City of Oslo
Port Authority

Port of Oslo

CO_2 Emissions for the calendar year 2008

(Based on the ISO 14064 standard)

The CO_2 emissions for 2008 is based on the CO_2 emissions calculation method and report prepared by Ecofys consultants July 4, 2007.

Summary

Port of Oslo calculated the carbon footprint for the first time in 2007.

The development of the Carbon Footprint of the Port of Oslo is based on the ISO14064-1 standard, which has been derived from the WBCSD/WRI GHG Protocol. The Port of Oslo have chosen the operational control approach to be able to calculate the carbon footprint that can actually be influenced by the Port Authority. The inventory was developed for the calendar year 2008.

The data analysed relate mostly to the energy production and consumption both in stationary and non-stationary sources. The emission sources currently included in the carbon footprint only generate CO_2 emissions. Relatively small emissions like technical gases as a by-product of combustion and so called F-gases from cooling installations were neglected. To ensure transparency, emission sources were divided in the following scopes:

- direct emissions (scope 1) resulting from fossil fuels combustions on the site
- energy indirect emissions (scope 2) for consumption of electricity imported to the site (indirect emissions),
- other indirect emissions (Scope 3) for consumption of fuels for commuting (indirect emissions), business travel

The greenhouse gas emissions in the period 1 January 2008 – 31 December 2008 are listed in the table below:

Item	GHG in tCO_2eq
Scope 1: Direct emissions	594
Scope 2: Energy indirect emissions	463*
Scope 3: Other indirect emissions	289**
Total	**1346**

* Emission factor 0,050 (based on SFT method)
** For details on sources of indirect emissions see appendix

The total estimated CO_2 emissions from the Port of Oslo activities are 1346 t CO_2e. Most of the emissions result from fossil fuel combustion (mostly from indirect sources) in the area of Port of Oslo. Business travel constitutes the smallest part of the carbon footprint.

1 GHG emission design and development

1.1 Organisational boundaries

Part of GHG inventory design is to establish the organisational boundaries that are applicable. An important choice is whether to apply the so called

- operational control approach or
- the equity approach.

The operational control approach is best suited for voluntary GHG emission reduction programs. The equity approach is more suited for determining the risk a company runs regarding carbon emissions.

The Port of Oslo chose the operational control approach[1] to be able to calculate the carbon footprint that can actually be influenced by the Port Authority.
Under the operational control approach, the activities form Oslo itself and its daughter company, HAV Eiendom AS are taken into account. HAV Eiendom AS consists of only one (two persons in the near future) person employed in this company and the company office is located in one of the buildings owned by Oslo Port Authority. The only emission sources from the company are indirect emissions from electricity use for heating and lightening. The electricity use is taken into account in the estimates for electricity usage for buildings owned by Port of Oslo.

The Port of Oslo rents out a lot of space to other companies but cannot control their energy consumption. Therefore, the emissions resulting from energy use in rented out buildings are excluded from the carbon footprint.

1.2 Operational boundaries

The Port of Oslo has calculated all direct and energy indirect emissions and a selection of other indirect emissions. The facilities included in the GHG inventory are based on activities under operational control per 31 December 2008 (see annual report 2008).

In the next paragraphs the emission sources leading to the emissions are described.

1. Direct emissions (scope 1)

Activities resulting in direct emissions for the Port of Oslo are categorised in the following way:

1. Fuel usage for heating of Port of Oslo buildings;
2. Fuel usage by company owned cars of Port of Oslo;
3. Fuel usage by operational vessels owned by Port of Oslo;
4. Fuel usage by operational machines and cranes owned by Port of Oslo.

There was no capture and storage of GHG on the Port of Oslo in the calendar year 2008. There was no combustion of biomass in operations controlled by the Port of Oslo. There was no export of energy from sites that are under the control of Port of Oslo.

2. Energy indirect emissions (scope 2)

[1] ISO 14064 International Standard, first edition 2006-03-01, Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals, ISO 2006, Geneva, Switzerland.

Activities resulting in energy indirect emissions by the Port of Oslo are categorised in the following way:

1. Electricity usage by cranes owned by Port of Oslo,
2. Electricity usage for the purpose of harbour lightning by Port of Oslo,
3. Electricity usage for buildings owned by Port of Oslo (e.g. heating, lightning),
4. Electricity usage by lighthouses owned by Port of Oslo,
5. Electricity usage from other sources in Port of Oslo.

No heat or steam was imported by the Port of Oslo in the calendar year 2008.

3. Other indirect emissions (scope 3)

Activities resulting to other indirect emissions by the Port of Oslo are categorised in the following way:

1. Car fuel usage (diesel) by commuting employees
2. Car fuel usage (petrol) by commuting employees
3. Kilometres driven (by train) by commuting employees
4. Kilometres driven (by public transport) by commuting employees
5. Kilometres driven (by motorcycle) by commuting employees
6. Kilometres driven (by boat) by commuting employees
7. Kilometres driven (by walking or by bicycle) by commuting employees
8. Domestic business travel by plane
9. Short-haul business travel by plane
10. Long-haul business travel by plane
11. Business travel by taxi
12. Business travel in non-company-owned vehicles

Emission sources that were currently not taken into account

Explicitly not taken into account are technical gases that are produced as a by-product during combustion processes and F-gases as a result of cooling processes. These emissions have a negligible impact on the total carbon footprint.

According to insufficient data emissions from waste are currently not included in the footprint. However, this will be included in the years to come. Port of Oslo will work on broadening the scope of emission sources based on stakeholder expectations, feasibility and reduction possibilities.

2 Results

2.1 Main results

The Port of Oslo has calculated the greenhouse gas emissions of installations and activities that are under its operational control. The methodology for estimating, consolidation and reporting of these emissions are according the WBCSD/WRI GHG Protocol.

The greenhouse gas emissions in the period 1 January 2008 – 31 December 2008 from the measured emission sources are listed in the table below:

Item	GHG in tCO_2eq	Remarks
Scope 1: Direct emissions	594	For Port of Oslo under current definition of scope 1, only CO_2 emissions are relevant. Scope 1 emission sources relevant for Port of Oslo are company owned cars, operational vessels and operational machines.
Scope 2: Energy indirect emissions	463	The Norwegian power production sector is predominantly based on hydro power; however, suppliers use a mix of locally produced (mostly green) power and imported (mostly grey) power. In this report the national grid factor for Norway as reported by SFT (2009) was applied. Scope 2 emissions relevant for Port of Oslo are electricity usage by cranes owned by Port of Oslo, harbour lighting, buildings, a lighthouse and some other sources
Scope 3: Other indirect emissions	289	Emission sources that are taken into account for Port of Oslo are commuting employees, business travel
Total	**1346**	

Port of Oslo has decided to separate emissions from the Port authority itself and additional scope 3 indirect emission sources. The figures below show the share of each scope.

Figure 1 shows the share of each scope for the Port Authority activities only.

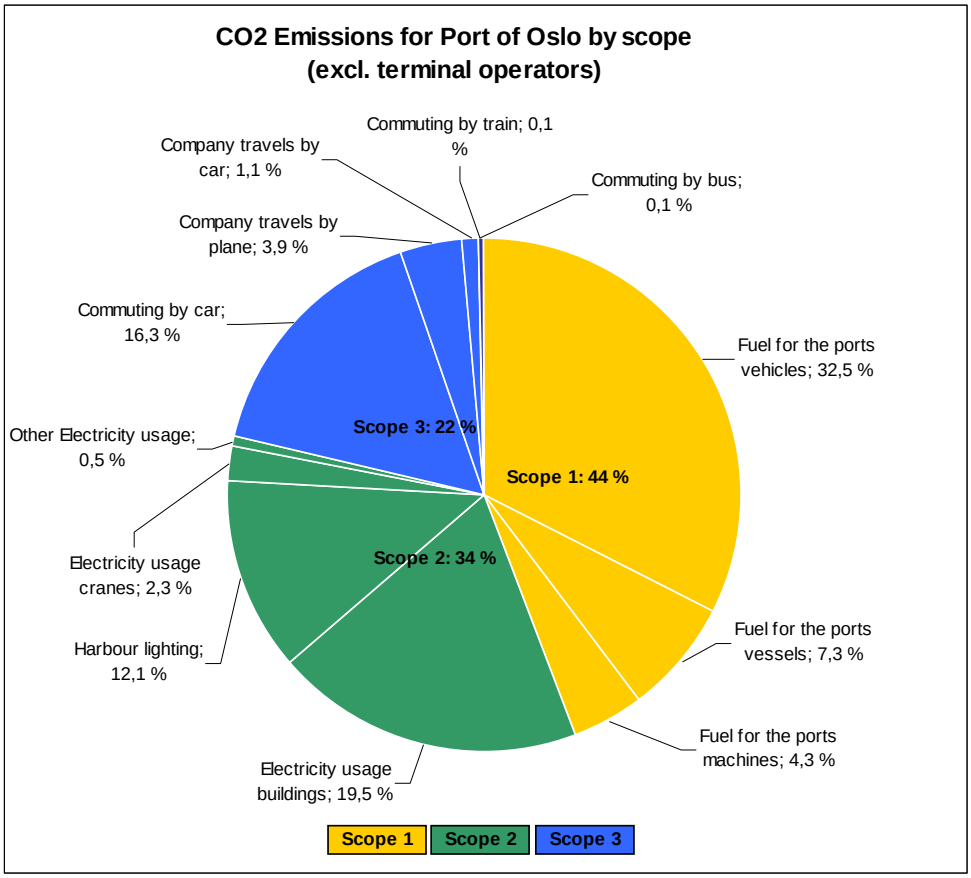

Figure 1 Total CO2 emissions (measured) Port of Oslo Authority 2008

With respect to the emissions by the Port authority fossil fuel combustion (scope 1) is the largest emission source. Business travel constitutes the smallest part of the carbon footprint.

2.2 Uncertainties

The calculation of the carbon footprint was done while striving to maintain the highest possible accuracy. Activity data were partly based on measurement and partly based on estimates. If not possible, expert estimates were made both by the Port of Oslo employees and external experts. A detailed description of the uncertainties of all the activity data and the emission factors is given in Annex 1 and 2 respectively.

2.3 Baseline emissions

This is the second emission report of the Port of Oslo regarding its GHG emissions. The calendar year 2008 will be the baseline year for which emission reductions regarding scope 1 and scope 2 will be measured. Port of Oslo wishes to broaden the scope of emission sources regarding scope 3. For the sources already measured 2008 will be the baseline year, but as new emission sources will be added the year of addition will be the baseline year.

The Port of Oslo will recalculate the baseline if the organizational boundaries change. This will be the case if there are new installations over which the Port of Oslo has operational control. The Port of Oslo will also recalculate the baseline if there changes in quantification methods that would lead to significant changes in GHG emissions.

3 Detailed results

Detailed results - scope 1

Scope		Source description	A Activity data	B Activity unit (per year)	D Emission factor	E Emission factor unit (per year)	H CO2 emissions in ton
							H =G/1000
Scope 1: direct emissions	1	Fuel (oil) usage for the purpose of heating of heating workshop buildings in the Port of Oslo	-	litre	-	kg CO2 / litre	**-**
	2	Fuel usage (diesel) by company owned cars in the Port of Oslo	128 068	litre	2,630	kg CO2 / litre	**337**
	3	Fuel usage (petrol) by company owned cars, Port of Oslo	43 570	litre	2,315	kg CO2 / litre	**101**
	4	Fuel (diesel) usage by operational vessels owned by the Port of Oslo	37 451	litre	2,630	kg CO2 / litre	**98**
	5	Fuel (diesel) usage by all operational machines owned by the Port of Oslo	21 921	litre	2,630	kg CO2 / litre	**58**
							594

The data provided for the analysis were data from the Port of Oslo measuring system. Fuel consumption was based on accounting figures related to the complete cost of fuel divided by the average cost of fuel in 2007. There was no oil consumption for heating in 2007.

Detailed results- scope 2

Scope		Source description	A Activity data	B Activity unit (per year)	D Emission factor	E Emission factor unit (per year)	H CO2 emissions in ton
							H =G/1000
Scope 2: indirect emissions (electricity and heating)	1	Electricity usage by cranes owned by the Port of Oslo	613 072	kWh	0,0500	kg CO2 / kWh	**31**
	2	Electricity usage for the purpose of harbour lightning by the Port of Oslo	3 258 242	kWh	0,0500	kg CO2 / kWh	**163**
	3	Electricity usage for buildings owned and used by the Port of Oslo (e.g. heating , lightning, intake of power for ships, electricity car etc)	5 226 359	kWh	0,0500	kg CO2 / kWh	**261**
	4	Electricity usage by lighthouse owned by the Port fo Oslo	26 669	kWh	0,0500	kg CO2 / kWh	**1**
	5	Electricity usage from other sources in the Port of Oslo	130 834	kWh	0,0500	kg CO2 / kWh	**7**
	0						**463**

The electricity consumption was based on measurements. The Port of Oslo was able to distinguish between power consumption for cranes, lighting of the harbour and lighthouse. Electricity used for heating and lighting of buildings was assumed by the Port of Oslo based on the renting contracts and invoicing to companies renting out space in buildings. The emissions in the category “other sources” are calculated by subtracting the emissions in the other four categories from the total measured consumption and may include intake of power by ships (both owned by the Port of Oslo and other companies) as well as other possible power use.

Detailed results– Scope 3 own emissions

Scope		Source description	A	B	D	E	H
			Activity data	Activity unit (per year)	Emission factor	Emission factor unit (per year)	CO2 emissions in ton
							H =G/1000
Scope 3 (reported): other indirect emissions	1	Car fuel usage (diesel) by commuting employees	49 880	liter	2,630	kg CO2 / liter	**131**
	2	Car fuel usage (petrol) by commuting employees	36 196	liter	2,315	kg CO2 / liter	**84**
	3	Kilometres driven (by train) by commuting employees	107 672	passenger km	0,005	kg CO2 / passenger km	**1**
	4	Kilometres driven (by public transport) by commuting employees	114 484	passenger km	0,015	kg CO2 / passenger km	**2**
	5	Kilometres driven (by motorcycle) by commuting employees	38 034	passenger km	0,100	kg CO2 / passenger km	**4**
	6	Kilometres driven (by boat) by commuting employees	4 432	passenger km	0,100	kg CO2 / passenger km	**0**
	7	Kilometres driven (by walking or by bicycle) by commuting employees	57 843	passenger km	-	kg CO2 / passenger km	**-**
	8	Domestic business travel by plane	51 623	passenger km	0,158	kg CO2 / passenger km	**8**
	9	Shourt-haul business travel by plane	135 600	passenger km	0,130	kg CO2 / passenger km	**18**
	10	Long-haul business travel by plane	242 564	passenger km	0,106	kg CO2 / passenger km	**26**
	11	Business travel by taxi	388	passenger 10 km	2,100	kg CO2 / passenger 10 km	**1**
	12	Business travel in non-company-owned vehicles	71 000	passenger km	0,204	kg CO2 / passenger km	**14**
	0						**288**

The commuting distances estimates are extrapolated based on a survey done by Port of Oslo among its employees. The survey included 55% of the employees.

4 Conclusions and next steps

The total estimated CO_2 emissions from the Port of Oslo activities are 1346 t CO_2e, excluding the terminal operators activities. The relatively low outcome is a result of Port of Oslo being mainly driven by, to a large extent, electricity based on hydro power, which is the major source of energy in Norway. All emission sources in the (conform the ISO 14064 standard) mandatory emission categories “direct emissions” and “energy indirect emissions” were taken into account. Excluded were only negligible emissions from technical gases and F-gases. Due to insufficient data the number of GHG emission sources in category “other indirect emissions” is still rather limited. Port of Oslo will base its future strategy for expanding the scope of the emission sources taken into account in its carbon footprint on stakeholder expectations, feasibility and possibilities to reduce GHG emissions.

Elaborating on the carbon footprint for 2007 and 2008 is the first step on the way to decreasing the climate impact of the Port of Oslo. Implementation of the footprint has yet to be done. Carbon management itself will be an ongoing process.

Annex 1: Sources and assumptions made for activity data