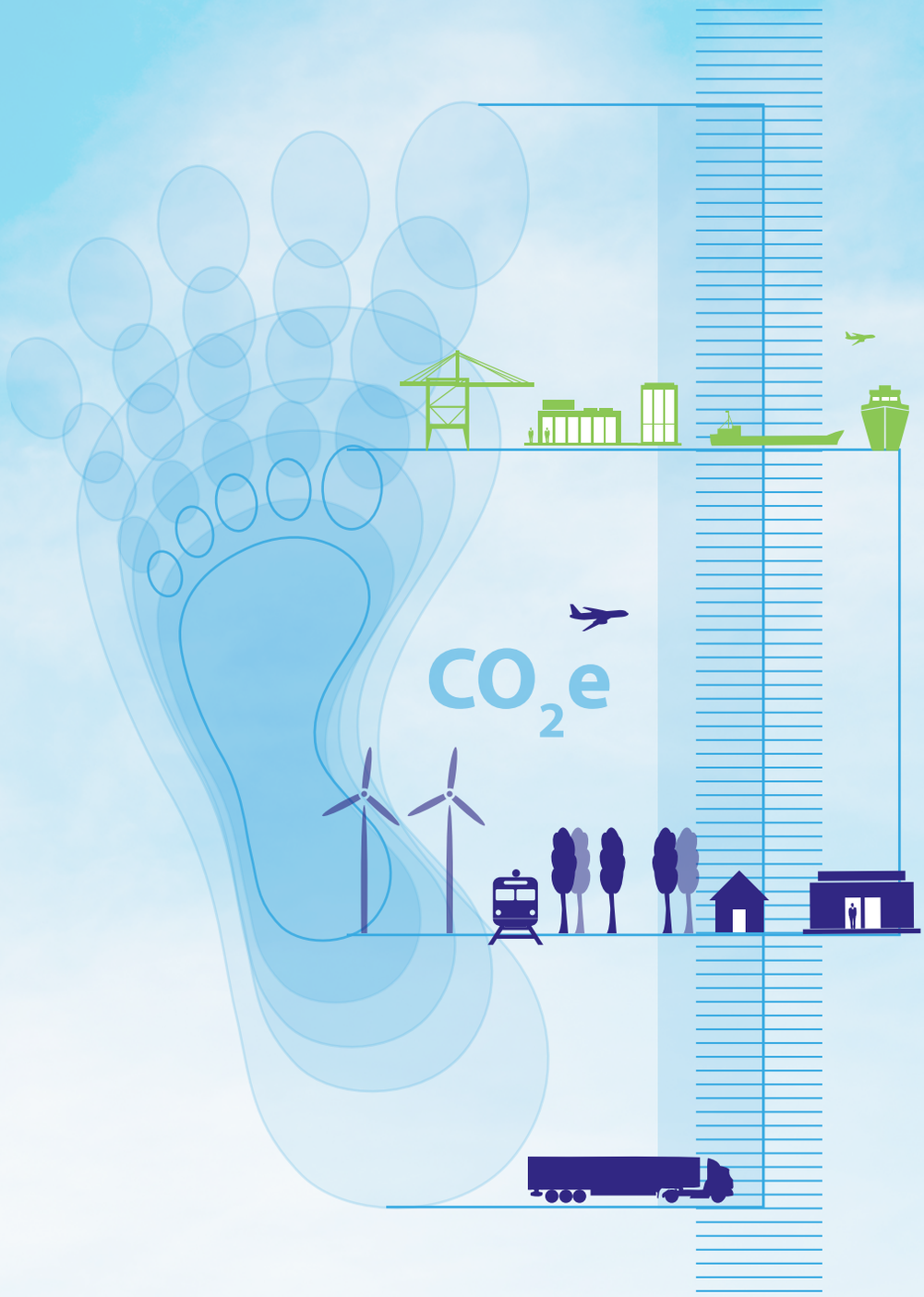
GUIDELINE 14 - CARBON FOOTPRINT IN LOGISTICS



Perishable and temperature controlled

Refrigeration, freezing and temperature control

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Guideline 14 - Perishable and temperature controlled
Refrigeration, freezing and temperature control

Carbon Footprint in logistics

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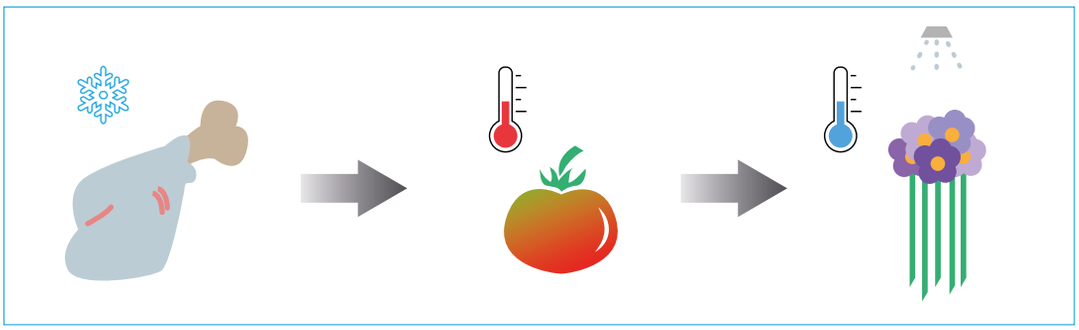
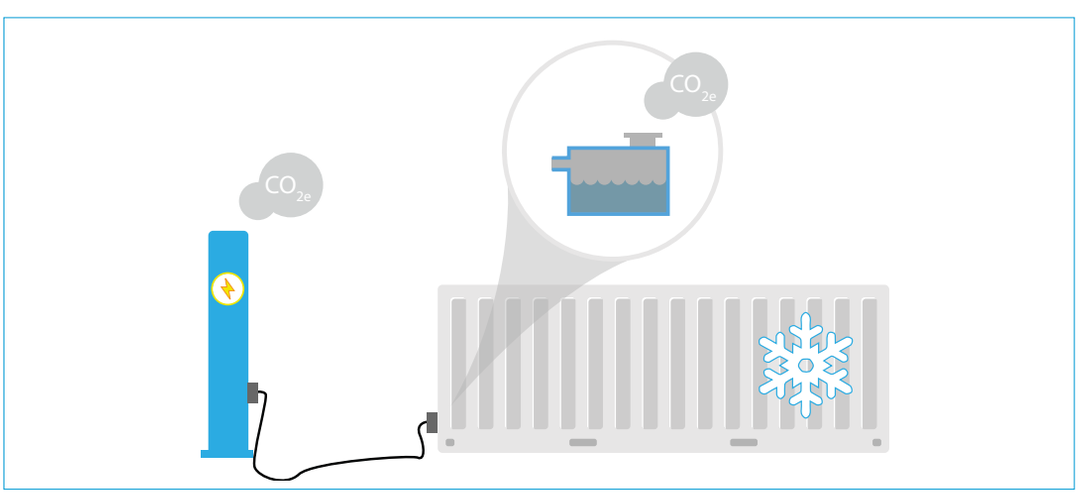
Perishable and temperature controlled

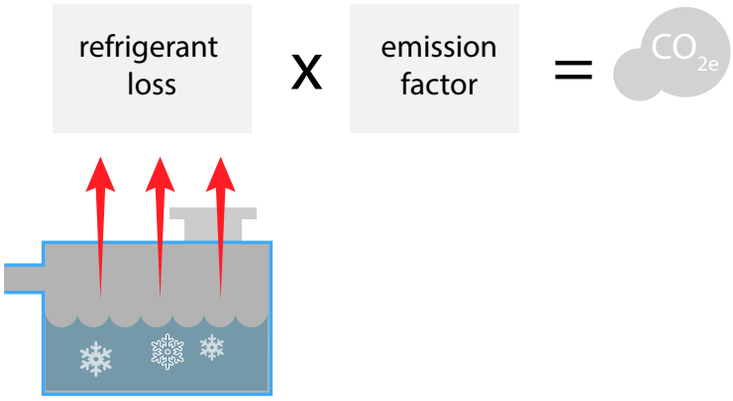
Refrigeration, freezing and temperature control

This guideline deals with the allocation of emissions associated with the refrigeration, freezing and temperature control of cargo.
The technology that makes it possible to control the climate in which goods are transported and stored has taken huge leaps forward. What initially involved freezing products such as meat to prevent them from perishing has now developed into a technology that allows the ripening of fruit, for example, to be precisely controlled during transport and storage. Cut flowers are given a longer life by controlling humidity and temperature.

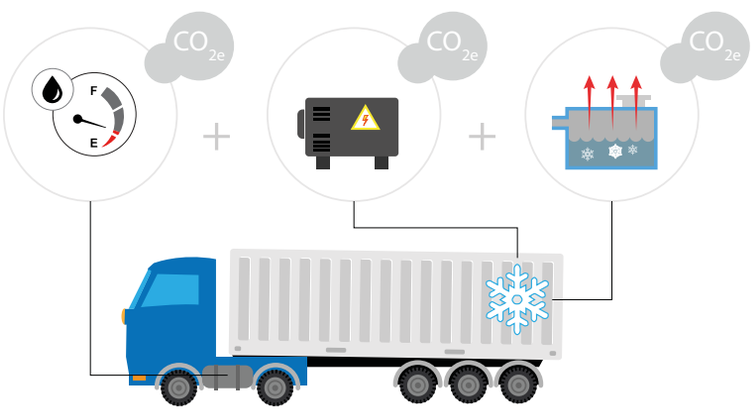


Temperature control requires additional energy and the refrigerants used can escape and end up in the atmosphere. Certain refrigerants have an extremely high greenhouse effect per kilogram compared with CO_{2e}.
When the refrigeration systems in temperature-controlled warehouses are maintained the refrigerant is usually topped up. The amount of refrigerant topped up times the emission factor of the specific refrigerant concerned gives you the CO_{2e} emissions. The emission factors of common refrigerants can be found at co2emissiefactoren.nl. These emissions need to be added to the emissions from electricity and other fuels and allocated to the goods. (See the guideline on storage and allocation.) If there is an ordinary warehouse and a temperature-controlled warehouse at a single location, the calculation has to be performed separately for each warehouse.





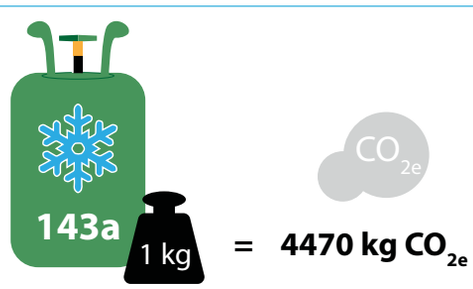
For transport the allocation is comparable with the process used to allocate fuel emissions. The difference is that the refrigerant loss has to be taken into account in the amount of CO_{2e} emissions to be allocated, converted into so-called CO_{2e} equivalents.



The emissions to be allocated are the sum of the:

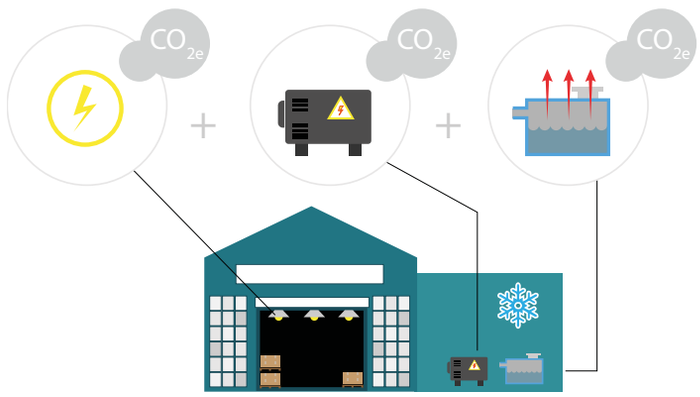
- fuel used for transport;
- fuel (diesel generator) or energy (battery or other) used for cooling during transport;
- refrigerant loss from the refrigeration systems times the emission factor of the refrigerant.

In practice, the refrigerant loss can only be calculated over a period and not per trip. That means it is best to allocate these emissions using the COFRET method. A second-best (but simpler) method involves allocating the emissions to the cargo on the basis of quantity.



The refrigerant R143a has one of the highest conversion factors: 1 kg of emissions of this substance has the same effect as 4,470 kg of CO_{2e} emissions.

There are also refrigerants, such as R744 (frozen CO_{2e}), that have a factor[1] of 1. It is therefore worth checking which refrigerants are used and whether others could be used instead, as this could be an easy way to cut emissions.



The same applies to temperature-controlled storage:

- fuel (diesel generator) or energy (electrical) used for cooling during storage;
- refrigerant loss from the refrigeration systems times the emission factor of each refrigerant.

Allocation will be performed for each period in which the refrigerant is topped up. The amount of refrigerant topped up times the emission factor of the specific refrigerant concerned gives you the CO_{2e} emissions. The emission factors of common refrigerants can be found at co2emissiefactoren.nl. These emissions need to be added to the emissions from electricity and other fuels and allocated to the goods. (See the guideline on storage and allocation.) If there is an ordinary warehouse and a temperature-controlled warehouse at a single location, the calculation has to be performed separately for each warehouse.

1 www.co2emissiefactoren.nl

Carbon Footprint guidelines

0. Measuring, calculating, allocating and reducing

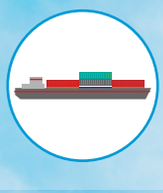
1. Allocating

2. Cargo

3. Origin and destination

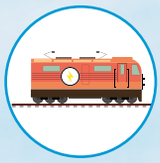
4. Fuel

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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