

CARBON FOOTPRINT REPORT

FINANCIAL YEAR 2021/2022



idealcombi 

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Introduction to Idealcombi

This greenhouse gas (GHG) Inventory covers emissions across parent company Idealcombi A/S and subsidiary Idealcombi UK Ltd. for the financial year 2021-22.

Idealcombi is a Danish manufacturer of quality windows and doors for the domestic and commercial markets. The headquarter and manufacturing facilities are located in Hurup, while sales offices are placed in Hvidovre and Tilst, Denmark. Subsidiary Idealcombi UK Ltd. is located in Milton Keynes, United Kingdom.

Methodology and Data

The GHG emissions in the inventory were calculated in accordance with the GHG Protocol. Likewise, the data in this report are presented in accordance with guidance from the GHG Protocol (World Resources Institute & World Business Council for Sustainable Development, 2004; 2011; 2013 and World Resources Institute, 2015). However, as for biogenic emissions, only a partial inventory has been prepared. The standards of the upcoming Land Sector and Removals Guidance from the GHG Protocol (World Resources Institute & World Business Council for Sustainable Development, 2022a; 2022b) will be integrated as appropriate, at a later point in time.

Data were collected during 2023-24 and concerns the base year 2021-22. This base year was chosen for all scopes (i.e. scopes 1, 2 and 3), since Idealcombi's activities this year are representative and it was possible to capture the relevant data.

Consolidation Approach

Operational control was chosen as the consolidation approach, and all operations and all sites have been included in the organisational boundary of the inventory. Please see Figure 1 for an illustration of the sites included.

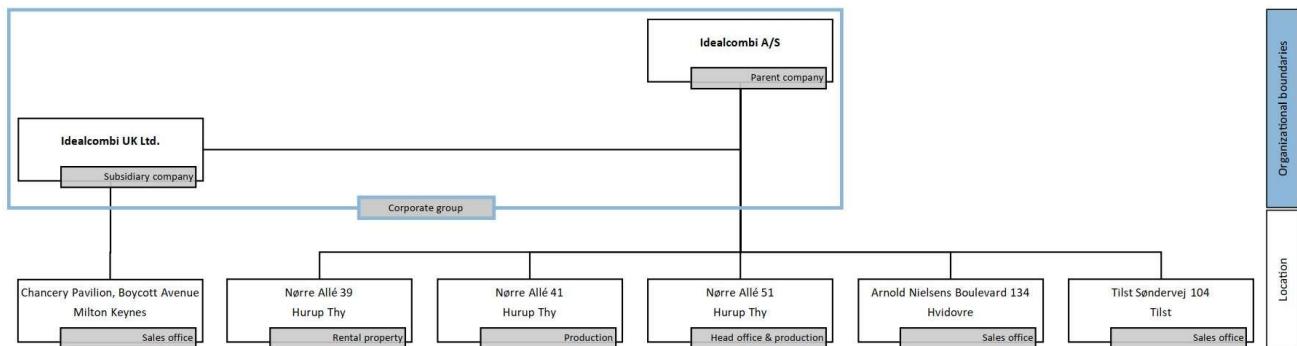


Figure 1. Organisational boundaries include parent company Idealcombi A/S, subsidiary Idealcombi UK Ltd. and sales offices in Denmark and the UK

Idealcombi's sales to all markets has been included in the inventory, which include Denmark, UK, Ireland, Norway, Iceland and the Faroe Islands.

Emissions Included

For scope 1 and 2, no activities have been excluded. In accordance with the GHG Protocol, we have calculated scope 2 emissions using both a location-based and a market-based approach for the consumption of electricity. Total emissions across scopes are reported based on the location-based approach.

For scope 3, a screening was conducted to determine relevant activities to include as well as to evaluate where data were available to calculate the associated emissions. As a result of this screening, most scope 3 activities were included in the inventory. Please refer to Table 1 for an overview of included categories and explanations for categories that have been excluded.

Scope 3 categories	Decision
Category 1: Purchased goods and services	Included
Category 2: Capital goods	Included
Category 3: Fuel- and energy-related activities (not included in scope 1 and 2)	Included
Category 4: Upstream transportation and distribution	Included
Category 5: Waste generated in operations	Included
Category 6: Business travel	Included
Category 7: Employee commuting	Included
Category 8: Upstream leased assets	Energy usage from leased assets is included in energy usage from Idealcombi's facilities in scope 1 and 2 (cf. the operational control consolidation approach) and thus no separate category 8 numbers are reported.
Category 9: Downstream transportation and distribution	Most activities that fall under this category are included in the inventory. However, transportation activities relating to a small fraction of sales has been excluded.
Category 10: Processing of sold products	Windows will occasionally be installed in finished building elements before the elements are transported to the building site. This type of sales nevertheless is estimated at less than 1% of our sales, and therefore category 10 is omitted.
Category 11: Use of sold products	A small fraction of windows is equipped with electric motor openers. These are small motors that are used sparingly during the lifetime of the windows. The result is that the impact from the use of the motor openers is negligible and category 11 is omitted.
Category 12: End-of-life treatment of sold products	Included
Category 13: Downstream leased assets	Included
Category 14: Franchises	Not applicable
Category 15: Investments	Not applicable

Table 1. Overview of scope 3 categories included and omitted

Additional qualitative information regarding assessments of categories 9, 10 and 11 is available in the appendix.

Calculation Tool

The emissions calculations for this inventory were done via Idealcombi's proprietary GHG tool, which was developed by Nordic LCA in collaboration with Idealcombi and Rotundo. The GHG tool was developed in accordance with the standards from GHG Protocol regarding all scopes (World Resources Institute & World Business Council for Sustainable Development, 2004; 2011; 2013 and World Resources Institute, 2015).

Carbon Dioxide equivalents (CO₂e) for each activity were calculated using the general formula:

$$\text{CO}_2\text{e} = (\text{activity data} * \text{CO}_2 \text{ per activity} * 1) + (\text{activity data} * \text{CH}_4 \text{ per activity} * 29,8) + (\text{activity data} * \text{N}_2\text{O per activity} * 273) + (...) + (\text{activity data} * \text{NF}_3 \text{ per activity} * 17200)$$

Equation 1. General formula for calculating CO₂e emissions per activity

The Global Warming Potential values (GWP values) applied in the inventory stem from IPCC Sixth Assessment Report (Forster et al., 2021). Please see Table 2 for details on the applied GWP-values.

Greenhouse gas	GWP values
CO ₂	1
CH ₄ -fossil	29,8
CH ₄ -non fossil	27
N ₂ O	273
HFC-32	771
HFC-134a	1526
CFC-11	6226
PFC-14	7380
SF ₆	22800
NF ₃	17200

Table 2. Applied GWP values (Forster et al., 2021)

The calculation methodologies are described in further detail in Idealcombi's Carbon Accounting Tool: Method Report, which can be requested from Idealcombi.

Data Quality

Data quality was evaluated in terms of quality of activity data and quality of emission factors.

Activity data reflect the magnitude of business activities in Idealcombi with relevance to the GHG inventory. Primary activity data in physical units such as MWh, metric ton, m³ etc. have been acquired where possible, as these reflect activities at Idealcombi most precisely. Scope 1 and 2 are predominantly calculated from primary activity data in physical units. As for scope 3, physical activity data have for instance been acquired for key manufacturing materials in category 1, transportation in category 4 and some waste fractions in category 5.

For other scope 3 categories, primary activity data in physical units were not available, and instead secondary activity data in monetary units (DKK and GBP) or in the form of estimations have been applied. Some manufacturing materials in category 1 and capital goods in category 2 are examples of activity data in monetary units. Secondary data for employee commuting in category 7, downstream transportation and distribution in category 9 and end-of-life treatment of sold products in category 12 were instead developed through estimations that were supported by industry or national averages where relevant. More information regarding the data sources is presented in Table 3.

Detailed emission factors specify how much of individual climate gases such as CO₂, CH₄, N₂O etc. is emitted from a given activity, while less detailed emission factors specify how many CO₂ equivalents are emitted in total, without details relating to the individual gases. Primary emission factors, i.e. emission factors from value chain partners, were acquired for some district heating utilities and for unprocessed wood, finger-joint wood and laminated wood via Environmental Product Declarations (EPDs). Emission factors were however mostly secondary and derived from Ecoinvent (version 3.10 Allocation, cut-off, EN15804), and Exiobase (version 3.4). Data from Ecoinvent were applied where activity data were available in physical units and from Exiobase where activities were only available in monetary units. Table 3 outlines the percentage of emission factors that were derived from value chain partners.

All emission factors acquired from the two databases were assessed for representativeness on a scale from 'very poor' to 'very good' for their geographical, technical and time representativeness. The assessment was based on criteria from Product Environmental Footprint Category Rules (European Commission, 2021). The majority of emission factors have a 'good' overall representativeness across geography, technology and time, while a smaller portion of the emission factors can be categorised as 'fair', when taking all three parameters into account.

Based on a combined evaluation of the quality of activity data and emission factors, the resulting quality of the reported emissions have been assessed for each scope and category in Table 3. The uncertainty of reported emissions is assessed on the scale: very poor – poor – fair – good – very good, and is based on the combined quality of the applied activity data and emission factors per scope and category.

Scope and category	Emission factors from value chain partners*	Data quality of reported emissions**
Scope 1	0%	Activity data are mostly primary and combined with secondary emission factors for combustion of fuels in physical units. These emission factors are of high validity, and the resulting emissions data are assessed to be of good quality.
Scope 2, Location-based calculation	14%	Activity data are mostly primary. Emission factors are based on national and local averages. The resulting emissions data are assessed to be of good quality.
Scope 2, Market-based calculation	14%	Activity data are mostly primary. Emission factors are based on a national average for Denmark. Danish average applied to UK context due to lack of UK-based data. The resulting emissions data are assessed to be of fair quality.
<i>Upstream scope 3 emissions</i>		
Category 1: Purchased goods and services	2%	<p>Activity data are a combination of primary data in physical units and secondary data in monetary units. Emission factors are secondary for the majority of purchased goods and services, although based on EPDs for some of the main wood products. Calculations are granular in terms of materials, goods and services and calculated per main supplier. The resulting emissions data are assessed to be of good quality.</p> <p>For a small portion of purchased goods and services, where only monetary units are available, average upstream transportation is included in the corresponding emission factors, which are based on economic value of goods. This means a small portion of emissions that would normally fall under category 4, are instead included in category 1.</p>

Category 2: Capital goods	0%	Activity data are secondary data in monetary units. Emission factors are secondary and divided into broad categories. The resulting emissions data are assessed to be of poor quality.
Category 3: Fuel- and energy-related activities (not included in scope 1 or scope 2)	0%	Category 3 emissions are for the most part based on primary activity data for the fuels and energy used and combined with secondary emission factors that are considered to be of high quality. As for the emissions relating to the combustion of waste wood, there is some uncertainty regarding the calorific value of the wood. The quality of the resulting emissions is assessed to be good.
Category 4: Upstream transportation and distribution (paid by Idealcombi)	0%	<p>Activity data relating to transportation of goods to Idealcombi are based on primary data around weight of goods and distances from suppliers, wherever possible.</p> <p>Activity data regarding transportation of finished goods to customers are based on a combination of primary activity data on yearly payload (i.e. weight of goods) from logistics partner, primary data on distances to/ between ports, and secondary activity data on an estimated average distance from ports to end customers. Emissions are calculated for the Danish market as well as for all export markets.</p> <p>Emission factors are secondary data based on ton.km. The resulting emissions data are assessed to be of good quality, although a small part of emissions is included in category 1, as noted under that category.</p>
Category 5: Waste generated in operations	0%	Activity data are split between primary data, where the weight of a fraction is known and secondary data where the weight of a fraction is estimated from the weight of a mixed fraction. Emission factors are secondary. The resulting emissions data are assessed to be of fair quality.
Category 6: Business travel	0%	Activity data for international flights and taxi are based on secondary (monetary) data. Mileage reimbursement is based on primary data in the form of kilometres driven. Emission factors are secondary. The resulting emissions data quality is assessed to be fair.
Category 7: Employee commuting	0%	Activity data based on adjustments to Danish commuting average. Estimation thus uncertain in terms of km travelled to/from Idealcombi and type of transportation. Emission factors are secondary. The resulting emissions data are assessed to be of poor quality.
<i>Downstream scope 3 emissions</i>		
Category 9: Downstream transportation and distribution (not paid by Idealcombi)	0%	<p>Activity data relate to markets where Idealcombi only delivers finished goods as far as to a relevant Danish port. The activity data are a combination of payload information (weight) extrapolated from other markets and estimated sea and truck distances to end customers.</p> <p>Sea transportation estimates are considered of good quality, while truck transportation estimates are less so. Emission factors are secondary. The resulting emissions data are assessed to be of fair quality.</p>

Category 12: End-of-life treatment of sold products	0%	Due to limited knowledge of actual disposal behaviour, especially outside the Danish market, activity data has been based on average percentages from Product Category Rules for windows and doors (DS/EN17213) and Statistics Denmark. Associated emission factors are secondary. The resulting emissions data are assessed to be of fair quality.
Category 13: Downstream leased assets	0%	Activity data relating to electricity are primary, while data relating to district heating are secondary and have been calculated as an average between relevant calendar years. Emission factors are secondary but based on Danish averages in physical units. The resulting emissions data are assessed to be of fair quality.

Table 3. Data quality overview. *Determined as number of sub-calculations with partner-specific emission factors compared to all sub-calculations in a given scope or category. ** Emissions data quality assessed on a scale from very poor to very good.

Data Management Policy

Moving forward, we will be working on increasing the accuracy of our greenhouse gas inventories.

Purchased goods and services are by far the biggest category of greenhouse gas emissions at Idealcombi (see Table 4), and thus an important area for data quality improvements. A key point of improving the data quality in this category is acquiring product-specific data for our most important purchase types. We are therefore working with our suppliers to get more product-specific Environmental Product Declarations (EPDs) in the coming years. Some of the most important purchase types are glass, aluminium and PUR (IdealcoreTM), and we will focus on these materials as a first step.

Scope 2 represents significant CO₂e emissions (see Table 4), and is an area where we consider it possible to increase the data quality by acquiring more supplier-specific declarations from the utilities that supply Idealcombi with electricity and district heating at our sites in both Denmark and the UK. As part of these efforts, emission factors for market-based electricity calculations in the UK will be an area of attention.

Recalculation Principles

Base year emissions will be recalculated if there are significant changes to the GHG inventory. Certain situations may trigger such a recalculation. These include:

- Structural changes in Idealcombi that affect the organisational boundaries for the greenhouse gas inventory, such as acquisitions, mergers and divestitures
- Changes in calculation methodology
- Improvements in the accuracy of emission factors or activity data
- Discovery of significant errors or several cumulative errors that are collectively significant

At Idealcombi we have defined a 5% significance threshold for base year recalculations. That is, if the cumulative effect of any of these situations exceeds 5% of total base year emissions, a base year recalculation will be triggered. A recalculation where changes represent less than 5% of base year emissions may also be carried out at Idealcombi's discretion.

Assurance

No third-party assurance review has been performed for this inventory.

GHG Emissions

Emissions are calculated in metric tons of CO₂e, metric tons of individual greenhouse gases (such as CO₂ and CH₄), or metric tons of biogenic carbon. The calculated emissions relating to scopes 1, 2 and 3 can be found in Table 4.

Scopes and categories	Tons CO ₂ e
Scope 1: Direct emissions from operations	738
Scope 2: Indirect emissions from purchased electricity and district heating*	998
<i>Upstream scope 3 emissions</i>	
Category 1: Purchased goods and services	28.047
Category 2: Capital goods	1.227
Category 3: Fuel- and energy-related activities*	1.085
Category 4: Upstream transportation and distribution	1.883
Category 5: Waste generated in operations	64
Category 6: Business travel	16
Category 7: Employee commuting	1.232
<i>Downstream scope 3 emissions</i>	
Category 9: Downstream transportation and distribution	405
Category 12: End-of-life treatment of sold products	298
Category 13: Downstream leased assets	2
Total**	35.996

Table 4. Emissions overview for Idealcombi. *Scope 2 and scope 3 category 3 emissions are location-based calculations. **Total deviates from summed subtotals due to rounding

Scope 2 data in Table 4 and Figure 2 and 3 are calculated using the location-based methodology and are based on an electricity consumption across Idealcombi's sites of: 7.117 MWh.

Scope 2 emissions calculated via the market-based methodology are: 2.940 tons CO₂e.

Table 4 and Figure 2 illustrates that although scope 1 and 2 contribute with sizeable carbon emissions, the majority of emissions stem from scope 3.

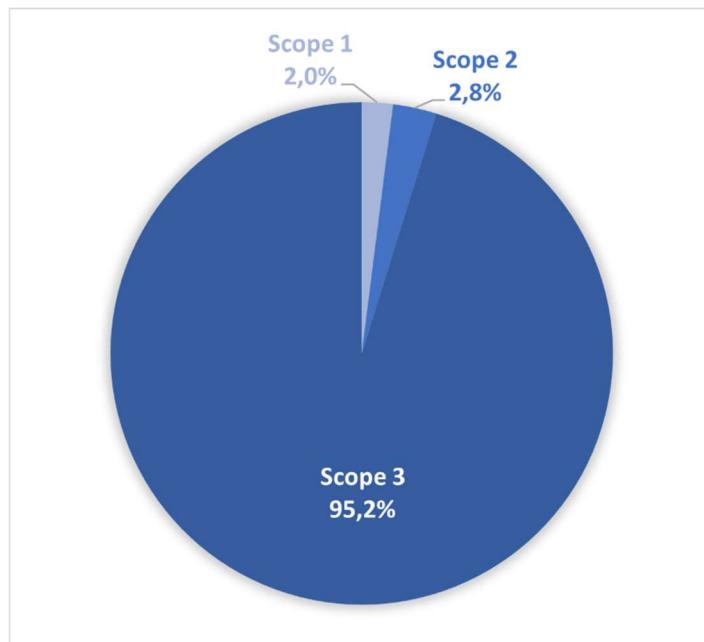


Figure 2. Distribution of emissions on scopes.

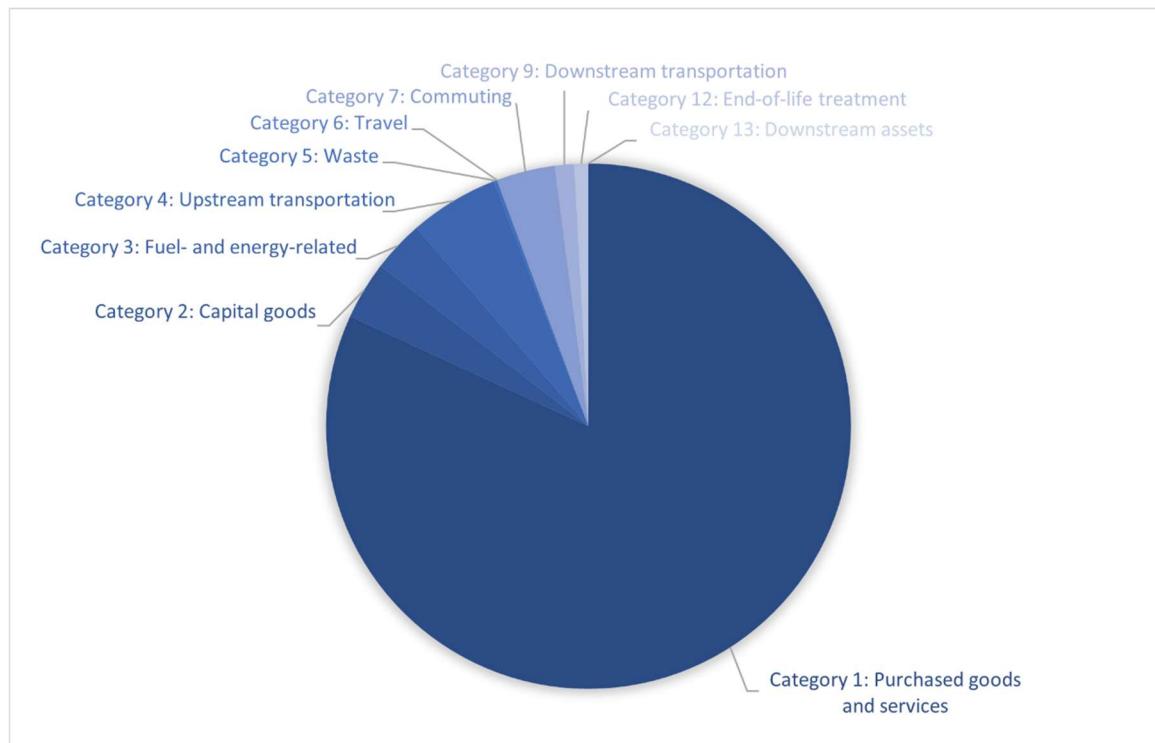


Figure 3. Scope 3 emissions distributed on categories

Within scope 3, Category 1, 'Purchased goods and services' constitutes 81,8% of emissions. Category 4, 'Upstream transportation and distribution'; category 7, 'Employee commuting'; and category 2, 'Capital goods', are examples of other important categories, as illustrated in Figure 3 and Table 5.

Scope 3 categories	Tons CO ₂ e	Percentage of scope 3 emissions
Category 1: Purchased goods and services	28.047	81,8%
Category 2: Capital goods	1.227	3,6%
Category 3: Fuel- and energy-related activities*	1.085	3,2%
Category 4: Upstream transportation and distribution	1.883	5,5%
Category 5: Waste generated in operations	64	0,2%
Category 6: Business travel	16	0,0%
Category 7: Employee commuting	1.232	3,6%
Category 9: Downstream transportation and distribution	405	1,2%
Category 12: End-of-life treatment of sold products	298	0,9%
Category 13: Downstream leased assets	2	0,0%
Total	34.260	100,0%

Table 5. Percentage of scope 3 emissions per category

Distribution on Types of Greenhouse Gasses

Most greenhouse gas emissions in the inventory stem from Carbon Dioxide emissions (CO₂), but a small fraction stem from Methane (CH₄) and especially Nitrous Oxide (N₂O) emissions. No data on emissions of HFCs, PFCs, SF₆ or NF₃ have been found during the preparation of the inventory.

Please see Table 6 for a detailed view of the greenhouse gas emissions in scope 1 and 2 of the inventory, and their conversion to Carbon Dioxide equivalents (CO₂e). The scope 2 distribution is calculated from the location-based method.

	CO ₂		CH ₄		N ₂ O	
	Tons CO ₂	Tons CO ₂ e	Tons CH ₄	Tons CO ₂ e	Tons N ₂ O	Tons CO ₂ e
Scope 1	722	722	0,06	2	0,05	14
Scope 2	951	951	0,7	21	0,09	25

Table 6. Emissions distributed on types of greenhouse gasses. No emissions of HFCs, PFCs, SF₆ or NF₃ have been found during the preparation of the inventory.

Many of the emission factors obtainable for scope 3 calculations, provide only the Carbon Dioxide equivalents, whereas the individual greenhouse gas emissions are not available. Therefore, it has not been possible to prepare an overview of individual gases for scope 3.

Intensity Ratios

The CO₂e-intensity per million Danish krone of turnover provides a key figure that will allow us to compare CO₂-performance from one year to the next. The base year CO₂e-intensity taking all scopes into account is:

52,5 tons CO₂e/mDKK

This ratio is calculated using the location-based method for scope 2 and the associated emissions that fall under scope 3, category 3.

Biogenic CO₂ emissions

Biogenic CO₂ is carbon stored in natural materials such as wood and other plant-based materials. Throughout the lifespan of a tree or any other plant, the net biogenic CO₂ emissions are zero: In the growth phase there is a removal of CO₂ from the atmosphere and this carbon is stored in the natural materials, while they are in use. However, the carbon is released again once the materials are decomposed or incinerated.

In this inventory, we have started to account for the biogenic CO₂ emissions within the organisational boundary, as required by the GHG Protocol. In this first inventory we have focused on emissions relating to the wood that is utilized in our manufacturing processes. The inventory does not encompass other sources of biogenic carbon emissions, such as biomass combustion in district heating and electricity supply chains, or food waste composting.

Emissions relating to the wood that is utilized in Idealcombi's manufacturing processes stem from:

- Combustion of waste wood from the manufacturing processes, which is used for heating at Idealcombi's facilities
- Combustion of waste wood that is sold to external partners as a fuel for heating at their facilities
- Incineration and landfilling of wood from Idealcombi's products at the end-of-life stage

Combustion and incineration with energy recovery (waste-to-energy processes) at facilities other than Idealcombi's own, are not included within the organisational boundaries of the biogenic inventory (analogous to the methodology applied in the fossil carbon inventory). Instead, these emissions are included in the emission factors for the generated electricity or heat. For completeness of the biogenic inventory, we have nevertheless reported the biogenic CO₂ emissions associated with combustion or incineration of wood outside scopes.

Scopes and categories	Tons biogenic CO ₂ emissions
Scope 1: Direct biogenic CO ₂ emissions from combustion of waste wood	2.583
Scope 2: Indirect biogenic CO ₂ emissions from the use of purchased electricity, steam, heating, and cooling	Not included
<i>Indirect biogenic CO₂ emissions - upstream scope 3</i>	
Category 1: Biogenic CO ₂ stored in wood-based raw materials	- 4.469
Category 2: Biogenic CO ₂ in connection with capital goods	Not included
Category 3: Biogenic CO ₂ removal in connection with forestry for wood production, for the waste wood that is later combusted for local heating	- 2.583
Category 4: Biogenic CO ₂ in connection with upstream transportation and distribution	Not included
Category 5: Biogenic CO ₂ emissions from waste generated in operations	Not included, but waste wood for external combustion is reported outside scopes
Category 6: Biogenic CO ₂ in connection with business travel	Not included
Category 7: Biogenic CO ₂ in connection with employee commuting	Not included
<i>Indirect biogenic CO₂ emissions - downstream scope 3</i>	
Category 9: Biogenic CO ₂ in connection with downstream transportation and distribution	Not included
Category 12: Biogenic CO ₂ emissions from end-of-life landfilling of wood components in sold products	157
Category 13: Biogenic CO ₂ in connection with downstream leased assets	Not included
<i>Biogenic CO₂ emissions – outside scopes</i>	
Biogenic CO ₂ emissions from combustion of waste wood at external partners'	1.312
Biogenic CO ₂ emissions from end-of-life incineration of sold products	3.000

Table 7. Selected sources of biogenic CO₂ removals and emissions

We have taken initial steps to create a more comprehensive picture of the biogenic carbon stock changes by considering biogenic removals in the forestry stage and subsequent storage in the product pool. To this end, we have accounted for:

- Biogenic carbon removal and storage in the wood that is used for Idealcombi's products
- Biogenic carbon removal in the forestry stage of the waste wood that is used as fuel for heating at Idealcombi

Table 7 provides an overview of the biogenic removals and emissions.

Findings and Next Steps

This base year inventory has provided a first overview of emissions across scopes and activity categories for Idealcombi.

'Purchased goods and services' is, not surprisingly, the category with the largest emissions, and we will be examining this category closer and looking into ways of reducing the impact from this category in the coming years. In parallel, we will work to increase the data quality in this category, to ensure the best possible data foundation for decisions regarding reduction efforts.

Since 2016, we have worked to reduce our energy consumption and have implemented a number of energy efficiency initiatives in the years that have followed. For instance, we have installed LEDs in part of our operations, we have significantly lowered the supply temperature on process heat and improved controls of our compressors and boiler systems. In total the initiatives have resulted in heat and energy savings of 14% compared to 2016.

This means scope 1 and 2 emissions have already been cut. However, we believe it is possible to reduce emissions further, and will continue to explore these opportunities systematically. One area of focus will be to minimise our heat consumption and the electricity intensity in manufacturing (kWh per hour of manufacturing).

We will also be working towards CO₂ improvements in our supply chain. A key point in this, is the engagement of our suppliers, and we are in dialogue with our suppliers on this important subject.

Please find more information on earlier and upcoming initiatives in Idealcombi's CSR-reports. Reports in Danish are available via the link: <https://idealcombi.dk/om-idealcombi/miljoe/csr-rapport/> and reports in English via: <https://idealcombi.com/about-idealcombi/csr-corporate-social-responsibility/>

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Appendix

Qualitative Information About Emission Sources Not Quantified

Scope 3 category 9: Downstream transportation and distribution

Transportation of goods to Iceland and the Faroe Islands is included in this category. This transportation constitutes the most important downstream transportation and distribution activities.

Excluded from this category is transportation of goods from individual carpentry firms that choose to store Idealcombi's products in their own warehouse before transporting them on to the building site. This type of transportation setup is rare, and only seen in around 3% of our sales, and it is consequently omitted from category 9.

Scope 3 category 10: Processing of sold products

As described in the Methodology and data section, windows will occasionally be installed in finished building elements before these elements are transported to the building site.

It is not possible to extract information on the volume of this type of sales from Idealcombi's ERP system. However, discussions with the sales offices to determine the volume over this type of sales the last five years showed that just 1 or 2 projects per year would fall into this category. Furthermore, typically only a small part of the elements included in these projects would be installed in finished building elements.

Overall, it is estimated that less than 1% of group turnover fall into this category and it is therefore omitted in the inventory.

Scope 3 category 11: Use of sold products

As described in the Methodology and data section, a small fraction of the sold windows is equipped with electric motor openers. This sale constitutes less than 2% of group turnover. At the same time, the motor openers are small motors that consume very few watts during use, and are used sparingly during the lifetime of the windows.

The conclusion was that the impact from the use of the motor openers is negligible and category 11 is thus omitted.

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