Port of Aberdeen GHG Emissions Inventory Report

Port of Aberdeen 2023 Reporting Period

04/04/2024

Rev	Reason for Issue	Date	Originator	Checked	Approval
A1	Issued for Review	04/03/24	OTO	APE	APE
B1	Issued for Client review	04/04/24	OTO	APE	APE
C1	Issued for Use				

PORT OF ABERDEEN EST.1136	P0752-REP-101

Sealand Projects, Bishop House, 50 Carden Place, Aberdeen, AB10 1UP

Contents

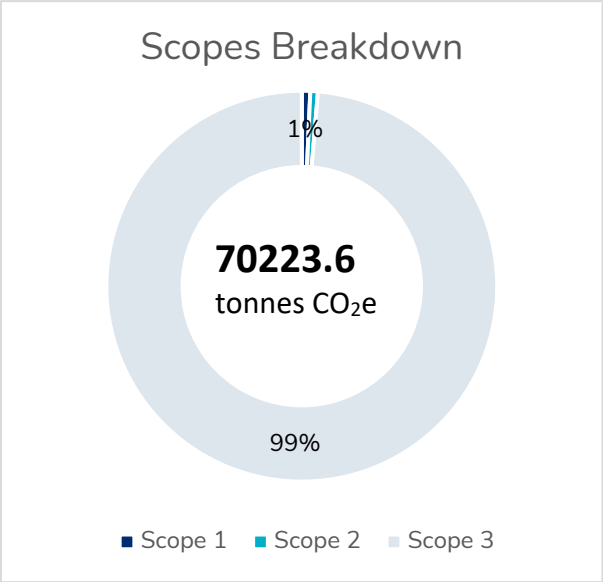
Executive Summary

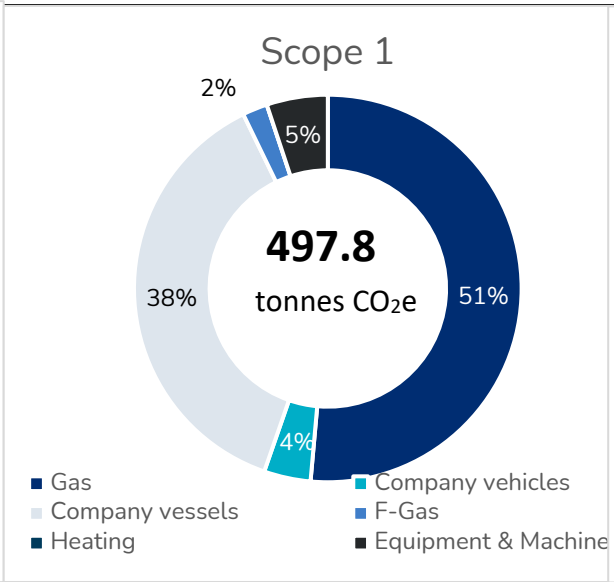
This carbon inventory report has been produced by Sealand Projects on behalf of Port of Aberdeen The chosen reporting period follows the 2023 Calendar year. The emission totals from this period can be seen in Table 1-1.

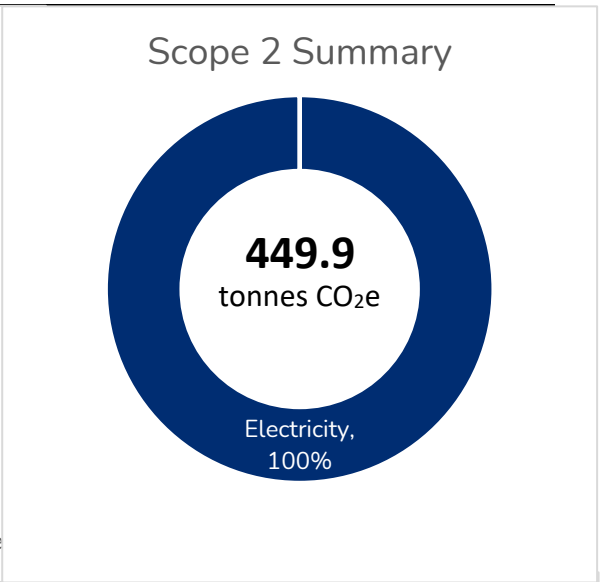
Table 1-1, Port of Aberdeen emission totals 2023

Emission category	Figure
Total annual emissions for 2023	70223.6 t CO_{2e}
Scope 1 total	498.2 t CO_{2e}
Scope 2 total	449.9 t CO_{2e}
Scope 3 total	69275.5 t CO_{2e}

The dashboards below show a summary of Port of Aberdeen's emission breakdown during the 2023 period.





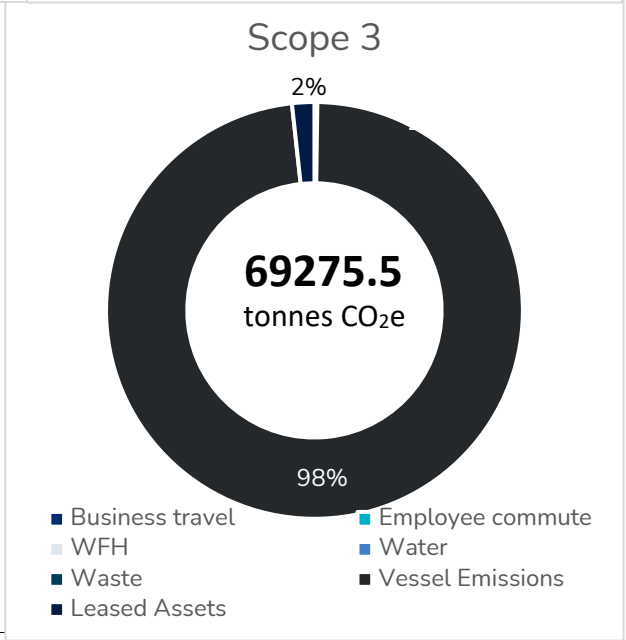


1.61

KG of CO_2e per vessel Vessel Tonnage handled

1529.9

tonnes CO_2e per million GBP of turnover



1 Definitions, Abbreviations & References

1.1 Table of abbreviations:

Abbreviation	Description
Kg CO_2e	Kilogram of carbon dioxide equivalent
CO_2e	Carbon dioxide equivalent
T CO_2e	Tonne of carbon dioxide equivalent
FTE	Full Time Equivalent
SECR	Streamlined energy and carbon reporting
GHG	Greenhouse gas
BEIS	Department for Business Energy & Industrial Strategy
SI	International System of Units
kWh	Kilowatt hour
km	Kilometre
kg	Kilogram
kW	Kilowatt
GWP	Global warming potential

1.2 Definitions

Phrase	Explanation
Greenhouse gas	Gaseous constituent of the atmosphere, both natural and anthropogenic, that absorbs and emits radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.
Direct GHG emission	GHG emissions from GHG sources owned or controlled by the organisation.
Indirect GHG emission	GHG emission that is a consequence of an organisation's operations and activities, but that arises from GHG sources that are not owned or controlled by the organisation.
Global warming potential	Based on radiative properties of GHGs measuring the radiative forcing following a pulse emission of a unit mass of a given GHG in the present-day atmosphere integrated over a chosen time horizon, relative to that of carbon dioxide (CO2).
Carbon dioxide equivalent	Unit for comparing the radiative forcing of a GHG to that of carbon dioxide.
Intensity ratio	Defining emissions data in relation to an appropriate business metric, such as turnover or full-time staff equivalent.
Comparison figure	An appropriate business metric to compare emission data.
Organisational boundary	Grouping of activities or facilities in which an organisation exercises operational or financial control or has an equity share.
Reporting boundary	Grouping of GHG emissions reported from within the organisational boundary as well as those significant indirect emissions that are a consequence of the organisation's operations activities.
Primary data	Quantified value of a process or an activity obtained from direct measurement, or a calculation based on direct measurements
Secondary data	Data obtained from sources other than primary data, such sources can include databases published literature validated by competent authorities.
Level of assurance	Degree of confidence in the GHG statement

Phrase	Explanation
Scope 1	Direct emissions that come direct from your organization's owned or controlled source, such as company vehicles or fuel combusted onsite, or emissions produced from manufacturing processes.
Scope 2	Indirect emissions generated from purchased energy- including electricity, steam, heating, and cooling.
Scope 3	All indirect emissions not included in scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions.

1.3 Codes and standards

Code or Standard	Explanation
ISO 14064 Standard	Details the principles and requirements for designing, managing, and reporting organisation-level GHG inventories. It includes requirements for determining GHG emission boundaries, quantifying an organization's GHG emissions and identifying specific company actions or activities aimed at improving GHG management.
GHG Protocol	The GHG Protocol Corporate Standard provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory.
Streamlined Carbon & Energy Reporting (2019)	Legislation introduced in 2019 requiring large companies to disclosure their annual carbon emissions, guidance also provides a framework in which companies should disclose emissions.
PPN 06/21	Government public procurement n"company_name»ce requiring all companies and organisations who apply for central government contracts to disclose a carbon reduction plan.

1.4 Online References

Ref	Website	Description	Accessed
1.	Greenhouse gas protocol Corporate Standard	Corporate standard: Greenhouse gas protocol Corporate Standard	December 13, 2022

Ref	Website	Description	Accessed
2.	Streamlined energy and carbon reporting (SECR) for Academy trusts	Regulation implemented in 2019 by the UK government requiring large organisations to disclosure carbon reports.	December 13, 2022
3.	ISO standard	ISO 14064-1:2018	December 13, 2022
4.	ESOS	Energy savings opportunity scheme	December 15, 2022
5.	Function, G.C.	Taking account of carbon reduction plans in the procurement of major government contracts	December 13, 2022

1.5 Third party references

Ref	Author	Document Title
6.	Skillet, L., and Ventress, l. (2020)	Homeworking Emissions Whitepaper

1.6 Sealand Projects references

Ref	Document Number	Document Title
7.	P0752-REP-001	Onboarding Requirements & Framing the Scope (2022)
8.	SPL-PROC-048	Calibration Procedure

2 Introduction

Port of Aberdeen has ambitious targets in place to become an exemplar Port for sustainability and to meet Net Zero targets set by the Scottish Government. Port of Aberdeen have already implemented several carbon reduction measures across their business activities.

This report measures Port of Aberdeen's baseline GHG emission inventory and will be acted as a point of reference for future annual carbon reports and carbon reduction targets. The report captures carbon emissions from the 12-month period between January-December 2023.

The following report finds that the majority of the Port of Aberdeen's emissions for the baseline period were because of Vessel emissions (scope 3), Leased assets (scope 3), and Electricity (scope 2).

Port of Aberdeen can directly control Scope 1 and 2 emission reduction. Regarding scope 3 high emission sources Port of Aberdeen has the power to influence rather than directly control reduction in these areas.

The next stage of Sealand Project's program will include the development of a Carbon Reduction Plan, focusing on how the Port of Aberdeen should implement further carbon reduction measures to meet Net Zero targets and target emission hot spots.

3 General Information and Scope

3.1 Purpose of the report

Report of the Port of Aberdeen's GHG emissions and energy consumption.

3.2 Inventory date and version

Reporting on the period 2023 January-December

3.3 Intended users.

Stakeholders of Port of Aberdeen.

3.4 Scope of the business & size

Port of Aberdeen has numerous business activities running across multiple facilities. Port of Aberdeen supports Renewables, Oil and Gas, Decommissioning, Ferries, Cruise and cargo.

Within the reporting period Port of Aberdeen had an annual turnover of £45.9 million and approximately 109 full-time staff.

A map of the site is included in Figure 3-1.

Figure 3-1: Map site

3.5 Previous carbon reports and methodology

This is the Port of Aberdeen's second GHG Emission Inventory and may be used as re baseline year with the addition of the south harbour.

3.6 Proposed frequency of reporting

Annual disclosure of GHG reports.

3.7 Disclaimer

This report has been created in accordance with the ISO 14064-1:2018[3] standard.

3.8 Assurance

The following sub-sections outline the provisions in place to ensure the verification of emission data included within this report.

3.8.1 Assurance of software portal

Sealand's software undergoes an in-house calibration process[8] annually, this is carried out by Sealand's experienced analysis team. Further to this, emissions factors at the back office of the software are updated upon DEFRA's release to ensure accurate and verifiable data.

3.8.2 Assurance of project data output

Sealand's Net Zero team and Software Portal follows the ISO 14064[3] and GHG Protocol [1] when carrying out GHG inventory calculations and reporting. In addition, internal verification of data output is run through our GHG inventory excel workbook, to assure software results.

3.8.3 Third party verification of results

The methodology and data collection carried out within this scope followed the ISO 14064[3] standard and therefore, if desired, could be third party verified.

4 Compliance Threshold

4.1 SECR or ESOS Compliant

Streamlined Energy and Carbon Reporting (SECR)[2] compliance requirements are met by Company in a year in which it satisfies two or more of the following requirements:

- Annual turnover of £36million or more ☑
- Balance sheet total assets of £18 million or more ☑
- 250 employees or more

Energy Savings Opportunity Scheme (ESOS) [4] is required for companies who satisfy one of the following criteria:

- 250 employees or more
- Annual turnover of £44.1 million ☑
- Balance sheet of over £37.9 million ☑

Regarding the number of employees we don't fall above SECR and ESOS. It's due to annual turnover and balance sheet.

Based on the Port of Aberdeen's annual turnover of £45.9 and 109 full-time employees during the 2023 reporting period, the business fall above SECR [2] and ESOS [4] compliance thresholds (the instances where the thresholds have been surpassed have been marked with an ☑). Further information on how to ensure SECR and ESOS compliance can be found in Appendix G.

Please note that this report satisfies over and above the reporting requirements of SECR.

If requested, Sealand Projects can assist with delivery of an ESOS audit. Next ESOS audit is due in 2026.

5 Organisational Boundaries

Incorrect statement: We do not operate directly our tenanted properties.

5.1 Identifying boundaries of the organisation & re-baseline

Port of Aberdeen have reported on all emission scopes under which it has operational control. In addition, the client owns and directly operates all facilities on the site. Please note that this reporting year includes South Harbour. This is a substantial new addition to the business line; therefore this report should be regarded as a ***re-baseline report***.

5.2 Scope 1, 2 & 3 reporting boundaries

An onboarding exercise was conducted to frame the scope 1,2 and 3 emission sources. These were documented in Onboarding document, P0752-REP-001 Rev C3 [7] and are listed in table 5-1.

Table 5-1 Emissions scopes included in this report

Scope 1: Direct	Scope 2: Indirect	Scope 3: Indirect
Company vehicles fuel use	Purchased electricity.	Business travel
Equipment/ machinery diesel use		Waste
Gas		Water
F Gas		Employee commute
Company Vessels		Transport & distribution
		Work from home
		Leased Assets
		Vessel Emissions

5.3 Disclosure of exclusions

The following emission sources have been excluded from this report as they were determined to be not significant, or they are not applicable to the Port of Aberdeen's business activities.

The following sources have been excluded as they were determined not to be significant:

A. Emissions from the use stage of the product

The following sources have been excluded as they are not applicable to the organisation:

B. Emissions from end-of-life stage of product

The following sources have been excluded as it is not feasible or cost effective to measure them:

C. Processing of sold products.

D. Purchased goods and services.

E. Capital goods.

F. Emissions from investments

G. Emissions from franchises

6 Data Collection & Methodology

The following provides statements on the data sources, data quality, and efforts taken to improve data quality for key activities.

6.1 Client relied upon dataset.

Primary activity data was collected throughout data collection, with the units supplied included in Table 6-1.

Table 6-1 Client Relied upon dataset.

Emission Source	Unit
Diesel	Litres
Gas	KWh
Imported electricity	kWh
Hybrid	Miles
Petrol	Miles
Diesel	Miles
Employee commute	km
Work from home	Hours
Business travel	Km
Waste	Litres Tonnes
Water	Cm^3 m3

Include: F-Gas / kg

6.2 Data collection method

Data was collected from utilities invoices; fuel use excel sheet and employee surveys.
Also from: electricity meters, F- Gas register spreadsheet and information provided by tenants.

6.2.1 Employee commute survey

To gain data regarding employees commute and work from home hours, an employee survey was conducted using Sealand's Carbon Management Portal where a 80% response rate was gained.

6.3 Data quality check

Internal review process is conducted by Sealand's Net Zero team, before calculations were carried out. The datasets provided were reviewed by Sealand's internal team to check for missing data and any inaccurate data which needed further explanation.

6.4 Assumptions explanation

Several estimates were used during calculations and have been logged in Appendix A.

6.5 Emission calculation methodology

Emissions calculated by following the GHG Protocol[1] and ISO 14064[3] standard. All activity-method calculations were inputted into Sealand's Carbon Management Portal. Please see Appendix B for all calculations methods followed throughout this GHG Inventory.

6.6 Leased Assets

Data for Leased assets was collected from tenants of Port of Aberdeen. PoA captured actual data from 61.7% of their tenants leased square footage. No assumptions or estimations were used to make it up to 100%. The type of data and the tenants the data was collected from can be seen in Appendix C.

Include that efforts were made to enhance engagement with tenants, leading to improved data collection on electricity, gas, fuel consumption, waste generation, and water usage. Aim in 2024 to engage with more tenants to obtain more data.

6.7 Vessel emissions

Vessel emissions was completed using methodology from the IMO Third and Fourth Report. Vessel emissions is a highly influential source. The methodology in terms of assumptions changed slightly for the year 2023. The changes and data sources for the new methodology can be found in Appendix D. A more in depth break down of the results can also be found in Appendix F. The Anchorage zone has not been included in the vessel emissions figure this is because it falls out of the geographical jurisdiction of the harbour, however the figure for emissions can be found in Appendix D.

7 Emission Data

7.1 Intensity ratio

Intensity ratios are a way of defining annual emissions data in relation to an appropriate business metric, this allows comparison of emission performance over time. The chosen intensity for the Port of Aberdeen's carbon reporting has been selected as kg of CO_2e per vessel tonnage handled.

7.2 Total footprint, intensity ratio & comparison figure

Table 7-1 Intensity Ratio on kg of CO_2e per vessel tonnage handled

Category	Total
Total footprint	70214969.0 kgCO_{2e} 70223.6 t CO_{2e}
Intensity ratio Tonnes (kg of CO_2e per vessel tonnage handled)	1.61
Comparison figure: Equivalent to cars on UK roads	33,440.0 cars

There is a difference between both numbers.

Figure 7-1 illustrates the majority of the Port of Aberdeen's annual emissions can be attributed to scope three emission sources, mainly from visiting vessels.

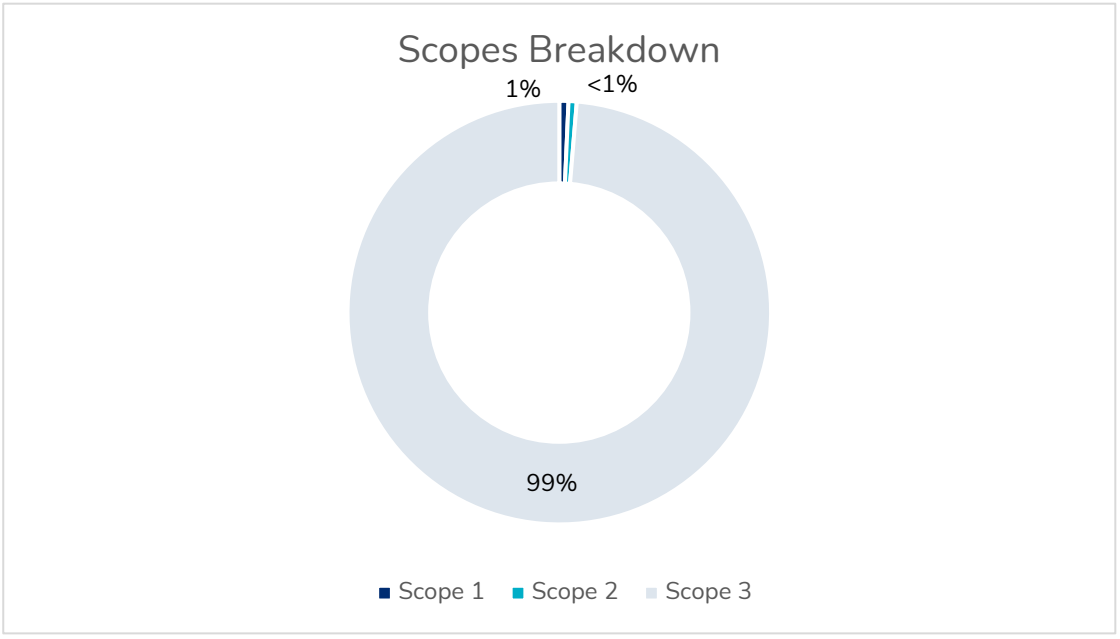


Figure 7-1 Total emissions by scope

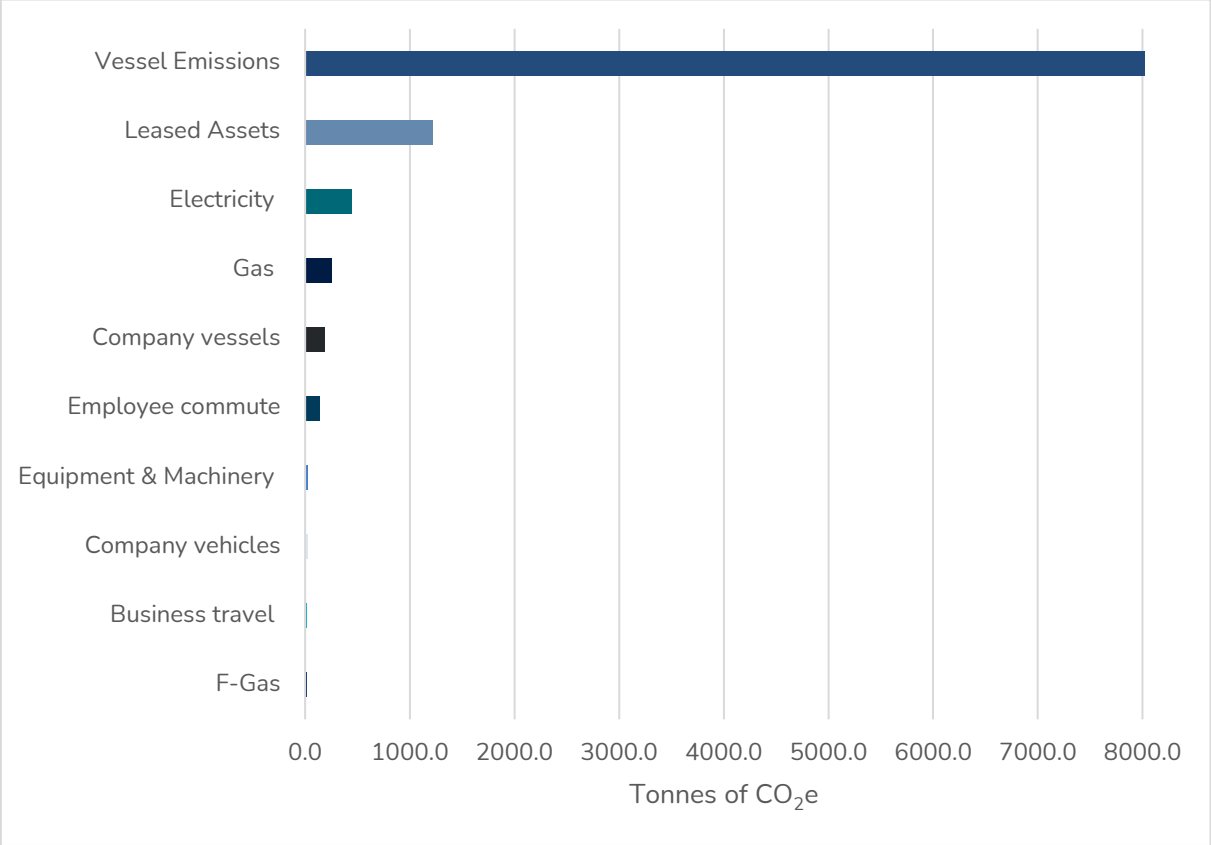


Figure 7-2 Emission hotpots

The above chart lists all the Port of Aberdeen's emission sources for the 2023 reporting period. The chart highlights that Vessel Emissions (scope 3) was the biggest source of emissions for the Port of Aberdeen in the 2023 reporting period, with Leased Assets (scope 3) coming second and Electricity (scope 2) being third.

7.3 Scope 1 results, kgCO_2e

Table 7-2 Scope 1 Emission Results

Scope 1 Emission Source	Total t CO_{2e}
Scope 1 total	498.2
Company vehicles fuel use	19.8
Equipment/ machinery diesel use	25.3
Gas	256.0
F Gas	10.4
Company Vessels (Pilot boats)	186.6

Within scope one, Gas was the largest contributor to emissions and Company Vessels came in at the second largest. Although, PoA have made the switch to predominately HVO over 2023, only 33% of fuel used by vessels was accounted for by HVO. This combined with the fact that vessel activity increased has led to a high figure.

Partially correct.
Please complement with the following information: Initially, trials of HVO were conducted in July 2023, with two deliveries per month. Full implementation of HVO in vessels took place in October, while full implementation in maintenance was achieved in August.

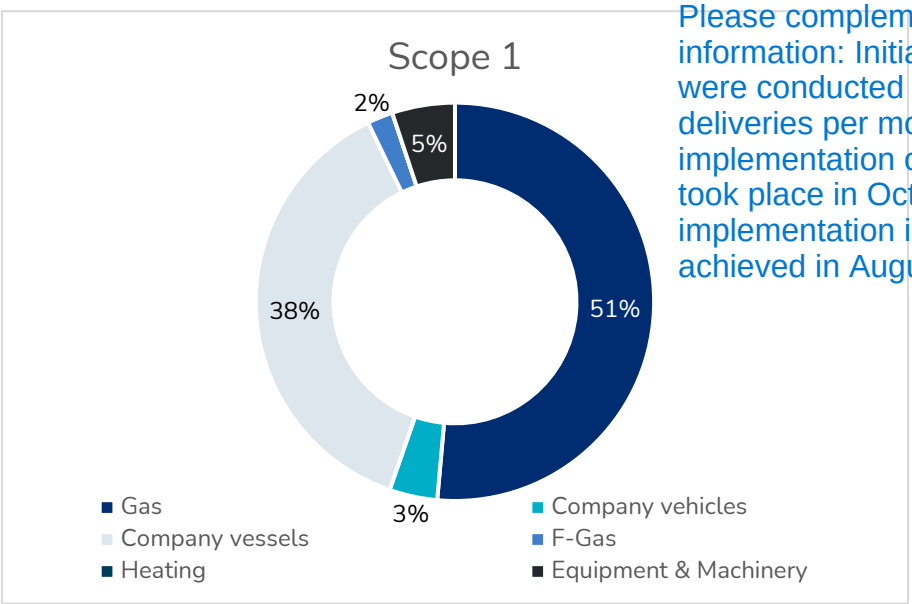


Figure 7-3 Emission breakdown within scope 1

7.4 Scope 2 results, kgCO2e

Table 7-3 Scope 2 Emission Results

Scope 2 Emission Source	Total t CO_{2e}
Total scope 2	449.9
Electricity	449.9

The Port of Aberdeen's scope 2 sources consisted of purchased electricity, the highest usage of electivity was at the Greyhope road facility. South Harbour, Greyhope Rd.

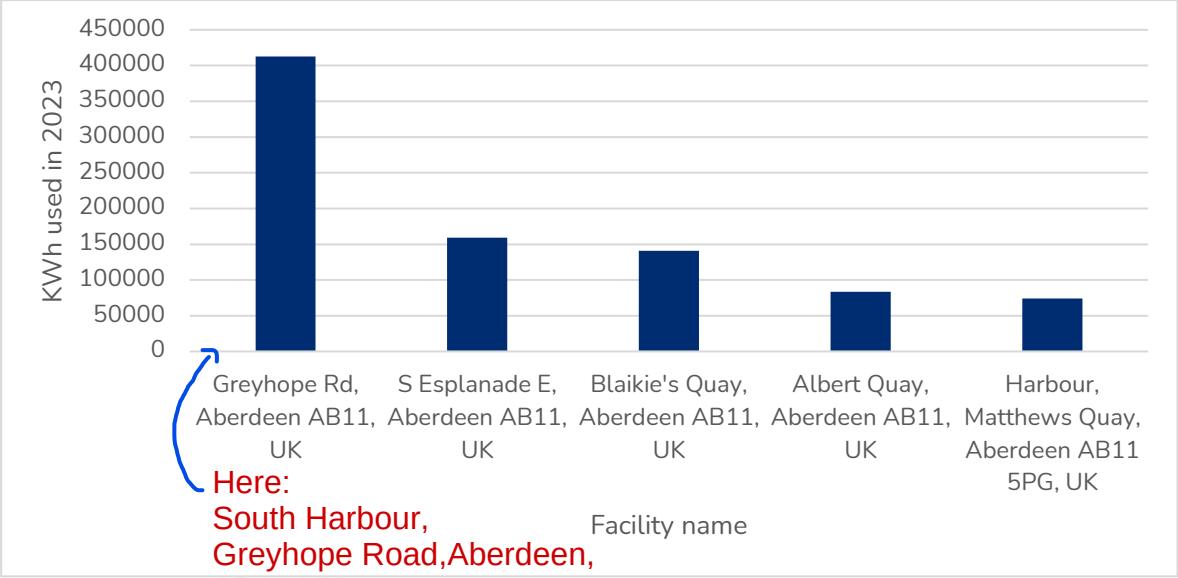


Figure 7-5 top 5 facilities by electricity consumption

Include:
South Harbour contributed to 19% of Scope 2 emissions.
A deep investigation was conducted to assess the number and condition of assets, including those that are fully leased, partially leased, and those owned and operated by the Port of Aberdeen (PoA).

Include:

The emission factor changed due to an error in the Sealand portal, which initially only considered the kgCO2e of CO2 factor instead of the total kgCO2e factor. (More information in email sent to Oliver)

7.5 Scope 3 results, kgCO_2e

Table 7-4 Scope 3 Emission Results

Scope 3 Emission Source	Total t CO_{2e}
Source 3 total	69,275.5
Business travel	11.6
Employee commute	136.6
WFH	7.5
Water	1.3
Waste	8.6
Leased Assets	1,215.7
Vessel Emissions	67,894 (excluding anchorage)

Emissions from scope 3 made up 98.6% of total emissions within the reporting period. The above table lists the emissions measured in the Scope 3 category. The below pie chart shows the scope 3 breakdown and within this, Vessel Emissions and Leased Assets make up the majority.

For leased assets, PoA captured actual data from 61.7% of their tenants leased square footage. No assumptions or estimations were used to make it up to 100%. It is recommended that for future reporting a target is set to improve this percentage. All changes to the percentage of data gathered will require to be reported as it will affect the final figure.

For employee commute, 90 out of 109 employees responded to the survey, the remaining 19 were accounted for and estimated using an average from the 90 that did respond. There is a slight increase in the number of employees thus the increase in commute emissions from 111.5 to 144.1 (136.6+7.5) from previous year.

Correction: In the previous (2020) GHG Inventory Report (P0752-REP-002), WFH and Employee Commute data for the year 2022 was noted as 24.9 tonnes with response from 80 employees. This was due to an error in the software which was then corrected. However, the

report (P0752-REP-002) was forgotten to be updated. The correct figure from 2020 is 111.5 and this can be seen in the SEAZERO software, where POA users have access to.

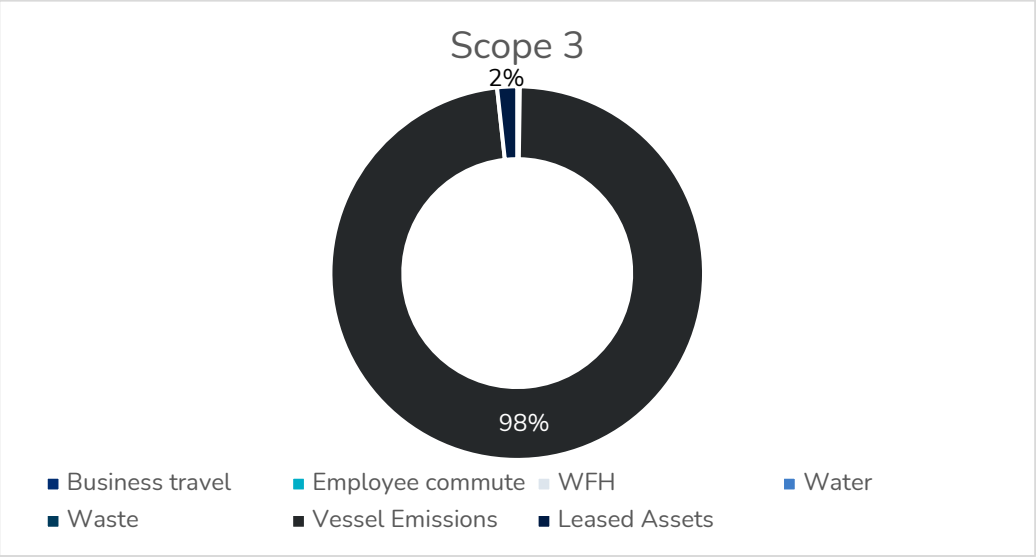


Figure 7-6 Emissions within scope 3

Within scope 3, non tenant emissions made up 2% of emissions, these emissions are 82% a result of employee commute emissions.

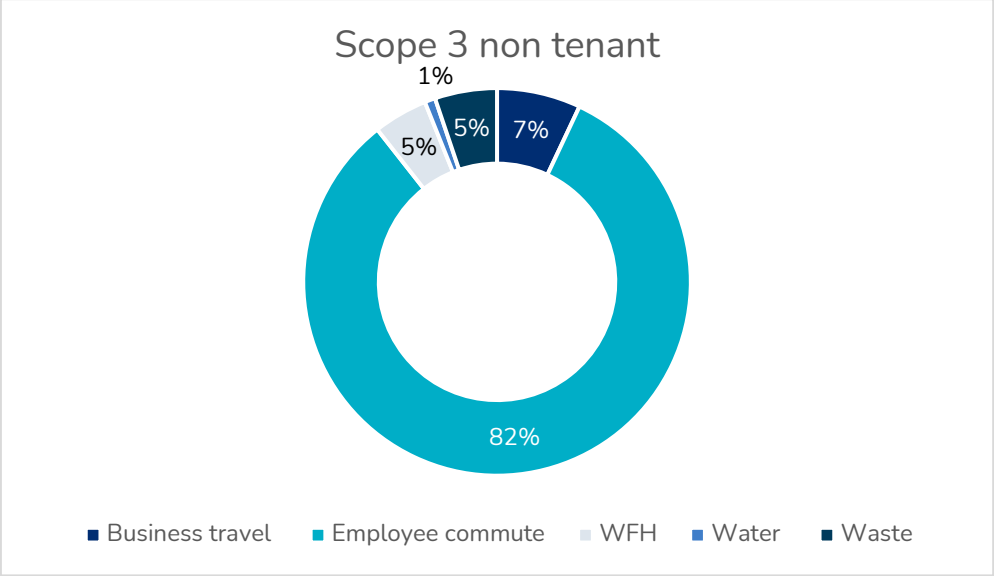


Figure 7-7 Non-tenant emissions within scope 3

8 Baseline Recalculation

8.1 Statement

To ensure the representativeness of the 2023 base-year GHG inventory, the organization should develop, document, and apply a base-year review and recalculation procedure to account for substantial cumulative in base-year emissions.

8.2 Change context.

Appropriate context identifying and describing notable change/s that trigger baseline inventory recalculation, includes:

- A structural change in reporting or organisational boundaries (i.e., merger, acquisition, or divestiture), or expansion ☑
- A change in calculation methodologies or emission factors ☑
- The discovery of an error or several cumulative errors that are collectively substantial.

The organisation shall document base-year recalculations in subsequent GHG inventories.

Recommendation:

With the addition of the south harbour and with some changes in vessel emission calculation methodology It is recommended that PoA use this 2023 GHG inventory report to re-baseline, given that two of the three previously mentioned triggers have been satisfied.

9 Recommendation on next reporting period

9.1 Next reporting period

It is recommended that the Port of Aberdeen annually measure their carbon emissions to track progress.

For this reporting period it is recommended that PoA undertake the necessary steps for SECR compliancy. Information on beginning this process can be found in appendix G.

The next reporting period for ESOS is in 2026, the steps for ESOS can also be found in appendix G.

10 Declaration and Sign Off

This Carbon Report has been completed in accordance with ISO 14064 Standard[3] and associated guidance and reporting standards for Carbon Reports.

Emissions have been calculated and reported in accordance with the publishing reporting methodology from the GHG Protocol[1] corporate standard and uses the appropriate Government emission conversion factors for greenhouse gas company reporting.

This Carbon Report has been reviewed and signed off by the board of directors (or equivalent management body).

Table 10-1, Port of Aberdeen Emission totals

Emission category	Figure (tCO_2e)
Total annual emissions for 2023	70223.6t CO_2e
Scope 1 total	498.2 t CO_2e
Scope 2 total	449.9 t CO_2e
Scope 3 total	69275.5 t CO_2e (excluding anchorage)

Signed on behalf of the Port of Aberdeen

PORT OF ABERDEEN
EST.1136

Name.....

Date.....

Appendix A Assumptions/ Comment Log

ID	Emission Source	Comments
1	Scope 1 & 2	For Scope 1 and 2 emission sources 100% of data used was actual activity data and therefore emission results have good level of accuracy.
2	Employee commute	The Employee Commute Survey received an 80% response rate. The remaining 20% was estimated by averaging the values from the 80% that did complete the survey.
3	Leased assets (buildings)	Actual data was collected from tenants (leased assets). See list App C.
4	Vessel emissions	AIS data was used with IMO GHG 4th study. See App D.

In the Net Zero Steering group it was confirmed by the Technology manager that the data provided comes from VTS data and no from AIS.

Appendix B Emission Factors

ID	Emission Source	Emission Factor
1	Diesel (litres)	2.660
2	LPG	1.557
3	Electricity	0.207
4	Medium truck/van (diesel) per mile	0.372
5	Small truck/van (diesel) per mile	0.228
6	Large truck/van (diesel) per mile	0.410
7	Ferry	2.302
8	HGV (diesel) per mile	1.433
9	Waste oil	0.0267
10	Waste landfill	8.883
11	Water supply	0.149
12	Water treatment	0.272
13	Car electric (miles)	0
14	Car petrol (miles)	0.274
15	Car hybrid (miles)	0.193
16	Car diesel (miles)	0.274
17	Heating (Natural Gas)	0.180

Appendix C Tennant List and Data

Equates to 61.7% of total square footage of leased assets.

Could you please replace this table with the one which includes the sq. ft of each tenanted facilities of the tenants that sent their data and the total amount of tenanted sq. ft in 2023?

No	TENANT	annual electricity usage (kWh)	annual diesel usage (L)	annual gas usage	Recycling waste (tonnes)	General Waste (tonnes)	annual water usage (L)
1	Asco World	YES	YES	YES	YES	YES	YES
2	Ais Survivex	YES	YES	YES	YES	YES	YES
3	Peterson Sbs Ltd	YES	YES	YES	YES	YES	YES
4	Global Energy	YES	YES	YES	YES	YES	YES
5	Total Energies	YES	YES	YES	YES	YES	YES
6	Dales Marine	YES	YES	YES	YES	YES	YES
7	Aberdeen Harbour Boatmen	YES	NO	NO	NO	NO	NO
8	Cobra Wind International Ltd	YES	YES	YES	YES	YES	YES
9	Total Exploration & Production UK PLC	YES	YES	YES	YES	YES	YES
10	Sea Cargo	YES	NO	NO	NO	NO	NO
11	Serco Ltd	YES	NO	NO	NO	NO	NO
12	A Offshore Windfarms Ltd	YES	NO	NO	NO	NO	NO
13	Bp Exploration Operating Company	YES	NO	NO	NO	NO	NO

Appendix D Vessel Emissions Methodology and Assumptions

Methodology

First the following inputs are used, and durations of each activity calculated from this data:

- **Ship type:** The ship type is used as a looks-up in reference tables to estimate fuel consumption.
- **Gross tonnage:** The gross tonnage is used as a look-up in reference tables to estimate fuel consumption.
- **Arrival Time Taken**: The time taken for the vessel to travel from the harbour entry point (this point is unique to each harbour) to its berth with the main engines turned off. This is calculated by subtracting the AIS 'Arrived' time and date from the 'ArrivalStarted' time and date. The vessel is conservatively assumed to travel at 5kt for this time period.
- **Departure Time Taken:** The time taken for the vessel to depart the harbour. This is calculated by subtracting the AIS 'SailingEnded' time and date from the 'Sailed' time and date. The vessel is conservatively assumed to travel at 5kt for this time period.
- **Total Manoeuvring Time:** For calculation convenience, the arrival and departure times are summed together as the 'Total Manoeuvring Time'.
- **Total Berth Time:** The berthed time is calculated by subtracting the 'Sailed' time from the 'Arrived' time, this is the period of time the vessel is stationary at berth with the main engines off.

Secondly, Vessel ship types are recategorized to agree with the best matching ship type described in the IMO GHG study. Note that there may be many peculiar and unique ship types in the supplied AIS data, and for these cases the vessel name and or IMO number should be cross-checked online to find the most appropriate IMO GHG study compatible ship type. This process requires some manual involvement and judgement, but allows for the rest of the calculation to be highly automated.

Then a spreadsheet calculation is used to determine the total annual CO_2 equivalent emissions for a given harbour. The first aim of the calculation is to estimate per vessel hourly fuel consumption in kg/h for the main engine, auxiliary engine and boiler as follows:

$$FC_i = SFC_i \cdot \dot{W}_i$$

This multiplies the specific fuel consumption (*SFCi*, kg/kWh) by the per vessel power demand ($\dot{W}i$, kW).

Two different fuel consumption conditions are considered in port:

- (1) Manoeuvring – a 5kt constant vessel speed is conservatively assumed.
- (2) Berthed – the vessel is stationary with the main engines turned off.

The main engine hourly specific fuel consumption is then calculated as follows:

$$SFC_{ME,i} = SFC_{base} \cdot (0.455 \cdot Load_i^2 - 0.710 \cdot Load_i + 1.280)$$

The vessel power demand ($\dot{W}i$) for the main engines in the manoeuvring condition (while berthed this is zero) are calculated as follows:

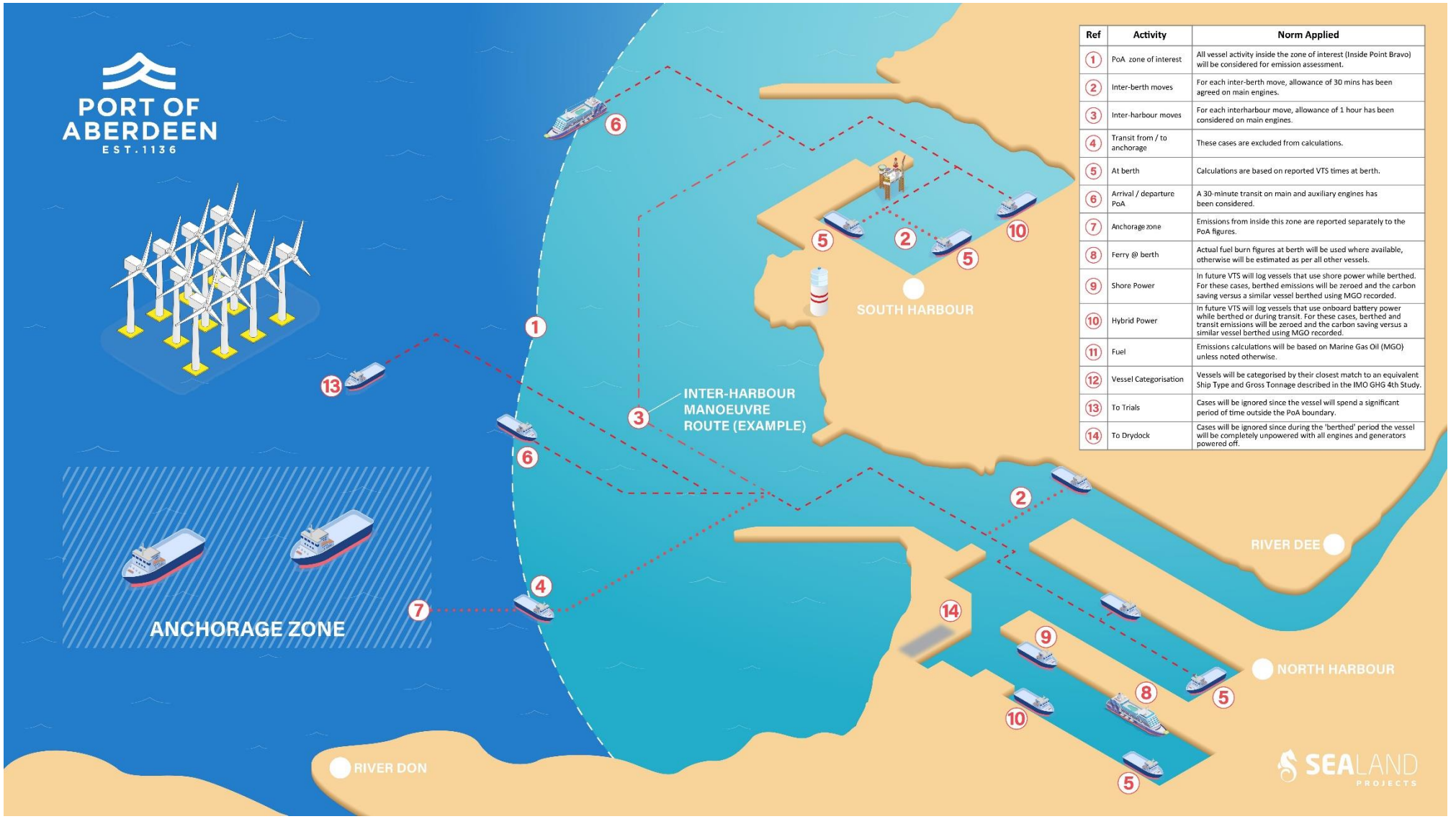
$$\dot{W}_i = \frac{\delta_w \cdot \dot{W}_{ref} \cdot \left(\frac{t_i}{t_{ref}}\right)^m \cdot \left(\frac{v_i}{v_{ref}}\right)^n}{\eta_w \cdot \eta_f}$$

Assumptions

- It is assumed that it takes each boat 1 hour to manoeuvre each time.
- Engine power is assumed based on its category.
- It is assumed that auxiliary engines are switched for the entire duration of the vessels time in port.
- The manoeuvring speed is assumed at 5kts.

Three 14/03/2024

Two meetings (23/02/24, 07/03/24)held with the PoA Management to agree on calculation methodology going forward. These assumptions are explained info-graphicly in the Figure below:



Ref	Activity	Norm Applied
1	PoA zone of interest	All vessel activity inside the zone of interest (Inside Point Bravo) will be considered for emission assessment.
2	Inter-berth moves	For each inter-berth move, allowance of 30 mins has been agreed on main engines.
3	Inter-harbour moves	For each interharbour move, allowance of 1 hour has been considered on main engines.
4	Transit from / to anchorage	These cases are excluded from calculations.
5	At berth	Calculations are based on reported VTS times at berth.
6	Arrival / departure PoA	A 30-minute transit on main and auxiliary engines has been considered.
7	Anchorage zone	Emissions from inside this zone are reported separately to the PoA figures.
8	Ferry @ berth	Actual fuel burn figures at berth will be used where available, otherwise will be estimated as per all other vessels.
9	Shore Power	In future VTS will log vessels that use shore power while berthed. For these cases, berthed emissions will be zeroed and the carbon saving versus a similar vessel berthed using MGO recorded.
10	Hybrid Power	In future VTS will log vessels that use onboard battery power while berthed or during transit. For these cases, berthed and transit emissions will be zeroed and the carbon saving versus a similar vessel berthed using MGO recorded.
11	Fuel	Emissions calculations will be based on Marine Gas Oil (MGO) unless noted otherwise.
12	Vessel Categorisation	Vessels will be categorised by their closest match to an equivalent Ship Type and Gross Tonnage described in the IMO GHG 4th Study.
13	To Trials	Cases will be ignored since the vessel will spend a significant period of time outside the PoA boundary.
14	To Drydock	Cases will be ignored since during the 'berthed' period the vessel will be completely unpowered with all engines and generators powered off.

Results

Annual Summary - Year 2023

CO2 Emissions by Harbour

All Movements
North: 61.5 kT
South: 6.3 kT


3506 Platform Supply Vessels


618 Standby Safety Vessels


125 Diving Support Vessels


187 General Cargo Vessels


28 Bulk Cargo Vessels


43 Cruise


16 Yachts

Usually the total vessel tonnage is displayed here

Vessel Arrivals 7013

North Harbour Arrivals: 6224
South Harbour Arrivals: 258
To Anchor: 531

TOTAL CO2 EMISSIONS FOR THE YEAR 2023 (ALL MOVEMENTS):

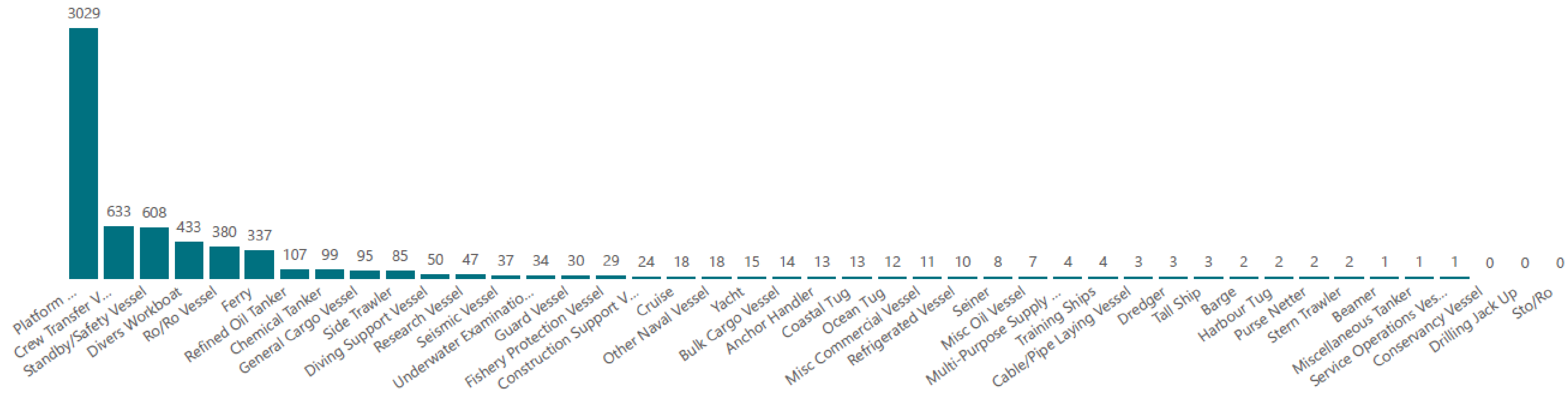
74.9kT, INCLUDING ANCHOR
67.8kT, EXCLUDING ANCHOR

Annual Vessel Port Emissions Equivalent to the Annual Emissions of 35,652 Cars

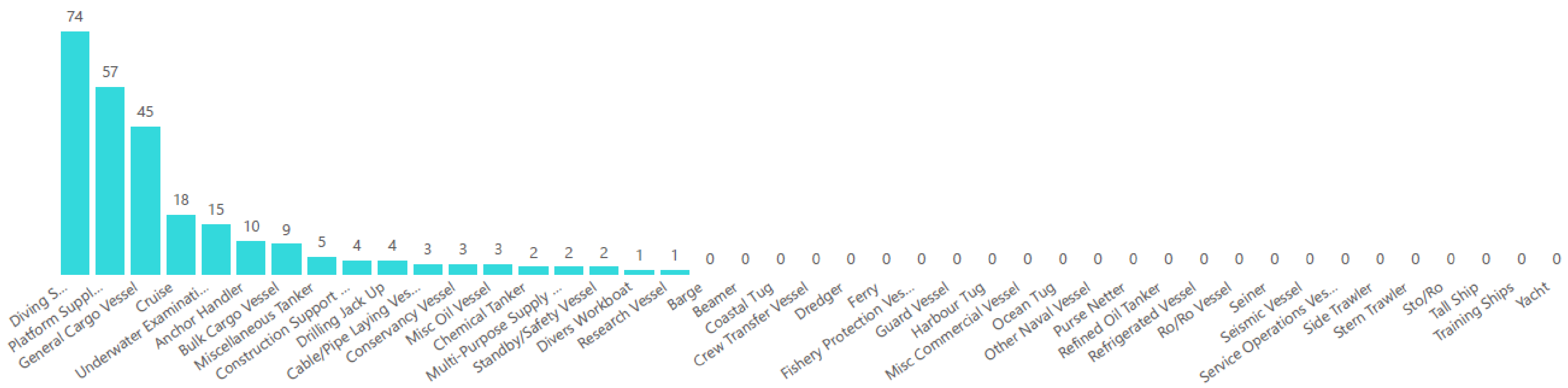
Vessel Total Fuel Consumption:

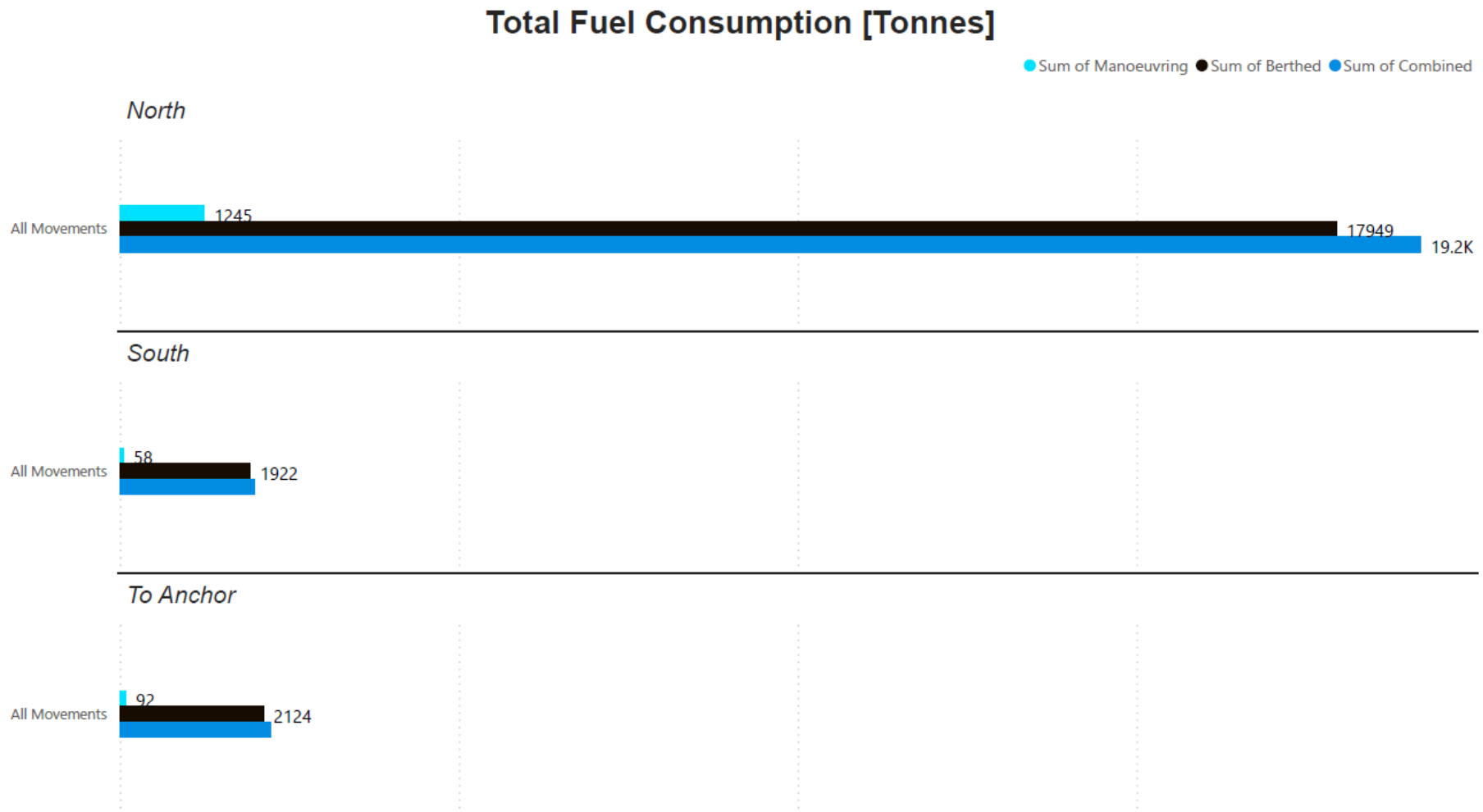
All Movements (North and South): 21.1kT
All Movements (To Anchor): 2.2 kT

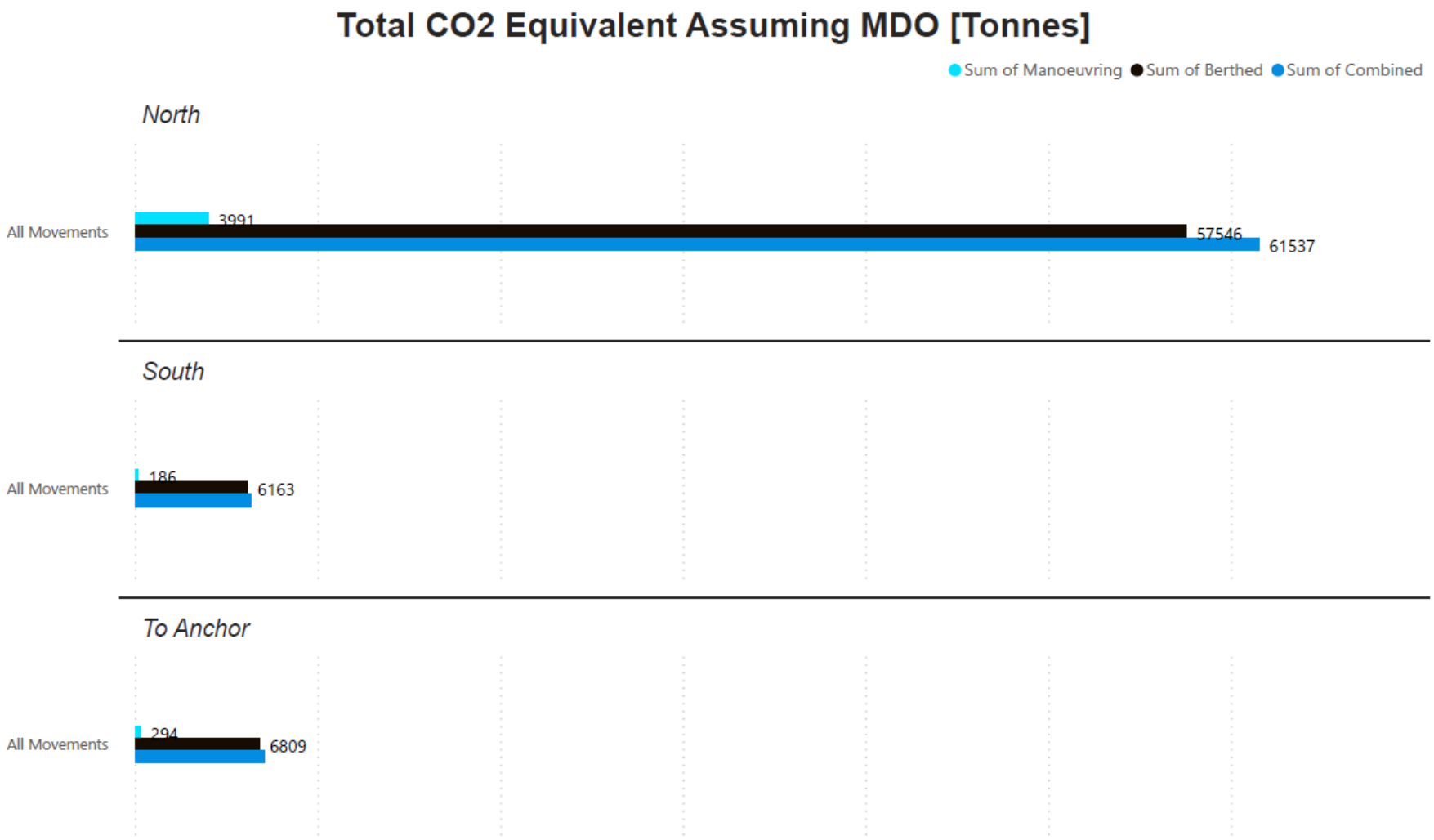
North Harbour by Vessel Type



South Harbour by Vessel Type




Total Fuel Consumption [Tonnes]
Sum of Manoeuvring
Sum of Berthed
Sum of Combined
North
All Movements
1245
17949
19.2K
South
All Movements
58
1922
To Anchor
All Movements
92
2124

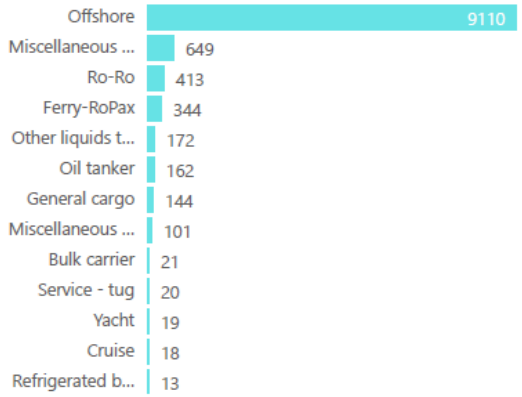

Total CO2 Equivalent Assuming MDO [Tonnes]
Sum of Manoeuvring
Sum of Berthed
Sum of Combined
North
All Movements
3991
57546
61537
South
All Movements
186
6163
To Anchor
All Movements
294
6809

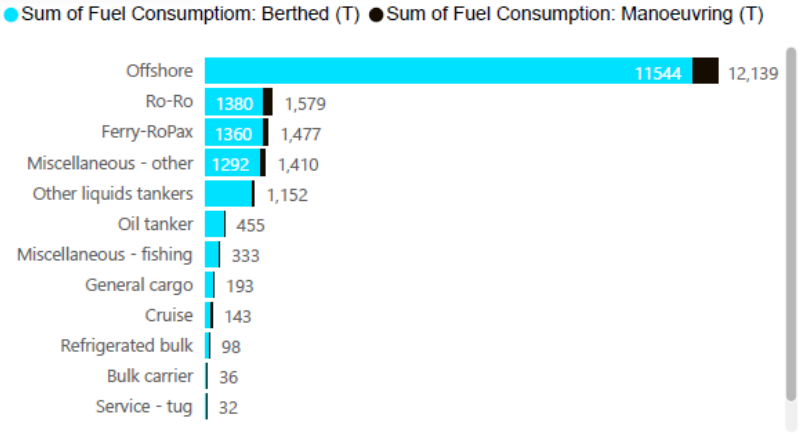
Vessel Type	Total Number
Platform Supply Vessel	7333
Standby/Safety Vessel	862
Crew Transfer Vessel	646
Divers Workboat	453
Ro/Ro Vessel	413
Ferry	344
Chemical Tanker	170
Refined Oil Tanker	162
General Cargo Vessel	144
Side Trawler	86
Diving Support Vessel	70
Research Vessel	60
Seismic Vessel	51
Underwater Examination Vessel	47
Construction Support Vessel	39
Guard Vessel	37
Anchor Handler	31
Fishery Protection Vessel	29
Ocean Tug	22
Bulk Cargo Vessel	21
Coastal Tug	18
Cruise	18
Other Naval Vessel	18
Misc Commercial Vessel	17
Yacht	16
Refrigerated Vessel	13
Misc Oil Vessel	11
Service Operations Vessel	9
Seiner	8
Dredger	6
Barge	5
Multi-Purpose Supply Vessel	5

All Movements

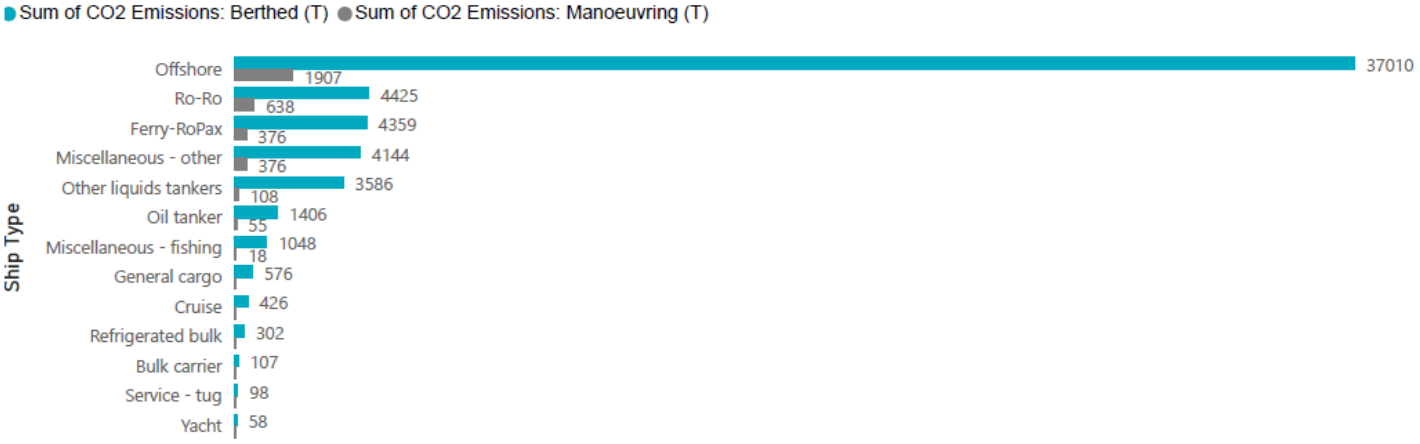
North Harbour Emissions Summary

Total Movements by Vessel Type





CO2 Emissions (T) by Vessel Type

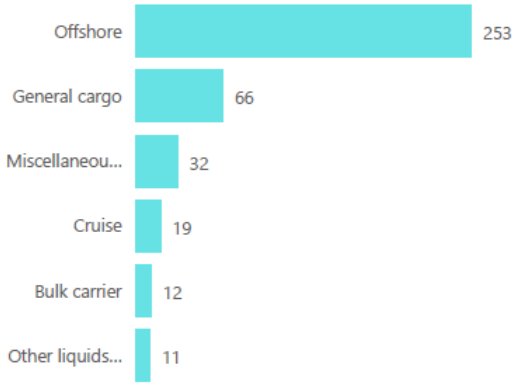


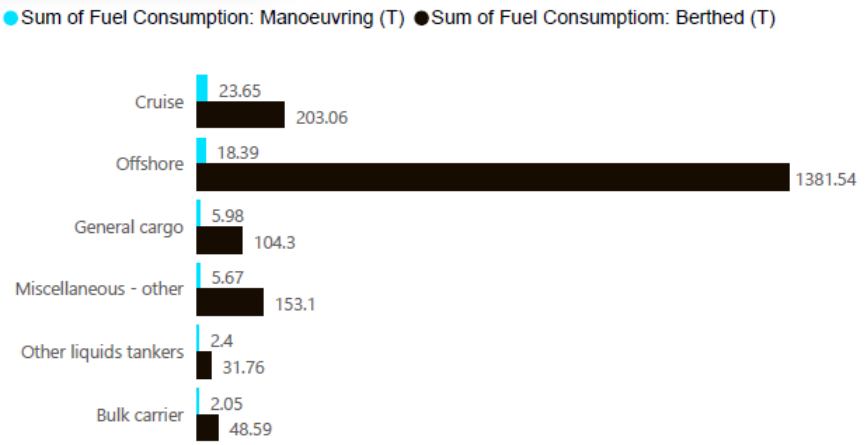
Vessel Type	Total Number
Diving Support Vessel	106
Platform Supply Vessel	106
General Cargo Vessel	66
Cruise	19
Anchor Handler	17
Underwater Examination Vessel	17
Bulk Cargo Vessel	12
Miscellaneous Tanker	8
Construction Support Vessel	6
Drilling Jack Up	4
Misc Commercial Vessel	4
Misc Oil Vessel	4
Standby/Safety Vessel	4
Cable/Pipe Laying Vessel	3
Chemical Tanker	3
Conservancy Vessel	3
Divers Workboat	3
Barge	2
Multi-Purpose Supply Vessel	2
Dredger	1
Fishery Protection Vessel	1
Ocean Tug	1
Research Vessel	1

All Movements

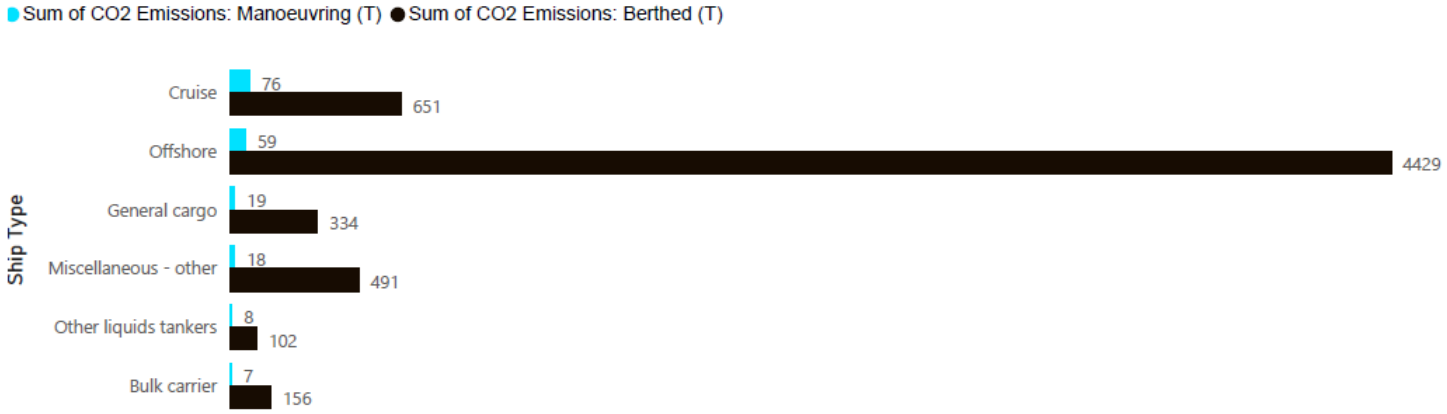
South Harbour Emissions Summary

Total Movements by Vessel Type





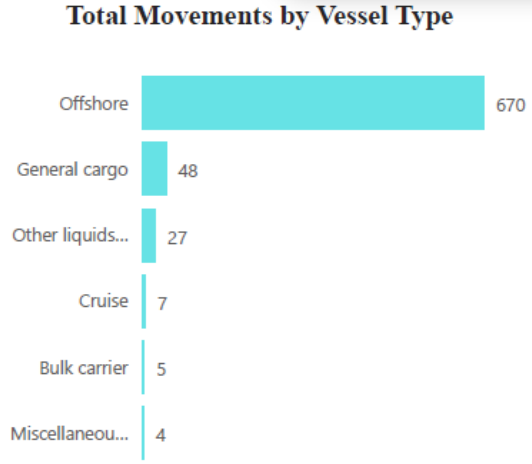
CO2 Emissions (T) by Vessel Type

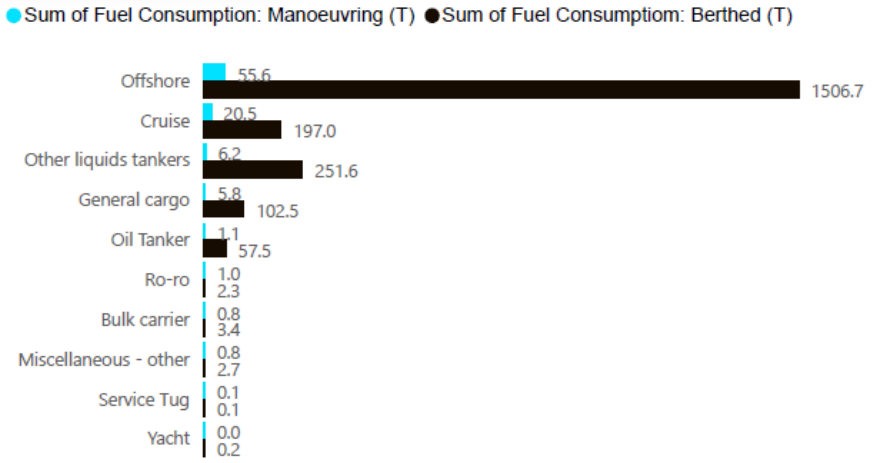


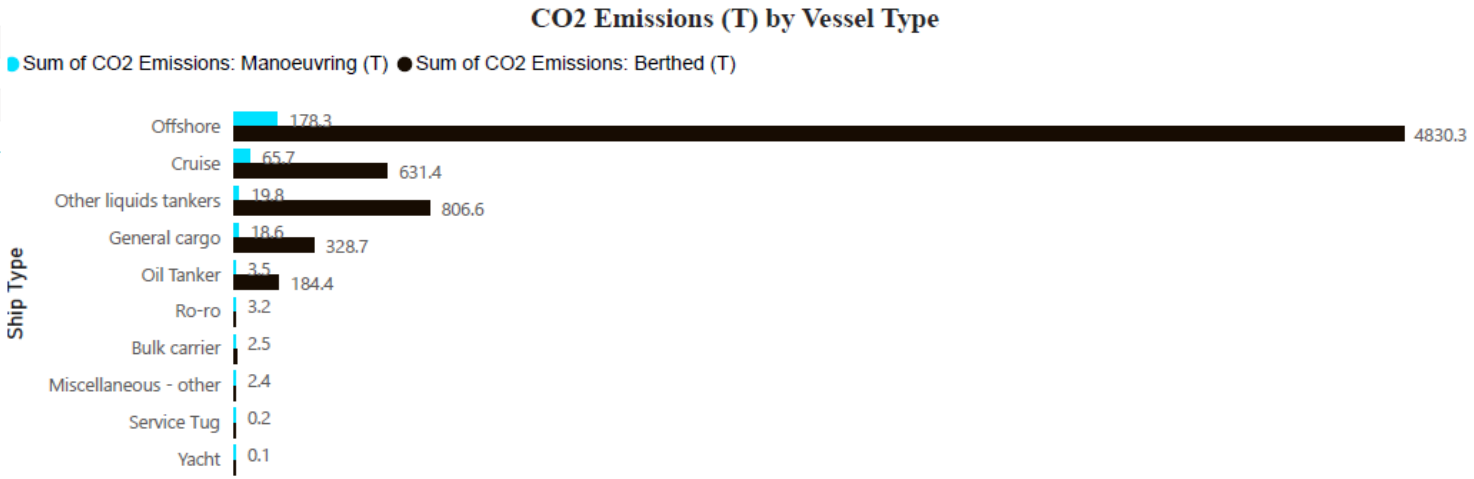
Vessel Type	Sum of Total Number
Platform Supply Vessel	648
General Cargo Vessel	47
Chemical Tanker	24
Refined Oil Tanker	9
Standby/Safety Vessel	8
Anchor Handler	7
Cruise	7
Bulk Cargo Vessel	5
Diving Support Vessel	3
Miscellaneous Tanker	3
Misc Oil Vessel	2
Ro/Ro Vessel	2
Coastal Tug	1
Divers Workboat	1
Fishery Protection Vessel	1
Misc Commercial Vessel	1
Ocean Tug	1
Seismic Vessel	1
Service Operations Vessel	1
Sto/Ro	1
Yacht	1
Total	**774**

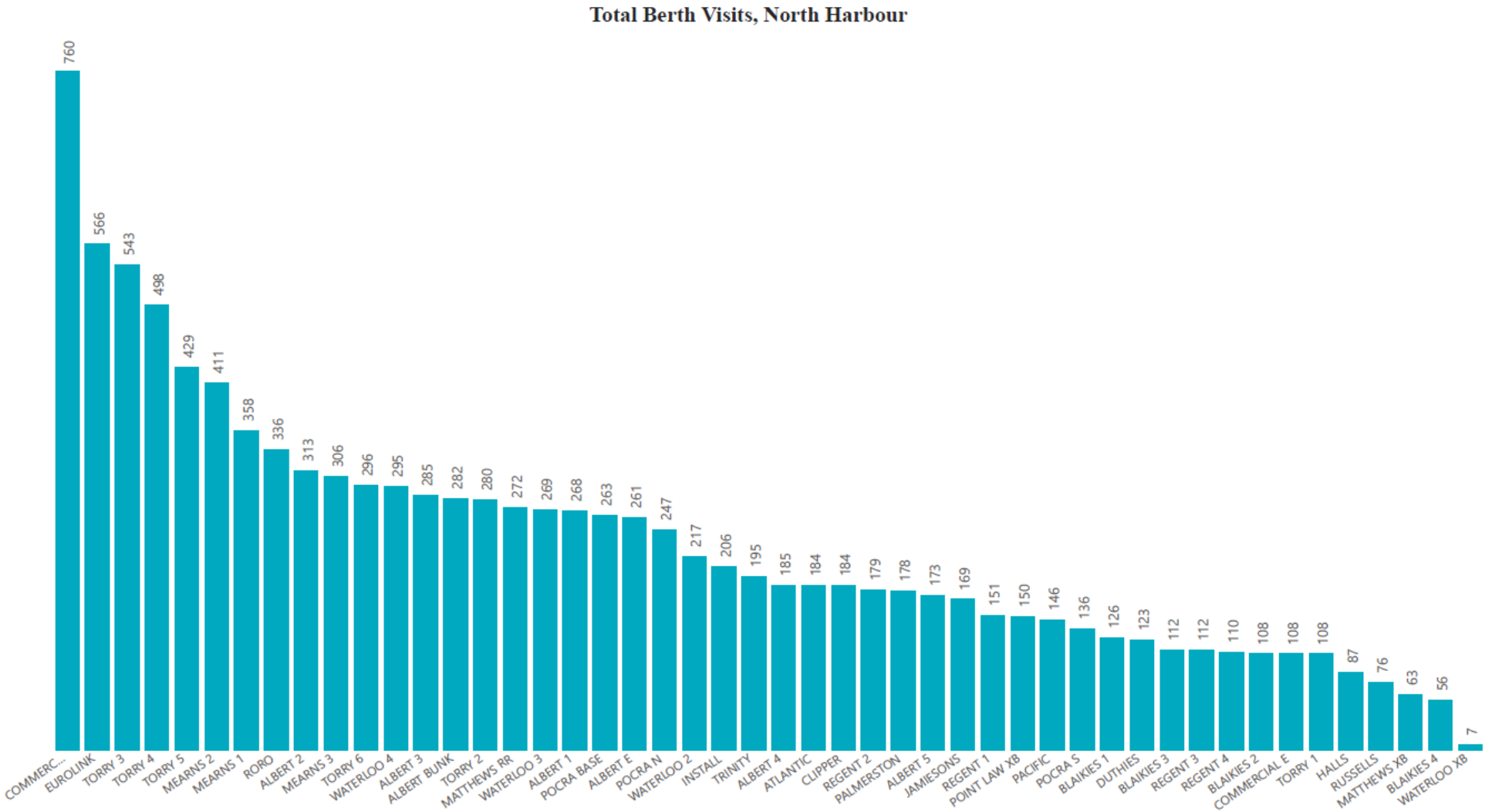
All Movements

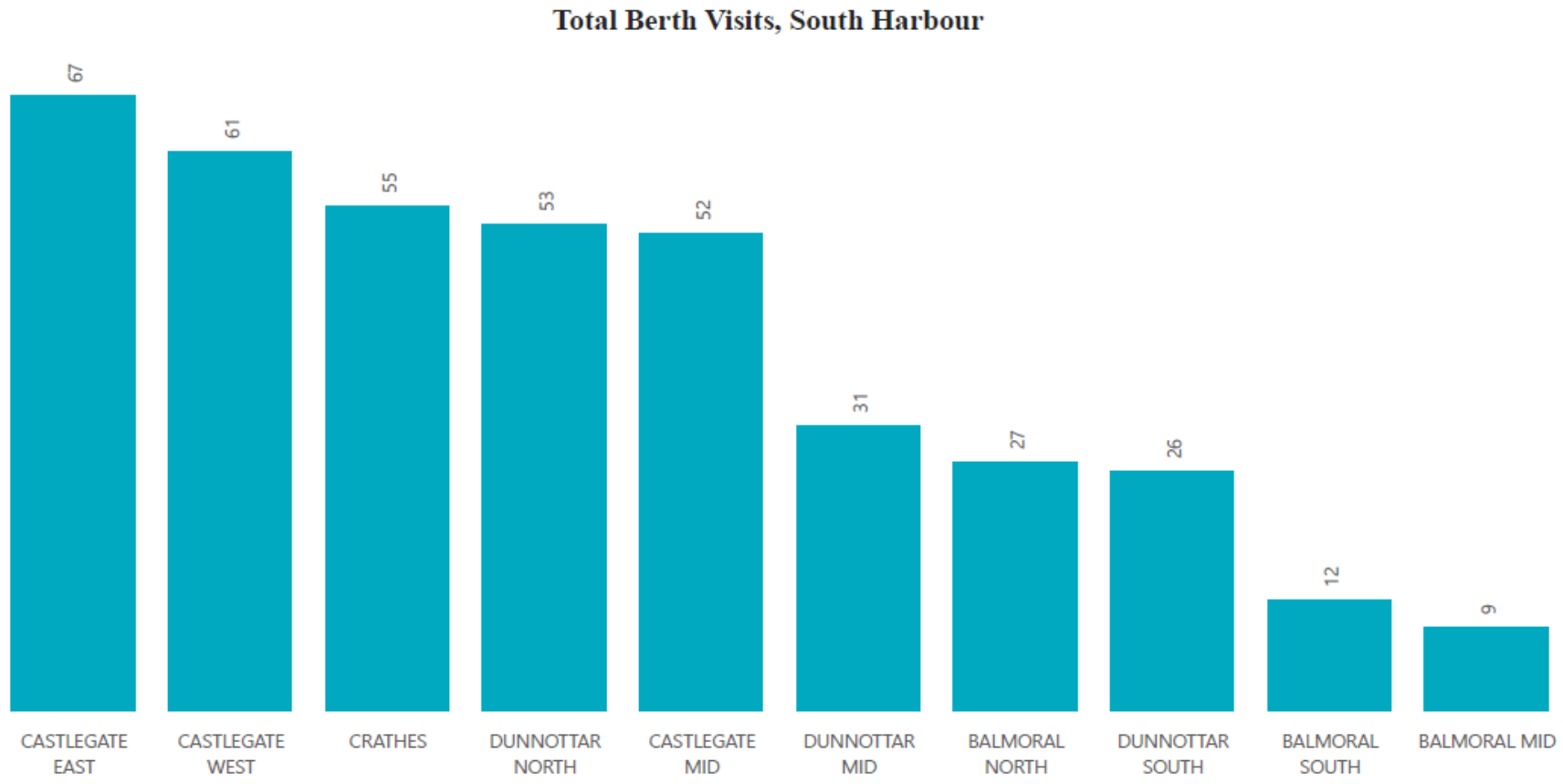
To Anchor Emissions Summary








Total Berth Visits, North Harbour
760
566
543
498
429
411
358
336
313
306
296
295
285
282
280
272
269
268
263
261
247
217
206
195
185
184
184
179
178
173
169
151
150
146
136
126
123
112
112
110
108
108
108
87
76
63
56
7
COMMERC...
EUROLINK
TORRY 3
TORRY 4
TORRY 5
MEARNS 2
MEARNS 1
RORO
ALBERT 2
MEARNS 3
TORRY 6
WATERLOO 4
ALBERT 3
ALBERT BUNK
TORRY 2
MATTHEWS RR
WATERLOO 3
ALBERT 1
POCRA BASE
ALBERT E
POCRA N
WATERLOO 2
INSTALL
TRINITY
ALBERT 4
ATLANTIC
CLIPPER
REGENT 2
PALMERSTON
ALBERT 5
JAMIESONS
REGENT 1
POINT LAW XB
PACIFIC
POCRA S
BLAIKIES 1
DUTHIES
BLAIKIES 3
REGENT 3
REGENT 4
BLAIKIES 2
COMMERCIAL E
TORRY 1
HALLS
RUSSELLS
MATTHEWS XB
BLAIKIES 4
WATERLOO XB


Total Berth Visits, South Harbour
67
61
55
53
52
31
27
26
12
9
CASTLEGATE EAST
CASTLEGATE WEST
CRATHES
DUNNOTTAR NORTH
CASTLEGATE MID
DUNNOTTAR MID
BALMORAL NORTH
DUNNOTTAR SOUTH
BALMORAL SOUTH
BALMORAL MID

Appendix E Calculation Methods

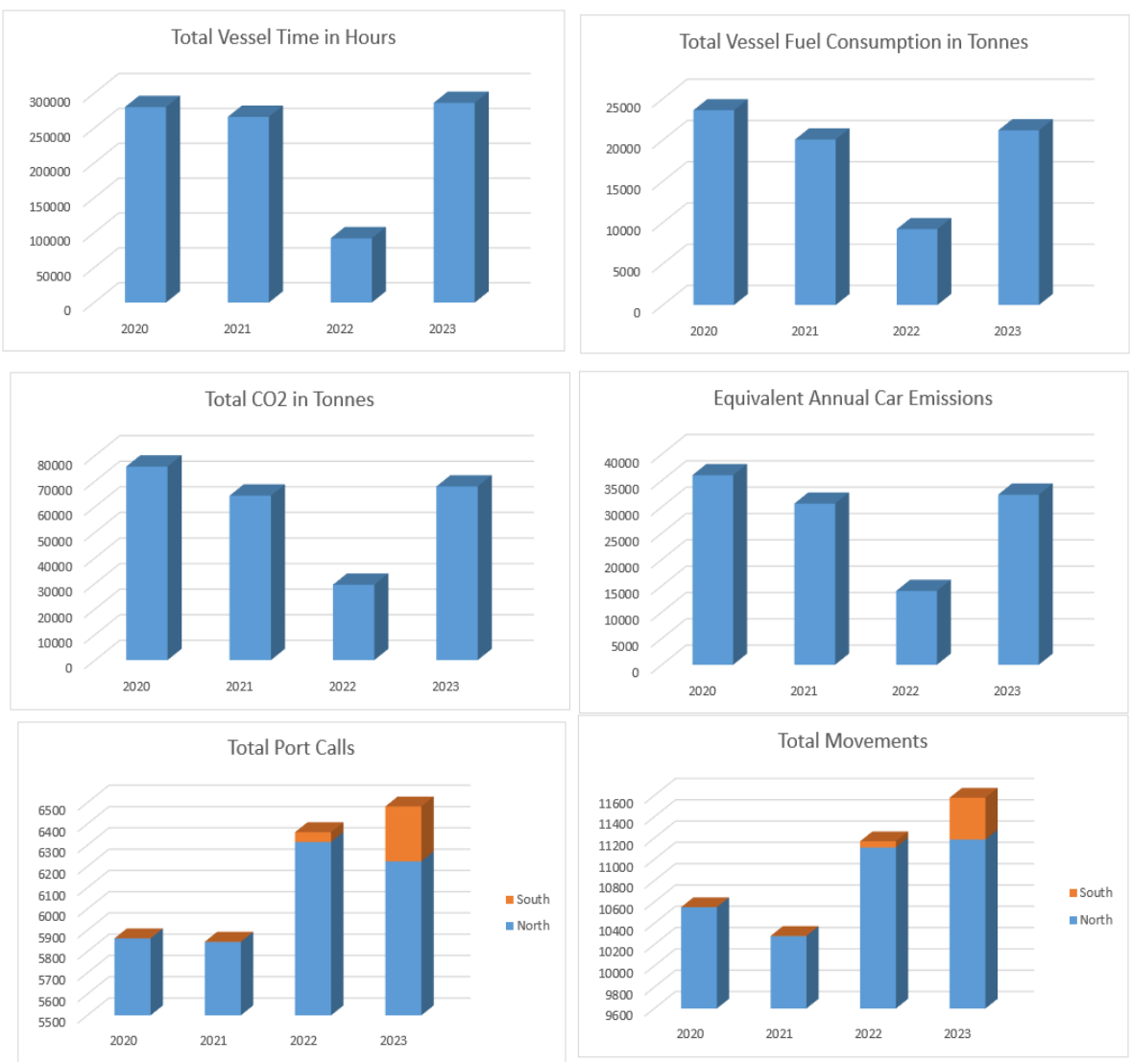
ID	Emission Source	Calculation Method
1	LPG	$Litres\ x\ LPG\ EF$
2	Company vehicles	Emission factors were selected upon size of vehicle and fuel type. $Miles\ x\ EF$
3	Diesel, equipment & machinery	$Litres\ x\ EF$
4	Electricity	$kWh\ x\ EF$
5	Waste	Waste emission factors are provided in tonnes and therefore the data "company_name»provided had to be converted from litres to tonnes. $Tonnes\ x\ Type\ of\ waste\ EF$
6	Water	$Cubic\ meter\ x\ water\ supply\ EF$ $Cubic\ meter\ x\ water\ treatment\ EF$
7	Employee commute	Employees were surveyed to gain their total miles of commute throughout the reporting and the type of commute. Appropriate EF were then applied to the commute type. $miles\ x\ appropriate\ EF$
8	WFH	Employees were surveyed on many hours per reporting period they work from home. $Hours\ x\ WFH\ EF$
9	Business travel	Sealand's software calculates the total distance for each entered trip, this is then multiplied by the appropriate EF. EF alter by mode of transport. If flying the EF also change depending on what class, the passenger flew. $Distance\ x\ EF$

ID	Emission Source	Calculation Method
10	Transport & distribution	Total distance and frequency of supplier trips were calculated this was multiplied by the size of vehicle's EF. $Distance\ x\ appropriate\ EF$

Appendix F Vessel Emissions breakdown for previous years

PORT OF ABERDEEN VESSEL EMISSIONS SUMMARY, 2020 - 2023

			Total Time [hours]			Total Fuel Consumption [tonnes]			Total CO2 Equivalent based on MGO [tonnes]						
	Harbour	Instance	Manoeuvring	Berthed	Combined	Manoeuvring	Berthed	Combined	Manoeuvring	Berthed	Combined	Equivalent Annual Car Emissions	Total Port Calls	Total Movements	Total Gross Tonnage
2020	North	All	8497	271894	280390	1090	22513	23603	3496	72175	75671	36019	5862	10552	39301170
	South		0	0	0	0	0	0	0	0	0	0	0	0	0
	To Anchor		844	519	1363	73	36	109	235	115	349	166	538	1325	5503867
	North & South		8498	271907	280404	1090	22513	23604	3496	72178	75673	36021	5862	10552	39301170
2021	North		8487	257839	266326	1059	19001	20059	3394	60917	64311	30612	5845	10281	35684493
	South		1	6	7	0	0	0	0	1	1	1	1	1	9383
	To Anchor		844	530	1374	77	39	116	246	124	370	176	440	844	3371843
	North & South		8488	257845	266333	1059	19001	20060	3394	60918	64312	30613	5846	10282	35693876
2022	North		11019	69701	80720	1291	7268	8558	4138	23300	27438	13060	6315	11112	39890704
	South		57	13289	13346	6	804	810	18	2577	2595	1235	46	59	492095
	To Anchor		785	542	1327	79	37	116	253	120	373	177	490	785	3300091
	North & South		9192	82990	92182	1127	8072	9198	3612	25877	29490	14037	6361	11171	40382799
2023	North		9138	246982	256120	1245	17949	19194	3991	57546	61537	29292	6224	11187	40267228
	South		356	29846	30202	58	1922	1980	186	6163	6349	3022	258	393	3352739
	To Anchor		774	28197	28971	92	2124	2216	294	6809	7103	3381	531	774	3555882
	North & South		9499	276868	286367	1304	19873	21177	4180	63714	67894	32317	6482	11580	43619967


Total Vessel Time in Hours
300000
250000
200000
150000
100000
50000
0
2020
2021
2022
2023
Total Vessel Fuel Consumption in Tonnes
25000
20000
15000
10000
5000
0
2020
2021
2022
2023
Total CO2 in Tonnes
80000
70000
60000
50000
40000
30000
20000
10000
0
2020
2021
2022
2023
Equivalent Annual Car Emissions
40000
35000
30000
25000
20000
15000
10000
5000
0
2020
2021
2022
2023
Total Port Calls
6500
6400
6300
6200
6100
6000
5900
5800
5700
5600
5500
2020
2021
2022
2023
South
North
Total Movements
11600
11400
11200
11000
10800
10600
10400
10200
10000
9800
9600
2020
2021
2022
2023
South
North

Appendix G ESOS and SECR Compliance

SECR

Quoted companies must continue to report on their global scope 1 and 2 GHG emissions in tonnes of CO2e and a chosen emissions intensity ratio in their directors report for current and previous periods.

Unquoted large companies and large LLPs will need to report, as a minimum UK energy use from electricity, gas and transport fuel- as well as the associated GHG emissions- including at least one intensity metric.

Quoted and unquoted companies and LLPs all need to report energy use, GHG emissions and at least one emissions intensity metric for the current and previous financial years. The relevant report must include a narrative description. Where possible, resulting energy saving from the actions reported should also be stated. If no measures have been taken this should also be included in the report.

SECR must be included in Director's Reports for all financial years starting on or after 1st April 2019.

Failure to comply with SECR regulations could incur financial penalties for your business.
The Conduct Committee of the Financial Reporting Council is responsible for checking compliance for the SECR information provided. If you do not report or your SECR report does not meet the requirements, the report may be rejected and penalty applied for late compliance.

Requirements for Streamlined Energy and Carbon Reporting differ depending on the type of organization. At a minimum, an organization will need to report:

1. Energy use which includes gas, purchased electricity and transport fuel, along with GHG emissions
2. Information around methodology used to measure energy use and emissions
3. A narrative description of efforts taken to improve energy efficiency over the last 12 months
4. An intensity ratio which is used to compare emissions data with a business metric, to allow for comparison with similar businesses and previous years
5. Equivalent figures from previous years as a base for comparison on changes and improvements

A filled in example template has been provided below to show the format of the documentation.

FORSYTHS LIMITED

DIRECTORS' REPORT (CONTINUED)

FOR THE YEAR ENDED 31 OCTOBER 2020

Summary of energy consumption and emissions

For the year-ended 31 October 2020	Group		Company	
	Energy Use kWh	Tonnes CO2e	Energy Use kWh	Tonnes CO2e
Energy use and emissions from stationary activities involving the combustion of gas (plant construction)	137,192	30	79,170	18
Energy use and emissions from stationary activities involving the combustion of gas (heating)	667,259	123	667,259	123
Energy use and emissions from mobile activities involving the combustion of gas (transport and plant construction)	2,646,567	650	878,433	216
Energy use and emissions from electricity use	1,573,025	367	1,388,426	323
Total energy use and gross emissions	5,024,043	1,170	3,013,288	680
Intensity ratio: CO2 emissions per revenue (T/£M)*	23.4		18.2	

Please note as this is the first year of reporting under Streamlined Energy and Carbon Reporting no comparative years are available, 2020 will therefore form the baseline year.

Methodology
We report our emissions with reference to the latest Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol). The 2020 UK Government GHG Conversion Factors for Company Reporting published by the UK Department for Environment Food & Rural Affairs (DEFRA) are used to convert energy use in our operations to emissions of CO2e. Carbon emission factors for purchased electricity calculated according to the "location based grid average" method. This reflects the average emission of the grid where the energy consumption occurs. Data sources include billing, invoices and the Group internal systems. For transport data where actual usage data (e.g. litres) was unavailable conversions were made using average fuel consumption factors to estimate the usage.

Intensity Ratio
We have chosen to report our gross emissions against total sales quantity.

Energy Efficiency Action
Forsyths Ltd are committed to reducing the environmental impact of our operations. Actions taken to improve energy efficiency include purchasing hybrid and electric vehicles, and installing more energy efficient equipment and lighting.

ESOS

The Energy Savings Opportunity Scheme (ESOS) is a mandatory energy assessment scheme for organizations in the UK that meet the qualification criteria. The Environment Agency is the UK scheme administrator.

Organisations that qualify for ESOS must carry out ESOS assessments every 4 years. These assessments are audits of the energy used by their buildings, industrial processes and transport to identify cost-effective energy saving measures.

Organisations do not need to pre-register with the Environment Agency but must notify the Environment Agency by the set deadline that they have complied with their ESOS obligations. As defined by the Energy Savings Trust.

The next phase will be in December 2026.

Compliance period	Qualification date	Compliance period	Compliance date
1	31 December 2014	From 17 July 2014* to 5 December 2015	5 December 2015
2	31 December 2018	From 6 December 2015 to 5 December 2019	5 December 2019
3	31 December 2022	From 6 December 2019 to 5 December 2023	5 December 2023
4	31 December 2026	From 6 December 2023 to 5 December 2027	5 December 2027

Steps in ESOS

1

Calculate your business's total energy consumption

You're required to measure all energy use across your premises, industrial processes and fleet.
Under ESOS, energy is defined as combustible fuels, heat, renewable energy, electricity and transport fuel.
Your assessment should cover a representative sample of your operations and sites, and results should be presented in a common unit, such as pounds sterling or kilowatt-hours.

2

Identify and audit areas of significant energy consumption

Pinpoint which assets and activities account for at least 95% of your overall energy usage. Up to 5% of your energy consumption can be classed as not signicant and omitted from your calculations.
Once you've identified your highest consumption areas, you need to audit them against **minimum government requirements**.
Any energy audits conducted between December 2019 and December 2023 count towards ESOS compliance.

3

Create an ESOS compliance plan

Use your audit results to map out energy-saving opportunities. Your plans should outline practical ways to minimise waste and improve energy efficiency – and detail their estimated cost benefits.
An experienced sustainability consultant can produce a comprehensive ESOS compliance plan, including innovative and achievable solutions – from installing EV charge points to embracing renewable energy and alternative fuels.

4

Appoint a lead assessor to review your report

A lead assessor oversees your energy audits and signs off your final ESOS assessment.
They can be a professionally registered employee, but working with an external specialist can guarantee compliance and place decades of industry experience on your side.

3.5 How energy is defined

Under ESOS, energy is defined as all forms of energy products, including:

- combustible fuels
- heat (excluding your organisation's surplus heat from industrial processes)
- renewable energy
- electricity
- fuel used in transport

There are no fuel type exemptions in ESOS.

5

Notify the Environment Agency

When your ESOS assessment is complete, you need to submit your notification of compliance to the Environment Agency.

6

Keep accurate compliance records

You're expected to maintain records of how you've complied with ESOS in an evidence pack – and you're free to choose the format.

8