

GHG Reporting Guidance for the Aerospace Industry

A Supplement to the GHG Protocol Corporate
(Scope 1 and 2) and Value Chain (Scope 3)
Accounting and Reporting Standards

International Aerospace Environmental Group – Work Group 3

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A. INTENT

The purpose of this document is to provide voluntary supplemental guidance for accounting and reporting greenhouse gas (GHG) emissions across the aerospace industry to encourage voluntary reporting of corporate GHG emissions by aerospace companies. This industry specific guidance document was developed by the International Aerospace Environmental Group – Work Group 3 and is a supplement to the 2004 GHG Protocol Corporate Accounting and Reporting Standard (The Corporate Standard), the 2015 GHG Protocol Scope 2 Guidance as well as the 2011 Corporate Value Chain (Scope 3) Accounting and Reporting Standard (The Scope 3 Standard), managed jointly by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

B. INTRODUCTION

The complexity and variability of information and requirements has led to an increased burden and substantial costs for the aerospace value chain. The International Aerospace Environmental Group (IAEG), a non-profit corporation comprised of a global group of [aerospace companies](#), was established to help develop understanding amongst the aerospace industry of environmental requirements faced by the world's value chain. IAEG has set up a dedicated Work Group (WG) to address the issue of greenhouse gas accounting and reporting by developing a voluntary consensus standard to be used by aerospace companies.

This document, known as GHG Reporting Guidance for the Aerospace Industry has been approved by IAEG Board of Directors and has been developed through partnership with World Resources Institute in order to ensure alignment with The Corporate Standard, the Scope 2 Guidance and the Scope 3 Standard.

The term “shall” is used in this document to indicate what is required in order for a GHG inventory to be in conformance with the GHG Reporting Guidance for the Aerospace Industry; it does not convey a statutory requirement. The term “should” is used to indicate a recommendation, but not a requirement.

Measurement of GHGs is the first step in making emission reductions. It enables the identification of the most carbon intensive activities, as well as the determination of drivers for potential reductions. WG3's objective is to promote the harmonisation of practices within the aerospace sector by: setting up a common framework of rules and methodologies; using common databases; having consistent vocabulary; and, issuing relevant recommendations. Reporting on the environmental performance of the sector will also be eased and made consistent.

This document is designed to work in conjunction with The Corporate Standard, the Scope 2 Guidance and the Scope 3 Standard by offering supplemental guidance that is

specific to the aerospace industry. It lists all of the requirements and guidance to follow in order to conform to this sector specific method for GHG emissions accounting and reporting. Please note that this document is not intended to replace or supplant any laws or regulations.

C. APPLICABILITY

This supplemental, voluntary GHG guidance document applies to all aerospace companies worldwide as defined herein, including: the aerospace business' operations, as well as joint ventures, subsidiaries or other business arrangements where, by contract, the business maintains control. **Companies shall consolidate GHG emissions for the identified scopes noted above, using the Operational Control approach as defined in The Corporate Standard.**ⁱ [*Control: The ability of a company to direct the policies of another operation. Within the realm of GHG reporting, control is defined as either operational control (the organization or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation) or financial control (the organization has the ability to direct the financial and operating policies of the operation with a view to gaining economic benefits from its activities)*]ⁱⁱ

D. SCOPE 1 AND 2 EMISSIONS

Aerospace businesses will report GHG emissions consistent with The Corporate Standard, the Scope 2 Guidance and this supplemental guidance. In the event that this guidance document conflicts with a mandatory, regulatory required GHG reporting methodology, the aerospace business will report in adherence to the mandatory, regulatory requirements.

All Scope 1 and all Scope 2 emissions shall be included in the GHG emissions inventory reporting.

Unless otherwise stated, reporters shall utilize the operational control approach to define their organization boundary. The accounting and reporting requirements apply to all operations within the organization boundary. This requirement applies to both wholly owned and leased facilities. It also applies to majority owned, operationally controlled joint ventures and subsidiaries of the company.

Chart 1 illustrates the reporting boundary to be used by aerospace industry companies and suppliers. **In short, companies shall report GHG emissions for all leased buildings for which the company directly pays the utility bills. In the event that the utility bills are a part of the rent and not independently available, an estimation of GHG emissions shall be derived consistent with the guidance identified in The Corporate Standard. Where utility data is directly available, the company shall report them.**

If a company subleases out part of or a whole site or operation, and the sublessee is not within the company’s operational control, the company is not required to report GHG emissions. If a company subleases out a part of or a whole site or operation, and the sublessee is within the company’s operational control, the company is required to report 100% of the sublessee’s GHG emissions.

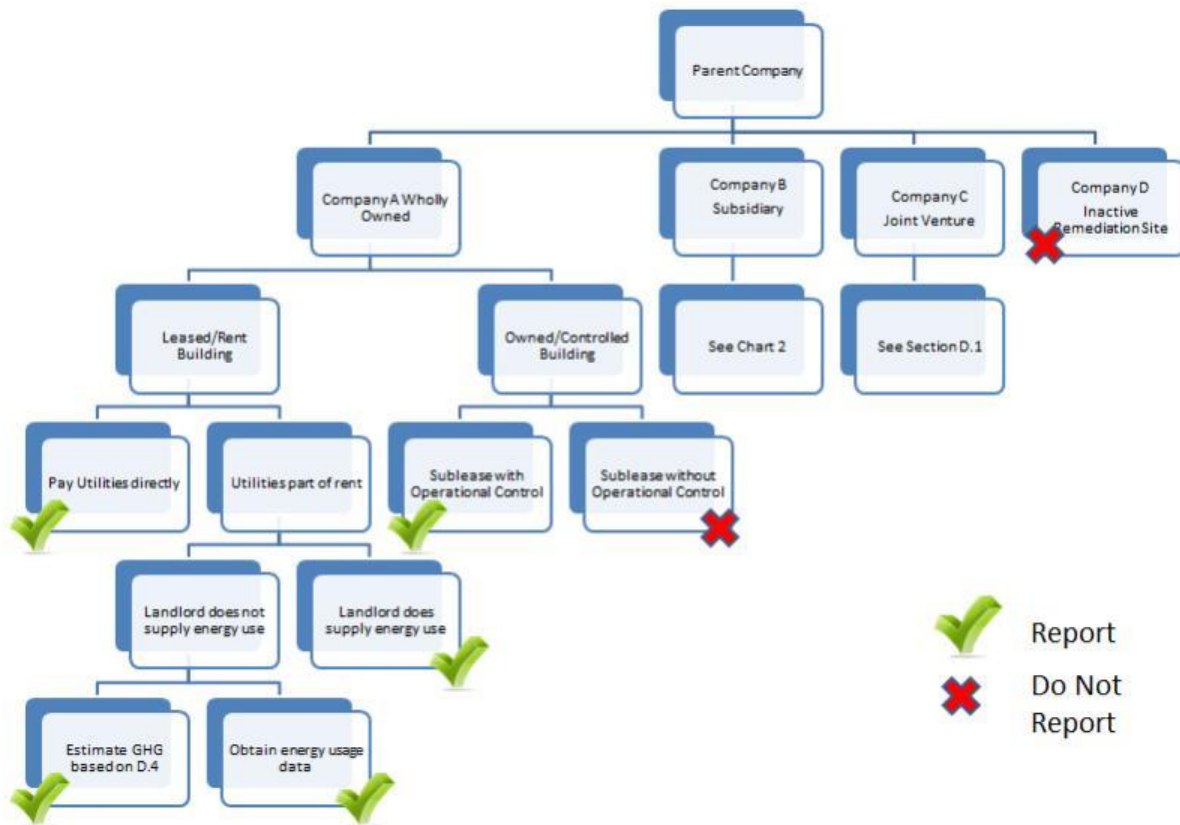


Chart 1- Reporting Guidance

D.1 - Joint Ventures

As defined in The Corporate Standard, “under the operational control approach, a company accounts for 100% of emissions from operations over which it or one of its subsidiaries has operational control”ⁱⁱⁱ. Operational control means that a company has the authority to introduce and implement its operating policies.

Reporting of emissions for Joint Ventures shall be done using the same operational control approach, where any Joint Venture (JV) that the company has

operational control of, shall be included in that company’s corporate inventory. Companies shall report 100% of the emissions from each JV where operational control is exhibited.

For JVs for which the company does not have operational control, the company is not required to report, but can encourage that JV to measure and report their own emissions.

D.2 - Subsidiaries

Following the operational control approach, subsidiaries under the aerospace business’ operational control shall report 100% of the subsidiaries’ GHG emissions. The operational control is not necessarily linked to the equity share. Indeed only two solutions exist under this approach:

- 1) The parent company has operational control of its subsidiary:
 - ➔ **100%** of the GHG emitted by the subsidiary has to be accounted for and reported by the parent company.
- 2) The parent company does not have operational control of its subsidiary:
 - ➔ The parent company accounts for and reports **none** of the GHG emitted by the subsidiary.

Chart 2 has been established to better understand how to account for and report GHG emissions emitted by subsidiaries.

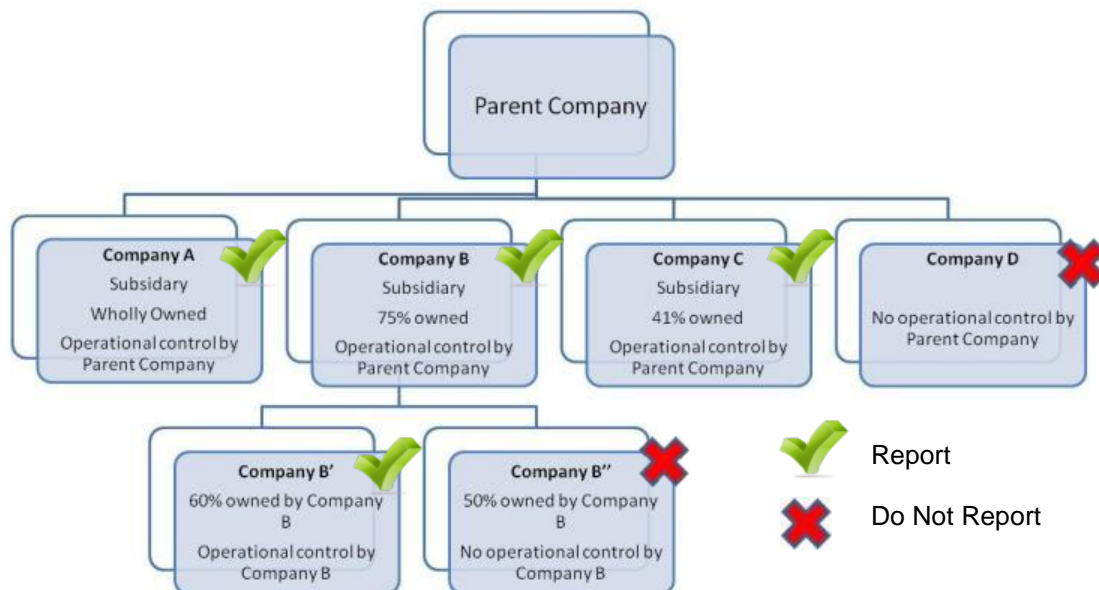


Chart 2 - Subsidiary Reporting

D.3 – Remediation Sites

Owned facilities that are not occupied by employees and where environmental remediation activities are underway in compliance with national, state, local, judicial or international regulations are considered *outside the operational control* of the company and therefore, not subject to GHG reporting requirements.

Where remediation activities are underway at a site or facility where the company has active business operations other than remediation activity, the site or facility is considered *within operational control* and therefore, subject to greenhouse gas reporting requirements.

D.4 – Relevance Thresholds

It is recommended that aerospace companies strive to report their entire emissions inventory. If necessary the following recommendations may be used to inform the relevance threshold for reporting such that the combined impact of non-reported emissions is not significant.

We encourage aerospace businesses to include in their inventory the GHG emissions of a facility when it meets one or more of the following thresholds:

- Number of FTEs^{iv} or Employees^v:
 - Industrial activities: 50 or more, or
 - Other facilities such as Warehouses, Offices: 100 or more
- Square feet/meters: 50,000 square feet or 4,600 square meters or more, or
- Annual spend (USD\$) on energy^{vi}: \$100,000 USD or more.

Where a facility is determined to be below the noted thresholds and excluded from a company's reported GHG emissions, the company shall identify, in as much detail as possible, those facilities and disclose this information and the reason for exclusion in the company's report.

D.5 – Scope 2 Accounting Methods

Aerospace companies shall account for all Scope 2 emissions in accordance with the Greenhouse Gas Protocol Corporate Standard, referring to the Scope 2 Guidance for further detail about the reporting requirements. Aerospace companies should take into consideration the following additional guidance when conforming to the Corporate Standard:

D.5.a – Location-Based Accounting Method: Companies shall report their scope 2 location-based emissions according to the Scope 2 Guidance, with location-based emissions accounting methods as a minimum. Companies that

have goals or targets around operational efficiency and/or facility energy reductions should use this Scope 2 methodology to describe their reductions, as well as describe changes to the grid mix of electrical generation sources.

D.5.b – Market-Based Accounting Method: Companies shall also report their scope 2 market- based emissions according to the Scope 2 Guidance if their operations are located in competitive electricity markets^{vii} or purchase renewable energy in the form of Renewable Energy Certificates, or similar instruments.

Market-based emissions accounting is required even if the company chooses not to participate in competitive electricity markets or utilize renewable energy or similar instruments available for purchase in that location. If no such products have been purchased, companies are required to use grid-average (location-based) emissions factors to account for consumption under the market-based approach, and report these emissions as market-based. This method best reflects performance towards GHG reduction goals due to the procurement of low- or no-carbon power sources available in some energy markets, such as renewable or alternative energy sourcing.

D.6 – Fuel Type Definitions

For purposes of reporting, fuel types shall be aligned with the most recent version of [CDP's \(formally known as the Carbon Disclosure Project's\) Fuel Definitions^{viii}](#), with the exception of biofuel which is defined as fuel composed of or produced from biological raw materials^{ix}.

Carbon dioxide emissions from biomass and biofuels should be included in the company GHG inventory, but reported separately from the Scopes, in accordance with the GHG Protocol. **Methane and nitrous oxide emissions from direct use of biomass and biofuels shall be included in Scope 1 emissions. Methane and nitrous oxide emissions from indirect use of biomass and biofuels, such as purchased electricity, heat, steam and cooling, shall be included in Scope 2 emissions.**

D.7 – Emission Factors

There are a variety of emission factor guidelines available for reporting for Scope 1 and Scope 2 emissions, including voluntary and regulatory. **The company shall document the source of the emission factors they used.** Companies should utilize the most current emissions factors as updates are provided from their emissions factor sources.

D.7.a - Scope 1 emission factors are defined by fuel-type and the form of combustion. Fuel-type (e.g. gasoline, diesel, and jet fuel) determines carbon dioxide (CO₂) emissions, while the form of combustion determines methane (CH₄) and nitrous oxide (N₂O) emissions. Some emissions factors may be specific to vehicle type, such as light-

duty or heavy-duty road vehicles. The volume of fuel consumed (for example, gallons of gasoline) or miles traveled are needed to calculate the equivalent emissions.

There are many recognized sources for Scope 1 emission factors, including but not limited to:

- Factors defined by government law or agencies, as applicable (for example U.S. Environmental Protection Agency (US EPA) eHub, United Kingdom (UK) DEFRA, ADEME Base Carbone® (FR))
- Voluntary factors, including:
 - GHG Protocol calculation tools (i.e., Cross Sector Tools etc.)
 - IPCC
 - CDP cross sector tool
 - International Energy Agency
 - United Nations Environment Programme (UNEP)
 - US DOE Federal Energy Management Program's (FEMP) Annual GHG and Sustainability Data Report
 - The Climate Registry

D.7.b - Scope 2 emission factors are defined based on the type of accounting methodology – location-based or market-based.

D.7.b.1 - Location-based emission factors are determined by geography and the fuel mix of the local electricity grid. Location-based emission factors vary in terms of scale. Location-based emission factors could be published for an entire country, region, province/state, city, or zip code/postal code. In general, emission factors for the zip code scale are considered more accurate than average country-level emission factors. Aerospace companies are encouraged to use local or regional government factors instead of national factors where available

There are many recognized sources for location-based Scope 2 emission factors, including but not limited to:

- Factors defined by government law or agencies, as applicable (for example U.S. Environmental Protection Agency (US EPA) eGRID, United Kingdom (UK) DEFRA, ADEME Base Carbone® (FR), The Climate Registry)

D.7.b.2 - Market-based emission factors are determined by energy procurement decisions purposefully made by the reporting entity. Market-based emission factors have a hierarchy of preference (Chart 3) which reflects the most precise emission factors to the least precise. Each unit of electricity consumption should be accounted for based on the availability or appropriateness of the emission factor applied by the instrument(s) below. The reporting entity's market-based emissions inventory may include units of electricity accounted for with any or all of the below market-based emission factor instruments. Companies should attempt to capture as much data in the market-based Scope 2 inventory at the higher levels of the hierarchy before proceeding to the next level.

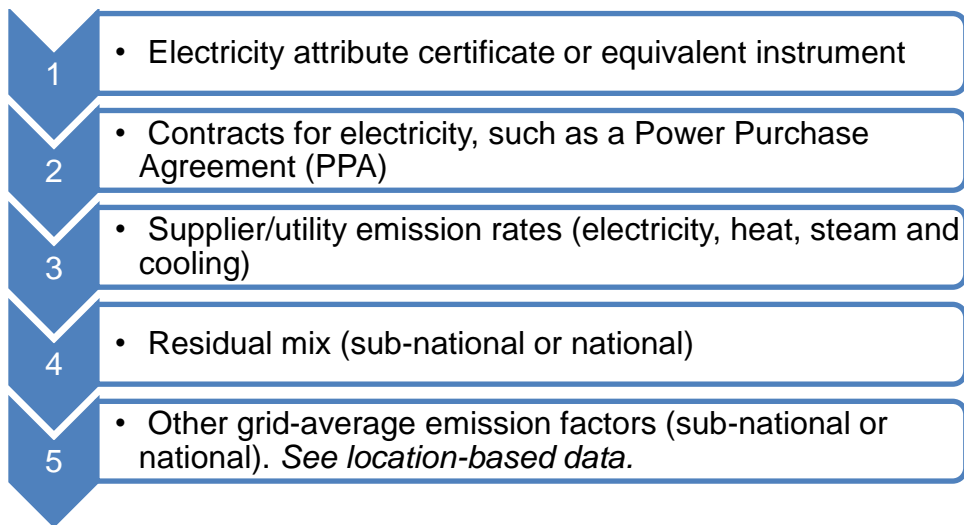


Chart 3 – Market-Based emissions hierarchy of preference

Aerospace companies should refer to the Scope 2 Guidance for definitions of the quality criteria. For levels 1, 2 and 3 companies should choose emissions factors which have a robust calculation methodology and are audited by an independent verification body for quality and accuracy. For level 4, residual mix factors are not widely available for all countries. For level 5, companies should refer to location-based guidance above.

Energy attribute certificates such as Renewable Energy Certificates (RECs), Guarantees of Origin (GOs), or other market-based instruments sourced directly by the reporting entity should meet the Scope 2 Quality Criteria as described in the Scope 2 Guidance. Accounting and reporting/disclosing requirements can also be found in the Scope 2 Guidance.

D.8 – Base Year Adjustments

The aerospace company shall establish a base year, with an effort to achieve downward trends of GHG emissions in subsequent years. The company shall develop and maintain a written process by which they adjust base year GHG emissions to account for, at a minimum:

- Mergers, acquisitions, and divestitures
- Improved accuracy of GHG emissions data (e.g., actual data becomes available where estimated data was only previously available, updated emissions factors)
- Changes in GHG emissions calculation methodology(ies)

Companies shall recalculate and disclose the reasons for adjustment of their base year GHG emissions in a manner consistent with The Corporate Standard.

D.9 - Uncertainty

If the level of uncertainty is reported, it is recommended to use the GHG Protocol Guidance on Uncertainty Assessment in GHG Inventories and Calculating Statistical Parameter Uncertainty^x. If another tool is used, the calculation methodology and expert judgment/assumption should be documented.

There are varieties of uncertainty range resources available, including voluntary and regulatory. The following sources are acceptable:

- Factors defined by government law or agencies, as applicable
 - E.g., Australian National Greenhouse and Energy Reporting (Measurement) Determination 2008, European Union (EU) ETS The Monitoring and Reporting Regulation –Guidance on Uncertainty Assessment, IPCC, etc., guidelines.
 - Note: aerospace companies are encouraged to use local or regional government uncertainty factors instead of national factors where available
- Voluntary factors, including:
 - GHG Protocol Guidance on Uncertainty Assessment in GHG Inventories and Calculating Statistical Parameter Uncertainty (most recent version)
 - Note: documentation should be maintained as objective evidence

D.10 - Carbon Offsets^{xi}

Aerospace companies that purchase voluntary carbon offsets should disclose the following information in their GHG inventory report. Carbon offsets are considered avoided emissions rather than emissions generated at a low- or no-carbon emission factor; thus carbon offsets should be accounted for separately from the scopes (scope 1, 2 and 3). Carbon offset accounting shall be guided by the six principles of project-based GHG accounting as per the [GHG Protocol for Project Accounting](#) and shall include all primary effects and significant secondary effects. Typically corporate purchasers will source carbon offset credits through a third party which has certified GHG project carbon offset activities through a verification standard.

Required:

- The quantity of offsets purchased and retired (Metric Tonnes)
- Verification standard(s)
- Volume(s) of offsets purchased that are in the Voluntary and Regulated Markets

Optional but encouraged:

- Corporate goals related to offset purchases
- Type/Category and location of the carbon offset project(s)

- The relative change in quantity purchased in the reporting year compared to the previous year

E. SCOPE 3 EMISSIONS

This section provides more detailed guidance to account for select Scope 3 emissions categories defined by the [Corporate Value Chain \(Scope 3\) Accounting and Reporting Standard](#) for the Aerospace Industry. Guidance on additional categories may be added over time. Each company should assess which Scope 3 categories are relevant to their business and use the following guidance when applicable.

Within the aerospace industry, developing a Scope 3 emissions inventory can be significantly more challenging than accounting for Scope 1 and 2 emissions; however, accounting for Scope 3 emissions provides a more comprehensive view of a company's GHG impacts throughout its entire value chain. Accounting for Scope 3 emissions should only be attempted by aerospace companies once Scope 1 and Scope 2 emissions accounting processes are established.

A materiality assessment has been conducted for all scope 3 categories by IAEG Work Group 3. This assessment is based on the criteria defined in The GHG Protocol Corporate Value Chain Accounting and Reporting Standard, which includes size, influence, risk and stakeholders. Each scope 3 category is scored numerically against each criteria to determine the relevancy of each scope 3 category to the Aerospace Industry. Recognizing the diversity in aerospace products, Work Group 3 conducted the assessment at a sub-industry level. The aerospace sub-industries included in this assessment are final assembly, electrical components, software, engines, structural components, and interiors. The Assessment result for each category is shown in Table 1, Scope 3 Categories Overview, Relevancy column.

Among the fifteen scope 3 categories, one is deemed to be relevant and six are potentially relevant to most aerospace companies. Companies using this guidance should review all fifteen categories of Scope 3 emissions and determine relevance of each category to their business while disclosing and justifying exclusions. Supplemental guidance for four categories has been provided. For relevant Scope 3 categories where supplemental guidance is not provided in this document, aerospace companies should refer to the GHG Protocol Scope 3 Standard, Scope 3 Calculation Guidance, and WRI-supported assessment tools to account for emissions.

Table 1. Scope 3 Categories Overview

No.	Scope 3 Category	Relevancy	Supplementary Guidance Provided	Comments
1	Purchased Goods and Services	Potentially relevant	No	Supplemental guidance is in development by IAEG Work Group 3, and not yet provided.
2	Capital Goods	Potentially relevant	No	Supplemental guidance is in development by IAEG Work Group 3, and not yet provided.
3	Energy and Fuel Related Activities	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.
4	Upstream Transportation and Distribution	Potentially relevant	Yes	Please refer to the guidance below.
5	Waste Generated in Operations	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.
6	Business Travel	Potentially relevant	Yes	Please refer to the guidance below.
7	Employee Commuting	Potentially relevant	Yes	Please refer to the guidance below.
8	Upstream Leased Assets	Not relevant	No	Supplemental guidance is not provided for this category because it is deemed to be not relevant to most aerospace companies.
9	Downstream Transportation and Distribution	Potentially relevant	Yes	Please refer to the guidance below.
10	Processing of Sold Products	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.
11	Use of Sold Products	Relevant	No	Supplemental guidance is not provided for this Category due to diverse product portfolios, each of which has a different GHG emissions profile. Companies should refer to the GHG Protocol Scope 3 Standard, Scope 3 Calculation Guidance, and WRI-supported assessment tools to account for emissions.
12	End of Life Treatment of Sold Products	Potentially relevant	No	Supplemental guidance is not provided for this Category due to diverse product portfolios, each of which has a different GHG emissions profile. Companies should refer to the GHG Protocol Scope 3 Standard, Scope 3 Calculation Guidance, and WRI-supported assessment tools to account for emissions.
13	Downstream Leased Assets	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.
14	Franchises	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.
15	Investments	Not relevant	No	Supplemental guidance is not provided for this Category because it is deemed to be not relevant to most aerospace companies.

E.1 - Category 6: Business Travel

A Business Travel GHG inventory shall include business travel emissions from the following emissions sources where each mode of transportation is applicable:

- **air travel**
- **rental car**
- **bus travel**
- **rail travel**

Where data is available, companies should include emissions associated with hotel nights in business travel.

The calculation methodology should be based on WRI Scope 3 Calculation Guidance, Category 6 – Business Travel.

Reporting of these emission sources should be prioritized based on the relevance and significance of each source to the reporting company's Scope 3 – Business Travel emissions. This guidance defines a source as significant if it represents 5 percent or more of total business travel emissions.

Other calculation resources include:

- GHG Protocol Calculation Tools, developed by World Resources Institute, available at: <http://www.ghgprotocol.org/calculation-tools/all-tools>
- International Civil Aviation Organization (ICAO) Carbon Emissions Calculator available at: <https://www.icao.int/environmental-protection/Carbonoffset/Pages/default.aspx>
- For UK organizations, the Department for Transport provides guidance and a calculation tool for work-related travel, available at: <https://www.gov.uk/guidance/measuring-and-reporting-environmental-impacts-guidance-for-businesses>
- U.S. EPA Center for Corporate Leadership provides business travel emissions factors on the Emission Factors Hub available at: <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub>

E.2 - Category 7: Employee Commuting

An Employee Commuting GHG inventory shall include emissions related to employees commuting between their home and assigned work locations. For purposes of accounting, contractors receiving day-to-day direction by the reporting company or representative of the reporting company and/or in reporting company payroll are in-scope for Employee Commuting-related emissions. Examples of emission sources from employee commuting may include:

Public:

- rail travel
- bus travel
- air travel
- boat travel
- other modes of public transportation

Private:

- personally-owned automobiles

It is the experience of IAEG member companies that personally owned automobiles, public rail and public buses are the most common and significant contributors to Employee Commuting emissions. Conversely, accounting for emissions from telecommuting are not recommended. However, if a reporting company includes these emissions in their Scope 3 GHG inventory, the methodology should be disclosed.

Reporting of these emission sources should be prioritized based on the relevance and significance of each source to the reporting company's total employee commuting emissions. This guidance defines a source as significant if it represents 5 percent or more of total employee commuting emissions.

Employee commuting does NOT include emissions associated with:

Description	GHG Scope/Category
Employees traveling between worksites	Scope 3 – Business Travel
Employees traveling to/from customer or project locations	Scope 3 – Business Travel
Employees traveling in company-owned vehicles	Scope 1
Employees traveling in company-leased vehicles	Scope 1 ^{xii}

The calculation methodology shall be based on WRI Scope 3 Calculation Guidance, Category 7: Employee Commuting. All modes of transportation included should use actual emissions/mileage data where possible. Where actual emissions and/or distance travelled data are not available, reasonable estimates may be used to supplement emissions in this category. Companies are encouraged to apply consistent calculation methodology year-over-year until such time that actual data are available. A common method used to estimate employee commuting emissions is to use data from Human Resources and/or employee surveys related to mode of transportation, daily/average distance travelled, and automobile type (if applicable).

E.3 - Categories 4 & 9: Upstream and Downstream Transportation & Distribution

Upstream and Downstream Transportation GHG inventories shall include transportation- and distribution-related emissions. Within the aerospace industry, the distinction between Upstream Transportation & Distribution (Category 4) and Downstream Transportation & Distribution (Category 9) emissions is not always clear. This section is intended to provide clarification to enable consistent industry-wide reporting for these two categories.

The boundary between upstream and downstream for Scope 3 GHG accounting and reporting is different than conventional value stream or life cycle models. Table 5.7, *Accounting for emissions from transportation and distribution activities in the value chain*, in The Corporate Value Chain (Scope 3) Accounting & Reporting Standard outlines the association of Transportation & Distribution activities to the appropriate Scope or Scope 3 category.

Aerospace Transportation & Distribution Scenarios

These scenarios illustrate aerospace industry-specific situations as a rationale for determination of the applicability of these categories:

Scenario A: Delivery/Shipping is Incurred by Manufacturer

This scenario is common in the aerospace industry. Company A sells an aircraft component to Company B. Company A offers a final all-inclusive price with an agreement to deliver the final product as part of this total price.

- Since Company A is paying for the shipment, they account for the shipment in their Category 4 (**Upstream**).
- Company B accounts for these emissions in their Category 1 (Purchased Goods and Services).

Scenario B: Final Delivery of Aircraft

In the event that the product is an aircraft, if the final contract delivery point is the final production facility and the customer picks up the aircraft and flies it offsite, Scope 3 emissions accounting is not applicable.

- It is assumed that the manufacturer either charges or gifts the initial fuel fill to the customer. The emissions from this initial fuel fill are not considered part of the manufacturing company's direct emissions since the aircraft is no longer the property of or in the possession of the reporting company.
- As soon as the customer receives delivery of the aircraft, emissions from the aircraft are Scope 1 emissions for the customer and Category 11 (Use of sold products) for the manufacturer, if the manufacturer chooses to report on this category.

Scenario C: Final Delivery/Shipping Billed to Customer

This scenario is not common in the aerospace industry: Company A sells an aircraft component to Company B. Company A submits an invoice to Company B specifically for delivery of the aircraft component.

- Company A accounts for shipping emissions in their Category 9 (**Downstream**) because Company A did not pay for the shipping.
- Company B would account for these same emissions in their Category 4 (Upstream) because Company B paid for the transportation.

E.3.a - Upstream Transportation & Distribution (Category 4)

An upstream Transportation & Distribution GHG inventory shall include services purchased by the reporting company. This includes emissions from vehicles and facilities not owned or controlled by the reporting company. It excludes emissions from owned or controlled vehicles or facilities, which are included in a reporting company's Scope 1 emissions.

Examples of emission sources that fall within Category 4 – Upstream Transportation & Distribution, include in-bound and out-bound logistics. For example:

- Transportation & Distribution of goods by a third-party purchased by the reporting company between Tier 1 suppliers and its own operations
- Transportation & Distribution between a company's own facilities using third-party vehicles
- Delivery of final product(s) to the customer (where the reporting company pays for delivery)

The calculation methodology should be based on the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Category 4 – Upstream Transportation and Distribution.

E.3.b - Downstream Transportation & Distribution (Category 9)

Evidenced in the Transportation & Distribution Scenarios, and reinforced by the applicability defined in the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, emissions associated with Downstream Transportation & Distribution are not typically relevant to the aerospace industry. Category 9 only includes transportation- and distribution-related emissions that occur after the reporting company pays to produce and distribute its products.

F. INTENSITY METRICS

F.1 Introduction

An intensity metric is the ratio of GHG emissions and a business metric (common denominator) over time, also known as a normalized metric or intensity ratio. An example of an intensity metric is tonnes of carbon dioxide equivalent / US\$ million revenue. Examples of common denominators used in intensity metrics are annual revenue, annual hours worked, floor area, average number of employees during the year, and annual number of products delivered, amongst others.

In contrast, an absolute metric is a measure of GHG emissions over a period of time. An example of an absolute metric is: tonnes of carbon dioxide equivalent emitted per year. Absolute metrics show changes in GHG emissions over time without the context of changes in the reporting organization.

Intensity metrics can be used to monitor trends in GHG emissions over time, allowing for changes in the size and activities of an organization, for example, if a company grows or has substantial change of its operations.

Intensity metrics can also be used for measuring efficiency performance improvements and can show “decoupling” of emissions compared to growth in business.

Intensity and absolute metrics can be used as key performance indicators (KPIs) to drive internal improvements.

F.2 Limitations

The same intensity metric is not always suitable for use at every level of an organization. For example revenue may be appropriate to calculate intensity of GHG emissions at company level, but may not be appropriate at factory or department level depending upon the revenue calculation for that location.

Reporting intensity metrics alone, without also disclosing the absolute numerators and denominators, can lack the context needed for stakeholders to interpret the data correctly. For instance, significant changes in the denominator may potentially exaggerate improvement or mask growth in absolute emissions.

F.3 Recommendation(s) on when and which intensity metrics to use

At company level, aerospace companies should consider using a revenue, floor area or headcount based intensity metric as these are consistently disclosed and verified within the aerospace industry. As applicable, other intensity metrics may be used.

When disclosing intensity metrics, Aerospace companies should endeavor to align the chosen denominator to the reporting boundary of the GHG data in the numerator and disclose any adjustments made to a denominator, particularly where the denominator may conflict with other sources of publicly available information.

Intensity metrics should be reported alongside absolute metrics and the intensity metric should be explained with appropriate narrative to understand the drivers of performance.

F.4 Examples

Examples of advantages and limitations of specific intensity metrics:

	Absolute data (e.g. tCO ₂ e)	Revenue: (e.g. tCO ₂ e/£m)	Floor area: (e.g. tCO ₂ e/m ²)	Population: (e.g. tCO ₂ e/empl.)	Labour Hours: (e.g. tCO ₂ e/ hour)	Number of products made / sold
Advantages	<ul style="list-style-type: none"> •Can identify and target largest uses to improve •Relatively easy to obtain/track 	<ul style="list-style-type: none"> •Accounts for business growth/productivity changes •Based on audited values 	<ul style="list-style-type: none"> •Accounts for changing emissions associated with changes in size of real estate •Compare with external building benchmarks •Can be applied consistently at all levels (i.e. facilities) •Best correlated to scope 2 GHG emissions 	<ul style="list-style-type: none"> •Useful to raise awareness with employees •Can be applied consistently at all levels (i.e. facilities) 	<ul style="list-style-type: none"> •Ease of collection (used for safety) •Could allow for productivity comparison 	<ul style="list-style-type: none"> •Reflects level of activity that has generated the emissions •Easy to relate to for some stakeholders
Limitations	<ul style="list-style-type: none"> •Organic growth •Effects of production increase or decrease 	<ul style="list-style-type: none"> •Outsourcing (reduce emissions but maintain revenue) •Could achieve solely by rise in revenue •Potentially impacted by research and development 	<ul style="list-style-type: none"> •Does not correlate energy use with activity type or productivity •Data availability/assurance •Negatively impacted by consolidations 	<ul style="list-style-type: none"> •Growth/reduction of population may have little effect on emissions •Does not take into account work activity •Dynamic Workforce (contract labour) 	<ul style="list-style-type: none"> •Does not differentiate type of work performed •High degree of data sensitivity •Variation in hour calculation 	<ul style="list-style-type: none"> • Difficult or unsuitable for companies with multiple products or complex operations

G. CONCLUSION

There is an increased need to mitigate the anthropogenic contribution to global warming throughout the aerospace value chain. Measurement of GHGs is the first step in this process. It enables the identification of the most carbon intensive categories, as well as the determination of drivers for potential reductions. While this supplemental guidance provides more specificity within GHG accounting and reporting, aerospace companies are encouraged to expand their capabilities for GHG accounting and reporting, including Scope 3 emissions.

This document is designed to work in conjunction with The GHG Protocol Corporate (Scope 1 and 2) and Value Chain (Scope 3) Accounting and Reporting Standards by offering supplemental guidance that is specific to the aerospace industry. It lists all of the requirements and guidance to follow when establishing a sector specific GHG emissions reporting and management system for the aerospace value chain.

Therefore, this guidance document is intended to act as the next step in the aerospace industry's demonstration of its strong commitment to reduce its environmental footprint.

RECORD OF REVISIONS

Issue	Date	Summary and reasons for changes
1	4/2014	Initial release supplementing The Corporate Standard (published prior to 2015 Scope 2 amendment)
2	4/2016	Expanded Scope 3 guidance
3	5/2019	Added new requirement from the Scope 2 Guidance, Intensity Metrics, additional business air travel calculation method and updated Scope 3 Materiality Assessment Methodology.

ENDNOTES

ⁱ Greenhouse Gas Reporting Protocol Corporate Standard, Page 16

ⁱⁱ Greenhouse Gas Reporting Protocol Corporate Standard, Page 97

ⁱⁱⁱ Greenhouse Gas Reporting Protocol Corporate Standard, Page 20

^{iv} Fulltime Equivalent (FTE): is a calculation that includes fulltime, part time employees and directly supervised contractors. The ratio of the total number of paid hours during a period (part time, full time, contracted) by the number of working hours in that period Mondays through Fridays. The ratio units are FTE units or equivalent employees working full-time. In other words, one FTE is equivalent to one employee working full-time. (For example: You have three employees and they work 50 hours, 40 hours, and 10 hours per week – totaling 100 hours. Assuming the employer defines a full time work period of 40 hours and a full-time employee works 40 hours per week, your full time equivalent calculation is 100 hours divided by 40 hours, or 2.5 FTE).

^v In countries where the term “employee” is specifically defined by regulation, the legal definition of the term is to be used.

^{vi} Annual Spend on Energy: annual spend on energy for Scope 1 sources and annual spend on Scope 2 purchased electricity, heat or steam.

^{vii} Competitive markets are defined as the markets providing consumer choice of differentiated electricity products or supplier-specific data, in the form of contractual instruments by GHG Protocol Scope 2 Guidance, page 28.

^{viii} See: <https://www.cdp.net/Documents/Guidance/2014/cdp-fuel-definitions-2014.pdf>

^{ix} Note: Distillate Fuel Oil (#1, 2, and 4) is also known as light fuel, light fuel oil, and distillate fuel or in France as domestic fuel. Fuel Oil (#5 and 6) is also known as heavy fuel oil or residual fuel oil. Motor Gasoline is also known as petrol.

^x See: <http://www.ghgprotocol.org/files/ghgp/tools/ghg-uncertainty.pdf>

^{xi} This section will be replaced with a reference to WRI’s Scope 2 Standard

^{xii} Leased assets should be included in Scope 1 emissions in accordance with the operational control boundary as recommended in section C of the GHG Reporting Guidance for the aerospace industry