



its operations in Norway and in Sweden

The input data is based on information from internal and external data sources and then converted into tonnes. The analysis is based on the international standard corporate reporting standard developed by the Greenhouse Gas Reporting Initiative (GHRI) protocol, which is the most important standard or baseline for greenhouse gas emissions and was the basis for the standard.

#### Data coverage:

The coverage of the carbon footprint is based on the data provided by the companies in the portfolio. The data is based on the GHRI protocol, which is the most important standard or baseline for greenhouse gas emissions and was the basis for the standard.

## Energy and GHG emissions 2018

Category	Description	Consumption	Unit	Energy (MWh eqv)	Emissions (tCO2e)	Emissions (distribution)
<i>Transportation</i>				-	-	-
Diesel (B5)		-	liters	-	-	-
<b>Scope 1 total</b>				-	-	-
<i>Electricity*</i>				3 158.7	142.1	12.2%
Electricity Nordic mix	Göteborg	26 083.0	kWh	26.1	1.2	0.1%
Electricity Nordic mix	Jonköping	12 058.0	kWh	12.1	0.5	-
Electricity Nordic mix	Linköping	12 000.0	kWh	12.0	0.5	-
Electricity Nordic mix	Lysaker	2 256 991.0	kWh	2 257.0	101.6	8.8%
Electricity Nordic mix	Malmö	59 983.0	kWh	60.0	2.7	0.2%
Electricity Nordic mix	Stockholm	746 454.0	kWh	746.5	33.6	2.9%
Electricity Nordic mix	Sundsvall	15 210.0	kWh	15.2	0.7	0.1%
Electricity Nordic mix	Västerås	29 970.0	kWh	30.0	1.3	0.1%
<i>DH Nordic locations</i>				2 440.2	59.6	5.1%
District heating SE/Göteborg		22 550.0	kWh	22.6	1.0	0.1%
District heating SE/Stockholm		509 110.0	kWh	509.1	18.4	1.6%
District heating Sweden mix		22 000.0	kWh	22.0	1.3	0.1%
District cooling SE/Stockholm		125 352.0	kWh	125.4	6.9	0.6%
District heating NO/Lysaker		1 643 800.0	kWh	1 643.8	27.9	2.4%
District heating SE/Linköping		22 000.0	kWh	22.0	0.6	0.1%
District heating SE/Vasteras		37 960.0	kWh	38.0	0.8	0.1%
District heating SE/Malmo		28 000.0	kWh	28.0	2.5	0.2%
District cooling SE/Goteborg		18 150.0	kWh	18.2	-	-
District heating SE/Sundsvall		11 298.0	kWh	11.3	0.1	-
<b>Scope 2 total</b>				5 599.0	201.7	17.4%
<i>Air travel</i>				-	842.9	72.6%
Flights		842.9	tCO2	-	842.9	72.6%
<i>Business travel</i>				19.6	36.6	3.2%
Taxi		1 444 474.0	NOK	-	8.9	0.8%
Train (SE)		279 638.0	pkm	19.6	1.8	0.2%
Mileage all. car (NO)		184 311.0	km	-	25.8	2.2%
Mileage all. electric car (NO)		22 672.0	km	-	0.2	-
<i>Waste</i>				-	33.9	2.9%
Waste, energy recovered		60 889.0	kg	-	30.6	2.6%
Paper,recycled		43 434.0	kg	-	0.9	0.1%
Glas,recycled		11 135.0	kg	-	0.2	-
Metal,recycled		1 569.0	kg	-	-	-
Organic,recycled		80 748.0	kg	-	1.7	0.1%
Plastic,recycled		7 408.0	kg	-	0.2	-
WEEE,recycled		528.0	kg	-	-	-
Special waste	Annet avfall	10 787.0	kg	-	0.2	-
<i>Kmgodtgjorelse(SE)</i>				187.6	45.3	3.9%
Diesel (B5)		4 776.5	liters	50.5	12.2	1.1%
Petrol		14 329.4	liters	137.1	33.0	2.8%
Mileage all. electric car (NO)		14 294.0	km	-	0.1	-
<b>Scope 3 total</b>				207.2	958.8	82.6%
<i>Total</i>				5 806.2	1 160.5	100.0%
<i>*Alternative Electricity emissions-Market based method (RECs, GoO)</i>						

**Scope 1**

No company cars or combustion of fossil fuels.

**Scope 2**

Electricity: The table shows emissions from electricity with the location-based emission factor Nordic Mix. Notably, the emission factor is reduced by 14% since 2017, because of more renewable production of electricity in the Nordic region. Electricity with a market-based emission factor, called Market-based electricity (GoO & residual), is presented in the star \*.

Guaranties of Origin (GoO) has been purchased for 99% of the electricity consumption in the 2016-2018 period, for consumption with GoO, the emission factor is zero. Consumption of electricity without GoO's have the emissions factor Nordic Residual Mix is used (Ref:RE-DISS).

This new practice of presenting electricity with two different emissions factors was introduced in 2015. This is further explained under Scope 2 in Methodology and sources.

District heating and cooling: Consumption of energy from district heating and cooling per location reported.

**Scope 3**

Air travel: Annual emissions from air travel reported from travel agency.

Mileage allowance: Emissions from traveling with employees' own vehicles from mileage allowance, reported in km.

Waste: Reported annual waste generation in kg per type and recycling or incineration processes.

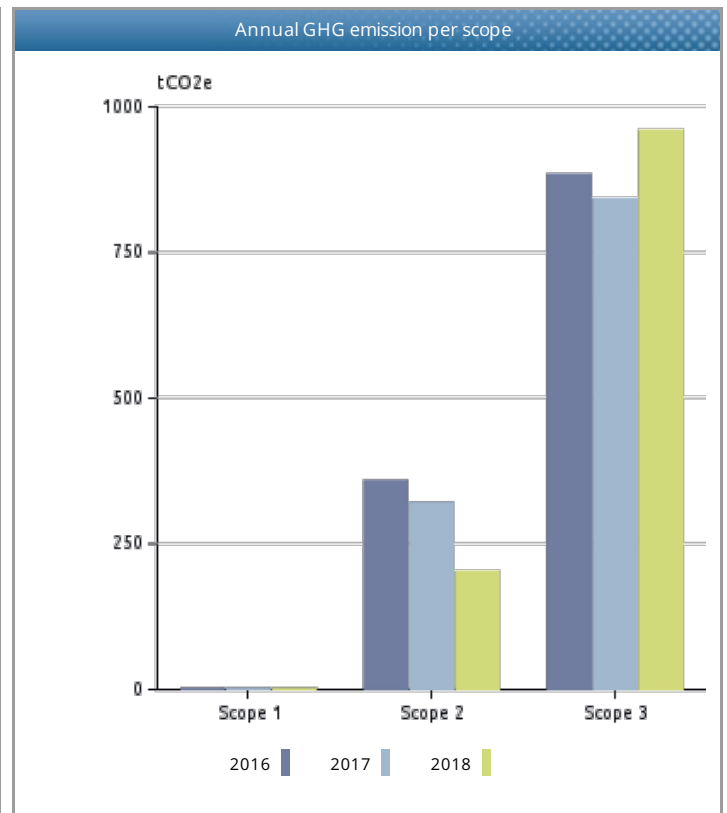
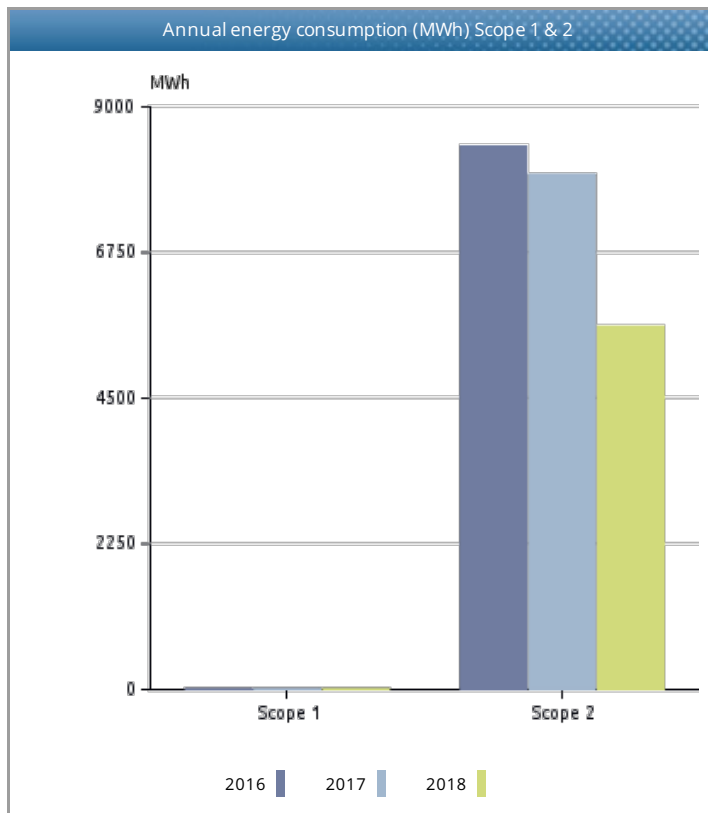
Other travel: reported train travel in Sweden.

## Yearly report – GHG emissions (tCO2e)

Category	Description	2016 tCO2e	2017 tCO2e	2018 tCO2e	% change from previous year
<i>Transportation</i>					-
Diesel (B5)		-	-	-	-
<b>Scope 1 Emissions</b>		-	-	-	-
<i>DH Nordic locations</i>					-
District cooling SE/Goteborg		-	-	-	-
District cooling SE/Stockholm		5.5	8.5	6.9	-18.7%
District heating NO/Lysaker		37.5	38.8	27.9	-27.9%
District heating SE/Göteborg		0.4	0.9	1.0	6.8%
District heating SE/Linköping			0.6	0.6	-%
District heating SE/Malmö		1.9	2.5	2.5	-%
District heating SE/Stockholm		39.7	23.9	18.4	-23.0%
District heating SE/Sundsvall		0.1	0.1	0.1	-%
District heating SE/Vasteras		2.7	1.4	0.8	-43.4%
District heating Sweden mix			0.5	1.3	133.8%
<i>Electricity*</i>					-
Electricity Nordic mix	Lysaker	218.0	193.4	101.6	-47.5%
Electricity Nordic mix	Stockholm	45.7	40.3	33.6	-16.7%
Electricity Nordic mix	Göteborg	1.7	2.5	1.2	-53.9%
Electricity Nordic mix	Sundsvall	0.4	0.9	0.7	-23.3%
Electricity Nordic mix	Västerås	1.9	1.6	1.3	-14.9%
Electricity Nordic mix	Malmö	1.4	2.9	2.7	-6.2%
Electricity Nordic mix	Linköping	0.3	0.6	0.5	-13.5%
Electricity Nordic mix	Jonköping	0.3	0.6	0.5	-13.1%
<b>Scope 2 Emissions</b>		357.4	320.2	201.7	-37.0%
<i>Kmgodtgjorelse(SE)</i>					-
Diesel (B5)		12.7	12.5	12.2	-2.2%
Mileage all. electric car (NO)		-	0.2	0.1	-29.9%
Petrol		34.5	33.9	33.0	-2.6%
<i>Air travel</i>					-
Flights		755.0	727.9	842.9	15.8%
<i>Waste</i>					-
Glas,recycled		0.1	0.1	0.2	113.5%
Metal,recycled		-	-	-	-
Organic,recycled		3.0	2.6	1.7	-34.2%
Paper,recycled		1.4	1.9	0.9	-51.3%
Plastic,recycled		0.1	0.2	0.2	1.9%
Special waste	Annet avfall	0.5	0.7	0.2	-69.2%
Waste, energy recovered		25.1	19.2	30.6	59.3%
WEEE,recycled				-	-
<i>Business travel</i>					-
Mileage all. car (NO)		40.6	31.9	25.8	-19.0%
Mileage all. electric car (NO)		0.2	0.2	0.2	-5.9%
Taxi		8.9	8.5	8.9	5.1%
Train (SE)		1.1	1.7	1.8	4.3%
<b>Scope 3 Emissions</b>		883.2	841.4	958.8	13.9%
<b>Total</b>		1 240.6	1 161.6	1 160.5	-0.1%
<b>Percentage change</b>			-6.4%	-0.1%	
<i>*Alternative Electricity emissions-Market based method (RECs, GoO)</i>		11.2			
Total emissions from business travel from air, road etc...		853	816.7	924.8	13.2%

## Key energy and climate performance indicators

Name	Unit	2016	2017	2018	% change from previous year
Sum locations kWh/m2 (Scope 1+2)		168.0	159.3	147.3	-7.5%
Sum square meters (m2)		49 907.0	49 907.0	38 011.0	-23.8%
Sum energy per location (MWh) (Scope 1+2)		8 383.3	7 949.7	5 599.0	-29.6%
tCO2e/årsverk (Scope 1+2+3)	Gjennomsnitt årsverk	0.7	0.7	0.7	2.1%
tCO2e/forvaltet kapital		2.2	1.7	1.8	2.3%
(Scope 1+2+3) FTE		1 761.0	1 647.0	1 611.0	-2.2%
Forvaltet kapital		576.7	664.5	649.1	-2.3%
<b>Total emissions from all business travel</b>		<b>853</b>	<b>816.7</b>	<b>924.8</b>	<b>13.2%</b>



## Methodology and sources

The Greenhouse Gas Protocol Initiative (GHG protocol) is developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). This analysis is according to A Corporate Accounting and Reporting Standard Revised edition, currently one of four GHG Protocol accounting standards explaining how to calculate and report GHG emissions. The reporting considers the following greenhouse gases, all converted into CO<sub>2</sub> equivalents: CO<sub>2</sub>, CH<sub>4</sub> (methane), N<sub>2</sub>O (laughing gas), SF<sub>6</sub>, HFCs and PFCs.

This analysis is based on the operational control aspect that defines what should be included in the carbon inventory, as well as in the different scopes. When using the control approach to consolidate GHG emissions, companies shall choose between either the operational control or financial control criteria. Under the control approach, a company accounts for the GHG emissions from operations over which it has control. It does not account for GHG emissions from operations in which it owns an interest but has no control.

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

**Scope 1** Mandatory reporting includes all direct emission sources where the organisation has operational control. This includes all use of fossil fuels for stationary combustion or transportation, in owned, leased or rented assets. It also includes any process emissions, from e.g. chemical processes, industrial gases, direct methane emissions etc.

**Scope 2** Mandatory reporting includes indirect emissions related to purchased energy; electricity or heating/cooling where the organisation has operational control. The electricity emissions factors used in CEMAsys is based on national gross electricity production mixes on a 3 years rolling average (IEA Stat). The Nordic electricity mix covers the weighted production in Sweden, Norway, Finland and Denmark, which reflects the common Nord Pool market area. Emission factors per fuel type are based on assumption in the IEA methodological framework. Factors for district heating/cooling are either based on actual (local) production mixes, or average IEA stat.

*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* method. The location-based method reflects the average emissions intensity of grids on which energy consumption occurs, while the market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice).

Businesses who report on their GHG emissions will now have to disclose both location-based emissions from the production of electricity and the market-based emissions related to the potential purchase of Guaranties of Origin (GoO).

The purpose of this amendment in the reporting method is on one hand to show the impact of energy efficiency and saving measures, and on the other hand to display how the acquisition of GoOs 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 factor using this method is determined by whether the business acquires GoOs or not. When selling GoOs, the supplier certify that the electricity is produced by only renewable sources, which has an emission factor of 0 grams of CO<sub>2</sub>e per kWh. However, for electricity without the guarantee of origin, the emission factor is based on the remaining electricity production after all GoOs 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 to foreign consumers. In a market perspective, this implies that Norwegian hydropower is largely substituted with an electricity mix including fossil fuels.

**Scope 3** Voluntary reporting of indirect emissions from purchased products or services in the value chain. The scope 3 emissions are a result of the company's different activities, which are not controlled by the company, i.e. they're indirect. Examples are business travel, goods transportation, waste handling, consumption of products etc. In general, the

GHG report 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 that reflects the substance and economic reality of the company's business relationships.

**References:**

[Department for Business, Energy & Industrial Strategy](#) (2018). Government emission conversion factors for greenhouse gas company reporting (DEFRA)

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This list of references may not be complete. Depending on the use of the CEMAsys emission factors database, there are a number of different local and national sources. If necessary, please contact CEMAsys Help Desk for further details.