DEME

Dredging, Environmental
& Marine Engineering

Carbon footprint report 2019

For DEME activities in Belgium and the Netherlands;

in accordance with the CO_2 Performance ladder v3.0

in Ton CO_2

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LIST OF ABBREVIATIONS

CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
DBM	Deme Building Materials
DEFRA	UK Department for Environment, Food and Rural Affairs
DEME	Dredging, Environmental & Marine Engineering
EU	European Union
GHG	Greenhouse gas
HFC	Hydrofluorocarbons
HFO	Heavy Fuel Oil
IMO	International Marine Organization
MGO	Marine Gas Oil
N_2O	Nitrous oxide
NOx	Nitrogen oxides
PFC	Perfluorocarbons
QHSE-S	Quality, Health, Safety, Environment & Security
SKAO	Stichting Klimaatvriendelijk Aanbesteden en Ondernemen
SOx	Sulphur oxides
SF_6	Sulphur hexafluoride
VOC	Volatile Organic Compound

1. INTRODUCTION

This report describes the DEME CO_2 emission inventory of 2019 for its activities in Belgium and the Netherlands which is prepared in accordance to the ISO 14064-1 standard, the requirements of CO_2 performance ladder (version 3.0) and the GHG protocol (Corporate accounting and reporting standard).

2. BASIC DATA

2.1 Description Organisation

DEME's group activities consist of following activities:

> Acquisition, design, engineering, procurement, construction, installation, execution and/or maintenance activities relating to: Dredging and land reclamation works, Environmental soils-, sediments and water treatment, Environmental remediation and development projects, Harbour and marine engineering works, Offshore renewable energy projects and offshore oil & gas industry support services, Pipe laying-, cable laying and rock placement projects, Civil infrastructure-, marine and hydraulic engineering projects, Extraction-, processing, and supply of marine aggregates.

2.2 Responsibility

The CO_2 emission inventory is compiled under the responsibility of the DEME QHSE-S Manager.

2.3 Base year

The base year of the CO2 emission inventory of DEME spans from January the 1st of 2011 till December the 31st of 2011. The carbon footprint for 2011 has been restated because of new CO_2 conversion factors for electricity and natural gas. The recalculated carbon footprint for 2011 amounts 153 439 ton CO_2.

2.4 Reporting period

The CO_2 emission inventory described in this report spans from January the 1st of 2019 till December the 31st of 2019.

2.5 Verification

The CO_2 emission inventory of 2019 was not (yet) verified according to ISO 14064-1 by an external party.

3. BOUNDARIES

3.1 Operational boundaries

To define the operational boundaries, the carbon footprint is reported in different scopes:

- **Scope 1** contains all direct CO_2 emissions. Direct CO_2 emissions occur from sources that are owned or controlled by the company such as the consumption of fuel and natural gas.

- **Scope 2** accounts for CO_2 emissions from the consumption of purchased electricity by DEME. Scope 2 emissions physically occur at the facility where electricity is generated. The CO_2 performance ladder differs from ISO 14064 on the subject of scopes and adds business travel (i.e. business air travel, public transport and the use of private cars for business purposes) to scope 2, whereas ISO 14064 accounts business travel to scope 3.

- **Scope 3** is a reporting category that allows for the inventory of other indirect emissions. Scope 3 emissions are a consequence of the activities of the company, but occur from sources not owned or controlled by the company. DEME has identified its most material scope 3 emissions in accordance with the Corporate Value Chain Accounting and Reporting Standard and reports only its most material emissions occurring in Belgium and the Netherlands.

3.2 Organisational boundaries

3.2.1 Definition of operational control (GHG Protocol, ISO 14064-1)

The boundary determination is based on the GHG protocol method – operational control. A company has operational control over an operation if the company (or one of its subsidiaries) has the full authority to introduce and implement its operating policies at the operation.

Under the operational control approach, 100 % of scope 1 (direct emissions) and scope 2 company emissions from operations over which the company has operational control are accounted for.

3.2.2 DEME's operational control for Joint Operations

To eliminate double counting and allow cross verifications with the operational parameters of DEME's fleet under its control, joint operations (mainly joint venture projects) require a specific approach. A difference is made between emissions due to mutually operated equipment and emissions due to separate equipment.

If DEME has operational control over an entity; all the mutual emissions are taken up into DEME's carbon footprint, in addition to the emissions from DEME equipment used. If DEME has no operational control only emissions from DEME equipment are taken up in the DEME inventory.

3.2.3 CO_2 Performance ladder

The companies included in the certification process are as following:

- Dredging International NV (BE)
- Baggerwerken Decloedt en Zoon NV (BE)
- DEME Infra Marine Contractors NV (BE)
  - DEME Infra Marine Contractors BV (NL)
- DEME Blue Energy NV (BE)
- DEME Building Materials NV (BE)
  - DEME Building Materials BV (NL)
- DEME Environmental Contractors NV (BE)
- De Vries & Van de Wiel Beheer BV (NL)
  - Aannemingsmaatschappij De Vries & van de Wiel BV
  - De Vries & van de Wiel Kust & Oeverwerken BV
  - Milieutechniek De Vries & van de Wiel BV
  - Zandexploitatie Maatschappij De Vries & van de Wiel BV
- Offshore
  - DEME Offshore Holding NV
  - DEME Offshore NL BV

3. QUANTIFICATION METHODOLOGY

3.1 Quantification methodology

The identification of CO_2 sources provides the basis for the quantification of carbon dioxide. Multiplying the data from the emission sources each with their relevant CO_2 emission factor results in the carbon footprint (in T CO_2).

3.2 Changes in quantification methodology or base year

The emission inventory or base year will only be recalculated in case of changes to operational boundaries or fixed emissions factors.

No changes required for the base year for 2011 because no new CO_2 conversion factors were published in 2019.

3.3 Exclusion of CO_2 emission sources

According to ISO 14064-1; direct or indirect CO_2 sources that are immaterial or whose quantification would not be technically feasible or cost effective, are excluded from quantification.

The following CO_2 sources were excluded from the DEME carbon footprint.

a) Cutting & welding gases

Gases such as acetylene and oxygen are occasionally used on worksites and on ships for cutting and welding purposes when repairing equipment. The research on the significance of cutting and welding gases indicates that the data collection would not be proportional with the significance in the carbon footprint report at this time.

b) Lubricants

Various sorts of lubricants are used in normal conditions i.e. to protect internal combustion engines and reduce friction between moving surfaces. Waste oil is processed according to IMO MARPOL requirements. Lubricants are not included in the CO_2 emission inventory at this time.

c) Air conditioning refrigerants

The leakage of air conditioning gases is minimal and is therefore excluded from the carbon footprint.

d) Train travel

The CO_2 emissions originating from train travel are immaterial and are therefore excluded from the carbon footprint.

3.4 CO_2 emission factors

The CO_2 Performance ladder utilises (total direct & indirect i.e. incl. extraction, refinery and transport) CO_2 emission factors, specifically determined for the Dutch market. To meet with the needs of the intended users the CO_2 emissions factors as mentioned in the ladder manual version 3.0 were used. All CO_2 emission factors are available on www.CO2emissiefactoren.nl.

3.5 CO_2 sinks & removals

Not applicable

3.6 Combustion of biomass

Not applicable

3.7 Assessing and reducing uncertainties

The qualitative influences of uncertainty on the DEME GHG emission inventory (or in this case CO_2 - carbon footprint) for 2019 are the following:

(1) Source data consists of invoices and delivery records. If the source data on purchased quantities is not available, actual or estimated energy consumption data is used. Estimations are always conservative. It may occur that fuel supply to third (non-DEME) equipment is not separately registered when the fuel is included in the invoice/delivery record of the DEME equipment or DEME project reported figure.

(2) Vessels in co-ownership are considered as subcontracted, however accounted for in scope 1 when their consumption could not be separately identified.

(3) Energy supplied to third equipment is not registered separately when shared fuel tanks are used on site.

(4) The quantity of gas consumed is reported in GCV (higher or gross calorific value), not NCV (lower or net calorific value).

(5) For each flight, the total of air miles is provided by the travel agency.

(6) The fuel consumption of cars is based on the data provided by the fuel supplier (invoices). Here, all invoices from the fuel supplier are taken into account (i.e. including use of the car for private purposes).

(7) The use of private cars for business purposes is compiled from the reimbursed expenses for employees.

(8) The fuel consumption for the ships of DEME Building Materials includes the total energy consumption of all their activities throughout Europe.

Were possible, data is cross-checked with energy consumption estimates based on activity to reduce errors, omissions and double accounting.

4. CO_2 SOURCES AND EMISSIONS

4.1 CO_2 emission sources

The following CO_2 sources can be identified:

a) Marine operations:
Main production vessels (Trailer Suction Hopper Dredgers, Cutter Suction Dredgers, Backhoe Dredgers…) and auxiliary vessels (tugs, crew boats, launches …) use Marine Gas Oil (MGO) or Heavy fuel Oil (HFO), Marine Diesel Oil (MDO)

b) Land-based operations:
Dry equipment (such as fix installations, utility vehicles, and generators) can use diesel, petrol, electricity and natural gas.

c) Office equipment:
Office related energy consumption: e.g. office heating diesel, electricity and natural gas.

d) Various:
Business related activities such as business air travel, use of business cars and personal cars.

4.2 CO_2 emissions

4.2.1 Company level

The carbon footprint consists of scope 1 and 2 emissions. The energy consumed by DEME in 2019 within Belgium and the Netherlands, including head office related emissions such as electricity use, lease cars and business air travel, is equivalent to **159.502Ton CO_2**. Most of the CO_2 emissions are due to fuel consumption, at the core of DEME's equipment and activities, therefore attributable to its largest share of emissions. An overview of the CO_2 emissions is given in table 1.

83% of the scope 1,2 emissions can be contributed to our consumption of Marine fuels, 8% due to the use of our land-based equipment, 3% due to the use of our business cards, 3% to business travel, and our office (heating),site electricity and office electricity each 1%

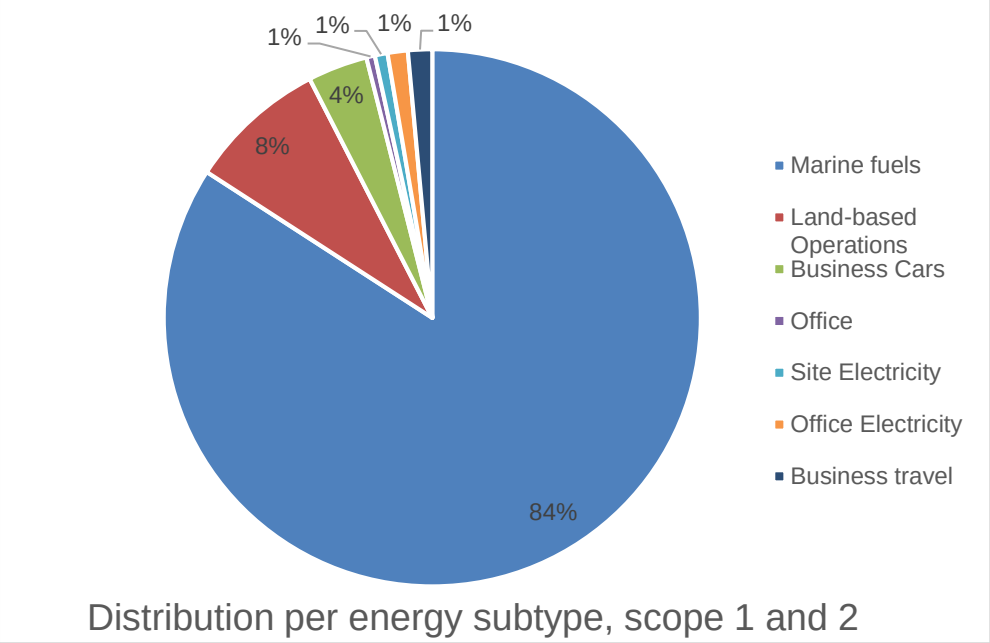

Figure 1: Overview carbon footprint 2019 per energy subtype

Overview DEME CO_2 emissions:

Emission category	2011	2019	2019 % of total
Scope 1	**143 547**	**150 184**	**97%**
Marine Operations	**tons CO_2**	**tons CO_2**	
MGO	70 849	69 267	
MDO	NVT.	61 383	
HFO	56 843	202	
Land-based Operations			
Diesel off road	10 438	12 934	
Business Cars			
Diesel cars	3 999	4 588	
Unleaded cars	404	1 009	
CNG	LPG 2	2	
Office			
Diesel for heating (1)	854	614	
Natural gas	158	186	
Scope 2	**9 782**	**5 338**	**2019 3%**
Site			
Electricity		1 187	
Office			
Electricity (1)	3 718	1 890	
Business travel			
Air Travel (2)	5 853	1 864	
Km reimbursement private cars	211	397	
Grand Total	**153 329**	**155 522**	**100%**

Table 1: Overview carbon footprint 2019 per emission source

Note:
(1) The total DEME head office related emissions are taken into account.
(2) Only air travel from project people working on projects in Belgium or the Netherlands. Calculated according to turnover. Air travel in the BNL = 15% Worldwide

Sommige kantoren maken gebruiken van een verdeelsleutel om de verbruiken van ons DEME-personeel te berekenen daar niet enkel DEME-personeel in desbetreffend gebouw actief is. De rekenmethode is gebaseerd op die afkomstig van de milieubarometer.nl

4.2.2 Project level

The CO_2 emission figures for the DEME projects with CO_2 related award advantage for 2019 are published on the DEME website.

Project budget nb.	Project description	Status project
5589	Land make middle island Ijburg	On-going
5264	Maintenance dredging of rivers NL	On-going
5311	Renovation of weir and lock complex in Nederrijn /Lek	On-going
5547 5548	Blankenburgverbinding	On-going
5447 5453	Rijnlandroute	On-going
5509 5512 5513	Lock Terneuzen	On-going

5. ISO 14064-1 CROSS REFERENCE

Aspect in ISO 14064-1 § 7.3	Description	Section in GHG inventory
a	Description organisation	2.1
b	Persons responsible	2.2
c	Period covered	2.4
d	Organisational boundaries	3.2
e	Scope 1 emissions	4.2
f	Combustion of biomass	3.6
g	GHG removal	3.5
h	Exclusion of GHG sources	3.3
i	Scope 2 emissions	4.2
j	Base year	2.3
k	Base year changes	3.2
l	Quantification methodology	3.1
m	Changes in quantification methodology	3.2
n	GHG emission factors used	3.4
o	Uncertainties in accuracy	3.7
p	ISO 14064 statement	1.
q	Verification statement	2.5

Table 2: ISO 14064-1 cross reference