Carbon Accounting Report 2023

AutoStore AS

This report provides an overview of AutoStore's greenhouse gas (GHG) emissions, which is an integrated part of the organisation's climate strategy. Carbon accounting is a fundamental tool in identifying tangible measures to reduce GHG emissions. The annual carbon accounting report enables the organisation to benchmark performance indicators and evaluate progress over time.

The GHG emissions accounting comprises the following organisational units: Norway (Nedre Vats, Oslo, Husøy, Raglamyr and Stavanger), Poland, the United States (Denver, Hatfield and Derry), Thailand, the United Kingdom, Germany, France, South Korea, Austria, Japan, Singapore, Canada, Italy, Sweden, Lithuania, Australia, Ireland, Malaysia and Spain. The production unit in Thailand will start production in 2024, but has included relevant emissions for 2023.

The input data is based on consumption data from internal and external sources, which are converted into tonnes CO_2-equivalents (tCO_2e). The carbon footprint analysis is based on the international standard; *A Corporate Accounting and Reporting Standard*, developed by the Greenhouse Gas Protocol Initiative (GHG Protocol). The GHG Protocol is the most widely used and recognised international standard for measuring greenhouse gas emissions and is the basis for the ISO standard 14064-I.

Reporting Year Energy and GHG Emissions

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions tCO_2e	% share
Transportation total				**391.0**	**99.7**	**-**
Diesel (NO)		6,747.7	liters	66.1	15.4	-
Petrol (E5)		2,984.0	liters	27.0	6.6	-
Diesel		-	liters	-	-	-
Diesel	Company cars	14,450.0	liters	143.3	38.4	-
Petrol	Company cars	11,985.0	liters	110.5	28.1	-
Petrol		2,242.0	liters	20.7	5.3	-
Diesel (B7)		2,361.4	liters	23.3	5.9	-
Stationary combustion total				**373.8**	**80.5**	**-**
Propane (US)		14,014.5	gal(us)	373.8	80.5	-
Scope 1 total				**764.7**	**180.1**	**-**
Electricity total				**6,634.3**	**1,739.0**	**0.4 %**
Electricity UK		74,262.0	kWh	74.3	15.3	-
Electricity UK	Company cars	-	kWh	-	-	-
Electricity France		55,490.0	kWh	55.5	2.9	-
Electricity Japan		68,957.6	kWh	69.0	32.1	-
Electricity Austria		21,108.0	kWh	21.1	2.8	-
Electricity Singapore		37,131.0	kWh	37.1	14.2	-
Electricity Spain		9,142.0	kWh	9.1	1.4	-
Electricity Sweden		30,232.0	kWh	30.2	0.3	-
Electricity Canada		31,826.6	kWh	31.8	3.8	-
Electricity Italy		14,055.0	kWh	14.1	4.0	-
Electricity Lithuania		7,394.0	kWh	7.4	1.0	-
Electricity Thailand		-	kWh	-	-	-
Electricity Australia		5,304.4	kWh	5.3	3.5	-
Electricity Ireland		7,553.0	kWh	7.6	2.4	-
Electricity Malaysia		-	kWh	-	-	-
Electricity Korea		53,044.0	kWh	53.0	24.3	-
Electricity Nordic mix		3,793,162.5	kWh	3,793.2	106.2	-
Electricity Nordic mix	Leased cars	3,233.0	kWh	3.2	0.1	-
Electricity USA		90,200.0	kWh	90.2	33.3	-
Electricity Poland		2,246,137.9	kWh	2,246.1	1,461.6	0.3 %
Electricity Germany		69,217.0	kWh	69.2	24.2	-
Electricity Germany	Company cars	16,800.0	kWh	16.8	5.9	-
District heating location total				**1,258.8**	**162.9**	**-**
District heating Poland mix		438,667.0	kWh	438.7	161.4	-
District heating NO/Stavanger/Sandnes		663,980.0	kWh	664.0	0.5	-
District cooling NO/Stavanger/Sandnes		83,000.0	kWh	83.0	0.5	-
District heating NO/Oslo		40,395.0	kWh	40.4	0.4	-
District cooling NO/Lysaker/Fornebu/Lilleaker		32,767.0	kWh	32.8	0.2	-
Heat fuel specific total				**2,153.8**	**396.3**	**0.1 %**
Heat Natural gas		2,153,828.0	kWh	2,153.8	396.3	0.1 %
Scope 2 total				**10,046.9**	**2,298.2**	**0.5 %**

Purchased goods and services total				-	**410,036.6**	**95.2 %**
Aluminium		2,516.5	kg	-	22.9	-
Steel, stainless		710,566.2	kg	-	2,330.7	0.5 %
Plastic avg. (virgin)		42,441,265.0	kg	-	131,669.8	30.6 %
Furniture, office		4,362.0	$kgCO_2e$	-	4.4	-
Office chair (A1-3)		653.0	Qty	-	82.1	-
Office Desk (A1-3)		347.0	Qty	-	29.1	-
Brass		32,013.0	kg	-	188.0	-
Water supply, municipal		17,169.0	m^3	-	3.0	-
Copper, recycled		74.5	kg	-	-	-
Aluminium (Hydro)		9,271,948.1	kg	-	77,328.0	17.9 %
PCBA, surface mounted, unspecified		22,643.0	kg	-	7,155.2	1.7 %
Aluminium (EU average)		10,884,460.9	kg	-	121,361.7	28.2 %
Glass		-	NOK	-	-	-
Clothing		240,891.0	NOK	-	7.0	-
Cable, unspecified		27,376.0	kg	-	173.8	-
Plastic bins (220mm)		813,233.7	kg	-	2,517.8	0.6 %
Office supplies incl paper		161,108.0	NOK	-	9.7	-
Batteries Li-ion		913,563.0	kg	-	5,762.8	1.3 %
Plastic bins (330mm)		12,056,345.4	kg	-	37,459.1	8.7 %
Office furniture		494,608.0	NOK	-	17.3	-
Postal service		-	NOK	-	-	-
Plastic bins (425mm)		6,127,066.2	kg	-	18,387.3	4.3 %
Other material inputs		48.3	tCO_2e	-	48.3	-
Other material inputs		-	$kgCO_2e$	-	-	-
Aluminium, recycled		11,198,409.0	kg	-	5,099.8	1.2 %
Wood material, virgin		1,212,041.5	kg	-	378.9	0.1 %
Capital goods total				**-**	**-**	**-**
Car compact (hybrid)		-	Qty	-	-	-
Fuel-and-energy-related activities total				**-**	**619.4**	**0.1 %**
Electricity Singapore (upstream)		37,131.0	kWh	-	3.4	-
Electricity Spain (upstream)		9,142.0	kWh	-	0.5	-
Electricity Sweden (upstream)		30,232.0	kWh	-	0.4	-
Electricity Canada (upstream)		31,826.6	kWh	-	1.0	-
Electricity Lithuania (upstream)		7,394.0	kWh	-	0.3	-
Electricity Thailand (upstream)		-	kWh	-	-	-
Electricity Australia (upstream)		5,304.4	kWh	-	0.8	-
Electricity Ireland (upstream)		7,553.0	kWh	-	0.7	-
Electricity Malaysia (upstream)		-	kWh	-	-	-
Propane/Butane (WTT)		14,014.5	liters	-	2.6	-
Electricity USA (upstream)		90,200.0	kWh	-	8.7	-
Petrol (WTT)	Company cars	13,238.0	liters	-	8.0	-
Petrol (WTT)		989.0	liters	-	0.6	-
Electricity Korea (upstream)		53,044.0	kWh	-	5.1	-
Electricity Japan (upstream)		68,957.6	kWh	-	8.1	-
Electricity Germany (upstream)		69,217.0	kWh	-	6.0	-
Electricity Germany (upstream)	Company cars	16,800.0	kWh	-	1.4	-
Electricity Austria (upstream)		21,108.0	kWh	-	0.7	-
Diesel (WTT)	Company cars	14,450.0	liters	-	9.0	-
Diesel (WTT)		6,747.7	liters	-	4.2	-

Petrol (SE) (WTT)		758.9	liters	-	0.5	-
Diesel (B7) (WTT)		2,361.4	liters	-	1.4	-
Electricity Poland (upstream)		2,246,137.9	kWh	-	393.3	0.1 %
Natural gas (WTT)		2,153,828.0	kWh	-	72.1	-
Heat & steam (upstream)		471,434.0	kWh	-	16.6	-
Heat & steam (upstream)	District cooling	83,000.0	kWh	-	2.9	-
Petrol (E5) (WTT)		2,225.1	liters	-	1.3	-
Electricity UK (upstream)		74,262.0	kWh	-	4.5	-
Electricity UK (upstream)	Company cars	-	kWh	-	-	-
Electricity Italy (upstream)		14,055.0	kWh	-	1.1	-
Electricity France (upstream)		55,490.0	kWh	-	1.3	-
Electricity Nordic mix (upstream)		3,328,088.0	kWh	-	56.6	-
Electricity Nordic mix (upstream)	Leased cars	3,233.0	kWh	-	0.1	-
District heating NO/SE (upstream)		704,375.0	kWh	-	3.5	-
Electricity Nordic mix (WTT)		-	kWh	-	-	-
Electricity Norway (upstream)		465,074.5	kWh	-	2.5	-
Upstream transportation and distribution total				**-**	**2,319.1**	**0.5 %**
Transportation	Kuehne+Nagel, WTW	939.0	tCO_2e	-	939.0	0.2 %
Transportation		-	$kgCO_2e$	-	-	-
Transportation	DSV, WTW	385.4	tCO_2e	-	385.4	0.1 %
Transportation	FexEx, WTW	7.2	tCO_2e	-	7.2	-
Transportation	Posten WTW	31.5	$kgCO_2e$	-	-	-
Transportation	Bring Cargo, WTW	163.9	tCO_2e	-	163.9	-
Transportation	Schenker, WTW	778.1	tCO_2e	-	778.1	0.2 %
Transportation	DHL, WTW	45.4	tCO_2e	-	45.4	-
Waste total				**-**	**23.3**	**-**
Paper waste, recycled		13,315.1	kg	-	0.3	-
Plastic waste, recycled		4,768.6	kg	-	0.1	-
Metal waste, recycled		61.0	m^3	-	0.2	-
Metal waste, recycled		9,796.3	kg	-	0.2	-
Metal waste, recycled	Steel	3,000.0	kg	-	0.1	-
Metal waste, recycled	Aluminium	22,900.0	kg	-	0.5	-
Glass waste, recycled		1,130.2	kg	-	-	-
Organic waste, recycled		3,634.0	kg	-	0.1	-
Residual waste, incinerated		20,499.5	kg	-	11.3	-
Residual waste, incinerated		3,975.0	kg	-	2.2	-
Hazardous waste, recycled	B1 batteries	-	kg	-	-	-
Residual waste, landfill (US)		1,705.2	lbs	-	0.4	-
Residual waste, landfill (US)		8,172.0	lbs	-	2.1	-
Wood waste, incinerated		20,743.0	kg	-	0.4	-
EE waste, recycled		633.0	kg	-	-	-
EE waste, recycled	Wires	-	kg	-	-	-
Mineral oil waste, recycled		-	kg	-	-	-
Plastic waste, incinerated		-	kg	-	-	-
Organic waste, anaerobic digestion		7,189.0	kg	-	0.1	-
Industrial waste, incinerated		6,339.0	kg	-	3.5	-
Cardboard waste, incinerated		2,585.0	kg	-	0.1	-
Metal aluminium waste, recycled		5,540.0	kg	-	0.1	-
Industrial waste, recycled	Wood	-	kg	-	-	-

Corrugated cardboard waste, recycled		1,024.5	kg	-	-	-
Fluorescent tubes waste (H), recycled		13.0	kg	-	-	-
Concrete waste, recycled		4,980.0	kg	-	-	-
Residual waste, landfill		3,120.0	kg	-	1.6	-
Plaster waste, recycled		1,880.0	kg	-	-	-
Plastic LDPE waste, recycled		316.0	kg	-	-	-
Hazardous waste, incinerated (Europe)		-	kg	-	-	-
Plastic EPS waste, recycled		299.0	kg	-	-	-
Business travel total				**-**	**13,474.3**	**3.1 %**
Hotel accomodation		11,006.1	EUR	-	2.6	-
Passenger transport		548.3	GBP	-	0.4	-
Hotel nights, world		875.0	nights	-	34.7	-
Hotel nights, Nordic		1,094.0	nights	-	8.2	-
Hotel nights, Europe		600.0	nights	-	8.2	-
Air travel, continental, incl. RF (WTW)		117,551.0	pkm	-	24.5	-
Air travel, domestic, incl. RF (WTW)		20,744.0	pkm	-	6.3	-
Air travel, intercontinental, incl. RF (WTW)		101,212.0	pkm	-	29.7	-
Airport express train (NO)		22.0	trip	-	-	-
Ferry, foot passengers (WTW)		271.0	pkm	-	-	-
Train (UK) (WTW)		13,547.3	pkm	-	0.6	-
Mileage all. avg. car (WTW)		51,638.5	km	-	10.9	-
Train International		1,594.7	pkm	-	-	-
Train International	Train continental	2,817.0	pkm	-	-	-
Train International	Train domestic	19,600.0	pkm	-	0.1	-
Train international (WTT)		1,320.7	pkm	-	-	-
Tram/Light rail		35.0	pkm	-	-	-
Tram/metro (WTT)		35.0	pkm	-	-	-
Taxi		1,180.4	km	-	0.2	-
Car/taxi avg. (WTT)		1,180.4	km	-	0.1	-
Air travel, intercontinental, incl. RF		42,998,815.9	pkm	-	11,235.6	2.6 %
Air travel, intercontinental, incl. RF		874.7	tCO_2e	-	874.7	0.2 %
Air travel, domestic, incl. RF		1,259,925.5	pkm	-	343.5	0.1 %
Air travel, continental, incl. RF		1,743,901.3	pkm	-	324.2	0.1 %
Air travel, continental, incl. RF		31.0	tCO_2e	-	31.0	-
Car, petrol (avg.)		-	km	-	-	-
Car, petrol (avg.)		2,975.4	liters	-	7.0	-
Car, petrol (avg.)	Mileage	-	km	-	-	-
Car, diesel (avg.)		-	km	-	-	-
Car, diesel (avg.)		530.4	liters	-	1.4	-
Car, diesel (avg.)	Mileage	-	km	-	-	-
Car, Plug-in Hybrid Electric Vehicle (PHEV)		-	km	-	-	-
Car, Plug-in Hybrid Electric Vehicle (PHEV)	Mileage	-	km	-	-	-
Electric car UK		-	km	-	-	-
Electric car UK	Mileage	-	km	-	-	-
Car, rental (fuel unknown)		7,258.4	km	-	1.2	-
Car, rental (fuel unknown)		526,906.5	$kgCO_2e$	-	526.9	0.1 %
Air travel, domestic		3,884.0	pkm	-	0.6	-
Train (US)		-	p-mile	-	-	-
Train (JP)		68,553.0	pkm	-	1.7	-

Employee commuting total			**-**	**430.0**	**0.1 %**
Car, petrol (avg.)	2,379,425.0	km	-	390.0	0.1 %
Train International	300,753.4	pkm	-	1.4	-
Bus local avg.	300,753.4	pkm	-	30.7	-
Motorbike, small	94,782.7	km	-	7.9	-
Processing of sold products total			**-**	**12.1**	**-**
Electricity Australia	900.0	kWh	-	0.6	-
Electricity Austria	540.0	kWh	-	0.1	-
Electricity Belgium	1,125.0	kWh	-	0.2	-
Electricity Brazil	90.0	kWh	-	-	-
Electricity Bulgaria	225.0	kWh	-	0.1	-
Electricity Canada	450.0	kWh	-	0.1	-
Electricity South America	315.0	kWh	-	0.1	-
Electricity EU 27	405.0	kWh	-	0.1	-
Electricity Czech Rep.	180.0	kWh	-	0.1	-
Electricity Denmark 125	1,125.0	kWh	-	0.1	-
Electricity Estonia	90.0	kWh	-	0.1	-
Electricity Finland	450.0	kWh	-	-	-
Electricity France	1,260.0	kWh	-	0.1	-
Electricity Germany	9,225.0	kWh	-	3.2	-
Electricity Hungary	180.0	kWh	-	-	-
Electricity Iceland	90.0	kWh	-	-	-
Electricity Italy	1,350.0	kWh	-	0.4	-
Electricity Japan	1,575.0	kWh	-	0.7	-
Electricity Lithuania	90.0	kWh	-	-	-
Electricity Malaysia	225.0	kWh	-	0.1	-
Electricity Netherlands	900.0	kWh	-	0.3	-
Electricity New Zealand	360.0	kWh	-	-	-
Electricity Norway	1,575.0	kWh	-	-	-
Electricity Poland	675.0	kWh	-	0.4	-
Electricity Portugal	90.0	kWh	-	-	-
Electricity Romania	90.0	kWh	-	-	-
Electricity Saudi Arabia	90.0	kWh	-	0.1	-
Electricity Singapore	180.0	kWh	-	0.1	-
Electricity Korea	1,125.0	kWh	-	0.5	-
Electricity Spain	1,800.0	kWh	-	0.3	-
Electricity Sweden	900.0	kWh	-	-	-
Electricity Switzerland	225.0	kWh	-	-	-
Electricity Thailand	225.0	kWh	-	0.1	-
Electricity United Kingdom	1,575.0	kWh	-	0.3	-
Electricity USA	10,080.0	kWh	-	3.7	-
Electricity Asia avg.	90.0	kWh	-	0.1	-
Electricity Serbia	225.0	kWh	-	0.2	-
Use of sold products total			**-**	**679.7**	**0.2 %**
Electricity Australia	56,139.0	kWh	-	36.6	-
Electricity Austria	346,728.0	kWh	-	46.1	-
Electricity Belgium	336,924.0	kWh	-	45.9	-
Electricity Brazil	3,025.0	kWh	-	0.4	-
Electricity Bulgaria	10,525.0	kWh	-	4.3	-
Electricity Canada	28,144.0	kWh	-	3.3	-
Electricity South America	8,197.0	kWh	-	1.5	-

Electricity EU 27	11,019.0	kWh	-	2.6	-
Electricity Czech Rep.	373.0	kWh	-	0.2	-
Electricity Denmark 125	74,976.0	kWh	-	9.3	-
Electricity Estonia	375.0	kWh	-	0.2	-
Electricity Finland	31,112.0	kWh	-	2.5	-
Electricity France	52,254.0	kWh	-	2.7	-
Electricity Germany	435,876.0	kWh	-	152.1	-
Electricity Hungary	3,538.0	kWh	-	0.7	-
Electricity Iceland	683.0	kWh	-	-	-
Electricity Italy	140,567.0	kWh	-	39.7	-
Electricity Japan	52,417.0	kWh	-	24.4	-
Electricity Asia avg.	3,701.0	kWh	-	2.4	-
Electricity Lithuania	938.0	kWh	-	0.1	-
Electricity Malaysia	5,186.0	kWh	-	3.2	-
Electricity Netherlands	62,616.0	kWh	-	19.6	-
Electricity New Zealand	2,661.0	kWh	-	0.4	-
Electricity Norway	49,263.0	kWh	-	0.3	-
Electricity Poland	18,873.0	kWh	-	12.3	-
Electricity Portugal	4,017.0	kWh	-	0.6	-
Electricity Romania	3,485.0	kWh	-	0.9	-
Electricity Saudi Arabia	4,034.0	kWh	-	2.5	-
Electricity Serbia	9,501.0	kWh	-	6.7	-
Electricity Singapore	4,153.0	kWh	-	1.6	-
Electricity Korea	39,893.0	kWh	-	18.3	-
Electricity Spain	83,694.0	kWh	-	12.6	-
Electricity Sweden	45,057.0	kWh	-	0.5	-
Electricity Switzerland	140,646.0	kWh	-	3.6	-
Electricity Thailand	5,403.0	kWh	-	2.5	-
Electricity United Kingdom	61,528.0	kWh	-	12.7	-
Electricity USA	558,977.0	kWh	-	206.4	-
End-of-life treatment of sold products total			**-**	**828.1**	**0.2 %**
Metal waste, recycled	6,201,311.0	kg	-	132.1	-
Plastic waste, recycled	19,554,702.6	kg	-	416.5	0.1 %
Rubber waste, recycled	2,831.7	kg	-	0.1	-
Hazardous waste, recycled	8,059.1	kg	-	0.2	-
EE waste, recycled	302,763.6	kg	-	6.4	-
Industrial waste, recycled	17,291.4	kg	-	0.4	-
Metal waste, landfill	252,688.9	kg	-	2.2	-
Plastic waste, landfill	29,294,292.2	kg	-	260.7	0.1 %
Rubber waste, incinerated	1,247.3	kg	-	3.9	-
Hazardous waste, landfill	3,604.2	kg	-	0.1	-
EE waste, landfill	139,862.2	kg	-	1.2	-
Industrial waste, incinerated	7,613.7	kg	-	4.2	-
Downstream leased assets total			**-**	**0.2**	**-**
Electricity Nordic mix	6,267.0	kWh	-	0.2	-
Scope 3 total			**-**	**428,422.7**	**99.4 %**
Total			**10,811.6**	**430,901.1**	**100.0 %**
KJ			**38,921,795,278.6**		

Reporting Year Market-Based GHG Emissions

Category	Unit	2023
Electricity Total (Scope 2) with Market-based calculations	tCO_2e	3,401.4
Scope 2 Total with Market-based electricity calculations	tCO_2e	3,960.6
Scope 1+2+3 Total with Market-based electricity calculations	tCO_2e	432,563.4

Introduction

This report provides an overview of AutoStore's greenhouse gas (GHG) emissions, which is an integrated part of the organisation's climate strategy.

Methodology

The Greenhouse Gas Protocol initiative (GHG Protocol) was developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). This analysis is done according to A Corporate Accounting and Reporting Standard Revised edition, currently one of four GHG Protocol accounting standards on calculating and reporting GHG emissions. The reporting considers the following greenhouse gases, all converted into CO2-equivalents: CO2, CH4 (methane), N2O (nitrous oxide), SF6, HFCs, PFCs and NF3.

Organizational boundary

Within the control approach, a reporting company distinguishes whether its reporting is based on entities in which it holds operational control or financial control. An operational control approach is based on the company's ability to introduce or implement operating policies in the entity. Similarly, a financial control approach is based on a company's ability to implement financial policies in the entity. In most cases, these two approaches carry the same outcome. AutoStore uses the operational control approach for consolidating its carbon accounting.

Inclusions/exclusions

For their carbon accounting 2023, AutoStore AS has included all relevant emissions, following the same methodology as the previous year. There are no significant exclusions in the carbon accounting 2024. Data is viewed as complete for scope 1, 2 & 3 emissions.

Reporting period

The reporting period for consolidating 2023 emissions data is set to 01.01.2023-31.12.2023.

Estimations

CEMAsys has estimated emissions for scope 2 where locations have less than 15 people, and for 6 categories in scope 3; waste, employee commuting, processing of sold products, use of sold products, end of life treatment of sold products and downstream leased assets. These categories were estimated due to a lack of available information and/or the relative size of the categories. For some categories, CEMAsys has estimated emissions for specific units. For instance, electricity use (per employee) was estimated for offices with less than 15 employees using data from Odyssee-Mure. Together, we have set a threshold for categories and units to be estimated, which will be consistent in the years to follow.

For the scope 3 categories the estimations are based on activity data from AutoStore's internal system that provided data on the number of individual products sold per location.

Changes from 2022

This year with a full scope 3 screening and reporting process, all of AutoStore's units are included in the relevant scopes and categories. Some data was reported in 2021*, however, the reporting did not include all units or follow the GHG Protocols scope 3 criteria. Therefore, the data from 2021 cannot be directly compared with 2022 or 2023 data.

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GHG accounting 2023

In 2023 AutoStore emitted directly and indirectly a total of 430,901.1 tonnes of carbon dioxide equivalent (tCO2e) in scope 1, 2 and 3:

Scope 1: 180.1 tCO2e (0.1%)
Scope 2: 2,298.2 (0.5%)
Scope 3: 428.422.7 tCO2e (99.4%)
Purchased goods and services: 410,036.6 *tCO2e*

Scope 1

Scope 1 emissions include all direct emission sources. This includes emissions from fuel consumption of company cars, stationary combustion of propane and natural gas as well as re-fill of refrigerants.

In 2023 AutoStore reported company cars in Norway, Poland, Germany, and South Korea. The relevant fuel type is reported in liters for all vehicles, and the total emissions are 99.7 tCO2e. The warehouse in the United States reported propane use, which amounted to 80.5 tCO2e.

In 2022 AutoStore reported 105 647 MMBtu of Propane (US) in total for consumption in Derry and Hatfield, corresponding to 6668.5 tCO2e. This number was incorrect, and the correct emissions for Propane (US) is 7568.6 gallons, corresponding to 43.5 tCO2e. The correct emissions are represented in this report.

Scope 2

Scope 2 emissions include all indirect emission sources from purchased energy. This includes electricity, district heating and district cooling.

Electricity is accountable for 0.4% of total emissions in 2023, with 1,739.0 tCO2e. Electricity use per employee was estimated for offices with less than 15 employees and Germany.

AutoStore indirectly emitted 162.9 tCO2e from district heating in 2023. The district heating is accountable for less than 0.1% of the total GHG emissions for the reporting year.

Heat fuel accounted for 396.3 tCO2e in 2023, 0.1 % of the total GHG emissions.

Scope 3

Purchased goods and services
AutoStore's scope 3 emissions mainly stem from category 1 Purchased goods and services. The factory in

Poland purchases all materials for AutoStore's products and therefore holds the majority of AutoStore's emissions.

The purchase of goods and services in 2023 is accountable for 95.2 % of the total GHG emissions, with 410,036.6tCO2e emitted from the products' production and transportation. AutoStore's factory in Poland is accountable for most purchased goods as it requires input material to produce the company's products and handles most purchases from third-party producers.

Aluminum
This year, AutoStore received a supplier-specific emission factor from its primary aluminum supplier. As such, this emission factor was used for 46% of the aluminum reported. This percentage corresponds to the portion of aluminum procured from the primary supplier by AutoStore. The primary supplier's analysis of the emission factor relied on the evaluation of 2023 delivery data, using the three principal delivery plants responsible for manufacturing profiles for AutoStore as the foundation.

The emission factor more specifically includes emissions from the supplier-specific Scope 1, 2 & 3, from the cradle of the raw material extraction and refining, transport, energy, smelting and/or casting to the gate of the extrusion factory including the specific emission from our value-added processes. The primary supplier has used amongst other metal sourcing reports, CRU intel about primary aluminium smelting, European Aluminium data and statistics and direct information from suppliers, including EPDs when available to make sure cradle-to-gate emissions are considered.

The remainder of the procured aluminium was accounted for utilizing the European average emission factor for aluminium production calculated by the primary supplier. This approach was considered appropriate given that most of Autostore's other production activities also occur within Europe.

Plastic
Supplier-specific factors were also used for the plastic bins. These emission factors were provided by one of Autostores largest plastic suppliers. The emission factors from this supplier were based on their Key Performance Indicator (KPI) calculator and covered the relevant lifecycle of the plastic bins. We compile data throughout the lifecycle, including energy consumption and transportation. Presently, we use database values for upstream considerations but aim to incorporate real values from suppliers in the future. Their calculations are based on site-specific CO2 equivalent emissions, supported by generic database data.

The plastic that is not purchased from this supplier, is used with the plastic average (virgin) emission factor.

PCBA
AutoStore's emission reporting for PCBA (Printed Circuit Board Assembly) boards previously categorized them under the general emission factor "PCB". However, this failed to accurately represent the emissions specific to PCBA boards. Consequently, there has been a recent shift in emission factors from 2021 to 2023, impacting historical emissions data.

Capital goods
In 2023 AutoStore did not purchase any capital goods.

Fuel-and-energy-related activities
Fuel-and-energy-related activities are accountable for 619.4 tCO2e in 2023.

Upstream transportation and distribution
In the reporting year upstream transportation was responsible for 2,319.1 tCO2e (0.5% of total). This represents a significant decrease in emissions from 2022 with 4336 tCO2e. The decrease in emissions is mainly due to the reported emissions from Schenker.

AutoStore has not reported activity data for Poland or the United States for 2023 and remains committed to enhancing its internal reporting procedures for future reporting.

Waste
Waste generated from AutoStore's operations is accountable for 23.3 tCO2e, which is less than 0.1% of total emissions. CEMAsys conducted estimations on the countries with less than 15 employees.

Business travel
In the reporting year business travels accounted for 13,474.3 tCO2e, representing 3.1% of the overall greenhouse gas emissions. Data was sourced from travel agencies and the AutoStore's internal database. AutoStore has reported activity data for 2023 and remains committed to enhancing its internal reporting procedures. Given the significance of emissions from this category and ongoing improvements in reporting, estimations for other locations in 2023 were not deemed necessary.

Employee commuting
CEMAsys estimated employee commuting to be 430 tCO2e in 2023, 0.1 % of total GHG emissions. Estimations were calculated based on employee numbers and combined with statistics from Moovit Insights which provided an overview of average commute distances (km) per country. Where distances or modes of transport per country could not be found on Moovit Insights, Statista was used as an alternative.

Processing of sold products
Emissions from the processing of sold products were estimated for 2023 and were responsible for 12.1 tCO2e, less than 0.1 % of total emissions. To calculate the emission from processing of sold products, assumptions had to be made based on conversations with employees in AutoStore as to the power usage involved in the setting up of individual products. This is because AutoStore does not install the products themselves, that responsibility falls to a third party. Estimations were calculated based on the power usage, operating time and number of tools used to set up a particular grid. These assumptions were then combined with activity data from Autostore to calculate kWh per location.

Use of sold products
Use of sold products was estimated for 2023 and accounted for 679.7 tCO2e, 0.2 % of total emissions. The estimations are based on the average daily power consumption of each of AutoStore's products. This data combined with units sold gave an output of annual kWh per location.

End-of-life treatment of sold products
Emissions from the future end-of-life treatment of sold products in 2023 are estimated to be 828.1 tCO2e. The calculations are based on units sold and the material composition of AutoStore's products. This data was provided by AutoStore for their individual products. To estimate treatment methods for the materials, statistics from the European Commissions Waste Stat database was used to acquire recycling rates and incineration/landfill rates per country. For locations outside of the EU, research on individual countries government websites related to waste statistics was carried out.

Downstream leased assets
AutoStore rents out grid systems, contributing to 0.2 tCO2e tCO2e emissions from the systems' electricity consumption in 2023.

Annual GHG Emissions

Category	Description	2021	2022	2023	% change from previous year
Transportation total		**17.8**	**89.4**	**99.7**	**11.5 %**
Diesel (NO)		5.1	9.5	15.4	62.1 %
Petrol (E5)		7.6	16.0	6.6	-58.8 %
Diesel	Company cars	-	14.1	38.4	172.3 %
Diesel		-	-	-	-
Petrol	Company cars	-	42.7	28.1	-34.2 %
Petrol		-	-	5.3	100.0 %
Diesel (B7)		5.1	7.0	5.9	-15.7 %
Stationary combustion total		**-**	**43.5**	**80.5**	**85.1 %**
Propane (US)		-	43.5	80.5	85.1 %
Scope 1 total		**17.8**	**132.9**	**180.1**	**35.5 %**
Electricity location-based total		**593.6**	**841.2**	**1,739.0**	**106.7 %**
Electricity UK		-	7.1	15.3	115.5 %
Electricity UK	Company cars	-	0.4	-	-100.0 %
Electricity France		-	2.7	2.9	7.4 %
Electricity Japan		-	13.5	32.1	137.8 %
Electricity Austria		-	2.9	2.8	-3.4 %
Electricity Singapore		-	10.9	14.2	30.3 %
Electricity Spain		-	0.8	1.4	75.0 %
Electricity Sweden		-	0.2	0.3	50.0 %
Electricity Canada		-	2.3	3.8	65.2 %
Electricity Italy		-	4.0	4.0	-
Electricity Lithuania		-	1.1	1.0	-9.1 %
Electricity Thailand		-	4.5	-	-100.0 %
Electricity Australia		-	3.2	3.5	9.4 %
Electricity Ireland		-	1.3	2.4	84.6 %
Electricity Malaysia		-	3.1	-	-100.0 %
Electricity Korea		-	15.4	24.3	57.8 %
Electricity Nordic mix		17.8	51.2	106.2	107.4 %
Electricity Nordic mix	Leased cars	-	0.1	0.1	-
Electricity USA		26.4	55.5	33.3	-40.0 %
Electricity Poland		549.4	661.1	1,461.6	121.1 %
Electricity Germany		-	-	24.2	100.0 %
Electricity Germany	Company cars	-	-	5.9	100.0 %
District heating location total		**125.2**	**421.9**	**162.9**	**-61.4 %**
District heating Poland mix		125.2	421.8	161.4	-61.7 %
District heating NO/Stavanger/Sandnes		-	-	0.5	100.0 %
District cooling NO/Stavanger/Sandnes		-	0.1	0.5	400.0 %
District heating NO/Oslo		-	-	0.4	100.0 %
District cooling NO/Lysaker/Fornebu/Lilleaker		-	-	0.2	100.0 %
Heat fuel specific total		**-**	**98.1**	**396.3**	**304.0 %**
Heat Natural gas		-	98.1	396.3	304.0 %
Scope 2 total		**718.8**	**1,361.2**	**2,298.2**	**68.8 %**

Purchased goods and services total		**181,524.1**	**361,312.1**	**410,036.6**	**13.5 %**
Aluminium		-	-	22.9	100.0 %
Steel, stainless		1,337.4	2,894.5	2,330.7	-19.5 %
Plastic avg. (virgin)		61,680.7	101,946.9	131,669.8	29.2 %
Plastic avg. (virgin)	Rubber	9.0	19.2	-	-100.0 %
Furniture, office		-	276.1	4.4	-98.4 %
Office chair (A1-3)		-	38.1	82.1	115.5 %
Office Desk (A1-3)		-	38.3	29.1	-24.0 %
Brass		76.4	175.4	188.0	7.2 %
Plastic bins (220mm)		1,178.6	1,948.0	2,517.8	29.3 %
PCBA, surface mounted, unspecified		7,550.8	16,826.4	7,155.2	-57.5 %
Water supply, municipal		-	0.3	3.0	900.0 %
Aluminium (Hydro)		31,355.8	71,913.2	77,328.0	7.5 %
Copper, recycled		0.1	0.3	-	-100.0 %
Plastic bins (330mm)		17,534.9	28,981.9	37,459.1	29.2 %
Aluminium (EU average)		49,211.0	112,863.5	121,361.7	7.5 %
Plastic bins (425mm)		8,607.2	14,226.2	18,387.3	29.2 %
Glass		-	1.4	-	-100.0 %
Clothing		-	99.0	7.0	-92.9 %
Cable, unspecified		95.0	197.4	173.8	-12.0 %
Office furniture		-	221.9	17.3	-92.2 %
Office supplies incl paper		-	-	9.7	100.0 %
Batteries Li-ion		2,284.7	6,141.1	5,762.8	-6.2 %
Postal service		-	2.1	-	-100.0 %
Other material inputs		77.6	181.4	48.3	-73.4 %
Aluminium, recycled		-	-	5,099.8	100.0 %
Wood material, virgin		524.7	2,319.4	378.9	-83.7 %
Capital goods total		**-**	**7.9**	**-**	**-100.0 %**
Car compact (hybrid)		-	7.9	-	-100.0 %
Fuel-and-energy-related activities total		**-**	**937.3**	**619.4**	**-33.9 %**
Electricity Singapore (upstream)		-	2.7	3.4	25.9 %
Electricity Spain (upstream)		-	0.3	0.5	66.7 %
Electricity Sweden (upstream)		-	0.1	0.4	300.0 %
Electricity Canada (upstream)		-	0.7	1.0	42.9 %
Electricity Lithuania (upstream)		-	0.3	0.3	-
Electricity Thailand (upstream)		-	1.4	-	-100.0 %
Electricity Australia (upstream)		-	0.9	0.8	-11.1 %
Electricity Ireland (upstream)		-	0.4	0.7	75.0 %
Electricity Malaysia (upstream)		-	1.0	-	-100.0 %
Propane/Butane (WTT)		-	599.0	2.6	-99.6 %
Electricity USA (upstream)		-	16.1	8.7	-46.0 %
Petrol (WTT)	Company cars	-	11.0	8.0	-27.3 %
Petrol (WTT)		-	-	0.6	100.0 %
Electricity Korea (upstream)		-	4.2	5.1	21.4 %
Electricity Japan (upstream)		-	3.9	8.1	107.7 %
Electricity Germany (upstream)		-	-	6.0	100.0 %
Electricity Germany (upstream)	Company cars	-	-	1.4	100.0 %
Electricity Austria (upstream)		-	0.8	0.7	-12.5 %
Diesel (WTT)	Company cars	-	3.3	9.0	172.7 %
Diesel (WTT)		-	2.9	4.2	44.8 %
Petrol (E5) (WTT)		-	4.3	1.3	-69.8 %

Diesel (B7) (WTT)		-	1.7	1.4	-17.6 %
Electricity Poland (upstream)		-	199.5	393.3	97.1 %
Natural gas (WTT)		-	16.6	72.1	334.3 %
Heat & steam (upstream)		-	49.4	16.6	-66.4 %
Heat & steam (upstream)	District cooling	-	-	2.9	100.0 %
Petrol (SE) (WTT)		-	-	0.5	100.0 %
Electricity UK (upstream)		-	2.3	4.5	95.7 %
Electricity UK (upstream)	Company cars	-	0.1	-	-100.0 %
Electricity Italy (upstream)		-	1.2	1.1	-8.3 %
Electricity France (upstream)		-	0.8	1.3	62.5 %
Electricity Nordic mix (WTT)		-	12.2	-	-100.0 %
Electricity Nordic mix (WTT)	Leased cars	-	-	-	-
Electricity Nordic mix (upstream)		-	-	56.6	100.0 %
Electricity Nordic mix (upstream)	Leased cars	-	-	0.1	100.0 %
District heating NO/SE (upstream)		-	0.2	3.5	1,650.0 %
District heating NO/SE (upstream)	District cooling	-	-	-	-
Electricity Norway (upstream)		-	-	2.5	100.0 %
Upstream transportation and distribution total		**-**	**4,336.0**	**2,319.1**	**-46.5 %**
Transportation	Kuehne+Nagel, WTW	-	1,051.0	939.0	-10.7 %
Transportation	Schenker, WTW	-	3,234.9	778.1	-75.9 %
Transportation	FedEx, WTW	-	11.5	-	-100.0 %
Transportation	DHL, WTW	-	38.4	45.4	18.2 %
Transportation		-	-	-	-
Transportation	Bring Cargo, WTW	-	0.2	163.9	81,850.0 %
Transportation	DSV, WTW	-	-	385.4	100.0 %
Transportation	FexEx, WTW	-	-	7.2	100.0 %
Transportation	Posten WTW	-	-	-	-
Waste total		**9.7**	**37.0**	**23.3**	**-37.0 %**
Residual waste, incinerated		-	12.4	11.3	-8.9 %
Residual waste, incinerated		-	-	2.2	100.0 %
Paper waste, recycled		0.5	8.4	0.3	-96.4 %
Glass waste, recycled		-	0.1	-	-100.0 %
Metal waste, recycled		-	0.3	0.4	33.3 %
Metal waste, recycled	Steel	-	5.4	0.1	-98.1 %
Metal waste, recycled	Aluminium	-	0.3	0.5	66.7 %
Organic waste, treated		-	0.9	-	-100.0 %
Plastic waste, recycled		-	0.1	0.1	-
Organic waste, recycled		-	-	0.1	100.0 %
Hazardous waste, recycled	B1 batteries	-	-	-	-
Residual waste, landfill (US)		-	1.9	-	-100.0 %
Residual waste, landfill (US)		-	-	0.4	100.0 %
Residual waste, landfill (US)		-	-	2.1	100.0 %
Wood waste, incinerated		-	0.1	0.4	300.0 %
EE waste, recycled		-	0.1	-	-100.0 %
EE waste, recycled	Wires	-	-	-	-
Mineral oil waste, recycled		-	-	-	-
Plastic waste, incinerated		8.8	5.6	-	-100.0 %
Organic waste, anaerobic digestion		-	-	0.1	100.0 %
Industrial waste, incinerated		-	-	3.5	100.0 %
Cardboard waste, incinerated		-	-	0.1	100.0 %
Metal aluminium waste, recycled		-	-	0.1	100.0 %

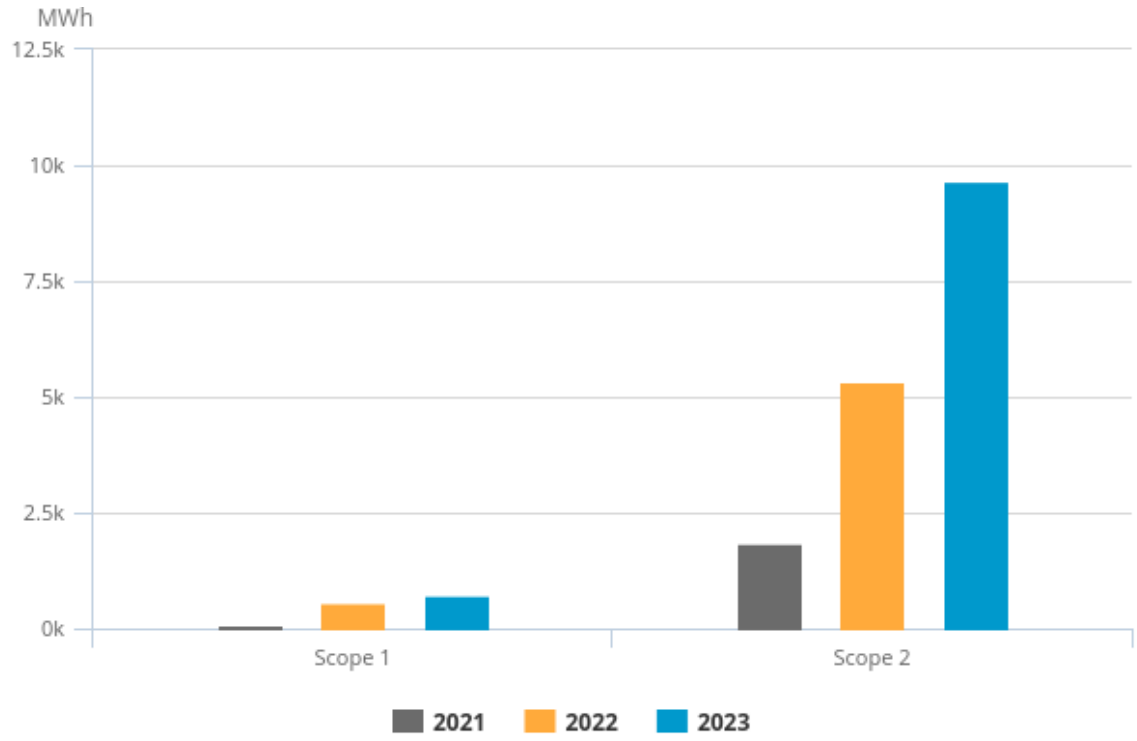
Industrial waste, recycled	Wood	0.3	1.3	-	-100.0 %
Industrial waste, recycled	Insulation materials	-	-	-	-
Corrugated cardboard waste, recycled		-	-	-	-
Fluorescent tubes waste (H), recycled		-	-	-	-
Concrete waste, recycled		-	-	-	-
Residual waste, landfill		-	-	1.6	100.0 %
Plaster waste, recycled		-	-	-	-
Plastic LDPE waste, recycled		-	-	-	-
Plasterboard waste, recycled		-	0.1	-	-100.0 %
Hazardous waste, incinerated (Europe)		-	-	-	-
Plastic EPS waste, recycled		-	-	-	-
Business travel total		**396.8**	**2,222.4**	**13,474.3**	**506.3 %**
Hotel accomodation		-	-	2.6	100.0 %
Passenger transport		-	-	0.4	100.0 %
Hotel nights, world		8.4	25.0	34.7	38.8 %
Hotel nights, Nordic		-	1.9	8.2	331.6 %
Hotel nights, Europe		-	1.1	8.2	645.5 %
Air travel, continental, incl. RF (WTW)		-	-	24.5	100.0 %
Air travel, domestic, incl. RF (WTW)		-	-	6.3	100.0 %
Air travel, intercontinental, incl. RF (WTW)		-	-	29.7	100.0 %
Airport express train (NO)		-	-	-	-
Ferry, foot passengers (WTW)		-	-	-	-
Train (UK) (WTW)		-	-	0.6	100.0 %
Mileage all. avg. car (WTW)		-	-	10.9	100.0 %
Train International		-	-	-	-
Train International	Train continental	-	-	-	-
Train International	Train domestic	-	0.1	0.1	-
Train international (WTT)		-	-	-	-
Tram/Light rail		-	-	-	-
Tram/metro (WTT)		-	-	-	-
Taxi		-	-	0.2	100.0 %
Car/taxi avg. (WTT)		-	-	0.1	100.0 %
Air travel, intercontinental, incl. RF		44.2	1,863.7	12,110.3	549.8 %
Air travel, domestic, incl. RF		321.5	113.5	343.5	202.6 %
Air travel, continental, incl. RF		22.3	200.6	355.2	77.1 %
Car, petrol (avg.)		0.2	0.1	7.0	6,900.0 %
Car, petrol (avg.)	Mileage	-	1.8	-	-100.0 %
Car, diesel (avg.)		0.3	1.9	1.4	-26.3 %
Car, diesel (avg.)	Mileage	-	4.5	-	-100.0 %
Car, Plug-in Hybrid Electric Vehicle (PHEV)		-	-	-	-
Car, Plug-in Hybrid Electric Vehicle (PHEV)	Mileage	-	1.2	-	-100.0 %
Electric car UK		-	-	-	-
Electric car UK	Mileage	-	0.3	-	-100.0 %
Car, rental (fuel unknown)		-	6.6	528.1	7,901.5 %
Air travel, domestic		-	-	0.6	100.0 %
Train (US)		-	-	-	-
Train (JP)		-	-	1.7	100.0 %
Employee commuting total		**-**	**414.3**	**430.0**	**3.8 %**

Car travel	-	378.8	-	-100.0 %
Motorbike, small	-	7.2	7.9	9.7 %
Train International	-	1.3	1.4	7.7 %
Bus local avg.	-	27.1	30.7	13.3 %
Car, petrol (avg.)	-	-	390.0	100.0 %
Processing of sold products total	**-**	**13.7**	**12.1**	**-11.7 %**
Electricity Australia	-	0.9	0.6	-33.3 %
Electricity Austria	-	0.1	0.1	-
Electricity Belgium	-	-	0.2	100.0 %
Electricity Canada	-	0.2	0.1	-50.0 %
Electricity South America	-	0.1	0.1	-
Electricity China	-	0.1	-	-100.0 %
Electricity Czech Rep.	-	1.0	0.1	-90.0 %
Electricity Denmark 125	-	0.1	0.1	-
Electricity Finland	-	0.1	-	-100.0 %
Electricity France	-	0.1	0.1	-
Electricity Germany	-	1.4	3.2	128.6 %
Electricity EU 27	-	0.1	0.1	-
Electricity Hungary	-	0.1	-	-100.0 %
Electricity Ireland	-	-	-	-
Electricity Asia avg.	-	0.1	0.1	-
Electricity Italy	-	0.4	0.4	-
Electricity Japan	-	1.0	0.7	-30.0 %
Electricity Africa avg.	-	0.1	-	-100.0 %
Electricity Malaysia	-	0.1	0.1	-
Electricity Mexico	-	-	-	-
Electricity Netherlands	-	1.1	0.3	-72.7 %
Electricity Nordic mix	-	-	-	-
Electricity Poland	-	0.5	0.4	-20.0 %
Electricity Romania	-	-	-	-
Electricity Singapore	-	-	0.1	100.0 %
Electricity Korea	-	1.1	0.5	-54.5 %
Electricity Spain	-	0.1	0.3	200.0 %
Electricity Sweden	-	-	-	-
Electricity Switzerland	-	-	-	-
Electricity Thailand	-	-	0.1	100.0 %
Electricity United Kingdom	-	0.4	0.3	-25.0 %
Electricity USA	-	3.5	3.7	5.7 %
Electricity Europe avg.	-	0.7	-	-100.0 %
Electricity Brazil	-	-	-	-
Electricity Bulgaria	-	-	0.1	100.0 %
Electricity Estonia	-	-	0.1	100.0 %
Electricity Iceland	-	-	-	-
Electricity Lithuania	-	-	-	-
Electricity New Zealand	-	-	-	-
Electricity Norway	-	-	-	-
Electricity Portugal	-	-	-	-
Electricity Saudi Arabia	-	-	0.1	100.0 %
Electricity Serbia	-	-	0.2	100.0 %
Use of sold products total	**-**	**1,013.0**	**679.7**	**-32.9 %**
Electricity Australia	-	67.0	36.6	-45.4 %
Electricity Austria	-	3.6	46.1	1,180.6 %

Electricity Belgium	-	1.2	45.9	3,725.0 %
Electricity Canada	-	14.0	3.3	-76.4 %
Electricity South America	-	1.6	1.5	-6.3 %
Electricity China	-	1.7	-	-100.0 %
Electricity Czech Rep.	-	228.8	0.2	-99.9 %
Electricity Denmark 125	-	10.8	9.3	-13.9 %
Electricity Finland	-	4.1	2.5	-39.0 %
Electricity France	-	2.9	2.7	-6.9 %
Electricity Germany	-	97.6	152.1	55.8 %
Electricity EU 27	-	4.0	2.6	-35.0 %
Electricity Hungary	-	4.1	0.7	-82.9 %
Electricity Ireland	-	1.9	-	-100.0 %
Electricity Asia avg.	-	14.6	2.4	-83.6 %
Electricity Italy	-	36.6	39.7	8.5 %
Electricity Japan	-	38.9	24.4	-37.3 %
Electricity Africa avg.	-	5.2	-	-100.0 %
Electricity Malaysia	-	11.9	3.2	-73.1 %
Electricity Mexico	-	0.7	-	-100.0 %
Electricity Netherlands	-	58.9	19.6	-66.7 %
Electricity Nordic mix	-	1.0	-	-100.0 %
Electricity Poland	-	20.5	12.3	-40.0 %
Electricity Romania	-	0.9	0.9	-
Electricity Singapore	-	0.8	1.6	100.0 %
Electricity Korea	-	73.8	18.3	-75.2 %
Electricity Spain	-	3.4	12.6	270.6 %
Electricity Sweden	-	1.6	0.5	-68.8 %
Electricity Switzerland	-	1.4	3.6	157.1 %
Electricity Thailand	-	0.3	2.5	733.3 %
Electricity United Kingdom	-	25.4	12.7	-50.0 %
Electricity USA	-	273.9	206.4	-24.6 %
Electricity Brazil	-	-	0.4	100.0 %
Electricity Bulgaria	-	-	4.3	100.0 %
Electricity Estonia	-	-	0.2	100.0 %
Electricity Iceland	-	-	-	-
Electricity Lithuania	-	-	0.1	100.0 %
Electricity New Zealand	-	-	0.4	100.0 %
Electricity Norway	-	-	0.3	100.0 %
Electricity Portugal	-	-	0.6	100.0 %
Electricity Saudi Arabia	-	-	2.5	100.0 %
Electricity Serbia	-	-	6.7	100.0 %
End-of-life treatment of sold products total	**-**	**1,191.8**	**828.1**	**-30.5 %**
Metal waste, recycled	-	250.5	132.1	-47.3 %
Metal waste, landfill	-	23.1	2.2	-90.5 %
Plastic waste, recycled	-	807.3	416.5	-48.4 %
Plastic waste, landfill	-	87.4	260.7	198.3 %
Rubber waste, recycled	-	0.1	0.1	-
Rubber waste, incinerated	-	3.8	3.9	2.6 %
Hazardous waste, recycled	-	0.7	0.2	-71.4 %
Hazardous waste, landfill	-	0.2	0.1	-50.0 %
EE waste, recycled	-	12.0	6.4	-46.7 %
EE waste, landfill	-	1.2	1.2	-

Industrial waste, recycled	-	1.0	0.4	-60.0 %
Commercial waste, landfill	-	4.6	-	-100.0 %
Industrial waste, incinerated	-	-	4.2	100.0 %
Downstream leased assets total	**-**	**0.1**	**0.2**	**100.0 %**
Electricity Nordic mix	-	0.1	0.2	100.0 %
Scope 3 total	**181,930.6**	**371,485.8**	**428,422.7**	**15.3 %**
Total	**182,667.2**	**372,979.9**	**430,901.1**	**15.5 %**
Percentage change	**100.0 %**	**104.2 %**	**15.5 %**	

Annual energy consumption (MWh) Scope 1 & 2



Annual Market-Based GHG Emissions

Category	Unit	2021	2022	2023
Electricity Total (Scope 2) with Market-based calculations	tCO_2e	822.8	1,581.4	3,401.4
Scope 2 Total with Market-based electricity calculations	tCO_2e	948.0	2,101.4	3,960.6
Scope 1+2+3 Total with Market-based electricity calculations	tCO_2e	182,896.3	373,720.1	432,563.4
Percentage change		**100.0 %**	**104.3 %**	**15.7 %**

Methodology and sources

The Greenhouse Gas Protocol initiative (GHG Protocol) was developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). This analysis is done according to *A Corporate Accounting and Reporting Standard Revised edition*, currently one of four GHG Protocol accounting standards on calculating and reporting GHG emissions. The reporting considers the following greenhouse gases, all converted into CO_2-equivalents: CO_2, CH_4 (methane), N_2O (laughing gas), SF_6, HFCs, PFCs and NF3.

For corporate reporting, two distinct approaches can be used to consolidate GHG emissions: the equity share approach and the control approach. The most common consolidation approach is the control approach, which can be defined in either financial or operational terms.

The carbon inventory is divided into three main scopes of direct and indirect emissions.

Scope 1 includes all direct emission sources. This includes all use of fossil fuels for stationary combustion or transportation, in owned and, depending on the consolidation approach selected, leased, or rented assets. It also includes any process emissions, from e.g. chemical processes, industrial gases, direct methane emissions etc.

Scope 2 includes indirect emissions related to purchased energy; electricity and heating/cooling where the organisation has operational control. The electricity emission factors used in Cemasys are based on national gross electricity production mixes from the International Energy Agency's statistics (IEA Stat). Emission factors per fuel type are based on assumptions in the IEA methodological framework. Factors for district heating/cooling are either based on actual (local) production mixes, or average IEA statistics.

In January 2015, the GHG Protocol published new guidelines for calculating emissions from electricity consumption. Primarily two methods are used to "allocate" the GHG emissions created by electricity generation to the end consumers of a given grid. These are the location-based and the market-based methods. The location-based method reflects the average emission intensity of the grids on which energy consumption occurs, while the market-based method reflects emissions from electricity that companies have purposefully chosen (or not chosen).

Organisations who report on their GHG emissions will now have to disclose both the location-based emissions from the production of electricity, and the marked-based emissions related to the potential purchase of Guarantees of Origin (GoOs) and Renewable Energy Certificates (RECs).

The purpose of this amendment in the reporting methodology is on the one hand to show the impact of energy efficiency measures, and on the other hand to display how the acquisition of GoOs or RECs affect the GHG emissions. Using both methods in the emission reporting highlights the effect of all measures regarding electricity consumption.

The location-based method: The location-based method is based on statistical emissions information and electricity output aggregated and averaged within a defined geographic boundary and during a defined time period. Within this boundary, the different energy producers utilize a mix of energy resources, where the use of fossil fuels (coal, oil, and gas) result in direct GHG-emissions. These emissions are reflected in the location-based emission factor.

The market-based method: The choice of emission factors when using this method is determined by whether the business acquires GoOs/RECs or not. When selling GoOs or RECs, the supplier certifies that the electricity is produced exclusively by renewable sources, which has an emission factor of 0 grams CO_2e per kWh. However, for electricity without the GoO or REC, the emission factor is based on the remaining electricity production after all GoOs and RECs for renewable energy are sold. This is called a residual mix, which is normally substantially higher than the location-based factor. As an example, the market-based Norwegian residual mix factor is approximately 7 times higher than the location-based Nordic mix factor. The reason for this high factor is due to Norway's large export of GoOs/RECs to foreign consumers. In a

market perspective, this implies that Norwegian hydropower is largely substituted with an electricity mix including fossil fuels.

Scope 3 includes indirect emissions resulting from value chain activities. The scope 3 emissions are a result of the company's upstream and downstream activities, which are not controlled by the company, i.e. they are indirect. Examples are business travel, goods transportation, waste handling, consumption of products etc.

In general, the carbon accounting should include information that users, both internal and external to the company, need for their decision making. An important aspect of relevance is the selection of an appropriate inventory boundary which reflects the substance and economic reality of the company's business relationships.

Sources:

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The reference list above is incomplete but contains the essential references used in CEMAsys. In addition, several local/national sources may be relevant, depending on which emission factors are used.