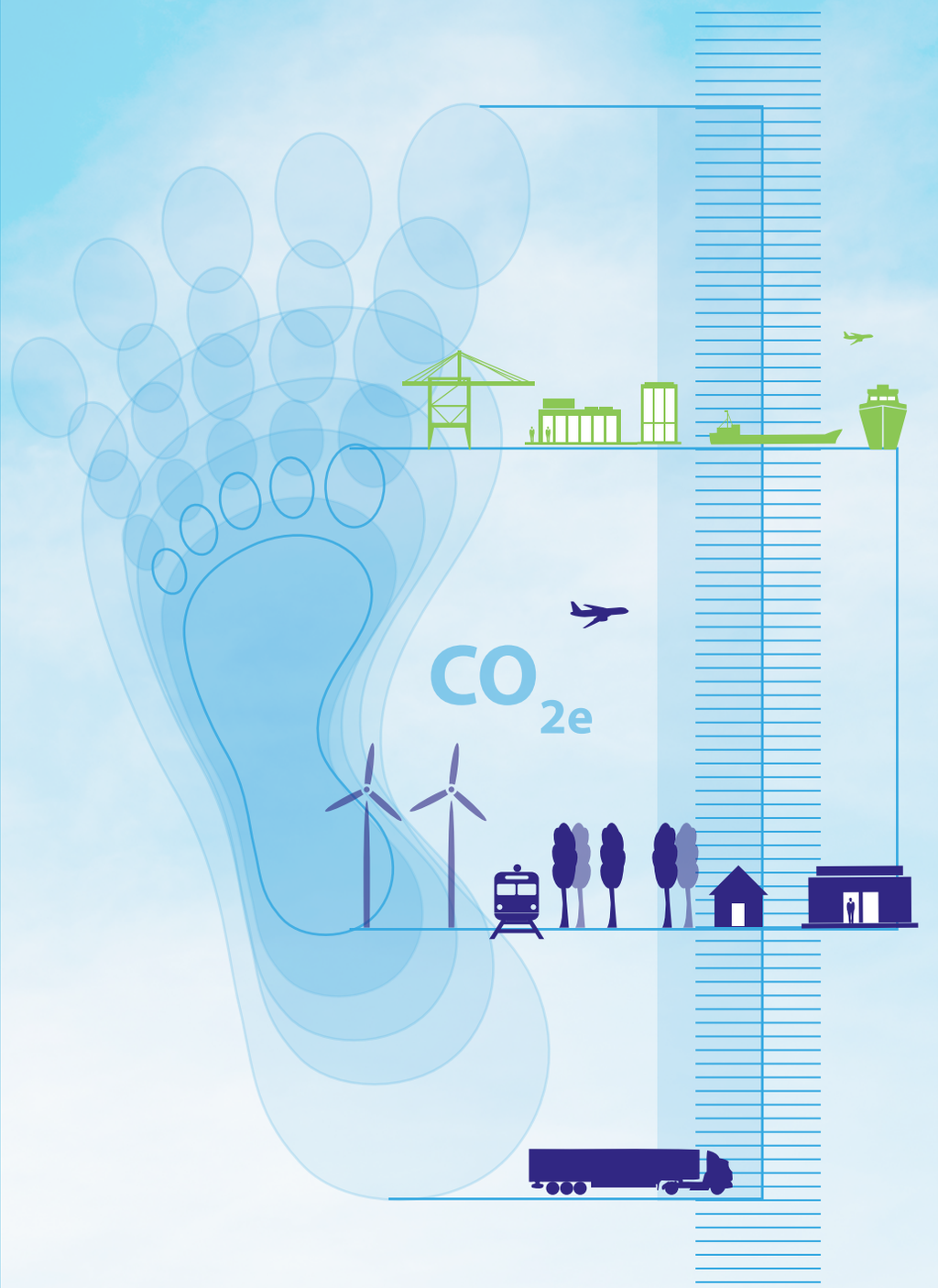
GUIDELINE 9 - CARBON FOOTPRINT IN LOGISTICS



Maritime and short sea shipping

Bulk and container transport by sea

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Carbon Footprint in Logistics

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Maritime and short sea shipping

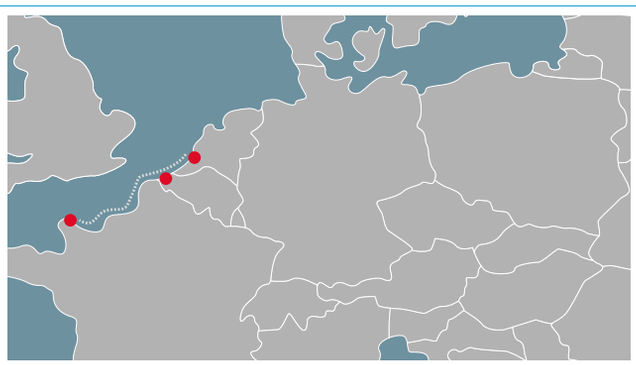
Bulk and container transport by sea

This guideline deals with the allocation of CO_{2e} emissions to cargo that is transported by sea.

Within maritime shipping a distinction is made between short sea shipping and deep sea shipping. Deep sea shipping involves crossing oceans or transport from one continent (e.g. Asia) to another (e.g. America or Europe).

The term maritime transport generally refers to this form of shipping.

Deep sea shipping
Also frequently referred to as maritime transport, this involves crossing oceans or transport from one continent to another.



Short sea shipping
This form of transport follows the coast.

Short sea shipping follows the coast from one port to another. It is therefore an alternative to continental transport by land over relatively short distances. An example is the transport of containers that arrive in Rotterdam via maritime shipping. Here they are transshipped, before being transported to other ports in Western Europe.

The most common types of cargo are dry bulk, wet bulk and containers (whether or not refrigerated ('reefers').

Almost all ports around the world can be designated using a standard code, the UN/LOCODE.

In principle, allocating CO_{2e} emissions to the cargo transported is fairly straightforward: the origins and destinations of the cargo are known, as is the weight of the cargo or the size (TEU) and weight of the containers. It is also known whether or not the containers are refrigerated.

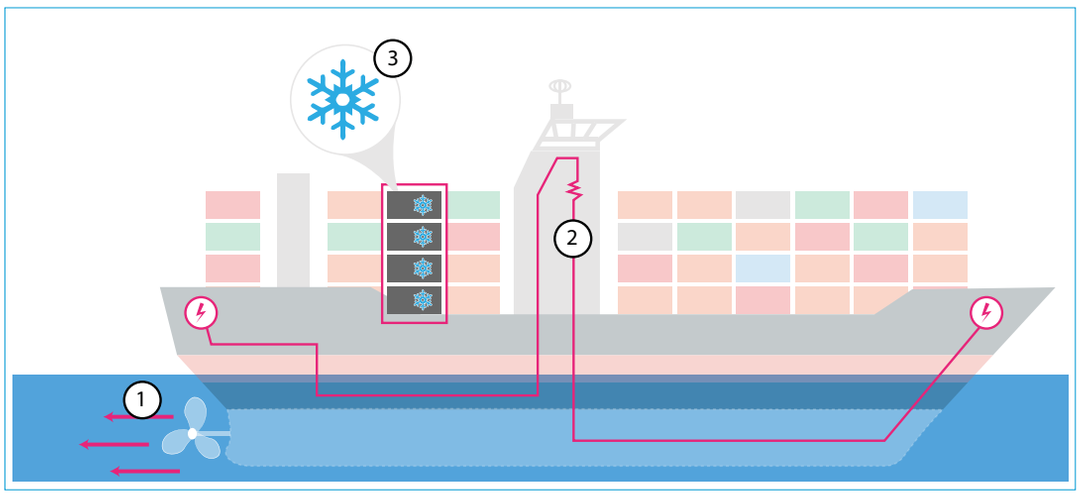
UN/LOCODE-origin	Terminal code-origin	UN/LOCODE-destination	Terminal code-destination	Quantity (tons)	❄
ATENA	OENNS	ATKRE	OOMER	22	✓
ATENA	OENNS	ATLNZ	OOMER	22	✗
ATENA	OENNS	ATVIE	OWIEW	21	✗

Fuel and energy consumption

The amount of fuel consumed for a complete trip is known. However, this is used for 3 different purposes:

1 propulsion of the vessel;
2 supply of energy to the vessel (equipment and living quarters);
3 refrigeration of temperature-controlled containers (reefers), if applicable.

The first two forms of consumption are allocated to the entire cargo, while the third is allocated only to the reefers transported.



In many cases the energy consumption for reefers is not measured separately and the energy consumed or the emissions from refrigeration have to be estimated.

In its methodology document (BSR-CCWG_Carbon_Emissions_Methodology_2015.pdf) the Clean Cargo Working Group (CCWG) defines a number of indicators that simplify the estimation process.

The calculation rules for applying these factors are described in chapter 3 of that report.

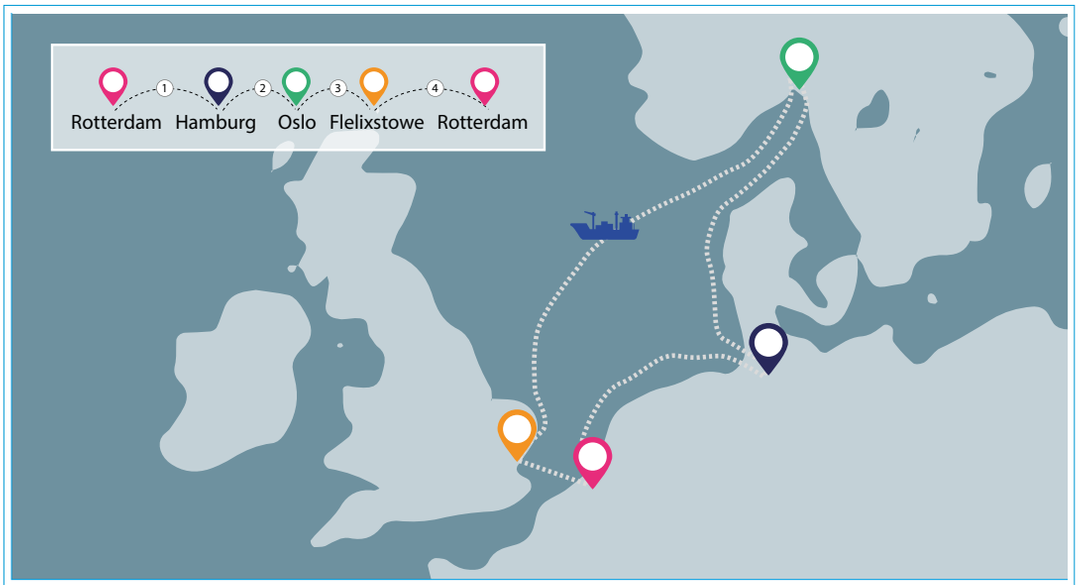
Various types of fuel are used for sea-going vessels, both for propulsion and to generate energy for other purposes. Heavy fuel oil (HFO) and diesel (marine diesel oil (MDO)) are the most common types.

One of the differences between these fuel types can be seen in the emissions of substances other than CO_{2e} (sulfur, soot/particulates, etc.): such emissions are not considered in this guideline.

The other difference relates to the Well-to-Wheel emissions: these are dependent on the source of the oil. In many cases the conversion factors used to convert fuel to CO_{2e} emissions are based on global averages.

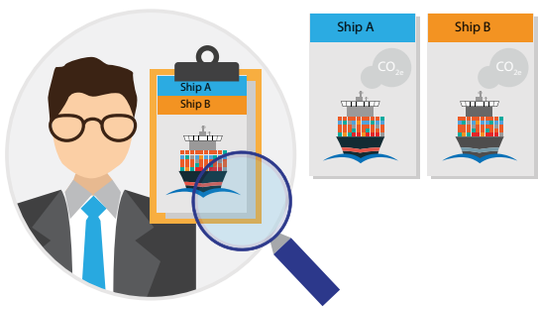
Global averages

For scheduled services operating back and forth along a fixed route the round trip is the smallest unit: in this way the emissions associated with repositioning are taken into account.



The CCWG method has its shortcomings, but at present (2021) it is often the most practical way of estimating the emissions of container transport by sea. The total emissions of ships sailing to and from Europe are reported in public databases, although performing allocation on the basis of these data is no easy task. This means that extra investigative work is needed to allow emissions resulting from transport by sea to be allocated to cargo.

For container shipping the Clean Cargo Working Group (CCWG) has published a methodology document (BSRCCWG_Carbon_Emissions_Methodology_2015.pdf).



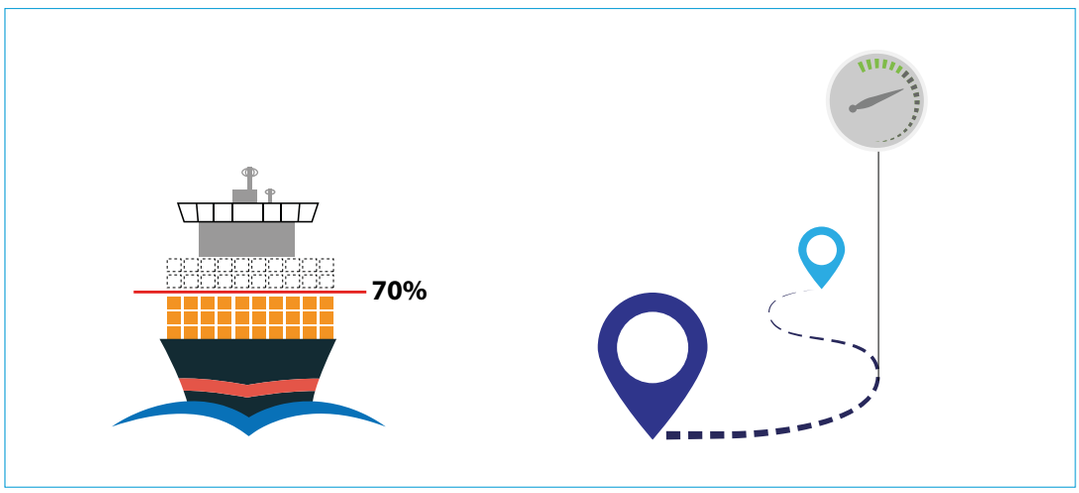
The aim of this methodology is to allow comparisons between vessels: this is a different aim than allocating CO_{2e} to the cargo transported per order.

To meet the needs of shippers, the CCWG publishes average emission factors for 25 major routes, which can be used to estimate emissions.

A number of additional assumptions or measurement points are needed to allow these emissions to be estimated. These are explained in more detail in section 3.1 of the methodology.

Two of the main influencing factors are:

- capacity utilization of the vessel (70% is assumed as a default);
- actual route sailed and actual speed (shortest possible route plus 15% is assumed).



The actual route sailed and the speed are influenced by current fuel prices, amongst other things. If prices are low, it may be beneficial to avoid the Suez Canal and sail around Africa, for example, which results in much higher consumption.
The consumption per kilometer depends to a large extent on the speed at which the vessel sails.

Carbon Footprint guidelines

0. Measuring, calculating, allocating and reducing

1. Allocating

2. Cargo

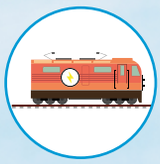
3. Origin and destination

4. Fuel

5. Inland shipping - containers

6. Inland shipping - bulk

7. Freight transport by rail



8. Air freight

9. Maritime and short sea shipping

10. Transshipment

11. Storage

12. Parcel transport and post

13. General road transport

14. Perishable and temperature controlled

15. Outsourced transport

16. Repositioning and empty kilometers

17. (Inter)national supply chains

18. Benchmarking

19. Intermediaries and platforms

20. Auditors and accountants

21. Data quality

22. The relationship between social goals and corporate goals

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