Study supporting the Impact Assessment of the CountEmissions EU initiative

Annex report: Current state of play

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Annex report – Current state of play

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Content

A Current standards and methodologies for GHG emissions accounting

A.1 Introduction

In this Annex we present the results of an analysis of the main current standards and methodologies for GHG emissions accounting in the transport sector. Both standards and methodologies provide the rules for the execution of GHG emissions accounting. Whereas standards stand on themselves and can be referred to when the rules of the standard are being followed, methodologies are part of a policy or incentive programme that sets the rules for accounting for that respective initiative. In this Annex we will not strictly distinguish standards and methodologies, as we are mainly interested in the (calculation) rules that are applied by both.

Based on an initial desk study, the results of the exploratory stakeholder interviews and discussions with the Commission, twelve standards/methodologies have been selected for further analysis. These standards/methodologies are presented below. Some methodologies that are directly linked to specific policy initiatives (i.e. IMO DCS, EU MRV, CORSIA and EU ETS for aviation) are discussed in Annex D.

Each individual standard/methodology have been assessed on criteria related to their scope, the emission calculation methodology applied, the emission allocation approach applied, definition of the output, verification and assurance, and use by stakeholders. Based on the results of this assessment of individual standards/methodologies a comparative analysis have been carried out. The main conclusions from that analysis can be found in Section 2.3 and Annex A of the main report.

A.2 Corporate value chain (Scope 3) standard of the GHG protocol

Name	**GHG Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard**
Brief description	The GHG protocol, a public/private initiative, is an internationally accepted greenhouse gas (GHG) accounting and reporting standard. The GHG Protocol Scope 3 Standard is a supplement to the GHG Protocol Corporate Accounting and Reporting Standard, Revised Edition (2004). The Scope 3 report focuses on indirect emissions from value chain activities. Scope 3 transport emissions are especially relevant for shippers.
Objective of methodology	Scope 3 Standard is designed to create further consistency in Scope 3 inventories through additional requirements and guidance for Scope 3 accounting and reporting.
URL	Greenhouse Gas Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard

Name	GHG Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard
Use of by stakeholders	
Type of GHG emissions	GHG emissions originating from combustion of fuel and from refrigeration and air conditioning expressed in CO_2-eq.
System boundaries of emissions	Emission in the use phase and for the energy provision need the included. Biogenic CO_2 emissions shall not be included in the scope, but shall be included and separately reported in the public report.
Other environmental impacts (NO_X, noise, etc.)	None.
Transport and logistics operations covered	The protocol focusses on business travel and transport and distribution from the Scope 3 perspective (the transport service user perspective). This includes all modes and logistic sites if relevant. The guidelines are not specified for the transport sector.
Geographical scope	Global.
Scope	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Scope 3 accounting involves defining goals, identifying activities and setting boundaries. Collecting data, allocating emissions and reporting emissions are further steps. The guidelines define boundaries but do not describe how emissions should be calculated. There are two main methods to quantify emissions: direct measurement and calculation. For Scope 3 emissions it is based on calculation. This includes emission factors and activity data. Emission factors need to be life cycle emission factors (WTW) as specific as possible for the activity. Emission from infrastructure and vehicles are optionally included.
Granularity of GHG calculation (e.g. company/leg/specific trip)	The protocol mainly described how emissions should be calculated at company level for transport service users, and does not give specific directions on the granularity behind the emission factors to be used.
Transport performance metrics (definition of weight and distance)	This is up to the user, as long as the source of emissions factors is referenced.
Ex-post or ex-ante?	Ex-post.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	Both primary data (from the transport operator) and secondary data (nonspecific data, e.g. average emission factors) can be used.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The protocol mainly describes the system boundaries and it flexible in the method to be used as long as it is reported. The protocol does describe the principles of relevance, completeness, consistency, transparency and accuracy, but leaves it up to the user. Transparency is important for reviewers and users to value the credibility.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	No specific advice for transport. In general the selected allocation method should reflect the causal relationship between the production of the outputs and the resulting emissions.
Time aggregation (allocation at shipment level or aggregated?)	Data should be based on annual data.
Reliability and consistency of the allocation methodology	Not applicable.

Name	GHG Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/ or voluntarily)	There are reporting requirements when following the GHG protocol. This applies for Scope 1 and 2 as well as Scope 3. For Scope 3 this includes total emissions as well as emissions by category should be reported as defined by GHG protocol. For transport this involves separating upstream and downstream emissions. For each category, a description of the types and sources of data should be reported, including activity data, emission factors and global warming potential (GWP) values, used to calculate emissions. Also a description of the data quality should be included.
Verification and assurance	
Third party validation?	Validation is optional, but recommended for credibility. A peer review is described for reviewing the methodology. Auditing for checking the input data.
Use of by stakeholders	
Uptake by the stakeholders/ industry	The GHG protocol is referenced by many GHG emission accounting frameworks, including for example the GLEC Framework.
Usability of the methodology and its application cost for stakeholders	The GHG protocol is very suited to provide overall guidance. However, for transport specific issues, the guidance is not detailed enough.
Potential use for generating innovations and new business models in the transport	It has no direct influence on innovation.
Alignment with other frameworks, tools, and green initiatives	Other framework align with the principles of the GHG protocol, such as GLEC, the Topsector logistics guidelines, the draft ISO 14083 standard.

A.3 EN standard EN16258

Name	EN16258
Brief description	EN 16258 is a common methodology for calculation and declaration of energy consumption and greenhouse gas (GHG) emissions related to any transport service. It has been established by the European Committee in 2012. It specifies general principles, definitions, system boundaries, calculation methods, apportionment rules (allocation) and data recommendations. It also includes examples on the application of the principles.
Objective of methodology	The objective is defined as to promote standardised, accurate, credible and verifiable declarations, regarding energy consumption and GHG emissions related to any transport service quantified.
URL	European Standards: CSN EN 16258 Methodology for calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers)
Scope	
Type of GHG emissions	All relevant GHG emissions originating from combustion of fuel and from refrigeration. Emissions are expressed as CO_2-equivalents.
System boundaries of emissions	EN 16258 methodology includes energy consumption and greenhouse gas (GHG) emissions related to any transport service (of freight, passengers or both). Both emission during vehicle operation (TTW emissions, and emissions during energy provision (WTT emissions) are included. Not included are: — direct emissions of GHG resulting from leakage (of refrigerant gas or natural gas for example) at the vehicle level; — additional impacts of combustion of aviation fuel in high atmosphere, like cont][rails, cirrus, etc.; — non-operational energy processes, like the production or construction of extraction equipment, transport and distribution systems, refinery systems, enrichment systems, power production plants, etc., so as their reuse, recycle and scrap. Offsetting actions or emissions trading (whether or not under the EU ETS) is not taken into account for calculation and declaration of energy consumption and GHG emissions in transport services.
Other environmental impacts (NO_X, noise, etc.)	The EN 16258 methodology also focusses on well-to-wheel and tank-to-wheel energy consumption. No other emission than GHG emissions are part of the methodology.
Transport and logistics operations covered	All transport modes are included. Within a vehicle all on-board vehicle systems, including propulsion and ancillary services, are covered. This specifically includes equipment for maintaining temperatures or possible transhipment infrastructure on-board (e.g. crane). Calculation shall take into account all fuel consumption, including that for empty trips, for all vehicles used to perform the transport service, including those operated by subcontractors. Not included are the following: — processes consisting of short-term assistance to the vehicle for security or movement reasons; — processes implemented by external handling or transhipment device (transhipment);

Name	EN16258
	— logistic sites; — processes at the administrative (overhead) level; — processes for the construction, maintenance, and scrapping of vehicles; — processes of construction, service, maintenance, and dismantling of transport infrastructures used by vehicles.
Geographical scope	Global, with a focus on Europe as the standard is European.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Emissions are calculated following a three step approach: 1. Identify relevant legs of transport service. 2. Calculate energy consumption and GHG emissions for each leg. 3. Sum results of individual legs. The energy consumption and individual legs are calculated as follows: — defining the vehicle used on the leg; — quantifying the total fuel use for vehicle; — calculation of total energy consumption and GHG emissions on the leg; — if applicable, allocation of energy consumption and emissions to relevant portion of the leg (e.g. in case of distribution). Emissions are calculated based fuel consumption and emission factors (in Mj/l and CO_2/l).
Granularity of GHG calculation (e.g. company/ leg/specific trip)	The method is suited to calculate at company or service level, based on emissions per transport operation categories (transport operation with same characteristics). The methods is able to assign GHG emissions to products or customers.
Transport performance metrics (definition of weight and distance)	The distances in general should be the real distance travelled. In case of round trips, instead of actual distance travelled, Great Circle Distance or shortest feasible distance. For aviation the distance used is the Great Circle Distance plus 95 kilometres to account for manoeuvring. . The quantity of freight shall be characterised by the cargo being carried, including any packaging, container, and means of handling or transport except those that are not part of the shipment. In most cases the quantity is measured in tonnes. The parameter to quantity the amount of freight in general is mass. There is, however, flexibility to deviate from the standard parameters. The freight quantity can also be expressed in: other parameters like volume, etc; corresponding units are tonne, cubic metre (m3), etc.; The quantity of passengers should be the actual number of passengers. The transport activity is expressed in passenger-km or tonne-km, but might also be expressed in kilometres or quantities such as passengers, trips or amount of freight.
Ex-post or ex-ante?	Not specified
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	EN16258 provides an order of preference for deriving energy use and calculating emissions: 1. Specific measured values. 2. Transport operator specific values. 3. Transport operator fleet values. 4. Default values.

Name	EN16258
	For default values the following terms are defined: Default values should be taken from a published documentation. The latest available version should be used. Default values should be relevant to the operation for which the calculation is being performed. Any energy and GHG emission factor of transport fuels used for the implementation of this standard shall be, by order of preference: 1. The value specified by the fuel supplier according to European Commission Directive 2009/30/EC and any amendments to this directive. 2. The value established on the basis of default values provided by EN 16258. 3. Any other value provided that: — the declaration is completed with this value, the corresponding source, and justification for its use; — the value selected includes all upstream operational processes; — if biofuels are used, the methodology is consistent with Directive 2009/30/EC and any amendments to this directive. TTW and WTT factors should be from corresponding sources For electricity (WTT emissions and energy (losses)) this list is given by order of preference: 1. Value specified by the electricity supplier for the production-certified electricity bought. 2. Value for the electricity bought, specified by the electricity supplier for its production in the relevant electricity grid within which the transport operation is performed. 3. As a last resort, average value for electricity supplied to consumers in the relevant electricity grid within which the transport operation is performed. As shown above there are a lot of different data sources accepted for the default factors. There is thus a great flexibility for the users, which however can result in various outcomes depending of the choices of the user.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The methodology allows calculation for different levels of data quality. Based on the underlying assumptions and modelling choices different outcomes can arise. These differences are, however, not the result of the calculation methodology which in itself is largely unambiguous. However, the following methodology items are not well defines: — The allocation method for freight distribution deviates from other transport operation types. The definition of distribution is up to the user and can be differently interpreted. — The allocation between freight and passengers allows two methods, one based on area allocation and the other on weight allocation.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Allocation happens corresponding to its relative share of the transport activity performed within the routes. However, multiple options for transport activity are possible as long as units used remain consistent over time. Only one allocation method is applicable for combined transport. Emissions are allocated based on transport activity (paxkm, tkm). The distance travelled should be the real distance travelled, except for collection and distribution round trips where great circle distance and shortest feasible distance are allowed.

Name	EN16258
	For aviation allocation between passengers and freight is based on mass, counting with 100 kg per passenger. For ferries the allocation between passengers and freight can be either based on the area used for freight and passenger transport or the mass of freight and passenger transport.
Time aggregation (allocation at shipment level or aggregated?)	The period over which GHG emission are allocated is up to the user, but should be stated.
Reliability and consistency of the allocation methodology	The allocation method is specific but thus require specific information about volumes at shipment levels for round trips. This does require granular data. If volumes are defined in similar units (m_3, pallets, mass) calculations remain consistent over time. Allocation between passenger and freight for ferries is not unambiguous.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/ or voluntarily)	Declarations should include WTW and TTW energy consumption as well as GHG emissions at service level. The results should include a fixed reference to the standard.
Verification and assurance	
Third party validation?	Not mentioned
Use of by stakeholders	
Uptake by the stakeholders/industry	The users can be various, however main users are: — transport service operators (freight or passengers carriers); — transport service organisers (carriers subcontracting transport operations, freight forwarders and travel agencies); — transport service users (shippers and passengers).
Usability of the methodology and its application cost for stakeholders	The methodology in itself is usable for its intended wide range of potential users. This is exemplified by being suited for both passenger and freight, combined transport and a specific focus on transport legs. However, the accompanying document is quite difficult to understand for non-expert users. There is also a lack of visualisation or support. No evidence is available for the application costs. The standard itself costs around 100 euro.
Potential use for generating innovations and new business models in the transport	Most existing tools, frameworks and greening initiatives have taken this standard in consideration.
Alignment with other frameworks, tools, and green initiatives	Not discussed directly. Many terms are aligned with other standards (ISO, EN, EU directives) However, according to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

A.4 ISO 14083 (concept September 2022)

Name	ISO DIS 14083 draft September 2022
Brief description	ISO/DIS 14083 provides requirements and guidance for the quantification, assignment, allocation and reporting of greenhouse gas (GHG) emissions for transport chains for passengers and freight. Currently the standard is in a draft version. The final version might be adapted at some points.
Objective of methodology	The method enables a consistent comparison of possible different energy carriers by transport service operators, users and any other interested parties. It allows transport service operators to share their GHG information in a consistent way to the transport service users which will help the latter to quantify, better manage and reduce the impacts of their transport or hub activities.
URL	ISO 14083 Greenhouse gases — Quantification and reporting of greenhouse gas emissions arising from transport chain operations
Scope	
Type of GHG emissions	GHG emissions originating from combustion of fuel and from refrigeration expressed in CO_2-eq. There is an informative appendix on the global warming effect of black carbon.
System boundaries of emissions	The ISO methodology includes all emissions that can be attributed to transport activity and transport hub operation, together with emissions of supportive activities, such as vehicle visits to repair shops. ISO distinguishes the emissions of vehicle operation (TTW emissions), hub operation, and emissions during energy provision (WTT emissions). Fuel or refrigerant spills and leakages during operation are also in scope. Emission of energy provision should also include emission for construction and dismantling of energy production infrastructure (e.g. power plants, solar cells). Construction and decommissioning of vehicles and transport infrastructure is explicitly out of the scope.
Other environmental impacts (NO_x, noise, etc.)	In general only GHG emissions are included. No explicit treatment of NO_x and other pollutants beyond their role in warming trapping effects, are covered. There is an informative appendix on black carbon, however, it does not have a normative function.
Transport and logistics operations covered	All freight and passenger modes including pipeline transport.
Geographical scope	Global.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The calculation of GHG emissions follows the following steps for a transport or hub operator: 1. Identify all transport and hub operation to be quantified. 2. Define transport and hub operations categories that have similar characteristics. 3. Define the total energy demand per category and calculate the total GHG emissions per category. For each category calculate the activity expressed in tonne-km (freight transport) passenger-km (passenger transport) and tonnes (hubs) and define the intensity value for each category (GHG emission/ activity). 4. Using the defined intensity factors, for every transport chain (having more than one leg) the GHG emission can be calculated by multiplying the activity values per element with the corresponding intensity factors.

Name	ISO DIS 14083 draft September 2022
	For transport service users and organisers a similar process is followed, but the intensity factors are either coming from the transport operators, models or default values. The activity kilometres are based on shortest feasible distance or great circle distance between origin and destination.
Granularity of GHG calculation (e.g. company/leg/specific trip)	The methodology is applicable at all levels of granularity: — a single vehicle on a single journey or specific schedule; — a single vehicle in multiple schedules/trade lanes – based on network/trade lane characteristics; — a specific vehicle type in a single schedule – for example, based on vehicle size class, drivetrain, age and emission standard, temperature control and related itineraries; — a specific vehicle type in multiple schedules/trade lanes – for example, based on vehicle size class, drivetrain, age and emission standard, temperature control and network/trade lane characteristics, including related itineraries; — a specified group of vehicles in a single schedule – for example, based on vehicle size class, drivetrain, age and emission standard, temperature control and related itineraries; — specified group of vehicles in multiple schedules/trade lanes – for example, based on vehicle size class, drivetrain, age and emission standard, temperature control and network/trade lane characteristics, including related itineraries.
Type of distance and quantity (weight/passenger) used in the calculation methodology applied	For emission allocation/assignment, tonne-kilometre units are used as units of transport activity. Transport activity computation may use either, Great Circle Distance (GCD) or Shortest Feasible Distance (SFD). Similarly to freight, the unit of transport activity for passengers is passenger-kilometre, measured using either GCD or SFD.
Ex-post or ex-ante?	Ex-post and ex-ante
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The standard provides unambiguous way for emission computation. For default emission data, calculations that rely on default emission intensity values shall state the source of the values used, justifying the reason for the choice if sources other than those referred to in the standard (Annex M) are used.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The standard requires unambiguous way of computation and full transparency for the use of assumptions and emission factors. Two ways of emission allocation for transport activity are possible: 1) GCD-based and 2) SFD-based. Emission intensity factors computed with these two different distance metrics shall not be compared.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Emissions are allocated proportionally to transport activity (tonne-kilometres/pax-kilometres), or hub activity (tonnes throughput, pax throughput). Kilometres are either GCD-based or SFD-based. Emission intensity factors computed with these two different distance metrics shall not be compared. For aviation allocation between passengers and freight is based on mass, counting with 100 kg per passenger. For ferries the allocation between passengers and freight is based on the mass of freight and passenger (including vehicles).

Name	ISO DIS 14083 draft September 2022
Time aggregation (allocation at shipment level or aggregated?)	The operational data for high frequency, regular, short duration transport should be aggregated over the period of one year (calendar year) to remove seasonal fluctuations or any transient impact on long term trends. Other time aggregations are permitted under the condition that deviation from the general rule of yearly aggregation are noted and reported.
Reliability and consistency of the allocation methodology	GCD-based allocation is very strong and reliable as the distance is not open for interpretation. The distance in SFD-based allocation can lead to differences in outcomes due to planning software or moment of time. SFD is allowed by ISO too, as some industrial players insist on using it. Thus the standard allows two types / metrics for allocation distance.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/or voluntarily)	The following shall be reported: — the operations that are covered, noting any cut-off criteria that have been applied, noting the reasons for and implications of their use; — corresponding total emissions and emission intensity values; — reference to ISO document.
Verification and assurance	
Third party validation?	Third party validation is advised for ISO implementations in order to ensure quality and trustworthiness of outputs.
Use of by stakeholders	
Uptake by the stakeholders/industry	Transport and logistics, passenger transport including hubs.
Usability of the methodology and its application cost for stakeholders	Costs implement the ISO standard are unknown. ISO DIS 14083 will be an international standard, which is largely aligned or building on existing standards like EN16528, the GLEC Framework and the Smartway methodology, which makes it easier for stakeholder that use these methodologies to implement the ISO standard. The cost for the ISO document itself are 118 CHF.
Potential use for generating innovations and new business models in the transport	It is possible to build tools and incentive schemes on the ISO methodology. New business models that include CO_2 accounting based on ISO need to be proven.
Alignment with other frameworks, tools, and green initiatives	This will be an international standard: the workgroup working on it have had its fair share of efforts related to finding a compromise that is acceptable for all parties involved.

A.5 ICAO/IATA RP1678

Name	IATA Recommended Practice 1678
Brief description	IATA has adopted a standard GHG emission measurement methodology in order to harmonise GHG accounting within the aviation sector. The methodology has been developed by the IATA Air Cargo Carbon Footprint (ACCF) working group, and establishes a methodology to measure the CO_2 emissions generated by air cargo at shipment level.
Objective of methodology	The objective is to have one, consistent international standard to measure CO_2 emissions generated by air cargo, in order to support requirements from regulators and shippers.
URL	IATA: Programs & Policy, Cargo CO2 Emissions Measurement
Scope	
Type of GHG emissions	The methodology includes CO_2 emissions from fuel combustion. Non CO_2 - GHG emissions or GHG effect (at high altitude) are not included.
System boundaries of emissions	The methodology describes the calculation of TTW emission. WTT (upstream) emissions are not included. WTT emissions can however be added, through multipliers, if this is required by other/local guidelines. In general fuel consumption must include: — landing and take-off cycle (LTO); — fuel consumed by the auxiliary power unit; — taxiing, holdings; — turn-around of aircraft; — repositioning flights. Fuel consumption excludes: — engine run-ups; — training flights; — aircraft delivery flights; — state flights; — search & rescue flights; — transporting head of states and government ministers; — police flights; — military flights; — fuel consumption when in Maintenance Repair and Overhaul (MRO).
Other environmental impacts (NO_X, noise, etc.)	No other impacts than CO_2 are included in the methodology.
Transport and logistics operations covered	The method covers air freight transport, though if other modes are used for specific segments (e.g. feeder service) these should be included as well, but IATA refers to use other recognized methodologies for non-air segments. The handling processes (such as cargo storage in the warehouse, handling devices and vehicles, loading and offloading activities) are not included. The administrative processes or overhead (such as operation of buildings, staff commuting, IT infrastructure) are not included.
Geographical scope	Global.

Name	IATA Recommended Practice 1678
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	According to the methodology CO_2 emissions need to be calculated from the fuel consumption linked to the vehicle operational processes (for aircrafts, it includes processes such as airborne, taxiing, turnaround, auxiliary power usage – as defined in the IATA's Fuel Measurement Protocol). In general this concerns all fuel use by an aircraft. The three-step approach described hereafter shall be followed: 1. Step 1: identify the different legs comprising the complete transportation service. 2. Step 2: calculate the CO_2 emissions for each leg. 3. Step 3: sum the results for all legs. Calculation of CO_2 emissions at shipment level need to be performed after the transportation service has occurred (ex-post), as the routing is definitively known. There are two options for calculation of air emissions per shipment. 1. Leg-based. This uses leg specific emissions (t x kgCO_2/t) which is for transportation of one tonne of cargo on a given city-pair. 2. Network-based. This uses average CO_2 emissions generated by the transportation of one tonne of cargo per kilometre for a defined network. Examples of a Network are entire airlines, or specific aircraft types, etc. The emission factor recommended is 3.15, tonne CO_2/tonne aviation fuel, which according to IATA is the internationally-recognized emission factor. The calculation of the average total fuel burn will be done in accordance with IATA's Fuel Measurement Protocol. There are four methods for deriving emissions: — Method A: based on financial records; — Method B: block-off/block-on (times between docking); — Method C & D: subsequent flight measurement after fuel uplift, through either fuel supplier or on-board measurements systems. Fuel uplift may be determined based on the measurement by the fuel supplier, as documented in the fuel delivery notes or invoices for each flight. Alternatively, fuel uplift may also be determined using aircraft on-board measurement systems. Fuel consumption must be based on actual fuel use data; the use of planned fuel consumption is a fall-back option. Only in the case of absence of consumed fuel data, and in exceptional cases, planned fuel consumption may be used as long as in the submission it is fully transparent and has been clearly indicated to the recipient of the data.
Granularity of GHG calculation (e.g. company/leg/specific trip)	The methodology aims to support calculating emissions at shipment level, from network-based emission or leg-based emission. However, the methodology is also suited for aggregation emission to higher levels, e.g. aircraft types or regions.

Name	IATA Recommended Practice 1678
Transport performance metrics (definition of weight and distance)	The origin and destination of the emission calculation should be in line with the Master Air Waybill (MAWB). An Air Waybill (AWB) or air consignment note is a receipt issued by an international airline for goods and an evidence of the contract of carriage, it is a document of title to the goods. Shipment weight (t) is the mass of the cargo carried as per the MAWB. It includes the weight of any packaging provided by the shipper, but excludes the tare weight of aircraft Unit Load Device (ULD). As per IATA's Fuel Measurement Protocol, Global Circle Distance (GCD) is the IATA recommended practice to be used for all aerodrome to aerodrome distance calculations. However, it does not exclude the usage of other existing and established methods (e.g. in case of mandatory reporting requirements like an Emissions Trading Scheme describing GCD+ fixed manoeuvring term). In case an alternative method to GCD is used, the airline shall disclose the method in the reporting.
Ex-post or ex-ante?	Emission calculations should be based on ex-post information. Ex-ante calculations are not recommended as actual routing (i.e. distance and conveyance) is unknown at booking time.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The methodology prescribes a fixed emission factor for all aviation fuels. This ensures that calculations are consistent. However, there is no flexibility to account for the use of sustainable or alternative fuels. It is recommended that airlines use their own historical data (fuel burn, payload distance flown) to measure the CO_2 emissions of their operating flights. Any third-party (interline partners, code-share partners, customers, etc.) will use operating airline's data if available or data available in the public domain.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The methodology allows the calculation following a leg-based approach and a network-based approach. Furthermore, there is flexibility in the time aggregation and scope of the network. As a result, there are different calculation options for users.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Emissions are allocated to individual shipments or passengers based on the so called revenue load (passengers, cargo and mail). Revenue load is the weight of passengers, cargo and mail for which has been paid. Pilots and crew for example, are thus excluded. For belly cargo, in order to provide an equitable split of CO_2 emissions between passengers and cargo and to achieve alignment and harmonisation within the industry, airlines shall use the same principles developed in IATA's Carbon Emissions Calculator Methodology supporting passenger carbon offsetting programmes .This consists in taking into account the infrastructure associated with passenger use (for example the weight of seats). The weight of seats are defined as 50 kg, passengers (including luggage) are 100 kg. The weights of passengers and freight determine the total aircraft payload. The total CO_2 emission are allocated to freight and passengers based on their share in weight.

Name	IATA Recommended Practice 1678
	In order to align with existing methodologies, the use of the incremental approach (marginal accounting) is not recommended for belly cargo.
Time aggregation (allocation at shipment level or aggregated?)	Considering that using actual data for each individual flight on which a shipment is transported would be misleading for the shippers, IATA recommends that airlines calculate averages based on their historical data. The minimum acceptable time range for averages' calculation is the previous calendar year but airlines may want to choose equivalent or shorter time ranges. Airlines may publish results on a shipment level or may aggregate results by shipper for all transportation services within a given time-frame. This is flexible.
Reliability and consistency of the allocation methodology	The allocation methodology prescribes a single option. This ensures that there is reliability and consistency. However, it does not provide flexibility.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/or voluntarily)	The methodology results in emissions (CO_2) per shipment or for a network. There are no further reporting requirements except that users should report if they deviated from the standard methodology (e.g. adding a manoeuvring premium on distance).
Verification and assurance	
Third party validation?	The methodology does not mention anything about validation.
Use of by stakeholders	
Uptake by the stakeholders/industry	The IATA Recommended Practice 1678 is used globally by many users within and outside the aviation sector. For example, the GLEC Framework has integrated the IATA methodology for calculation of CO_2 emissions from aviation.
Usability of the methodology and its application cost for stakeholders	There are no direct costs involved; no information is available for indirect costs.
Potential use for generating innovations and new business models in the transport	There is no evidence available in potential uses for generating innovations.
Alignment with other frameworks, tools, and green initiatives	IATA has also worked closely with ICAO through ICAO's Aviation Carbon Calculation Support group (ACCS) under CAEP (Committee on Aviation Environmental Protection). ICAO CAEP has endorsed the IATA RP in February 2016.

A.6 IATA Recommended practice per-passenger CO_2-calculation Methodology

Name	IATA Recommended Practice 1728
Brief description	IATA has adopted a standard GHG emission measurement methodology in order to harmonise GHG accounting for passenger transport within the aviation sector. The methodology has been developed by various partners involved in passenger aviation including airlines, flight search engines and offset programmes. The methodology considers airline fuel measurement protocols, passengers vs. cargo CO_2 allocation, cabin class factors and more.
Objective of methodology	The objective is to have one, standard industry best practice approach to calculate per passenger CO_2 emissions, in order to provide a consistent calculation results. The methodology does not aim to calculate emissions at individual flight level as this scope does not considers factors in fuel use (e.g. due to weather or traffic) that impact flights at the same route. IATA therefore recommends to use data that, to a certain extent, is aggregated.
URL	IATA: Programs & Policy, Passenger CO2 Standard Methodology
Scope	
Type of GHG emissions	The methodology includes CO_2 emissions from fuel combustion. Non CO_2 GHG emissions or GHG-effects (at high altitude) are not included. Radiative Forcing Index (RFI) is not recommended to be applied as long as scientific consensus does not exist on the value.
System boundaries of emissions	The methodology describes the calculation of TTW emission. WTT (upstream) emissions are not included. WTT emissions can however be added, through multipliers, if this is required by other/local guidelines. Non-aircraft emissions are not included. SAF (sustainable aviation fuel) can only be claimed by members and not by passengers or third parties. Members having purchased SAF, and using the SAF on flights that transport passengers, can reduce the CO_2 intensity of a given passenger per flight in accordance with the environmental attributes for the quantity or batch of SAF used. In absence of a global SAF book and claim system, the reduction in carbon intensity only applies to the routes (and per passenger CO_2 calculations) departing the airport where SAF was deployed, with the recommendation to use the CORSIA Default Life Cycle Emissions Values for calculating the reduction values. With the introduction of a global book and claim system, allowing the tracing of SAF investment of members and feedstock related life cycle emissions, the CO_2 reduction claim can be disconnected from the physical use of SAF and therefore becomes part of an overall reduction of carbon intensity of flights. The exact accounting rules will have to be determined as part of the global SAF book and claim system. Carbon offsets cannot be deducted from direct emissions as the GHG reporting does not allow this to protect against double counting. Fuel consumption excludes: — training flights; — ferry flights; — maintenance flights; — aircraft delivery flights; — state flights; — search & rescue flights; — transporting head of state and government ministers; — police flights; — military flights.

Name	IATA Recommended Practice 1728
Other environmental impacts (NO_X, noise, etc.)	No other impacts than CO_2 are included in the methodology.
Transport and logistics operations covered	The method covers air transport of passengers. The administrative processes or overhead (such as operation of buildings, staff commuting, IT infrastructure) are not included.
Geographical scope	Global.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The CO_2 emissions are calculated from the fuel consumption linked to the vehicle operational processes. In general this concerns all fuel use by an aircraft. The approach described hereafter shall be followed: — Step 1: identify the different legs comprising the complete transportation service. — Step 2: calculate the CO_2 emissions for each leg. — Step 3: calculation of estimated fuel burn average for each leg of a future flight. — Step 4: calculation of passenger and cargo weight. — Step 5: allocating fuel burn to passengers based on total weight. — Step 6: allocating fuel burn to passengers based on travel class and cabin class factor weighting. — Step 7: converting fuel mass to per passenger CO_2 emissions. Noteworthy details for the different steps are the following: – Step 1: When measuring the CO_2 emissions on a per-passenger level, the scope shall be defined in terms of individual flight legs. – The passenger journey may include several segments which can be air segments operated by the reporting airline or air segments operated by another airline (interline, codeshare). As part of this methodology, the calculation of CO_2 emissions is limited to the air segment operated by the reporting airline, accounting for Scope 1 emissions only. – Step 2 can be performed before or after the flight. – Step 3 recommends to align monitoring points for starts and ends with CORSIA. – For Step 7 a fixed multiplier (CO_2/kg fuel) of 3.16 is used. Fuel consumption must be based on recorded fuel consumption on a per-flight basis. IATA recommends to align with the existing monitoring method and procedures already applied for the purpose of CORSIA monitoring and reporting.
Granularity of GHG calculation (e.g. company/leg/specific trip)	The methodology is based on emission calculation at leg level. These can be aggregated to company level.
Transport performance metrics (definition of weight and distance)	Non-revenue passengers (e.g., deadhead crew members, employee business and personal travel) are to be included in the CO_2 calculation methodology. Non-revenue cargo loaded to the cargo space of an aircraft is to be included in the CO_2 calculation methodology. No-show passenger must be excluded from the calculation. Passenger weight: equal to the actual or standard mass for passengers and checked baggage contained in the mass and balance documentation of members. Alternatively, the industry recognised standard value of 100 kg for each passenger and their checked baggage can be applied.

Name	IATA Recommended Practice 1728
	Passenger add-on seat weight for all seats: additional seat weight must not be added to all seats and specific or standard passenger weight. If required due to local regulations, members can optionally add the passenger add-on weight for all seats using the standard weight of 50 kg. The exceptional inclusion of passenger add-on weight needs to be clearly indicated to the consumer of the CO_2 emissions data. Weight of cargo: freight and mail is determined to be actual or standard mass. The actual freight and mail mass shall exclude the tare weight of all pallets and containers that are not payload.
Ex-post or ex-ante?	Ex-ante and ex-post. When estimating the fuel burn average of scheduled flights, fuel consumption of non- scheduled flights may be excluded.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The methodology subscribes a fixed emission factor for all aviation fuels. This ensures that calculations are consistent. However, there is no flexibility to account for the use of sustainable or alternative fuels with lower CO_2 emissions . It is recommended that airlines use their own historical data (fuel burn, payload distance flown) to measure the CO_2 emissions of their operating flights. It is recommended that users calculate averages based on their historical data. The recommended time range for such calculation is the previous calendar year or equivalent time range such as previous fiscal year or last twelve months Shorter aggregation periods are accepted (as provisional data) in case data is only available for a shorter time period.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The methodology allows a single calculation following a leg-based approach. The preferred time period used is a year. Both these choices result in a very reliable and consistent methodology. In exceptional cases, for example due to limited data availability, it remains possible to deviate from the standard guidelines which ensures that some flexibility in the calculation remains.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Emissions are allocated to individual shipments or passengers based on both the so called revenue load and non-revenue load. Revenue load is the weight of passengers, cargo and mail for which has been paid. Non-revenue is the weight of non-paying passengers and freight, excluding the flight crew. Pilots for example, are thus excluded. The allocation of CO_2 emissions equals the proportional share of weight between passengers (passengers and checked baggage) and freight weight (cargo + mail). In order to align with existing methodologies, the use of the incremental approach (marginal accounting) is not recommended for belly cargo. In order to account for different weight and space associated with a passenger seat in different cabin classes, CO_2 emissions should apply cabin class weighting and respective cabin class factor. These differ between narrow and wide-body aircraft. Factors are given in the methodology, by different factors can be used in case individual configurations can be better reflected.

Name	IATA Recommended Practice 1728
Time aggregation (allocation at shipment level or aggregated?)	The methodology aims to support calculating emissions at flight level, though IATA recommends a higher aggregation level in order to account for specific differences of individual flights. This can for example be done by using results over a long time period. However, the methodology is also suited for aggregation at higher levels, e.g. aircraft types or regions. Airlines may publish results on a shipment level or may aggregate results by shipper for all transportation services within a given time-frame
Reliability and consistency of the allocation methodology	The allocation methodology prescribes a single option. This ensures that there is reliability and consistency. However, it does not provide flexibility.
Definition of output	
Level of detail on emissions data reported/ made available by different type of stakeholders (prescribed and/or voluntarily)	The methodology results in emissions (CO_2) for a single trip. There are no further reporting requirements except that users should report if they deviated from the standard methodology.
Verification and assurance	
Third party validation?	Itis recommended that the fuel burn data used as a basis for calculating CO_2 emissions has been audited by an external and independent verification organization. The role of the verification organization is to validate the completeness and accuracy of fuel data used, with the recommendation to repeat the auditing of data each calendar year or when updating values used.
Use of by stakeholders	
Uptake by the stakeholders/industry	The IATA Recommended Practice 1728 is a newly released recommended practice which has been developed based on by increasing demands from travellers, corporate travel managers, and travel agents a.
Usability of the methodology and its application cost for stakeholders	There are no direct costs involved; no information is available for indirect costs.
Potential use for generating innovations and new business models in the transport	The emission calculation methodology can be useful for carbon offset programmes.
Alignment with other frameworks, tools, and green initiatives	Life cycle emissions in relation to SAF use claimed by passengers or third parties (e.g., corporate businesses or cargo customers) cannot be claimed or reduced as part of the CO_2 calculation for attribution to general passengers. This reporting is in accordance with the Greenhouse Gas Protocol (GHG) protections against double counting. Members and third parties can report emissions reductions as part of their Scope 1 and 3 emissions respectively and in accordance with the GHG protocol. IATA has also worked closely with ICAO through ICAO's Aviation Carbon Calculation Support group (ACCS) under CAEP (Committee on Aviation Environmental Protection). ICAO CAEP has endorsed the IATA RP in February 2016. The allocation factor for passenger is based on 100 kg per passenger including baggage. The 50 kg per seat is not recommended and therefore not aligned with the IATA Recommended Practice 1678 for freight, It is, however aligned with the EN16258 methodology and the draft ISO standard.

A.7 prEN 17837 – Parcel Delivery Environmental Footprint

Name	prEN 17837 – Parcel Delivery Environmental Footprint
Brief description	A standard for GHG emissions accounting in the parcels sector is currently under development. It is expected to be finished in the beginning of 2023. Some specific documents were shared by mail.
Objective of methodology	To create a harmonized standard for parcels GHG accounting.
URL	Postal Services - Parcel Delivery Environmental Footprint - Methodology for calculation and declaration of GHG emissions and air pollutants of parcel logistics delivery services
Scope	
Type of GHG emissions	WTW CO_2 equivalent emissions.
System boundaries of emissions	All emissions from packaging to delivery are included.
Other environmental impacts (NO_X, noise, etc.)	Air pollutants (NO_x, SO_x and $PM_{2.5}$) are also included. However, these may become optional to report.
Transport and logistics operations covered	All transport related to parcels delivery (so road, ship, airplane, etc.).
Geographical scope	Since parcels delivery is worldwide, worldwide transport is within the scope. However, the focus of the standard is on the EU market (transport to/from the EU).
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The emission calculation has five main steps: 1. Define Parcel Flow process. 2. Establish operational categories (Transport Operation Categories and Location Operation Categories). 3. Quantify emissions per operation category. 4. Allocate emissions per operation category to parcels. 5. Sum up all emissions (result: total emissions per parcel). The calculation of emissions is in line with EN 17837.
Granularity of GHG calculation (e.g. company/ leg/specific trip)	Emissions are calculated per parcel.
Transport performance metrics (definition of weight and distance)	-
Ex-post or ex-ante?	The emissions are calculated ex-post.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	Default emission factors can be used if primary data is not available. Also, transport operators have the choice whether to include empty trips.
Flexibility, reliability and consistency in use of the calculation methodology (e.g.are multiple calculation methods possible, and is this transparent)	For the allocation, two methods are possible (as explained below).

Name	prEN 17837 - Parcel Delivery Environmental Footprint
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Two allocation methods are distinguished by CEN/TC 311: — The first method for allocation per parcel is based on both volume and weight. The second method (optional) is based on the amount of stops in the last mile: — Since in reality the amount of parcels per stop is a large factor that decides the emissions (it is very inefficient to make a detour for only one parcel) this method is a better allocation because: • all stops get equal emissions; • within a stop, the allocation is done per parcel. Also, no Great Circle Distance is used, but the whole round trip distance.
Time aggregation (allocation at shipment level or aggregated?)	The allocation is done for each individual parcel.
Reliability and consistency of the allocation methodology	Since the standard is still in being developed, this cannot be answered.
Definition of output	
Level of detail on emissions data reported / made available by different type of stakeholders (prescribed and/ or voluntarily)	Since the standard is still in being developed, this cannot be answered.
Verification and assurance	
Third party validation?	The standard itself does not arrange third party validation. However, it is expected that as soon as the standard becomes available verifiers will start to offer verification services.
Use of by stakeholders	
Uptake by the stakeholders/industry	Since the standard is still in being developed, this cannot be answered.
Usability of the methodology and its application cost for stakeholders	Since the standard is still in being developed, this cannot be answered.
Potential use for generating innovations and new business models in the transport	-
Alignment with other frameworks, tools, and green initiatives	The standard is largely in line with ISO 14083 (draft), GLEC, GHG protocol and CEN 16258. The main difference is the allocation method.

A.8 Article L. 1431-3 of the French transport code (Objectif CO_2)

Name	Article L. 1431-3 of the French transport code
Brief description	By the application of Article L. 1431-3 of the French transport code, all transport service providers (both goods and passengers, including all modalities) and home moving services have to provide well-to-wheel (WTW) CO_2 information for every transport service departing from and/or ending in France.
Objective of the code	The purpose of Article L. 1431-3 of the French transport code is to have all transport service providers and organisers to report the CO_2 emissions of their transport activities for their clients (e.g. shippers or passengers). The code should encourage climate emission reduction by diagnosis, information sharing with clients, and support the development tools and labels to improve GHG performance in transport.
URL	Legifrance : Code des transports : Chapitre Ier : Principes, Article L1431-3 See also: Objectif CO2 : GHG information for transport services: Application of Article L. 1431-3 of the French transport code- Methodological guide and (Davydenko et al., 2019).
Scope	
Type of GHG emissions	All relevant GHG emissions originating from combustion of fuel and from refrigeration. Emissions are expressed as CO_2 equivalents.
System boundaries of emissions	The code requires calculation of GHG emissions from transport service operation (TTW) and of the upstream energy production processes (WTT).
Other environmental impacts (NO_X, noise, etc.)	Other environmental effect are not included in the methodology.
Transport and logistics operations covered	The code covers all freight and passenger modes that provide a transport service. The code explicitly mentions that emissions related to operations ancillary to transport (e.g. handling of goods), the construction and maintenance of vehicles, and the construction and maintenance of infrastructure are not part of mandatory reporting.
Geographical scope	France.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The following steps need to be followed: 1. Breaking down the transport service into segments. A segment is any part of the route taken or to be taken by a transport service over which the person or goods is/are transported by the same means of transport. 2. Calculating the quantity of the energy source consumed for each segment. 3. Converting the quantity of the energy source used into a quantity of GHG produced for each segment. 4. Adding together the quantities of GHG generated by the different segments for the service provided. In order to assess the amount of energy source consumed on a segment (Step 2), the service provider shall calculate it by the product of the kilometre rate of energy source consumption of the means of transport by the distance in question for the leg. In case transport of different transport service users is combined on the segment (leg), the energy consumption for a particular transport user is calculated by taking its share in the energy consumption on the leg based on its share in the total transport units transported on the leg.
Granularity of GHG calculation (e.g. company/leg /specific trip)	GHG emissions are calculated at service level by adding up the GHG emissions per segment (leg) or specific trip of the service.

Name	Article L. 1431-3 of the French transport code
Type of distance and quantity (weight/passenger) used in the calculation methodology applied	The method is based on real driven kilometres for both allocation an fuel efficiency figures. Quantities used in allocation are mass (tonnes), volume (m^3), surface (m^2), or the linear meter or the package (for freight) or passengers. Also the product of these quantities with kilometres can be used (e.g .tonne-km).
Ex-post or ex-ante?	Ex-post.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The fuel emission factors for operation and upstream phase to be used are set by the code. If a transport service provider uses an emission factor for an energy source which is not predefined us should be justified and reported to the transport service user.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	There are four calculation data levels accuracy. — Level 1: default values provided for each mode of transport per type of activity or means of transport; — Level 2: values correspond to average figures calculated by the service provider for all of its activities; — Level 3: values correspond to mean values calculated by the service provider based on a complete breakdown of its activity; — Level 4: values are calculated based on real data for the transport service. Level 1 values are only to be used by transport service providers with less than fifty employees.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Allocation to individual passengers or shipments is based on the share of units of the passenger/shipment in the total transport on the transport segment. The unit can be chosen by the transport service provider and can be either mass, volume, surface, or the linear meter of the package (for freight) or passengers (for passengers). Alternatively tonne-km, volume-km, surface-km, passenger-km, etc., can be taken as metrics to express the share. The transport service provider should also determine a way to allocate empty trips to services. For aviation allocation between passengers and freight is based on mass, counting with 100 kg per passenger. For ferries the allocation between passengers and freight is based on the area used for freight and passenger transport.
Time aggregation (allocation at shipment level or aggregated?)	No specific time period to aggregate data is recommended or demanded.
Reliability and consistency of the allocation methodology	The allocation method is chosen by the service provider when breaking down and distributing its GHG emissions between transport services providers. Different methods may lead to different result.
Definition of output	
Level of detail on emissions data reported / made available by different type of stakeholders (prescribed and/ or voluntarily)	The WTW GHG emission of a service should be reported to the transport service user. The method of calculation should be available to the transport user. Deviations from the standard emission factors and methods should be reported.
Verification and assurance	
Third party validation?	The is no third party validation mentioned.

Name	Article L. 1431-3 of the French transport code
Use of by stakeholders	
Uptake by the stakeholders/ industry	By the application of Article L. 1431-3 of the French transport code, all transport service providers (both goods and passengers, including all modalities) and home moving services have to provide well-to-wheel (WTW) CO_2 information for every transport service departing from and/or ending in France.
Usability of the methodology and its application cost for stakeholders	A methodology guide has been developed (Objectif CO_2) with many calculation examples. There are no costs involved in the usage of this guide. For small companies default values are available to make calculations less demanding.
Potential use for generating innovations and new business models in the transport	Objectif CO_2 provides a label which is awarded to companies that reach a high performance level in terms of CO_2 emissions. This label enhances the company's image with suppliers and customers. The CO_2 emissions reduction programme is voluntary.
Alignment with other frameworks, tools, and green initiatives	— European standard NF EN 16258; — OMINEA 2011 report of the CITEPA for France; — Decision 2007/589/EC; — BigMile, it is possible to generate a carbon footprint that is compliant with Objectif CO_2 based on BigMile input data.

A.9 GLEC Framework v1.0

Name	GLEC Framework
Brief description	Global Logistics Emission Council (GLEC) Framework is an initiative started by the Smart Freight Network in order to harmonise the calculation of GHG emissions of freight transport. The methodology considers elements from the COFRET project as well as the EN 16258 standard. GLEC has a user oriented focus and offers guidance for shippers and LSPs with computing their logistics-related emissions. The use of primary data is promoted by the GLEC Framework, modelling and the use of default factors are fall-back options. The GLEC Framework is currently one of the main industry standards.
Objective of methodology	The goal of the GLEC Framework is to offer a simple explanation for GHG accounting methodology for logistics emissions with clear implementation steps. The results are clear KPIs that measure GHG emission performance of companies. According to GLEC the following benefits are served: — use GHG emissions as a metric for sustainable freight transportation decisions; — make or influence decisions around supply chain optimization; — manage the performance of the transportation in your supply chain; — evaluate the impact of measures taken to reduce emissions; — track progress towards your climate goals; — inform customers of emissions reductions achieved; — stay ahead of regulatory requirements.
URL	Smart Freight Centre
Scope	
Type of GHG emissions	All relevant GHG emissions originating from combustion of fuel and from refrigeration. Emissions are expressed as CO_2-equivalents. Also, a methodology for defining black carbon emissions is included in a separate report. Not included: — Additional climate impacts from the combustion of aviation fuels in high atmosphere such as radiative forcing, contrails, cirrus, etc., are explicitly not included.
System boundaries of emissions	GLEC follows the categorisation in Scope 1, 2 and 3 emissions according to the greenhouse gas protocol: — Scope 1: Emissions from Scope 1 are direct emissions. This means that they directly come from a company's owned- or controlled source, such as company vehicle emissions. — Scope 2: Emissions in Scope 2 cover the indirect emissions from purchased sources, such as a company's consumed electricity or cooling. For example; this would entail the emissions from the burning of fossil fuels at a power station that generates electricity. — Scope 3: Emissions from Scope 3 cover all the other indirect emissions within the entire value chain of companies. Including the upstream supply chain (suppliers), as well as downstream GHG emissions (e.g. from customer usage). Think of emissions from; business travels, waste disposal transportation, or investments. For many organizations, Scope 3 emissions provide a dominant impact category (up to 80% of total footprint).

Name	GLEC Framework
	The GLEC Framework focusses on WTW emissions. This means that direct emissions from combustion (TTW) are included as well as indirect emissions (WTT) from energy production. WTT emissions from the production and distribution of fuels are included under Scope 3 emissions. Emission from vehicle and infrastructure production are not included in the GLEC Framework. In general, the boundaries of transport movements are for all modes the place of loading and unloading, while empty trips do have to be included as well. In addition, the framework has the emission of energy consumption (including upstream emissions) at logistic sites in scope. Not included are: — fuel spills and leaks; — emissions from construction, maintenance and scrappage of vehicles or transport infrastructure.
Other environmental impacts (NO_X, noise, etc.)	No other environmental impacts are part of the methodology.
Transport and logistics operations covered	GLEC covers all modes of freight transport: — aviation; — inland waterways; — rail; — road; — sea. Logistics sites are also included. These are defined as stopping points along a journey, where goods are transferred, stored or repackaged. For example, services provided by the air terminal (e.g., loading, unloading, cleaning, block power) are classified under logistics sites.
Geographical scope	Global.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The calculation methodology describes a three step approach : 1. Setting boundaries and goals. First the boundaries and goals need to be set. The boundaries are at minimum Scope 1 and 2 and it should be determined at what detail level emission need to be reported (e.g. for a particular country, customer or carrier). The goal of the calculations (e.g. official reporting, measuring efficiency or other) also determines the information need. and which data is critical and where data is less essential. 2. Calculate Scope 1 & 2 emissions. For Scope 1 and 2, fuel and electricity data are converted to emissions using a standard fuel or electricity emission factor. The fuel and electricity data for Scope 1 and 2 calculations should be based on primary data. Modelling or use of default energy use factors is not allowed. 3. Calculate Scope 3 emissions. Depending on data availability three methods are described to calculate Scope 3 emission. Scope 3 emissions are generally based on activity data (tonne-kilometres) coupled with a fuel or emission intensity factor. In specific cases multiple methodologies options are allowed under the GLEC Framework. This has practical purposes, but also ensures alignment with other existing methodologies.

Name	GLEC Framework
Granularity of GHG calculation (e.g. company/ leg/specific trip)	One of the main goals of the Framework is to facilitate reporting of annual emission and emission intensity (e.g. emission per tonne-km). For this purpose GHG calculation at company level is more relevant than reporting at shipment level. However, the methodology does support calculations at service level as information about allocation on shipment levels is included. This does, however, require data of sufficient quality at shipment level. Data at shipment level is, however, not a definitive requirement for GHG calculations for the GLEC Framework.
Type of distance and quantity (weight/ passenger) used in the calculation methodology applied	There is some flexibility in the type of distances and quantities that can be used: — Actual distance (from odometer or TMS; only known by carrier). — Great circle distance (GCD). — Shortest feasible distance (SFD): shortest route between two places and is typically found using route planning software. — Planned distance. Shortest distance taking into account real operating conditions using route planning software. — Network distance. Effectively a variation of planned distance, network distance is used where the route options that can be taken are limited, such as rail or inland waterway networks. The general approach, except for air transport, is to use the planned or network distances. Air transport uses global circle distance (GCD) to measure distance. Advice on how to derive distances in case of incomplete information is available, also advice on alignment with other frameworks (e.g. CCWG and EN16258).
Ex-post or ex-ante?	Ex-post and ex-ante.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The methodology offers flexibility in default factors used. As various types of (default) data sources are accepted there is flexibility for the users. Due to reporting requirements, assumptions have to be documented, making emission calculations transparent and reliable. However, depending on the assumptions and data quality different outcomes could arise from similar starting points.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	There are some specific situations where multiple methodologies can be used: — For aviation emissions can be calculated following ICAO/IATA RP1678 methodology and the EN16258. Both approaches result in different outcomes. — Allocation options for delivery routes with multiple stops. This is discussed below. — Multiple options to define distances and weights. The methodology prescribes to document the assumptions for transparency reasons. If this condition is fulfilled the emission calculations are reliable. However, depending on the assumptions and precise methodology different outcomes could arise from similar starting points.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Allocation methodologies are described for aviation (belly-freight) and delivery rounds. — For aviation this can be done calculated following ICAO/IATA RP1678 methodology and the EN16258. Both result in different outcomes; see relevant methods for more information. — For distributional types of transport (Mail, Parcels, Express, Palletized deliveries) where routes exist out of multiple stops GLEC gives two options: • EN16258 approach. Allocation by direct tonne-kilometres between origin (logistics site) and destination.

Name	GLEC Framework
	• Simplified per item approach. Allocation by number of items delivered in delivery round. — For ferries default factors are presented based on weight-based allocation between passengers and freight.
Time aggregation (allocation at shipment level or aggregated?)	Not specifically defined in GLEC. The methodology supports multiple options.
Reliability and consistency of the allocation methodology	Multiple methods are allowed for allocation, which makes the results less consistent between different users. However, the method applied should be reported along with the results to offset the abovementioned issue. Within the options there is consistency.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/or voluntarily)	The results are in presented in KPI's (total emissions and emission intensity). In general annual emissions for a company or individual transport service, although further disaggregation, such as for a particular carrier, activity, vehicle or country, may be helpful for specific reporting or decision-making needs.
Verification and assurance	
Third party validation?	Not mandatory but recommended. Documentation is available to guide third party validation.
Uptake and use by stakeholders	
Uptake by the stakeholders/industry	Target audience are company involved in logistics. GLEC has a global uptake and is used by many companies involved with shipping. Within the logistics sector GLEC is one of the most used methodologies. Currently more than 100 large (multinational) companies are involved in GLEC. These are transport service operators, as well as transport service organiser and users.
Usability of the methodology and its application cost for stakeholders	The GLEC method is a guide for greenhouse gas accounting and support GHG accounting on different levels of complexity and data availability. It is therefore useable for a broad range of users. Furthermore, sample problems are provided in order to assist users. The GLEC Framework is available without direct costs. No evidence is provided on the indirect costs of monitoring GHG emissions according to the GLEC Framework.
Potential use for generating innovations and new business models in the transport	Results calculated using the GLEC Framework are intended to facilitate reporting, target-setting and emissions reduction strategies.
Alignment with other frameworks, tools, and green initiatives	GLEC has been developed with various existing frameworks and standards. Table 1 in Smart Freight Centre (2019) provides a detailed overview. In terms of methodology this, among others, includes: — GHG protocol; — IATA 1678; — EN 16258. In terms of emission reporting it is in alignment with: — Greenhouse Gas Protocol; — UN-led Global Green Freight Action Plan; — CDP reporting.

Name	GLEC Framework
	With regards to initiatives alignment includes: — US Smartway; — Lean & Green; — Green Freight Asia; — Clean Cargo Working Group. Also it is possible to become member of GLEC, which allows users to have an active participation in updating the framework.

A.10 SmartWay programme

Name	EPA SmartWay
Brief description	SmartWay is a US based programme run by the Environmental Protection Agency(EPA). It launched in 2004 and is a voluntary public-private programme. EPA's SmartWay programme helps companies advance supply chain sustainability by measuring, benchmarking, and improving freight transportation efficiency. One of the elements is the set-up of a system to track, document and share fuel use and emissions information.
Objective of methodology	SmartWay offers a Transport Partnership, which focusses on measuring and documenting emissions. This includes dedicated tools and methods for Shippers, Carriers (by mode), and logistics companies.
URL	EPA: SmartWay and Sustainable Freight
Scope	
Type of GHG emissions	CO_2 emissions (not equivalents)
System boundaries of emissions	TTW for fuels and WTW for electricity: — Emissions related to fuel consumption of cooling (e.g. reefer) are included into the scope. — Emissions related to infrastructure and vehicle chain are not included. Also fuel/energy used for heating in buildings, forklifts or other non-transportation sources are excluded.
Other environmental impacts (NO_X, noise, etc.)	NO_x, $PM_{2,5}$, PM_{10} and black carbon. Not all emissions types are included for all tools/carriers due to relevance or other reasons.
Transport and logistics operations covered	Carriers, shippers and logistics companies. For the carriers, the following mode-specific tools are available: truck carrier, rail carrier, barge carrier, air carrier and multimodal carrier. SmartWay provides one tool per user group, together with guidance and improvement strategy documents. At this time maritime shipping is not included. Emissions from transhipment points (e.g. ports, hubs, DCs) are not included into the scope at the moment.
Geographical scope	US origin and focus. But a growing uptake including Mexico, Canada and Latin America
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Fuel and energy use are used to calculate emissions (CO_2, NO_x, $PM_{2.5}$, PM_{10} and black carbon). These emissions are divided by transport activity to calculate relative performance in gram CO_2 per mile and per tonne-mile. Smartway categorises the data of different carriers by mode, fleet type (road transport), performance level (logistics), and per company (for air and barge). The values in the database are used in the tool for shippers to calculate their emissions with input on ton-miles or miles. In case of truck and rail transport data are not carrier specific, but an average of a carrier category. In case a carrier is not in the database, the lowest performance level is applied (for road).
Level of GHG calculation (e.g. company/service) and can emissions be used to calculate environmental footprint of products and organisations	The calculation level can be different and depends on user selection. For highly disaggregated results it is necessary to have detailed input data. Fuel and energy use is always reported in amounts per year, though it can be specified towards for example fuel type or truck class. The tools for shippers and logistics companies do not require the user to enter fuel/energy data. Calculation at shipment level is, however, not possible as annually aggregated fuel data is used.

Name	EPA SmartWay
Transport performance metrics (definition of weight and distance)	The transport activity is, just like the fuel and energy use, always provided in amounts per year in accordance to the fixed disaggregation levels per tool. Two options are available: specifying actual tonne-miles or miles (railcar miles for trains) and average payload. For trucks both volumes and weight are required. CO_2 intensity factor are expressed in gram CO_2 per mile per tonne-mile of per m^3-mile.
Ex-post or ex-ante?	Ex-post for carrier. For shippers the focus is also on ex-post, but ex-ante calculations are possible as well.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	SmartWay tools use fixed fuel emission factors, that are presented in the SmartWay Technical Documentation. For biofuels the focus is on tailpipe emissions, not on WTW. As the methodology relies on tools the use of emission factors is reliable and consistent, but not flexible.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The tool provides a fixed methodology. There is flexibility in the level of disaggregation and, to a certain extent, in the input data.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	By using the intensity factors of groups of carriers, the emission are in essence allocated to users based on miles, ton-miles or m^3-miles. For less than truckload (LTL) transport, Smartway uses a method that allocates line haul emission to a shipment, based on its mass and the distribution emission are allocated based on great circle distance ton miles between origin and destination.
Time aggregation (allocation at shipment level or aggregated?)	Data inputs on fuel consumption and transport performance need to be open an annual base. Only for starting companies three months of data are accepted.
Reliability and consistency of the allocation methodology	The average segment based emission intensities used by shippers are not very specific and can be either defined per mile or per tonne-mile. The results may therefore be not specific and might depend on the input of either miles or tonne-miles.
Definition of output	
Level of detail on emissions data reported/ made available by different type of stakeholders (prescribed and/ or voluntarily)	SmartWay computes different KPIs for the different user types. This includes total emissions and emissions per tonne-mile, mile or m^3-miles. Disintegration levels differ between mode and user. For example for road many different vehicle types (9), logistical characteristic types (6) and performance levels are available. For rail only an average factor is available. Shippers that use the data cannot calculate with the average performance data per category. For example, the shipper cannot select different fuel types, whereas the carrier can do this as an input. The output of various users are collected for anonymous benchmarking.
Verification and assurance	
Third party validation?	This is not specified.

Name	EPA SmartWay
Use of by stakeholders	
Uptake by the stakeholders/industry	According to the official website SmartWay has nearly 4,000 SmartWay Shipper, Logistics Company, and Carrier Partners. For shippers users include: — Fortune 500® companies; — small and medium-sized businesses; — local, state, tribal, and federal governments; — colleges and universities.
Usability of the methodology and its application cost for stakeholders	SmartWay provides one tool per user group, together with guidance and improvement strategy documents. The computations are hidden from the user; the underlying methodology is provided in the documents related to the tools.
Potential use for generating innovations and new business models in the transport	Not specified.
Alignment with other frameworks, tools, and green initiatives	Alignment with GLEC, which has accredited the calculation tool

A.11 Topsector Logistics method

Name	GuidelinesTopsector Logistics
Brief description	Topsector Logistics is a focus programme of the Dutch government in which government, the business community and knowledge institutes collaborate on innovation in logistics. Topsector Logistcs has set up guidelines to calculate emissions based on a selection of methodologies including GLEC, EN16258. and the methodology developed for the EU FP7 project COFRET. As COFRET also forms the basis for GLEC there are similarities with other projects.
Objective of methodology	The guidelines have been developed to properly regulate accounting, registration and control of GHG emission of freight transport for transport service operators and users.
URL	Guidelines Topsector Logistics
Scope	
Type of GHG emissions	GHG emissions originating from combustion of fuel and from refrigeration expressed in CO_2-eq.
System boundaries of emissions	Guidelines are presented for emissions on freight transport, transhipment and storage. Both emission during operation (TTW for transport) and for fuel provision (WTT for transport) are included . Refrigerant losses for cooled transport are also part of the guidelines.
Other environmental impacts (NO_X, noise, etc.)	Not included
Transport and logistics operations covered	All types of freight transport, transhipment activities and storage are part of the guidelines. The is no specific guideline for pipeline transport.
Geographical scope	Global
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	CO_2-eq. emissions are computed as the amount of fuel used (or the amount of electricity used) times the relevant emission factor. For emission factors for the Netherlands the guidelines refer to a harmonised set of TTW and WTT CO_2 emission factors (CO2 emissiefactoren). Emissions of a transport chain are divided in legs, connected via nodes (logistics facilities). At the shipment level, the shipment emissions are computed as the sum of emissions related to the shipment under consideration in each transport leg. Emission are allocated great circle distance tonne-km according to the COFRET methodology. Emissions from transhipment and warehousing by tonnes output.
Granularity of GHG calculation (e.g. company leg/specific trip)	Depending on the data quality or the goals there are multiple possibilities to aggregate data or do calculations, such as on trip level averages of a leg, but also on company level.
Type of distance and quantity (weight/passenger) used in the calculation methodology applied	The weight of goods are tonnes per default, but also other metrics are allows such as, containers, pallets, trolleys, m^3. Conversion factors for the latter metrics to tonnes are given to allow for conversion. For allocation and carbon intensity factors per tonne-kilometre the distance measure should be expressed as great circle distance kilometres between origin and destination.
Ex-post or ex-ante?	Ex-post and ex-ante.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	Standard emission factors are recommended, as defined on www.co2emissiefactoren.nl. The main underlying requirement is that emission factors are Well-To-Wheel (WTW).

Name	GuidelinesTopsector Logistics
	Emission are preferably calculated with primary fuel data and transport data. The guidelines, however, also recognise the use of modelled and default data when no primary data are available (especially for transport service users). To recognise the difference in data quality the guideline proposes the following data quality levels: — (B) Bronze: estimations based on default values and key figures; — (S) Silver: measured values, aggregated per period (year or month) or per license plate or location; — (G) Gold: measured values per license plate or location per period (month, week, trip or stop). The higher quality data used, the more reliable and consistent the outcomes are.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	Using the data quality levels the methodology is both flexible with data and consistent within the frame of a certain level. However, not all allocation problems seems to be addressed in the guidelines. In particular the allocation between passengers and freight in combined passenger and freight transport (e.g. aviation and ferries).
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	The allocation of freight to different transport users should be executed on leg basis (between two hubs of transhipments). The allocation should be based on the product of the amount of freight and the great circle distance of origin and destination. The amount of freight is per default in tonnes but other metrics can be used when applicable for a certain sector.
Time aggregation (allocation at shipment level or aggregated?)	Allocation of emission if performed at the level of legs. There is no specific time aggregation recommended for the data at a leg.
Reliability and consistency of the allocation methodology	As long as the assumptions for the allocation methodology are consistent the outcomes are reliable and consistent. There is some flexibility in time aggregation and allocation principles for combined freight and passenger transport. It is therefore difficult to compare the outcomes of calculations of different companies.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/or voluntarily)	The guidelines are focussed on calculation principles and auditing. No reporting requirements prescribed.
Verification and assurance	
Third party validation?	There is a guideline explaining how auditing could be performed. It is advised to use for larger datasets automated data -processing to be certified according to the ISAE 3000 standard. The input information can then be audited.
Use of by stakeholders	
Uptake by the stakeholders/ industry	More than 200 companies are using BigMile software that follows the guidelines. Many of these companies are involved in the Dutch lean and green programme.
Usability of the methodology and its application cost for stakeholders	There is no information available on the costs for implementation. The guidelines are freely available.
Potential use for generating innovations and new business models in the transport	The guidelines have been used to base tool on (e.g. BigMile).

Name	GuidelinesTopsector Logistics
Alignment with other frameworks, tools, and green initiatives	The guidelines are based on COFRET and also considers other developments such as of GLEC and ISO.

A.12 Clean Cargo Working Group Carbon Emissions Accounting Methodology

Name	Clean Cargo Working Group Carbon Emissions Accounting Methodology
Brief description	The Clean Cargo Working Group (CCGW) has developed a standard methodology for calculating emissions and benchmarking in the global container shipping sector in 2015. The intended users are carriers and shippers involved to the CCWG.
Objective of methodology	The objective according to methodology report is as follows: *"establish a robust and user-friendly industry standard on how to collect, calculate, and use CO_2-emission data for ocean container transportation based on actual (primary) operational and static data directly from container carriers, including fuel consumption and distance travelled, as well as other factors"* Comparability of vessel performance is the main objective.
URL	BSR : Clean Cargo Working Group Carbon Emissions Accounting Methodology (June 2015)
Scope	
Type of GHG emissions	The scope of the standard is on CO_2 emissions and other GHG emissions are not included. CO_2 emissions are assumed to be an appropriate approximation of total GHG emissions.
System boundaries of emissions	The methodology includes CO_2 emissions from TTW emission. WTT emission are not included but might be calculated by the user by adjusting the TTW to WTW emission as long as it is reported transparently. WTT emission might be included in updates of the methodology.
Other environmental impacts (NO_X, noise, etc.)	No other environmental impacts are part of the methodology.
Transport and logistics operations covered	The methodology is for maritime container shipping. It is not applicable to non-containerised cargo transported in bulk, break-bulk, tank, Ro-Ro, and ferry vessels. Transhipment and feeder services are to be included. Total CO_2 emissions related to container transportation must be captured (including emissions from empty back haul sailing/repositioning of containers) and allocated to full containers.
Geographical scope	Global.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The methodology differentiates between refrigerated and regular containers as refrigerated containers use significant amounts of energy for cooling. Emissions are calculated by multiplying fuel use with emission factors. The use of IMO standard fuel emission factor values is advised. These emissions are then divided by transport performance (TEU-km) to calculate average emissions. The fuel consumption for reefers is calculated separately with an average standard energy consumption factors for reefers per day. Carriers submit vessel specific data to the CCWG. This information is aggregated to calculate carrier and trade lane specific average emission factors. These values are also aggregated to calculate industry average factors. These factor in CO_2/TEU-km can be used by shipper and freight forwarders to calculate the CO -emissions of their shipments, knowing the TEU-km. Emissions from charter vessels should be included as well. These are preferably direct data, if not emission factors of comparable vessels should be used. The same applies for feeder services. In order to apply the 70 percent utilisation factor for containers the user should divide the CO_2 emission factors based on nominal capacity by 70 percent.

Name	Clean Cargo Working Group Carbon Emissions Accounting Methodology
Granularity of GHG calculation (e.g. company/leg/specific trip)	Emission are calculated at the level of a trade lane specific for a carrier or if not available for the shipper on the industry level (based on collected information from CCGA). If fewer than three carriers have reported on a trade lane global average data are applied by CCGA. The specific methodology applied for emission calculation should be clarified when reporting. In general the method calculates averages in order to overcome incidental differences due to for example weather conditions.
Transport performance metrics (definition of weight and distance)	Volumes are measured in TEU, the standard container unit. Different sizes are converted to TEU using conversion factors. Kilometres are measured in distance sailed, though shortest distance is also possible. If so, an adjustment factor must be applied.
Ex-post or ex-ante?	Ex-post.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	The CCGW methodology recommends fuel emission factors from IMO. For shippers, the CCGW can supply carrier of industry average trade-lane emission factors (in g CO_2/ TEU-km). If data are not available, the proxy should be used. This makes the method flexible but not less consistent, regarding the emission factors used.
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	The overall calculation methodology is prescribed but still leaves room for different interpretations and uses. However, if assumptions are reported as is prescribed, the calculations are reliable.
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Allocation must to the extent possible be based on capacity-limiting factors, which for container ships can be defined in container (TEU) capacity and Dead Weight Tonnage (DWT) restrictions. The transport of empty containers is allocated to the transport of full containers.
Time aggregation (allocation at shipment level or aggregated?)	Data should be collected over at least six months.
Reliability and consistency of the allocation methodology	There are two options for defining capacity, and as such there is some flexibility. Within both options the methodology is reliable and consistent.
Definition of output	
Level of detail on emissions data reported/made available by different type of stakeholders (prescribed and/ or voluntarily)	All carriers submit data annually according to a standardized reporting format coordinated and overseen by the CCWG secretariat, which is responsible for conducting high-level quality checks of the submitted data. The data submission covers the full reporting year and all vessels (owned and charter) operated by the carrier, excluding spot charter vessels hired for less than six months. When reporting according to the CCWG methodology reference to the methodology should be made. Also, in a clause, it should be specified how emissions are calculated.
Verification and assurance	
Third party validation?	Verification is not mandatory but carriers must report whether data is validated. A specific guidance document is available.

Name	Clean Cargo Working Group Carbon Emissions Accounting Methodology
Use of by stakeholders	
Uptake by the stakeholders/industry	According to the methodology report it is one of the industry standards used by maritime container shipping.
Usability of the methodology and its application cost for stakeholders	Not specified.
Potential use for generating innovations and new business models in the transport	Not specified.
Alignment with other frameworks, tools, and green initiatives	The methodology is aligned with internationally recognised standards such as the GHG Protocol supply chain guideline, GLEC, the European EN 16258 standard, and IMOs EEOI guidelines. GLEC refers to the CCGW method in its framework.

B Technical support tools

B.1 Introduction

In this Annex we present the results of an analysis of the main technical support tools, differentiating between calculation tools and emission databases. Each individual tool have been assessed on criteria related to their scope, their relevance, the emission calculation approach applied, their transparency, usability, costs and scalability (e.g. to other countries, transport segments, etc.).

The most relevant calculation tools and databases have been identified based on an initial desk study, results of the exploratory interviews and discussions with the Commission. They are discussed in more detail below.

B.2 Calculation tools

B.2.1 BigMile

Name	BigMile
Brief description	BigMile provides solutions to calculate, analyse and improve the CO_2 footprint of logistics companies (e.g. shippers, logistics service providers, field service companies). The main focus of the tool is on the allocation of GHG emission of transport to individual services. BigMile has been partially developed by the Topsector Logistics from the Lean & Green CO_2 reduction programme in the Netherlands. BigMile has grown to a private firm offering footprinting solutions for an international audience. BigMile offers two main solutions: – BigMile Carbon Analytics: which calculates, allocates, and analyses transport-related emissions; – BigMile Emission API: which embeds carbon emission calculations in third party applications. Currently over 200 companies are using BigMile.
Objective of the tool or database	BigMile is a support tool for logistic companies to monitor and reduce CO_2 emissions. It serves a dual purpose: – to calculate emission based on (preferably primary) data; – to allocate emission to specific orders and to perform analytics. The aim is to make it easy for users to get started on calculating their CO_2 footprint and get a better understanding of how their activities contribute to the total CO_2 footprint emissions thereby allowing them to reduce their CO_2 emissions. In addition it allows users to share information within the transport chain (e.g. between carriers and shippers).The platform aims at providing steps to reduce costs and emissions of the user but also within the supply chain.
URL	BigMile Homepage Bigmile Handbook (Januari 2021

Name	BigMile
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
System boundaries of emissions	The BigMile tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emission for hub operation and transhipment can be calculated.
Other environmental impacts (NO_X, noise, etc.)	Other environmental impacts are not included.
Intended users	Freight transport service operators and users.
Transport and logistics operations covered	The tool allows to calculate GHG emission for all modes of freight transport, as well as activities on logistic sites. The tool is used for regional, and urban transport as well as for international transport.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool provides CO_{2eq} -calculations, but the precise output depends on the solution and the goal of the user. The tool allows for GHG calculation at shipment level provided that sufficient data at shipment level is available. The second solution offers a Dashboard to monitor logistics analytics in combination with CO_2-eq. emissions. The outcomes of the CO_2-eq. calculation can be used for: – commercial offerings (e.g. proposal); – official transport documents (e.g. shipping documents drafted according to CMR); – reporting, business intelligence or analysing purposes; – invoices. BigMile has received ISAE 3000 certification, which confirms that BigMile calculates and allocates transport-related CO_2 emissions correctly. This ensures that auditors only have to check the input that goes through the system. The results can be downloaded as PDF file or, as user of Carbon Analytics, be viewed on a dashboard.
What is the frequency of updating the tool/ database?	This is not specified, but since it is a private service, updating most likely is continuously.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The BigMile tools offers users to calculate emission following different types of methodologies. These options are: – GLEC; – EN-16258; – own method (COFRET derived) described by the Topsector Logistics. Based on the selected option the methodology is applied for calculating emissions and distances, allocating emissions to shipments and calculate KPI's. Also, different default factors can be selected. The preferred method to calculate CO_2-eq. emission is calculation based on fuel consumption and fuel emission factors. Alternatively emission are modelled based on vehicle kilometres or tonne-kilometres and corresponding emission factors can be used.

Name	BigMile
Transparency	
is it clear how calculations are made?	The calculation method is not directly visible as this is not the purpose of the tool. Background documentation and accreditation from ISAE is, however, available.
Which input data is used? Where is data coming from?	Input data comes from carriers, shippers or logistic operators. The data is composed of four types: shipment data (origin destination and amounts), trip data, fuel data and locations (e.g. energy use of transhipment, cross docking, storage). The data used can be case specific, depending on the availability of the data. For example, fuel data can be based on litres used or average fuel consumption measured. The tools therefore allows users to draft multiple profiles to account for differences in data availability within their operation. Within types of data there is flexibility. Emission factors can be selected by the user. Standard options included are: – GLEC; – EN-16258; – CO_2-emissiefactoren.nl.
Usability	
is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is a private service and therefore not publicly accessible. BigMile offers software in the form of a subscription and thus offers support continuously. A handbook is provided to guide users in setting up their account (BigMile, 2021). The handbook describes the following procedure: 1. The tool provides users a questionary to determine the user's data availability. 2. Based on this, an Excel input file is generated, which users have to fill in. 3. The user than uploads the input file, which BigMile software will validate, as well as providing a completeness level (e.g. % of emissions/shipments covered). 4. The user than receives back the analysis. Further support is available by contacting BigMile. The available support languages are English and Dutch.
Alignment with other frameworks, tools, and green initiatives	BigMile is in various forms aligned with other initiatives. It allows calculation with various methodologies, various default factors can be used and BigMile is a partner of Lean & Green as well as GLEC. Compliancy with other initiatives includes: – GLEC; – ISAE 3000; – EN-16258; – NL CO_2-Emissiefactoren.nl; – UK Defra.
Costs	
What are the costs of using the tool/database?	The tools are provides for costs in the form of a subscription. Subscription fees are not published.
Scalability	
Are there any barriers for upscaling the tool/database?	The tool can handle large data files and is already suited for multiple trips. The tool is already flexible in aligning with different frameworks, so upscaling seems feasible to us. The tool can already be used for world-wide transport and there seems to be no barrier for incorporating new information of new modes or countries.

B.2.2 Carbon Care

Name	Carbon Care
Brief description	Carbon Care is a CO_2 and other GHG emissions calculator for passenger and freight transport. It calculates emissions by cargo movement in all continents and also offers the option to compensate the emissions. Carbon Care offers a free webpage based calculator, but also licenses for the use of more sophisticated tools with data exchange via Excel/FTP, XML/API. The tool is based on the methodology of the EU EN16258 standard. The online tool is for freight transport calculations.
Objective of the tool or database	The mission at the Carbon Care website states "The Carbon Care emissions calculator for industry, trade, and transport and logistics service providers supports companies on their way to 'Green Logistics' and climate-neutral transport. Robust and secure calculations for entire transport sector worldwide".
URL	CarbonCare: CO2 Emissions Calculator
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq. (and CO_2 separately). Carbon Care applied RF-Index for aviation of 1.0 according to CORE Project of University of Stockholm.
Life cycle boundaries of emissions	The tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emission for storage and transhipment can be calculated.
Other environmental impacts (NO_x, noise, etc.)	Only GHG emissions are calculated.
Intended users	Freight and passenger transport service operators and users.
Transport and logistics operations covered	The following freight modes an operations are covered by the tool: – air; – rail; – road; – sea; – inland-shipping; – refrigerated cargo; – transhipment and storage.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool presents emission values for TTW (CO_2-eq.) and WTW (CO_2-eq.) per period, means of transports and if information is provided per customer.
What is the frequency of updating the tool/ database?	The update frequency is unknown.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The methodology follows the EU EN16258 standard. The tool uses weight and origin and destination as input. The routing is calculated by the tool thereby determining the tonne-kilometres. Emission factors per tonne-kilometre are multiplied with the tonne-kilometres. For carriers the Carbon Care also offers the option to calculate CO_2 values for individual vehicles and for complete fleets based on actual consumption value and routing.

Name	Carbon Care
Transparency	
Is it clear how calculations are made?	The tool and the website do roughly mention what the input data fare and what sources are used for the different modes. Detailed information is not publicly available.
Which input data is used? Where is data coming from?	The user can input cargo weight and add legs or segments which are included in the total logistics chain. A location finder connects the route. With kilometres calculated by the tool tonne-kilometres are calculated. Emission factors per tonne-kilometre are multiplied with the tonne-kilometres to determine the CO_2 emission per leg and mode.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	Several legs can be added relatively easy including numerous transport modes. The tool is free to use and is available in German and English. The calculator interface is designed to include multiple segments with different mode of transport combined: Road, rail, air, sea and inland-waterways. Optionally, the emissions generated during the handling process (loading, unloading, storage, etc.) and the extra CO_2 generated by cooling the goods (cold Chain), can be added to the calculation (using default values). The licensed software can calculate for many more transports in an automated way.
Alignment with other frameworks, tools, and green initiatives	The tool is based on the methodology of the EU EN16258 standard, and validated by the 'myclimate' Foundation. It uses data from the clean cargo working group (Sea), STREAM (IWT).
Costs	
What are the costs of using the tool/database?	Carbon Care offers, next to the free calculator, advanced products and licenses to compute automatically the CO_2 emissions of transport and logistic, all available with data exchange, offset of the emissions, data storage and analysis options. The licensed software has costs depending on the products and the turnover of the company that is using it. Prices start from annual costs of 19,000 CHF.
Scalability	
Are there any barriers for upscaling the tool/ database?	The tool can already model world-wide transport and covers the most important modes (at least for freight transport, unclear for passenger transport).

B.2.3 Carbon Visibility

Name	Transporeon Carbon Visibility
Brief description	Transporeon Carbon Visibility provides certified emission reports for goods movement and benchmarking. Both shippers and carriers are able to use the tool to gain insight in their logistics movements. The tool is compliant with GLEC and EN16258.
Objective of the tool or database	The Carbon Visibility dashboard enables users to precisely measure and report on logistics emissions across your entire supply chain and all transport modalities. With the Key Environmental Indicator of Transporeon, companies can benchmark and compare GHG values based on data quality. Also shipper can compare different carriers. Finally, tool also allows scenario analysis. With those insights users can take action to reduce their emissions.
URL	Transporeon
Scope of the tool or database	
Type of (GHG) emissions	It is not completely clear whether GHG emission or only CO_2 emission originating from combustion of are reported by the tool.
Life cycle boundaries of emissions	Tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions).
Other environmental impacts (NO_x, noise, etc.)	No other environmental impacts are reported by the tool.
Intended users	Freight transport service operators and users
Modes, vehicles and operation type (warehousing?)	The tool makes calculation on intermodal freight transport, including: — road; — rail; — air; — sea.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool reports GHG emissions of organization, on lane level and on carrier level (for shippers). The tool also analytics and benchmarking options, the latter in collaboration with GLEC.
What is the frequency of updating the tool/database?	Fuel emission factors and default emission factors seem to be based on GLEC . It is unclear how often de tool is updated.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The tool is compliant with GLEC and EN 16258. Also ready for ISO 14083. No much details are given in the public available information on the website.
Transparency	
Is it clear how calculations are made?	The website does not specify how calculations are being made.
Which input data is used? Where is data coming from?	The input is not completely clear but seems to be flexible and includes fuel consumption, real time data and input for default calculation such as ton/km). Default factors in the tool are in line with the GLEC Framework methodology.

Name	Transporeon Carbon Visibility
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool can be integrated in the systems of the customer using an API.
Alignment with other frameworks, tools, and green initiatives	The tool is compliant with GLEC and EN 16258. Also ready for ISO 14083.
Costs	
What are the costs of using the tool/database?	An account with Transporeon is needed to access the tool.
Scalability	
Are there any barriers for upscaling the tool/database?	This is unknown.

B.2.4 EcoPassenger

Name	EcoPassenger
Brief description	EcoPassenger is a tool to compare energy consumptions and global warming and local emissions of the different major transport modes on passenger traffic. The main task of EcoPassenger is to deliver specific primary energy consumptions and pollutant emissions data for passenger trips in Europe and Russia.
Objective of methodology	The methodology document of EcoPassenger provides an explanation on the scope of transport modes, routing, use of energy and emission data sources. Furthermore, the document focusses on the methodology of connecting locations by routing, considering the selected transport modes, using country specific values.
URL	EcoPassenger Methodology
Use of by stakeholders	
Type of GHG emissions	CO_2 emissions.
System boundaries of emissions	— WTW, WTT, TTW; — Primary Energy Consumption (PEC); — emissions which are linked to the operation of vehicles; — emissions which are linked to the production of fuels and electricity.
Other environmental impacts (NO_X, noise, etc.)	— energy resource consumption (litres); — NO_x emissions; — NMHC – Non-methane hydro carbons; — PM – $PM_{2.5}$ and PM_{10} (exhaust emissions); — RFI – Radiation Forcing Index (aviation, longer than 500 km flight distance).
Transport and logistics operations covered	**Passenger transport** Road transport: — Passenger cars (gasoline*, diesel*, LPG, battery electric). (* Including specific biofuel blend) Rail transport: — High-speed, intercity, regional, suburban trains (electricity, diesel). Air transport: — Airplanes (kerosine). Feeder: — Busses, metro, taxis (diesel, electricity).
Geographical scope	Europe and Russia.
Emission calculation methodology	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The EcoPassenger methodology is based on calculating the specific emissions related to a routing, determined by the start and destination location. The aim of the integrated route planner is to find the real routes for journeys in Europe based on existing train and flight connections and car routes for an ecological comparison of the different modes. Due to the different emission data tables for different countries the route length of international journeys has to be broken down to single route lengths per country. The length of **car** routes is a result of an algorithm with linear distances and deviation factors, which depend on the distance class. The length of **train** routes is determined by the polygon defined by all in-between stops by a train. The length of a train route is defined by the 'line of sight' distance extended by 20 till 30% depending on the case. **Ferries** are handled as car or train route based on the distance between harbours.

Name	EcoPassenger
	Flights distanced are determined with air-line distance. An average of 50 km is added for wait loops. All airports within a radius of 250 km of the route start are considered. With several airport option the closest by airport is selected. **Feeder** transport to the airport follows the same methodology as train or car, depending on the selection by the user for feeder transport. The data used can be distinguished between country specific data (such as national mix of electricity production) and common data (such as emission data). Based on the routing the tool selects the values needed from the tables in the datasets, weighed against the distance covered per country. If no data is available than averages are used from the datasets. The routing distance and emissions per mode of transport are calculated per connection (if applicable) and country and are summed up. This result is presented to the user.
Level of GHG calculation (e.g. company/service) and can emissions be used to calculate environmental footprint of products and organisations	GHG emissions are calculated for passenger transport. Ton-kilometres are not considered in EcoPassenger, and the tool is not specified to be used for product or freight transportation. The tool can be used to register business travels for companies based on single journeys at a time.
Transport performance metrics (definition of weight and distance)	— duration of the journey (hours/minutes); — passenger kilometres, based on routing.
Time aggregation	Calculations and results are provided by selecting a single point-to-point journey. The duration is the time which takes to complete the journey. If applicable, the duration consists out of selected modes of transport combined (such as different train connections or aircraft with feeder).
Ex-post or ex-ante?	Ex-ante. EcoPassenger uses emission and energy databases to calculated the projected use of different modes of transportation, dependent on the destination and the transport mode selected by the user.
Flexibility, reliability and consistency in use of data sources for energy use and emission factors (e.g. are default emission factors mandatory)	Databases for emissions, energy mix, load factor are determined and are updated for all countries in scope. These are fixed and cannot be altered by the user. There are a few of parameters that can be adjusted by the user in the EcoPassenger interface: — start location and destination of trip (distance changes and, if selected, type of train or feeder to airport); — vehicle class (small, middle or upper); — EURO class passenger car; — fuel of passenger car; — number of passengers in passenger car (1 till 5, or average of 1,5); — load factor for train or airplane (average or maximum); — CO_2 emissions (with or without climate factor); — feeder to airport (consisting out for train, car or both); — selected electricity mix of railways (national production mix or railways mix including Green Certificates).
Flexibility, reliability and consistency in use of the calculation methodology (e.g. are multiple calculation methods possible, and is this transparent)	Although the input of several parameters can be changed by the user, the calculation methodology is fixed within the tool and cannot be changed by the user.

Name	EcoPassenger
Emission Allocation	
Type of methodology used to allocate emissions to individual shipments or passengers	Passenger km.
Time aggregation (allocation at shipment level or aggregated?)	Ex-ante allocated, which are based on statistics (annual).
Reliability and consistency of the allocation methodology	The country specific values are selected based on the input (start location, destination, date/time of departure/arrival) from the user interface. For instance for passenger cars, if the complete distance is divided in half between two countries, values are taken from the emission table for the first one half for the start nation and the second half for the destination nation. The estimated average speed is used for estimating the distribution of the estimated distance on to street classes motorway, rural and urban.
Definition of output	
Level of detail on emissions data reported / made available by different type of stakeholders (prescribed and/ or voluntarily)	Not applicable, determined by the user of the tool.
Use of by stakeholders	
Uptake by the stakeholders/ industry	The International Railways Union (UIC) uses the methodology to increase awareness among transportation users about the consequences of travel choices.
Usability of the methodology and its application cost for stakeholders	Application for single journey calculation is free. The tool is available to be implemented into other websites.
Potential use for generating innovations and new business models in the transport	The methodology provides insight into emissions related to passenger kilometres per mode of transport. These can therefore be compared to each other.
Alignment with other frameworks, tools, and green initiatives	— EN 16258 - Methodology for calculation and declaration of energy consumption and GHG emissions of transport services (freight and passengers). — Environment Strategy Reporting System (ESRS). — UIC Zero Carbon Project.

B.2.5 Eurocontrol small emitters tool

Name	Eurocontrol Small emitters tool
Brief description	The small emitters tool is a calculation tool that estimates the fuel burn of an entire flight considering the characteristics of the air traffic covered by the EU emissions trading scheme (EU ETS). The tool is developed by Eurocontrol in order to support aircraft operators that are "small emitters" in estimating emissions.
Objective of the tool or database	The tools main purpose is to estimate emission between origin and destination of flights. The underlying data is based on real measurements. The goal of the tool is to support aircraft operators (small emitters or operators that lack data on specific flights) in estimating CO_2 emissions for EU ETS reporting obligations.
URL	Eurocontrol: Small emitters tool
Scope of the tool or database	
Type of (GHG) emissions	The tool report CO_2 emission of fuel use.
Life cycle boundaries of emissions	The scope of the reported emission is TTW.
Other environmental impacts (NO_x, noise, etc.)	Next to CO_2 emissions the tool also reports energy consumption (fuel burn).
Intended users	The website of the tool states the following about the intended users: – Aircraft operators that are 'small emitters' (see definition in EC regulations related to ETS), with regard to their monitoring and reporting obligations pursuant to Article 14(3) of Directive 2003/87/EC (the EU ETS Directive) and Part 4 of Annex XIV to Decision 2007/589/EC (the monitoring and reporting guidance). – All aircraft operators, pursuant to Part 5 of Annex XIV to Decision 2007/589/EC for the purposes of estimating the fuel consumption of particular flights covered by the EU ETS, where the data necessary to monitor the emissions of carbon dioxide are missing as a result of circumstances beyond the control of the aircraft operator and which cannot be determined by an alternative method defined in the operator's monitoring plan (data gaps).
Transport and logistics operations covered	The tool is for aviation and gives results on entire flights.
Geographical scope	Global, but with an European focus as the underlying data is of European origin.
Relevance	
Output: what does the tool/database provide (as final result)?	The Excel tool provides an estimate of Fuel use and CO_2 emissions for a given distance, number of flights and aircraft type.
What is the frequency of updating the tool/database?	Annually.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	Emissions are calculated using fuel burn figures and emission factors. Fuel burn figures are calculated by tool itself based on historical measurements. The emission factors are in accordance with ICAO doc. 8643.

Name	Eurocontrol Small emitters tool
Transparency	
Is it clear how calculations are made?	There is some documentation available on the calculation method but the underlying assumptions is not visible.
Which input data is used? Where is data coming from?	Input data users have to provide is type of Aircraft (from a selection list), city pair flown distance, number of flights and whether 95 km should be added in case the great circle distance is used as input. The tool itself is based on fuel use data. The SET internal aircraft type fuel burn and emissions models are built on a statistical approach based on fuel burn samples of real life flights operation.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is very straightforward and, given its official purposes, does not offer much freedom for the users. Users can select the unit for distances (km or nm) as well as actual distance flown or an estimate (GCD + 95 km).
Alignment with other frameworks, tools, and green initiatives	The tool is used by several other tool and databased such as the DEFRA database and STREAM.
Costs	
What are the costs of using the tool/database?	The tool can be used free of costs. No information on indirect costs is available.
Scalability	
Are there any barriers for upscaling the tool/ database?	Only aircrafts active in ETS area are included. Aircrafts below 5,700 kg, which are exempted from EU ETS, are not included in the tool.

B.2.6 GHG Protocol Calculation tool for transport

Name	GHG Protocol Calculation tool for transport
Brief description	The GHG Protocol establishes a global standardised framework to measure and manage GHG emissions form private and public operations. The GHG Emissions Calculation Tool is a free, Excel-based tool that helps companies estimate their emissions.
Objective of the tool or database	The GHG Emissions Calculation Tool helps companies estimate their greenhouse gas (GHG) emissions based on the GHG Protocol.
URL	GHG Emissions Calculation Tool
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel and from refrigeration expressed in CO_2-eq.
Life cycle boundaries of emissions	This tool covers the following cross-sectoral emission sources: – Scope 1: Stationary Combustion, Mobile Combustion, and Fugitive Emissions from Air Conditioning; – Scope 2: Purchased Electricity and Purchased Heat/Steam; – Scope 3: Upstream Transportation and Distribution, Business Travel, and Employee Commuting. According to the GHG Emissions calculation tool, companies might have other emissions sources in their value chain and potentially also their internal operations. Companies should strive to calculate these other emissions, when appropriate. The tool gives the option to uplift the CO_2 emissions of aviation for the Radiative Forcing (RF) effect of emissions at high altitude.
Other environmental impacts (NO_x, noise, etc.)	The tool is about GHG emissions only.
Intended users	Transport service operators and users.
Transport and logistics operations covered	The tool allows to calculate and model emission of all transport modes and emission of transport hubs specified for the following categories: – Stationary: • natural gas boilers • diesel generators – Mobile: • cars; • trucks; • planes; • boats. – Refrigerants.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The final result are total emissions per scope or per activity, specifically for all transport (passenger and or freight) activities of a company.
What is the frequency of updating the tool/database?	The frequency of updating is unknown. The last update was in March 2021.

Name	GHG Protocol Calculation tool for transport
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	Input values from the user are processed with default emission factors per amount of fuel per kWh of electricity for primary data or per kilometre, per passenger-km or tonne-km when fuel consumption is not directly known. For the latter category and for electricity also own emissions factors can be applied in the tool.
Transparency	
Is it clear how calculations are made?	The Excel tool states how calculations are being made. Furthermore, since the tool is Excel based, formulas can be identified and followed and the way how calculations are executed are clear.
Which input data is used? Where is data coming from?	The tool uses default emission factors, which vary by country. These are free to use and publicly available, and the tool includes links of where to obtain them. Currently, separate sets of emission factors are available for the UK and US. Location-based Scope 2 emission factors are also available for the US, Canada and Australia, while market-based residual mix emission factors are available for the US, Canada and all European counties. The Excel tool states the use of the latest GWP values is recommended.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is very clear and relatively basic to use. Instructions are cleary given and the user has the possibility to use its own emission values. An extensive guideline on the Technical Guidance for Calculating Scope 3 is provided on the GHG Protocol website. The tool seems to be only available in English.
Costs	
What are the costs of using the tool/database?	The tool is free to use.
Scalability	
Are there any barriers for upscaling the tool/database?	The tool already focusses on a wide scope on stationary combustion, mobile combustion, refrigerants, purchased electricity and transport. The tool has potential to be upscaled further.

B.2.7 GreenRouter

Name	GreenRouter
Brief description	GreenRouter is a tool developed in Italy that focusses on climate impact measurement of supply chains from production facilities to point of sales. The tool is EN 16258 compliant as verified by SGS, and consistent with the GHG protocol. The web platform calculates the environmental impact of transport and warehousing activities, together with other GHG related activities. GreenRouter has been accredited by Smart Freight Centre as a calculation tool that provides emissions calculations in conformance with the GLEC Framework.
Objective of the tool or database	The website states "GreenRouter aims to turn the climate impact measurement of supply chains into an established practice for both large companies and SMEs, which are interested in developing a CO_2 emission measurement process".
URL	Greenrouter
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel and from refrigeration expressed in CO_2-eq.
Life cycle boundaries of emissions	The tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emission for hub operation and transhipment can be calculated.
Other environmental impacts (NO_X, noise, etc.)	The tool includes the following other environmental impacts (source: Smart Freight Centre): – energy consumption; – particulate matter (PM).
Intended user	Freight transport service operators and users, both large companies and SMEs.
Transport and logistics operations covered	The tool covers the following logistics activities: – road transport; – rail transport; – maritime transport; – air transport; – activities at logistics sites (based on defaults from the work on the Reff tool).
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	Emission projection and allocation of the GHG emission from the production facilities to the point of sale location (PoS) throughout the supply chain. Through the interface serval modes of transport can be compared over the same route. The comparison includes total emissions and energy consumption, emission per transport chain element and per ton.km.
What is the frequency of updating the tool/ database?	There is no mentioning on the website of the frequency of updating the tool or database.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The GreenRouter tool provides emissions calculations in conformance with the GLEC Framework. Logistic buildings calculation model is verified with the Fraunhofer (Reff Tool) guidelines on GHG emission calculation. An automatic haulage-specific distance calculating system is used in the tool, with a database of 540 airports, 1,510 ports and 300 intermodal terminals.

Name	GreenRouter
Transparency	
Is it clear how calculations are made?	Calculation methods are not presented on the GreenRouting website, nor in the GreenRouting EN 16258 certificate. The methodology is available for users upon written request and NDA (source: Smart Freight Centre).
Which input data is used? Where is data coming from?	The user provides the routing, vehicle type and the transport activity (tkm). Fuel consumption parameters are provided by the tool, but can be customized. Routing can be provided by the user of by Here Maps (truck specific routing), GIS internal engine (Rail, Sea), or great circle distance for aviation according to EN 16258.(source: Smart Freight Centre).
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	A preview of the tool, or examples of it, is unavailable on the website. The tool uses data from the user, though default values are available. The website is available in Italian and English, it is unclear if there are other languages available within the tool.
Costs	
What are the costs of using the tool/database?	There is no mentioning of costs of using or implementing the tool.
Scalability	
Are there any barriers for upscaling the tool/ database?	On the website there is not enough information to identify what is needed to upscale the tool to other countries or other modes.

B.2.8 LogEC

Name	LogEC
Brief description	LogEC is a tool that helps shippers, transport organisers and carriers of freight to calculate CO_2 and CO_2-eq. emission on individual shipment level for their client according to N 16258 and French decree 2011-1336. It uses primary data where possible but can model emissions as well. Through standard interfaces for shipment data, the user can integrate new customers. With the information provided by LogEC, the user and their customers are able to plan, evaluate, implement and monitor shipments and logistics to reduce CO_2 and GHG emissions. LogEC is also available as a light version and Mobile app.
Objective of the tool or database	LogEC is helps users to report CO_2 and CO_2-eq. emission to client according to N 16258 and French decree 2011-1336.
URL	LogEC – Logistics Emissions Calculator
Scope of the tool or database	
Type of (GHG) emissions	The tool reports both CO_2 and CO_2-eq. (including N_2O en CH_4).
Life cycle boundaries of emissions	The LogEC tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emission for warehousing and handling can be calculated.
Other environmental impacts (NOX, noise, etc.)	Next to GHG the tool can also calculate: – energy consumption; – CO (carbon monoxide); – hydrocarbons (HC); – nitrous oxides (NO_x).
Intended users	Freight transport service operators and users.
Transport and logistics operations covered	The tool allows to calculate GHG emission for all modes of freight transport, as well as activities on logistic sites.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool provides the user emission calculation on shipment or parcel level, from pickup point to delivery point. Through automatization within LogEC users can analyse a high amount of shipments at once.
What is the frequency of updating the tool/database?	The frequency of updates is not presented by LogEC.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	Transport chains are divided into legs, in which different transport modes can be operative. Through energy and fuel consumption LogEC calculates CO_2 and GHG emissions per transport and per parcel. LogEC has approaches both for shippers and Third Party Logistics Providers (3PLs). For shippers calculations can be based on transport invoices and delivery notes to estimate the transport emissions with default and modelled data. For the '3PLs more detailed (primary) transport information can be used. The tool is certified by Bureau Veritas for compliance with DIN EN 16258 abd French Decree 2011:1336.
Transparency	
Is it clear how calculations are made?	The website of LogEC (by Bearing Point) informs about the global architecture of the calculations. An elaborate presentation of the calculation methods or formulas of LogEC is not given.
Which input data is used? Where is data coming from?	LogEC can use fuel data and operational data such as track and trace or simulate transports, for instance, by using invoice data. HBEFA data can be used in case of missing real data.

Name	LogEC
Usability	
is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	Due to the lack of a methodology or accurate representation of LogEC by Bearing Point, it is unclear how the tool operates.
Costs	
What are the costs of using the tool/database?	The website of Bearing Point does specify the costs of using LogEC.
Scalability	
Are there any barriers for upscaling the tool/ database?	Due to the lack of a methodology or accurate representation of LogEC by Bearing Point, it is unclear how the tool can be upscaled.

B.2.9 NTM calc

Name	NTM Calc
Brief description	In order to promote and develop the environmental work in the transport sector, the Network for Transport and Environment (NTM), based in Sweden, acts for a common and accepted method for calculation of emissions, use of natural resources and other external effects from goods and passenger transport. The NTM tool has been primarily developed for buyers and sellers of transport services, hence enabling evaluation of the environmental impact from their own transports. The tool has a public basic version and an advanced version for members. The method behind the tool is consistent with the EN 16 258 for calculating greenhouse gas emissions and energy use.
Objective of the tool or database	NTM Calc was created by Nätverket för Godstransporter och Miljö (NTM, the Network for Freight Transport and the Environment). The purpose of NTM Calc is to calculate emissions and energy consumption for a user defined transport chain. The tool can be used for optimising transports by evaluating different transport strategies.
URL	Transport measures: NTMCalc Basic 4.0 Environmental Performance Calculator Transport Measures : About The Network for Transport Measures (NTM)
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
Life cycle boundaries of emissions	The NTM tooling includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emission for hub operation and transhipment can be calculated.
Other environmental impacts (NO_x, noise, etc.)	Besides GHG emission the NTM tool (in advance mode) calculates SO_2, NO_x, Hydrocarbons, particulate matter emissions and Energy consumption.
Intended users	Freight and passenger transport service users. The tool seems less suited for transport operator.
Transport and logistics operations covered	The tool include calculation options for all passenger and freight modes including: – road (car, van, truck, city bus); – aviation; – sea shipping; – public transport; – rail transport. Also cargo handling activities such as refrigeration, loading and unloading of cargo are included in the tool.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool provides the user with the TTW and WTT emissions per leg of the journey.
What is the frequency of updating the tool/database?	It is not clear from the background information how often the tool and methodology are updated.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The calculation methodology behind the tool is consistent and compatible with the CEN standard, EN 16 258 for calculating greenhouse gas emissions and energy use for freight and passenger transport. In the basic mode, the calculation are based on default factors. In the advanced mode also calculations based on primary data are possible.

Name	NTM Calc
Transparency	
Is it clear how calculations are made?	The website of NTM provides some information on the calculation methods. No mentioning within the tool are made about how calculations are made. Transport Measures : NTM, 1.1. Cargo calculations
Which input data is used? Where is data coming from?	The user can define different modes of transport , the shipment weight and the origin and destination. Other additional parameters (in the advanced version) include fuel, road type, Euro Class, road gradient, cargo load factor weight and fuel type. Routing is performed using Google Maps. In the basic mode emission are calculated based on default emission factors per passenger-km or tonne-km. In the advanced mode also other inputs such as amount of fuel for road transport are possible.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is available in English and is relatively simple to use. The user can state destinations for the start (A) point and end (B) point, although suggestions on typing destinations is absent. Furthermore the tool asks about transport activity, which highlights the different modes that can be selected. A Google Maps interface is given to present the given routes.
Alignment with other frameworks, tools, and green initiatives	The tool is consistent and compatible with the CEN standard, EN 16258.
Costs	
What are the costs of using the tool/database?	The NTM calculator is free to use in the basic mode. Membership is required for the advanced tool. The annual membership costs depends on the turnover of the company and start from € 100,00 per year.
Scalability	
Are there any barriers for upscaling the tool/ database?	The tool uses default values for several parameters. These hinder upscaling the tool, since flexibility is contained by these pre-determined parameters.

B.2.10 Oui.sncf

Name	SNCF
Brief description	The Société Nationale des Chemins de fer Français (SNCF) is the French national rail association. SNCF Connect provides a calculation tool for the CO_2 emission calculation on train journeys. By presenting the emission calculation, users can calculate or validate the most environmental friendly mode of transport for their route and choose accordingly. SNCF provides the traveller with CO_2 information when finalising their booking, before validating the ticket for TGV, Intercités TER and Transilien trains for all journeys in France and abroad.
Objective of the tool or database	Informing traveller on CO_2 emissions or their journey, giving them the choice of selecting the most environmentally friendly mode of transport and thus contributing to the fight against climate change.
URL	SNCF Connect Methodology report
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
Life cycle boundaries of emissions	The CO_2 emissions are based on emission factors on well-to-wheel basis.
Other environmental impacts (NO_x, noise, etc.)	No other environmental impacts are included in the tool.
Intended users	Train (SNCF) service users.
Transport and logistics operations covered	The tool is focussed on train transport but makes comparisons to other modes. The tool includes the following transport modes: — train (TGV, Intercity, TER, Transilien, train/RER, and international trains per provider); — urban and interurban couches; — metro, tram, bus; — passenger car; — domestic flights.
Geographical scope	France and countries connected by French rail connections.
Relevance	
Output: what does the tool/database provide (as final result)?	SNCF Connect provides the user with CO_2 information when the booking of a train ticket is finalised. Before validating the shopping cart, the user is informed about the CO_2 emissions of the train journey and emissions of other transport modes.
What is the frequency of updating the tool/database?	The SNCF emission factors for the different type of trains are always based on the previous year. The emission for other modes are based on ADEME Carbon Base (ADEME: Bilans GES, Centre de ressources sur les bilans de gaz à effet de serre) and updated every year.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The method used by SNCF complies with the methodology guide published by the French government for greenhouse gases information for transport services, implementing Article L1431-3 of the French transport code. The route length (km) is calculated following the input on depart and destination location for the specific mode of transport on this route. The resulting passenger kilometres are multiplied by the emission factors per passenger kilometre. For trains, differentiated per train type, the values are based on the total annual energy consumption divided by the total passenger kilometres of the previous year. For other modes emission factors are based on ADEME's 'Carbon database – Base carbone' (ADEME: Bilans GES, Centre de ressources sur les bilans de gaz à effet de serre). When a trip requires the use of several types of train, the route's CO_2 emissions are calculated by adding up the calculation of individual trajectories.

Name	SNCF
Transparency	
Is it clear how calculations are made?	The website of SNCF Connect presents the method of CO_2 calculation. The methodology report of the tool presents the calculations and sources in a more elaborate manner.
Which input data is used? Where is data coming from?	Emission factors for trains are based on primary data from the train lines. Other emission factors are based on ADEME's 'Carbon database – Base carbone' (ADEME: Bilans GES, Centre de ressources sur les bilans de gaz à effet de serre). The distances are based on the kilometric databases for the rail , Mappy (cars) and DGAC (planes).
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is executed by the SNCF ticketing website. Therefore, the user is unable to alter input variables, other than the ticket involving start and end location and the train company with train type. The SNCF website is available in nine languages. The SNCF Connect website presents the calculation method and emissions per train type, the methodology report presents the input variables in a more extensive manner.
Costs	
What are the costs of using the tool/database?	The tool is incorporated into the ticketing service and is free.
Scalability	
Are there any barriers for upscaling the tool/ database?	The tool is only applicable on predetermined routes (see also Methodology report). This hampers the flexibility of the tool. In order to fit more routes outside France the tool has to be extended significantly. A more flexible method of routing requires radical rework of the methodology.

B.2.11 Reff tool

Name	REff tool
Brief description	Logistics sites have a connecting role within transport chains and play their part in contributing to overall logistics emissions. The aim is to provide businesses a tool that measures and monitors the resource consumption and emissions efficiency at logistics sites, and monitoring resource efficiency and developing further KPI's in the storage and transhipment sector. The tool focusses on warehouses, transhipment sites and distribution centres, for which GHG emissions can be calculated. The REff Tool is the result of numerous interlinked projects and activities in close cooperation with and the support of various partners. These are, among others, the German R&D project Green Logistics and GILA, LEARN project, the Global Logistics Emissions Council GLEC, EcoTransIT World, Sustainable Performance Monitor and Greenrouter. The tool follows EN 16258 and aims at implementing latest internationally accepted methods and standards, such as ISO/DIS 14083.
Objective of the tool or database	The aim is to provide businesses a tool that measures and monitors the resource consumption and emissions efficiency at logistics sites, and monitoring resource efficiency and developing further KPIs in the storage and transhipment sector.
URL	REff Assessment Tool
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel and from refrigeration expressed in CO_2-eq.
Life cycle boundaries of emissions	The tool inlcudes emissions of energy use and emissions during energy provision (WTW approach). Fuel or refrigerant spills and leakages during operation are also in scope.
Other environmental impacts (NO_x, noise, etc.)	Besides GHG emission the tool gives the option to monitor resource efficiency.
Intended users	Logistic site operators
Transport and logistics operations covered	The following activities at logistic sites (warehouses and transhipment sites) are covered by the tool: – inbound and outbound handling of load carriers; – handling for storage and retrieval (including temperature-control); – order picking; – yard logistics.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The calculated annual carbon footprint per site, average emission intensity values per site and possibility to monitor the company's resource efficiency over the years.
What is the frequency of updating the tool/database?	The site of the REff Tool states that "We continuously work on this topic and plan to update these values in the future." The most recent market study to estimate average logistic site emissions was carried out in 2021, with the next study planned for 2022.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The GLEC emission factors are recommended to calculate emissions. Allocation of emission is also according to the GLEC methodology based on the outgoing cargo measured in tonnes.

Name	REff tool
Transparency	
Is it clear how calculations are made?	Calculations are given in the Guide for Greenhouse Gas Emissions Accounting for Logistics Sites by Fraunhoger IML (Dobers et al., 2019)
Which input data is used? Where is data coming from?	Consumption data (such as annual fuel and electricity consumption) and logistics data can be delivered by the logistics site organisations themselves. Alternatively, REff Tool provides an average emission intensity value for logistics site calculations.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is relatively user friendly, though the user has to implement input variables themselves, and then use the tool to calculate the results. For energy consumption of materials handling equipment, the energy consumption of all relevant materials handling or storage equipment has to be collected. For calculating emission intensity values, the company records the throughput of the site. In addition to the total amount of cargo leaving the logistics site (throughput), the reporting company may also collect information on the share of logistics units with or without order picking or the share of ambient or refrigerated goods (depending on the relevant activities at the site) leaving the site. The methodology report and the website provide methodological guidelines. From the website it is unclear in which languages the tool is available.
Costs	
What are the costs of using the tool/database?	The website of REff Tool does not specify the costs of using the tool.
Scalability	
Are there any barriers for upscaling the tool/database?	The tool is specified to be used to calculate emissions from warehouses, etc. and can be implemented by other tool and framework as is foreseen by GLEC and EcoTransIT. The tool will be aligned with the new ISO standard.

B.2.12 Seaexplorer

Name	Global Sea Logistics Carbon Calculator/SeaExplorer
Brief description	Global Sea Logistics Carbon Calculator is a tool offered by Kuehne and Nagel to calculate e CO_2 emission for the door-to-door transport of full containers and part loads. At the SeaExplorer platform Kuehne and Nagel provides information on the reliability and departure schedules of global ship routings, in combination with the CO_2 emissions of these routings to allow customers to compare different options. The tool's calculation methodologies are verified by Clean Cargo.
Objective of the tool or database	The tool aims to give Kuehne+Nagel clients insight in the duration, the reliability and the GHG emission of different sea transport options from A to B.
URL	Kuehne-nagel. Carbon-footprint-calculator Kuehne-nagel. Seaexplorer - Your intelligent platform for sea logistics services in container shipping
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
Life cycle boundaries of emissions	The tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions).
Other environmental impacts (NO_x, noise, etc.)	According to the definitions on the website, the tool seems to give also information on: – energy consumption; – nitrogen oxide (NO_x); – sulphur dioxide (SO_2); – particulate matter (PM_{10}).
Intended users	Shipping companies that want to now the GHG emission of their transport.
Modes, vehicles and operation type (warehousing?)	The main transport mode of the tool is sea shipping of containers. Also pre- and end-haulage by road and rail are included in the tool.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The Global Sea Logistics Carbon Calculator provides a calculation of the CO_2 emission for the door-to-door transport of full containers and part loads. The SeaExplorer platform combines standard information on sea freight services and routings, with more detailed comparative data to aid the user choose the best transport options. The tool provides the user with real-time information on shipments, routing details including live vessel positions, cargo details and specific CO_2 emissions and ratings per routing.
What is the frequency of updating the tool/database?	The tool is updated frequently with new routes and shipping details. Furthermore, the tool uses the latest emission data from EcoTransIT. According to the website the tool uses the aggregated data on trade lanes reported by the members of the Clean Cargo (CC) shipping companies to CC in 2015.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The Global Sea Logistics Carbon Calculator provides a calculation of the CO_2 emission for the door-to-door transport of full containers and part loads. These calculations include current emission data by EcoTransIT reported by individual carriers including pre-, main- and on-carriage. The calculation methodology and emissions factor are verified by Clean Cargo.
Transparency	
Is it clear how calculations are made?	Kuehne+Nagel's emission calculator is using the methodology developed by Clean Cargo (CC) for the port to port transportation and the formula used by EcoTransit for truck or rail movements. For LCL shipments the formula uses 3 g/m^3/km.

Name	Global Sea Logistics Carbon Calculator/SeaExplorer
Which input data is used? Where is data coming from?	The input from the user is origin and destination and amount of containers. Kuehne+Nagel uses the aggregated data on trade lanes reported by the members of the Clean Cargo (CC) shipping companies to CC in 2015.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	CO_2 emissions are calculated within the routing of SeaExplorer. The tool uses the EcoTransIT interface to calculate emissions. Though the website is available in English and Dutch, the is no mentioning on the languages available in the tool.
Costs	
What are the costs of using the tool/database?	There is no mentioning of costs on the SeaExplorer or on the Kuene+Nagel website.
Scalability	
Are there any barriers for upscaling the tool/ database?	The tool is specifically for sea container transport with pre and end-haulage. The tool already has a world-wide coverage. Upscaling to other sea transport or other modes will probably not be easy and will look like the EcoTransit tool.

B.2.13 TK'Blue

Name	TK'Blue
Brief description	TK'Blue is a non-financial rating and labelling agency of transport that measures, rates and promotes the eco-responsible performance of each of the stakeholders, in compliance with the legislative and regulatory requirements relating to CO_2 emissions and Corporate social responsibility (CSR). TK'Blue provides them with a global and recognised platform of services to select, enhance and measure the precise societal impact of their eco-responsible choices and collectively share their benefits in a dynamic and sustainable way.
Objective of the tool or database	The goal of the tool is to highlight shippers, freight forwarders and carriers who choose to promote eco-responsible transport solutions, i.e. those that are economically, environmentally, socially and socially efficient. TK'Blue aims to exchange information between shippers, freight forwarders and carriers. Specific tools are available for shippers, carriers, freight forwarders and logisticians. Some of the tools are aimed at GHG accounting, others at general analytics, e.g. transmission of transport flows. For GHG accounting the function are: – to calculate emission based on primary data; – to allocate emission to specific orders and to perform analytics.
URL	TK'Blue: Particulate Matter, Pollution, Noise, Traffic Congestion and Accidents
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
System boundaries of emissions	The GHG tools include all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions). Also emissions at logistic sites can be calculated.
Other environmental impacts (NO_X, noise, etc.)	The tooling includes calculation of air pollutants and external costs.
Intended users	Freight transport service operators and users.
Transport and logistics operations covered	The tool is made to cover GHG accounting for all freight transport modes, as well as logistic sites.
Geographical scope	Global.
Relevance	
Output: what does the tool/database provide (as final result)?	The output of the tool depends on the type of tool or user. For the GHG accounting oriented functions the output includes: – TK'T index: Measures the quality level of transport companies. – TK'Ext index: Measures the economic, societal and performance of transport flows. – TK'CSR index: External costs of transport (CSR reporting). – TK'GHG index: GHG performance (total and g/tkm) calculated following two methods. Shippers are also able to compare performance of individual carriers.
What is the frequency of updating the tool/ database?	The update frequency is not specified

Name	TK'Blue
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	Two methods are applied: – French decree 2017-639; – EN 16258. Results are displayed for both. The calculation method has been audited and declared by Bureau VERITAS to comply with the regulatory requirements of the implementing decree n° 2014-530 of 22 May 2014 (implementing French decree 2017-639). The tool is also accredited by GLEC.
Transparency	
Is it clear how calculations are made?	This is not directly shown, but reference is made to the methods French decree 2017-639 and EN 16258.
Which input data is used? Where is data coming from?	The input depends on the type of tool. Overall carriers are able to submit transport data on their fuel consumption and transport performance. This allows a calculation of average GHG energy intensity (gCO_2e-tkm). Shippers import their transport flows, which uses carrier specific information to calculate results. Data has to be provided to TK'Blue platform in Excel, CSV format or via the TK'Blue API.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	TK'Blue is available in four languages: English, French, Spanish and German. Depending on the type of user different levels of data are required. For carriers, which submit data, the quality of data is divided in four categories. Primary data is the top category and results in a more accurate rating.
Alignment with other frameworks, tools, and green initiatives	TK'Blue is aligned with two methodologies for its emissions calculations. Other, non GHG functions, are aligned with other programmes and reports.
Costs	
What are the costs of using the tool/database?	TK'Blue labelling is free of charge for carriers. For the other tools and services a subscription is required.
Scalability	
Are there any barriers for upscaling the tool/ database?	Not specified.

B.2.14 TRACKS

Name	TRACKS
Brief description	TRACKS is a private company that provides CO_2 allocation solutions which helps transport businesses to reach emission goals. TRACKS want to drive decarbonisation of freight transport. TRACKS provides separate solutions for shippers, carriers, and logistics service providers.
Objective of the tool or database	The goal of the tool is to help companies to reduce emissions of transport. The exchange of data between shippers, carriers and forwarder is promoted by the tool by offering a tool that: — calculates emission based on primary data; — allocates emission to specific orders and performs analytics. Tracks works with primary data. Tracks also predicts fuel consumption, offer improvement recommendations like type of vehicle or tire selection.
URL	TRACKS
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
System boundaries of emissions	The tool includes all emissions of vehicle operation (TTW emissions) and emissions during energy provision (WTT emissions).
Other environmental impacts (NO_X, noise, etc.)	Next tot GHG emission, the tool reports fuel consumption.
Intended users	Freight transport service operators and users.
Transport and logistics operations covered	The focus seems to be on HGV. No other modes are mentioned on the website. It is however suggested that other modes are to be included. TRACKS performs analysis on results of truck telematics.
Geographical scope	Not specified.
Relevance	
Output: what does the tool/database provide (as final result)?	The tool provides users with a Dashboard that allows users to track and analyse their emissions. The details of the dashboard are not public.
What is the frequency of updating the tool/database?	Not specified, but probably continuously.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The tool is accredited by the GLEC Framework more specifics are not given.
Transparency	
Is it clear how calculations are made?	The calculations itself are not visible. but is according to the GLEC Framework.
Which input data is used? Where is data coming from?	Users have to supply primary data. It is unclear what primary data specifically is required, but TRACKS is able to communicate with truck telematics directly.

Name	TRACKS
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	Not clear as TRACKS is a private B2B solution.
Alignment with other frameworks, tools, and green initiatives	Tracks is accredited by GLEC, which means that calculation is done according to GLEC framework. Also compliant with GHG protocol, ISO, SolarImpulse, Science Based Targets, CDP.
Costs	
What are the costs of using the tool/database?	The costs are not specified on the website.
Scalability	
Are there any barriers for upscaling the tool/database?	TRACKS current focus is on truck emissions, but integration of other modes is probably possible. No other barriers are indicated. The website even indicated that upscaling is foreseen.

B.3 Emission databases

B.3.1 ADEME database

Name	ADEME database Base Carbone
Brief description	Base Carbone is a database constructed by ADEME, the French governmental environmental agency. It is administered by ADEME, but its governance involves many stakeholders and it can be added to freely. It consist of a database that is accessible online and downloadable for paying users. The articulation and convergence of environmental regulations requires data homogenisation, which Base Carbone does for France.
Objective of the tool or database	The goal of the database is to assist users for the accounting of carbon emissions with: — default fuel emission factors for calculations of emission based on fuel consumption; — database with default vehicle emission factors to support emission calculation when primary data is not available, but transport performance is known.
URL	Bienvenue sur Bilans GES
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel and refrigerants expressed in CO_2-eq.
System boundaries of emissions	— the database includes TTW and WTT emission factors; — biogenic emissions are included separately; — non-CO_2 emissions from aviation at high altitude are included separately.
Other environmental impacts (NO_X, noise, etc.)	Other environmental impacts are not included.
Intended users	It is intended for companies that report their CO_2 emissions, specifically in France. The database has a selection of data to report in the light of the framework of article L1431-3 of the French Code of Transport relating to CO_2 information for transport services.
Transport and logistics operations covered	The database includes emission factors for Passenger and freight for modes: Road, Rail, Air, Maritime, Inland waterway. No default emission factors for logistic sites are available.
Geographical scope	The database is constructed from a French context.
Relevance	
Output: what does the tool/database provide (as final result)?	The database is accessible via an internet search tool, Downloading data requires additional subscription to a user license. The tool provides emissions factors for fuels, transport vehicles and other sources of emissions (purchase of goods, waste treatment, electricity production).
What is the frequency of updating the tool/database?	The database us periodically updated, around every three years. But not all sources are updated constantly.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	This concerns a database so no calculations are made directly. The underlying transport data is derived from other sources which rely on certain methodologies. For combined air transport a weight of 100 kg for passengers is assumed for mass-based allocation between freight and passengers.

Name	ADEME database Base Carbone
Transparency	
Is it clear how calculations are made?	This concerns a database and not a tool, hence no direct calculations are made. Documentation details the hypotheses underlying the construction of all the data in the base, and refers to the studies that have enabled their construction.
Which input data is used? Where is data coming from?	Input data for fuels is divided into default factors for France and Europe. The European values are based in most cases on Decision 2007/589/CE. For France, the factors are based on ETS regulations and, for non-ETS fuels, the 2012 OMINEA report. Upstream emission factors for France and EU values are based on the 2013 JRC WTW study. Input data related to vehicles is derived from other sources: — GLEC: HGV, maritime; — Ecotransit: rail freight; — TARMAAC (French aviation agency calculator): air; — ADEME (2019) report: IWT; — HBEFA, CCTN, UTP; road passengers; — SNCF: rail passenger. The data in the database are validated by a governance committee incorporating various public and private stakeholders.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The tool is quite user friendly. The online search tool is helpful to search specific emission factors. As well as the ability to show the documentation and details of the specific emission factor. The database is available in French and English. There is a Forum to ask for support or discuss other issues.
Alignment with other frameworks, tools, and green initiatives	Many of the sources used in the database are taken from other sources. This includes GLEC, Ecotransit and HBEFA. The other way around, GLEC also uses the ADEME data as a source.
Costs	
What are the costs of using the tool/database?	Free of costs for basic use.
Scalability	
Are there any barriers for upscaling the tool/database?	Part of the emission factors are specific for France. This restricts upscaling towards other countries.

B.3.2 DBEIS/DEFRA database

Name	Greenhouse gas conversion factors of the UK Department for Business, Energy & Industrial Strategy
Brief description	The Greenhouse gas conversion factors of the UK Department for Business, Energy & Industrial Strategy emission conversion factors are suitable for use by UK and international organisations reporting on UK operations. It includes passenger and freight transport but also other activities. The conversion factors consist of: — (default) fuel emission factors for calculations of emission based on fuel consumption; — a database with default vehicle emission factors to support emission calculation
Objective of the tool or database	The conversion factors are for UK and international organisations reporting on UK operations. Therefore, the scope of the factors is defined such that it is relevant to emissions reporting according to the scopes of the GHG protocol. The factors may also be used for other purposes, but users do this at their own risk. There is a full set for expert users and a condensed set for non-expert users
URL	UK Government collection: : Government conversion factors for company reporting of greenhouse gas emissions UK Government Research and analysis: Greenhous gas reporting: conversion factors 2022
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel or losses of refrigerant expressed in CO_2-eq.
System boundaries of emissions	The database contains TTW and WTT emission factors. (WTT emission factors are not included in the condensed set). Scope 1, 2 and 3 emissions accounting is followed according to the GHG Protocol. Topics include fuels, bioenergy, refrigerants, electricity production for UK, heat and steam, distribution electricity,
Other environmental impacts (NO_X, noise, etc.)	Next to GHG emission also energy figures are part of the tool.
Intended users	UK and international organisations reporting on UK operations.
Transport and logistics operations covered	Passenger vehicles (car, motorbike), HGV, Vans, passenger and freight air transport, Ferries, freight tanker, maritime transport, Rail transport. Also warehousing can be covered by the fuel emission factors, however, mobile machinery default factors are not part of the tool.
Geographical scope	UK, and transports from and to the UK.
Relevance	
Output: what does the tool/database provide (as final result)?	The output is provided in an Excel document containing various sheets with emission factors accompanied by guidance.
What is the frequency of updating the tool/database?	Annually.

Name	Greenhouse gas conversion factors of the UK Department for Business, Energy & Industrial Strategy
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The database provides input for further calculations and is supported by a methodology report. In general amount of fuel or activity factors (passenger-km or tonne-km) are needed to calculate the emissions with the given emission factors. In order to calculate emission factors for combined transport specific methodologies are followed. For belly freight aviation this includes accounting additional weight of equipment specific to passenger services (e.g. seats, galleys, etc.) in the calculations, as well as type of seat (business, economic). For ferries, CO_2 emissions are allocated to passengers based on the weight of passengers + luggage + cars relative to the total weight of freight including freight vehicles/containers.
Transparency	
Is it clear how calculations are made?	It is explained how the emission factors can be used.
Which input data is used? Where is data coming from?	The number of sources for the input data are significant. These include national and international sources. Some of the most relevant data: Fuel: — national fuel and electricity emission factors from UK Greenhouse Gas Inventory (GHGI) managed by Ricardo energy & Environment; — Excergia study for WTT emissions, as well as JEC WTW study. Vehicles: — emissions based on NEDC/WLTP values, uplift values and well as national fleet data; — national public transport agencies and Eurostar; — UK Department for Transport; — Eurocontrol SET in combination with national statistics; — the Second IMO Study (which is already surpassed by two new editions); — EcoInvent for many life cycle analysis.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The database is fairly user-friendly. A full set is available for expert users, and a condensed set for most users. Both datasets include introductions as well as guidance at individual sheets. The sheets are categorized according to topic and Scope (1, 2 and 3). A detailed methodology report explains how the emission factors are derived.
Alignment with other frameworks, tools, and green initiatives	The emission factors are suited to assist UK based firms in reporting GHG emissions. There is a separate guidance report available for GHG reporting in general. Some companies have to comply in GHG reporting, for others this voluntary. Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance The emission factors are used by many other initiatives such as GLEC and the GHG protocol tool.

Name	Greenhouse gas conversion factors of the UK Department for Business, Energy & Industrial Strategy
Costs	
What are the costs of using the tool/database?	No direct costs are involved.
Scalability	
Are there any barriers for upscaling the tool/ database?	The database has been constructed from a UK perspective. As a result the fuel values, occupancy rates, etc. do not comply with other countries. This restricts upscaling of the results itself. The exercise can however be repeated for different countries.

B.3.3 GLEC database

Name	GLEC database
Brief description	The GLEC framework contains a dataset with default emission factors for fuels and vehicles. The default factors for vehicles are seen as a 'fall back' option in cases, for Scope 3 emissions, when knowledge about the details of subcontracted transport services, or access to primary data, is limited or unavailable. Use of the default factors described by GLEC is not mandatory, other sources can be used as long as they are accompanied with documentation.
Objective of the tool or database	The goal of the database is to provide: — (default) fuel emission factors for calculations of emission based on fuel consumption; — default vehicle emission factors to support emission calculation when primary data is not available, but transport performance is known.
URL	Smart Freight Centre : What is the GLEC Framework
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel and refrigerant emissions expressed in CO_2-eq.
Life cycle boundaries of emissions	The database provides Well-to-Wheel emission factors with a split between Tank-to-Wheel and Well-to-Tank.
Other environmental impacts (NO_x, noise, etc.)	Not included.
Intended users	The database is provided for users of the GLEC framework, The tool gives fuel factors for all users and vehicle values (per tkm) to report Scope 3 emissions for users that do not have primary data.
Transport and logistics operations covered	The database is relevant for logistics (freight only): Air, inland waterway transport, logistics sites, rail, road, sea.
Geographical scope	Global, with specifications for various regions (US, EU, and other) and geographical features (mountainous areas). Fuel and vehicle emission factors are specified per region.
Relevance	
Output: what does the tool/database provide (as final result)?	The default figures are provided for Fuel emission factors and Vehicle emission factors, which if relevant and possible specified towards regions. Refrigerant emission factors are also included. Tables are included in pdf with default factors. Further calculations have to be done manually.
What is the frequency of updating the tool/database?	Not clearly specified, but last update of the fuel default factors is from 2015. Vehicle factors are potentially from later years.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The dataset is intended to be used with the GLEC framework. However, users have to apply the methodology themselves.
Transparency	
Is it clear how calculations are made?	Not applicable, as this concerns a database and not a tool no calculations are performed directly.
Which input data is used? Where is data coming from?	The default values are based on other sources or constructed by other parties assigned by GLEC. The sources are clearly reported and contain regional differentiations to support the global outreach of GLEC. GLEC mentions the difficulty in remaining up-to-date while being aligned with other frameworks and

Name	GLEC database
	standards. Also, in order to promote accuracy, the use of default factors is not promoted. **Fuel data** From different sources: – EN16258, which itself draws heavily on the JEC report WTW- Reports Version 3c 2011, JEC. These figures are potentially outdated but still used in order not to create confusion through a proliferation of reference data. – GREET has been used for the NA fuel data. **Vehicle data** The GLEC default factors have been produced with certain constraints in mind, particularly: – the default values quoted are conservative in order to incentivise using primary data; – the values are generally quoted to two significant figures in order to emphasize that they only provide estimates of Scope 3 GHG emissions. **Air**: Multiple sources: – Eurocontrol Small Emitters Tool, based on values supplied by EcoTransIT; – ICAO Carbon Emissions Calculator Methodology Version 10 using calculation methodologies ATA RP1678 as well as EN16258. **IWT** emissions are based on separate study by STC-NESTRA (2018) commissioned by GLEC. **Logistics sites emissions** are constructed based on initial data gathering done during study on Fraunhofer IML's Guide for GHG Assessment for Logistic (Dobers et al., 2019) **Rail transport** emissions are based on UIC handbook, IEA global electricity emission factors, American Association of Railroads, ERTAC, GREET, GLEC Framework, Ecotransit 2018. **Road transport** emissions are primarily fuelled by: 1. SmartWay truck data 2018 for North America. 2. Handbook of Emission Factors (HBEFA) database values processed by intermediaries such as EcoTransIT, and others. 3. UK BEIS (formerly Defra). 4. Base Carbone, as used in application of article L. 1431-3 of the French Transport code (September 2018) 5. Network for Transport Measures (NTM). **Sea transport** emissions are for Tanker, General cargo and Bulk carrier derived from IMO 3rd GHG study and STREAM (CE Delft, 2021) Ro-Ro 'Average, freight only': Clean Shipping Index Fleet. Ro-Pax derived using fleet modelling data provided by EcoTransIT World on a weight-based allocation basis. Container emission factors are derived from the latest (2019) Clean Cargo trade lane CO_2 emission factors **Refrigerant** emission factors are derived from (Dobers et al., 2019)

Name	GLEC database
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The database serves a dual purpose. It delivers fuel emissions factors for Scope 1 and 3 calculations as well as vehicle emissions factors for Scope 3 calculations. The default vehicle factors have tiered levels of detail, designed to match the level of understanding of potential users of the information. Up to three levels of detail have been provided for each mode. 1. A single, conservative value where the user's knowledge is highly limited, often to the mode of transport used with little, if any, additional information. 2. A basic level of disaggregation where a service type is known, but detailed information of the vehicle or operational characteristics, which could help refine the value used, remain unknown. 3. A more granular set of values, for use where some knowledge about the vehicle type, vehicle size and fuel exists. The default values are supported by guidelines in English. Example calculations are provided in the annexes.
Costs	
What are the costs of using the tool/database?	Free of costs, no evidence available on costs/time for doing calculations
Scalability	
Are there any barriers for upscaling the tool/ database?	Within the GLEC framework the ambition is declared that default values become obsolete in the future. As discussed, using default values cannot match the quality of using primary figures. Specific barrier for using default factors mentioned: — they do no stimulated gathering primary data; — upscaling increases the demand for more specific factors; — there is a balance in updating emission factors, alignment with other methods, and having consistent results.

B.3.4 STREAM database

Name	STREAM freight transport
Brief description	STREAM freight 2020 is a report that provides emission factors for freight transport as well as underlying methodology and guidance on applying factors. The report has been developed by CE Delft and is primarily aimed for the Netherlands. STREAM has an older report on passenger transport, which is currently updated.
Objective of the tool or database	Stream is a database with default vehicle emission factors to support emission calculation when primary data is not available, but transport performance is known. Information on fuel emission factors is also available as part of the underlying methodology and to be used for emission calculation based on fuel consumption.
URL	CE Delft: STREAM Freight Transport 2020 CE Delft: STREAM personenvervoer 2014 versie 1.1
Scope of the tool or database	
Type of (GHG) emissions	GHG emissions originating from combustion of fuel expressed in CO_2-eq.
System boundaries of emissions	TTW and WTT emission factors are both included. For fuels and electricity also WTT emission related to infrastructure are included.
Other environmental impacts (NO_X, noise, etc.)	STREAM also reports air pollutants (PM, NO_x and SO_2).
Intended users	The STREAM database serves the website CO_2-emissiefacoren.nl, a harmonised dataset of CO_2-emission factors for the Netherlands. The Emission factors are intended for any user that wants to calculate emission of transport.
Transport and logistics operations covered	All modes of freight transport are reported in STREAM freight: Road, Rail, Air, IWT and maritime transport. STREAM passenger transport report all common passenger modes (road, rail, air).
Geographical scope	The factors are constructed for the Netherlands. The international modes of transport have a global relevance.
Relevance	
Output: what does the tool/database provide (as final result)?	The databased is delivered in a report which contains about 30 detailed tables which include Emission factors. Emission factors are specified to type of road, vehicle type, type of goods, and type of fuel.
What is the frequency of updating the tool/database?	The report is updated periodically. Approximately every 3-5 years.
Emission calculation methodology	
Which methodology is applied to calculate and allocate emissions (referring to the methodologies identified in Task 1.1).	The focus of STREAM is on supplying default emission factors per passenger-km and tonne-km. The report explains that calculations based on fuel consumption is preferred.
Transparency	
Is it clear how calculations are made?	The emission factors are presented in a report with detailed explanation on the sources.

Name	STREAM freight transport
Which input data is used? Where is data coming from?	The input data used is extensive. The main sources for each mode are: – Road: Emissions are based on Taskforce of transportation in the Netherlands which uses TNO measurement data. Load factors are based on CBS and HBEFA. – Rail: Ecotransit, Prorail. – IWT: Emissions are based on Taskforce of transportation in the Netherlands which uses TNO measurement data. – Air: Eurocontrol SET, EEA emissions calculator and Schiphol data. – Sea: EU ETS as well as IMO 4th GHG study.
Usability	
Is the tool/database user-friendly? Does the tool provide the option to use both own input data and default data? Is the tool available in multiple languages? Are there any guidelines supporting the use of the tool/database (and/or can support be requested for applying the tool/database)?	The emission factors in STREAM can be very specific, and for non-educated users it can be difficult to select the correct emission factors. Another issue is that, for non-average load factors, emission factors have to be adapted manually. The emission factors are accompanied by a report which provides guidance. This is available in Dutch as well as English.
Alignment with other frameworks, tools, and green initiatives	There is alignment due to the input data used. The results, vehicle and fuel emission factors, are presented on CO2emissiefactoren.nl.
Costs	
What are the costs of using the tool/database?	Free of costs.
Scalability	
Are there any barriers for upscaling the tool/ database?	The emission factors are focused on the Netherlands, which is a flat country with a specific inland waterway infrastructure. The emission factors itself thus have limited upscaling ability. The methodology and report can however be carried out for different countries.

C GHG emissions reporting schemes, green incentive programmes and certification frameworks

C.1 Introduction

In this annex we present the results of an analysis of the main current GHG emissions reporting schemes, green incentive programmes and certification frameworks. Although these initiatives often have a broader scope than just GHG emissions accounting, they are relevant as they provide incentives to apply emissions accounting. Moreover, all schemes/ programmes provide methodological guidance and reporting requirements. For that reason, they are relevant for CountEmissions EU.

The schemes/programmes considered have been identified based on an initial desk study, results of the exploratory interviews and discussions with the Commission. The overview provided below is not intended to be exhaustive, but instead focusses on the main schemes and programmes currently available.

Each individual scheme/programme have been analysed on criteria related to their type of users, scope, facilitation of users, reporting requirements, certification regimes applied, data exchange instruments used, and impacts. The detailed description of the schemes/ programmes on these topics can be found below.

C.2 Clean Cargo Working Group Initiative

Name	**Clean Cargo Working Group**
Brief description	The CCWG was established in 2002 by BSR (Business for Social Responsibility) and founding industry members. CCWG is composed of a member-elected steering committee and several working teams. BSR serves as the neutral secretariat, data manager, and expert facilitator. Data from more than 20 of the world's leading ocean carriers are reported to CCWG, representing more approximately 85% of global ocean trade. In January 2022 Clean Cargo became an initiative of Smart Freight Centre.
Objective of scheme	The Clean Cargo Working Group (CCWG) is focused on improving environmental performance in marine container transport using standardized tools for measurement, evaluation, and reporting.
URL	BSR CCWG Carbon Emissions Methodology 2015
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Major brands, cargo carriers, and freight-forwarders involved with maritime container transport.

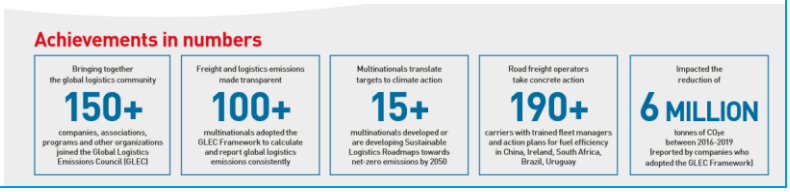
Name	Clean Cargo Working Group
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	Maritime container shipping. The focus is on CO_2 emissions but SO_x is also included.
Facilitation of users	
Which measures are available to support users in applying emission calculations?	There is a methodology report available that clarifies how emissions should be calculated.
Are different types of measures available for different types of stakeholders?	To an extent. Depending on the type of organisation there are other type of responsibilities and thus different types of measures.
Benefits for users	Clean Cargo generates high quality, decision useful containership greenhouse gas emissions performance information for members. Clean Cargo also serves as a forum for best practice sharing amongst members.
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	Yes, participants of the CCWG are required to measure and report emission performance for their operations. Carriers are required to report detailed data at vessel level about fuel use as well as vessel details and transport volumes and distances. The carrier specific emissions information is then made accessible to shipper and forwarder members. The results are processed anonymously to create sector and trade lane averages.
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	There is no certification of participants.
Data exchange instruments	
How is data exchange organised?	Not specified.
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	Annual average emissions are reported, which could be used to estimate efficiency. improvement. However, as emissions are measured in terms of TEUkm this only includes energy efficiency.

C.3 GLEC

Name	GLEC
Brief description	The Global Logistics Emissions Council (GLEC) was established in 2014. GLEC has grown into a voluntary partnership of more than 150 companies, industry associations, programmes, experts and other organisation.
Objective of the scheme	GLEC is a community of organisations and NGOs dedicated to driving widespread, transparent, and consistent calculation and reporting of logistics GHG emissions. It works to identify common problems, remove barriers and share a conviction that emission reduction in freight is urgent.
URL	Global Logistics Emissions Council
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Companies involved with logistics; mainly shippers, carriers and logistic service providers. Multinationals are more prominent, but SMEs can also participate as there are no exemptions. Besides companies directly involved also industry associations, programmes, experts and other organization are participating in the development of GLEC and its Framework.
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	WTW CO_2-eq. emissions following the GHG protocol. All transport related emissions are included for freight logistics. This involves: – air; – inland waterway transport; – logistics sites; – rail; – road; – sea.
Facilitation of users	
Which measures are available to support users in applying emission calculations?	The main support measure is the GLEC Framework. An extensive guideline for the calculation of GHG emissions in transport. The guideline distinguishes various modes, types of goods and type of users (e.g. carrier, shipper) to assist users in calculating emissions. Furthermore, GLEC offers a network for further support.
Are different types of measures available for different types of stakeholders?	The data requirement differs depending on the scope type of emissions. Scope 1 and 2 emissions must be calculated on primary data. In practice, carriers thus need to have fuel use data based on receipts or vehicle management systems. For Scope 3 the use of primary data is not always possible as this type of data is available throughout the supply chain. As a consequence more types of data besides primary data are allowed, being planned data, modelling data and default factors. The flexibility above is an example that measures for calculation emissions are differentiated depending on the type of user.
Benefits for users	The benefits of contributing to GLEC can be multiple depending on the type of organisation. For users of the GHG accounting the following benefits are identified: – use GHG emissions as a metric for sustainable freight transportation decisions; – make or influence decisions around supply chain optimisation; – manage the performance of the transportation in your supply chain; – evaluate the impact of measures taken to reduce emissions; – track progress towards your climate goals; – inform customers of emissions reductions achieved; – stay ahead of regulatory requirements.

Name	GLEC
	For other type of organisations, benefits are different: – influence future direction and standards for logistics emissions reporting and reduction; – improve performance and visibility; – position yourself with companies that want to report and reduce emissions; – stay informed on GLEC and related developments.
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	The reporting requirements are dependent on the type of reporting which depend on the followed approach (e.g. CDP reporting). The basic, minimum, option is to report the two main KPIs in conjunction with each other. This is the expectation but there is no further verification. – total emissions value, which shows the scale of the overall impact; – an emission intensity value, which links the emission to the transport activity or amount of product transported; – companies are free to report other KPI's as well, for example for specific goods or regions. Besides the basic reporting GLEC has initiated the GLEC Declaration. The GLEC Declaration was designed to harmonise and add transparency to the reporting process. The Declaration aims to streamline emissions reporting by increasing consistency in the information buyers request and sellers provide. This guidance covers typical freight transportation arrangements; different situations may require other types of data. Companies that sign the declaration are obliged to follow the guidelines for reporting. The GLEC Declaration includes two main parts: 1. A general section containing: • information on the company and its activities; • logistics information; • commitment to GLEC. 2. Declaration of emissions data and supporting information tailored to the primary audience, which has two possibilities: • Business-to-Business (B2B), customer reporting, where the emissions reported pertain to the service provided to a specific customer, i.e. tied to a contract and associated invoice. • reporting to external stakeholders, where the scope of reporting focuses on the total annual emissions and average emission intensity (e.g. in CSR or annual reports, to governments, carbon reporting initiatives such as CDP, GRI, etc.). The GLEC Framework also provides guidance to report according to the CDP Questionnaire. CDP is the primary reporting platform for corporate carbon emissions. The guidance mainly focuses on Scope 3 emissions, which are divided into specific categories.
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	Data verification is optional but encouraged. A separate guidance document is available for assurance (SFC, 2019). It is informed by the content of ISAE 3410 and ISO 14064-3, and assurance providers should follow the good practice guidelines laid out in abovementioned standards.

Name	GLEC
Data exchange instruments	
How is data exchange organised?	There is no data exchange within GLEC required. However, GLEC has researched how data exchange should ideally been organised. Within GLEC data exchange is being promoted. Currently a three phase project is running. Firstly the current situation has been reviewed, secondly to develop data exchange guidelines and a protocol and thirdly to start test cases. Phase 1 and 2 are completed (SFC, 2021a). The third phase is ongoing. The goals of data exchange are summarised as: – exchange of GHG emissions; – exchange of energy consumed; – the exchange of activity data. In each of these cases the calculation can be outsourced to a third party, whilst the input data can be derived from different sources and different aggregation levels. Understanding what input data is used and, most importantly, how the emission intensity value is derived determines the relative level of accuracy. GLEC advises a practical approach is proposed by selecting only a few key parameters and Data Type (e.g. primary or default), and exchanging this in a bilateral methodology statement or as an optional field within the proposed data model. A formal data quality ranking is subject to further discussion, since it can act as an incentive to increase precision and enable comparison and benchmarking but is subjective and high-quality data does not necessarily correlate with good emission performance or actions being taken to improve it. The responsibility for gathering and reporting the data is distributed across the shipper/freight buyers and the carrier/service provider. A general principle is that the consignment/shipment information is the responsibility of the freight buyer, whilst routing, transport asset information and energy consumed are the responsibility of the service provider, although in practice, in many complex supply chains, these responsibilities are transferred or shared. In the GLEC guidelines, suggestions are made to overcome trust and assurance issues at each of the stages of exchange (reluctance to share information, unreliable data retrieved, missing or inaccurate data, or wrong implementation of calculation methodology). By considering the use of an independent third party (possible in various setups) or through exchange of (anonymised) GHG emissions, automated and audited data and the use of accredited tool providers such issues can be overcome. To increase awareness and action in supply chains, freight buyers will require to support, in particular, their service providers in calculating and exchanging GHG emissions. This can be done by covering the cost for calculation, offer educational and technical support, share insights gained from the data retrieved and finally incentivize suppliers through contractual agreements and procurement. In the long term, it is anticipated that regulations will require each organization to report their GHG emissions.

Name	GLEC
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	Smart Freight Centre produces an annual report (SFC, 2021b) which produces some evidence. 

C.4 Lean & Green

Name	Lean and Green
Brief description	Lean and Green is a greening programme which has started in the Netherlands around 2010 by the public initiative Connekt. Since then more than 500 companies from fourteen European countries have participated in the programme. In the programme participants promise to reduce CO_2 emissions. For different reduction levels and associated efforts stars are awarded. This promotes companies which want to continue with GHG emissions as they are able to receive more rewards.
Objective of scheme	The goal is to reduce CO_2 emissions from transport and achieve zero emission transport in the future.
URL	Lean & Green Program: The road to zero emission logistics
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Shippers, carriers, retailers and other stakeholders involved with logistics (government, inland terminal, waste collection) that want to reduce their CO_2 footprint. Joining Lean and Green is compulsory but for parties involved certain requirements have to be met. Lean and Green is primarily a framework for frontrunners to measure and show their efforts for reducing GHG emissions.
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	The focus is on all transport operations. This includes all modes (potentially), but the main focus is on continental transport. CO_2-eq. emissions are included.
Facilitation of users	
Which measures are available to support users in applying emission calculations?	There are supportive documents. Calculations are done by participants, methodologies allowed are flexible and include: – COFRET; – CO_2 objectif; – GLEC. Furthermore, specific accredited tools, like BigMile, are allowed to calculate emissions automatically. This allows users to minimize effort as calculations do not have to be replicated.
Are different types of measures available for different types of stakeholders?	Depending on the data quality different calculations are done. Also, depending on the ambitions different emissions reduction measures have to be reached.
Benefits for users	Participants actively reduce GHG emissions which is beneficial for the environment as well as for fuel costs. Another benefit is that the grip on operations increases as data requirements increase with further improvements. A benefit of the star system is that benefits can be communicated externally showing the effort to general public.
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	Reporting is not a mandatory requirement. Depending on the CO_2 reduction achieved and measures taken to reduce emissions stars can be acquired. Depending on the stars different measures are required. E.g. one star is awarded after a 20% relative reduction of CO_2 emissions has been achieved (and verified). In total five stars can be achieved. External publications should include the emission reduction and or measures taken.

Name	Lean and Green
	In order to be awarded the first star at least information on fuel use and transport performance have to be available. For more stars, which takes more effort, more detailed data is required. This allows users to reduce their GHG emissions through a stepped approach.
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	Verification is done by the Lean and Green programme, which is run by the Dutch initiative Connekt. Auditing is done by a qualified and independent accounting firms according to standard 4400N in request of the participant.
Data exchange instruments	
How is data exchange organised?	The participants shares annual calculations and results with Lean and Green annually. These results are than used for anonymous benchmarking against similar companies.
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	According to the website over 700 kton CO_2 has been reduced, as well as more than 40 million road kilometres driven. No company specific evidence is available.

C.5 Objectif CO_2

Name	French Objectif CO_2 scheme
Brief description	The French Ministry of Ecology, Sustainable Development and Energy (MEDDE) and ADEME, working with all the professional organisations in the field of road freight transport, have developed a voluntary CO_2 emissions reduction programme. In the framework of a charter of commitments, transport companies pledge to work towards an overall CO_2 emissions reduction goal over a period of three years. A label is awarded to the companies that achieve the required level of performance. Objectif CO_2. An Emissions Reduction Program
Objective of scheme	The Objectif CO_2 programme was launched in December 2008 in the road freight sector (RFT) and was extended to intercity road passenger transport (RPT) in September 2011. Companies commit for a period of three years based on a concrete and customised action plan in order to achieve a global aim to reduce their CO_2 emissions. For this purpose, they must implement at least one action for each of the four key areas defined in the process, i.e.: vehicle, fuel, driver, organisation of flows (RFT) or organisation and management (RPT). This process was developed in collaboration with professional organisations of the sector, to meet the state environmental commitments. Source Ecologie
URL	Objectif CO_2. An Emissions Reduction Program
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Participation by companies is voluntary. Supply chain actors, shippers, freight forwarders, wholesalers, freight and passenger carriers. See also *'Are there any reporting requirements? What type of data are users expected to report?'*
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	Air, rail, inland shipping, sea, road, public transport. CO_2 and other GHGs.
Facilitation of users	
Which measures are available to support users in applying emission calculations?	A company can be assisted by a third party firm for all parts of the process. Furthermore, financial aid from ADEME is *possible, although is decided case-by-case. Other public aids may be added.
Are different types of measures available for different types of stakeholders?	Companies participating can select one of the four actions to implement.
Benefits for users	The advantages for companies are; – better management of activities and fuel consumption; – commitment in a structure-based process and a source for mobilising and motivating staff; – commercial promotion of actions taken with customers; – possibility of using logo related to the process and appearing on the list of signatory companies; – promoting the efforts made by companies to improve the image of road transport in France.

Name	French Objectif CO_2 scheme
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	There are a couple of participation conditions; – carry out a CO_2 diagnosis for initial reference and define scope of commitments; – establish a consumption monitoring system; – retain at least one environmental performance indicator specific to the company; – define an action plan retaining at least one action for each area (vehicle, fuel, driver, organisation of flows or organisation and management).
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	The allocation of the Objectif CO_2 label is certified on the basis of an external initial audit during which the reliability of the data and the performance level of the activity are verified in relation to the HBEFA standard. Objectif CO2
Data exchange instruments	
How is data exchange organised?	A data exchange platform facilitates the transmission and recovery of environmental data between carriers and clients. Carriers communicate the necessary environmental data to their customers. Clients can make a request to their service providers via the platform and then collect the expected environmental data. Objectif CO2
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	1.3 million tons of CO_2 emissions avoided each year. 230,000 vehicles covered, over 1,500 companies already engaged. Objectif CO2

C.6 SmartWay

Name	SmartWay US
Brief description	SmartWay is a US based programme run by the Environmental Protection Agency(EPA). It launched in 2004 and is a voluntary public-private programme. EPA's SmartWay programme helps companies advance supply chain sustainability by measuring, benchmarking, and improving freight transportation efficiency. SmartWay has three components: 1. The SmartWay Transport Partnership; freight shippers, carriers, logistics companies and other stakeholders partner with EPA to measure, benchmark and improve logistics operations so they can reduce their environmental footprint. 2. The SmartWay Brand; Through SmartWay technology verification and branding, EPA has accelerated availability, adoption and market penetration of fuel-saving technologies and operational practices while helping companies save fuel, lower costs and reduce adverse environmental impacts. 3. SmartWay Global Collaboration; EPA works with a broad range of national and global organisations to harmonise sustainability accounting methods in the freight sector.
Objective of scheme	Offer companies tools to assess and streamline shipping operations so they can use less fuel and generate less pollution.
URL	EPA - SmartWay
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Carriers, shippers and logistics companies. This includes multinationals as well as SMEs. Besides this also public parties, like local governance and universities are involved. Either as shippers or as other stakeholder.
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	Carriers, shippers and logistics companies. For the carriers, the following mode-specific tools are available: truck carrier, rail carrier, barge carrier, air carrier and multimodal carrier. Maritime transport is not covered directly, though there is alignment with other programmes (e.g. GLEC).
Facilitation of users	
Which measures are available to support users in applying emission calculations?	The SmartWay Transport Partnership provides calculation tools and guidance specified to type of user as well as mode. For frontrunners there is the possibility to contribute with the SmartWay Brand programme which signifies top performance in freight efficiency.
Are different types of measures available for different types of stakeholders?	Yes, see above.
Benefits for users	Some of the benefits are mentioned in the documentation: 4. the SmartWay brand is well known as a symbol of sustainable freight transportation; 5. help save fuel, lower costs and reduce adverse environmental impact; 6. measure, benchmark and improve logistics operations so they can reduce their environmental footprint.

Name	SmartWay US
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	There are tips and guidance about reporting or referring to SmartWay. But there do not seem to be actual requirements concerning reporting.
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	No mention of verification. Calculation tool is inhouse SmartWay.
Data exchange instruments	
How is data exchange organised?	Users fill in the tools from SmartWay which processes the information and compares results against other, comparable, companies.
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	No evidence.

C.7 TK'Blue

Name	TK'Blue
Brief description	TK'Blue is a freight transport labelling and rating agency. TK'Blue advices clients about their transport service providers and enable them to meet their new obligations with regard to legislative and regulatory requirements, such as GHG (CO_2) and CSR reporting.
Objective of scheme	TK'Blue is a collaborative platform which enables shippers, carriers and freight forwarders to work together with a common goal of reducing poor quality factors (delays, breakdowns, theft), and the cost of the societal footprint of transport (PM, pollution, GHG, congestion, noise, accidents, etc.). Furthermore, TK'Blue highlights these three groups who choose to promote eco-responsible transport solutions, that are economically, environmentally and socially efficient.
URL	Particulate Matter, Pollution, Noise, Traffic Congestion and Accidents
Type of users	
What are the type of users participating? In case of a mandatory scheme: are some type of users (e.g. SMEs) exempted?	Shippers, carriers and freight forwarders.
Scope of the scheme	
Which transport modes/operations are considered? Which emissions are considered?	– road; – aviation; – sea shipping; – rail.
Facilitation of users	
Which measures are available to support users in applying emission calculations?	TK'Blue provides four indexes or four performances. Namely carrier performance (service quality), environmental performance (CO_2 and GHG emissions), societal performance (external costs) and ethical and social performance (sustainable measurers).
Are different types of measures available for different types of stakeholders?	TK'Blue offers different solutions for shippers, carriers and freight forwarders. Ratings are different for logistic parties. See also *'Are there any reporting requirements? What type of data are users expected to report?'*
Benefits for users	TK'Blue labels carriers based on their materials and equipment, so clients can make decisions on GHG emissions, pollutants and particles generated by your transport operations.
Reporting requirements	
Are there any reporting requirements? What type of data are users expected to report?	Rating is constructed via a combination of logistics data of the principals with the information of the carriers. TK'Blue carriers deliver GHG declaration Levels 1, 2 or 3 (average consumption, load rate) and carriers declaration (action plan, innovations, training, standard). TK'Blue shippers provide data flows with logistic data (tons, km). Rating criteria are constantly increased and updated thanks to a scientific council. Carbon footprint and methodology

Name	TK'Blue
Verification regimes applied	
Which approaches for verification are applied? Which type of auditors are involved?	TK'Blue provides a CO_2 calculator which is audited by Bureau Veritas.
Data exchange instruments	
How is data exchange organised?	TK'Blue is an collaborative platform, it enables players in the transport chain to work together. Through labelling, shippers, carriers and freight forwarders can identify their respective performance.
What are the impacts from the scheme/programme/framework	
Is any evidence available on the transport and environmental impacts achieved? And on the costs for participants?	According to TK'Blue, thousands of shippers and carriers are connected with the TK'Blue agency.

D Other relevant EU/global policies

D.1 Introduction

In this annex we analyse the relevance and (potential) interactions of the CountEmissions EU initiative and existing (and planned) EU (and relevant other international) policies. The main aim of this analysis is to identify potential overlaps, synergies and complementarities of these policies with CountEmissions EU. Furthermore, there are a few policies that provide a specific methodology for accounting emissions (i.e. EU MRV of CO_2 emissions from maritime transport, EU ETS for aviation, CORSIA, and IMO Data Collection System for fuel consumption of ships), which are relevant to include in the discussion of existing standards and methodologies (see Section 2.3 and Annex A of the main report).

The selection of relevant EU and global policies considered in this annex, is made based on inputs from an initial desk study, results of the exploratory interviews and discussions with the Commission.

We have described the various policy instruments in the next sections on criteria like their scope, emission calculation approach, and verification and assurance schemes. Based on this description of individual policies, an overall analysis of potential interlinkages of these policies with the CountEmissions EU initiative has been made (see Annex B of the main report). The results of the description of individual policies have also been used as input for the analysis of existing standards and methodologies for GHG emissions accounting in transport (see Section 2.3 and Annex A in the main report).

D.2 Renewable Energy Directive (II and III)

Directive 2018/2001 on the promotion of the use of energy from renewable sources (Renewable Energy Directive)	
Brief description	The Renewable Energy Directive (RED) establishes a common framework for the promotion of energy from renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. Member States should establish their individual contribution to the achievement of that target as part of their integrated national energy and climate plans. The RED also includes a specific target for the transport sector: 'In order to mainstream the use of renewable energy in the transport sector, each Member State shall set an obligation on fuel suppliers to ensure that the share of renewable energy within the final consumption of energy in the transport sector is at least 14 % by 2030 (minimum share)'. Besides a binding target for the share of energy from renewable sources the RED also lays down rules on other aspects related to the support of renewable energy, e.g. on financial support for electricity from renewable sources, on the use of energy from renewable sources in the transport sector, on guarantees of origin, etc. It also establishes sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels.

Directive 2018/2001 on the promotion of the use of energy from renewable sources (Renewable Energy Directive)	
	The original Directive (RED I) came into effect in 2009. The Directive was then updated with RED II in 2018. The Fit for 55 package includes a slight revision to this directive (REDIII) in order to align the RED with the EU's significantly raised climate ambition as part of the EU Green Deal. The proposal for the RED III changes the 2030 transport target (as share of final energy consumption in transport) to a greenhouse gas intensity target. This implies the RED transport goal will no longer focus on volumes of renewable energy, but on actual GHG emissions. GHG accounting will become more important, because renewable energy sources with a better GHG performance will contribute more towards the targets.
Policy status	This RED II is fully implemented. A proposed revision of this directive (RED III) has been proposed as part of the Fit for 55 package.
URL to legislative document	Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (Text with EEA relevance.) (RED II) RED III proposal
Scope	
Type of emissions	The WTW emissions of CO_2, N_2O and CH_4 are within the scope of the Directive. The greenhouse gas emissions from biofuels and other renewable fuels are expressed in terms of grams of CO_2 equivalent per MJ of fuel, g CO_2-eq./MJ.
Transport and logistics operations covered	In order to determine the share of renewable energy in transport, the total amount of renewable energy supplied for consumption in ALL transport modes should be divided by the total amount of energy supplied for consumption in road and rail. This implies fuels supplied to, for example, the aviation sector, IWT and maritime sector can contribute to the targets, but fuel suppliers supplying fuels to those sectors are not subject to the obligation. The same sustainability criteria should be met by those sectors though. In the RED III proposal, all fuels and electricity supplied to the transport sector shall be taken into account in the denominator, which implies the maritime and aviation sectors as well as IWT are also included.
Geographical scope	EU (the energy consumed in the EU, which means that renewable energy, such as biofuels, imported from outside the EU are subject to the RED as well).
Emission calculations	
Type of emissions calculation methodology applied	The RED sets sustainability criteria with minimum thresholds for emission reduction of 70% compared to the fossil fuel reference of 94g CO_2/MJ being the most important one. Emission reductions should be calculated as the combined effect of: – the emissions from the extraction or cultivation of raw materials; – annualised emissions from carbon stock changes caused by land-use change; – emissions from processing; – emissions from transport and distribution; – emissions from the fuel in use; – emission savings from soil carbon accumulation via improved agricultural management; – emission savings from CO_2 capture and geological storage; – emission savings from CO_2 capture and replacement. The achievement of the targets should be ensured by obligations on fuel suppliers. Therefore fuel suppliers should perform the calculations. Certification schemes are in place to verify sustainability and emission reduction claims.

Directive 2018/2001 on the promotion of the use of energy from renewable sources (Renewable Energy Directive)	
Approach to estimate transport related emissions	Default values for the emissions of different biofuels from specific feedstocks are defined (based on typical values) for all steps of the life cycle. Economic operators have the option to either use the default GHG intensity values or calculate actual values for their pathways. These default values are in some cases higher than the typical values, to incentivise the use of actual emission factors. The methodology for the calculation of actual values are included in the Part C of Annex V or Part B of Annex V of the Directive.
Reporting requirements	Fuel suppliers need to supply information on how they have met their obligations and to show sustainability criteria have been met by using a mass balance system. Member States shall take measures to ensure that economic operators submit reliable information regarding the compliance with the GHG emissions savings thresholds and with the sustainability and GHG emissions saving. This includes rules for proper auditing. One measure is to establish a Union database. 'Member States shall require the relevant economic operators to enter into that database information on the transactions made and the sustainability characteristics of those fuels, including their life cycle greenhouse gas emissions, starting from their point of production to the fuel supplier that places the fuel on the market. A Member State may set up a national database that is linked to the Union database ensuring that information entered is instantly transferred between the databases. Fuel suppliers shall enter the information necessary to verify compliance with the requirements.' The mass balance system and Union Database should avoid double counting of single consignments. The Union database will cover all types of the renewable transport fuels. Within the REDIII proposal it is also suggested to extent the scope to other sectors.
Verification and assurance	
Third party validation	Member States need to arrange for adequate standard of independent auditing of the information submitted, and provide an evidence of this verification. So far, the EC has recognised thirteen voluntary schemes to verify sustainability and emission reduction claims. Fuel suppliers can use those schemes to proof compliance. These schemes are international schemes or national schemes. Some of these are focused on specific feedstocks or renewable fuels. Probably more certification schemes will follow. Besides approval by the Commission, Member States may choose to use other schemes as well: EU countries may accept evidence from voluntary schemes or national certifications schemes set up by EU countries not recognised by the Commission if the competent authorities in those countries are confident about the quality of the certification services provided by these schemes'.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The RED provides specific emission values for biofuels from various feedstocks (and other renewable fuels in transport). These emissions values (in gCO_2/MJ and in comparison to the fossil fuel comparator) could be adopted by the CountEmissions EU Framework as well. Shippers (in case of freight transport), passengers or transport operators can use these emission values to calculate their emissions based on their fuel consumption. However, the RED covers different production pathways in combination with different feedstocks. Often, stakeholders (other than fuels suppliers) are not aware of the feedstocks being used. Therefore, average values (based on the average feedstock mix) are probably required to simplify the process.

Directive 2018/2001 on the promotion of the use of energy from renewable sources (Renewable Energy Directive)	
	The Union database will also be very helpful as a potential data source for the CountEmissions EU Framework. Aligning the methodology for the GHG intensity of fuels with the RED methodology as much as possible will contribute to the harmonisation and alignment of EU policies.

D.3 Fuel Quality Directive

Policy name	**Directive 2009/30 regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions (Fuel Quality Directive)**
Brief description	The Fuel Quality Directive (FQD) lays down the fuel specifications for fuels used in road transport. For example, the provisions of the FQD define how much biodiesel diesel might contain to still be sold as regular diesel. In addition, Article 7a of the FQD sets a reduction target for the average GHG intensity of fuels by 6% by 2020 compared to 2010 levels. This Article 7a target is closely linked to the targets of the Renewable Energy Directive (same provisions apply regarding sustainability and calculation methodology (except the double counting provisions)). Because the Fit for 55 proposal for RED III introduces a GHG intensity target as well, the GHG intensity target as laid down in Article 7a might be less relevant. As part of the Fit for 55 no proposal for revision of the FQD has been published, so any target for 2030 is not known yet.
Policy status	Implemented.
URL to legislative document	EUR-Lex - Document 32009L0030
Scope	
Type of emissions	CO_2, N_2O and CH_4 emission over the full life cycle of the fuels (i.e. WTW emissions).
Transport and logistics operations covered	The Fuel Quality Directive applies to: — petrol, diesel and biofuels used in road transport; — gasoil used in non-road mobile machinery.
Geographical scope	EU.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Like with the RED, the reductions in GHG intensity of fuels should be calculated as the combined effect of: — the emissions from the extraction or cultivation of raw materials; — annualised emissions from carbon stock changes caused by land-use change; — emissions from processing; — emissions from transport and distribution; — emissions from the fuel in use; — emission savings from soil carbon accumulation via improved agricultural management; — emission savings from CO_2 capture and geological storage; — emission savings from CO_2 capture and replacement. The FQD does not contain any provisions for double counting of fuels.
Approach to estimate transport related emissions	See RED, in general the approach in terms of calculation methodology is similar.
Reporting requirements (parameters, granularity, time aggregation)	See RED, in general the approach in terms of reporting is similar. In addition to emissions, the FQD requires fuel suppliers to report on fuel quality as well. Although this provides information on fuel consumption levels per Member State this is less relevant for GHG accounting.
Verification and assurance	
Third party validation	See RED, in general the approach with respect to verification and assurance is similar.

Policy name	Directive 2009/30 regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions (Fuel Quality Directive)
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The FQD delivers emission factors (per MJ of fuel) for all road transport fuels (both fossil and renewable), where the RED covers more transport modes, but no fossil fuels. Like with the RED the emission factors per MJ of fuel are determined on a WTW basis based on feedstock and production pathway. In relation to the CountEmissions EU Initiative these factors can be used as well, but sometimes it might be difficult to know the exact feedstock/production pathways, which make that averages might be considered as well.

D.4 CO_2 emissions performance standards for new LDVs

Policy name	Regulation (EU) 2019/631 setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles
Brief description	Regulation (EU) 2019/631 sets out CO_2 emission performance standards for new passenger cars and for new light commercial vehicles. Compared to 2021, the regulation requires the following fleet-wide average CO_2 emissions from new cars and new vans: – by 15% (2025-2029); – by 37.5% for new cars and 31% for new vans from 2030 onwards. Based on these EU targets, specific targets for manufacturers are defined by the European Commission. Manufacturers need to pay fines if the targets are not met. Three related policies are covered by this factsheet as well: 1. **Regulation (EC) 715/2007** specifies rules for manufacturers and national governments for the type-approval of light passenger and commercial vehicles. Relevant requirements for manufacturers are that they should: • prove that all new vehicles and new pollution control devices comply with the legislation and can meet the emission limits during a vehicle's normal life under normal conditions; • ensure that pollution control devices can last 160,000 km; • ensure that vehicles emissions can be checked after five years or 100,000 km; • provide buyers with CO_2 emissions and fuel consumption figures. 2. **Regulation (EU) 2017/1151** supplements Regulation (EC) 715/2007 through: • a variety of tests designed to check emissions of light-duty vehicles; • setting a regulated procedure for checking Real Driving Emissions (RDE); • incorporates the Worldwide harmonised Light-duty vehicles Test Procedure (WLTP) into EU law. 3. Implementing **Regulation (EU) 2021/392** sets out procedures for the monitoring and reporting of data relating to new passenger cars and light commercial vehicles that are to be followed by the competent authorities of the Member States, the manufacturers as well as the Commission and the European Environment Agency.
Policy status	Implemented
URL to legislative document	– Regulation (EU) 2019/631 – Regulation (EU) 2017/1151 – Regulation (EC) 715/2007 – Implementing Regulation (EU) 2021/392
Scope	
Type of emissions	TTW CO_2 emissions.
Transport and logistics operations covered	New passenger cars and light commercial vehicles.
Geographical scope	EEA

Policy name	Regulation (EU) 2019/631 setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	To measure CO_2 emissions of new light duty vehicles a harmonised test procedure has been developed, i.e. the Worldwide harmonised Light-duty vehicles Test Procedure (WLTP). The WLTP cycle replaced the earlier used New European Driving Cycle (NEDC), as this test cycle, in combination with many other aspects of the procedure, resulted in emission figures that deviated too much from actual emissions. In addition to the WLTP, manufacturers are required to apply the Real Driving Emissions (RDE) test as well. This test determines the NO_x and PM emission figures in actual driving circumstances. Also, on-board diagnostics systems (OBD) must be installed on all vehicles to identify all forms of deterioration or malfunction over the lifetime of the vehicle. Furthermore, as part of the revised WLTP and RDE test procedures, all new passenger cars and light commercial vehicles must be fitted with an onboard fuel consumption meter (OBFCM) from 1 January 2020 to continuously measure the quantity of fuel/energy used to operate the vehicle. These devices should be readily accessible.
Approach to estimate transport related emissions	In accordance with Regulation (EU) 2017/1151 a certified CO_2 emission figure is determined for each LDV sold in EU Member States using the WLTP. Additional information on real-world fuel consumption can be obtained from onboard fuel consumption meters (OBFCM). These data could be used to derive more representative default real-world CO_2 emission factors.
Reporting requirements (parameters, granularity, time aggregation)	The monitoring and reporting cycle as defined by Regulation (EU) 2019/631 consists of three main steps: 1. The annual reporting by Member States to the Commission of provisional data based on registrations of new vehicles in the preceding calendar year. 2. The transmission of that data by the Commission to the manufacturers. 3. The verification of that data by the manufacturers and, where necessary, the notification to the Commission of corrections to that data. CO_2 emission values of vehicles are reported by OEMs on the Certificate of Conformity. National road authorities combine national sales data with the CoC-data and report the results on national vehicle registrations to the European Commission/European Environmental Agency. The CO_2 regulation applies to the measured CO_2 emissions in g/km on the complete WLTP test cycle. However, the CoC does contain the individual emission test results on the four phases (low/medium/high/extra high) of the WLTP test cycle, which could be used to derive specific emission factors for specific operating conditions.

Policy name	Regulation (EU) 2019/631 setting CO_2 emission performance standards for new passenger cars and for new light commercial vehicles
Verification and assurance	
Third party validation	Type approval is granted by Type Approval Authorities. These validate and approve the CO_2 emission tests carried out by either the TAA, a certified test laboratory or the OEM itself (in which case the tests may be witnessed by the TAA). Legislation with respect to In-Service Verification are in place or in preparation which oblige both TAAs and Member states to carry out validations of whether vehicles in service comply with the regulations under which they have received type approval.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	Similar to the CO_2 emissions standards for HDVs, the CO_2 emission standards for LDVs are largely complementary to the CountEmissions EU initiative. Where the emission standards are particularly meant to incentivise manufacturers to lower the average CO_2 emissions of the new vehicles they sell, the CountEmissions EU initiative is targeting emissions at the transport level and hence is more focussed on transport operators and users. A potential synergy between both policy frameworks is the fact that the emission figures provided by the WLTP (test may be used as default values within the CountEmissions EU Framework. However, it should be noticed that WLTP figures are only available for the most recent years (while for the NEDC figures available for earlier years it is known that they show large deviations from real-world CO_2 emission figures). Therefore, it will probably take some time before this potential synergy could be achieved. A potential risk of not using the WLTP emission figures within the CountEmissions EU Framework is that there may be significant differences between the CountEmissions EU CO_2 figures (per km) and the WLTP emission figures. This may lead to confusion of car owners and may negatively affect the credibility of the emission figures (WLTP figures and/or CountEmissions figures). It should be noted that the replacement of the NEDC by the WLTP test procedure has reduced the gap between type approval CO_2 emissions and the real-world values, but that a gap still exists. WLTP test results are therefore not directly suitable for deriving real-world emission factors needed for carbon footpinting of transport/logistic activities. The increasing database of certified WLTP CO_2 emission figures, combined with existing CO_2 emission factors for various classes and age categories of LDVs as used in various national emission monitoring activities, data from OBFCM, and if necessary augmented with results from additional modelling or monitoring, do provide a good basis for deriving an appropriate set of default emission factors for LDVs as input for carbon accounting for road freight transport.

D.5 CO_2 emissions performance standards for new HDVs

Policy name	**Regulation (EU) 2019/1242 setting CO_2 emissions performance standards for new heavy-duty vehicles (and related policies)**
Brief description	Regulation (EU) 2019/1242 specifies EU-wide CO_2 emission standards for new heavy duty vehicles (HDVs). CO_2 emission reduction targets of -15% in 2025 and -30% in 2030 compared to the reference period (1 July 2019 – 30 June 2020) have been specified. Two other related policies are included in this factsheet: 1. **Regulation (EU) 2018/956 — monitoring and reporting CO_2 emissions from, and fuel consumption of, new heavy-duty vehicles.** This policy sets rules for the monitoring by Member States of certain registration data for new HDVs registered for the first time in the EU. The Member States have a reporting responsibility of certain registration data for new HDVs to the European Commission. Manufacturers must also monitor and report each year to the Commission the CO_2 and fuel consumption values, as well as additional data, for each new HDV, in accordance with Commission Regulation (EU) 2017/2400. The data is made publicly accessible in a central EU register. 2. **Regulation (EU) 2017/2400 implementing Regulation (EC) No 595/2009 — determination of the CO_2 emissions and fuel consumption of heavy-duty vehicles.** This regulation establishes a common method to calculate the CO_2 emissions and fuel consumption of new HDVs on sale in the EU.
Policy status	Implemented.
URL to legislative document	Regulation 2019/1242 Regulation 2018/956 Regulation 2017/2400
Scope	
Type of emissions	Tailpipe CO_2 emissions (as well as fuel consumption).
Transport and logistics operations covered	All new HDVs (including lorries, buses and coaches).
Geographical scope	EEA.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Manufacturers are required to use a simulation package (i.e. VECTO) to calculate the CO_2 emissions of new HDVs. These simulations should be performed by vehicle manufacturers before registration, sale or entry into service of new vehicles in the EU. The simulation tool takes as input information about the CO_2 emission and fuel consumption or energy efficiency properties of the following components: – engines; – transmissions; – torque converters; – other torque transferring components; – additional driveline components; – axles; – body or trailer air drag; – auxiliaries; – tyres.
Approach to estimate transport related emissions	For the CO_2 emission, energy efficiency and/or fuel consumption properties of the different components use either certified values derived from standardized tests need to be used or, if no certified values are available, standard/default

Policy name	Regulation (EU) 2019/1242 setting CO_2 emissions performance standards for new heavy-duty vehicles (and related policies)
	values can be used. The standard values are included in the Annexes of Regulation (EU) 2017/2400. For establishing certified values, a detailed description of the requirements is included in the different Annexes of the Regulation. Standardised whole vehicle CO_2 emission and fuel consumption figures for specific prescribed vehicle configurations are determined in VECTO by simulating the fuel consumption of this vehicle driving over a number of prescribed duty cycles with different load factors. Separate figures are determined for different logistic applications of the vehicle and different loads. Results are expressed in g/km, g/t-km and g/m^3-km resp. l/100km, l/t-km and l/m^3-km. The regulation discerns seventeen categories of HD vehicles. The current HDV CO_2 standards only apply to the four most commonly used vehicle categories, responsible for the majority of the emissions from HD vehicles. CO_2 and fuel consumption figures need to be determined for nine of these seventeen vehicle categories. For the purpose of determining a manufacturer's compliance with the regulation for each vehicle a specific CO_2 emission figure is determined as a weighted average of the results for the different mission profiles applicable to the category/sub-segment to which the vehicle belongs.
Reporting requirements (parameters, granularity, time aggregation)	Manufacturers are obliged to specify the whole vehicle CO_2 emission and fuel consumption figures, determined in accordance with Regulation (EU) 2017/2400 for a range of mission profiles and payloads, on the Certificate of Conformity of each vehicle sold, as well as in a customer information file.
Verification and assurance	
Third party validation	The annexes of Regulation (EU) 2017/2400 include detailed information about the verification requirements for certified values of different components. Certification of component test results is granted by Type Approval Authorities. Tests can be performed by manufacturers (witnessed and/or validated by the TAA) or by accredited laboratories. Regulation 2018/956 sets out provisions for verifying and ensuring the conformity of the simulation tool of Regulation (EU) 2017/2400 operation. This verification procedure should include on-road testing. The new type approval framework, as set out in Regulation (EU) 2018/858, provides the means for ensuring that, in the case of deviations, remedial measures are taken by the manufacturer and that fines can be imposed if this is not done (correctly).
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	CO_2 emission standards for HDVs are largely complementary to the CountEmissions EU initiative. The standards are set for new vehicles, providing an effective incentive for manufacturers to lower the emissions at the vehicle level, either by applying fuel consumption reducing measures to conventional vehicles or by marketing vehicles with zero emission powertrains. The CountEmissions initiative, on the other hand, targets emissions at the transport service level and hence is more focussed on transport operators and users. One potential synergy between both policy frameworks is the fact that the 'official TTW CO_2 figures' simulated to meet the requirements set by Regulation

Policy name	Regulation (EU) 2019/1242 setting CO_2 emissions performance standards for new heavy-duty vehicles (and related policies)
	(EU) 2019/1242 may be used as input for the development of default emission factors for the Count Emissions Framework. However, it should be noted that these emission figures are only available for vehicles built in 2019 or later, implying that for a large share of the fleet such certified CO_2 figures are not available yet. Therefore, it will take quite some time before this potential synergy could be achieved. In addition it should be noted that, although the emission profiles used in the VECTO simulations have been derived from real-world driving data, the certified CO_2 emission figures may deviate to some extent from actual average real-world emission factors. The increasing database of certified CO_2 emission figures combined with existing official CO_2 emission factors for various classes and age categories of HDVs, as used in various national emission monitoring activities, augmented with results from additional modelling or monitoring, do provide a good basis for deriving an appropriate set of default emission factors for HDVs as input for carbon accounting for road freight transport.

D.6 EU MRV of CO_2 emissions from maritime transport

Policy name	**Regulation (EU) 757/2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport.**
Brief description	Under the EU MRV Framework, all maritime vessels heavier than 5.000GT sailing to and from EU ports have to Monitor, Report and Verify their CO_2 emissions. When ships are not used for the purpose of transporting passengers or cargo, they are exempt from the reporting obligation.
Policy status	Implemented
URL to legislative document	Regulation (EU) 2015/757
Scope	
Type of emissions	Tank-to-wake CO_2 emissions of main engines, auxiliary engines, gas turbines, boilers and inert gas generators at voyage and at berth.
Transport and logistics operations covered	Maritime shipping
Geographical scope	All voyages to and from EEA ports
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The ship owners can choose between the following four options to calculate the CO_2 emissions: – calculation based on fuel use according to the Bunker Fuel Delivery Note and periodic stocktakes of fuel tanks; – bunker fuel tank monitoring on board; – fuel flow meters for applicable combustion processes; – direct CO_2 emissions measurements. Any combination of these methods, once assessed by the verifier, may be used if it enhances the overall accuracy of the measurement. Allocation of emissions to passengers and freight, which is relevant for RoPax vessels, is done in line with the CEN 16258 standard.
Approach to estimate transport related emissions	In principle, companies should use default fuel emission factors (CO_2 intensity of the fuel) to convert fuel use to CO_2 emissions. Those default values for fuel emission factors shall be based on the latest available values of the Intergovernmental Panel for Climate Change (IPCC). Companies can decide to use different fuel emission factors. If they choose to do so, the fuel (quality) data set out in the Bunker Fuel Delivery Notes should be used as basis for these calculations. For biofuels, these fuel emission factors are not specified. The regulation requires that appropriate emission factors shall be used. In all cases, the chosen fuel emission factors need to be verified and reported.
Reporting requirements (parameters, granularity, time aggregation)	Reporting to the EU (and flag State) is required for individual vessels. No allocation of emissions to individual passengers or cargo is made. The following parameters should be monitored *on a per-voyage basis*: – port of departure and port of arrival including the date and hour of departure and arrival; – amount and emission factor for each type of fuel consumed in total; – CO_2 emitted; – distance travelled; – time spent at sea; – cargo carried (metric tonnes or number of passengers); – transport work (tonne-kilometres).

Policy name	Regulation (EU) 757/2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport.
	The following parameters should be monitored *on an annual basis*: – amount and emission factor for each type of fuel consumed in total; – total aggregated CO_2 emitted within the scope of this Regulation; – aggregated CO_2 emissions from all voyages between ports under a Member State's jurisdiction; – aggregated CO_2 emissions from all voyages which departed from ports under a Member State's jurisdiction; – aggregated CO_2 emissions from all voyages to ports under a Member State's jurisdiction; – CO_2 emissions which occurred within ports under a Member State's jurisdiction at berth; – total distance travelled; – total time spent at sea; – total transport work; – average energy efficiency. By 30 April of each year, companies have to submit to the Commission and to the authorities of the flag States concerned, an emissions report for the entire reporting period for each ship under their responsibility. This implies that no per-voyage data have to be reported. However, as mentioned above, these data have to be monitored and needs to be verified by the verification body.
Verification and assurance	
Third party validation	The calculated emissions need to be verified by an EU-wide accredited verification body. A document of compliance issued by a verifier should be kept on board to demonstrate compliance. More specifically, verifiers should check whether the reported emissions are conform a certified monitoring plan and some specific articles of the EU MRV Regulation. This monitoring plan, that companies need to submit to the verifiers for each of the their ships before their first visit to an EEA port, contains at least the following information: – identification and type of the ship; – company name and address; – a description of the CO_2 emission sources on board; – description of the procedures, systems and responsibilities used to update the CO_2 emissions sources on board over the reporting period; – a description of the procedures used to monitor the completeness of the list of voyages; – a description of the procedures for monitoring the fuel consumption of the ship; – single emissions factors used for each fuel type or, for alternative fuels, methodologies for determining the emissions factors; – a description of the procedures used for determining activity data per voyage; – a description of the method to be used to determine surrogate data for closing data gaps; – a revision record sheet to record all the details of the revision history. Where needed, modifications should be made to the monitoring plan over time and again verified by the verifier.

Policy name	Regulation (EU) 757/2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	There are significant synergies between EU MRV of emissions from maritime shipping and the CountEmissions EU initiative. Within the EU MRV Framework, standards for measuring and calculation of CO_2 emissions in the maritime sector have been specified (see above). Also, all vessels within the scope are required to monitor, verify and report their CO_2 emissions. These procedures and data may be used by the maritime sector to meet the requirements set by the CountEmissions initiative as well (depending on the actual design of the CountEmissions Framework). CountEmissions EU could complement the existing EU MRV regulation since it only specifies the calculation of CO_2 emissions on a tank-to-propellor basis. Additional standards for well-to-tank emissions or other greenhouse gases would complement the existing EU MRV Framework. Additionally, EU MRV does not specify how to allocate emissions to individual passengers or cargo (i.e. transport service level), an issue that will be addressed by the CountEmissions initiative. For RoPax vessels the EU MRV methodology does specify how the allocation of the total emissions to passengers or cargo should be done. This could possibly be misaligned with allocation methods from CountEmissions EU.

D.7 EU ETS, including extensions of the scheme

Policy name	**Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading (including the proposed revision)**
Brief description	The EU Emission Trading System (ETS) is a scheme for GHG emission allowance trading within the EU. A revision of the current Directive is proposed as part of the Fit for 55 package. This revision includes proposals: – for a separate ETS for road transport and the built environment; – to include maritime shipping in the current ETS; – for some changes for aviation in the current ETS.
Policy status	Directive 2003/87/EC is implemented. The proposed revision still needs to be agreed on by the Council and the Parliament.
URL to legislative document	Directive 2003/87/EC proposal for a directive amending the current regulation
Scope	
Type of emissions	In general, the EU ETS covers the emissions of CO_2, N_2O, CH_4 HFCs, SF_6 and PFCs from aluminium production. Specifically, for the transport sector the following emissions are covered: – aviation: CO_2 emissions; – maritime transport: CO_2 emissions (it is envisaged to add other GHG emissions in the future); – road transport: CO_2, N_2O and CH_4 emissions. In the transport sector, only the tank-to-wheel emissions are within the scope However, since the production of fuels or electricity is (assuming that this happens within the EU) also within the scope of EU ETS, the policy does to a certain extent cover the well-to-tank emissions.
Transport and logistics operations covered	Currently, the EU ETS only covers commercial aviation within the European Economic Area (and flights to airports in Switzerland and the UK). It is proposed to maintain this scope in the future, as flights to and from third countries will be subject to the CORSIA provisions. In the proposal for a revised EU ETS, it is proposed to include the maritime transport sector, i.e. all emissions from voyages to and from EEA ports (same scope as in the EU MRV on CO_2 emissions of maritime transport). Also, it is proposed to include all GHG emissions of road transport in a separate ETS for buildings and road transport.
Geographical scope	EEA
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	– For aviation, airlines are the regulated entity. In general, emissions are calculated based on actual fuel consumption. Only so-called small emitters (i.e. aircraft operator having emissions lower than 25 kilo tonnes CO_2 per year or operators operating fewer than 243 flights per period for three consecutive four-month periods) are allowed to apply model exercises (using tools approved by the Commission, like the Eurocontrol's small emitter tool. – For maritime shipping, the shipping companies would be the regulated entities. The monitoring results of the EU MRV system (Regulation (EU) 757/2015) will be used as emission data in the ETS as well.

Policy name	Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading (including the proposed revision)
	– For road transport, fuel suppliers will become the regulated entity. Therefore, the emissions would be calculated based on total fuel sales data. This implies that emissions are not regulated at the level of individual transport operators (as is the case for aviation and maritime transport).
Approach to estimate transport related emissions	– Aviation: actual fuel consumption has to be measured based on 1) fuel delivery notes or invoices for each flight; or 2) data from aircraft onboard measurement systems. Standardised emission factors have to be used to calculate CO_2 emissions based on the fuel consumption data (3.10 t CO_2/t fuel for aviation gasoline and Jet gasoline, 3.15 for Jet Kerosene, and 0 for biofuels). – Maritime transport: CO_2 emissions will be directly based on the output of the EU MRV Regulation. – Road transport: as CO_2 emissions will be calculated at the level of fuel suppliers, there is no direct link to the CountEmissions initiative. Therefore, the approach for emission calculation for road transport is not discussed in any more detail in this factsheet.
Reporting requirements (parameters, granularity, time aggregation)	Airlines have to submit annually an emission report to the competent authority. This authority is assigned by the Member State (non-EU airlines are allocated to the Member State with the greatest estimated attributed aviation emissions from flights performed by that aircraft operator in the base year). The emission report should cover, among other issues, the following data for the reporting period: – airline particulars; – total number of flights per State pair; – mass of fuel (in tonnes) per fuel type per State pair; – total CO_2 emissions in tonnes, disaggregated by the Member State of departure and arrival; – amount of biofuels used, per type of biofuel; – tonne kilometre data in case they want to apply for free allowances, including data used to calculate these tonne kilometres. For maritime transport, all relevant reporting requirements are discussed in the factsheet on the EU MRV for CO_2 emissions of maritime transport. As emissions of road transport will be regulated at the level of fuel suppliers, proposed reporting requirements in the EU ETS are not very relevant for the CountEmissions EU initiative.
Verification and assurance	
Third party validation	For aviation: the data in the annual emissions report for a given year must be verified by an independent verifier. The annual procedure of monitoring, reporting and verification (MRV), together with all the associated processes, is known as the ETS compliance cycle. Airlines covered by the EU ETS are required to have an approved monitoring plan for monitoring and reporting annual emissions. Additionally, operators must submit an emission report every year. The data for a given year must be verified by an accredited verifier by 31 March of the following year. Once verified, operators must surrender the equivalent number of allowances by 30 April of that year. For maritime transport, validation specifications from the EU MRV for CO_2 emissions of maritime transport are relevant.

Policy name	Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading (including the proposed revision)
	For road transport, no details on the verification process is included in this factsheet, as there is no direct link with the CountEmissions initiative.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The EU ETS Framework requires airlines to calculate CO_2 emissions per flight (in a comparable way as CORSIA). By aligning the requirements set by the CountEmissions Framework with the requirements set by the EU ETS Framework, the administrative burden for airlines could be lowered. For maritime transport, the emission calculations have to be done in line with the EU MRV regulation. Therefore, the same finding on interactions with CountEmissions as identified for that Regulation are relevant her. For road transport, CountEmissions and the proposed ETS Framework are largely complementary, as the regulated entities differ (i.e. fuel suppliers vs. transport operators).

D.8 Clean Vehicle Directive

Policy name	Directive 2019/1161 on the promotion of clean and energy-efficient road transport vehicles (Clean Vehicle Directive)
Brief description	The revised Clean Vehicles Directive (2019/1161/EC) promotes clean mobility solutions in public procurement tenders in order to boost the demand and further uptake of low- and zero emissions vehicles. Therefore, national targets are defined as a minimum percentage of clean vehicles in the aggregate public procurement (including purchase, lease, rent and relevant services contracts) across a Member State. This implies that Member States are flexible in how they distribute the effort across different contracting authorities and entities. Targets are set for two periods: from 2 Augustus 2021 to 31 December 2025 and from 1 January 2026 to 31 December 2030. For the first period, light duty vehicles(LDVs) are defined as clean vehicles, when these emit no more than 50g/km CO_2 and up to 80% of applicable real driving emission (RDE) limits for NO_x and PN (particulate number) (low emission vehicles). For the second period, clean vehicles are defined as zero-emissions vehicles. Heavy duty vehicles (trucks and buses) should run on one of the following alternative fuels to be defined as a clean vehicle: hydrogen, battery electric (including plug-in hybrids), natural gas (both CNG and LNG, including biomethane), liquid biofuels, synthetic and paraffinic fuels, LPG. Besides this, a Member State has to meet at least half of the procurement target for clean buses in each period through the procurement of zero-emission buses. So in fact the target is more strict for buses, which can be explained by the current availability and uptake of ZE-busses compared to other HDV.
Policy status	Implemented.
URL to legislative document	Directive (EU) 2019/1161
Scope	
Type of emissions	The definition of 'low-emission' and 'zero emission' vehicle for light duty vehicles is related to the TTW CO_2 emissions (in line with the latest CO_2 emission performance standards for cars and vans) and TTW NO_x and PN emissions (in line with the applicable real driving emission (RDE) limits for these emissions.
Transport and logistics operations covered	The Directive applies to cars, vans, trucks and buses (excluding coaches) when they are procured through: – purchase, lease, rent or hire contracts under obligation by EU public procurement rules; – public service contracts for the provision of passenger road transport services; – services contracts for public road transport services (e.g. non-scheduled passenger transport, refuse collection services, mail and parcel delivery, etc.).
Geographical scope	EU.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Not applicable - the Clean Vehicle Directive (CVD) focuses on emission standards rather than monitoring, estimations or calculation of emissions.
Approach to estimate transport related emissions	Not applicable - the CVD focuses on emission standards rather than monitoring, estimations or calculation of emissions.

Policy name	Directive 2019/1161 on the promotion of clean and energy-efficient road transport vehicles (Clean Vehicle Directive)
Reporting requirements (parameters, granularity, time aggregation)	Not applicable (only reporting on share of clean vehicles).
Verification and assurance	
Third party validation	Monitoring and reporting of the share of clean vehicles happens primarily through the Tender Electronic Database.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	Within the current scope of the CVD, there are limited synergies because the CVD focuses on shares of clean vehicles. However, the CountEmissions initiative may provide the option to further specify or broaden the scope of the CVD: – The targets of the CVD may be defined in terms of shares of transport services, such that the CVD is actually linked to the actual transport performance. This may increase the effectiveness of the CVD, particularly in case clean vehicles are under the current version of the CVD mainly used for shorter trips (this will require more research). It may also provide the opportunity to base the targets on actual CO_2 emissions (depending on the actual design of the CountEmissons initiative) instead of emission figures based on test cycle data. – For HDVs, targets may be defined in terms of CO_2 emissions instead of fuel type, as this data may become available from the CountEmissions initiative (depending on the actual design of the initiative). – Depending on the design of the CountEmissions initiative, there may be options to extend the scope of emissions covered by the CVD (e.g. WTW CO_2 emissions or CO_2-equivalent emissions).

D.9 Car Labelling Directive

Policy name	**Directive 1999/94/EC relating to the availability of consumer information on fuel economy and CO_2 emissions in respect of the marketing of new passenger cars.**
Brief description	The Car Labelling Directive requires that information on the fuel economy and CO_2 emissions of new passenger cars offered for sale or lease in the EU is made available to consumers in order to enable them to make an informed decision. In a Commission recommendation (EU/2017/948) published in 2017, Member States are encouraged to make air pollutant emissions available to consumers as well.
Policy status	Implemented.
URL to legislative document	Consolidated text: Directive 1999/94/
Scope	
Type of emissions	Tank-to-Wheel CO_2 emissions.
Transport and logistics operations covered	New passenger cars.
Geographical scope	EU27.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The CO_2 emissions (and fuel consumption figures) should be based on the official values reported in the EC vehicle type-approval certificate or in the certificate of conformity. These figures are based on test cycle runs (initially NDEC, currently WLTP) and are the same ones used to check conformity with the CO_2 emissions standards for new passenger cars.
Approach to estimate transport related emissions	As emission figures are taken from the EC vehicle type approval certificate (or certificate of conformity), no specific emission calculations are made for the purpose of this Directive.
Reporting requirements (parameters, granularity, time aggregation)	Information on fuel economy and CO_2 emissions should be displayed by a fuel economy label, a guide on fuel economy and CO_2 emissions and a poster (or display), all available at the point of sale. Furthermore, all promotional literature must contain the official fuel consumption and specific CO_2 emission data for the passenger car model to which it refers. Member States are free to require any comparative figures, whether a categorisation of each car against all cars (absolute) or of each car against cars in a similar (size) class (relative). Currently, both absolute and relative labels exist in the EU as well as countries without any comparative labelling scheme.
Verification and assurance	
Third party validation	Member States are obliged to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive. Hence, they are also responsible for monitoring, verification and enforcement.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The Car Labeling Directive is mainly complementary to the CountEmissions initiative. Although both initiatives provide information on GHG emissions of transport activities, their scope significantly differ. The Car Labelling Directive is focusing on the emission figures at the vehicle level, while the CountEmissions initiative cover emission figures at the level of transport services. Both initiatives can, therefore, be considered as complementary.

D.10 Tyre labelling regulation

Policy name	Regulation (EU) 2020/740 on the labelling of tyres with respect to fuel efficiency and other parameters
Brief description	According to this regulation, a tyre label should be provided for tyres of road vehicles (cars, vans, busses and trucks), classifying the tyres performance with respect to 1) rolling resistance (indicator of energy efficiency), 2) braking on wet surfaces and 3) external noise. Furthermore, the label show if the tyres are suitable for use in severe snow conditions or in extreme climatic situations.
Policy status	Implemented.
URL to legislative document	Regulation (EU) 2020/740
Scope	
Type of emissions	N/a
Transport and logistics operations covered	All.
Geographical scope	EEA.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	N/a
Approach to estimate transport related emissions	N/a
Reporting requirements (parameters, granularity, time aggregation)	N/a
Verification and assurance	
Third party validation	Standardised tests are used to assess the performance of tyres in all the five parameters indicated on the label. National authorities perform random controls to check the accuracy of the performance levels. Furthermore, they shall lay down the rules on penalties and enforcement mechanisms applicable to infringements of this Regulation. They shall also take all measures necessary to ensure that these enforcement mechanisms are implemented.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	Like the Car Labeling Directive, the tyre labelling regulation is fully complementary to the CountEmissions initiative.

D.11 Regulation on electronic freight transport information

Policy name	EU Regulation on electronic freight transport information (eFTI) and the associated expert group Digital Transport and Logistics Forum (DTLF)
Brief description	The EU Regulation on electronic freight transport information (eFTI) establishes a legal framework for road, rail, maritime and air transport operators to share information with enforcement authorities in an electronic format. The aim of the Regulation is to encourage the digitalisation of freight transport and logistics to reduce administrative costs, improve enforcement capabilities of competent authorities, and enhance the efficiency and sustainability of transport. Although the regulation has a strong environmental dimension, emissions/data related to emissions is not covered explicitly. 'Electronic freight transport information' or 'eFTI' means a set of data elements that are processed by electronic means for the purpose of exchanging regulatory information among the economic operators concerned and between the economic operators concerned and competent authorities. The Digital Transport and Logistics Forum (DTLF) is an expert group of the European Commission. The DTLF's work includes the provision of technical assistance for the implementation of the eFTI Regulation.
Policy status	Entered into force 20 August 2020; applies from 21 August 2024. Full application from 30 months after the date of entry into force of the first of the delegated and implementing acts referred to in Articles 7 and 8 of the regulation.
URL to legislative document	Regulation (EU) 2020/1056
Scope	
Type of emissions	NA
Transport and logistics operations covered	Transport of goods by road, rail, inland waterways and air in the European Union (EU). Operators are not obliged to make regulatory information available electronically to a competent authority. However, when they choose to make this information available electronically, operators must: — use data processed on a certified eFTI platform and, if applicable, by a certified eFTI service provider; — communicate to the authorities an unique identifying link that via an authenticated and secure connection and based on the authorities' authorisation allows to access data in machine-readable format located on an eFTI platform; — present data in human-readable format if requested by the competent authority, on the spot, on the operator's device. Relevant authorities must: — accept regulatory information made available electronically by operators; — be able to access and process electronically the eFTI data made available by operators.
Geographical scope	EU

Policy name	EU Regulation on electronic freight transport information (eFTI) and the associated expert group Digital Transport and Logistics Forum (DTLF)
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	NA
Approach to estimate transport related emissions	NA
Reporting requirements (parameters, granularity, time aggregation)	NA
Verification and assurance	
Key elements	Data on eFTI platforms (which would be used to calculate emissions) is uploaded there by the economic operators. eFTI platforms do not provide any means to verify or assure that the uploaded data is correct, however, eFTI platforms allow to uniquely identify each distinct processing operation, the nature of legal person having made the operation, and the sequencing of the operations on each individual data element. All eFTI platforms need to be certified by conformity assessment bodies to prove compliance with the technical specifications listed in the eFTI regulation, including among others specifications regarding logs, identification of processing operations and protection against corrupting the data. The conformity assessment bodies themselves need to be accredited by a responsible Member State authority that maintains an up-to-date list of the accredited conformity assessment bodies, eFTI platforms and eFTI service providers which hold a valid certification. Certification of eFTI platforms will follow the rules that will be established in the respective delegated act.
Costs	In the Impact Assessment on eFTI, total costs for public authorities were estimated at about EUR 268 million over 2018-2040, of which EUR 17 million related to the certification of solution providers, and EUR 251 million to enforcement. National authorities will be expected to invest in new IT systems, or to adjust existing ones.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	CoutEmissions EU should be cognisant of the following opportunities: — development of common services (backend data infrastructure or procedural); — data sharing and common data structures; — the integration of emissions data with electronic freight transport information collected by national authorities (not currently addressed explicitly in the regulatory content). There is an opportunity to address emissions data consistency, privacy and security issues through the certification procedures (of ICT systems and service providers) as they are further defined during eFTI implementation at the national scale.

D.12 FuelEU Maritime

Policy name	**Proposal for a regulation of the European Parliament and of the Council on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC**
Brief description	The proposal for the FuelEU Maritime regulation specifies rules for: – the limit on the greenhouse gas ('GHG') intensity of energy used on-board by a ship arriving at, staying within or departing from ports under the jurisdiction of an EEA Member State; – the obligation to use on-shore power supply or zero-emission technology in ports under the jurisdiction of an EEA Member State. These rules intend to increase consistent use of renewable and low-carbon fuels and substitute sources of energy across the EU, while ensuring the smooth operation of maritime traffic and avoiding distortions in the internal market.
Policy status	Adoption in Autumn 2023.
URL to legislative document	European Commission Europe
Scope	
Type of emissions	The calculation is based on CO_2-equivalent emissions. Specifically, the emissions of CO_2, N_2O and CH_4 are within the scope. Furthermore, a WTW scope is chosen for the emissions calculations.
Transport and logistics operations covered	This Regulation applies to all ships above a gross tonnage of 5,000. This Regulation does not apply to warships, naval auxiliaries, fish-catching or fish-processing ships, wooden ships of a primitive build, ships not propelled by mechanical means, or government ships used for non-commercial purposes.
Geographical scope	The proposal for a regulation applies to the energy used during the stay in a port of call under the jurisdiction of an EEA Member State, as well as energy used on voyages between ports under the jurisdiction of an EEA Member State and half of the energy used on voyages departing from or arriving to a port of call under the jurisdiction of a Member State, where the last or the next port of call is under the jurisdiction of a third country.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The GHG emission intensity calculation consists of two steps: – The total emissions should be calculated as the sum of the tailpipe emissions of combusting fuels (in the main engine(s), auxiliary engine(s) and fired oil boilers), the emissions of electricity production associated to electricity supplied to the vessel and the emissions associated to the production of the fuels. Also, the emissions of leakage and spill should be included in the calculation. – The emission intensity is calculated as the total emissions divided by the total energy content of the fuels and electricity.
Approach to estimate transport related emissions	The mass of fuel shall be determined using the amount reported in accordance with the EU MRV Framework (Regulation (EU) 2015/757). Annex II of the proposal for a regulation specifies the emission factors that should be used to determine the emissions of fossil fuels. For CO_2, these values equal the values from EU MRV. For most fuel types, concrete emission factors are stated. However, some are 'to be determined'. For the calculation of the global warming potential, a horizon of 100 years was used. The emissions factors of biofuels, biogas, renewable fuels of non-biological origin and recycled carbon fuels shall be determined according to the methodologies set out in the REDII ((EU) 2018/2001).

Policy name	Proposal for a regulation of the European Parliament and of the Council on the use of renewable and low-carbon fuels in maritime transport and amending Directive 2009/16/EC
	In accordance with its compliance plan and upon assessment by the verifier, other methods, such as direct CO_2-eq. measurement, laboratory testing, may be used if it enhances the overall accuracy of the calculation. For the purpose of this Regulation, emissions of leakage and spill are taken into account as a percentage of the mass of the fuel used by the engine. In case substitute sources of energy, such as wind or electricity, are installed on board, a reward factor for substitute sources of energy can be applied.
Reporting requirements (parameters, granularity, time aggregation)	Ship owners should be responsible for monitoring and reporting the amount and type of energy used on-board by ships in navigation and at berth, as well as other relevant information, such as information on the type of engine on board or presence of wind assisting technologies. To facilitate the fulfilment of these monitoring and reporting obligations and the verification process by the verifiers, similarly to Regulation (EU) 2015/757, companies should document the envisaged monitoring method and provide further details on the application of the rules of this Regulation in a monitoring plan. The monitoring plan, as well as its subsequent modifications, if applicable, should be submitted to the verifier.
Verification and assurance	
Third party validation	A robust monitoring, reporting and verification system should be put in place by this Regulation in order to trace compliance with its provisions. Such system should apply in a non-discriminatory way to all ships and require third party verification in order to ensure the accuracy of the data submitted within this system. Any data already reported for the purpose of Regulation (EU) 2015/757 should be used for verifying compliance with this Regulation in order to limit administrative burden imposed on companies, verifiers and maritime authorities.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	There are significant synergies between FuelEU Maritime and CountEmissions EU. The procedures and data provided by FuelEU Maritime may be used by the maritime sector to meet the requirements that will be set by the CountEmissions initative. Aligning the scope and calculation rules between FuelEU Maritime and CountEmissions may lower the administrative burden for ship operators, verifiers and maritime authorities. The CountEmissions EU initiative could complement the FuelEU Maritime initiative by increasing the scope of emission calculations or the scope of the vessels to which the regulation applies to (for example, by including vessels of 5,000 GTW and smaller). Also, the CountEmissions EU initiative could complement the FuelEU Maritime initiative by further specifying the emission factors that should be used. Finally, FuelEU Maritime does not specify how to allocate emissions to individual passengers or cargo (i.e. transport service level), an issue that will be addressed by the CountEmissions initiative.

D.13 Combined Transport Directive

Policy name	**Directive 92/106/EEC on the establishment of common rules for certain types of combined transport of goods between Member States, taking into account the on-going revision process.**
Brief description	Directive 92/106/EEC aims to promote intermodal transport operations by supporting international operations meeting certain criteria. The support consists of: – safeguarding combined transport from national restrictions; – clarifying that road cabotage restrictions do not apply to the combined transport road legs; – allowing heavier and bigger loads for vehicles used in combined transport road legs; – granting financial support through tax incentives and an extended definition of own-account transport for combined transport operations. A proposal for an amendment of this directive (2017/0290) was withdrawn by the European Commission in 2020, due to lack of agreement between the Council and the European Parliament. A new revision of the Directive is currently being prepared as part of the Sustainable and Smart Mobility strategy action plan. Since the update is ongoing, no definitive information is available. However, some provisional information could be shared. In the ongoing update, the main revisions that are being considered are to: – *Identify what types of transport qualify as eligible for combined transport operations.* – *Define options to incentivise combined transport.*
Policy status	Directive 92/106/EEC is fully applicable. The new Commission proposal is planned for 2023.
URL to legislative document	Directive 92/106/EEC Sustainable transport - revision of Combined Transport Directive (Ongoing revision).
Scope	
Type of emissions	It is still uncertain which type of emissions would be included to define the eligibility criteria for intermodal operations.
Transport and logistics operations covered	Directive 92/106/EEC refers to transport of goods with intermodal loading units between EU countries where: – the vehicle or trailer uses the road on the initial or final leg of the journey; – on the other leg, rail or inland waterway or maritime services where this section exceeds 100 km as the crow flies; – makes the initial or final road transport leg of the journey: • between the point where the goods are loaded and the nearest suitable rail loading station for the initial leg and between the nearest suitable rail unloading stations and the point where the goods are unloaded for the final leg; • within a radius not exceeding 150 km as the crow flies from the inland waterway port or seaport of loading or unloading.
Geographical scope	EU27.

Policy name	Directive 92/106/EEC on the establishment of common rules for certain types of combined transport of goods between Member States, taking into account the on-going revision process.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	In Directive 92/106/EEC no emission calculations are required. If in the current update of the Directive it is chosen to relate the eligibility to the GHG emissions performance of the intermodal transport, specific rules for the emission calculations should be based on the Count Emissions EU Framework.
Approach to estimate transport related emissions	N/a
Reporting requirements (parameters, granularity, time aggregation)	N/a
Verification and assurance	
Third party validation	
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	There is no significant overlap between the CountEmissions EU initiative and (the current) Directive 92/106/EEC. However, there might be a large potential synergy between CountEmissions EU and the ongoing revision of Directive 92/106/EEC, in terms of the information on GHG emissions that may be taken into account while establishing criteria for eligible operations.

D.14 Passenger rights regulatory framework

Policy name	
Brief description	The Commission will review the current regulatory framework for passenger rights, including to ensure its resilience to extensive travel disruptions and including options for multimodal tickets.
Policy status	The review is currently ongoing.
URL to legislative document	Travel - better protection for passengers and their rights
Scope	
Type of emissions	N/a
Transport and logistics operations covered	N/a
Geographical scope	N/a
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	N/a
Approach to estimate transport related emissions	N/a
Reporting requirements (parameters, granularity, time aggregation)	N/a
Verification and assurance	
Third party validation	N/a
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	A representative from the European Commission (DG MOVE) involved in the ongoing update of the regulatory framework confirmed to us that there are no overlaps with CountEmissions EU. More details could not be shared at this point, because the review of the regulatory framework is still in progress.

D.15 CORSIA

Policy name	CORSIA – Carbon Offsetting and Reduction Scheme for International Aviation
Brief description	In 2016, Member States of ICAO agreed on the adoption of a Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Within this scheme, aircraft operators are obliged to offset emissions above the baseline emissions levels for flights between participating States. Initially, the baseline emissions levels were based on the average of the 2019 and 2020 emissions covered by CORSIA, but because of the significant drop in aviation in 2020 because of COVID-19, only the 2019 level is used as baseline in the first phase of CORSIA. Decisions on the baseline for next phases still have to be made. CORSIA distinguishes three phases: pilot phase (2021-2023), first phase (2024-2027), and a second phase (2027-2035). Both the pilot and first phase are voluntary, while the second phase is a mandatory one.
Policy status	Implemented.
URL to legislative document	SARPs - Annex 16 Volume IV
Scope	
Type of emissions	TTW CO_2 emissions.
Transport and logistics operations covered	CORSIA applies to all international flights on the routes between participating States. Hence domestic flights and flights between a participating State and a non-participating State are exempted. However, for these flights there is a reporting obligation. Airplane operators that produces annual CO_2 emissions smaller than 10,000 tonnes from airplanes with a maximum certificated take-off mass smaller than 5,700 are fully exempted.
Geographical scope	Global. At the outset of the scheme, 88 countries participated in CORSIA, including all 27 EU Member States. As per June 2022, 112 countries have agreed to participate in the first phase of CORSIA, starting at 1 January 2023. In the second (mandatory) phase, all countries with an individual share of international aviation activities above 0.5% of total RTK's in 2018 or whose cumulative share in the list of States from the highest to the lowest amount of RTKs reaches 90% of total RTKs should participate. There are a few exceptions, like the least developed countries and small island developing states.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Two options to measure CO_2 emissions are distinguished: 1. **A Fuel Use Monitoring Method.** This method has to be used by airplane operators with annual CO_2 emissions from international flights greater than or equal to 500,000 tonnes. Operators with lower annual CO_2 emission levels are allowed to use this method as well, but they are not obliged to. 2. **The ICAO CORSIA CO2 Estimation and Reporting Tool (CERT).** Airplane operators with annual CO_2 emissions from international flights below 500,000 tonnes are allowed to use this method.
Approach to estimate transport related emissions	As for the **Fuel Use Monitoring Method**, preferably actual fuel consumption figures (in tonnes) for individual flights are used, which are multiplied with fuel conversion factors (3.16 kg CO_2/kg fuel for Jet-A fuel/Jet-A1 fuel and 3.10 kg CO_2/kg fuel) for AvGas or Jet-B-fuel) to calculate the CO_2 emissions. Another option allowed is to use specific annual average fuel burn ratios (in tonnes per hour) and multiply them with the number of (block) hours required for a specific flight. These fuel burn ratios should be calculated specifically for the airplane operator and should distinguish between airplane types. Any data gaps may be filled by using CERT (under certain conditions).

Policy name	CORSIA – Carbon Offsetting and Reduction Scheme for International Aviation
	The alternative method to make use of the **CERT tool** allows airplane operators to make simplified estimations of CO_2 emissions of specific flights. They may use either the Block Time input method (i.e. CO_2 emissions are estimated based on data on block times, aircraft types, origins and destinations, all provided by the airplane operator) or the Great Circle Distance input method (i.e. CO_2 emissions are estimated based on the great circle distance determined for a specific aircraft type between origin and destination; data on aircraft type, origin and destination should be collected by the airplane operator). Airplane operators may claim for emission reductions from the use of low-CO_2 fuels. These fuels (so-called CORSIA eligible fuels) should meet the CORSIA Sustainability Criteria and may only be taken from fuel producers that are certified. The relative emission reductions that may be claimed shall be calculated by comparing the life cycle emissions value for the CORSIA eligible fuel (in g CO_2-eq./MJ) compared to baseline life cycle emissions values for aviation fuel (i.e. 89 CO_2-eq./MJ for jet fuel and 95 CO_2-eq./MJ for AvGas). The life cycle emissions value may be based on default figures (to be taken from the ICAO document 'CORSIA Default Life Cycle Emissions Values for CORSIA Eligible Fuels') or on actual figures which are measured based on a certified methodology.
Reporting requirements (parameters, granularity, time aggregation)	The airplane operator submits annually an Emissions Report and associated Verification report to the State where it is located. The State may decide on the level of aggregation (i.e. state pair or aerodrome pair) for which the operator shall report the number of (international) flights and CO_2 emissions. Airplane operators may request that their disaggregated data (at state pair or aerodrome pair) is not published as this may harm their commercial interest (only in case these data may be attributed to a specific airplane operator). States shall submit annually a report to ICAO containing aggregated CO_2 emission data for each airplane operator allocated to that State as well as aggregated CO_2 emission data for each State pair.
Verification and assurance	
Third party validation	Airplane operators are obliged to submit an Emission Monitoring Plan to the State for approval (only once, unless there is a need to review). This Plan should contain, among other things, a description on the methodology that will be applied to estimate CO_2 emissions, methods to fill data gaps, data on the aircraft fleet of the operators, etc. Furthermore, airplane operators should let their annual Emissions Report be verified by a verification body accredited in the State to which the airplane operators is attributed (operators may engage with verification bodies located in other States when these meet the rules and regulations set for verification bodies in the State to which the operator is attributed). The verification body have to be accredited by a national accreditation body to ISO 14065-2013. This national accreditation body shall be working in accordance with ISO/IEC 17011. As for the verification and approval of emission reductions from the use of CORSIA eligible fuels, data on fuel purchases, transaction reports, fuel blending records and sustainability credentials acts as documentary proof. Finally, States have to perform an order of magnitude check of the annual Emissions Report.

Policy name	CORSIA – Carbon Offsetting and Reduction Scheme for International Aviation
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	As part of CORSIA, for the majority of flights leaving or arriving on EU airports, data on CO_2 emissions is collected and reported. These data is verified by independent verification bodies. Aligning with CORSIA may therefore be an option for the CountEmissions initiative with respect to aviation. There are, however, a few issues that should be investigated/addressed: – For small airplane operators with relatively small aircrafts, there is no reporting obligation yet. – CORSIA covers WTT CO_2 emissions. In case CountEmissions applies another scope (e.g. WTT CO_2 emissions) additional calculations are required. – CORSIA allows certain airplane operators to apply a simplified modelling exercise (using the CERT tool) to estimate the CO_2 emissions. This may not be in line with the requirements set by CountEmissions initiative (depending on the actual design of the initiative). – Based on requirements set by individual States, airplane operators should report CO_2 emissions on state pair or aerodrome pair level. Emission data on state pair level will probably not be in line with the CountEmissions' objective, as this requires data on transport service level (which is more in line with data on aerodrome pair level). However, it may be expected that airlines do have data at aerodrome level (or maybe even flight level), even if they are not obliged to report at the level. Furthermore, the option to not publish disaggregated data (at state pair or aerodrome pair) because of commercial interest may also clash with the overall objective of CountEmissions. – It should be investigated whether the approach followed by CORSIA to deal with low-CO_2 fuels is consistent with the approach followed for these type of fuels for other modes.

D.16 IMO Data Collection System for fuel consumption of ships

Policy name	IMO Data collection system for fuel oil consumption of ships
Brief description	The International Maritime Organisation (IMO) adopted a mandatory Fuel Oil Data Collection System (DCS) for international shipping, requiring ships to collect and report data to an IMO database from 2019. Aggregate data on fuel consumption and traffic performance have to be submitted on an annual level. The IMO publishes an annually fully anonymised summary report on collected data from the DCS fleet.
Policy status	Implemented
URL to legislative document	RESOLUTION MEPC.278(70)
Scope	
Type of emissions	Fuel oil consumption, differentiated to different types of fuel (if relevant). All fuel oil consumed on board (e.g. also including fuel oil consumed by auxiliary engines, gas turbines, boilers, etc.) should be taken into account. Although ship operators are not required calculate and report emissions, the IMO Fuel Oil Consumption Database automatically assigns a value for the carbon conversion factor (CF) for each fuel that is reported. The emission factors (TTW CO_2 emissions in g CO_2/g fuel) used in the database are: – heavy fuel oil: 3,114; – light fuel oil: 3,151; – diesel/Gas oil: 3,206; – LPG (propane): 3,000; – LPG (butane): 3,030; – LNG: 2,750; – methanol: 1,375; – ethanol: 1,913.
Transport and logistics operations covered	All maritime ships of 5,000 gross tonnage and above are covered by this policy.
Geographical scope	Global.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	There are three fuel consumption monitoring methodologies that can be used: – bunkery delivery notes (BDN); the annual total amount of fuel oil used is based on BDNs. Corrections have to be made for the amount of fuel that is in the tank at the beginning and end of the year; – flow meters; annual fuel oil consumption is the sum of daily fuel oil consumption data measured by flow meters; – bunker fuel tank monitoring on-board; based on daily tank readings the amount of daily fuel oil consumption is measured, which can be aggregated to annual figures.
Approach to estimate transport related emissions	The approach to monitor fuel consumption should be described in the Data Collection Plan (DCP). This plan describes the ship's particulars as well as the procedures, systems and responsibilities used to monitor fuel consumption, hours underway and distance travelled. The DCP should be part of the Ship Energy Efficiency Management Plan (SEEMP) and should be available on-board the vessel.

Policy name	IMO Data collection system for fuel oil consumption of ships
	More specifically, the DCP should contain information on issues like: – ship particulars; – record of any revisions to the plan; – ship engines and other fuel oil consumers and fuel oil types used; – measures to measure fuel oil consumptions; – measures to measure distance travelled and hours underway; – process to report data to the Administration. – data quality.
Reporting requirements (parameters, granularity, time aggregation)	Every year, ship operators should prepare a fuel oil data report using a standardised reporting format provided by the IMO. This data report covers the following elements: – method used to measure fuel oil consumption; – fuel consumption for each type of fuel; – hours underway and distance travelled; – power output (auxiliary engine(s) and main propulsion power; – other information, like ship type, deadweight tonnage, gross tonnage, etc. The fuel oil data report is submitted to the Flag Administration (flag state of the ship) or any organisation that is duly authorised by this Administration for verification. The flag states report aggregated data to the IMO, which include it in the centralised database.
Verification and assurance	
Third party validation	Verification of the reported data will be done by the Flag Administration (or any duly authorised organisation appointed by the Flag Administration). Both the data collection method and process (presented in the DCP) and the actual data submitted and their compliance with the agreed process will be verified. In case the Flag Administration agrees with the data submitted by the ship operators, a Statement of Compliance (SOC) is issued, which is valid for one year. The SOC and disaggregated data should be retained on-board for a certain period (at least a year).
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The IMO Fuel Oil Data Collection System and the EU MRV are quite well in line. EU MRV requires ship operators to monitor on a per voyage level and report on an annual basis more detailed data than the Fuel Oil DCS. There may also be differences between the figures prescribed for the CO_2 content of fuels. But despite these differences, the interaction between Fuel Oil DCS and CountEmissions is similar to the interactions described between EU MRV and CountEmissions. Both initiatives have many potential synergies with the CountEmissions initiative (depending on the actual design of the latter initiative). At the same time, the CountEmissions initiative may broaden the scope of GHG emissions accounting in maritime transport, e.g. by standardising the approach to allocate emissions to individual passengers or cargo.

D.17 Corporate Sustainability Reporting Directive

Policy name	**Proposal for a Directive amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting**
Brief description	On 21 April 2021, the Commission adopted a proposal for a Corporate Sustainability Reporting Directive (CSRD). This proposal would amend the existing reporting requirements of the Non-Financial-Reporting Directive. The proposal includes: – a scope extension to all large companies and all companies listed on regulated markets (except micro-enterprises); – requires the audit of reported information; – introduces more detailed reporting requirements including a requirement to report according to mandatory EU sustainability reporting standards; – requires companies to digitally 'tag' the reported information, so it is machine readable and feeds into the European single access point such as envisaged in the capital markets union action plan. The application of the regulation will take place in three stages: 1. January 2024 for companies already subject to the non-financial reporting directive. 2. January 2025 for large companies that are not presently subject to the non-financial reporting directive. 3. January 2026 for listed SMEs, small and non-complex credit institutions and captive insurance undertakings. As for CountEmissions, particularly the sustainability reporting standards are relevant. These standards are not known yet. The Commission will adopt delegated acts to further specify the type of information that companies have to report in this respect (and in which structure).
Policy status	Implemented
URL to legislative document	Document 52021PC0189
Scope	
Type of emissions	The sustainability reporting standards are not fully specified yet and hence it is not clear how emissions will be defined. It is already clear that companies have to disclose information on the following themes: – change mitigation; – climate change adaptation; – water and marine resources; – resource use and circular economy; – pollution; – biodiversity and ecosystems.
Transport and logistics operations covered	Transport and logistics operation are not mentioned in the proposal itself, but given the environmental factors stated above GHG reporting on transport emissions might be part of the delegated acts that still have to be developed.
Geographical scope	EU.

Policy name	Proposal for a Directive amending Directive 2013/34/EU, Directive 2004/109/EC, Directive 2006/43/EC and Regulation (EU) No 537/2014, as regards corporate sustainability reporting
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	To be included in the delegated acts to this Directive.
Approach to estimate transport related emissions	To be included in the delegated acts to this Directive.
Reporting requirements (parameters, granularity, time aggregation)	To be included in the delegated acts to this Directive.
Verification and assurance	
Third party validation	To be included in the delegated acts to this Directive.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The CSRD could make use of the harmonised emissions figures produced under the CountEmissions EU initiative. This would be a potential synergy between both initiatives.

D.18 EU Taxonomy

Policy name	Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088
Brief description	The EU taxonomy is a classification system which provides a clear definition of what may be considered as sustainable. The EU taxonomy provide companies, investors and policymakers with appropriate definitions for which economic activities can be considered environmentally sustainable. In this way, it should create security for investors, protect private investors from greenwashing, help companies to become more climate-friendly, mitigate market fragmentation and help shift investments where they are most needed. The EU taxonomy identifies six environmental objectives: 1. Climate change mitigation. 2. Climate change adaptation. 3. The sustainable use and protection of water and marine resources. 4. The transition to a circular economy. 5. Pollution prevention and control. 6. The protection and restoration of biodiversity and ecosystems. An economic activity can be classified as a sustainable activity if it substantially contributes to one or more of these objectives, and does not significantly harm one of the other objectives. Since 'climate change mitigation' is the most relevant environmental objective with respect to the CountEmissions EU initiative, the content of this factsheet is mostly limited to this objective.
Policy status	Regulation (EU) 2020/852 entered into force on 12 July 2020. It establishes the basis for the EU taxonomy. Under the Taxonomy Regulation, the Commission had to come up with the actual list of environmentally sustainable activities by defining technical screening criteria for each environmental objective through delegated acts. On 2 February 2022, the Commission approved in principle a Complementary Climate Delegated Act including, under strict conditions, specific nuclear and gas energy activities in the list of economic activities covered by the EU taxonomy. Since this is not relevant for the CountEmissions EU Framework, this is no further discussed in the factsheet.
URL to legislative document	Regulation (EU) 2020/852 Delegated act containing technical screening criteria Complementary climate delegated act

Policy name	Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088
Scope	
Type of emissions	TTW CO_2 emissions.
Transport and logistics operations covered	For the transport sector, technical screening data have been developed for two types of economic activities: 1. The manufacturing of low carbon technologies for transport. 2. Transport of freight and passengers. Below we summarize the specific requirements for both. For the manufacturing of low carbon technologies for transport, the specific requirements for 'low carbon technologies' vary per vehicle category. In general, requirements on the tailpipe CO_2 emissions are defined (either zero-emission or below a threshold). Furthermore, specific rules are defined, such as that transport dedicated to the transportation of fossil fuels can never count as a low carbon technology. For the transport of freight and passengers, also specific requirements have been defined per vehicle category. In general, requirements on the tailpipe CO_2 emissions are defined (either zero-emission or below a threshold). Furthermore, specific rules are defined, such as that transport dedicated to the transportation of fossil fuels can never count as a low carbon technology. Furthermore, technical screening requirements for low-carbon transport infrastructure are specified.
Geographical scope	EEA.
Emission calculations (if applicable)	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	The EU Taxonomy currently is focussed on the sustainability of vehicles (for example, vehicles that have been type-approved to emit less than a certain amount of CO_2 per kilometre). To determine the sustainability of such vehicles, often references are made to other policies in which the emission calculations for such vehicles are defined (for example type-approval of cars). Also, it is not always clearly defined how the emissions of vehicles should be calculated or measured.
Approach to estimate transport related emissions	
Reporting requirements (parameters, granularity, time aggregation)	For companies within the scope of the Non-Financial Reporting Directive[1], it is required to disclose how and to what extent their activities are aligned with the EU taxonomy. Other companies can voluntarily disclose this information. The percentage of the turnover, CAPEX or OPEX that is Taxonomy-eligible and taxonomy-aligned should be reported.
Verification and assurance	

[1] The NFRD requires large (i.e., public interest entities that either have a balance sheet total that exceeds € 20,000,000 or a turnover that exceeds € 40,000,000) 'Public Interest Entities' with more than 500 employees to include non-financial statements as an integral part of their annual public reporting obligations. Public Interest Entities are: a) Companies governed by the law of a Member State and whose transferable securities are admitted to trading on a regulated market of any Member State; b.) Credit institutions, other than those referred to in Article 2 of the Credit Institutions Directive; c.) Insurance companies; or d.) Designated by Member States as public interest entities, e.g., companies that are of significant public relevance because of the nature of their business, their size or the number of their employees.

Policy name	Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088
Third party validation	The Taxonomy Regulation does not explicitly require any formal verification of whether activities comply with the technical screening criteria and minimum safeguards of the EU taxonomy. However, national supervisors will monitor compliance by financial market participants with the taxonomy disclosure obligations. In addition, following good practice, financial market participants are encouraged to seek external assurance on their taxonomy-related disclosures. Companies that fall under the scope of the Non-Financial Reporting Directive (NFRD) must make the relevant taxonomy disclosures as part of their non-financial statements, which does not, as a baseline, require verification (although this might be different based on the transposition by Member States). However, this may be subject to change depending on the outcome of the currently on-going review of the NFRD. Additionally, the Commission will evaluate the need for setting up mechanisms for verifying compliance with the Taxonomy criteria by autumn 2022. Note, however, that verification can be an explicit element in standards and labels that are based on the EU Taxonomy. For example, as part of the technical expert group on sustainable finance recommendations for an EU Green Bond Standard, the TEG recommends that the Green Bond Framework and the Final Allocation Report should be verified by supervised or authorised verifiers. As for the EU Ecolabel for retail investment products, verification is subject to the standard verification procedures as part of the EU Ecolabel scheme.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	The transport relevant technical screening data in the EU Taxonomy is currently mainly focussed on the sustainability on a vehicle level (e.g.: what percentage of the vehicles that are produced by a manufacturer are taxonomy-aligned?). This limits the overlap with CountEmissions EU, since how and how much the vehicles are used is not accounted for. The emission figures produced within the CountEmissions EU Framework may help to further specify the emission calculation requirements which are needed to determine whether transport operations are taxonomy-aligned.

D.19 Commission Recommendation (EU) 2021/2279 of 15 December 2021 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations

Policy name	**Recommendation (EU) 2021/2279 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations**
Brief description	The initiative 'Building the Single Market for Green Products' aims to boost the free circulation of green products across the EU by removing potential barriers, especially the lack of a common definition of green products and organisations and the high cost for complying with the range of different labelling and verification schemes. Therefore two methods have been introduced: the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF). The 'Commission recommendation on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations' promotes the use of these environmental footprint methods in relevant policies and schemes linked to the life cycle environmental performance of products as well as that of organisations. The Recommendation does not apply to the implementation of EU mandatory legislation when it already prescribes a specific methodology for the calculation of the life cycle environmental performance of products. PEF and OEF are likely to clearly identify the potential environmental impacts and include various data quality requirements. The two methods can be complemented with Category Rules (CR) and Sectorial Rules (SR), respectively. For example, the rules for similar products are organized in PEF Category Rules (PEFCR). Those rules laid down in documents enable easier comparison of products and state that 16 PEF environmental impact categories should be used for the characterised environmental profile. Furthermore, a specific default life cycle impact assessment (LCIA) method per impact category is recommended.
Policy status	Implemented
URL to legislative document	Commission Recommendation (EU) 2021/2279 of 15 December 2021 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations
Scope	
Type of emissions	The OEF and PEF cover 16 environmental impacts. With respect to climate change, they consider CO_2-equivalents (covering among others CO_2 , N_2O and CH_4). Additionally, the OEF and PEF cover all kinds of types of emissions into air, water, and soil potentially leading to other environmental impacts, like effects on human health, ecosystems, soil quality and resource depletion.

Policy name	Recommendation (EU) 2021/2279 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations
Transport and logistics operations covered	Although the OEF and PEF are focussed on the environmental impacts of organisations and products, transport and logistic emissions are covered indirectly as they contribute to the overall environmental impacts of products (and organisations). All transport and logistics related emissions over the entire life cycle of a product or organisation are included in the PEF and OEF. For the situation where the transport is done by the company who produces the product more strict data quality requirements are in place. On the other side, vehicles are also products for which a PEF study could be performed. In that case, the highest data quality requirement s apply to the use phase.
Geographical scope	Global (under the Single Market Act, hence the PEF aims at products placed on the EU market, not only the ones produced in the EU).
Emission and impacts calculations	
Type of emissions calculation methodology applied (how are emissions calculated, which steps are applied?)	Life Cycle Impact Assessment (LCIA) approach. All transportation processes across the products supply chain shall be modelled using EF-compliant datasets. Transport parameters that shall be taken into account are for foreground processes: transport type, vehicle type and fuel consumption, utilisation ratio, number of empty returns (when relevant), transport distance, allocation for goods transport based on load-limiting factor (i.e. mass for high-density products and volume for low-density products) and fuel production. For background processes several default scenarios are available. Transport parameters that should be taken into account are: transport infrastructure, additional resources and tools such as cranes and transporters, allocation for personal transport based on time or distance, allocation for staff business travel based on time, distance or economic value. Note that roads are part of the transport processes already. With respect the type of data to be used the PEF Guidance mentions: “Primary data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, material/product balances, stoichiometry, or other methods for obtaining data from specific processes in the value chain of the company applying the PEFCR”.

Policy name	Recommendation (EU) 2021/2279 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations
Approach to estimate transport related emissions	The impacts due to transport shall be expressed in the default reference units, i.e. tkm for goods and person-km for passenger transport. Any deviation from these default reference units shall be justified and reported. EF-compliant transport datasets are available at http://lcdn.thinkstep.com/Node/. The environmental impact due to transport shall be calculated by multiplying the impact per reference unit for each of the vehicle types by: a For goods: the distance and load. b For persons: the distance and number of persons based on the defined transport scenarios. Default scenarios are available and shall be used if no specific data is available for transport, such as: – from supplier to factory; – from factory to final client; and – from EoL collection to EoL treatment. However, at least the following primary data is required: – percentage of products transported to various destination types; – tonnages or volumes. In order to guarantee a certain level of data quality, the overall data quality is assessed as the product of: – Technological-Representativeness (TeR); – Geographical-Representativeness (GR); – the Time-Representativeness (TiR); – and the Precision/uncertainty (P). Measured and/or calculated data should be verified by an external party.
Reporting requirements (parameters, granularity, time aggregation)	Member States are invited to inform the Commission of actions taken in light of this Recommendation on a yearly basis. The first provision of information should be transmitted one year after the adoption of this Recommendation. Information transmitted should include: – how the PEF method and the OEF method are used in policy initiative(s); – number of products and organisations covered by the initiative; – incentives related to life cycle environmental performance; – initiatives related to the development of high quality life cycle data; – assistance provided to SMEs in the provision of life cycle environmental information and in improving their life cycle environmental performance; – eventual problems or bottlenecks identified with the use of the methods. The maximum validity of a PEF/OEF report is three years starting from their first issue date. If during this period the result for one of the impact category worsens with more than 10%, or when the aggregated impact worsens with more than 5%, a new report should be issued. Note that the PEF methodology is still in progress and in the so-called 'transition phase'. This transition phase is planned to be completed by the end of 2024. This means that using the PEF isn't mandatory. Only for the European construction sector a mandatory methodology has emerged: the PEF norm EN15804+A2.

Policy name	Recommendation (EU) 2021/2279 on the use of the Environmental Footprint methods to measure and communicate the life cycle environmental performance of products and organisations
Verification and assurance	
Third party validation	If PEF and OEF studies are to be used for communication purposes, the studies should be verified according to the review requirements of the PEF and OEF methods. The verification should be based on the following guiding principles: – a high degree of credibility for the measurement and communication; – proportionality of the cost and benefit of the verification to the intended use of PEF and OEF results; – verifiability of the life cycle data as well as the traceability of products and organisations.
Synergies, complementarities and overlaps	
Potential synergies, complementarities and overlaps with the CountEmissions EU initiative	There may be potential synergies with the CountEmissions EU initiative, especially if the extension of its scope is considered in the future.

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