



Carbon Accounting Report 2022

Mapei AS

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-I.

Reporting Year Energy and GHG Emissions

Emission source	Description	Consumption	Unit	Energy (MWh)	Emissions tCO ₂ e	% share
Stationary combustion total				159.2	5.1	0.7 %
Biodiesel (100%), ME, stationary		15,394.0	liters	147.3	2.6	0.3 %
LPG		867.0	kg	11.9	2.5	0.3 %
Transportation total				1,274.8	309.2	39.4 %
Diesel		3,401.0	liters	36.3	9.2	1.2 %
Diesel (B5)	Firmabiler	76,167.0	liters	807.4	195.9	25.0 %
Petrol	Firmabiler	44,492.0	liters	431.1	104.1	13.3 %
Refrigerants total				-	6.7	0.9 %
R-407 C		3.8	kg	-	6.7	0.9 %
Scope 1 total				1,434.0	321.1	41.0 %
Electricity total				8,867.7	62.1	7.9 %
Electricity Norway		8,867,677.2	kWh	8,867.7	62.1	7.9 %
Electricity general total				456.7	-	-
Electricity Geothermal		456,659.0	kWh	456.7	-	-
Electric vehicles total				16.4	0.4	0.1 %
Electric car Nordic		16,431.0	kWh	16.4	0.4	0.1 %
Scope 2 total				9,340.8	62.5	8.0 %
Waste total				-	214.0	27.3 %
Water supply, groundwater		25,327.0	m ³	-	14.6	1.9 %
Waste water treatment	vaskevann Produksjon til deponi	1,293,000.0	kg	-	0.4	-
Waste water treatment		8,081.0	m ³	-	2.2	0.3 %
Hazardous waste, treated	Vaskevann fra Produksjon til rens og forbrenning	187,000.0	kg	-	4.0	0.5 %
Residual waste, incinerated		64,010.0	kg	-	32.1	4.1 %
Paper waste, recycled		36,453.0	kg	-	0.8	0.1 %
Metal waste, recycled		30,930.0	kg	-	0.7	0.1 %
Organic waste, treated		3,370.0	kg	-	0.1	-
Plastic waste, recycled		42,950.0	kg	-	0.9	0.1 %
Wood waste, recycled		120,850.0	kg	-	2.6	0.3 %
Industrial inert waste, landfill	Mørtelstøv	426,240.0	kg	-	0.5	0.1 %
Hazardous waste, incinerated		56,264.0	kg	-	136.0	17.3 %
Waste, Transportation	Uorganisk vaskevann	16.7	tCO ₂ e	-	16.7	2.1 %
Waste, Transportation	Organisk vaskevann	2.5	tCO ₂ e	-	2.5	0.3 %
EE waste, recycled		1,161.0	kg	-	-	-
Glass waste, recycled		-	kg	-	-	-
Business travel total				-	186.3	23.8 %
Mileage all. car (NO)		35,424.5	km	-	2.7	0.3 %
Air travel, intercontinental, incl. RF		-	pkm	-	-	-
Air travel, domestic, incl. RF		662,119.0	pkm	-	162.8	20.8 %
Air travel, continental, incl. RF		135,670.0	pkm	-	20.8	2.7 %
Mileage all. el car Nordic		2,412.4	km	-	-	-
Scope 3 total				-	400.3	51.1 %
Total				10,774.7	783.9	100.0 %

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38,788,984,872.0

Reporting Year Market-Based GHG Emissions

Category	Unit	2022
Electricity Total (Scope 2) with Market-based calculations	tCO ₂ e	3,591.4
Scope 2 Total with Market-based electricity calculations	tCO ₂ e	3,591.8
Scope 1+2+3 Total with Market-based electricity calculations	tCO ₂ e	4,313.2

The greenhouse gas emissions in 2022 had the following mix:

Scope 1:	321.1 tCO ₂ e (40.96 %)
Scope 2:	62.5 tCO ₂ e (7.97 %)
Scope 3:	400.3tCO ₂ e (51.07 %)
Total 2022:	783.9 tCO ₂ e

Reduction / increase from previous year?

Scope 1 saw a reduction of -6.7 % in 2022 compared to 2021, Scope 2 was reduced by 30.9 % from the previous year, while scope 3 had a reduction of 5 % from 2021 to 2022. This leaves a total of 8.4 % emission reduction overall, despite a revenue increase.

Scope 1:

GHG emissions in scope 1 decreased by 6.7 % from 2021 to 2022. This includes direct emissions from the combustion of fuels, transportation, and refrigerants. The total fuel consumption from Mapei's stationary combustion is equivalent to the emission of 5.1 tCO₂e. The total emission of fossil fuel for transportation in 2022 is 309.2 tCO₂e from the consumption of 124060 liters.

Scope 2:

This includes emissions from the measured use of electricity in company-owned or leased locations. The overall emissions from electricity, using a location-based method, are 62.5 tCO₂e. The emission factors used to calculate emissions from electricity use statistics from the International Energy Agency (IEA/OECD) are updated annually based on changes in the energy mix in individual countries. From 2021 to 2022, there was a 30 % decrease in EF value due to lower share of natural gas in electricity production in favor of hydro energy. This change resulted in a 31.3 % reduction in emissions from electricity in 2021, even though kWh consumption was only reduced by 3.62 %. This year Electric vehicles was included in the reporting, making up 0.4 tCO₂e of the total scope 2 emissions.

Based on the market-based method, Mapei's GHG emissions in scope 2 were 4313.2 tCO₂e, which is a decrease of 1.9 % from 2021. The emissions from electricity using a market-based emission factor for 2022 are presented at the top of page 3 of this report, and annual market-based emissions on page 5. The purpose of presenting the emissions from electricity consumption with two different emission factors is further explained under Scope 2 in the Method section. The emissions from Refrigerants were 6.7 tCO₂e in 2022.

Scope 3:

Overall scope 3 emissions saw a decrease from 2021 with emissions reducing from 421.3 tCO₂e to 400.3 tCO₂e, equivalent to 5 %.

Business travel: Measured in person-kilometer (pkm). The mileage information is retrieved from the travel

agency, as well as internal reporting through travel receipts. Emission factors for 2022 takes radiative forcing into account, meaning that with the RF factor, the emissions include both direct (CO₂, CH₄ and N₂O) and indirect (non-CO₂ emissions e.g., water vapour, contrails, NO_x) climate change effects. This provides more accurate representation of the GHG emissions. Business travel saw an increase of 161.5 % from 2021 to 2022, from 71.2 tCO₂e to 186.3 tCO₂e. This can be explained by the reduction of Covid-19 restrictions, making 2022 a normal travel year. Comparing 2018- 2019 with 2022 number there would be an increase of 16 % emission, making 2020-2021 an exception.

Waste: Reported waste in kilo divided into different waste fractions, as well as treatment methods (recycled, energy recovered, landfilled). The reported emissions on waste in 2022 was 214 tCO₂e, a decrease of 36.44 % from 2021.

Key performance indicators

FTE: Total tCO₂ emission per man-hour was 3.769 a decrease of 5.75 % from 2021.

Revenue: Total tCO₂e emissions from MNOK turnover was 0.658 a decreased of 22.22 % from 2021.

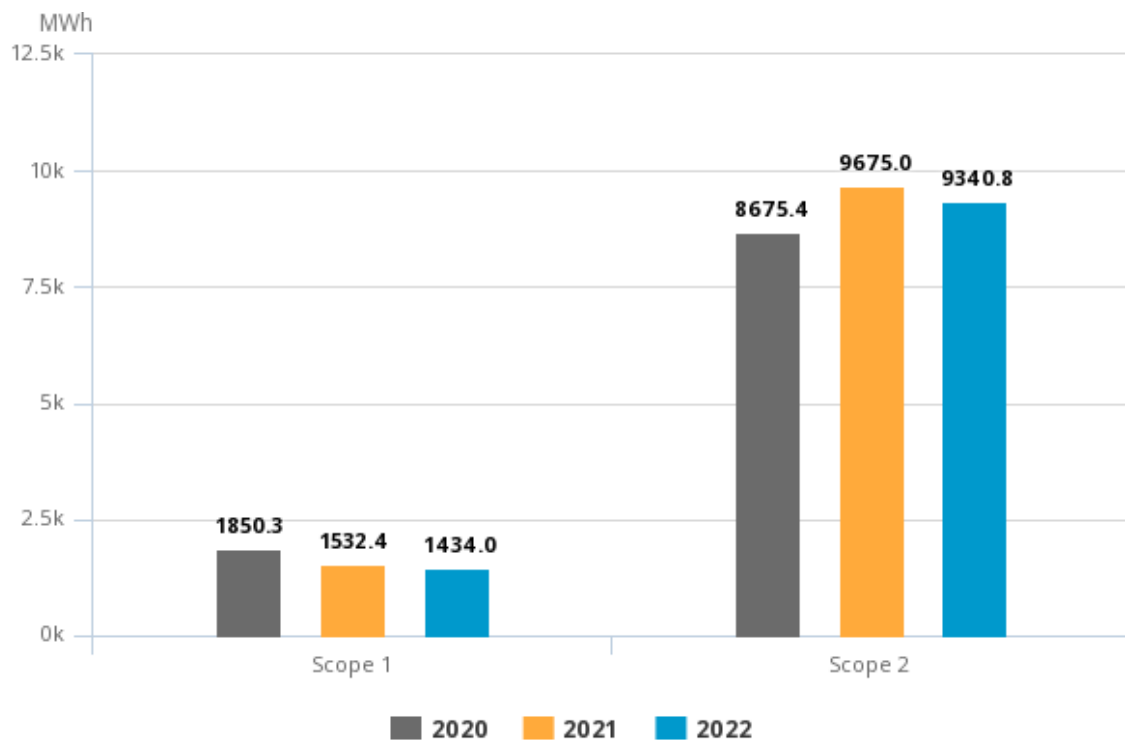
All numbers less than 0.1 are marked with "-" in the report.

Annual GHG Emissions

Category	Description	2020	2021	2022	% change from previous year
Stationary combustion total		74.5	8.0	5.1	-35.9 %
Burning oil		71.0	-	-	-
LPG		3.5	3.7	2.5	-32.0 %
Biodiesel (100%), ME, stationary		-	4.3	2.6	-39.4 %
Transportation total		373.9	308.7	309.2	0.2 %
Diesel (B5)	Firmabiler	260.7	183.5	195.9	6.8 %
Petrol	Firmabiler	113.2	113.5	104.1	-8.3 %
Diesel		-	11.8	9.2	-22.0 %
Refrigerants total		-	27.5	6.7	-75.4 %
R-404 A		-	27.5	-	-100.0 %
R-407 C		-	-	6.7	100.0 %
Scope 1 total		448.4	344.2	321.1	-6.7 %
Electricity total		322.9	90.4	62.1	-31.3 %
Electricity Nordic (M)		322.9	-	-	-
Electricity Norway		-	90.4	62.1	-31.3 %
Electricity general total		-	-	-	-
Electricity Geothermal		-	-	-	-
Electricity (Market based) total		-	-	-	-
Electricity Norway (residual)		-	-	-	-
Electric vehicles total		-	-	0.4	-
Electric car Nordic		-	-	0.4	100.0 %
Scope 2 total		322.9	90.4	62.5	-30.9 %
Business travel total		73.6	71.2	186.3	161.5 %
Air travel, intercontinental, incl. RF		11.3	-	-	-
Air travel, domestic, incl. RF		48.9	64.0	162.8	154.2 %
Air travel, continental, incl. RF		8.1	4.4	20.8	375.6 %
Mileage all. car (NO)		5.2	2.8	2.7	-5.6 %
Mileage all. el car Nordic		-	-	-	100.0 %
Waste total		307.1	336.7	214.0	-36.4 %
Residual waste, incinerated		34.3	41.2	32.1	-22.0 %
Paper waste, recycled		1.0	0.9	0.8	-15.0 %
Metal waste, recycled		0.5	0.7	0.7	-9.3 %
Organic waste, treated		-	-	0.1	90.9 %
Plastic waste, recycled		1.2	1.0	0.9	-10.0 %
Wood waste, recycled		3.1	3.1	2.6	-17.7 %
Industrial inert waste, landfill	Mørtelstøv	0.7	0.6	0.5	-20.7 %
Hazardous waste, incinerated		240.5	253.7	136.0	-46.4 %
Waste water treatment		3.5	2.1	2.2	3.4 %
Waste water treatment	vaskevann Produksjon til deponi	-	-	0.4	100.0 %
Waste, Transportation	Vaskevann, uorganisk	18.3	16.0	-	-100.0 %
Waste, Transportation	Vaskevann, organisk	4.0	3.8	-	-100.0 %
Waste, Transportation	Uorganisk vaskevann	-	-	16.7	100.0 %
Waste, Transportation	Organisk vaskevann	-	-	2.5	100.0 %
EE waste, recycled		-	-	-	-32.0 %
Glass waste, recycled		-	-	-	-

Water supply, groundwater	-	13.3	14.6	9.6 %	
Hazardous waste, treated	Vaskevann fra Produksjon til rens og forbrenning	-	-	4.0	100.0 %
Water consumption total		11.1	13.3	-	20.1 %
Water supply, groundwater		11.1	13.3	-	-100.0 %
Scope 3 total		391.8	421.3	400.3	-5.0 %
Total		1,163.1	855.8	783.9	-8.4 %
Percentage change		100.0 %	-26.4 %	-8.4 %	

Annual energy consumption (MWh) Scope 1 & 2



Annual Market-Based GHG Emissions

Category	Unit	2020	2021	2022
Electricity Total (Scope 2) with Market-based calculations	tCO ₂ e	1,961.1	3,633.5	3,591.4
Scope 2 Total with Market-based electricity calculations	tCO ₂ e	1,961.1	3,633.5	3,591.8
Scope 1+2+3 Total with Market-based electricity calculations	tCO ₂ e	2,801.3	4,398.9	4,313.2
Percentage change		100.0 %	57.0 %	-1.9 %

Annual Key Energy and Climate Performance Indicators

Name	Unit	2020	2021	2022	% change from previous year
Scope 1 + 2 emissions (tCO ₂ e)		771.3	434.5	383.6	-11.7 %
Total emissions (s1+s2+s3) (tCO ₂ e)		1,163.1	855.8	783.9	-8.4 %
Total energy scope 1 + 2 (MWh)		10,525.7	11,207.5	10,774.7	-3.9 %
Sum energy per location (MWh)		8,675.4	9,675.0	9,340.8	-3.5 %
Sum square meters (m ²)		24,000.0	24,000.0	-	-100.0 %
Sum locations kWh/m ²		361.5	403.1	-	-100.0 %
S1+S2 tCO ₂ e/Årsverk		3.6	2.0	1.8	-9.2 %
S1+S2 CO ₂ e/Omsetning		0.8	0.4	0.3	-25.1 %
S1+S2 tCO ₂ e/produisert volum		6.2	3.4	-	-100.0 %
S1+S2+S3 tCO ₂ e/Årsverk		5.5	4.0	3.8	-5.8 %
S1+S2+S3 CO ₂ e/Omsetning		1.2	0.8	0.7	-22.3 %
S1+S2+S3 tCO ₂ e/produisert volum		9.4	6.6	-	-100.0 %
MWh/FTE		49.3	52.4	51.8	-1.1 %
Revenue	MNOK	933.6	1,011.0	1,191.6	17.9 %
FTE		213.3	214.0	208.0	-2.8 %
Produced volume	1000 tonn	124.2	129.7	-	-100.0 %

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.

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 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.

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.

IEA (2022). Electricity information, International Energy Agency (IEA), Paris.

Ecoinvent 3.8 and 3.9.1. Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment.

IMO (2020). Reduction of GHG emissions from ships - Third IMO GHG Study 2014 (Final report). International Maritime Organisation, <http://www.iadc.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). <http://www.ipcc.ch/report/ar5/>

AIB, RE-DISS (2022). 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.