

ATIONS

FOR GENERATIONS

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Carbon Accounting Report 2023

This report provides an overview of the organisation'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.

THIS REPORT COMPRISES THE FOLLOWING ORGANISATIONAL UNITS:

The input data is based on consumption data from internal and external sources, which are converted into tonnes CO₂-equivalents (tCO₂e). 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 14064-1.

REPORTING YEAR ENERGY AND GHG EMISSIONS

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions (tCO ₂ e)	% share
Transportation total				2,160.0	24.2	0.2 %
Diesel (NO)		10,641.0	liters	104.3	15.5	-
Diesel (NO)	Farget diesel	6,787.0	liters	66.5	35.8	-
Diesel (B7)		14,401.0	liters	142.1	1.5	-
Diesel (B7)	Blank diesel	605.0	liters	6.0	4.4	-
Diesel (SE)		2,400.0	liters	23.2	24.7	-
Diesel	Owned cars	9,281.0	liters	92.1	282.3	0.1 %
Diesel		106,150.9	liters	1,053.0	23.1	-
Diesel		23,086.0	kgCO ₂ e	86.1	2.1	-
Diesel	Pool cars	807.9	liters	8.0	0.9	-
Petrol (E7)		392.0	liters	3.5	95.3	-
Petrol		40,623.4	liters	374.5	10.3	-
Petrol		10,300.0	kgCO ₂ e	40.5	3.4	-
Petrol		384.0	gal(us)	13.4	4.3	-
Petrol	Pool cars	1,834.0	liters	16.9	2.5	-
Bioethanol (E85)		6,903.7	liters	44.3	17.6	-
Petrol (E27)		10,276.0	liters	85.5	17.6	-

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions (tCO ₂ e)	% share
Stationary combustion total				6,340.6	1,278.1	0.5 %
Natural gas		1,426,493.0	kWh	1,426.5	262.5	
Natural gas		355,210.6	m ³	3,569.9	729.5	
Natural gas (NL)		695.0	m ³	6.1	1.2	
Natural gas (US)		624,987.0	kWh	625.0	113.2	
LPG		457.0	liters	3.1	0.7	
LPG		352.0	kg	4.5	1.0	
Burning oil		43,207.0	liters	422.8	109.8	
Natural gas (UK grid)		181,138.0	kWh	181.1	33.1	
Propane (NO)		21.6	kg	0.3	0.1	
Propane		54.0	kg	0.7	0.2	
Fuel/Diesel oil		9,860.0	liters	100.6	26.7	
Chemical-process total				-	32.3	-
Aviform L50		5,000.0	liters	-	1.8	-
Aviform S-solid		3,000.0	kg	-	1.9	-
Acetylene, combusted		8,439.7	kg	-	28.5	-
Liquid Oxygene (LOx)		3,740.8	m ³	-	-	-
Arcal Force		1,006.3	kg	-	0.2	-
Scope 1 total		8,500.5		1,858.2		0.7%
Electricity total				10,045.8	2,280.5	0.9%
Electricity Norway		3,994,151.7	kWh	3,994.2	24.8	-
Electricity Denmark 125		199,740.9	kWh	199.7	24.8	-
Electricity Sweden		374,760.0	kWh	374.8	4.3	-
Electricity Switzerland		7,936.0	kWh	7.9	0.2	-
Electricity Japan		5,437.0	kWh	5.4	2.5	-
Electricity Germany		880,019.5	kWh	880.0	307.1	0.1 %
Electricity Germany	Cars	53,185.3	kWh	53.2	18.6	-
Electricity France		615,462.0	kWh	615.5	32.1	-
Electricity China		1,272,650.0	kWh	1,272.7	779.9	0.3 %
Electricity Korea		981.0	kWh	1.0	0.4	-
Electricity UK		737,430.0	kWh	737.4	152.1	0.1 %
Electricity USA		492,593.0	kWh	492.6	181.9	0.1 %
Electricity Singapore		11,111.2	kWh	11.1	4.3	-
Electricity Poland		97,115.4	kWh	97.1	63.2	-
Electricity Israel		30,916.0	kWh	30.9	13.7	-
Electricity Netherlands		14,043.6	kWh	14.0	4.4	-
Electricity India		733,120.0	kWh	733.1	525.4	0.2 %
Electricity Spain		9,500.0	kWh	9.5	1.4	-
Electricity Finland		65,713.3	kWh	65.7	5.2	-
Electricity Thailand		39,306.0	kWh	39.3	18.5	-
Electricity Malaysia		19,564.0	kWh	19.6	12.1	-
Electricity Romania		366,096.0	kWh	366.1	99.7	-
Electricity Brazil		21,087.0	kWh	21.1	2.8	-
Electricity Italy		3,854.0	kWh	3.9	1.1	-

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions (tCO ₂ e)	% share
Electricity general total				8,242.9	4.9	-
Hydropower, Quebec		8,242,881.0	kWh	8,242.9	4.9	
Electric vehicles total				0.4	0.3	
Electric car Nordic		393.4	kWh	0.4	-	-
Hybrid vehicles		2,400.0	km	-	0.3	-
District heating location total				240.5	18.0	-
District heating NO/Grimstad		13,967.0	kWh	14.0	0.7	-
District heating Sweden mix		5,700.0	kWh	5.7	0.3	-
District heating Finland mix		33,620.6	kWh	33.6	3.7	-
District heating NO/Trondheim		57,121.0	kWh	57.1	1.2	-
District heating NO/Oslo		99,221.0	kWh	99.2	0.9	-
District heating NO/Stavanger/Sandnes		21.5	kWh	-	-	-
District cooling NO/Stavanger/Sandnes		4.3	kWh	-	-	-
District heating Poland mix		30,855.2	kWh	30.9	11.4	-
Heat fuel specific total					-	-
District cooling, renewable		547.7	kWh	0.5	14.7	-
Heat fuel specific total					-	-
Heat Natural gas		79,764.8	kWh	79.8	14.7	-
Scope 2 total		18,609.9		2,318.4		0.9 %
Purchased goods and services total		-	kg	-	-	-
Cheese, soft (A1-3)		-	kg	-	-	-
Fuel-and-energy-related activities total		-	kg	-	1,302.9	0.5 %
Diesel (B7) (WTT)		26,432.0	liters		16.2	
Electricity Norway (upstream)		3,989,597.7	kWh		21.5	
Electricity Sweden (upstream)		314,376.0	kWh		4.4	
District heating NO/SE (upstream)		228,799.8	kWh		1.1	
Electricity Germany (upstream)		933,204.8	kWh		80.3	
Electricity Denmark (upstream)		199,740.9	kWh		9.7	
Diesel (SE) (WTT)		2,400.0	liters		1.4	
Electricity Finland (upstream)		65,713.3	kWh		2.3	
Natural gas (WTT)		2,256,158.8	kWh		75.5	
Natural gas (WTT)		360,017.6	m ³		121.2	
Electricity Canada (upstream)		8,242,881.0	kWh		269.5	0.1 %
Electricity France (upstream)		615,462.0	kWh		14.6	
Electricity China (upstream)		1,272,650.0	kWh		165.4	0.1 %
Electricity Korea (upstream)		981.0	kWh		0.1	
Diesel (WTT)		121,657.6	liters		75.9	
Electricity UK (upstream)		733,318.0	kWh		44.3	
Electricity USA (upstream)		492,593.0	kWh		47.6	

Electricity Singapore (upstream)	11,111.2	kWh		1.0	
Electricity Poland (upstream)	97,115.4	kWh		17.0	
Electricity Israel (upstream)	30,916.0	kWh		3.3	
Electricity Netherlands (upstream)	14,043.6	kWh		1.0	
Petrol (E5) (WTT)	392.0	liters		0.2	
Electricity Nordic mix (WTT)	-	kWh			
Diesel (B5) (WTT)	6,000.0	liters		3.7	
Petrol (WTT)	52,733.4	liters		32.0	
Petrol (WTT)	2,664.5	kgCO ₂ e		2.7	
Petrol (WTT)	384.0	gal(us)		0.9	
Heat & steam (upstream)	65,023.5	kWh		2.3	
Electricity Nordic mix (upstream)	393.4	kWh			
Electricity Spain (upstream)	9,500.0	kWh		0.5	
Electricity Switzerland (upstream)	7,936.0	kWh		0.1	
Electricity Japan (upstream)	5,437.0	kWh		0.6	
LPG (WTT)	457.0	liters		0.1	
LPG (WTT)	352.0	kg		0.1	
Electricity Malaysia (upstream)	19,564.0	kWh		3.2	
Electricity Thailand (upstream)	39,306.0	kWh		5.7	
Propane/Butane (WTT)	75.6	kg			
Electricity Romania (upstream)	366,096.0	kWh		29.7	
Electricity Italy (upstream)	3,854.0	kWh		0.3	
Electricity Brazil (upstream)	21,087.0	kWh		1.3	
Fuel oil (WTT)	9,860.0	liters		6.9	
E85 Bioethanol (WTT)	6,903.7	liters		4.0	
Burning oil (WTT)	43,207.0	liters		22.9	
Electricity India (upstream)	733,120.0	kWh		212.2	0.1 %
Upstream transportation and distribution total	246,757.0			96.8 %	
Electricity Norway (upstream)	81.9	tkm			
Truck avg.	36.1	tCO ₂ e		36.1	
Truck avg.	294,168.2	tkm		89.7	
Air freight avg. (WTT)	67,451.4	tCO ₂ e		67,451.4	26.5 %
Air freight avg. (WTT)	3.2	tCO ₂ e		3.2	
Rail freight	16,112.6	tkm		0.1	
Sea ship avg. (WTT)	179,168.9	tCO ₂ e		179,168.9	70.3 %
Sea ship avg. (WTT)	7.6	tCO ₂ e		7.6	
Transportation	2,256,158.8	kWh		75.5	

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions (tCO ₂ e)	% share
Waste total					291.6	0.1 %
Residual waste, incinerated		249.8	m ³		33.3	
Residual waste, incinerated		102,260.2	kg		56.3	
Wood waste, recycled		0.6	tonne			
Wood waste, recycled		132,523.2	kg		2.8	
Glass waste, recycled		3,814.3	kg		0.1	
Paper waste, recycled		7,116.6	m ³		23.1	
Paper waste, recycled		64,050.5	kg		1.4	
Plastic waste, recycled		117.0	m ³		0.2	
Plastic waste, recycled		24,483.6	kg		0.5	
EE waste, recycled		102.0	m ³		0.2	
EE waste, recycled		14,918.6	kg		0.3	
Mixed waste, recycled		17.0	m ³			
Mixed waste, recycled		73,554.0	kg		1.6	
Hazardous waste, recycled		76,706.8	kg		1.6	
Hazardous waste, treated		4,337.0	kg		0.1	
Cardboard waste, recycled		67,727.8	kg		1.4	
Hazardous waste, incinerated (Europe)		11,237.0	kg		27.0	
Commercial waste, landfill		8,700.0	kg		4.5	
Food loss		215.6	kg			
Hazardous waste, landfill		19,866.0	kg		0.4	
Residual waste, landfill		275.0	m ³		34.2	
Residual waste, landfill		53,638.4	kg		26.7	
Metal waste, recycled		13,401.0	m ³		37.0	
Metal waste, recycled		74,742.4	kg		1.6	
Organic waste, treated		252.0	tonne		5.4	
Organic waste, treated		16.0	m ³		0.2	
Organic waste, treated		29,979.0	kg		0.6	
Plastic packaging waste, recycled		21.0	kg			
Mineral oil waste, incinerated		600.0	liters		1.5	
Waste water treatment		2,891.0	m ³		0.6	
Industrial waste, recycled		1,682.4	kg			
Organic waste, recycled		6,426.1	kg		0.1	
Organic waste, anaerobic digestion		1,446.0	kg			
Wood waste, reused		14,821.0	kg		0.3	
Organic waste, composting		2,254.0	kg			
Sorted waste, recycled		7,200.0	kg		0.2	
CCA impregnated wood waste (H), incinerated		4,492.0	kg		0.1	
Metal copper waste, recycled		12,179.3	kg		0.3	
Mineral wool waste, landfill		1,752.0	kg			
Metal aluminium waste, recycled		3,064.2	kg		0.1	
Plastic EPS waste, incinerated		9,068.0	kg		21.5	
Metal stain steel waste, recycled		9,972.0	kg		0.2	
Plastic waste, incinerated		2,450.0	kg		5.8	
Fluorescent tubes waste (H), recycled			kg			

Special waste, treated	262.0	kg		
Plasterboard waste, recycled	3,240.0	kg		0.1
Mineral oil waste, recycled	180.0	kg		
Paint warnish waste (H), incinerated	140.0	kg		0.3
Business travel total				1,898.2 0.7 %
Air travel, continental, incl. RF	23,214.0	pkm		4.3
Air travel, continental, incl. RF	76.0	flight trip		15.7
Air travel, continental, incl. RF	15,514.0	kgCO ₂ e		15.5
Mileage all. avg. car	122,551.2	km		20.4
Mileage all. avg. car	181,729.0	mile		48.7
Air travel, domestic	142,697.0	pkm		23.0
Air travel, domestic	1,420.0	flight trip		105.8
Air travel, domestic	4.8	tCO ₂ e		4.8
Air travel, domestic	96,872.9	kgCO ₂ e		96.9
Air travel, domestic	523,546.0	pmile		109.5
Air travel, continental	357,102.0	pkm		39.2
Air travel, continental	124.0	flight trip		15.1
Air travel, continental	31.5	tCO ₂ e		31.5
Air travel, continental	122,825.8	kgCO ₂ e		122.8
Car, petrol (avg.)	259,321.0	km		42.5
Car, petrol (avg.)	21,742.0	liters		51.0
Air travel, intercontinental	908,926.0	pkm		140.2
Air travel, intercontinental	25.0	flight trip		25.0
Air travel, intercontinental	8.5	tCO ₂ e		8.5
Air travel, intercontinental	23,386.3	kgCO ₂ e		23.4
Mileage all. el car Nordic	9,239.3	km		
Mileage all. car (NO)	3,162.0	km		0.2
Mileage all. car (NO)	4,464.8	NOK		0.1
Taxi	216,211.6	km		45.0
Car, rental (fuel unknown)	76,776.0	km		12.8
Car, rental (fuel unknown)	53.0	kgCO ₂ e		0.1
Electric car EU27	834.0	km		
Air travel, domestic, incl. RF	19,170.0	pkm		5.2
Air travel, domestic, incl. RF	44.0	flight trip		5.6
Air travel, domestic, incl. RF	11,638.6	kgCO ₂ e		11.6
Train International	170,123.0	pkm		0.8
Train International	3,260.0	kgCO ₂ e		3.3
Hotel nights, world	7,984.0	nights		316.3
Car, diesel (avg.)	204,532.4	km		34.7
Car, diesel (avg.)	41,173.0	liters		109.5
Train, diesel	812,165.0	pkm		73.9
Hotel nights, Europe	2,358.0	nights		32.1
Car, Plugin Hybrid Electric Vehicle (PHEV)	4,671.9	km		0.4
Air travel, intercontinental, incl. RF	37,864.0	pkm		9.9
Air travel, intercontinental, incl. RF	2.0	flight trip		3.4

Air travel, intercontinental, incl. RF	12,616.0	kgCO ₂ e	12.6	
Train (FI)	266.0	pkm		
Flights	103.1	tCO ₂ e	103.1	
Flights	134,683.7	kgCO ₂ e	134.7	0.1 %
Bus regional	1,100.0	pkm		
Hotel nights, Nordic	386.0	nights	2.9	
Airport express train (NO)	72.0	trip		
Car travel	45,001.0	pkm	7.4	
Train (UK)	66.0	pkm		
Mileage all. el car EU27	3,381.0	km	0.2	
Bus (NO)	540.0	pkm		
Air travel, continental, EC	125,943.0	pkm	13.6	
Air travel, continental, BC	36.0	flight trip	6.5	
Mileage all. car (DK)	12,270.0	km	1.3	
Air travel, intercontinental, EC	61,574.0	pkm	7.3	
Employee commuting total			394.7	0.2 %
Car, petrol (avg.)	1,336,269.0	km	219.0	0.1 %
Car, Plugin Hybrid Electric Vehicle (PHEV)	62,643.0	km	5.9	
Car, diesel (avg.)	583,491.0	km	99.1	
Train (UK)	106,892.0	pkm	3.8	
Motorbike, small	3,002.0	km	0.2	
Car, petrol (medium)	291,310.0	km	51.9	
Car, Hybrid Electric Vehicle (HEV)	25,615.0	km	3.0	
Electric car EU27	204,000.0	km	9.1	
Bus local avg.	26,904.0	pkm	2.7	
Scope 3 total			250,644.5	98.4 %
Total	27,110.4		254,821.1	100.0 %
KJ	97,597,442,257.2		254,821.1	100.0 %

REPORTING YEAR MARKETBASED GHG EMISSIONS

Category	Unit	2023
Transportation total		
Electricity Total (Scope 2) with Marketbased calculations	tCO ₂ e	4,304.3
Scope 2 Total with Marketbased electricity calculations	tCO ₂ e	4,342.2
Scope 1+2+3 Total with Marketbased electricity calculations	tCO ₂ e	256,844.9

ANNUAL GHG EMISSIONS

Category	Description	2021	2022	2023	% change from last year
Transportation total		472.3	487.2	547.8	
Diesel		350.5	303.9	305.4	0.5 %
Diesel	Owned cars			24.7	100.0 %
Diesel	Pool cars			2.1	100.0 %
Diesel (B7)		29.6	26.3	35.8	36.1 %
Diesel (B7)	Blank diesel		2.1	1.5	28.6 %
Diesel (NO)			25.4	24.2	4.7 %
Diesel (NO)	Farget diesel		13.7	15.5	13.1 %
Diesel (SE)				4.4	100.0 %
Bioethanol (E85)			2.0	2.5	25.0 %
Petrol (E7)				0.9	100.0 %
Petrol		81.9	100.9	109.0	8.0 %
Petrol	Pool cars			4.3	100.0 %
Petrol (E27)		3.2	12.8	17.6	37.5 %
Diesel (B5)		7.1			
Autogas, LPG			0.1		100.0 %
Stationary combustion total		1,110.4	1,234.9	1,278.1	3.5 %
Natural gas		814.8	939.1	992.0	5.6 %
Natural gas (NL)				1.2	100.0 %
Natural gas (US)		123.7	138.3	113.2	18.1 %
Burning oil		135.9	109.4	109.8	0.4 %
LPG		8.6	3.6	1.7	52.8 %
Natural gas (UK grid)			30.8	33.1	7.5 %
Propane (NO)		0.2		0.1	100.0 %
Propane			0.1	0.2	100.0 %
Fuel/Diesel oil		27.2	13.5	26.7	97.8 %
Chemical process total		1.4	17.8	32.3	81.5 %
Acetylene, combusted		1.4	13.0	28.5	119.2 %
Aviform L50			4.2	1.8	57.1 %
Aviform Ssolid		123.7	0.6	1.9	216.7 %
Arcal Force		135.9		0.2	100.0 %
Refrigerants total		1.4	4.2	32.3	100.0 %
R410 A		1.4	4.2	28.5	100.0 %
Scope 1 total		1,584.2	1,744.1	1,858.2	6.5 %

Category	Description	2021	2022	2023	% change from last year
Electricity location based total		2,760.2	2,442.0	2,280.8	6.6 %
Electricity Norway		38.0	26.8	24.8	7.5 %
Electricity Denmark 125		1.6	22.8	24.8	8.8 %
Electricity Sweden		0.5	0.6	4.3	616.7 %
Electricity Switzerland		0.3	0.2	0.2	
Electricity Japan		3.6	4.4	2.5	43.2 %
Electricity Germany		268.8	211.5	307.1	45.2 %
Electricity Germany	Cars		3.3	18.6	463.6 %
Electricity France		43.2	35.6	32.1	9.8 %
Electricity China		1,266.0	1,129.0	779.9	30.9 %
Electricity Korea		0.6	0.5	0.4	20.0 %
Electricity UK		24.5	142.0	152.1	7.1 %
Electricity USA		187.4	147.4	181.9	23.4 %
Electricity Singapore				4.3	100.0 %
Electricity Poland		59.1	7.0	63.2	802.9 %
Electricity Israel				13.7	100.0 %
Electricity Netherlands				4.4	100.0 %
Electricity India		735.7	599.7	525.4	12.4 %
Electricity Thailand		14.0	16.9	18.5	9.5 %
Electricity Spain		0.6	0.2	1.4	600.0 %
Electricity Finland			3.4	5.2	52.9 %
Electricity Malaysia		14.6	10.4	12.1	16.3 %
Electricity Romania		98.3	75.9	99.7	31.4 %
Electricity Brazil		1.4	1.9	2.8	47.4 %
Electricity Italy		1.6	1.8	1.1	38.9 %
Electric car Nordic			0.1		100.0 %
Hybrid vehicles		0.3	0.4	0.3	25.0 %
Electricity general total		4.1	4.7	4.9	4.3 %
Hydropower, Quebec		4.1	4.7	4.9	4.3 %
District heating location total		10.1	23.5	18.0	23.4 %
District heating NO/Grimstad			0.2	0.7	250.0 %
District heating SE/Jonkoping		2.2	1.8		100.0 %
District heating NO/Oslo		1.1		0.9	100.0 %
District heating Sweden mix		0.5	0.6	0.3	50.0 %
District heating Finland mix				3.7	100.0 %
District heating DE/Karlsruhe			1.1		100.0 %
District heating SE/Stockholm		0.5			
District heating NO/Trondheim		5.9	11.5	1.2	89.6 %
District heating Poland mix			8.4	11.4	35.7 %
District heating general total		13.9			
District heating CHP		13.9			

Heat fuel specific total	49.9	14.7	70.5%	
District heating CHP	49.9	14.7	100.0%	
Scope 2 total	2,838.2	2,470.2	6.1 %	
Purchased goods and services total	0.7			
Water supply, groundwater	0.7			
Fuel and energy related activities total	1,562.9	1,398.1	1,302.9	6.8 %
Electricity Norway (upstream)	13.7	7.6	21.5	182.9 %
Diesel (WTT)	88.8	87.1	75.9	12.9 %
Diesel (B7) (WTT)		5.3	16.2	205.7 %
Electricity Sweden (upstream)	0.1	0.2	4.4	2,100.0 %
District heating NO/SE (upstream)	2.7	2.0	1.1	45.0 %
Electricity Germany (upstream)	50.0	61.7	80.3	30.1 %
Electricity Denmark (upstream)	0.8	4.0	9.7	142.5 %
Diesel (SE) (WTT)			1.4	100.0 %
Electricity Finland (upstream)		0.9	2.3	155.6 %
Natural gas (WTT)	167.8	166.6	196.7	18.1 %
Electricity Canada (upstream)	284.2	277.2	269.5	2.8 %
Electricity France (upstream)	9.0	11.1	14.6	31.5 %
Electricity China (upstream)	409.5	330.0	165.4	49.9 %
Electricity Korea (upstream)	0.2	0.1	0.1	
Electricity UK (upstream)	9.0	45.9	44.3	3.5 %
Electricity USA (upstream)	48.2	42.7	47.6	11.5 %
Electricity Singapore (upstream)			1.0	100.0 %
Electricity Poland (upstream)	19.2	2.1	17.0	709.5 %
Electricity Israel (upstream)			3.3	100.0 %
Electricity Netherlands (upstream)			1.0	100.0 %
Diesel (B5) (WTT)	1.7	15.7	3.7	76.4 %
Petrol (E5) (WTT)			0.2	100.0 %
Electricity Nordic mix (WTT)				
Petrol (WTT)	22.0	40.4	35.5	12.1 %
Heat & steam (upstream)	2.6	1.0	2.3	130.0 %
Electricity Nordic mix (upstream)				
Electricity Spain (upstream)	0.2	0.1	0.5	400.0 %
Electricity Switzerland (upstream)	0.1	0.1	0.1	
Electricity Japan (upstream)	1.0	1.3	0.6	53.8 %
LPG (WTT)	1.0	0.4	0.2	50.0 %
Electricity India (upstream)	339.9	230.0	212.2	7.7 %
Electricity Malaysia (upstream)	4.7	3.2	3.2	
Electricity Thailand (upstream)	4.5	5.1	5.7	11.8 %
Propane/Butane (WTT)				
Electricity Romania (upstream)	45.6	26.2	29.7	13.4 %
Electricity Italy (upstream)	0.6	0.5	0.3	40.0 %
Electricity Brazil (upstream)	0.5	0.8	1.3	62.5 %
Burning oil (WTT)	28.3	22.8	22.9	0.4 %
Fuel oil (WTT)	7.0	3.5	6.9	97.1 %
E85 Bioethanol (WTT)		2.5	4.0	60.0 %

Category	Description	2021	2022	2023	% change from last year
Upstream transportation and distribution total				246,757.0	100.0 %
Electricity Norway (upstream)					100.0 %
Truck avg.				36.1	100.0 %
Air freight avg. (WTT)				67,541.1	100.0 %
Rail freight				3.2	100.0 %
Sea ship avg. (WTT)				179,169.0	100.0 %
Transportation				7.6	45.2 %
Waste total		79.1	149.3	291.6	95.3 %
Residual waste, incinerated		35.0	50.5	89.7	77.6 %
Wood waste, recycled		0.9	1.0	2.8	180.0 %
Glass waste, recycled				0.1	100.0 %
Paper waste, recycled		0.6	0.9	24.4	2,611.1 %
Plastic waste, recycled		0.4	0.8	0.7	12.5 %
EE waste, recycled			0.3	0.6	100.0 %
Mixed waste, recycled		6.2	0.6	1.6	166.7 %
Hazardous waste, recycled		0.3	0.5	1.6	220.0 %
Hazardous waste, reused					
Hazardous waste, treated			1.0	0.1	90.0 %
Cardboard waste, recycled		0.7	1.1	1.4	27.3 %
Residual waste, landfill		19.3	46.0	60.8	32.2 %
Hazardous waste, incinerated (Europe)		4.1	9.2	27.0	193.5 %
Commercial waste, landfill			4.4	4.5	2.3 %
Hazardous waste, landfill		0.3	0.2	0.4	100.0 %
Metal waste, recycled		1.4	4.1	38.6	841.5 %
Organic waste, treated		0.2	0.7	6.2	785.7 %
Waste water treatment		2.3	1.1	0.6	45.5 %
Plastic packaging waste, recycled					
Mineral oil waste, incinerated			12.5	1.5	88.0 %
Industrial waste, recycled			0.1		100.0 %
Organic waste, recycled				0.1	100.0 %
Wood waste, reused				0.3	100.0 %
Sorted waste, recycled			0.2	0.2	
CCA impregnated wood waste (H), incinerated				0.1	100.0 %
Metal copper waste, recycled			0.2	0.3	50.0 %
Metal aluminium waste, recycled				0.1	100.0 %
Plastic EPS waste, incinerated				21.5	100.0 %
Metal stain steel waste, recycled				0.2	100.0 %
Plastic waste, incinerated		7.2	0.8	5.8	625.0 %
Wood waste, incinerated		0.1	0.3		100.0 %
Plasterboard waste, recycled				0.1	100.0 %
Hazardous waste, incinerated (GLO)			12.8		100.0 %
Paint warnish waste (H), incinerated				0.3	100.0 %

Category	Description	2021	2022	2023	% change from last year
Business travel total		543.2	1,457.3	1,898.2	30.3 %
Hand sanitizer					
Air travel, continental, incl. RF		38.0	308.9	35.5	88.5 %
Mileage all. avg. car		60.7	80.1	69.1	13.7 %
Air travel, domestic		75.0	132.8	340.0	156.0 %
Air travel, domestic, incl. RF		48.0	120.3	22.4	81.4 %
Air travel, continental		6.6	46.6	208.6	347.6 %
Car, petrol (avg.)			28.6	93.5	226.9 %
Air travel, intercontinental		27.0	68.6	197.0	187.2 %
Flights		58.5	231.3	237.8	2.8 %
Hotel nights, Europe		32.1	26.6	32.1	20.7 %
Air travel, intercontinental, BC, incl. RF			27.8		100.0 %
Air travel, intercontinental, incl. RF			73.7	25.9	64.9 %
Mileage all. car (NO)			2.4	0.3	87.5 %
Taxi		3.6	26.8	45.0	67.9 %
Car, rental (fuel unknown)		0.1	5.0	12.8	156.0 %
Train International		0.6	0.5	4.0	700.0 %
Hotel nights, world		146.0	220.8	316.3	43.3 %
Car, diesel (avg.)				144.2	100.0 %
Train, diesel		31.8	32.5	73.9	127.4 %
Car, Plugin Hybrid Electric Vehicle (PHEV)				0.4	100.0 %
Air travel, continental, EC		3.6	11.6	13.6	17.2 %
Bus (NO)					
Hotel nights, Nordic		2.4	1.4	2.9	107.1 %
Car (avg.) DEFRA		8.5			
Car travel			3.2	7.4	131.3 %
Mileage all. el car EU27				0.2	100.0 %
Mileage all. car (DK)		0.9		1.3	100.0 %
Air travel, intercontinental, EC			4.8	7.3	52.1 %
Air travel, continental, BC			3.0	6.5	116.7 %
Employee commuting total			298.5	394.7	32.2 %
Car, petrol (avg.)			184.9	219.0	18.4 %
Car, Plugin Hybrid Electric Vehicle (PHEV)			0.1	5.9	5,800.0 %
Car, diesel (avg.)			47.9	99.1	106.9 %
Train (UK)				3.8	100.0 %
Motorbike, small				0.2	100.0 %
Car, petrol (medium)			56.2	51.9	7.7 %
Car, Hybrid Electric Vehicle (HEV)				3.0	100.0 %
Electric car EU27			6.5	9.1	40.0 %
Bus local avg.			2.8	2.7	3.6 %
Scope 3 total		2,186.0	3,303.2	250,644.5	7,487.9 %
Total		6,608.3	7,517.4	254,821.1	3,289.8 %
Percentage change		100.0 %	13.8 %	3,289.8 %	6.1 %

ANNUAL ENERGY CONSUMPTION (MWH) SCOPE 1 & 2



Category	Unit	2021	2022	2023
Electricity Total (Scope 2) with Market based calculations	tCO ₂ e	4,231.2	4,139.5	4,304.3
Scope 2 Total with Marketbased electricity calculations	tCO ₂ e	4,309.5	4,168.2	4,342.2
Scope 1+2+3 Total with Marketbased electricity calculations	tCO ₂ e	8,079.6	9,215.5	256,844.9
Percentage change		100.0 %	14.1 %	2,687.1 %

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 CO₂-equivalents: CO₂, CH₄ (methane), N₂O (laughing gas), SF₆, 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.

Average emission factors for fossil fuel, stationary combustion and refrigerants are based on The Department For Environment, Food, and Rural Affairs, DEFRA (DEFRA, 2023). Country-specific emission factors are based on Drivmedel 2023 (Energimyndigheten, 2023), Norwegian Environmental Agency 2023 and EPA 2023.

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 Cemsys 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 market-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 CO₂e 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.

Most emission factors used for calculating waste generated in own operations are published by EcoInvent 3.9 (2023), while business travel and fuel-and-energy-related activities are derived from DEFRA (DEFRA, 2023) and IEA (2023).

Following the GHG Protocol, emissions are calculated using the 100-year Global Warming Potential (GWP) from the IPCC Assessment Reports recommended in emission factor sources.

SOURCES

Department for Business, Energy & Industrial Strategy (2022). Government emission conversion factors for greenhouse gas company reporting (DEFRA) IEA (2022). Emission Factors database, International Energy Agency (IEA), Paris. IMO (2020). Reduction of GHG emissions from ships - Third IMO GHG Study 2014 (Final report). International Maritime Organisation, <https://www.imo.org/wp-content/uploads/2014/02/MEPC-67-6-INF3-2014-Final-Report-complete.pdf> IPCC (2014). IPCC fifth assessment report: Climate change 2013 (AR5 updated version November 2014). [ipcc.ch/report/ar5/AIB_RE-DISS](https://www.ipcc.ch/report/ar5/AIB_RE-DISS) (2020). Reliable disclosure systems for Europe – Phase 2: European residual mixes. WBCSD/WRI (2004). The greenhouse gas protocol. A corporate accounting and reporting standard (revised edition). World Business Council on Sustainable Development (WBCSD), Geneva, Switzerland /World Resource Institute (WRI), Washington DC, USA, 116 pp. WBCSD/WRI (2011). Corporate value chain (Scope 3) accounting and reporting standard: Supplement to the GHG Protocol corporate accounting and reporting standard. World Business Council on Sustainable Development (WBCSD), Geneva, Switzerland /World Resource Institute (WRI), Washington DC, USA, 149 pp. WBCSD/WRI (2015). GHG protocol Scope 2 guidance: An amendment to the GHG protocol corporate standard. World Business Council on Sustainable Development (WBCSD), Geneva, Switzerland /World Resource Institute (WRI), Washington DC, USA, 117 pp. 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.

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