



CLIMATE ACCOUNTING REPORT

Scope 1, 2 & 3 2022

Created in collaboration between SustainX and Nissens Cooling Solutions

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Executive summary

Nissens Cooling Solutions Scope 1, 2 & 3 calculation for the year 2022 is a continuous calculation practice from the baseline calculated in 2020, conducted by the Footprint Firm.

This report prioritizes transparency and accountability, focusing on emissions from scope 1 & 2 data, together with scope 3, purchased goods and services, upstream transportation and distribution, waste and use of sold products.

Nissens Cooling Solutions analysis primarily relies on direct activity data in average data for scope 1 & 2, and a mix of spend-based data, average data, and supplier specific data for scope 3, providing stakeholders with a comprehensive view of the company's carbon footprint throughout its own operations and value chain.

The report serves as a valuable resource for stakeholders to obtain a descriptive overview of the climate accounting practices for Nissens Cooling Solutions.

Nissens Cooling Solutions baseline year is 2020, and this report is part of an on-going climate accounting process.

Document Revision history

Date	Revision	Description of Changes	Approval
Dec-23	01	Document finalized	Anders Allesø

1. Purpose

The purpose of this GHG Accounting manual is to provide a detailed description of how the climate accounting process was conducted. Overall themes such as quality control and reporting frequency are described and, within the three scopes, an activity data area is provided per activity, following the principles below.

- How the data was defined, gathered, and compiled
- Any data assumptions, calculation methods, estimation methods
- Data proof sampling procedures
- Applied emission factors

The content of this report will provide transparency for future third party validations, and for future internal GHG calculations in Nissens Cooling Solutions, to ensure coherence and consistency in methodologies and scopes across years.

2. GHG emission sources for Scope 1, 2 & 3 - Nissens Cooling Solutions 2022

Nissens Cooling Solutions is a provider of cooling solutions for renewable energy and industrial applications. They have their HQ and production in Horsens, Denmark, and production sites in Slovakia, Czech Republic and China. Nissens Cooling Solutions is a part of the value chain of large wind turbine manufacturers such as Vestas and Siemens Gamesa.

The majority of their emissions are related to Scope 3, cat. 1, purchased goods and services, where aluminium is one of the major sources of emissions. In Scope 1 and Scope 2, natural gas consumption and electricity consumption are the major emitters within these scopes. See the graphs below:

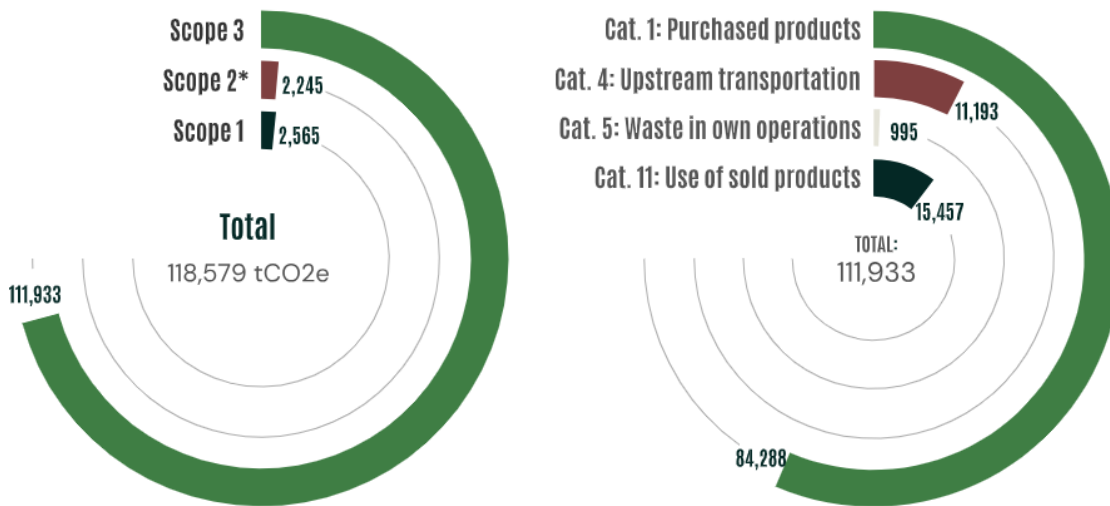


Figure 1: Scope 1, 2 & 3 emissions, and Scope 3 emissions from selected sub-categories
 * Scope 2 emissions – market based

The following table outlines the main sources of GHG emission within Nissens Cooling Solutions, Scope 1, 2 & 3, as well as it outlines which categories have been excluded from the calculation. The exclusions are based on the evaluations in the baseline year 2020, performed by the Footprint Firm.

Scope 1 & 2	Emission types
Scope 1	
Transport emissions	Diesel consumption from company vehicles.
Direct emission from stationary combustion	Natural gas consumption for heating and brazing.
Fugitive emissions	No emissions from fugitive sources with relevance for Nissens Cooling Solutions operations.
Process emissions	No emissions from process sources with relevance for Nissens Cooling Solutions operations.
Scope 2	
Purchased electricity	Purchased electricity within every location.
Purchased heating	Purchased heating through district heating in Denmark & Slovakia.
Purchased cooling	No emissions from cooling sources with relevance for Nissens Cooling Solutions operations.
Purchased Steam	No emissions from steam sources with relevance for Nissens Cooling Solutions operations.

Scope 3 - Category	Emission types
1. Purchased goods and services	Primarily purchase of metals - Aluminum and helping materials for the manufacturing process of cooling equipment. This category consists of 75% of total scope 3 from 2020 data.
2. Capital goods	This category was under 2% from the 2020 data, therefore it is not considered material.
3. Fuel- and energy-related activities	This category was under 2% from the 2020 data, therefore it is not considered material.
4. Upstream transportation and distribution	Shipping of products is a parameter of great interest for Nissens Cooling Solutions, and it consist of 3% of the total Scope 3 from 2020 data.
5. Waste generated in operations	Waste is a strategic working topic for Nissens Cooling Solutions, even though it only consists of 1% of the total scope 3 from 2020 data.
6. Business travel	Category was under 1% from the 2020 data, therefore it is not considered material.
7. Employee commuting	Nissens Cooling solutions does not have any direct control over the employees commuting and therefore this category is excluded.
8. Upstream leased assets	This category was under 1% from the 2020 data, therefore it is not considered material.
9. Transportation and distribution of sold products	This category was under 1% from the 2020 data, therefore it is not considered material.
10. Processing of sold products	Nissens Cooling Solutions does not have any direct control over the power needed for installation of products, therefore this category is excluded.
11. Use of sold products	The usage of the cooling equipment sold by Nissens Cooling Solutions demands power for operation, and the use of sold products consists of 13% of the total Scope 3 emissions from 2020 data.
12. End of life treatment of sold products	This category was under 1% from the 2020 data, therefore it is not considered material.
13. Downstream leased assets	Nissens Cooling Solutions does not have any downstream leased assets, therefore this category is excluded.
14. Franchises	Nissens Cooling Solutions does not have or operates in any franchises, therefore this category is excluded.
15. Investments	Investments is not a business model for Nissens Cooling Solutions, therefore this category is excluded.

3. Targets

Nissens Cooling Solutions does not have any published targets, but a roadmap for Scope 1 & 2 reduction initiatives to become Science-based targets (SBTi) compliant in 2030, has been established. The target from SBTi is absolute contraction at 1.5C. This information is available within the Sharepoint folder: DK - NCS – SustainX > Documents > General > 01 – Climate Accounting > Reduction Roadmap scope 1 + 2.

4. Reporting Period

Reporting period	01-january-2022 to 31-december-2022
Reporting frequency	Scope 1 & 2: Annually Scope 3: TBD

5. Exclusions

The scope exclusions in Scope 1 & 2 are minor cooling units in Denmark, where there have been added 0.5 kg of refrigerant gas to a cooling unit. This amount is excluded from the calculations. The Scope 3 sub-categories for 2022 are based on the baseline in 2020, therefore, the sub-categories excluded are based on the exclusions made in 2020. In 2020, all sub-categories were evaluated and in 2022, Nissens Cooling Solutions have chosen to calculate only the most relevant sub-categories:

- 01 – Purchased goods & services
- 04 – Upstream transportation & distribution
- 05 - Waste generated in own operations
- 11 - Use of sold products

In category 04 – upstream transport & distribution from 2020, supplier transport has not been calculated, and therefore, we have gathered data for the supplier transport in 2022. These specific measures are stated in section 7. Activity data collection, calculations, and estimations.

6. Emission factors

GWPs for Nissens Cooling Solutions inventory follow the [Intergovernmental Panel on Climate Change \(IPCC\) Fourth Assessment Report](#) using 100-year values. Hence, the GHG inventory is estimated based on AR4 standard in the base year.

Global warming potential (GWP) values relative to CO ₂ 100 YEAR TIME HORIZON						
$\frac{\text{CO}_2}{1}$	$\frac{\text{CH}_4}{28}$	$\frac{\text{N}_2\text{O}}{265}$	$\frac{\text{HFCs}}{4}$	$\frac{\text{PFCs}}{7910}$	$\frac{\text{SF}_6}{23500}$	$\frac{\text{NF}_3}{16100}$
			- 12400	- 9540		

Figure 2: GWP multiplication factor of each GHG to CO₂ equivalent, HFCs and PFCs range due to variation of the gas.

For each Scope 1, 2 & 3 category, total emissions of GHGs (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) is reported in metric tons of CO₂ equivalent, (tCO₂e) since it was not possible to obtain emissions data at a detailed level to split the results per specific gas per category. This is due to the fact that national agencies and other relevant sources do not publish this information. The results will, therefore, only be displayed as CO₂e.

Nissens Cooling Solutions has chosen to use 'Climatic' as its emission factor bank for emissions covering scope 1 & 2, within 2021 and 2022. Most emissions originate from DEFRA (UK GOV) and AIB (Association of Issuing Bodies), and a few are selected from more specific data. This is covered in section 7. Activity data collection, calculations, and estimations.

7. Activity data collection, calculations, and estimations

In this section, each scope and sub-category is outlined and described with relevant information on how the data was retrieved, handled, and what emission factors and sources are matched with the activity data.

7.1 Scope 1

Emission sources

The emissions selected to the specific types of data activity are listed below, for Scope 1, only emissions related to the UK GOV from DEFRA have been selected from the Climatic database to match the activities from Scope 1.

Table 1: Total Scope 1 activities and emission factors

Description of activity	Type of fuel	Description of emission factors	Source
Company cars (CN)	Diesel	Diesel (average biofuel blend) 2022 UK	BEIS
Company cars (DK) - diesel (Arval, Alm Brand, Q8, Eurocard)	Diesel	Diesel (average biofuel blend) 2022 UK	BEIS
Company cars (SK) - diesel	Diesel	Diesel (average biofuel blend) 2022 UK	BEIS
Company cars (CZ) - diesel	Diesel	Diesel (average biofuel blend) 2022 UK	BEIS
Total amount of used gas m3 ex brazing 2022	Natural gas	Natural gas 2021 UK	BEIS
Total amount of used gas m3 ex brazing 2022	Natural gas	Natural gas 2021 UK	BEIS
Total amount of used gas m3 ex brazing 2022	Natural gas	Natural gas 2021 UK	BEIS
Total amount of used gas m3 ex brazing 2022	Natural gas	Natural gas 2021 UK	BEIS
Gas used for brazing m3 2022	Natural gas	Natural gas 2021 UK	BEIS
Gas used for brazing m3 2022	Natural gas	Natural gas 2021 UK	BEIS

Description of activity	Type of fuel	Description of emission factors	Source
Gas used for brazing m3 2022	Natural gas	Natural gas 2021 UK	BEIS

Data collection and completeness of data

All data was gathered and collected in an excel sheet:

FootprintFirm_X_SustainX_Year_2022_Scope_1_2_3.

This sheet contains descriptions on how data was retrieved. All Scope 1 data are gathered from the NSC HESQ KPI extract. This data is gathered by HESQ to ensure and uphold all consumption within Nissens Cooling Solutions and its operations on each location. All activities are based on invoice data from purchased materials.

For Scope 1, the following consumption data was extracted covering the total Scope 1 activity data input.

Table 2: Total Scope 2 activities

Description of activity	Country	Type of fuel
Company cars (CN)	China	Diesel
Company cars (DK) - diesel (Arval, Alm Brand, Q8, Eurocard)	Denmark	Diesel
Company cars (SK) - diesel	Slovakia	Diesel
Company cars (CZ) - diesel	Czech Republic	Diesel
Total amount of used gas m3 ex brazing 2022	Denmark	Natural gas
Total amount of used gas m3 ex brazing 2022	Slovakia	Natural gas
Total amount of used gas m3 ex brazing 2022	Czech Republic	Natural gas
Total amount of used gas m3 ex brazing 2022	China	Natural gas
Gas used for brazing m3 2022	Denmark	Natural gas
Gas used for brazing m3 2022	Slovakia	Natural gas
Gas used for brazing m3 2022	China	Natural gas

Calculations, estimations & assumptions

All data gathered represents the emissions from Nissens Colling Solutions in Scope 1, no estimations or assumptions have been made within this scope

7.2 Scope 2

Emission sources

Nissens Cooling Solutions has chosen to calculate the Scope 2 emissions with the market-based method. This implies that the emission factors selected for purchased grid electricity are residual mix emission factors. The emissions selected for the specific types of data activity are listed below, for Scope 2, emissions related to the AIB have been selected from the Climatic database to match the activities from Scope 2. Within selected activities, specific factors are used. See the table below.

Table 3: Total Scope 2 activities & emission factors

Description of activity	Country	Type	Description of emission factors	Source
Total el kWh ex brazing 2022	Denmark	Grid	Electricity supplied from grid - residual mix 2022 DK	AIB
Total el kWh ex brazing 2022	Slovakia	Grid	Electricity supplied from grid - production mix 2022 SK	AIB
Total el kWh ex brazing 2022	Czech Republic	Grid	Electricity supplied from grid - production mix 2022 CZ	AIB
Total el kWh ex brazing 2022	China	Grid	Electricity supplied from grid CN North 2021	Climatic
El kWh from brazing 2022	Denmark	Grid	Electricity supplied from grid - residual mix 2022 DK	AIB
El kWh from brazing 2022	Slovakia	Grid	Electricity supplied from grid - production	AIB

Description of activity	Country	Type	Description of emission factors	Source
			mix 2022 SK	
El kWh from brazing 2022	China	Grid	Electricity supplied from grid CN North 2021	Climatic
District heating use 2022	Denmark	District heating	District heat Horsens	Fjernvarme Horsens
District heating NSC North SK	Slovakia	District heating	District heat Slovakia	Annual report 2022, Slovenské elektrárne

Data collection and completeness of data

All data was gathered and collected into an excel sheet:

FootprintFirm_X_SustainX_Year_2022_Scope_1_2_3. This sheet contains descriptions on how data was retrieved. All Scope 2 data are gathered from the NSC HESQ KPI extract. This data is gathered by HESQ to ensure and uphold all consumption within Nissens Cooling Solutions and its operations on each location. All activities are based on invoice data from purchased materials.

For Scope 2, the following consumption data was extracted covering the total Scope 2 activity data input.

Table 4: Total Scope 2 activities

Description of activity	Country	Type
Total el kWh ex brazing 2022	Denmark	Grid
Total el kWh ex brazing 2022	Slovakia	Grid
Total el kWh ex brazing 2022	Czech Republic	Grid
Total el kWh ex brazing 2022	China	Grid
El kWh from brazing 2022	Denmark	Grid

Description of activity	Country	Type
El kWh from brazing 2022	Slovakia	Grid
El kWh from brazing 2022	China	Grid
District heating use 2022	Denmark	District heating
District heating NSC North SK	Slovakia	District heating

Calculations, estimations & assumptions

All data gathered represent the emissions from Nissens Colling Solutions in Scope 2. All grid emission factors are retrieved from internationally recognized agencies. The emission factor for district heating is retrieved from supplier specific data. The Slovakia emission factor for district heating is selected from the suppliers' annual report, where they state their own emissions. The factor is based on both, the electricity they provide from electrical grid and district heating, thus there is some limitation to this factor. However, it is the best data available. The emission factor from the Danish district heating in Horsens represents the emissions from the specific supplier.

7.3 Scope 3

7.3.1 Purchased goods and services

Emission sources

The emissions for category 01 - Purchased Goods & Services are based on the same emission factors used in 2020. No significant change in purchased materials has been detected. The emission factors for 2022 are divided into three sections. The major databases chosen are listed below.

Table 5: Internal Purchase categories

Internal categorization of sub-category 01	Emission database
Purchased goods and services (non-material spend)	DEFRA – Table 13, indirect emissions from the supply chain
Purchased materials weight-based (materials used in production)	Ecoinvent 3.7, Research papers, and supplier specific emission factors
Purchased materials spent-based (materials used in production)	DEFRA – Table 13, indirect emissions from the supply chain

Few emissions selected are based on research papers, or supplier specific values, this is highlighted in appendix 9, where all emission factors are listed for the specific category.

In the category of 'purchased materials weight-based' (materials used in production), a special focus has been put to evaluate the aluminium suppliers and the materials they supply to Nissens Cooling Solutions. All aluminium suppliers have been evaluated and divided into two categorizations: The origins and the composition of the supplied aluminium. The distribution below is based on supplier specific information gathered in 2020 and 2022. The suppliers that have been contacted cover 99% of the total purchase of aluminium in 2022. The suppliers that have delivered new information in 2022 consist of 28 % of the total purchase of aluminium in 2022, and the remaining is based on supplier data collected in 2020. Thus, only 2 out of 8 suppliers answered the sourcing and composition questions. The remaining suppliers are covered with 2020 data.

Table 6: Supplier origin and material composition of aluminum. *The supplier; Hydro Precision Tubing is not represented in this table because they have provided their own product specific emission factors in 2020.

Supplier aluminium origin	Virgin aluminium	Post consumer scrap	Internal Scrap
EU (w/o Hydro Precision Tubing*)	40%	82%	41%
Russia	21%	1%	20%
Africa (& Gulf Cooperation (Average)	16%	0%	15%
Asia (excl. China)	6%	14%	4%
China	11%	0%	12%
North America	5%	2%	5%
Other	2%	1%	2%

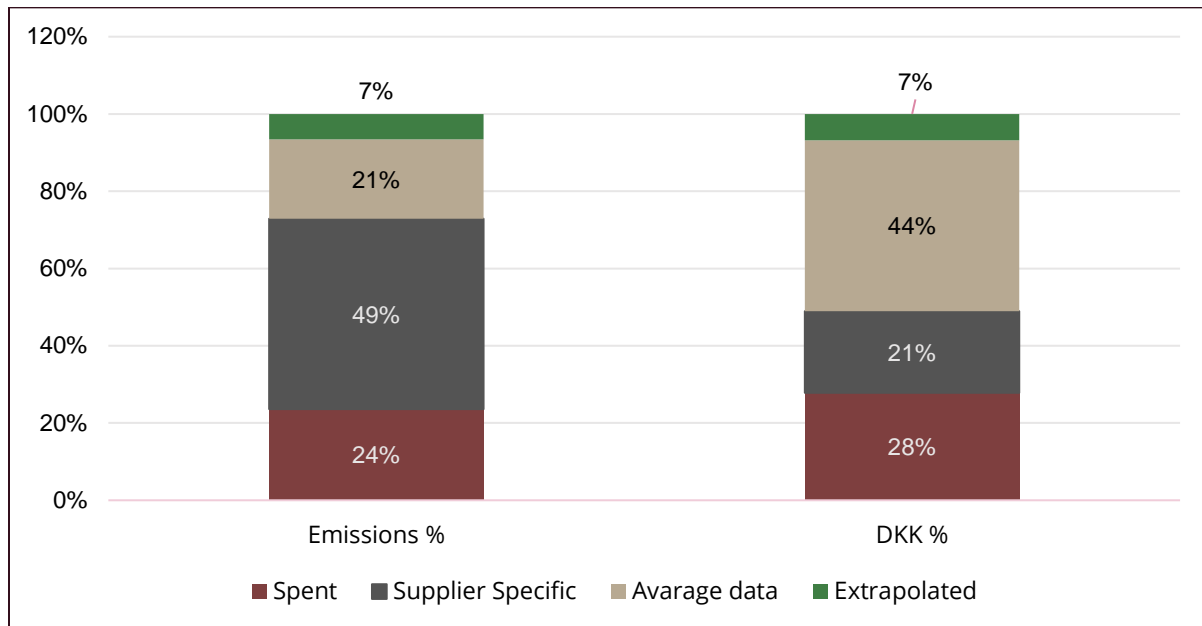
From the distribution above, specific emission factors have been modelled for each origin and composition. The references list can be found in appendix 9, table 9.

Data collection and completeness of data

All data extracted for sub-category 01 – Purchased Goods & Services, is based on financial data extracted from all locations that Nissen Cooling Solution is operating and controlling. However, it has not been possible to gain the data on specific location level. All data was gathered and collected into an excel sheet: FootprintFirm_X_SustainX_Year_2022_Scope_1_2_3. This sheet contains descriptions on how data was retrieved. All Scope 3, sub-category 1 data was gathered in the folder: Scope 3.01 Purchased goods & services located in SharePoint: 01 - Climate Accounting.

All the data gathered for sub-category 01 - Purchased Goods & Services have been divided into a specific methodology stated by the Greenhouse Gas Protocol - Technical Guidance for Calculating Scope 3 Emissions. The methods differentiate between spent-based, supplier specific data, average weight data. The remaining spent that cannot be categorized into an emission category is extrapolated. As highlighted in the graph below, the supplier specific data accounts for a higher ratio within emissions compared to the amount of money spent on the products.

Figure 3: Sub-category 01- Purchased Goods & Services methodologies.



Calculations, estimations & assumptions

An extrapolation has been conducted for the sub-category 01 – Purchased Goods & Services, for the remaining spent that Nissens Cooling Solutions could not categorize into materials. This equals 7% of total spent, therefore, this is extrapolated, by adding 7% more to the total emissions for sub-category 01 – Purchased Goods & Services.

The emission factors used for spent-based data has not been changed regarding to the inflation occurring between 2020 and 2022. The prices are an indication on price level in 2020.

The data collection procedures and calculations are aligned with the practices performed in the baseline year 2020.

7.3.2 Upstream transportation and distribution

Within this category, Nissens Cooling Solutions has investigated supplier transport, customer transport paid for by Nissens Cooling Solutions, and intercompany transport between sites. Each of these three categories are evaluated with different approaches and for each location: Denmark (Horsens), Slovakia (Čachtice), China (Tainjin), and Czech Republic (Olomouc). All measures in this sub-category are following the methodology of the distance-based method. Where a specific route in

km is multiplied with the amount of goods moved in tonnes, corresponding to the specific mode of transport used.

Emission sources

The emissions for category 04 – Upstream transport & distribution - are based on the same emission factors used in 2020. The emission factors for 2022 are divided into three sections. The major databases chosen are listed below. For the specific emissions see appendix 9, table 12.

Transport categorization	Emission database
Supplier transport	DEFRA conversion factors, Freightage goods, 2022
Intercompany transport	DEFRA conversion factors, Freightage goods, 2022
Customer transport paid by Nissens Cooling Solutions	DEFRA conversion factors, Freightage goods, 2022

Data collection and completeness of data

The transportation and distribution data were estimated based on the transportation routes, extracted for each location. The overall procedure and data structure are based on the distance method, where Nissens Cooling Solutions has evaluated transport routes, mode of- and weights moved on the specific route. Data on routes, modes of transport and weight of goods transported are extracted from Nissens Cooling Solutions’ internal systems. All data was gathered and collection into an excel sheet: FootprintFirm_X_SustainX_Year_2022_Scope_1_2_3. This sheet contains descriptions on how data was retrieved. All Scope 3, sub-category 4 data was gathered in the folder: Scope 3.04 Upstream transportation located in SharePoint: 01 - Climate Accounting.

Calculations, estimations & assumptions

The supplier transport is evaluated by estimating routes and weight purchased from the biggest suppliers. The coverage is approximately 80% of total spent within each location. The distances are evaluated, and the emissions are calculated for each route corresponding to the purchase weight moved in total.

The intercompany transport & customer transport paid for by Nissens Cooling Solutions are evaluated with the same method, however, here it was not possible to

extract the percentage spent coverage, which apply some uncertainties to this data. The internal logistic system at Nissens Cooling Solution, could only provide the distances for each route in km from Slovakia. The remaining routes from Denmark and Czech Republic were evaluated manually.

Google Maps¹ were used to evaluate distances on a specific route when the freight was carried out with trucks, and EcoTransIT² were used to evaluate sea and air freight distances. The sea freight was evaluated from the specific internal site the biggest port in the destination country. Only the sea km was used, which means that the truck transfer from internal sites to the harbour were excluded. Air freight was evaluated from the specific internal site to the capital of the destination country. Only the air km was used, the truck transfer from internal sites to the airport, or from airport to the capital, were excluded.

7.3.3 Waste in own operations

Within this category, Nissens Cooling Solutions has investigated waste discarded from own operations at each site. The waste has been categorized into relevant waste categories and matched to the relevant treatment method and the specific emission factor.

Emission sources

The emissions for category 05 – Waste from own operations - are based on the same emission factors used in 2020. Thus, no significant changes in waste streams have been detected. The emission factors for 2022 are all defined by using DEFRA values from the UK Government. Except the waste category of hazardous waste for incineration, here a research paper has been evaluated and the emission factors implemented. For the full list of internal waste categorization and specific emission factors see appendix 9, table 11.

¹ <https://www.google.com/maps>

² <https://www.ecotransit.org/en/>

Table 7: Waste treatment categories and the corresponding emission factors

Internal categorization of waste treatment types	Emission database/Articles
Hazardous waste incineration	Leinikka Dall, O., Wenzel, H., & NAAMANSEN, E. T. (2012). CARBON FOOTPRINT FOR HAZARDOUS WASTE INCINERATION. https://findresearcher.sdu.dk:8443/ws/files/71160147/232_O.L.Dall_Carbon_Footpring.pdf
Closed loop recycling; Scrap metal	DEFRA conversion factors 2022
Assumed combusted; Wood	DEFRA conversion factors 2022
Closed-loop recycling	DEFRA conversion factors 2022
Combustion	DEFRA conversion factors 2022
Open-loop recycling	DEFRA conversion factors 2022
Composting	DEFRA conversion factors 2022
Landfill	DEFRA conversion factors 2022

Data collection and completeness of data

The waste data was collected at each site. In Denmark the internal waste categorization is correlated to EAK-codes (Det Europæiske affalds katalog). These codes were in 2020 matched with the treatment types and emission factors provided by DEFRA. No major changes in waste types have been detected internally at Nissens Cooling Solutions, therefore the same procedure of machining EAK-codes with DEFRA values was applied to the 2022 waste data. In Eastern Europe (Czech Republic and Slovakia), the same procedure was carried out by using the internally provided EWC codes (European waste catalogue) and matching these codes with the DEFRA values. In China, only 5 waste categories were detected and therefore a manual comparison to the DEFRA values was applied for the 2022 data.

Calculations, estimations & assumptions

The data was gathered, and emission factor selected following the same procedure as in 2020. All the data gathered was directly measured waste data in kg from each site. The data methodology used within this sub-category is the average data method, relying on specific amount of waste type corresponding to the relevant treatment method.

7.3.4 Use of sold products

Nissens Cooling Solutions sell products that require fuel for function, most of these products are operated in machinery or vehicles where the need for fuel is vital for the operation. Therefore, this category has been investigated by looking into sold quantities, estimations on lifetime and fuel consumption.

Emission sources and completeness of data

Nissens Cooling Solutions' sold products are all estimated to use diesel for operating. Therefore, the emissions are based on DEFRA values for diesel average bio-blend, common road fuel for vehicles.

Fuel consumption	Emission database
Fuel for operating of sold products	DEFRA conversion factors, Fuels, 2022

Data collection

The data was extracted from the internal sales system and the quantity of sold products that Nissens Cooling Solutions has sold in the year 2022 and are one of the inputs needed to evaluate emissions within this category. In 2020, each sold item was analysed for estimated lifetime and kwh consumption within this lifetime. In 2022, we matched the item numbers with the ones in 2020 and received an extract of the same items and assumption of lifetime & consumption thereof. There were 58 item numbers that were sold in 2022, that we could not match with the items sold in 2020. These were investigated manually, and an estimated lifetime and consumption of fuels was added.

Calculations, estimations & assumptions

The calculation was performed by multiplying the total kwh in the expected lifetime of all relevant sold goods with the emission factor for diesel (average biofuel-blend) in kwh. The sold goods were evaluated in different categories, where only the fuel consuming items were considered. The sold goods were evaluated within two categories, goods for the wind industry and goods for the general industry. In 2020, a calculation for the amount of energy needed to operate the sold goods in the wind industry was performed. The emissions were very low, and, therefore, this category was excluded.

8. Base year change log

Structural and methodological changes in subsequent year inventories may trigger a base year recalculation; for example, changed calculation methodologies and emission factors; new or additional data availability; structural changes that require a description of calculation approached for new GHG emission sources at Nissens Cooling Solutions.

No recalculation of the base year 2020 has been triggered within the calculation of 2022 data. However, a recommendation is to investigate the base year of 2020 and evaluate the supplier transport parameter within Scope 3, category 04 – Upstream Transport & distribution.

Date	Revision	Description of Changes	Approval
N/A	N/A	N/A	N/A

9. Appendix

Table 8: Purchased Goods and Services (non-material spend)

Category	Sub-category	Emission factor description	Source
Materials	Materials - non specified	Wholesale and retail trade and repair services of motor vehicles and motorcycles	DEFRA – Table 13, indirect emissions from the supply chain
Materials	Materials - chemicals	Accounting, bookkeeping and auditing services; tax consulting services	DEFRA – Table 13, indirect emissions from the supply chain
Materials	Materials - premanufactured	Services of head offices; management consulting services	DEFRA – Table 13, indirect emissions from the supply chain
Materials	Paint	Telecommunications services	DEFRA – Table 13, indirect emissions from the supply chain
Materials	Materials - products used in production	Computer, electronic and optical products	DEFRA – Table 13, indirect emissions from the supply chain
IT & equipment	IT, computers, phone and internet	Services to buildings and landscape	DEFRA – Table 13, indirect emissions from the supply chain
Cleaning services	Cleaning & sanitary	Repair services of computers and personal and household goods	DEFRA – Table 13, indirect emissions from the supply chain
Marketing &	Recruiting	Services to buildings and	DEFRA – Table

Category	Sub-category	Emission factor description	Source
Recruiting		landscape	13, indirect emissions from the supply chain
Marketing & Recruiting	Marketing	Office administrative, office support and other business support services	DEFRA – Table 13, indirect emissions from the supply chain
Service, repair & maintenance	Maintenance and service (tools, equipment and goods)	Education services	DEFRA – Table 13, indirect emissions from the supply chain
Service, repair & maintenance	Repair and maintenance (buildings & landscape)	Furniture	DEFRA – Table 13, indirect emissions from the supply chain
Service, repair & maintenance	Buildings	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Equipment, tools & manufactured machines	Tools	Paper and paper products	DEFRA – Table 13, indirect emissions from the supply chain
Equipment, tools & manufactured machines	Machines for office & manufacturing	Information services	DEFRA – Table 13, indirect emissions from the supply chain
Equipment, tools & manufactured machines	Equipment	Other chemical products	DEFRA – Table 13, indirect emissions from the supply chain
Products	Products - non	Other manufactured goods	DEFRA – Table

Category	Sub-category	Emission factor description	Source
	specified		13, indirect emissions from the supply chain
Products	Hire of bottles	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Packaging	Packaging - wood	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Packaging	Packaging - paper & cardboard	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Offices-related expenses (supplies, subscriptions, furniture)	Office supplies	Soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations	DEFRA – Table 13, indirect emissions from the supply chain
Offices-related expenses (supplies, subscriptions, furniture)	Furniture	Paper and paper products	DEFRA – Table 13, indirect emissions from the supply chain
Offices-related expenses (supplies, subscriptions, furniture)	Office machines	Wood and wood products	DEFRA – Table 13, indirect emissions from the supply chain
Offices-related expenses (supplies, subscriptions, furniture)	Professional subscriptions and memberships	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Consultants	Consulting services	Machinery and equipment	DEFRA – Table

Category	Sub-category	Emission factor description	Source
		n.e.c.	13, indirect emissions from the supply chain
Consultants	Audit	Machinery and equipment n.e.c.	DEFRA – Table 13, indirect emissions from the supply chain
Consultants	IT Advisory services	Food and beverage serving services	DEFRA – Table 13, indirect emissions from the supply chain
Food, canteen & representation	Food, catering, restaurants	Food and beverage serving services	DEFRA – Table 13, indirect emissions from the supply chain
Food, canteen & representation	Representation - food, restaurants, and other	Accommodation services	DEFRA – Table 13, indirect emissions from the supply chain
Food, canteen & representation	Representation - hotel for customers/suppliers	Insurance, reinsurance and pension funding services, except compulsory social security & Pensions	DEFRA – Table 13, indirect emissions from the supply chain
Insurance	Insurance	Advertising and market research services	DEFRA – Table 13, indirect emissions from the supply chain
Clothing	Clothing	Advertising and market research services	DEFRA – Table 13, indirect emissions from the supply chain
Administrative	Education	Wearing apparel	DEFRA – Table

Category	Sub-category	Emission factor description	Source
costs			13, indirect emissions from the supply chain
Administrative costs	Admin	Glass, refractory, clay, other porcelain and ceramic, stone and abrasive products - 23.1-4/7-9	DEFRA – Table 13, indirect emissions from the supply chain
Other services	Service - non specified	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Company vehicles services (non-fuel related)	Repair, maintenance, road tax and other	Office administrative, office support and other business support services	DEFRA – Table 13, indirect emissions from the supply chain

Table 9: Purchased materials weight-based (materials used in production)

Category	OEM-Purchase group	Emission factor description	Source
Raw material, virgin alu, sourced from EU (excl. Hydro precision tubing)	100, 101, 102, 103	aluminium production, primary, ingot, EU27 & EFTA	EcolInvent 3.7: IAI Area, EU27 & EFTA aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, sourced from Russia	100, 101, 102, 103	aluminium production, primary, ingot, Russia & Europe outside EU27 & EFTA	EcolInvent 3.7: IAI Area, Russia & Europe outside EU27 & EFTA aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, sourced from Africa (and Gulf Cooperation)	100, 101, 102, 103	aluminium production, primary, ingot, Africa & Gulf cooperation*	Average of: "EcolInvent 3.7: IAI Area, Gulf Cooperation Council aluminium production, primary, ingot: IPCC 2013, Climate change " and "EcolInvent 3.7: IAI Area, Africa aluminium production, primary, ingot: IPCC 2013, Climate change"
Raw material, virgin alu, sourced from Asia (excl. China)	100, 101, 102, 103	aluminium production, primary, ingot, Asia	EcolInvent 3.7: IAI Area, Asia, without China and GCC aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, sourced from China	100, 101, 102, 103	aluminium production, primary, ingot, China	EcolInvent 3.7: China aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, sourced from North America	100, 101, 102, 103	aluminium production, primary, ingot, North America**	EcolInvent 3.7: Canada aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, sourced from Other	100, 101, 102, 103	aluminium production, primary, ingot, rest of the world	EcolInvent 3.7: Rest-of-World aluminium production, primary, ingot: IPCC 2013, Climate change
Raw material, virgin alu, Hydro precision tubing)	100, 101, 102, 103	Supplier specific emission factor from hydro precision	https://www.hydro.com/Document/In dex?name=REDUXA%20brochure.pdf&id =548546
Material recycled from post-consumer scrap	100, 101, 102, 103	Global emission factor for remelting of post-consumer scrap	https://www.world-aluminium.org/media/filer_public/2021/03/16/iai_ghg_pathways_data_calculatio n.pdf
Material recycled from internal scrap	100, 101, 102, 103	Global emission factor for remelting of internal scrap	https://www.world-aluminium.org/media/filer_public/2021/03/16/iai_ghg_pathways_data_calculatio n.pdf

Category	OEM-Purchase group	Emission factor description	Source
Flux, Total	150	flux production, for wave soldering, GLO	Ecoinvent 3.71 https://v371.ecoquery.ecoinvent.org/Details/LCIA/3d854441-a747-47b1-9c6e-e97545305fc5/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Alu, Sheet	200	Assumed Alu production RoW + sheet rolling, aluminium, RER,	https://v371.ecoquery.ecoinvent.org/Details/LCIA/3d5152f0-a2a5-4d41-aa3c-e13cb1ddb5f6/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Alu, Welded	201	Assumed Alu production RoW +welding, arc, aluminium, RER,	https://v371.ecoquery.ecoinvent.org/Details/LCIA/3d5152f0-a2a5-4d41-aa3c-e13cb1ddb5f6/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Alu, Machined	203	Assumed Alu production RoW	https://v371.ecoquery.ecoinvent.org/Details/LCIA/3d5152f0-a2a5-4d41-aa3c-e13cb1ddb5f6/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Carbon, Sheet	210	Steel production, low-alloyed, hot rolled, RER, + sheet rolling, steel RoW:	https://v371.ecoquery.ecoinvent.org/Details/LCIA/3415b4d6-9fda-4b9c-86a7-3ecffdc131a3/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/2ece816f-a805-4996-9583-408ce265bd06/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Carbon, Welded	211	Steel production, low-alloyed, hot rolled, RER, + 1 m of welding	https://v371.ecoquery.ecoinvent.org/Details/LCIA/b35f171a-ac12-458b-8ea2-211747eea0ab/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/a77d2fb6-466b-44ed-97ba-5ba3da71e26b/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Carbon, Tubes	212	Steel production, low-alloyed, hot rolled, RER, + drawing of pipe from 1 kg steel	https://v371.ecoquery.ecoinvent.org/Details/LCIA/25c0b74f-527a-4f89-ab4b-99c9217b3ad5/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/b35f171a-ac12-458b-8ea2-211747eea0ab/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce

Category	OEM-Purchase group	Emission factor description	Source
Metal, Stainless, Sheet	220	Steel production, electric, chromium steel 18/8, RER, + sheet rolling, chromium steel	https://v371.ecoquery.ecoinvent.org/Details/LCIA/b040787b-c775-4724-a806-0a0f327b9195/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/98966d57-88f9-462d-b26a-4c172c056094/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Stainless, Welded	221	Steel production, electric, chromium steel 18/8, RER, with Welding 1 m of steel	https://v371.ecoquery.ecoinvent.org/Details/LCIA/b040787b-c775-4724-a806-0a0f327b9195/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/a77d2fb6-466b-44ed-97ba-5ba3da71e26b/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Stainless, Tubes	222	Chromium steel pipe production	https://v371.ecoquery.ecoinvent.org/Details/LCIA/ef279495-40a7-4f45-ac0c-c504ab5bb48c/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Metal, Fanguards	250	1 kg Steel produced ReR + wire drawing of 1 kg of steel	https://v371.ecoquery.ecoinvent.org/Details/LCIA/cefb994e-85da-4d48-a284-970819ec20c9/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce + https://v371.ecoquery.ecoinvent.org/Details/LCIA/2ece816f-a805-4996-9583-408ce265bd06/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Mould/cast, Alu (cast)	310	1 kg of cast aluminium	https://v371.ecoquery.ecoinvent.org/Details/LCIA/f49a67a1-9cda-48c8-a256-805ad375e260/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Mould/cast, Glassfiber (molded)	330	Glass fiber reinforced plastic production, polyamide, injection molded, EU	https://v371.ecoquery.ecoinvent.org/Details/LCIA/4f2ba58f-dea9-49fa-ae46-0c73cfb8d9c5/290c1f85-4cc4-4fa1-b0c8-2cb7f4276dce
Drives&Trans, Fan units	530	See article "Towards BIM-integrated, resource-efficient building services 2015",	https://www.researchgate.net/publication/275950578_Towards_BIM-integrated_resource-efficient_building_services

Category	OEM-Purchase group	Emission factor description	Source
		page 8	
Drives&Trans, Centrifugal fans	540	See article "Towards BIM-integrated, resource-efficient building services 2015", page 8	https://www.researchgate.net/publication/275950578_Towards_BIM-integrated_resource-efficient_building_services
Components, Hoses	400	Steel pipes - EPD	https://portal.environdec.com/api/api/v1/EPDLibrary/Files/eb39024d-c0f5-4068-9b30-d14ef6d5eee8/Data
Drives&Trans, Pumps	500	Grundfos Magna3 EPD: Page 7: Stages A1-A5	https://epd-online.com/PublishedEpd/Detail/10788
Drives&Trans, Motors (Electric)	520	AC Low voltage cast iron motor, type M3BP 315. 17,617 kg/kW. - https://library.e.abb.com/public/ba93942efae7c40bc1256d63003cee01/EPD%20M3BP315GB.pdf	https://portal.environdec.com/api/api/v1/EPDLibrary/Files/eb39024d-c0f5-4068-9b30-d14ef6d5eee8/Data
Packaging, Wood	720	See article "Characterizing the Carbon Footprint of Wood Pallets Logistics", page 6	https://www.researchgate.net/publication/285640628_Characterizing_the_Carbon_Footprint_of_Wood_Pallet_Logistics
Nitrogen consumption SK (Calculation based on energy needed to produce)	100, 101, 102, 103	IEA 2020	IEA 2020 Slovak republic
Nitrogen consumption CN (Calculation based on energy needed to produce)	100, 101, 102, 103	IEA 2020	IEA 2020 China

Table 10: Purchased materials spent-based (materials used in production)

Category	OEM-Purchase group	Emission factor description	Source
Coolers, Alu Coolers	10	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Coolers, Oil Coolers	20	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Raw mat, Carbon, Plates	110	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Raw mat, Stainless, Plates	120	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Raw mat, Cu/Br, coil,sheet,profiles	130	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Raw mat, Plastic, Granulate	140	Rubber and plastic products	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Alu, Tubes	202	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Alu, Stamping	204	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Metal, Carbon, Machined	213	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Stainless, Machined	223	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Cu/Br, Tubes	231	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Cu/Br, Machined	232	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Metal, Lifting & Safety equip.	240	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Plastic, Machined	300	Rubber and plastic products	DEFRA – Table 13, indirect emissions from the supply chain
Mould/cast, Plastic (moulded)	320	Rubber and plastic products	DEFRA – Table 13, indirect emissions from the supply chain
Mould/cast, Thermoform parts	340	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Components, Sensor, Switch, Trans	410	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Components, Valves	420	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Components, Expan.tank (plast)	430	Rubber and plastic products	DEFRA – Table 13, indirect emissions from the supply chain
Components, Expan.tank (metal)	440	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Components, Radiator caps	450	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Components, Standard	460	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Components, Gaskets	470	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Components, Rubber	480	Rubber and plastic products	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Components, Heater	490	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Drives&Trans, Motors (Hydraulic)	510	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Drives&Trans, Impellers (Wings)	550	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Electrical, Cables & accessories	600	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Electrical, Terminal boxes	610	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Packaging, Label/Instruc./Sign	700	Paper and paper products	DEFRA – Table 13, indirect emissions from the supply chain
Packaging, Cardboard	710	Paper and paper products	DEFRA – Table 13, indirect emissions from the supply chain
Packaging, Foil & Others	730	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Fasteners, Screw/bolt/washer	740	Fabricated metal products, excl. machinery and equipment and weapons & ammunition - 25.1-3/25.5-9	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Metalwork	810	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Anod DK	820	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Anod SK	825	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Paint DK	830	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Paint SK	835	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Galv DK	840	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Galv SK	845	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Outsourced, Surf treat. Pick DK	850	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, Surf treat. Pick SK	855	Paints, varnishes and similar coatings, printing ink and mastics	DEFRA – Table 13, indirect emissions from the supply chain
Outsourced, External operations	860	Other basic metals and casting	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Clothes (DK)	900	Wearing apparel	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Clothes (SK)	905	Wearing apparel	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Indirect material (DK)	920	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Indirect material (SK)	925	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Office supplies	930	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Supplies, Office supplies	930	Paper and paper products	DEFRA – Table 13, indirect emissions from the supply chain
Supplies, Internal production	940	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Customer as supplier	960	Electrical equipment	DEFRA – Table 13, indirect emissions from the supply chain
Miscellaneous, Various costs	980	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Miscellaneous, New items PSA	993	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Miscellaneous, New items ROBA	994	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Miscellaneous, New items OES	996	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain
Miscellaneous, New Purch.items	999	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain

Category	OEM-Purchase group	Emission factor description	Source
Miscellaneous, DAKR, 1time prot.	990A	Other manufactured goods	DEFRA – Table 13, indirect emissions from the supply chain

Table 11: Waste types & treatment with selected emission factors

Country	Internal waste type	Waste treatment	Emission factor description	Source
Waste recorded from NCS SK	Hazardous Waste	Hazardous waste incineration	Hazardous waste incineration	Leinikka Dall, O., Wenzel, H., & NAAMANSEN, E. T. (2012). CARBON FOOTPRINT FOR HAZARDOUS WASTE INCINERATION. https://findresearcher.sdu.dk:8443/ws/files/71160147/232_O.L.D.all_Carbon_Footpring.pdf
Waste recorded from NCS SK	Metal: scrap metal	Closed loop recycling; Scrap metal	Assumed closed loop recycling; Scrap metal	DEFRA conversion factors - full set 2022; Waste disposal; Metal
Waste recorded from NCS SK	Wood	Assumed combusted; Wood	Combustion	DEFRA 2022 Conversion factors; Construction; Wood
Waste recorded from NCS SK	Paper and board: mixed	Closed-loop recycling	Closed-loop recycling	DEFRA 2022 Conversion factors; Paper; Paper and board: mixed
Waste recorded from NCS SK	Commercial and industrial waste	Combustion	Combustion	DEFRA 2022 Conversion factors; Refuse; Commercial and industrial waste
Waste recorded from NCS SK	Plastics: average plastics	Open-loop recycling	Open-loop recycling	DEFRA 2022 Conversion factors; Plastics; Plastics: average plastics
Waste recorded from NCS SK	Batteries	Open-loop recycling	Open-loop recycling	DEFRA 2022 Conversion factors; Electrical items, Batteries

Country	Internal waste type	Waste treatment	Emission factor description	Source
Waste recorded from NCS CZ	Hazardous Waste	Hazardous waste incineration	Hazardous waste incineration	Leinikka Dall, O., Wenzel, H., & NAAMANSEN, E. T. (2012). CARBON FOOTPRINT FOR HAZARDOUS WASTE INCINERATION. https://findresearcher.sdu.dk:8443/ws/files/71160147/232_O.L.D_all_Carbon_Footpring.pdf
Waste recorded from NCS CZ	Metal: scrap metal	Closed loop recycling; Scrap metal	Assumed closed loop recycling; Scrap metal	DEFRA conversion factors - full set 2022; Waste disposal; Metal
Waste recorded from NCS CZ	Wood	Assumed combusted; Wood	Combustion	DEFRA 2022 Conversion factors; Construction; Wood
Waste recorded from NCS CZ	Paper and board: mixed	Closed-loop recycling	Closed-loop recycling	DEFRA 2022 Conversion factors; Paper; Paper and board: mixed
Waste recorded from NCS CZ	Plastics: average plastics	Open-loop recycling	Open-loop recycling	DEFRA 2022 Conversion factors; Plastics; Plastics: average plastics
Waste recorded from NCS CZ	Household residual waste	Combustion	Combustion	DEFRA 2022 Conversion factors; Refuse; Household residual waste
Waste recorded from NCS DK	Hazardous Waste	Hazardous waste incineration	Hazardous waste incineration	Leinikka Dall, O., Wenzel, H., & NAAMANSEN, E. T. (2012). CARBON FOOTPRINT FOR HAZARDOUS WASTE INCINERATION. https://findresearcher.sdu.dk:8443/ws/files/71160147/232_O.L.D_all_Carbon_Footpring.pdf

Country	Internal waste type	Waste treatment	Emission factor description	Source
Waste recorded from NCS DK	Metal: scrap metal	Closed loop recycling; Scrap metal	Assumed closed loop recycling; Scrap metal	DEFRA conversion factors - full set 2022; Waste disposal; Metal
Waste recorded from NCS DK	Wood	Assumed combusted; Wood	Combustion	DEFRA 2022 Conversion factors; Construction; Wood
Waste recorded from NCS DK	Paper and board: mixed	Closed-loop recycling	Closed-loop recycling	DEFRA 2022 Conversion factors; Paper; Paper and board: mixed
Waste recorded from NCS DK	Plastics: average plastics	Open-loop recycling	Open-loop recycling	DEFRA 2022 Conversion factors; Plastics; Plastics: average plastics
Waste recorded from NCS DK	Organic: food and drink waste	Composting	Composting	DEFRA 2020 Conversion factors; Refuse; Organic: food and drink waste
Waste recorded from NCS DK	Household residual waste	Combustion	Combustion	DEFRA 2022 Conversion factors; Refuse; Household residual waste
Waste recorded from NCS DK	WEEE - small	Open-loop recycling	Open-loop recycling	DEFRA 2020 Conversion factors; Refuse; Electrical Items; WEEE - small
Waste recorded from NCS DK	Commercial and industrial waste:Landfill	Landfill	Landfill	DEFRA 2020 Conversion factors; Refuse; Commercial and industrial waste:Landfill

Country	Internal waste type	Waste treatment	Emission factor description	Source
Waste recorded from NCS DK	Batteries	Open-loop recycling	Open-loop recycling	DEFRA 2020 Conversion factors; Refuse; Electrical Items; Batteries
Waste recorded from NCS DK	WEEE - Large	Open-loop recycling	Open-loop recycling	DEFRA 2020 Conversion factors; Refuse; Electrical Items; WEEE Large
Waste recorded from NCS DK	WEEE - mixed	Open-loop recycling	Open-loop recycling	DEFRA 2022 Conversion factors; Refuse; Electrical Items; WEEE - mixed
Waste recorded from NCS CN	Metal: scrap metal	Closed loop recycling; Scrap metal	Assumed closed loop recycling; Scrap metal	DEFRA conversion factors - full set 2022; Waste disposal; Metal
Waste recorded from NCS CN	Wood	Assumed combusted; Wood	Combustion	DEFRA 2022 Conversion factors; Construction; Wood
Waste recorded from NCS CN	Paper and board: mixed	Closed-loop recycling	Closed-loop recycling	DEFRA 2022 Conversion factors; Paper; Paper and board: mixed

Table 12: Emissions for cat. 04 - Upstream transport & distribution

Transport mode	Emission Factor description	Source
Air	Freighting goods, Freight flights, International, to/from non-UK, without RF, DEFRA 2022	DEFRA conversion factors, Freighting goods, 2022
Sea	Freighting goods, cargo ships, Container ship, average, DEFRA 2022	DEFRA conversion factors, Freighting goods, 2022
Truck	Freighting goods, HGV, all HGV, Average laden, DEFRA 2022	DEFRA conversion factors, Freighting goods, 2022