Gold Standard for the Global Goals

Climate Security & Sustainable Development

METHODOLOGY TOOL

GS4GG A6 400 MT 002

SDG 13

EMISSIONS FROM FREIGHT TRANSPORT

Publication Date: 05/09/2025

Version: 1.0

Next Planned Update: 05/09/2028

SUMMARY

This document, Methodology Tool 2 (herein referred to as Tool 2), details methods and requirements for calculating greenhouse gas (GHG) emissions associated with the transportation of goods and materials (freight). Tool 2 is currently applicable to freight transport via road vehicles and/or rail but may be adapted to include additional means of transportation, such as shipping and pipelines. Tool 2 provides three options for estimating emissions:

- **Option 1** – Direct measurement of fuel consumption
- **Option 2** – Direct measurement of fuel consumption by vehicle type and emission control technology
- **Option 3** – Direct measurement of the distance travelled, referred to as the tonne-kilometre (km) method (Tier 3)

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1| KEY INFORMATION

Tool summary	Tool 2 can be used to calculate GHG emissions associated with the transportation of goods and materials (freight).
Applicable mitigation type	☒ Emission reduction ☒ GHG removal
Applicable activity scale	☒ Micro scale (e.g., ≤10,000 tCO_2e per year) ☒ Small scale (e.g., ≤60,000 tCO_2e per year) ☒ Large scale (e.g., >60,000 tCO_2e per year)
Applicable methodologies	Tool 2 is applicable to methodologies which involve transport activities.
Limitations	Tool 2 is currently applicable to road vehicles and/or rail but may be adapted to include additional means of transportation, such as ships.

2| APPLICABILITY CONDITIONS

2.1.1 | Tool 2 shall be used in conjunction with a Gold Standard-approved methodology(ies) and shall not be applied to quantify emission reductions in isolation.

2.1.2 | Tool 2 is applicable to activities in which transportation is not the primary activity nor the main source of GHG emissions for the activity.[1] Tool 2 does not provide procedures to estimate baseline emissions from transportation activities.

2.1.3 | Activities that apply Tool 2 shall specify the transport activity to which Tool 2 is being applied.

2.1.4 | Tool 2 is currently applicable to road vehicles and/or rail but may be adapted to include additional means of transportation, such as ships.

3| SOURCES AND REFERENCES

3.1.1 | Tool 2 refers to the latest approved versions of the following methodologies, tools, and documents:

A. Gold Standard:

i. Principles & Requirements

ii. Safeguarding Principles & Requirements

iii. Methodology Tool 1: Emissions from Fossil Fuel Combustion

[1] This applicability condition is to ensure that transport-related emissions are small relative to the expected total emission reductions and, for this reason, enables the use of a simplified approach to estimate activity or leakage emissions from transportation of freight.

B. Other sources:

i. Clean Development Mechanism (CDM) Tool 12: Project and leakage emissions from transportation of freight

ii. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 (Energy) Chapter 3: Mobile Combustion

iii. Les émissions de CO_2 par les poids lourds français entre 1996 et 2006 ont augmenté moins vite que les volumes transportés, published on 09/22/2009

4| DEFINITIONS

4.1.1 | The definitions outlined in the Glossary of GS4GG shall apply in addition to those outlined below.

Table 1. Terms and Definitions

TERM	DEFINITION
Freight	Goods/materials that are transported in bulk. This can include, but is not limited to, biomass and captured CO_2.
Freight transportation activity	Trips undertaken within the activity that shall be grouped together when the vehicles are of the same vehicle class and are used to transport a specific freight between the same origin and destination.
Gross vehicle mass (GVM)	The maximum on-road mass of the fully loaded vehicle, including the vehicle mass and the mass of the load (i.e., the freight) that the vehicle is permitted to carry according to its design specifications.
Internal combustion engine vehicle	A vehicle that is powered by a regular internal combustion engine, in which fuel (e.g., gasoline, diesel, natural gas, or biofuel) combusts to generate power for propulsion. For the purpose of Tool 2, the vehicle is not required to exclusively transport freight associated with the activity and may also be used to transport other freight beyond the activity boundary. However, the vehicle shall be designed for freight transport only, not for passenger transportation.
Vehicle class	Tool 2 defines two classes of vehicle based on the GVM: i. Heavy vehicles with a GVM greater than 26 tonnes ii. Light vehicles with a GVM less than or equal to 26 tonnes Tool 2 provides default values for these two vehicle classes. Activity developers may add vehicle classes or use a different vehicle classification system, if necessary. The application of a new vehicle class shall be justified, and the corresponding emission factors shall be determined according to the requirements and guidelines provided in Tool 2.

5| TOOL SCOPE AND BOUNDARY

5.1 | Activity Scope

5.1.1 | Tool 2 provides methods to calculate activity and/or leakage emissions resulting from freight transport.

5.2 | Activity Boundary

5.2.1 | The activity boundary shall be defined as specified in the applied methodology. Tool 2 shall cover gate-to-gate transport, i.e., the transport of freight from origin to end destination.

6| BASELINE EMISSIONS/REMOVALS

6.1.1 | Tool 2 does not apply to baseline emissions and/or removals.

7| ACTIVITY REMOVALS

7.1.1 | Tool 2 does not apply to activity removals.

8| ACTIVITY EMISSIONS

8.1 | Calculation of Total Emissions

8.1.1 | The activity emissions in monitoring period y from transport ($\mathrm{AE}_{\mathrm{trans,y}}$) include all transportation activities associated with the project activity, i.e., the transportation of a specific freight m (e.g., feedstock, raw freight, byproduct etc.) via the transportation mode j (e.g., rail, road). Hence, emissions shall be calculated as follows:

$$\mathrm{AE}_{\mathrm{trans,y}} = \sum_{m.y} \mathrm{AE}_{\mathrm{trans,m,y}} \quad (1)$$

Where:			Parameter ID/section
$\mathrm{AE}_{\mathrm{trans,y}}$	=	Activity emissions in monitoring period *y* (tCO_2e)	N/A
y	=	The monitoring period (year)	N/A
m	=	Specific freight (e.g., feedstock, raw freight, byproduct etc.)	N/A
$\mathrm{AE}_{\mathrm{trans,m,y}}$	=	Activity emissions from transportation of freight *m* in monitoring period *y* (tCO_2e)	Sections 9.2, 9.3, and 9.4

8.1.2 | Tool 2 provides three options for calculating emissions related to the transportation of specific freights, $AE_{trans,m,y}$:

- **Option 1** – Direct measurement of fuel consumption
- **Option 2** – Direct measurement of fuel consumption by vehicle type and emission control technology
- **Option 3** – Direct measurement of the distance travelled, referred to as the tonne-km method

8.1.3 | An activity may use any combination of the three methods for calculating emissions. However, the selected method for determining emissions from the transportation of a specific freight shall remain consistent throughout the crediting period unless moving to a higher tier of measurement.

8.1.4 | For all options, the estimation of fuel consumption shall include both outbound and return trips for rail- or road-based transportation, even if one of the transportation activities is not associated with the project activity.

8.1.5 | If biofuels are used, the corresponding CO_2 emission factor of the fossil fuels that would most likely be used in the absence of biofuels shall be used.[2] If biofuel blends are consumed, the CO_2 emission factor of the fossil fuel used in the blend shall be used, as a conservative simplification.

8.1.6 | For **Options 1** and **2**, the monitoring plan shall document how data on fuel consumption is collected and checked. For each transportation activity, the monitoring reports shall contain information on the origin and destination and the number of trips conducted.

8.1.7 | Under **Options 1, 2,** and **3,** the following data shall be monitored separately for each freight transportation activity to estimate the emissions:

a. The type of freight transported
b. The origin and destination of the freight transported
c. The vehicle class used, if the freight is transported by road

8.1.8 | In addition to the data listed above, under **Option 3**, the following data shall also be monitored:

a. The distance between the origin and the destination $(D_{m,b,c,d,y})$
b. The quantity of freight transported per vehicle class $(TM_{m,b,c,d,y})$

8.1.9 | The activity developer can add vehicle classes if necessary. The application of a new vehicle class shall be justified, and the corresponding emission factors shall be determined according to the requirements and guidelines provided in Tool 2. These shall be included as part of the project documentation, following the guidelines provided for this parameter in the monitoring section.

8.2 | Option 1: Calculation of $AE_{trans,m,y}$ via direct measurement of fuel consumption

8.2.1 | **Option 1** requires the direct monitoring of fuel consumption for the transportation of freight under the project activity.

8.2.2 | For **Option 1**, emissions shall be calculated as follows:

$$AE_{trans,m,y} = \sum_{m.y}[FC_{i,j,y}(EF_{i,y,CO2} + EF_{i,y,CH4} + EF_{i,y,N2O})] \quad (2)$$

Where:	Parameter ID/section

[2] The GHG emissions associated with the production of biofuels may vary and are methodologically challenging to estimate (see, for example, Methodology ACM0017: Production of biodiesel for use as fuel). Given that Tool 2 applies to cases where emissions from freight transportation are small relative to the overall emission reductions, this assumption is made to keep Tool 2 simple to apply. The emission factors shall be based on those fossil fuels that would most likely be used in the absence of the use of biofuels. For example, petrodiesel shall be assumed in the case of biodiesel, natural gas in the case of biogas, and gasoline in the case of ethanol.

i	=	Fuel type	N/A
j	=	Mode of transport	N/A
$FC_{i,j,y}$	=	Quantity of fuel type *i* combusted in transportation mode *j* during the monitoring period *y* (mass or volume unit/year)	Parameter 2
$EF_{i,y,CO2}$	=	Emission factor coefficient for CO_2 emissions resulting from fuel type *i,* used in transportation mode *j,* during monitoring period *y* (tCO_2/mass or volume unit)	Parameter 3
$EF_{i,y,CH4}$	=	Emission factor for CH_4 emissions resulting from fuel type *i,* used in transportation mode *j,* during monitoring period *y* (tCO_2e/mass or volume unit)	Parameter 4
$EF_{i,y,N2O}$	=	Emission factor for N_2O emissions resulting from fuel type *i,* used in transportation mode *j,* during monitoring period *y* (tCO_2e/mass or volume unit)	Parameter 5

8.3 | Option 2: Calculation of $AE_{trans,m,y}$ via direct measurement of fuel consumption by vehicle type and emission control technology

8.3.1 | **Option 2** requires the direct monitoring of fuel consumption for the transportation of freight under the project activity based on the vehicle type and the emission control technology, as applicable.

8.3.2 | For **Option 2**, emissions shall be calculated as follows:

$$AE_{trans,m,y} = \sum_{m,b,c,y} [FC_{i,b,c,y}(EF_{i,b,c,y,CO2} + EF_{i,b,c,y,CH4} + EF_{i,b,c,y,N2O})] \quad (3)$$

Where:			Parameter ID/section
b	=	Vehicle type	N/A
c	=	Emission control technology (such as uncontrolled, catalytic converter, etc.)	N/A
$FC_{i,j,b,c,y}$	=	Quantity of fuel type *i* consumed by vehicle type *b* with emission control technology *c*, during monitoring period *y* (mass or volume unit/yr)	Parameter 2
$EF_{i,b,c,y,CO2}$	=	Emission factor for CO_2 emissions resulting from fuel type *i,* used by vehicle type *b,* with emission control technology *c,* during monitoring period *y* (tCO_2/mass or volume unit)	Parameter 3
$EF_{i,b,c,y,CH4}$	=	Emission factor for CH_4 emissions resulting from fuel type *i,* used by vehicle type *b,* with emission control technology *c,* during	Parameter 4

		monitoring period *y* (tCO_2e/mass or volume unit)	
$EF_{i,b,c,y,N2O}$	=	Emission factor for N_2O emissions resulting from fuel type *i,* used by vehicle type *b,* with emission control technology *c,* during monitoring period *y* (tCO_2e/mass or volume unit)	Parameter 5

8.4 | Option 3: Calculation of $AE_{trans,m,y}$ via based on distance travelled (tonne-km method)

8.4.1 | **Option 3** relies on the monitoring of freight transportation activity details and conservative emission factors to estimate project emissions from road or rail transportation of freight.

8.4.2 | For **Option 3**, emissions shall be calculated as follows:

$$AE_{trans,m,y} = \sum_{m,y}[D_{m,b,c,d,y} \times TM_{m,b,c,d,y}(EF_{i,b,c,d,y,CO2} + EF_{i,b,c,d,y,CH4} + EF_{i,b,c,d,y,N2O})] \quad (4)$$

Where:			Parameter ID/section
d	=	Operating conditions (e.g., urban or rural road type, climate, or other environmental factors)	N/A
$D_{m,y}$	=	Return trip distance travelled for delivery of freight m in monitoring period y (km)	Parameter 6
$TM_{m,y}$	=	Total mass of freight m transported by vehicle in monitoring period y (tonne)	Parameter 7
$EF_{i,b,c,d,y,CO2}$	=	Emission factor for CO2 emissions resulting from fuel type i used by vehicle type b, with emission control technology c, in operating conditions d, during monitoring period y (tCO2/mass or volume unit)	Parameter 3
$EF_{i,b,c,d,y,CH4}$	=	Emission factor for CH4 emissions resulting from fuel type i used by vehicle type b, with emission control technology c, in operating conditions d, during monitoring period y (tCO2e/mass or volume unit)	Parameter 4
$EF_{i,b,c,d,y,N2O}$	=	Emission factor for N2O emissions resulting from fuel type i used by vehicle type b, with emission control technology c, in operating conditions d, during monitoring period y (tCO2e/mass or volume unit)	Parameter 5

9| LEAKAGE EMISSIONS

9.1.1 | Leakage emissions shall be covered using the same methods as outlined above for activity emissions, where required by the applied methodology.

10| QUANTIFICATION OF UNCERTAINTY

10.1.1 |Potential sources of uncertainty, along with the associated Quality Assurance/Quality Control (QA/QC) requirements to minimize them, are summarized in the Monitoring Methodology section.

10.1.2 |The uncertainties associated with the parameters shall be aggregated in the methodology into an overall uncertainty estimate for emission reductions. A 95% confidence interval shall be employed for quantifying uncertainty due to random errors, following the statistical approaches in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (propagation of errors method). When the uncertainty in the estimated value of emission reductions or removals is expected to be at a 95% confidence interval (within +/-10% range when applicable), the activity may exclude such random errors, while in the case of being outside +/-10% range at a 95% confidence interval, the activity shall address such random errors by deducting the emission reductions or removals accordingly. The uncertainty estimation and means of addressal shall be determined to the extent possible in the methodology, thereby simplifying or eliminating the associated procedure required from the activity.

11| MONITORING METHODOLOGY

11.1.1 |The activity developer shall describe and specify all monitoring procedures in the activity Project Design Document, including the types of measurement instrumentation used, the responsibilities for monitoring, and QA/QC procedures that will be applied. When the methodology provides different options (e.g., use of default values or on-site measurements), the activity developer shall specify which option will be used.

11.1.2 |Meters shall be installed, maintained, and calibrated according to equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., International Electrotechnical Commission [IEC], International Organization for Standardization [ISO]).

11.1.3 |All data collected for monitoring shall be archived electronically and kept for at least two years after the end of the last crediting period. Unless indicated otherwise in the tables below, 100% of the data shall be monitored.

11.1.4 |In addition to the details provided for below parameters, relevant provisions on data and parameters monitored in the GS4GG Tool 1: Tool emissions from fossil fuel combustion apply.

11.2 | Data and Parameters Not Monitored

Parameter ID	1
Data/Parameter:	$EF_{CO2,m}$
Description	The CO_2 emission factor for freight transportation activity based on weight and distance for vehicle type and class
Data unit:	g CO_2e/tonne-km or similar units
Equations referred:	Equation 4
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions
Value(s) applied	Tool 2 provides default values for the two vehicle classes, i.e., light and heavy. The activity developer can add vehicle classes if necessary. The application of a new vehicle class shall be justified, and the corresponding emission factors shall be determined according to the requirements and guidelines provided in Tool 2. These shall be included as part of the project documentation, following the guidelines provided for this parameter in the monitoring section. The below default values may be applied: a. Light vehicles – 245 g CO_2/t km a. Heavy vehicles – 129 g CO_2/t km
Source of data	☐ Measured ☒ Other source
Choice of data or measurement methods and procedures	The default CO_2 emission factors take into account emissions generated by loaded outbound trips and empty return trips. The default emission factors have been obtained from two sources: For light vehicles, the emission factor was obtained from empirical data from European vehicles.[3] b. For heavy vehicles, the emission factor was derived based on a custom-designed transient speed-time-gradient drive cycle (adapted from the international FIGE cycle), vehicle dimensional data, mathematical analysis of loading scenarios, and dynamic modelling based on engine power profiles, which in turn are a function of GVM, load factor, speed/acceleration profiles, and road gradient. The following assumptions on key parameters were made: an average driving speed of 30 km/h,

[3] Les émissions de CO_2 par les poids lourds français entre 1996 et 2006 ont augmenté moins vite que les volumes transportés, published on 22/09/2009

	an average gradient of 1%, and a load factor attained when biomass[4] is transported.
Comments:	Applicable to **Option 3**

11.3 | Data and Parameters Monitored

Parameter ID	**2**	
Data/Parameter	FC	
Description	Quantity of fuel type combusted	
Data unit	Mass or volume unit per time (e.g., tonnes/yr or m^3/yr)	
Equations referred	Equations 2 and 3	
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions	
Measurement methods and procedures	On-site measurements	
Entity/person responsible for the measurement	Activity developer, unless specified otherwise in the applied methodology	
Measuring instrument(s)	Type of instrument	Mass or volume meters In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: a. The ruler gauge shall be part of the daily tank, shall be calibrated at least once a year, and shall have a book of control for recording the measurements (on a daily basis or per shift). b. Accessories such as transducers and sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receive reasonable maintenance.
	Accuracy class	Not applicable
	Calibration requirements	Meters shall be installed, maintained, and calibrated according to equipment manufacturer instructions

[4] Biomass is the most commonly transported freight in existing CDM projects where transportation is not the main project activity. Due to a low bulk density of biomass, volumetric loading was used to derive the emission factor assuming that activity developer will extend the height of side panels to the height of 2.4 metres to maximize their trip efficiency.

		and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO). In the case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions.
	Location	Not applicable
Measurement intervals	Continuous	
QA/QC procedures	The consistency of metered fuel consumption quantities shall be cross-checked with: a. an annual energy balance that is based on purchased quantities and stock changes, and b. available purchase invoices from the financial records, where the purchased fuel invoices can be identified specifically for the activity.	
Comments	Activities or Programmes of Activity in which end users of the subsystems or measures are households/communities/small and medium enterprises faced with data gaps due to meter failure or other reasons unforeseen may estimate the quantity of fuel using one of the following options, provided the gap period does not exceed 30 consecutive days within six consecutive months: a. The purchased fuel/energy invoices/bills, where the purchased fuel can be identified specifically for the activity. b. The energy produced by the equipment, adjusted by efficiency. Efficiency of the equipment is determined using the CDM Tool 09: Determining the baseline efficiency of thermal or electric energy generation systems, and energy produced is measured directly or calculated based on operation hours. c. The highest value of the parameter for the same calendar period of the previous years. d. The fuel consumption of a representative sample of the first batch[5] of devices. It may be assumed that the fuel consumption measured in a representative sample of the first batch of devices apply to all subsequent batches for which data is missing.	

[5] A batch refers to a group of devices of the same type commissioned within a specific year. To determine the commissioning date, activity developer can choose to categorize the devices into "batches." The most recent commissioning date of a device within a batch will be considered the commissioning date for the whole batch.

Parameter ID	**3**	
Data/Parameter:	EF_{CO2}	
Description	Carbon dioxide emission factor	
Data unit:	g CO_2e/tonne-km or similar units	
Equations referred:	Equations 2, 3, and 4	
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions	
Measurement methods and procedures	The following data sources may be used in the order of preference listed below: a. Values provided by the fuel supplier in invoices. This is the preferred source. b. Measurements by the activity developer, if data source (a) is not available. c. Values obtained by the fuel supplier in official documents/publications applicable to the location and date of refuelling, if data source (a) or (b) is not available. d. Regional or national default values for liquid fuels, if data source (a), (b), or (c) is not available. The values shall be obtained from well-documented and reliable data sources, such as national energy balances. e. IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4, Chapter 1, Volume 2 (Energy), if data source (a), (b), (c), or (d) is not available.	
Entity/person responsible for the measurement	Activity developer or supplier to the activity developer	
Measuring instrument(s)	Type of instrument	For data sources (a) and (b), measurements shall be undertaken in line with national or international fuel standards.
	Accuracy class	Not applicable
	Calibration requirements	Calibration shall be undertaken in line with equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO).
	Location	Not applicable

Measurement intervals	For data sources (a) and (b), the CO_2 emission factor value shall be obtained for each fuel delivery, from which weighted average annual values shall be calculated. For data sources (c) and (d), review appropriateness of the values annually. For data source (e), any future revision of the IPCC Guidelines shall be taken into account.
QA/QC procedures	Not applicable
Comments:	Not applicable

Parameter ID	**4**
Data/Parameter	EF_{CH4}
Description	Methane emission factor
Data unit	g CO_2e/tonne-km or similar units
Equations referred	Equations 2, 3, and 4
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions
Measurement methods and procedures	The following data sources may be used in the order of preference listed below: a. Values provided by the fuel supplier in invoices. This is the preferred source. b. Measurements by the activity developer, if data source (a) is not available. c. Values obtained by the fuel supplier in official documents/publications applicable to the location and date of refuelling, if data source (a) or (b) is not available. d. Regional or national default values for liquid fuels, if data source (a), (b), or (c) is not available. The values shall be obtained from well-documented and reliable data sources, such as national energy balances. e. IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4, Chapter 1, Volume 2 (Energy), if data source (a), (b), (c), or (d) is not available.
Entity/person responsible for the	Activity developer or supplier to the activity developer

measurement		
Measuring instrument(s)	Type of instrument	For data sources (a) and (b), measurements shall be undertaken in line with national or international fuel standards.
	Accuracy class	Not applicable
	Calibration requirements	Calibration shall be undertaken in line with equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO).
	Location	Not applicable
Measurement intervals	For data sources (a) and (b), the CO_2 emission factor value shall be obtained for each fuel delivery, from which weighted average annual values shall be calculated. For data sources (c) and (d), review appropriateness of the values annually. For data source (e), any future revision of the IPCC Guidelines shall be taken into account.	
QA/QC procedures	Not applicable	
Comments	Not applicable	

Parameter ID	**5**
Data/Parameter	EF_{N2O}
Description	Nitrous oxide emission factor
Data unit	g CO_2e/t km or similar units
Equations referred	Equations 2, 3, and 4
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions
Measurement methods and procedures	The following data sources may be used in the order of preference listed below: a. Values provided by the fuel supplier in invoices. This is the preferred source. b. Measurements by the activity developer, if data source (a) is not available. c. Values obtained by the fuel supplier in official documents/publications applicable to the location and

		date of refueling, if data source (a) or (b) is not available. d. Regional or national default values for liquid fuels, if data source (a), (b), or (c) is not available. The values shall be obtained from well-documented and reliable data sources, such as national energy balances. e. IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 1.4, Chapter 1, Volume 2 (Energy), if data source (a), (b), (c), or (d) is not available.
Entity/person responsible for the measurement	Activity developer or supplier to the activity developer	
Measuring instrument(s)	Type of instrument	For data sources (a) and (b), measurements shall be undertaken in line with national or international fuel standards.
	Accuracy class	Not applicable
	Calibration requirements	Calibration shall be undertaken in line with equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO).
	Location	Not applicable
Measurement intervals	For data sources (a) and (b), the CO_2 emission factor value shall be obtained for each fuel delivery, from which weighted average annual values shall be calculated. For data source (c) and (d), review appropriateness of the values annually. For data source (e), any future revision of the IPCC Guidelines shall be taken into account.	
QA/QC procedures	Not applicable	
Comments	Not applicable	

Parameter ID	**6**
Data/Parameter	$D_{m,y}$
Description	Return trip distance between the origin and destination of freight transportation of freight *m* in monitoring period *y*

Data unit	Kilometre	
Equations referred	Equation 4	
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions	
Measurement methods and procedures	Either of the following two options may be applied to determine the travelled distance: a. Recorded for reference trips once every year for each freight transportation activity using the vehicle odometer or any other appropriate sources (e.g., online sources) b. Recorded for each freight transportation activity using the vehicle odometer or any other appropriate sources (e.g., online sources)	
Entity/person responsible for the measurement	Activity developer	
Measuring instrument(s)	Type of instrument	Vehicle odometer or any other appropriate sources (e.g., online sources)
	Accuracy class	Not applicable
	Calibration requirements	Calibration shall be undertaken in line with equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO).
	Location	Within the monitored vehicle
Measurement intervals	Continuous or once per year	
QA/QC procedures	If reference trips are used to determine the total distance, the activity developer shall ensure that the reference trips are statistically representative and shall ensure that travel conditions for the entire year are accounted for. The recorded distance shall be cross-checked using common third-party mapping tools such as Google Maps or similar.	
Comments	Not applicable	

Parameter ID	**7**
Data/Parameter	$TM_{m,y}$
Description	Total mass of freight transported in freight transportation activity in monitoring period *y*

Data unit	Tonnes	
Equations referred	Equation 4	
Purpose of data	☐ Baseline emissions ☒ Activity emissions ☒ Leakage emissions	
Measurement methods and procedures	Recorded using the standard weighing methods at the activity site or departure site (preferably)	
Entity/person responsible for the measurement	Records by activity developer or truck operators	
Measuring instrument(s)	Type of instrument	Weighing scales or volumetric measuring techniques.
	Accuracy class	Not applicable
	Calibration requirements	Calibration shall be undertaken in line with equipment manufacturer instructions and shall be in line with national standards or, if these are not available, international standards (e.g., IEC, ISO). The frequency of weighing scale calibration shall be maintained according to the manufacturer's specifications or the regulatory norms of the host country, if they exist.
	Location	At the activity site or departure site (preferably)
Measurement intervals	Continuous	
QA/QC procedures	Parameter shall be cross-checked with project records. Evidence shall be provided if a weighing scale is used for recording at the project site.	
Comments	Not applicable	

11.4 | Sampling requirements

11.4.1 | Not applicable

12| DOCUMENT INFORMATION

Version	Date	Description
01.0	05/09/2025	First version released
Published by Gold Standard Contact Details		

The Gold Standard Foundation
International Environment House 2
Chemin de Balexert 7-9
1219 Châtelaine Geneva, Switzerland
Tel +41 22 788 70 80
Email help@goldstandard.org