



BSI Standards Publication

Postal Services — Parcel Delivery Environmental Footprint — Methodology for calculation and declaration of GHG emissions and air pollutants of parcel logistics delivery services

National foreword

This British Standard is the UK implementation of EN 17837:2023.

The UK participation in its preparation was entrusted to Technical Committee SVS/4, Postal services.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Fußabdruck der Paketzustellung - Methodik zur
Berechnung und Deklaration von THG-Emissionen und
Luftschadstoffen von Paketlogistik-Lieferdiensten

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European foreword

This document (EN 17837:2023) has been prepared by Technical Committee CEN/TC 331 “Postal services”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2024, and conflicting national standards shall be withdrawn at the latest by March 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Introduction

This document provides principles and rules for the quantification, allocation and reporting of environmental impacts from parcel logistics delivery services.

Background

As the consumer product and retail sectors continuously grow and e-commerce increases, logistics services are becoming ever more critical. Traditional logistics value chains and related business models are also disrupted by trends in digitalisation and new fulfilment technologies. General considerations to sustainability are growing in importance due to climate change, changing global supply chains and increased stakeholder consciousness. Measuring the environmental impacts - along the entire value chain from manufacturing to end of life treatment of retail goods - and implementing meaningful mitigation measures is key in combating climate change.

To understand the environmental impacts of the e-commerce and parcel logistics and delivery sectors, all activities in the parcel logistics and delivery service value chain should be looked at. To choose the most effective mitigation strategies and to fully disclose the environmental impacts of parcel logistics and delivery services, solid monitoring methodologies, data sets and standard accounting and reporting approaches are essential.

Purpose

This Parcel Delivery Environmental Footprint (PDEF) standard aims to describe a consistent and harmonized methodology for environmental footprinting across the supply chain of parcel logistics and delivery services. In the first instance, it will focus on the accounting of Greenhouse gas (GHG) emissions. At present there are a variety of standards and methodologies for emissions accounting publicly available, but these do not focus on parcel specific accounting.

The PDEF seeks to account for the emissions of the full logistics service supply chain for a delivery including all consequential transportation and operational activities. The standard allocates all emissions towards each specific parcel delivered. This is achieved through the description of a standard set of data points to be measured and a standard calculation and parcel specific allocation methodology.

The objective of this standard is to be consistent with ISO 14083 in its current working draft format¹. While the PDEF is built on the existing platform of EN 16258 and is consistent with the current working draft of EN ISO 14083², it provides an extended scope with its nuanced parcel specific approach, covering the entire parcel delivery value chain from collection to final delivery. Further, the PDEF also covers, as an option, other air pollutants as well as operational and energy provision GHG emissions other than fuel. This reflects the current need to provide more transparency about environmental impacts along complex supply chains.

Use

The PDEF is designed to be widely applicable by parcel transport service organizers and accessible to a diverse user group. Within this sector, it is recognized that parcel delivery service operations vary hugely, from multi-national organizations operating multiple transport modes through to a small local operators. Consequently, the standard balances the desire for absolute precision and scientific rigor with a degree of pragmatism to achieve ease of use. Nonetheless, the requirements set out and guidance given are aligned with existing standards³ and based on sound scientific methods.

¹ ISO 14083:2023 Greenhouse gases — Quantification and reporting of greenhouse gas emissions arising from transport chain operations

² EN 16258 provides the basis methodology for calculation and declaration of energy consumption and GHG emissions of transport services in the context of freight and passengers; ISO 14083 is building further on EN 16258 with inclusion of transport and hub operations

³ For example: EN 16258:2012, ISO 14064

Use of this standard will ensure that calculated emissions are fully accounted and allocated to a parcel. It enables disclosures of parcel specific emissions to have greater consistency and comparability as a foundation for more transparency enabling more sustainable parcel delivery services in the future.

Coverage

The normative part of this document covers GHG emissions associated with the transportation related activities as well as the operational activities for a parcel to be delivered. In more detail, it includes:

- the use of vehicles (for all transportation modes) during the delivery phase in terms of core trunking as well as first and last mile related transportation;
- all related operational and energy provision emissions from the use of and processes in logistics sites, namely sites and buildings where the physical handling operations of parcels are carried out.

When quantifying GHG emissions, account is also taken of the GHG emissions associated with energy processes for fuels and electricity used by vehicles and related operations infrastructure (including for example production and distribution of fuels). In addition, empty mileage shall be considered too. As a result, calculation results allow the consistent comparison of possible different energy sources by parcel service providers, users, and other interested parties.

The present document also covers optional guidance on quantifying emissions related to:

- air pollutants (carbon monoxide, nitrogen oxides, particulate matters 2.5 and 10, and sulfur oxides) associated with the use of vehicles for all transportation modes for exhaust and non-exhaust emissions.
- other operational activities needed to fulfil the parcel delivery service, e.g. required packaging materials (everything additional to the underlying parcel inherent packaging) provided by the parcel transport service organizers;
- waste management from the sites of the parcel transport service organizers; and
- all related operational and energy provision emissions from related virtual processing (data computing services).

It specifies general principles, definitions, system boundaries, calculation methods, parcel allocation rules and data requirements, with the objective to promote standardized, accurate, credible and verifiable declarations, regarding emissions quantified. It also includes examples on the application of the principles.

Potential users of this document are any person or organization quantifying emissions related to a parcel delivery service, especially parcel transport service organizers and parcel service users (e.g. consignors and consignees).

This document presents the below elements:

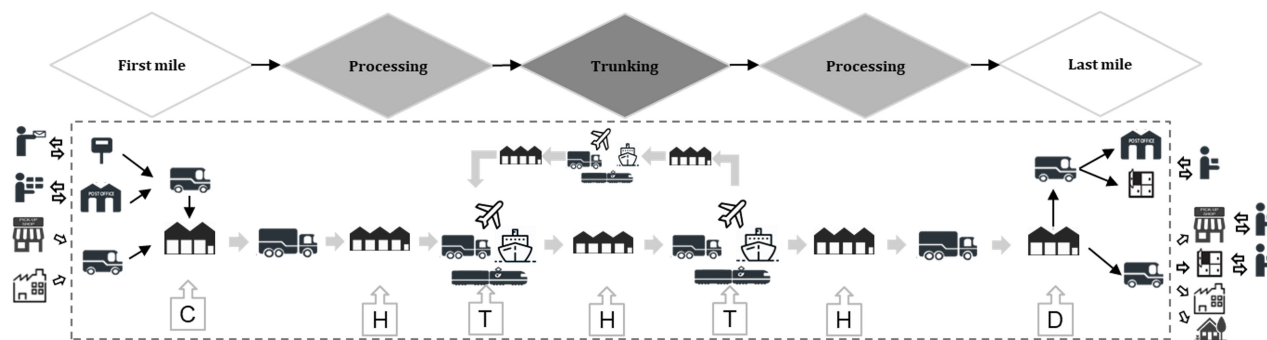
- step by step guidance for quantifying emissions of parcel logistics services;
- calculation methodology for GHG emissions;
- calculation methodology for air pollutants (carbon monoxide (CO), nitrogen oxides (NOx), particulate matters (PM) 2.5 and 10, and sulfur oxides (SOx);
- allocation rules per item (parcel); and
- reporting frameworks and data to be shared with business customers or consignees.

1 Scope

This document establishes a common methodology for the calculation, allocation and declaration of Greenhouse gases (GHGs) as well as air pollutant emissions related to any parcel delivery service.

It only covers a part of the entire retail value chain. The retail value chain usually consists of creating the product, storing the inventory, distributing the goods and making the product available for consumers.

This document includes only the distribution of goods but considers the entire value chain of the parcel transportation process flow, namely the collection and delivery rounds, the trunking and the operations due to processing and the physical handling of parcels. See Figure 1 below for a graphical illustration.



Key

- C Collection Depot (Aggregation)
- H Hub
- T Transport
- D Delivery Depot (Dis-aggregation/Distribution)

Figure 1 — Overview of parcel delivery operations

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org>

3.1 General terms

3.1.1

allocation

partitioning the input or output flows of a process or a product system between the product system under study and one or more other product systems

Note 1 to entry: In this context, partitioning of GHG emissions to the parcel.

[SOURCE: EN ISO 14040:2006, 3.17, modified — Note 1 to entry has been added.]

3.1.2**air pollution**

presence of contaminant or pollutant substances in the air at a concentration that interferes with human health or welfare or produces other harmful environmental effects

[SOURCE: <https://www.eea.europa.eu/help/glossary/eea-glossary>]

3.1.3**air pollutant**

any pollutant agent or combination of such agents, including any physical, chemical, biological, radioactive substance or matter which is emitted into or otherwise enters the ambient air and can, in high enough concentrations, harm humans, animals, vegetation or material

Note 1 to entry: Air pollutants is a term which then describes an air pollutant for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set. Examples include: carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matters.

Note 2 to entry: This document considers carbon monoxide (CO), nitrogen oxides (NO_x), particulate matters (PM_{2.5} and PM₁₀) and sulfur oxides (SO_x).

[SOURCE: <https://www.eea.europa.eu/help/glossary/eea-glossary>]

3.1.4**air pollutant activity data**

quantitative measure of activity that results in the production or removal of air pollutants to or from the atmosphere. For transport operations this is primarily the combustion of fossil fuels or other type of energy consumption

3.1.5**booked transport service**

agreement to carry goods in a specified manner between specified origin and destination locations

Note 1 to entry: For a cargo service this would be accompanied by the cargo unit's gross mass (in (kg) or (tonne)) and the distance between dispatching and receiving locations (indicated as zip codes, IATA codes, UN LoCodes or geo data) carried on the various chosen means of transport.

3.1.6**carbon dioxide equivalent****CO_{2e}**

CO_{2e} (also written as carbon dioxide equivalent, CO₂ equivalent or CO_{2eq}) is a metric measure that is used to compare emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of CO₂

[SOURCE: Eurostat, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Carbon_dioxide_equivalent]

3.1.7**carbon offsetting**

mechanism for compensating for carbon emissions of a process through the prevention of the release of, reduction in, or removal of, an equivalent amount of GHG emissions outside the boundary of that process, provided such prevention, removal or reduction are quantified, permanent and additional to a business-as-usual scenario

[SOURCE: EN ISO 14067:2018, 3.1.1.7, modified]

3.1.8

cargo

collection / quantity of goods (carried on a means of transport) transported from one place to another

Note 1 to entry: Cargo can consist of either liquid or solid materials or substances, without any packaging (e.g. bulk cargo), or of loose items of unpacked goods, parcels, unitised goods (on pallets or in containers) or goods loaded on transport units and carried on active means of transport.

[SOURCE: EN 14943:2005, 3.151, modified]

3.1.9

collection and delivery round

journey normally, but not necessarily, starting and ending at the same location, with the purpose to collect and/or deliver one or more consignment/parcel in different locations during the course of the journey

3.1.10

consignment

separately identifiable amount of *freight or parcel* transported from one consignor to one consignee via one or more modes of transport

Note 1 to entry: Although consignment and shipment are common terms often considered as synonyms, in this document and other technical publications, a consignment is differentiated to a shipment. Indeed, a shipment refers to a grouping of freight corresponding to the shipper needs, whereas a consignment refers a grouping of freight according to a carrier or freight forwarder's transport solutions.

[SOURCE: EN ISO 14064-3:2019, modified]

3.1.11

distance

distance between two locations (origin, destination) that could either be actual distance covered or network or planned distance

3.1.11.1

actual distance

distance along the actual route taken by a vehicle

Note 1 to entry: Distance measured by an on-board device (odometer)

3.1.11.2

network distance

distance between two locations where there is a strict limitation in the possible routes due to the available infrastructure options

3.1.11.3

planned distance

distance of the shortest route between two locations according to the respective infrastructure and operational constraints for the journey and transport modes

3.1.11.4**shortest feasible distance****SFD**

DEPRECATED: planned distance, network distance

transport distance (3.1.27) determined as the distance achievable by the shortest practical route available according to the infrastructure options for a particular vehicle (3.1.35) type

Note 1 to entry: "Shortest practical route" implies that small detours from the shortest distance, for example to avoid congested city centres or rural roads unsuitable for certain vehicle (3.1.34) sizes, can be included.

3.1.12**empty trip**

section of the route of a vehicle during which no freight or parcel is transported

EXAMPLE (Re)positioning trips and empty backhauls are examples of empty trips.

3.1.13**energy**

electricity, fuels, steam, heat, compressed air and other similar media

Note 1 to entry: For the purposes of this document, energy refers to the various types of energy, including renewable, which can be purchased, stored, treated, used in an equipment or in a process, or recovered.

[SOURCE: EN ISO 50001:2018, 3.5.1]

3.1.14**energy carrier**

substance or phenomenon that can be used to transfer energy or to operate chemical or physical processes

EXAMPLE Such as electricity, combustible fuels, steam, heat and compressed air.

[SOURCE: ISO 13600:1997, 2.5, modified — EXAMPLE has been added.]

3.1.15**energy consumption**

quantity of energy applied

[SOURCE: EN ISO 50001:2018, 3.5.2]

3.1.16**energy factor**

factor relating activity data to energy consumption

3.1.17**energy provision emissions**

GHG emissions released to atmosphere during the process of producing, storing, processing and distributing an energy carrier for an equipment or vehicle operation

3.1.18

freight

goods being transported from one location to another

EXAMPLE Examples of goods are materials, commodities, parcels, etc.

[SOURCE: EN 14943:2005, 3.437, modified — EXAMPLE has been added.]

3.1.19

fuel consumption

quantity of fuel (as an energy carrier) used

Note 1 to entry: For reasons of simplification, this definition includes all energy carriers, such as electricity.

Note 2 to entry: Fuel consumption should be expressed in most commonly understood units for each type of fuel, whilst respecting scientific principles for accuracy of the calculation; normally this would mean volume (litres or gallons) for liquid fuels, mass for gaseous fuels and kWh for electricity.

Note 3 to entry: For transport using electric traction, the fuel consumption is the total quantity of energy supplied minus any energy returned by the vehicle and subsequently transmitted back to the energy grid or to other vehicles, when vehicles are used as distributed power sources. Energy is returned (to the contact line) when electric traction has regenerative braking or other types of reused energy such as waste heat recovery systems. The energy generated during braking may be stored on the vehicle in question, or in shared systems such as rail transport may be made available to other consumers connected to the contact line.

3.1.20

fuel emission factor

factors that relate the emissions produced to the amount of a specific fuel that is consumed

Note 1 to entry: Depending on its nature, a fuel may have a factor for both operational and energy provision.

Note 2 to entry: Depending on the production process, what are nominally the same fuels at point of use may have different energy provision emission factors.

Note 3 to entry: Fuel emission factors should include both emissions that result from the feedstock production, transformation and distribution processes and, where applicable (e.g. some biofuels), a consequential approach to induced land use change.

Note 4 to entry: See Annex A for details on Energy and Emissions Factors.

3.1.21

global warming potential

GWP

index, based on radiative properties of GHGs (3.1.22), measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO₂)

[SOURCE: EN ISO 14064-1:2019, modified]

3.1.22**greenhouse gas
GHG**

gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the earth's surface, the atmosphere, and clouds

Note 1 to entry: For a list of greenhouse gases, see latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report. In this standard, GHGs are limited to, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆).

[SOURCE: EN ISO 14064-1:2019, 3.1.1, modified — Note 1 to entry, text added: In this standard, GHGs are limited to, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF₆). Note 2 to entry has been removed.]

3.1.23**greenhouse gas activity
GHG activity**

activity that results in a greenhouse gas (3.1.22) emission

EXAMPLE Consumption of energy, refrigerant leakage, methane slip

3.1.24**greenhouse gas activity data
GHG activity data**

quantitative measure of GHG activity (3.1.23)

[SOURCE: EN ISO 14064-1:2019, 3.2.1, modified — “or GHG removal” deleted, EXAMPLE replaced and moved to GHG activity.]

3.1.25**GHG emission intensity factor**

value relating GHG emissions to an activity, also including a coefficient relating GHG activity data with the GHG emission

EXAMPLE For example, expressed as:

- mass CO₂e per tonne kilometre, or equivalent units, for (aggregated) parcel transportation;
- mass CO₂e per parcel for a depot parcel throughput.

3.1.26**load**

quantity or nature, by mass, of whatever is being transported (cargo and/or parcel)

[SOURCE: EN 14943:2005, 3.564, modified]

3.1.27**load carrier**

means for the creation of load or storage units with carrying function or with carrying and encasing function or with carrying, encasing and closing function

EXAMPLE For example, pallet as carrying function; box pallet with carrying and encasing function; and container with carrying, encasing and closing function.

3.1.28

load factor

ratio of the actual load to the maximum legally authorized load of a particular vehicle

3.1.29

logistic site

the area where parcels are processed, sorted, packaged, handled and/or stored at an intermediate destination prior to being transferred to a means of transport

3.1.30

location operator

entity responsible for or managing a logistics site

3.1.31

means of transport

particular vessel, vehicle, or other mobile device used for the transport of parcel and/or freight

[SOURCE: EN 14943:2005, 3.631, modified]

3.1.31.1

air transport

any movement of goods and/or passengers carried out by a machine that can derive support in the atmosphere from the reactions of the air other than the reactions of air against the earth's surface

Note 1 to entry: Transport includes all flight stages (positioning, take-off, cruising, landing and parking) for drones and aircraft movement between the place of loading and unloading

3.1.31.2

inland water transport

movement of goods and/or passengers carried out by any floating marine structure with one or more surface displacement hulls, along a stretch of water not part of the sea

EXAMPLE Navigable rivers, lakes, canals and estuaries, which is suitable for navigation, primarily by inland waterways vessels.

3.1.31.3

rail transport

movement of goods and/or passengers carried out by equipment capable of running on rails either under its own power (tractive vehicles) or hauled by another vehicle (coaches, railcar trailers, vans and wagons) between a place of loading and unloading

Note 1 to entry: Shunting and train formation processes may form part of the rail emissions, depending on the detail of how the activities are organized and the entity that is responsible.

3.1.31.4

road transport

movement of goods and/or passengers carried out by any vehicles running on wheels and intended for use on roads, on a given road network between a place of loading and unloading

3.1.31.5

sea transport

transport by sea, sea transport, or ocean transport, is defined as any movement of goods and/or passengers carried out by vessels, including any floating marine structure with one or more surface displacement hulls undertaken wholly or primarily at sea

3.1.32**operational emission**

Emissions released to atmosphere as a result of equipment or vehicle operation

3.1.33**parcel**

postal item containing goods with or without commercial value, other than an item of correspondence, with a weight not exceeding 31,5 kg

[SOURCE: Cross border parcel delivery services regulation (EU 2018/644)]

3.1.34**postal item**

item addressed in the final form in which it is to be carried by a postal service provider

Note 1 to entry: In addition to items of correspondence, such items also include for instance books, catalogues, newspapers, periodicals and postal parcels containing merchandise with or without commercial value.

[SOURCE: Postal Services Directive; Directive 97/67/EC amended by Directive 2002/39/EC and Directive 2008/6/EC]

3.1.35**process**

activity involving the carriage of consignments or activities that enable or support the transport of consignments, which consumes energy, material and refrigerants and/or generates waste and/or emits GHG

3.1.36**refrigerants**

gases used in refrigeration and air conditioning systems that are listed as greenhouse gases to the United Nations Framework Convention on Climate Change with related emission factors

3.1.37**round trip**

a group of sequential journeys that start and end in the same place

3.1.38**route**

path (to be) taken to get from a starting point to a point of destination

[SOURCE: EN 14943:2005, 3.964, modified]

3.1.39

shipment

identifiable collection of one or more freight items (available to be) transported together from the original shipper to the ultimate consignee

Note 1 to entry: A shipment may be transported in one or a multiple number of consignments.

Note 2 to entry: A shipment can be aggregated or disaggregated to different consignments according to the requirements of the means of transportation on any one element of the transport chain, e.g. single bulk units and packages can be aggregated on a pallet and such pallet can be handed over as a unit for aggregation in a container, which in turn is treated as a consignment in a vehicle.

Note 3 to entry: Although consignment and shipment are common terms often considered as synonyms, in this document and other technical publications, a consignment is differentiated to a shipment. Indeed, a shipment refers to a grouping of freight corresponding to the shipper needs, whereas a consignment refers a grouping of freight according to a carrier or freight forwarder's transport solutions.

[SOURCE: ISO 26683-1:2013, 3.34, modified]

3.1.40

throughput

quantity of passengers or freight handled, sorted, cross-docked, or transferred within and between modes at a location

3.1.41

transport

assisted movement of parcel and/or freight

Note 1 to entry: The term *transport* in general is used for movement supported by means.

[SOURCE: EN 14943:2005, 3.1157, modified]

3.1.42

transport operator

entity that carries out transport operations involving carriage of freight, or passengers, or both

3.1.43

twenty-foot equivalent unit

TEU

standard unit (6,10 m) used to express a number of containers of various lengths and for describing the capacities of container ships or terminals

Note 1 to entry: One standard forty-foot ISO Series container equals 2 TEUs.

Note 2 to entry: One ISO 45-foot container equals 2,25 TEUs.

[SOURCE: EN 14943:2005, 3.1166, modified]

3.1.44

vehicle

any means of transport

Note 1 to entry: Within this standard, this definition includes vessels (watercraft and aircraft like ships, boats, planes, rail and cargo bicycles), for reasons of simplification only.

3.1.45**waste**

substances or objects which the holder intends or is required to dispose of

3.2 Specific terms**3.2.1****aggregation**

collection and clustering of parcels resulting in a consolidated group of parcels

3.2.2**collection**

delivery round

parcel transport performed by the parcel delivery services provider or associated transport operator, relatively localised transport activities with multiple collections from the consignors or pick-up point or deliveries to the consignees or pick-up point, within a single journey that starts and ends at a logistics site

3.2.3**consignee**

end receiver of the parcel

3.2.4**consignor**

sender of the parcel

3.2.5**direct injection**

transport of previously aggregated parcels from the consignor specified location to the parcel delivery service providers' logistics site performed by a transport operator

3.2.6**parcel transport chain**

expression referring to the sequential transport and location operations that, when taken together, comprise the operational aspect of the parcel delivery service provided

3.2.7**parcel transport chain element****PTCE**

one constituent part of a parcel transport chain that consists of multiple transport and location operations

Note 1 to entry: A parcel transport chain element can consist either of a transportation operation category or a Hub Operation Category.

3.2.8

Parcel transport service organizer

PTSO

provider of parcel delivery services enabling transport of parcels from consignor to consignee

Note 1 to entry: This could include every stakeholder who participates in the value chain of a parcel delivery.

EXAMPLE Merchants, e-commerce entities, shippers (if any different than consignor), logistics services companies and others.

Note 2 to entry: A parcel transport service organizer may work along with one or more transport operators and/or location operators.

Note 3 to entry: An e-commerce entity or consignors may also be considered as a parcel transport service organizer even if they fully outsource necessary transportation services to third parties.

3.2.9

pre-collection

parcel transport to a pick-up point by the consignor

3.2.10

processing

all operational activities needed to fulfil the parcel delivery service, namely the virtual & physical processing, the physical handling and the sorting among other operations of parcels at logistics sites

3.2.11

post delivery

parcel transport from pick up point by the *consignee*

3.2.12

returns

specific context in which the delivered parcel is returned by the consignee to the sellers' address (e-commerce entity) either due to non-deliverability of the parcel or due to the seller's return services and customer relationship conditions

3.2.13

trunking

long distance transport of consolidated parcels between initial and final logistics sites, which could involve multiple legs and transport modes, performed by the parcel transport service organizer or associated transport operator partners

3.2.14

vehicle type

categorisation of vehicle based on emission standard, fuel, capacity or weight

Note 1 to entry: vehicle types refer to the vehicle category nomenclature from the EMEP/EEA air pollutant emission inventory guidebook

EXAMPLE Light commercial vehicle, heavy-duty vehicle, passenger car or L-category.

3.2.15

vehicle technology type

vehicle emission standard

different technologies of the vehicles according to emission-control legislation

[SOURCE: EEA Report No 13/2019 – EMP/EEA air pollutant emission inventory guidebook 2019]

4 Symbols and units

For the purposes of this document, the following symbols and units apply.

Energy	Where required for intermediate calculations to arrive at emission values, quantities of energy are expressed in joule (J), or multiples thereof such as megajoules (MJ) or gigajoules (GJ).
GHG emissions	Quantities of GHG emissions are expressed in gram (g) of carbon dioxide equivalent (CO ₂ e) or multiples thereof such as kilogram (kg) or tonne (t) of CO ₂ e.
Distance	The standard unit for expressing distance is the kilometre (km). Where alternative systems are in use (e.g. miles or nautical miles) these units may be used as long as this deviation is unambiguously signalled.
Mass	The standard unit for expressing units of mass (e.g. quantities of parcel) is metric kg or metric tonnes (1 000 kg, or tonnes). Quantities of liquid fuel may be expressed as either litre or kilogram, or multiples thereof, whereas gaseous fuels may only be expressed as kilogram, or multiples thereof. Where alternative systems are in use (e.g. pounds and tonnes) these units may be used as long as this deviation is unambiguously signalled. NOTE The phrase ton is commonly and incorrectly used to denote 1 000 kg, a mistake that can lead to systematic inaccuracies in calculation and reporting. The correct phrase for 1 000 kg are tonne or metric ton.

5 General principles

The application of principles is fundamental to ensure that emission-related information is a true and fair account. The principles are the basis for, and will guide the application of, the requirements in this document:

- a) **Relevance:** Select the emission sources, data and methodologies appropriate to the needs of the intended user;
- b) **Completeness:** Include all relevant emissions;
- c) **Consistency:** Enable meaningful comparisons in emission-related information;
- d) **Transparency:** Disclose sufficient and appropriate emission-related information to allow intended users to make decisions with reasonable confidence;
- e) **Accuracy:** Reduce bias and uncertainties as far as is practical;
- f) **Conservative estimation:** When making estimations, maintain a conservative approach and ensure that the emission impacts are not understated;
- g) **Continuous improvement:** Aim towards continuous improvements in emissions accounting.

The principles as outlined below determine the approach set out in the subsequent clauses of this document:

- The methodology for calculating GHG emissions shall be substantively similar for each transport mode or hub across passenger and freight operations.
- All GHG emissions resulting from transport chain operation shall be treated equally, irrespective of the energy carrier used.
- All GHG emissions shall be assigned across the passengers and/or freight carried or transferred.
- In case of unavoidable divergence, the sum of calculated GHG emissions shall not be less than the total GHG emissions calculated.

6 Quantification boundaries

6.1 Definition of parcel delivery elements

6.1.1 General

The processes in the following subclauses relate to the parcel delivery service being assessed and are not limited by organisational boundaries.

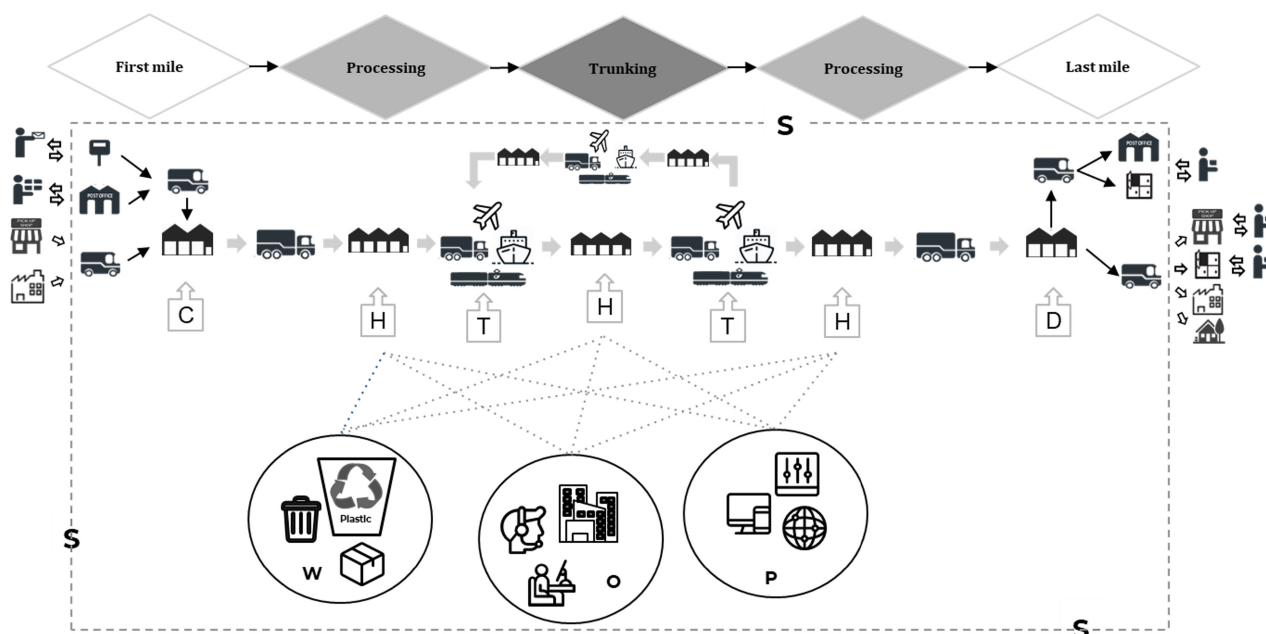
The parcel delivery operations (see also Figure 2 below) can be described as the below two categories, *inter alia*:

a) Transportation:

- 1) First and last leg transportation of parcels involving relatively localized transport activities:
 - i. Collection & delivery rounds multiple/single collections and deliveries within a single journey that starts and ends at a logistic site:
 - delivery rounds operated e.g. with light commercial vehicles;
 - collection rounds either operated with light commercial vehicles, usually bundled with a delivery round or for large parcels volumes may be operated with heavy-duty trucks (similar to long distance trunking operations).
 - ii. Direct injections of parcels, which are part of the contracted service, which involve the transport of previously consolidated items from the consignor's location to the parcel delivery service provider logistics site performed by a transport operator.
- 2) Long distance trunking (line-hauls) activities whereby individual items are consolidated and transported between the initial, intermediary and final logistics sites. This in itself could involve multiple journey segments and different transport modes (road, rail, air, short sea).

b) Location:

- 1) Logistics sites (processing / sorting / depots / hubs, etc.): The sites where physical processing and physical handling operations of parcels in logistics sites as well as other operational activities are conducted to fulfil the parcel delivery service.
- 2) Office and buildings (processing): The site where virtual processing of parcels as well as other operational activities are conducted to fulfil the parcel delivery service.



Key

- C collection depot
- H hub
- T transport
- D delivery depot
- O operation
- W waste, packaging, paper
- S system boundary
- P data processing

Figure 2 — Parcel delivery operations consisting of transportation and location-based activities

6.1.2 Modes of transport

The following transport modes are covered by this document:

- air transport;
- inland waterway transport;
- ocean transport;
- rail transport;
- road transport.

6.1.3 Location operations

This document covers the emissions from all associated and relevant buildings and facilities where physical or virtual handling of the parcel delivery services is carried out. This shall include all related locations for processing, sorting, depots, hubs among others owned or operated by the parcel transport service organizer and other logistics sites.

6.2 Principles of quantification

6.2.1 General

The scope of emissions considered relevant to be quantified and reported for generation and consumption of heat, electricity and carrying out transport operations and operations at site consists of the sum of the operational and energy provision. In the case of GHGs the emissions are quantified as mass of CO₂ equivalent using appropriate global warming potential (GWP). Further, the emissions are quantified through the application of appropriate emission factors, calculated as set out in Annex A.

The following subclauses refer in more detail to the processes included in and excluded from the scope of emission quantification.

6.2.2 Processes included

The assessment of emissions of a parcel delivery service shall include the below listed emission sources. Hereby, this standard is aligned with the GLEC framework as illustrated in Figure 3.

- a) All operational emissions from parcel logistics services (operations and transportation):
 - 1) logistics sites operations emissions;
 - 2) emissions related to offices at operational level;
 - 3) logistics sites and operational offices fugitive emissions from refrigeration and air-conditioning systems operation;
 - 4) company and commercial vehicles emissions under operational control of the reporting company.
- b) All energy provision emission from:
 - 1) logistics sites operations;
 - 2) emissions related to offices at operational level;
 - 3) company and commercial electric vehicles under operational control of the reporting company.
- c) Other GHG emissions related to the parcel logistics services:
 - 1) subcontracted logistics sites operational and energy provision emissions;
 - 2) subcontracted transport mode (road, rail, air, sea) operational and energy provision emissions;
 - 3) transportation related emissions for prior aggregation and disaggregation of parcels before entering the parcel delivery service provider network (direct injection) are included if contracted and/or paid for.
- d) Optional other GHG emissions related to the parcel logistics services:
 - 1) office and building fugitive emissions from refrigeration and air-conditioning systems operation;
 - 2) Subcontracted office and building operational and energy provision emissions;
 - 3) purchased paper and other packaging materials used by PTSO, for GHG emissions. In such case, the packaging materials to be considered are only the additional (secondary and tertiary) packaging used for preventing damage and to facilitate the handling, storage and transport of the

parcel. The secondary and tertiary packaging are layers of packaging outside the primary packaging⁴. It hence comprises all additional packaging layers beyond the underlying parcel inherent and original product packaging;

- 4) waste management of materials used during/for the delivery service, for GHG emissions;
- 5) purchased Information and Communication Technology (ICT) and cloud computing services from third parties, for GHG emissions;
- 6) operational emissions of GHG (other than refrigerants) resulting from leakage (of natural gas for example) at the vehicle level.

Certain categories of emissions such as fugitive emissions from refrigeration and air-conditioning systems; packaging related emissions; and ICT related emissions may be excluded, if they are not material or under the de minimis limits (less than 5 % of the reporting entity's emissions)⁵.

In case charging of electric vehicles is carried out at the logistics site itself, double counting of the corresponding electricity used is to be avoided.

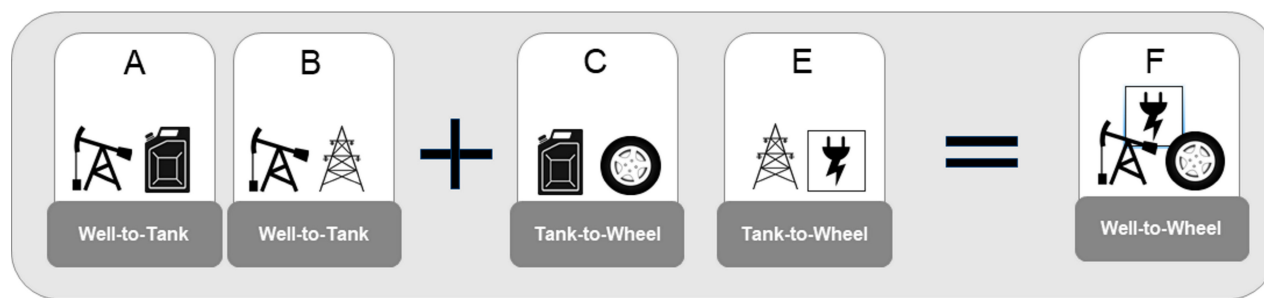
The calculation shall take into account all loaded and empty trips made by each vehicle (transport), hence including fuel consumed during diversionary and/or out-of-route (non-revenue) distances.

The energy operational processes shall include:

- for fuels: production and dismantling of fuel source infrastructure, extraction or cultivation of primary energy, chemical processing, transport and distribution of energy at all steps of the production of the fuel used;
- for electricity: extraction, processing and transport of primary energy, power generation, power generation infrastructure, grid losses associated with transmission and distribution of electricity.

⁴ Primary packaging is the packaging in direct contact with the product itself with the main purpose being to protect and/or preserve, contain and inform the consumer about the actual product e.g. food, accessories, clothing, gadgets etc.

⁵ In accordance with the WRI GHG Protocol Measuring to manage: A guide to designing GHG Accounting and Reporting Programs

**Key**

- A fuel production and distribution
- B electricity production and distribution
- C fuel consumption > combustion
- E electricity consumption
- F fuel life-cycle emissions

Figure 3 — Operational and energy provision emissions from fuel consumption⁶

6.2.3 Processes not included

The assessment of emissions of a parcel delivery service shall not include, in particular:

- fugitive emissions from refrigeration and air-conditioning systems operation, ICT and cloud computing services from third parties, paper and packaging as well as production and disposal of waste are not to be considered for quantification of air pollutant emissions;
- additional impacts of combustion of aviation fuel in high atmosphere, like contrails, cirrus;
- processes consisting of short-term assistance to the vehicle for security or movement reasons, with other devices like tugboats for towing vessels in harbours, aircraft tractors for planes in airports;
- processes implemented by external handling or transshipment devices, for the movement or transshipments of aggregated parcels as freight. In transport services organized in networks, handling operations that take place consisting of loading and unloading of parcels or pallets, belong to this category of processes, e.g. loading of parcels through forklifts in an aircraft;
- processes at the administrative (overhead) level of the organisations involved in the parcel delivery services, these processes can be offices, staff commuting and business trips;
- processes for the construction, maintenance, and scrapping of vehicles or transshipment and (de)boarding equipment;
- processes of construction, service, maintenance, and dismantling of transport infrastructures used by vehicles, e.g. roads, inland waterways or rail infrastructure, or transshipment and (de)boarding infrastructure;
- production and supply processes of refrigerants;
- independent businesses located within a building for example a logistics site located in a hub with other functions such as retail and hospitality services, whose functions are severable and incidental to the parcel operation of the logistics site; and

⁶ Adapted from Global Logistics Emissions Council (GLEC) Framework, version July 2019.