



DEME

**Dredging, Environmental
& Marine Engineering**

Energy Management Progress Report

2019 H1

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1 INTRODUCTION

This report describes the progress and the energy reduction initiatives within DEME for the first half of the year 2019, in accordance to the requirements of the CO₂-Performance Ladder.

Emphasis is placed on the DEME activities of relevant DEME companies (offices and projects) within Belgium and the Netherlands; known as the DEME CO₂ Performance Ladder boundary.

The companies included in this report are as following:

- Dredging International NV (BE)
- Baggerwerken Decloedt en Zoon NV (BE)
- GeoSea NV (BE)
- GeoSea Maintenance NV (BE)
- EverSea NV (BE)
- DEME Environmental Contractors NV (BE)
- DEME Building Materials NV (BE)
- DEME Blue Energy NV (BE)
- DEME Infra Marine Contractors NV (BE)
- DEME Infra Marine Contractors BV (NL)
- De Vries & Van de Wiel BV (NL)

2 BOUNDARIES

2.1 Organisational boundaries

DEME N.V. uses the operational control approach according to the GHG Protocol to determine the organisational boundary of its emissions' inventory.

2.2 Operational boundaries

To define the operational boundaries, the CO₂ emissions are categorised in different scopes:

- **Scope 1** contains all direct emissions. Direct emissions occur from sources that are owned or controlled by the company, such as the consumption of fuel and natural gas.
- **Scope 2** covers indirect emissions from the consumption of purchased electricity. Scope 2 emissions physically occur at the facility where electricity is generated.
- **Scope 3** is a reporting category that includes all 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. This includes air travel and subcontractors' equipment for example.

3 QUANTIFICATION METHODOLOGY

The identification of CO₂ sources provides the basis for the quantification of carbon dioxide. Multiplying the data from the emission sources each with their relevant CO₂ emission factor results in the carbon footprint (in T CO₂).

The combustion of biomass is not applicable. GHG sinks and removals are not applicable.

3.1 Changes in quantification methodology or base year

Changes in the quantification methodology or base year will be conducted in light of quality improvement to the reported data, transparent towards the intended users.

3.2 Exclusion of CO₂ emission sources

According to ISO 14064-1; direct or indirect GHG sources whose contribution to GHG emissions or removals is not material or whose quantification would not be technically feasible or cost effective, may be excluded from quantification.

The following CO₂ 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 CO₂ emission inventory at this time.

c) Air conditioning refrigerants

Air conditioning refrigerants are purchased on an ad hoc basis, their consumption can be found in offices and on board ship's logs; however the leakage of these gases is minimal and not material.

d) Scope 3 emissions

Not all scope 3 emissions are reported by DEME. Only the most essential emissions that can be monitored and for which reduction measures can be taken, are considered.

For more details see Document [DEME-QHSE-DOC-002].

3.3 CO₂ emission factors

Most of the CO₂ emissions are calculated based on the CO₂ emission factors listed on the website www.CO2emissiefactoren.nl, as prescribed by the CO₂ Performance ladder handbook 3.0.

For activities which are not listed on the website, different sources are consulted. The table below gives an overview of the other sources.

Table 1: Overview CO₂- emission factors 'other sources'

Activity	CO ₂ emission factor
procurement of steel	Conversion factor steel: 2.100 kg CO ₂ /tonne steel (cradle to gate primary steel). Study Tata Steel
procurement of concrete	Conversion factor concrete: SBK database. 54 kg CO ₂ /tonne concrete
waste processing	Conversion factor for residual waste incineration: 1,83 kg CO ₂ /tonne waste. Chain analyse waste incineration GDF Suez Netherlands dd. 18.08.2016

3.4 Quality control

To guarantee the quality of the CO₂ emission inventory, internal routine checks are performed in combination with external verification assessments.

4 EMISSIONS & REDUCTIONS - COMPANY LEVEL

The carbon footprint described in this report is intended for the use within the CO₂ Performance ladder boundary. The CO₂ inventory is compiled under the responsibility of the DEME Corporate QHSE-S Manager and in accordance to the ISO 14064 principles (relevance, completeness, consistency, accuracy and transparency).

4.1 DEME Emissions

The CO₂ emissions for DEME activities in Belgium and the Netherlands (CO₂ Performance Ladder boundary) for the year 2019 H1 are stated in the table below.

Table 2: Evolution Scope 1 CO₂ emissions

In tonnes CO ₂	2019 H1
Scope 1:	67 128
- DEME marine equipment MGO	32 226
- DEME marine equipment MDO	30 870
- DEME marine equipment HFO	0
- DEME marine equipment EN 590	45
- Diesel all site (excl. personnel transport)	694
- Diesel cars (personnel transport)	2 345
- Natural gas	76
- Office heating diesel	364
- Unleaded cars (personnel transport)	508
- LNG	0
Scope 2:	3 051
- Air travel	932
- Belgium use of private car	200
- Electricity*	1 919
Grand total	70 179

* inclusive Electricity used for the Blanew

The evolution of the scope 1 CO₂ emissions are stated in the figure below.

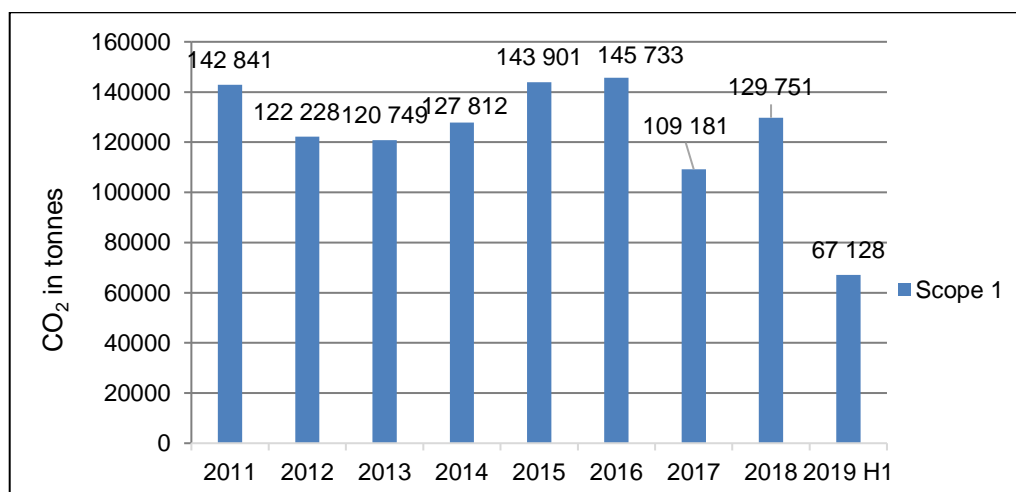


Figure 1: Evolution Scope 1 CO₂ emissions

An overview of the CO₂ emissions (Scope 1 & 2) for DEME activities in Belgium and the Netherlands (CO₂ Performance Ladder boundary) per year from 2011 is shown in Figure 2.

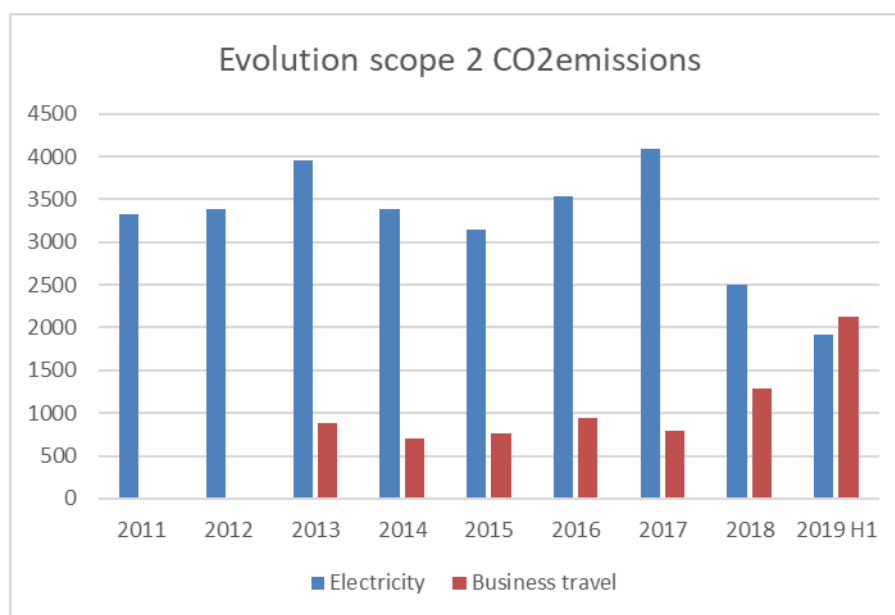


Figure 2: Evolution Scope 2 CO₂ emissions

Note:

For 2011 and 2012 there is no separate business travel data available for DEME activities in Belgium and the Netherlands. However the total emissions for business travel for DEME’s worldwide activities amounted to 24,304 tonnes in 2011 and 27,188 tonnes in 2012. The reduction in the first half of 2019 is due to the CO₂ emission factor ‘stroom onbekend’ grey + green electricity. The use of green electricity is increased in the first half of 2019.

4.2 Reduction targets

DEME has established different targets for scope 1, 2 & 3.

Scope 1

- Fuel efficiency 7% efficiency improvement by 2022 worldwide (base year: 2011)
- Lease cars 95 grams CO₂/ kilometre by 2022 NL-BE

Scope 2

- Electricity HQ head office CO₂ neutrality by 2025 BE
- Electricity on sites 15% renewable energy by 2022 NL-BE

Scope 3

- Scope 3 emissions* 3% reduction in CO₂ intensity° by 2022 NL-BE (base year: 2016)
- Vessel operations GeoSea 5% efficiency improvement by 2022 NL-BE (base year: 2016)
- Maritime transport DBM 6% reduction in CO₂ intensity+ by 2022 NL-BE (base year: 2015)

* scope 3 = transport, fuel consumption hired dry earthmoving equipment & vessels, domestic waste & commuter travel

° CO₂ intensity = CO₂ per turnover

+ CO₂ intensity = CO₂/ton km

4.2.1 Scope 1

Fuel efficiency

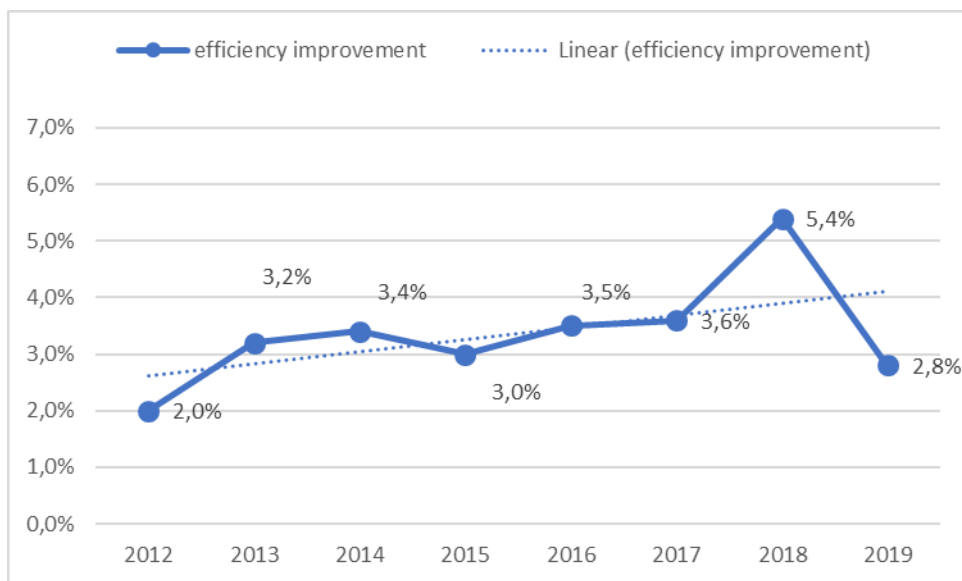
As a result of serious efforts at project level, following energy -efficiency improvements have been achieved:

Table 3: Energy -efficiency Scope 1

Year	Avoided emissions Scope 1 (in tonnes)	Progress energy efficiency yearly (%)
2012	11.368	2.0%
2013	18.306	3.2%
2014	19.677	3.4%
2015	17.195	3.0%
2016	20.335	3.5%
2017	20.677	3.6%
2018	30.951	5.4%
2019 H1	8.200	2,8%
2019 H2	Estimated amount 8200	

DEME has set a goal to improve its efficiency to at least 7% by 2022 compared to 2011. For the first half of 2019, 8.200 ton CO₂ was avoided. Based on these results the energy efficiency is estimated at 2,8% for 2019.

Figure 3: Efficiency improvement



Lease cars

In terms of CO₂ reduction, DEME is optimising its lease vehicle fleet. The evolution of CO₂ emissions is represented in the figure below.

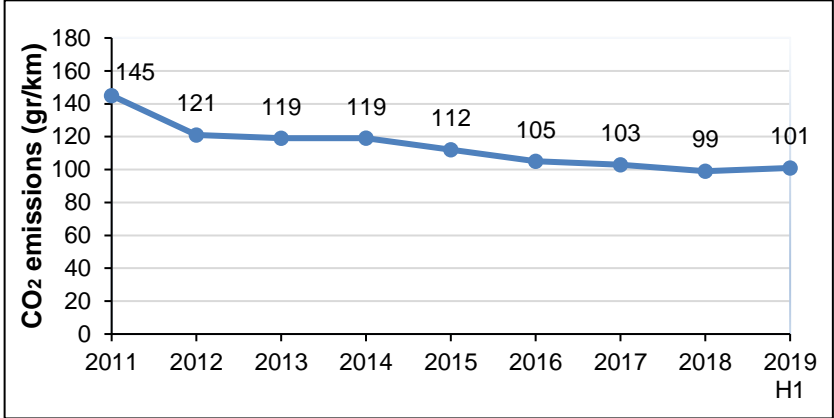


Figure 4: Evolution CO₂-emissions DEME lease car fleets

The results demonstrate a positive trend, which is entirely in line with the DEME reduction target. DEME aims for an average emission of 95 grams CO₂ per kilometre by 2022.

In the chart below the distribution by type of fuel is proposed. The chart shows that the major part of DEME's fleet makes use of a diesel engine.

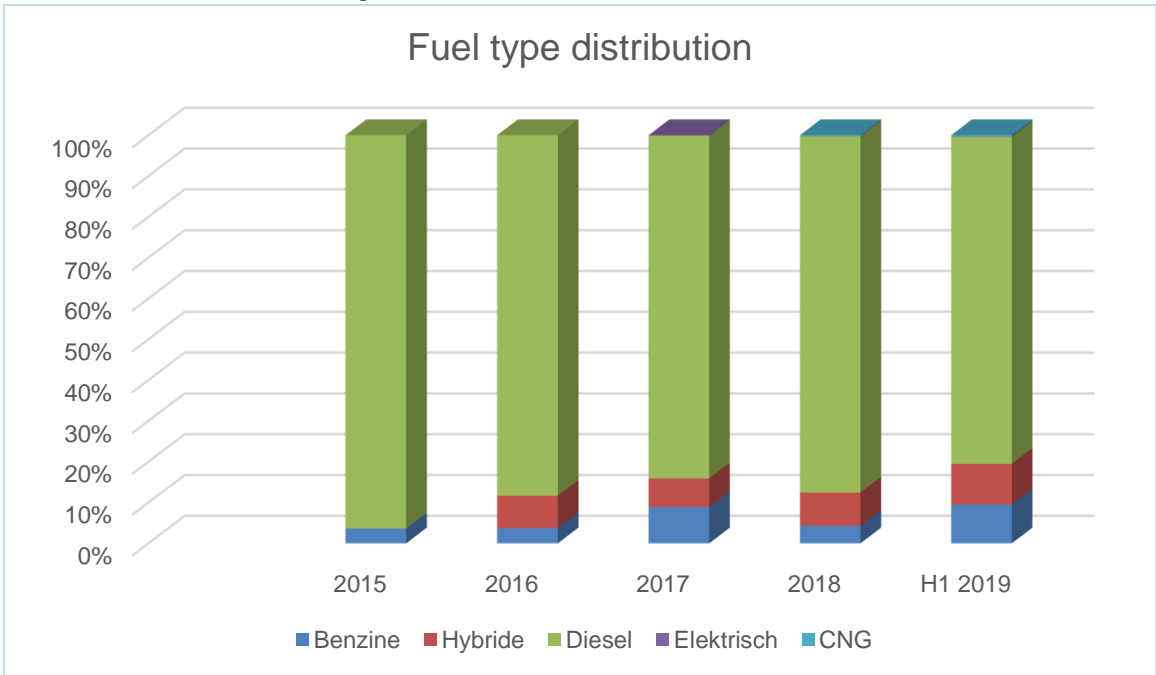


Figure 5: Distribution by fuel type

4.2.2 Scope 2

Electricity use Head office

DEME is aiming for CO₂ neutrality for its electricity use at the DEME head office by 2025 (year-on-year). The current electricity consumption is already 100% renewable in origin (contractually regulated), but a master plan is being built in order to provide for the local electricity needs and to become electricity self-sufficient.

The evolution of the electricity consumption on the DEME HQ site is shown below. In the first half of 2019 7% of the total electricity consumption was self produced energy (by solar panels and wind turbine). Solar energy production has been around since mid-May to the present. This is due to a power failure caused by ground drilling where a high-voltage cable was hit.

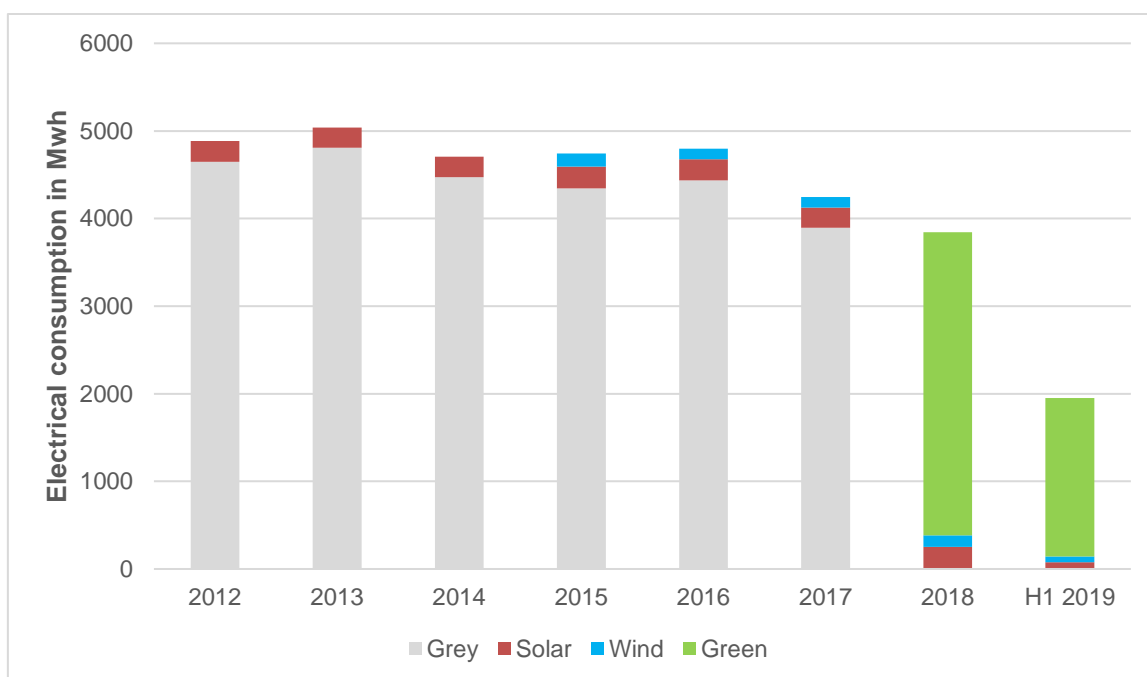


Figure 6: Share renewable electricity in DEME Head Office

Electricity use on sites in Belgium & the Netherlands

The aim is to fulfill the energy needs on sites with renewable energy. Objective for the project sites is to increase the total share of green power to 15% by 2022. The share of renewable energy on project sites for H1 2019: 24%.

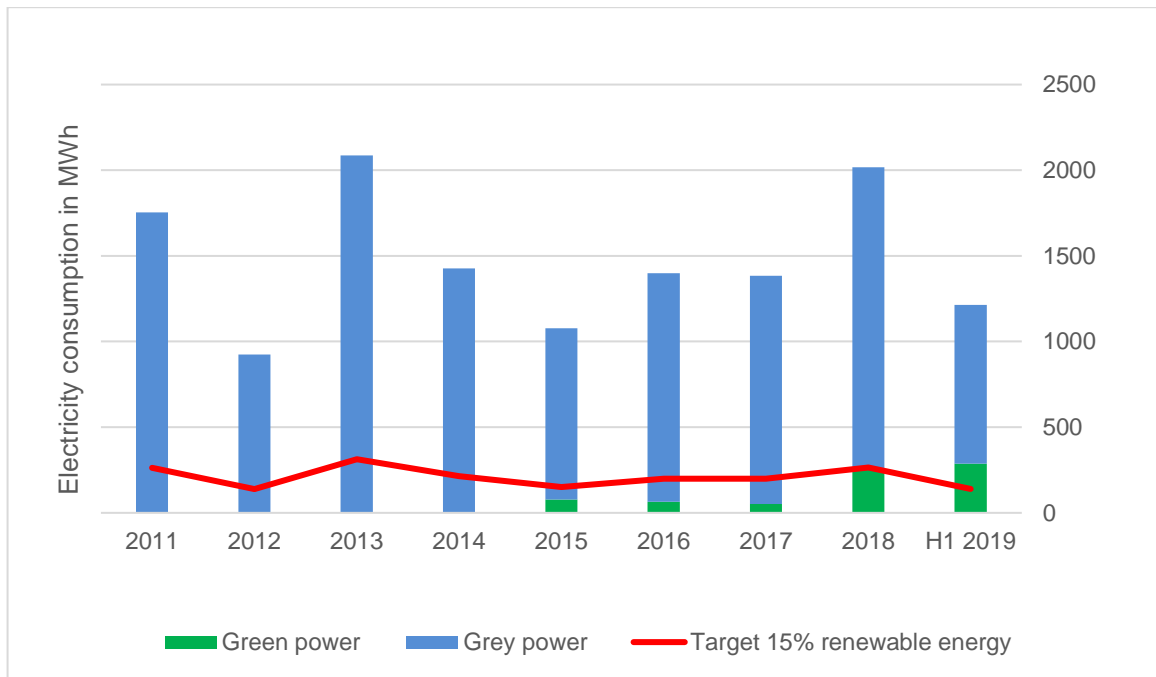


Figure 7:Ratio green versus grey electricity and 15% target line

4.2.3 Scope 3

DEME has analysed its scope 3 emissions and decided to monitor only 4 emission categories (see table 5.1 GHG Protocol Scope 3 Standard in the 'Handreiking Aanbesteden Versie 3.0) for which the amounts are measurable and reducible; e.g:

- Cat 1: purchase of goods & services (concrete, steel, fuel consumption of hired equipment);
- Cat 4& 9: transport;
- Cat 5: generated waste;
- Cat 7: commuter travel.

The scope 3 emissions for 2019 are shown in the graph below.

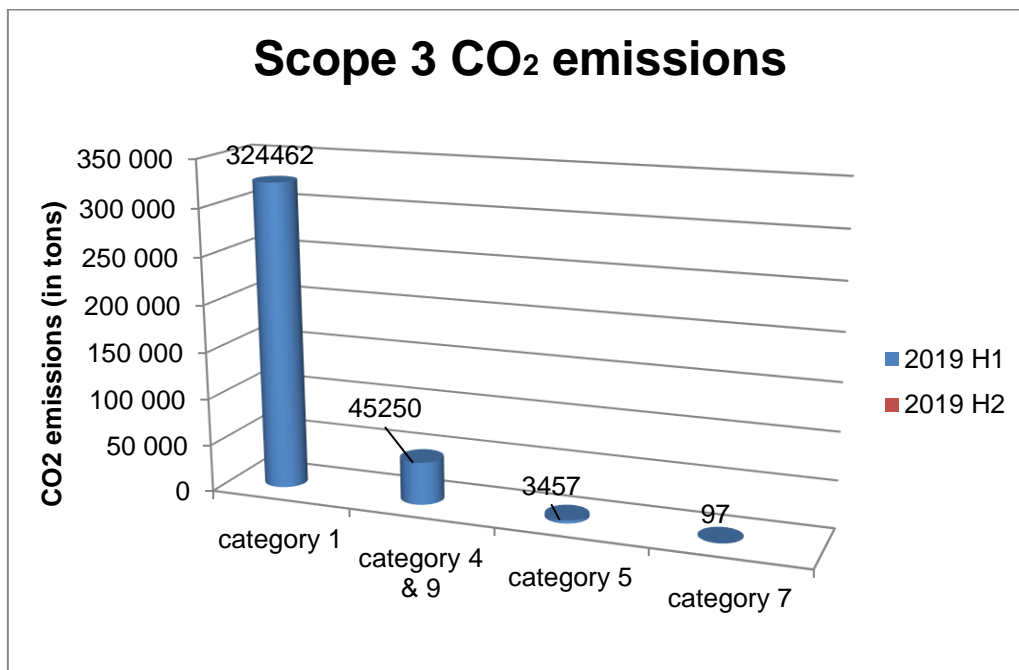


Figure 8: Scope 3 standard CO₂ emission categories for the H1 of 2019

Not all the scope 3 emissions are calculated on the basis of real data, some emissions are calculated by CO₂ conversion factors retrieved from literature. The reliability of the scope 3 emissions is indicated in the table below.

Table 4: scope 3 emissions

Emission category	% based on product carbon footprints or real data
Category 1	95%
Category 4&9	45%
Category 5	0%
Category 7	0%

The category 1 scope 3 emissions consist of several subcategories: concrete, steel & fuel consumption for hired equipment. The CO₂ amounts for H1 2019 are shown in the graph below.

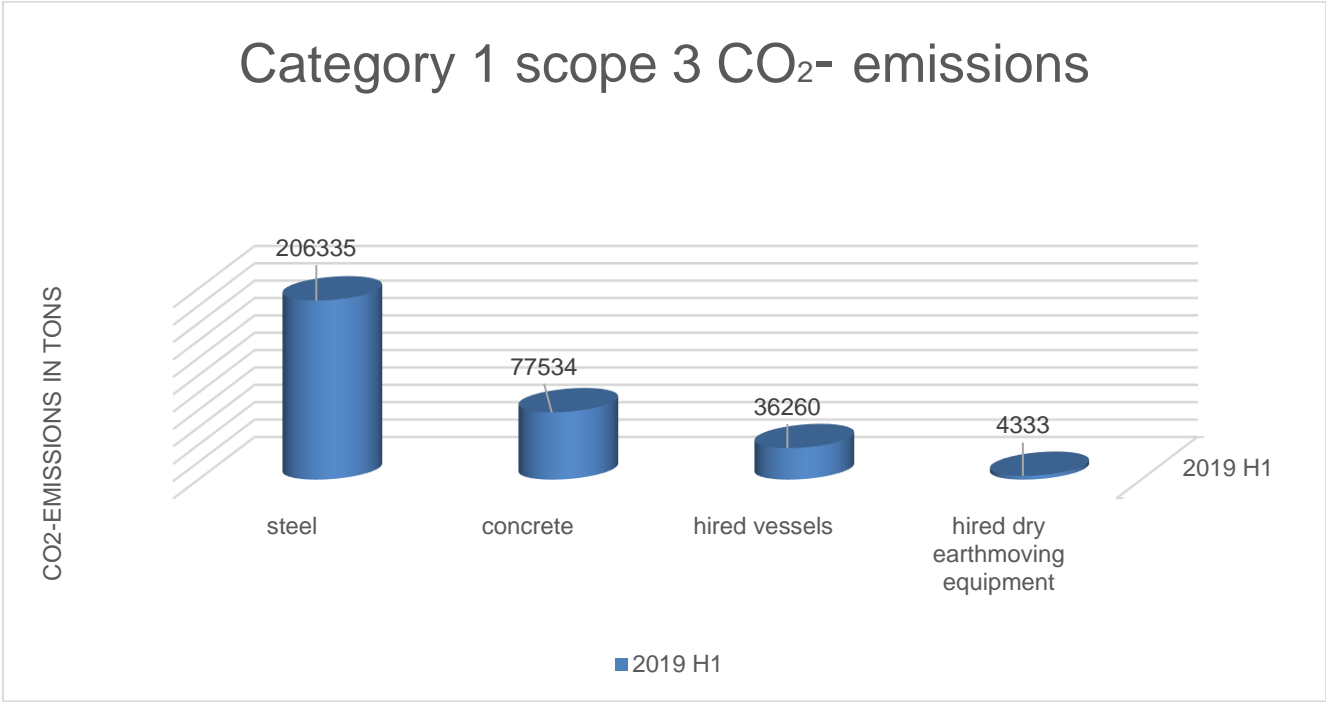


Figure 9: category 1 CO₂ emissions for the H1 of 2019

Chain emissions

To get more insight in its chain emissions, 2 chain analysis were conducted, i.e. 1 for the installation of offshore wind farms and another for maritime & fluvial sand/gravel transport.

Installation of offshore windfarms

In 2019 we started a new chain study on the Rentel Wind Turbine project. Depending on this outcome of this study and the review by an independent recognized consultancy, we will be able to formulate new objectives.

Maritime & fluvial marine aggregates transport

DBM analysed its activities for processing and supplying marine aggregates. The major contribution of its scope 3 emissions is due to external transport activities. Therefore DBM established a reduction policy for its maritime & fluvial transport. The policy aims for a 6 % reduction in CO₂ emissions per tonne km, starting from 2015 till 2022.

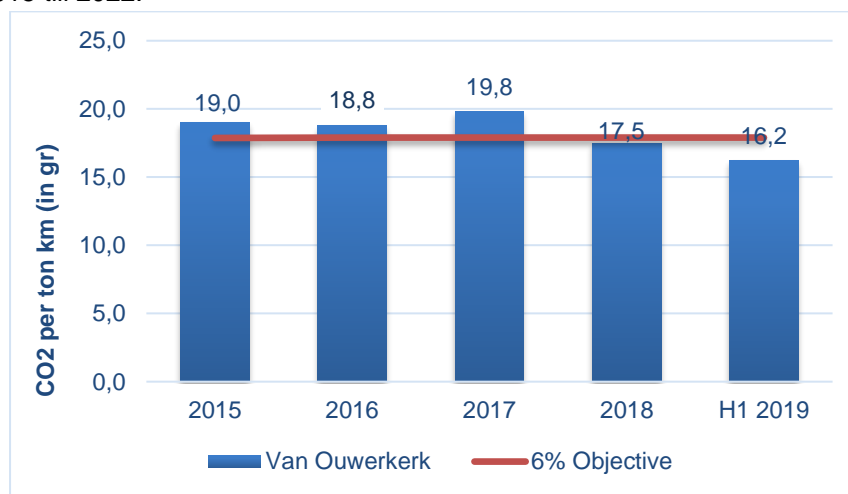


Figure 10: CO₂ emission maritime & fluvial transport organised by DBM

The average emissions per ton * km has dropped by 5,5%. From 0.01714kg / ton*km in 2017 to 0.01621 kg / ton*km in the first half of 2019.

4.3 DEME'S ENERGY ACTION PLAN

DEME's energy reduction programme is evaluated and assessed by means of an energy management action plan. Ref. document [DEME-QHSES-DOC-031](#).

Actions accomplished on 31th June of 2019

Description	Scope	CO ₂ Reduction	Status	Responsible
Tuning exercise on engines (skip fire)	1	Monitor the exercise and see what reduction occurs	Head of Technical Department	2016- 2019
Monitoring emissions from LNG dual fuel ships	1	Methane slip, CO ₂ , SO _x , NO _x , Particulate matter	Head of New building Department	2017-2019

SCOPE 3

Commuter travel

Description	Scope	CO ₂ Reduction	Status	Responsible
Home office, satellite offices	3	HRD Dept.	2019	Sustainable manager
Flex offices	3	HRD/ QHSE-S	2019	Sustainable manager

Waste management

Description	Scope	CO ₂ Reduction	Status	Responsible
Monitoring of waste quantities	3	QHSE-S	2019	Environmental manager

5 EMISSIONS & REDUCTIONS - PROJECT LEVEL

5.1 Projects with CO₂-related award advantage

Emissions and reductions related to projects with a specific award advantage on the CO₂ Performance Ladder are separately reported.

An overview of these projects is given in the table below.
Further information about the projects can be found at DEME's corporate website.

Table 5: Overview of projects with CO₂ award advantage

Project budget nb.	Project description	Status project
5589	Land make middle island IJburg	On-going in 2019
5264	Maintenance dredging of rivers NL	On-going since 2016
5311	Renovation of weir and lock complex in Nederrijn /Lek	On-going since 2016
5547 5548	Blankenburgverbinding	On-going in 2019
5447 5453	Rijnlandroute	On-going since 2017
5509 5512 5513	Lock Terneuzen	On-going in 2018

5.2 Assessing and reducing uncertainties

The qualitative influences of uncertainty on the DEME GHG emission inventory (or in this case CO₂ - carbon footprint) 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.
- (9) Except for the emissions for maritime & fluvial transport and chartered vessels all the scope 3 emissions are calculated based on the total cost of sales and by applying average CO₂ emission conversion factors [DEME- QHSES-DOC-002].

6 ISO 14064-1 CROSS REFERENCE

Table 6: ISO 14064-1 cross reference

Aspect in ISO 14064-1 § 7.3	Description	Section in this document
a	Description organisation	1
b	Persons responsible	4
c	Period covered	4.1
d	Organisational boundaries	2.1
e	Scope 1 emissions	4.1
f	Combustion of biomass	3
g	GHG removal	3
h	Exclusion of GHG sources	3.2
i	Scope 2 emissions	4.1
j	Base year	3
k	Base year changes	3.1
l	Quantification methodology	3
m	Changes in quantification methodology	3.1
n	GHG emission factors used	3.3
o	Uncertainties in accuracy	6
p	ISO 14064 statement	4
q	Verification statement	3.4

7 DOCUMENT REFERENCES

DEME-QHSES-DOC-002	Scope 3 CO ₂ emission analysis
DEME-QHSES-DOC-031	Energy Management Action Plan