

Fórsa Carbon Footprint Report - 2019

Prepared by the Clean Technology Centre

Cork Institute of Technology

Safaa Al Tameemi and James Hogan

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All information contained within this report is deemed to be confidential and commercially sensitive

Introduction

This carbon footprint report has been prepared in full accordance with the Greenhouse Gas Protocol (GHG), using the international carbon calculation methodology that is compatible with the GHG standard of ISO 14064.

This report covered the emitting activities for 2019 including direct and indirect emissions resulting from Fórsa owned and controlled emissions (Scope 1), emission from purchased electricity (Scope 2), and selected indirect emissions resulting via Fórsa staff business travel and water consumption (Scope 3).

It is important to mention that under the GHG Protocol, the reporting of both direct emissions and indirect emissions resulting from purchased electricity are compulsory. Whereas all other indirect emissions that result from business activities, Scope 3 emissions, are reported on a voluntary basis.

Organisational Boundaries

Fórsa has chosen to use the Emissions Factors approach for the purposes of consolidating and reporting GHG emissions.

Using this approach, this Carbon Footprint Report includes emissions from the following offices.

<i>Office Name</i>	<i>Office Address</i>
Nerney's Court Office	Nerney's Court & Gardiner Place
Limerick Office	Roxboro Road, Limerick
Sligo Office	ICE House, Fish Quay, Sligo
Cork Office	Father Mathew Quay, Cork.
Galway Office	23/24 Mulvoy Park, Sean Mulvoy Road, Galway
Adelaide Office	19 Adelaide Road, Dublin 2
Woodford Office	Unit 2/4 Woodford Business Park, Santry, Dublin 17
Merrion Square Office	30 Merrion Square, Dublin 2

Operational Boundary

Five GHG sources were determined to be relevant within Fórsa organisational boundaries, as outlined in the table below.

Table 1: Source of Fórsa GHG Emission within the Organisational Boundaries

Scope Number	Emission Type	Fórsa Investigated Emission
Scope 1 Emissions	Direct Emissions from onsite Fuel Combustion	Oil and Natural Gas Combustion
Scope 2 Emissions	Indirect Emissions from Electricity Purchase	Electricity
Scope 3 Emissions	All Other Indirect Emissions from Activity of Organisation	Business Travel, Water Consumption and Treatment

Base Year

A base year, under the Kyoto Protocol, is like a reference point where future emissions can be compared to, and allow for the tracking of progress to a given target. The base year of Fórsa for the purposes of reporting Greenhouse Gas Emissions is 2019.

Calculation Method

The methodologies used to collect and assess emissions data varied throughout the inventory. Fórsa has chosen to use Emissions Factors methodology to be applied to the number of resources consumed for the purpose of calculating GHG emission. The Clean Technology Centre has made all efforts possible to use the best available emission factors at the time.

There have been no changes to the prescribed methodologies used within this inventory, as this is the first reporting year. If changes to any of the identified methodologies occur, they will be quantified and explained in detail in future inventories. There is a big opportunity for improvement in future inventories, particularly in collecting Fórsa activity data due to poor internal data monitoring and collection.

Gross Emission

The total emissions for Fórsa in the reporting period of 2019 are about 528.21 t CO_{2e}. The total emissions broken down by scope are as follows:

Table 2: Fórsa Gross Emission for 2019

Scope	Total Emission (tCO _{2e})
Scope 1 Emission	134.86
Scope 2 Emission	139.55
Scope 3 Emission	199.80

Performance

Scope 1: Natural Gas and Heating Oil Greenhouse Gas Emissions

Scope 1 in Carbon Footprint Protocols uses all direct emissions from activities of an organisation under their control. This includes fuel combustion on-site, from owned vehicles and fugitive emissions, e.g. refrigerant leaks.

At Fórsa, all offices use natural gas for space and water heating except for the Sligo office where they use oil heating, and the Galway and Woodford offices where they use electricity. Figure 1 below illustrates Scope 1 CO_{2e} emissions for Fórsa offices that combust natural gas or heating oil on-site for heating and hot water purposes.

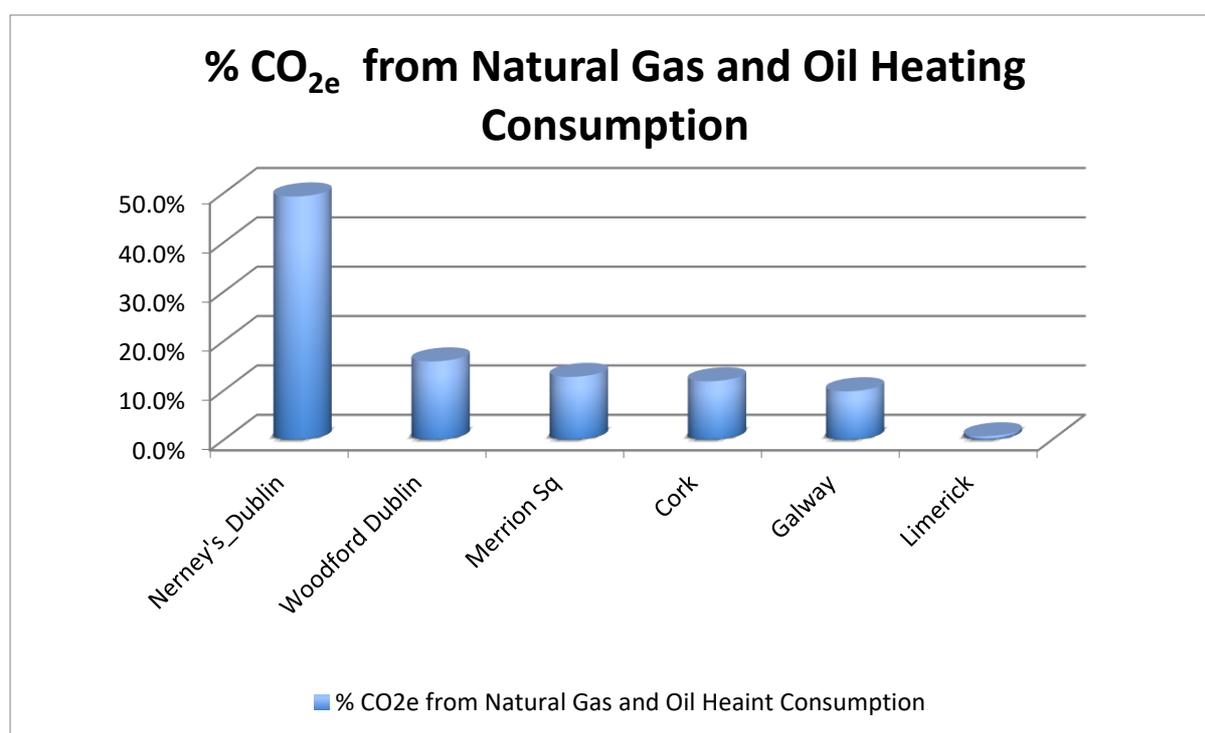


Figure 1: Scope 1 CO_{2e} Emissions

Scope 1 Estimation of Uncertainty

The level of uncertainty of Scope 1 carbon footprint estimation for Fórsa direct emissions is medium. The data for natural gas and heating oil collection systems is considered to be potentially poor in terms of reliability, as this data was collected manually from the gas and oil bills without using any software (e.g. Excel) for calculations. Thus, there was a big chance for human error. However, the team in Clean Technology Centre use a robust emission factors value provided by the Irish Environmental Protection Agency.

Scope 2: Electricity Greenhouse Gases Emissions

Scope 2 in Carbon Footprint Protocol includes all indirect emissions from electricity purchased and used by the organisation. Emissions will be created during the production of the energy and when it is used by the organisation.

As the Nerney's Court office is the highest electricity consumption office among the offices, the CO_{2e} for the Nerney's office is also the highest at around 52% of the total CO_{2e} of all offices. That is followed by Woodford at 10.5% and Limerick 10.2%. In addition Galway, Adelaide, Cork, Sligo and Merrion Square are 7.6%, 7%, 6.5%, 4.5% and 1.7% respectively. This can be seen in Figure 2 below.

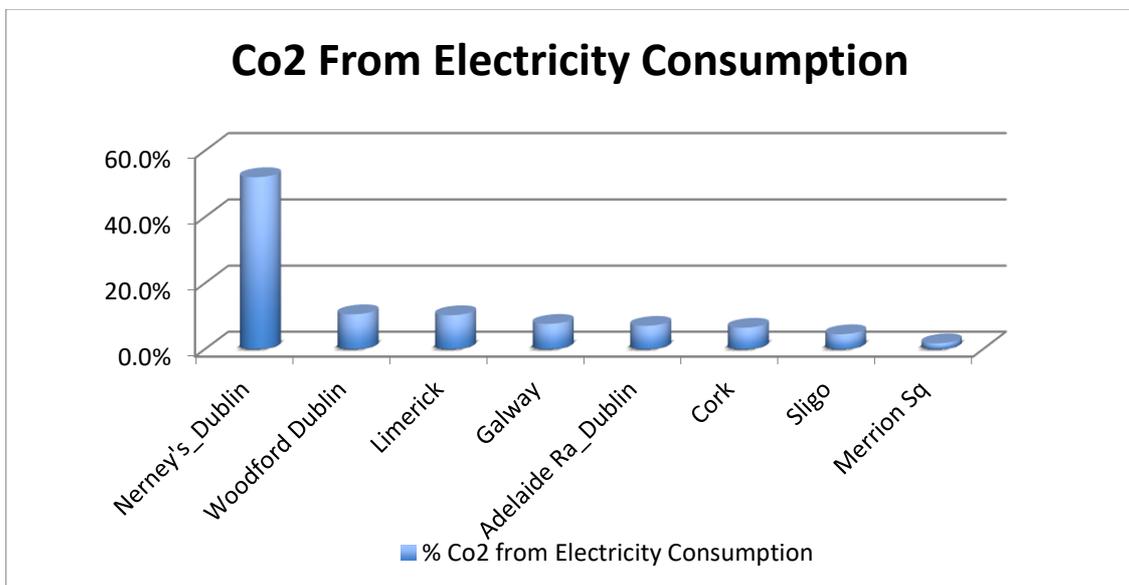


Figure 2: Scope 2 CO_{2e} Emissions

Scope 2 Estimation of Uncertainty

The level of uncertainty of the estimated Scope 2 emissions for Fórsa electricity consumption is very low as the data provided was provided directly from energy supplier 'Electric Ireland' as a total electricity consumption for each site of Fórsa offices. At the same time, the Clean Technology Centre team use a robust emission factors value provided by the Irish Environmental Protection Agency.

Scope 3: Business Travel and Water Supply and treatment

Scope 3 in Carbon Footprint Protocol includes all other indirect emissions from the organisation's activities which occur from sources that they do not own or control. This scope includes the largest share of the carbon footprint as it covers emission from business travel, waste, water and procurement. As calculating this scope emission is on a voluntary basis by companies, carbon footprint emission from Fórsa staff business travel and water supplied to the offices were included in this study.

Water

Assuming that the volume of the water supplied to Fórsa offices is the same as the discharged water volume, it was estimated that 1.7 tonnes of CO_{2e} were emitted from supplying water to five Fórsa offices as well as treating the discharged water from those five offices.

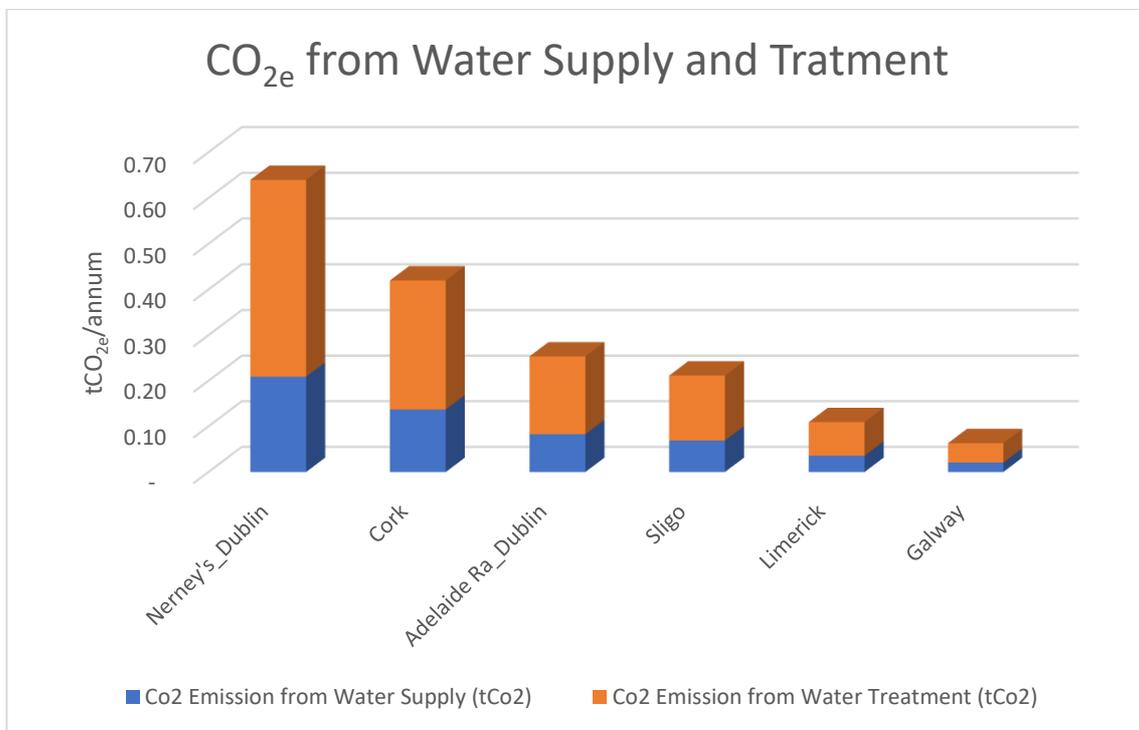


Figure 3: Scope 3 CO_{2e} Emissions (Water Supply and Treatment)

As can be seen from Figure 4 below, Nerney's Court office was the highest contributor of around 38% of total CO_{2e} emissions from water supply and treatment in Fórsa offices. This was followed by Cork 25%, Adelaide 15%, Sligo 12%, Limerick 6% and Galway 4% respectively.

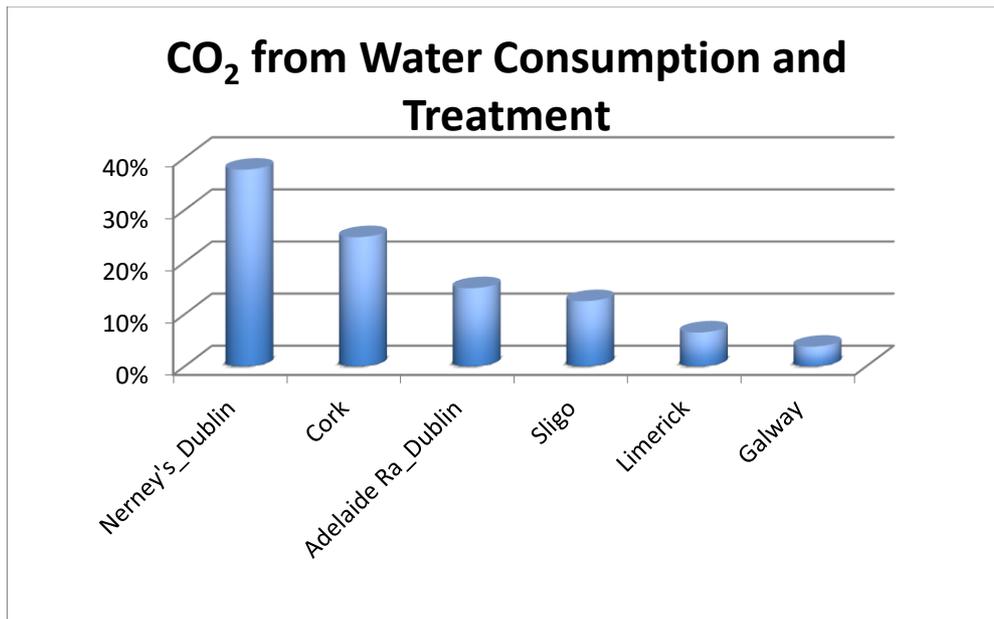


Figure 4: Scope 3 Water CO_{2e} Emissions

Business travel

The carbon footprint of any road travel depends on a few factors that are fundamental to accurately calculate the CO_{2e} emissions, which are:

- Trip distance
- Engine size or car tax band
- Fuel type (petrol, diesel, hybrid etc.)

However, Fórsa wasn't able to provide all this information; thus, a few assumptions were taken in the calculation methodology of the staff business travel carbon footprint:

- All business travel distances were provided
- Engine size for 32% of the cars being used was unknown. Thus, the average engine size for the provided engine size was applied.
- The fuel type for cars wasn't provided, thus, the average proportion of petrol to diesel cars in Ireland was extracted from the Irish Central Statistics Office since 2000, which was then applied to the cars used by Fórsa staff.

It was estimated that around 198 tonnes of CO_{2e} was emitted from the business travel by Fórsa staff.

Scope 3 Estimate of Uncertainty

The level of uncertainty for the Fórsa staff travel activity section on Scope 3 emissions was high. This is as a consequence of using many assumptions on quantification methodology and subsequent calculations of the travel emissions, such as fuel type and 32% of the used car's engine size. At the same time, the Clean Technology Centre team use a robust emission factors value provided by the Irish Environmental Protection Agency.

Whereas, the uncertainty level of the water consumption and treatment section in Scope 3 emissions was medium, due to accurate water data that was provided by Fórsa and verified by the Clean Technology team.

However, the only thing that draws the water uncertainty level to a medium is that Ireland doesn't announce water emission factors, and in this case, an international emission factor had to be used. In this study, the United Kingdom water consumption and treatment emission factors were used.

Ratio Performance Indicators

For any organisation, the performance indicators can be calculated in different ways depending on the available data or organisational preferences. The below Table 3 is the total performance indicators for Fórsa offices.

Table 3: Fórsa Carbon Footprint Performance Indicators

Scope 1	Natural Gas and Heating Oil	Tonnes of CO _{2e} /Employee	0.85
Scope 2	Electricity	Tonnes of CO _{2e} /Employee	0.82
Scope 3	Business Travel and Water Consumption	Tonnes of CO _{2e} /Employee	1.22
Total Carbon Footprint (Scope 1,2 and selection of 3)		Tonnes of CO _{2e} /Employee	2.89

Scope 1 Performance indicators

As Scope 1 is all of the direct emissions that emitted from fuel combustion, the below offices in Table 4 are only applied to Scope 1 emissions that used natural gas or heating oil for space heating and hot water.

Table 4: Scope 1 Performance Indicators

Office	Scope 1 (kgCO ₂ /m ²)	Scope 1 (kgCO ₂ /staff)
Nerney's Court Dublin	17.203	608.153
Limerick	45.552	2208.652
Sligo	1.664	57.199
Cork	13.642	1240.315
Galway	0.000	0.000
Adelaide Rd Dublin	20.857	
Woodford Dublin	0.000	0.000
Merrion Sq.	36.957	

Note; No staff at Adelaide and Merrion Square offices.

Scope 2 Performance Indicators

As Scope 2 is the indirect emissions from electricity purchased, below in Table 5 outlines the Scope 1 carbon footprint for each of the Fórsa offices.

Table 5: Scope 2 Performance Indicators

Office	Scope 2 (kgCO ₂ /m ²)	Scope 2 (kgCO ₂ /staff)
Nerney's Dublin	17.540	620.065
Limerick	28.483	1381.003
Sligo	10.988	377.711
Cork	8.699	790.909
Galway	24.050	1284.729
Adelaide Rd Dublin	12.004	
Woodford Dublin	15.954	2365.298
Merrion Sq.	4.785	

Note; No staff at Adelaide and Merrion Square offices.

Scope 3 Performance Indicators

As Scope 3 in this study includes all emissions from water supply and treatment as well as staff business travel, the below performance indicators were estimated.

Table 6: Water Performance Indicator

	Water (kgCO ₂ /m ²)	Water (kgCO ₂ /staff)
Nerney's Dublin	0.16011094	5.66031858
Limerick	1.31917667	10.9408
Sligo	0.38446517	13.21575
Cork	0.41970603	38.1589091
Galway	0.14770095	0.14770095
Adelaide Rd Dublin	0.32105663	

Table 7: Travel Performance Indicator

kg CO _{2e} /staff	1,208
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Carbon Offsetting

Reducing greenhouse gases emissions from organisational activities is one of the first steps to tackle global climate change.

However, offsetting carbon footprint is an additional way for an organisation to cut their emissions. Carbon offsetting is generated from projects that reduce or absorb the amount of greenhouse gases entering the atmosphere.

Carbon offsetting projects can be split into two main aspects - technologies avoiding greenhouse gases, e.g. renewable energy project or fuel switches, and technologies sequestering or absorbing CO₂, e.g. reforestation.

There are a few key categories to look at when selecting the type of offsets to buy, such as;

- **Project type** is it based on avoiding greenhouse gas emissions or absorbing CO₂.
- **The project location** is it in developing or developed countries.
- **Level of aggregation** whether the project credits from a portfolio or individual project.
- **Guarantees** does the project provide guarantees against non-delivery or permanence issues.
- **Labelling** service offered such as carbon neutrality stamp.

The below Table 8 is an estimated cost if Fórsa would like to offset the carbon emission estimated in this study. However, it has to be mentioned that this only a cost estimation, and if Fórsa would like to proceed with this it requires further investigation.

As can be seen from Table 8 below, there is a significant cost range, and that depends on the above project categories, for example, project location and the certification type of the project.

Table 8: Carbon Offsetting Cost Estimation

Scope	Total Emission (tCO _{2e})	Estimated Offsetting Cost (€)
Scope 1 Emission	134.86	€1,000 - €2,100
Scope 2 Emission	139.55	€1,100 - €2,300
Scope 3 Emission	199.80	€1,400 - €2,500

Recommendations

There are different actions that can be taken by Fórsa staff and management to reduce the origination's carbon footprint emissions, such as;

- Harness renewable energy source such as installing PV panels, change the heating system from traditional natural gas or oil boilers to heat pumps.
- Install an intelligent or high-tech control system throughout the office for both heating and electricity system.
- Use night rate electricity for equipment and computers.
- Reduce business travel as much as possible.
- Encourage employees to use electric vehicles by providing free charging points on site. There is no BIK for employees who use electric vehicles, so this is an added incentive.
- When booking flights for staff try to book the most fuel-efficient economy seat on a direct flight. Also pay for the offset of the carbon emitted.
- Encourage the staff to bike to work by providing bike parking space as well as change rooms and shower in addition to offering employee bike scheme.
- Reduce water consumption by installing water low flow taps and by eliminating or controlling urinals.
- Sharing this report with employees and provide training and workshops to raise staff awareness.
- Move towards zero waste by assessing your business's current waste generation, management and disposal. Or develop waste reduction strategies and focuses on reducing-reusing-recycling materials.