

Climate Audit for Advania Group



Methodology and results report

Financial year 2021

March 2022



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Background and methodology

The greenhouse gas protocol

All calculations and reporting conform to the guidelines set out in the Greenhouse Gas (GHG) Protocol. Accordingly, the company's emissions have been divided into three scopes (1-3) where scope 1 includes the direct emissions, scope 2 includes the indirect emissions from producing purchased energy and scope 3 includes all other indirect emissions. In Figure 1 the division of categories between scopes are shown.

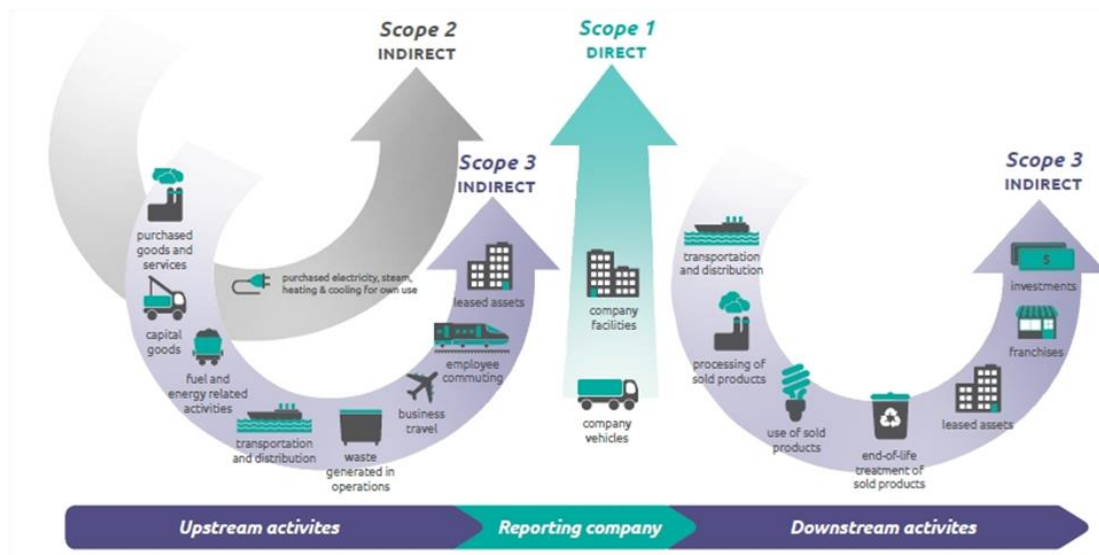


Figure 1. The different scopes and categories included in the GHG protocol.

Control approach

The division of categories, direct and indirect emissions between the scopes, depends on the chosen control approach.

- **Financial control approach** – direct GHG emissions are defined as emissions from sources where the company has financial control.
- **Operational control approach** – direct GHG emissions are defined as emissions from sources over which the company has operational control.

For the climate calculations of Advania, an **operational control approach** has been used.

Methods for scope 2 accounting

According to the guidance of the GHG Protocol, there are two distinct methods for scope 2 accounting where both methods are useful for different purposes. The methods are:

- **Location-based method** – the emission factor is represented by the average emissions intensity of the grid on which the energy consumption occurs. In this method, no regard for the origin of the energy is taken. All energy consumed receives the same emission factor.
- **Market-based method** – the emission factor is represented by the emissions from electricity sources that companies purposefully have chosen. This means that if the company has bought electricity with guarantees of origin, the emission factors reflect that. All other electricity that is delivered without guarantees of origin represents the remaining electricity production, a so-called residual mix.

In the climate accounting report of Advania, a **market-based method** has been applied.

Process description & system boundaries

The climate calculations include data from the Nordic markets of Advania Group, meaning Sweden, Denmark, Finland, Iceland, and Norway.

All calculations are primarily based on actual activity data from Avania's operations. The activity data reported from Advania have been matched to emission factors to calculate the climate impact from the operations, see more details in the section *Detailed methodology*.

System boundary and GHG-scopes

Emissions from Advania's operations have been categorized within the various scopes and the GHG protocol's emission categories following the control approach and market-based method. The scope and categories of the GHG protocol and the activities from Advania are included below.

Advania's scope 1 emissions are represented by:

- Company-operated cars and rental cars (Company operated vehicles)
- Refrigerant leakage (Company facilities)
- Fuel use (Company facilities)

Advania's scope 2 emissions are represented by:

- Electricity consumption in offices, divided into facility electricity and operational electricity (Purchased electricity for own use)
- Electricity consumption in data centres (Purchased electricity for own use)
- District heating (Purchased heating for own use)
- District cooling (Purchased cooling for own use)

Advania's scope 3 emissions are represented by:

- Business travel with flight, train, taxi, hotel and other (Business travel)
- Fuel and energy-related activities
- Purchased hardware (Purchased goods and services & parts of Transportation and distribution)

Results

This part contains a presentation of the results from the climate calculations for Advania group in 2021.

Total emissions per category and scope

The total emissions for the included categories reach 113 812 tons CO₂e during the fiscal year 2021. Table 1 below displays the emissions within each scope for each category and subcategory.

Table 1. Emissions per category within each scope.

Overview of emissions	Scope 1, ton CO ₂ e	Scope 2, ton CO ₂ e	Scope 3, ton CO ₂ e	Total emissions, ton CO ₂ e	Share of total, %
Business travel	264,5	2,0	178,1	445	0,4%
Company operated cars and rental cars	264,5	2,0	89,8	356,3	0,3%
Flights	-	-	70,1	70,1	0,1%
Train travel	-	-	5,7	5,66	0,0%
Taxi travel	-	-	2,6	2,6	0,0%
Hotel nights	-	-	9,8	9,8	0,0%
Other	-	-	0,1	0,1	0,0%
Hardware	-	-	112 869	112 869	99,2%
Desktop	-	-	5 662	5 662	5%
Laptop	-	-	65 706	65 706	58%
Monitor	-	-	27 955	27 955	25%
Printer	-	-	2 556	2 556	2%
Server	-	-	6 635	6 635	6%
Smartphone	-	-	655	655	0,6%
Tablet	-	-	3 700	3 700	3%
Energy and fuel use	26,2	327,4	144,3	498	0,44%
Electricity in offices	-	234,4	18,7	253,1	0%
Electricity in data centers	-	38,8	24,4	63,3	0%
District heating	-	54,2	8,2	62,4	0%
District cooling	-	-	92,9	92,9	0%
Refrigerants	25,5	-	-	25,5	0%
Fuel use	0,8	-	0,1	0,8	0%
TOTAL	291	329	113 192	113 812	100%

As can be seen in figure 2 below, emissions from hardware account for a large majority of Advania's reported emissions (99,2%).

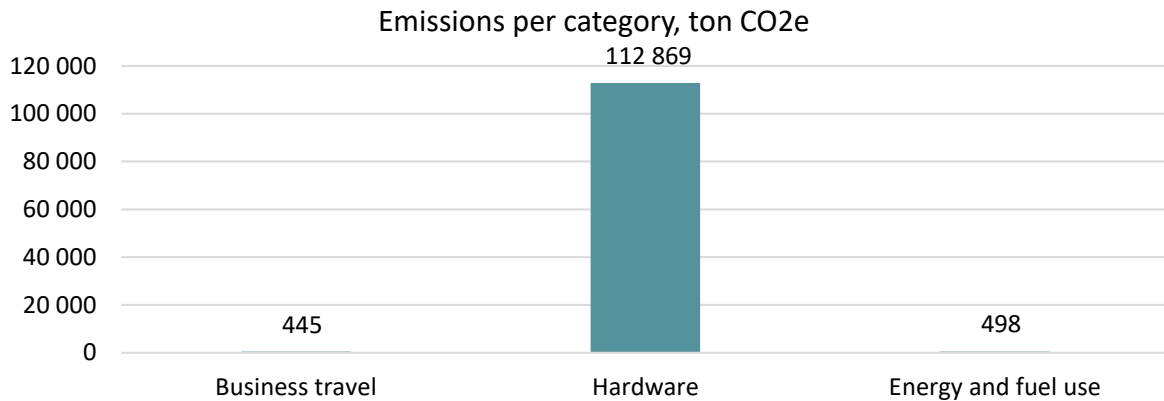


Figure 2. Emissions per category for Advania Group FY2021.

Energy use

Energy use includes electricity in offices and data centres, district heating, district cooling, refrigerants, and fuel use. The total emission from energy use amount to 498 tons CO₂e in 2021. Below, in figure 3, the emissions are shown distributed per category. Here, reported emissions within all the scopes are included.

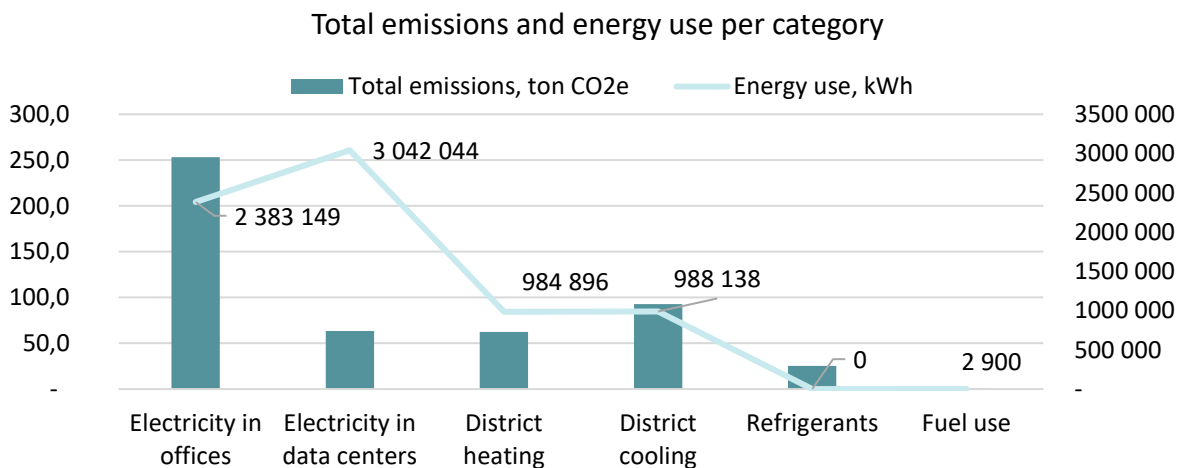


Figure 3. Emissions from the energy use, including all scopes.

Figure 3 shows that electricity consumption for both offices and data centres (64%) followed by district cooling consumption (19%) stands for the majority of the emissions. It can be seen that the electricity consumption in the data centres is the highest, however, the emissions do not correlate to the consumption. This is a result of a high share of renewable electricity used in the data centres.

An alternative method of accounting for emissions in scope 2

The calculations have been made using the market-based method, where emission factors reflect the choices of origin Advania has made for its energy use. The alternative to this method is called the location-based method, where emission factors represent the average emission intensity of the grid and thus do not take the origins of energy into account.

According to the GHG Protocol, the chosen method for calculating scope 2 emissions should be presented along with the non-chosen method. In table 2 below, the difference between market-based and location-based

methods are presented. The emission factor for the location-based method is based on the Nordic average mix for electricity production¹.

Table 2. Emissions according to the market-based and location-based methods.

Market based vs. location based	Scope 2 emissions, ton CO2e	Total emissions, ton CO2e
Market based	329,3	113 812
Location based	1 164,4	114 647
Difference (MB-LB)	- 835	- 835

Business travel

0.39% of Advania’s total emissions are from business travel. In 2021, the emissions reached 445 tons CO2e. If hardware is disregarded, travelling makes up 47% of the emissions from Advania’s business. In figure 4 below, the share of emissions from each travelling category is illustrated.

Share of total emissions by type of transportation

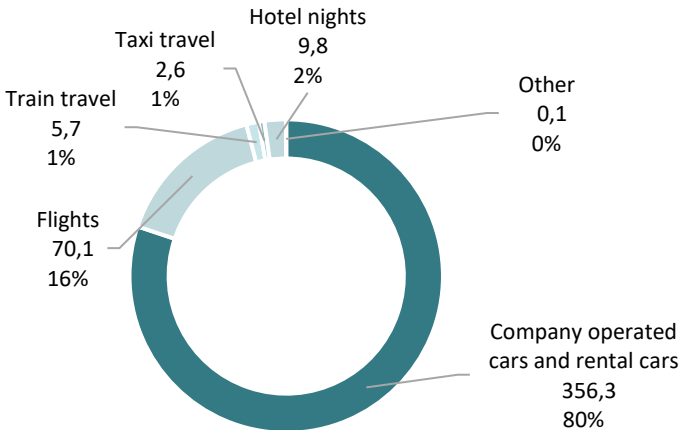


Figure 44. Total emissions in ton CO2e and the percentage of the emissions from business travel, per travelling category.

80% of the emissions come from company-operated and rental cars. Much of this comes from cars running on petrol or diesel. The data does not allow for comparisons regarding the distance travelled and the emissions related to it. This since the data has been collected in both travelling distance (km), use of fuel (litres), and spent amount (local currency). It is important to note that emissions per distance are greater for flight than the others. Approximately 615 nights have been spent at hotels, resulting in 9.8 tons CO2e of emissions.

Hardware

Emissions from purchased hardware for sales represent 99,2% of Advania’s reported emissions. In 2021, the emissions reached 112 869 tons CO2e. How emissions are divided between the product categories is displayed in figure 5, together with the number of purchased products.

¹ Sources: ENTSO-E, AIB European Residual Mixes (2020) and IEA CO2 emissions from fuel combustion (2018).

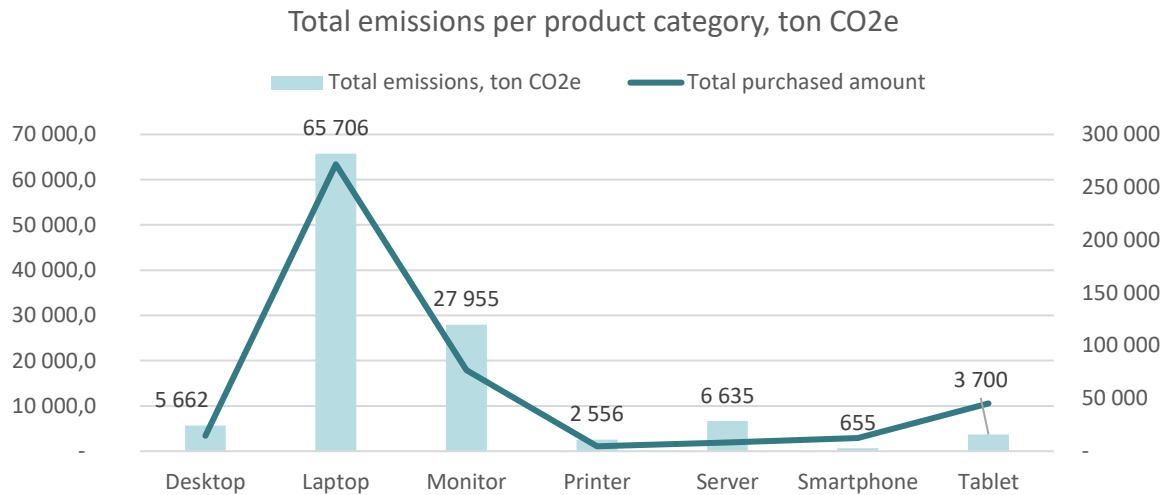


Figure 5. Total emissions by product category during 2021 and the number of purchased hardware.

As shown in Figure 5 above, emissions are strongly connected to the number of products purchased. There is a difference in emissions per product, as shown in table 3 below. Tablets and mobile phones have a lower emission per product and servers and printers a bit higher.

Table 3. Total purchased amount per product, total emissions per product and average emissions per product.

Product category	Total purchased amount	Total emissions, ton CO2e	Average emissions per product including transports, kg CO2e/unit
Desktop	14 495	5 662,2	390,6
Laptop	271 761	65 706,0	241,8
Monitor	76 707	27 955,1	364,4
Printer	4 643	2 556,3	550,6
Server	8 277	6 634,5	801,6
Smartphone	12 472	654,6	52,5
Tablet	45 144	3 700,4	82,0
TOTAL	433 499	112 869	260,4

The emissions divided by country can be seen below in figure 6. The majority of emissions are from products bought in Sweden, which corresponds with the purchased number of products.

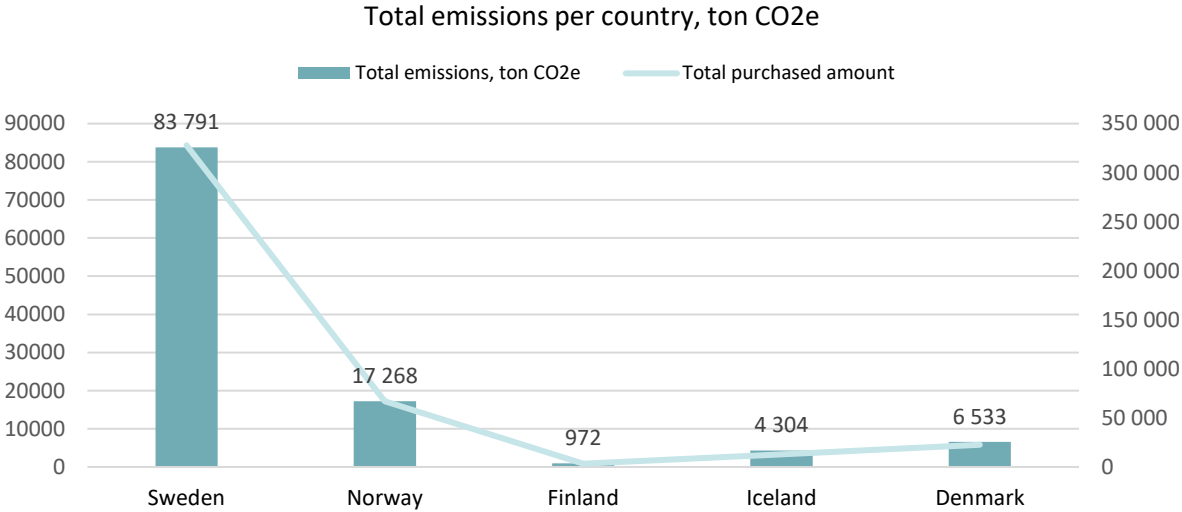


Figure 6. Total emissions and purchased products per country during 2021.

Detailed methodology and methodology assumptions

In this section, detailed methodology and assumptions made in the respective category are presented. The sources for the emissions factors used during the calculations are presented under each category.

Business travel

Business travel includes company-operated cars and rental cars (scope 1), flight, train, taxi, and other travel (scope 3), and hotel stays (scope 3).

Emissions from business travel by car are divided into two categories: well-to-tank and tank-to-wheel. Well-to-tank includes emissions from production and distribution of fuel and is placed in scope 3. Tank-to-wheel includes emissions from driving and is placed in scope 1. For hybrid cars, where a part of the energy come from electricity, some of the emissions are placed in scope 2. Advania has 2021 used company cars, private cars, and rental cars, all of which are included in the calculations under *company-operated cars and rental cars*. Emissions are for the most part based on the distance travelled, for others on the amount of fuel used, and in some instances on either the energy (kWh) used, or money spent. Emission factors primarily come from the Swedish Transport Administration (Trafikverket) and the Swedish Energy Agency (Energimyndigheten).

Calculations for flight and train travel are based on the passenger kilometres travelled, where available. For the others, estimations have been made based on the total spending. Emission factors come from NTM (Network for Transport Measures). For flight travel, a Radiative Force Index (RFI) of 2.7 is added.

Taxi travel emissions are calculated based on the reported money spent (local currency), converted to Swedish crowns (SEK). The emission factors come from the Taxi Association's (Taxiförbundet) report about the industry's current state, *Branschläget 2021*. Subway travel has been estimated to be similar to travel by electric train, and bus travel has been estimated based on the total spend.

The emissions from hotel stays are calculated from the number of nights reported. Where that data was missing, estimations have been made based on the total spend reported. Emission factors for hotel nights come from Larsson & Kamb (2019), Chalmers University of Technology.

Energy

For Advania's facilities in Denmark, Finland, Iceland, Norway, and Sweden a detailed data collection has been made where the consumption and origin of the electricity, heating and cooling have been collected by Advania.

Emissions from purchased energy include electricity consumption (property electricity and business electricity) for offices, electricity consumption in data halls, district heating consumption and district cooling. Energy fuels are only found in the office property in Bromma where fuel oil is used for heating. The emission factor for fuel oil was from Energiföretagen (2021).

The emission factors used were specific to the chosen purchased electricity and heating. Factors for residual mixes came from AIB European Residual mixes 2020. Electricity with guarantees of origin came from EPDs from Vattenfall. Nordic average for location-based calculations came from IVL's report "*Emissionsfaktor för nordisk elmix med hänsyn till import och export*". District heating came from Werner (2017) "*International review of district heating and cooling*", Energiföretagen VMK (2017 & 2020) & IVL (2017). Iceland's geothermal heating was based on "*Geothermal district heating system in Iceland: a life cycle perspective with focus on primary energy efficiency and CO2 emissions*" (Rós Karsottir et al. 2014). Usage of excess heat from water for heating in Iceland was assumed to generate no emissions.

For the facility in Västerås, Sweden, no data was available on business electricity, and this was therefore estimated based on the kWh usage per square meter for the other facilities in Sweden and adjusted to the area at the Västerås facility. For the facility, Herlev HQ, Denmark the property electricity was estimated as an average based on the other facilities' electricity consumption per square meter and adjusted to the Danish facilities area.

Where Advania's office is only part of a larger property, and specific consumption for Advania cannot be distinguished from the rest of the property, an estimate of Advania's share of the total consumption has been made based on area.

Refrigerant leakage

Data for refrigerant leakage was only available for Iceland, and for these facilities the actual emissions were included in calculations. Where data was unavailable, emissions were estimated based on Advania’s share of the facility area. It was assumed that all facilities that did not report district cooling instead had refrigerant leakage. The calculations for emissions from refrigerants were calculated similarly to previous years.

Purchased hardware

Purchased hardware consists of the emissions from the production and transportation of the hardware that has been purchased during the year 2021. Purchased hardware is assumed to be of the same magnitude as sold hardware. The production includes raw material extraction to complete product and the transportation includes the transport from the country of production to Advania’s different sites. Emissions have been calculated using Advania’s tool “Klimatsnurran”.

The hardware has been divided into the subcategories *Desktop, Laptop, Monitor, Printer, Server, Smartphone, and Tablet*. For each subcategory, a weighted average production emission factor has been calculated using data of different product carbon footprints (PCF) from suppliers. Where unavailable, the calculations are based on several PCFs for products similar to those reported by Advania.

The goal was to cover 80% of the purchased products to obtain as representative averages as possible. However, some products did not have PCFs available. In these cases, as many products as possible have been included. The average value is weighted based on how many models Advania has purchased. Table 4 below presents the proportion of the mean value based on PCFs.

Table 4. The proportion of the mean value based on product carbon footprints (PCFs).

Category	Emissions per product kg CO2e/product	Share of quantity on which the average value is based	Number of PCFs on which the average value is based	Comment
Laptop	238,07	60%	46	Based on 46 of the most purchased models
Monitor	347,05	70%	26	Based on 26 of the most purchased models
Desktop	381,19	77%	27	Includes desktops, thin clients, and workstations
Printer	376,50	0%	17	No PCFs were available for Advania’s models. Value is based on PCFs on other models within the same printer category.
Server	757,20	12%	18	Share seems low since there are a lot of other products in the purchased data (like cables and support packages). Based on 18 of the most purchased servers
Smartphone	52,06	35%	10	PCFs for Samsung are not available. Based on the 10 most purchased products from other brands than Samsung.
Tablet	80,60	85%	2	Mostly iPads within this category.

For the calculations of the emissions from transportation, it has been assumed that all products are manufactured in Asia and that 15% is air freight while the rest is sea freight.

Methodology changes

Here, the methodological changes compared to last year are presented. They consist primarily of the addition of new emission categories, updates on emission factors, and the addition of reporting countries.

Addition of new emission categories

More products have been included to obtain better values for emissions per product in calculations for hardware. The average production emissions per product have been based in, when possible, a minimum of 80% of purchased products or 20 models.

Unlike last year, purchased servers have been included in the results. It has been done in the same way as for other hardware.

Update on emission factors

An overview has been made to ensure all emission factors are relevant and up to date, such as grid mixes and transport factors.

Addition of reporting countries

For 2021, the climate audit includes not only Advania Sweden but the whole Advania group. Data from the sites in Finland, Norway, Denmark, and Iceland has been added to the calculations and results. The results are presented both at the group level and for each country.

As Advania Sweden have data from previous years accessible, comparisons between the years are presented to recognize the transition made.

Analysis

The financial year 2021 is the first year that Advania Group includes all Nordic markets in the climate audit. The total emissions are 113 812 tons CO₂e, of which the majority (99,5%) are in scope 3. The main source of emissions is production and transport emissions for hardware, which stands for 99,2% of all emissions.

Within hardware, laptops are the product with the largest emissions (58% of hardware emissions), which however is related to this being the product with the highest purchased quantity for 2021 (63% of total quantity). The highest emission per product come from servers, but this is also the category that contains the most uncertainties regarding the underlying data. Here, Advania can work with improved underlying emission data by working with suppliers to collect more accurate information.

Emissions for producing hardware can be seen as far away from Advania's control. Therefore, the main actions for Advania could be to actively choose suppliers with ambitious climate targets and work together with other actors in the industry to impact the entire value chain.

The second-largest category of emissions is energy and fuel use which stand for 0,44% of the emissions for Advania. It is interesting to note the higher emissions that stem from district cooling for 2021. This is mainly due to a methodology change where actual data for district cooling was collected, compared to previous years where refrigerants were assumed to be used.

The main source of emissions within this category is electricity in offices, where specific actions can include:

- Changing to renewable electricity in Norway and Denmark offices where no green certificates are used
- Changing to renewable electricity in data centres in Denmark
- Looking into options for district heating and cooling with less climate impact

Within business travel, the main category is company-operated cars (80% of business travel emissions), which is different to previous years when only Sweden was included in the climate audit. The lower share of emissions from air travel could be a possible effect of the covid-19 pandemic which has greatly reduced business travel in general. For company-operated cars, Advania can work with:

- Replacing fossil-based fuels with alternatives with lower climate impact, such as electric cars or fuels that run on biofuels
- Reducing the amount travelled by car for employees.

Overall, Advania is a frontrunner within climate accounting and reporting, for both emissions within their control (scope 1 and 2) as well as outside of their control (supply chain in scope 3).

Energy mapping

According to the Global Reporting Initiative (GRI) standard for energy mapping, a company should, in addition to the emission report, inform on the energy consumption both within and outside of its own business. Here, the methodology is presented along with the results from the energy mapping completed for the reported emission categories of Advania Group.

Methodology

The energy mapping includes the total use of fuel (renewable and non-renewable fuels) used for business travel, electricity use, heating, and cooling.

The standard states that emissions from fuel use should be reported in joules while energy consumption (electricity, heating, and cooling) should be reported in watt-hours. More details on the fuels used and the type of energy consumed can be found in the calculation file. Each point of data can be found accompanied by sources.

The energy mapping for Advania Group's business travels comes from the reported data, either in the form of kilometres travelled (km), the amount of fuel used (litres), or the money spent (local currency). An energy factor (kWh/km), as offered by the Network of Transport Measures² (NTM), has been used for train travel and flights. Travel by car (both company-operated cars and taxis) has an energy factor (J/litres) from the Swedish Energy Agency (Energimyndigheten). Relevant conversion factors were used to change units to cover all data points.

For the use of electricity, heating, and cooling, the energy mapping is based on the reported energy use from each office and data centre.

² For more information regarding NTM and their data points, please visit their website ([link](#)).

Results

Table 5 below shows the results of the energy mapping, divided by reported emission categories business travel and energy consumption.

Table 52. Energy use within each category is presented in kilowatt-hours (kWh) and joules (MJ).

Emission category	Energy consumption 2021 [kWh]	Energy consumption 2021 [MJ]
Business travel	1 292 253	4 652 110
Company operated cars and rental cars	1 068 575	3 846 869
Flights	198 453	714 432
Train travel	17 323	62 361
Taxi travel	7 902	28 448
Other	6 933	24 959
Energy consumption	7 401 127	26 644 057
Electricity in offices	2 383 149	8 579 335
- <i>facility electricity</i>	963 006	3 466 821
- <i>operational electricity</i>	1 420 143	5 112 514
Operational electricity in data centers	3 042 044	10 951 358
District heating	984 896	3 545 625
District cooling	988 138	3 557 297
Fuel and energy use	2 900	10 441
Other emissions	-	-
Refrigerant leakage	N/A	N/A
Purchased hardware	N/A	N/A
TOTALT	8 693 380	31 296 166

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