**Company Name**

The Workbook

### A picture containing logo Description automatically generated

The Workbook

Operational carbon neutrality

Redshaw Advisors Ltd.

2020

[Users’ guide 3](#_Toc66704774)

[Contact details 4](#_Toc66704775)

[Scope 1 5](#_Toc66704776)

[Fuel sources: 5](#_Toc66704777)

[Refrigerant top-ups 6](#_Toc66704778)

[Scope 1 total 6](#_Toc66704779)

[Scope 2 7](#_Toc66704780)

[Electricity 7](#_Toc66704781)

[Scope 2 total 7](#_Toc66704782)

[Defra 2020 electricity factors 7](#_Toc66704783)

[Scope 3 8](#_Toc66704784)

[Water usage 8](#_Toc66704785)

[Waste 8](#_Toc66704786)

[Employee commuting 9](#_Toc66704787)

[Business travel 9](#_Toc66704788)

Flights and [trains 10](#_Toc66704789)

Working from home….…………………………………………………………………………………………………………………………………11

[Scope 3 total 11](#_Toc66704790)

[Final operational carbon footprint 11](#_Toc66704791)

[Final emissions calculation 11](#_Toc66704792)

[Conversion tables 12](#_Toc66704793)

# Users’ guide

Use this One Two Zero workbook to calculate your organisation’s operational carbon footprint. Whereavailable, please fill in your organisation’s activity data and complete the greenhouse gas (GHG) emissions calculation for each source of emission. When you are confident that you have collected all measurable emissions data, please return to the Plannet Zero team who will check your data, retire the carbon offsets on your behalf and return operational carbon neutral certification.

One Two Zero uses readily available company data and by applying up-to-date GHG emissions factors we can produce a credible operational carbon footprint, supported by the Department of Environment, Food and Rural Affairs (Defra) and the GHG Protocol (<https://ghgprotocol.org/>). All emissions conversion factors are up to date with the latest 2021 Defra reporting figures.

***Activity data x Emissions factor = GHG emissions***

‘Activity data’ is information used to calculate GHG emissions from combustion and other processes. For example, this could be litres of fuel consumed by your organisation’s vehicles. Most activity data is easy to obtain, relatively accurate and can be found on bills, invoices and receipts. The table below sets out common emission-releasing activities and sources of information to change this data into GHG emissions.

It is best to collect activity data by **volume or mass** (e.g. litres of petrol used) as emissions can be calculated more accurately.

|  |  |
| --- | --- |
| Emissions releasing activity | Source of information |
| **Electricity use** | Total kilowatt hours (kWh) used from electricity bill |
| **Natural gas use** | Total kilowatt hours (kWh) used from gas bill |
| **Fuel used in company owned vehicles** | Litres of fuel purchased form invoices and receipts |
| **Employee passenger travel** | Receipts for details of travel and use distance calculation websites to obtain, flight rail and road distances |
| **Water supply** | Total water supplied in cubic metres (m3) from water bill |
| **Water treatment** | Total water treated in cubic metres (m3) from water bill |
| **Waste disposal/recycling** | Tonnes of waste-treated by waste type (e.g. paper, glass, waste to landfill) from waste collection provider. |

Having completed your first carbon footprint, you may want to implement plans to monitor these emissions activities over time for future reporting. There are a number of ways to collect and manage this activity data at a corporate level. For example, this could include operational staff entering activity data directly into secure Internet databases or completing spreadsheet templates which could be emailed to a central point. Ideally, GHG reporting should be integrated into existing reporting tools and processes of your organisation.

When collecting data at a corporate level, using a standardised reporting format is recommended to ensure that data received from different business units and operations is comparable. You may wish to establish a quality management system to ensure that you produce a high-quality corporate carbon footprint.

Please fill in all table data fields that apply to your business and you have data available for. Actual data should be accessible for scope one and scope two activities. Actual data for company scope three emissions may not be available, for example waste collection, in this case an estimated average activity data is recommended in the absence of actual figures.

# Contact details

|  |  |
| --- | --- |
| Applicant | |
| **Name** |  |
| **Position** |  |
| **Telephone** |  |
| **Email** |  |

|  |  |
| --- | --- |
| Company | |
| **Company name(s)** |  |
| **Address** |  |
| **Telephone** |  |
| **Industry** |  |
| **Year company was founded** |  |
| **Year of reporting (start and finish date)** |  |
| **Number of company premises** |  |
| **Number of employees** |  |
| **Surface area of premises (f2)** |  |
| **Annual Turnover** |  |

# Scope 1

Activities owned or controlled by your organisation (on-site and company-owned vehicles) that release emissions straight into the atmosphere. You may find this information from bills, fuel card data or meters.

They are direct emissions. Examples of Scope 1 emissions include emissions from combustion in company-owned or controlled boilers, furnaces, vehicles: emissions from chemical production in company-owned or controlled process equipment.

Boxes highlighted in blue, have been pre-loaded with the latest Defra conversion factors and appropriate units.

Fuel sources:

Use the appropriate emissions factor, depending on the unit of data collected to calculate your GHG emissions

Natural gas – (kWh or therms)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | kWh | therms | kgCO2e |
|  | kWh | 0.1832 | 5.369 |  |

Heating oil – (kWh or litres)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | kWh | litres | kgCO2e |
|  |  | 0.2467 | 2.5409 |  |

Coal – (kWh or tonnes)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | kWh | tonnes | kgCO2e |
|  |  | 0.3446 | 2883.26 |  |

LPG – (kWh or litres)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | kWh | litres | kgCO2e |
|  |  | 0.2145 | 1.5571 |  |

Petrol – (litres)

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Usage | Unit | litres | kgCO2e |
|  | litres | 2.1935 |  |

Diesel – (litres)

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Usage | Unit | litres | kgCO2e |
|  | litres | 2.5123 |  |

Wood – (tonnes)

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Usage | Unit | tonnes | kgCO2e |
|  | tonnes | 61.8174 |  |

Refrigerant top-ups – if you have significant refrigeration needs you may have refrigerant leaks, which cause a significant GHG impact. If you have information of any refrigeration gas or air conditioning top-ups from this reporting period, please complete the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Refrigerant Gas | Unit | kg | kgCO2e |
| R22 | kg | 1810 |  |
| R134A | 1430 |  |
| R403A | 3124 |  |
| R404A | 3922 |  |
| R407A | 2107 |  |
| R407C | 1774 |  |
| R407F | 1825 |  |
| R408A | 3152 |  |
| R410A | 2088 |  |
| R507A | 3985 |  |
| R508B | 13396 |  |

|  |  |
| --- | --- |
| Unit | GHG emissions total |
| kgCO2e |  |
| tCO2e |  |

Scope 1 total **–** fuel consumption + refrigerant top-ups

# Scope 2

Emissions being released into the atmosphere associated with your consumption of purchased electricity. These are indirect emissions that are a consequence of your organisation’s activities, but they occur at sources you do not own or control.

Please collect the meter readings from all your operational company premises and list separately. Add rows as required.

Based on 2020 Defra conversion factors, check your energy bill as some providers supply their own conversion factors

Electricity – (kWh)

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Premises | Usage (kWh) | kgCO2e/kWh | kgCO2e |
|  |  | 0.21233  or  Energy provider actual data |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| Unit | GHG emissions total |
| kgCO2e |  |
| tCO2e |  |

Scope 2 total **–** electricity consumption

## Defra 2020 electricity factors

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Activity | Country | Unit | Year | kg/CO2e | kg/CO2 | kg/CH4 | kg/N2O |
| Electricity generated | Electricity: UK | kWh | 2021 | 0.21233 | 0.21016 | 0.0008 | 0.00137 |

# 

# Scope 3

Emissions that are a consequence of your actions, which occur at sources which you do not own or control and which are not classed as Scope 2 emissions. Examples of Scope 3 emissions are business travel by means not owned or controlled by your organisation, water treatment, waste disposal or purchased materials and services.

Whilst Scope 3 reporting is not essential in operational carbon neutrality (according to Defra and the GHG Protocol), One Two Zero is designed to record all measurable company emissions for the best possible self-validated footprint, making it a robust and comprehensive carbon neutral certification programme. We have provided the following templates for measuring these emissions, where data is available. In the absence of data we have provided additional questionnaires for you to collect emission estimates.

Water usage **-** Emissions from water use are associated with the energy use from supplying water and from the wastewater treatment processes. These emissions are classified under Scope 3, because they occur in the individual water utilities that supply water to the institutions or treat the wastewater they discard.

You will find this information on your water bill.

### 

### Water Supply

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | m3 | million litres | kgCO2e |
|  |  | 0.149 | 149 |  |

### Wastewater treatment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity data | | Emissions factor | | GHG emissions |
| Usage | Unit | m3 | million litres | kgCO2e |
|  |  | 0.272 | 272 |  |

Waste **-** Emissions from waste disposal are mainly associated with CH4 and N2O emissions from landfills or solid waste disposal sites, which are typically the largest source of GHG emissions in the waste sector. These emissions are classified under Scope 3, because they occur in landfills or treatment facilities operated by private companies, often in partnership with the local authorities.

If you can’t gather this information from your waste contracting service, perhaps monitor your weekly waste output and average out for the year.

### Waste breakdown

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Usage | Unit | kgCO2e/tonne | kgCO2e |
|  | tonnes | Recycling = 21.294  Landfill = 467.046  Food and garden waste = 8.951 |  |
|  |  |
|  |  |
| Total | | |  |

Employee commuting - We have designed an employee questionnaire (separate attachment) to identify emissions derived from your employee commuting journeys. The document can be shared as is or uploaded onto Survey Monkey using the instructions provided for an easy to share online questionnaire.

Please use this table to aggregate the results from your employee responses.

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Transport type | Distance (km) | kgCO2e/km | kgCO2e |
| Small car (petrol) |  | 0.1495 |  |
| Medium car (petrol) |  | 0.1879 |  |
| Large car (petrol) |  | 0.2791 |  |
| Small car (diesel) |  | 0.1376 |  |
| Medium car (diesel) |  | 0.165 |  |
| Large car (diesel) |  | 0.2072 |  |
| Hybrid car |  | 0.1195 |  |
| Car (LPG) |  | 0.1983 |  |
| Electric Car |  | - |  |
| Carpool |  | - |  |
| Motorbike |  | 0.1136 |  |
| Van (<1.74t) |  | 0.1832 |  |
| Van (<3.5t) |  | 0.2653 |  |
| HGV (<7.5t) |  | 0.4806 |  |
| HGV (7.5t-17t) |  | 0.5869 |  |
| Light rail or tram |  | 0.0281 |  |
| National Rail |  | 0.0355 |  |
| London Underground |  | 0.0278 |  |
| Bus |  | 0.1177 |  |
| Local London bus |  | 0.0772 |  |
| Cycle |  | - |  |
| Walk |  | - |  |
| Total | | |  |

Business travel **–** Rental cars, flights and train tickets purchased by the company.

Add extra rows as required.

### Vehicles

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Transport type | Distance (km) | kgCO2e/km | kgCO2e |
| Small car (petrol) |  | 0.1495 |  |
| Medium car (petrol) |  | 0.1879 |  |
| Large car (petrol) |  | 0.2791 |  |
| Small car (diesel) |  | 0.1376 |  |
| Medium car (diesel) |  | 0.165 |  |
| Large car (diesel) |  | 0.2072 |  |
| Hybrid car |  | 0.1195 |  |
| Car (LPG) |  | 0.1983 |  |
| Electric Car |  | - |  |
| Carpool |  | - |  |
| Motorbike |  | 0.1136 |  |
| Total | | |  |

Please use an online air mile calculator to estimate the flight distance and apply the correct factor.

### Flights

Flight air mile calculator [link](https://www.airmilescalculator.com/)

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Flight Journey Details | Distance (km) | kgCO2e/km | kgCO2e |
|  |  | Domestic, to/from UK  0.2459  Short-haul, to/from UK  0.1535  Long-haul, to/from UK  0.1931  International, to/from non-UK  0.1836 |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Total | | |  |

## 

### Trains

Train journey calculator [link](https://my.railmiles.me/mileage-engine/)

Please use an online rail route mapping tool to work out journey mileage and apply the correct transport type conversion factor

|  |  |  |  |
| --- | --- | --- | --- |
| Activity data | | Emissions factor | GHG emissions |
| Train Journey Details | Distance (km) | kgCO2e/km | kgCO2e |
|  |  | National rail  0.0355  International rail  0.0045  Light rail and tram  0.0281  London Underground  0.0278 |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Total | | |  |

# Working from home (Optional) - Use the work from home template provided to survey employees. Insert the total company level footprint emissions recorded by your employees for their working from home activities.

|  |  |
| --- | --- |
| Unit | GHG emissions total |
| kgCO2e |  |
| tCO2e |  |

Company level footprint **–** employee domestic heating (Scope 1) and

electricity consumption (Scope 2)

# 

|  |  |
| --- | --- |
| Unit | GHG emissions total |
| kgCO2e |  |
| tCO2e |  |

# Final Scope 3 total

Scope 3 total **–** Water + waste + business travel + employee commuting

+ working from home (company level footprint)

# Final operational carbon footprint

Final emissions calculation **–** add all three GHG emissions totals together for your operational footprint.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Scope 1 (tCO2e) | Scope 2 (tCO2e) | Scope 3 (tCO2e) |  | Total Operational Footprint (tCO2e) |
|  |  |  | = |  |

# Conversion tables

**Using the abbreviation table**

The abbreviation table simply demonstrates common abbreviations that may be found within the carbon reporting arena and their long-hand form. This table is entirely for reference.

**Using the conversions table**

To convert from the units of measure in the columns on the left-hand side of the table to the units of measure in the column headers in the same tables, simply multiple by the factor displayed where the two units meet on the table.

For example, to convert from kWh to GJ, multiply the kWh value by 0.036.

|  |  |  |  |
| --- | --- | --- | --- |
| Abbreviation | Symbol | Number | Standard form |
| Kilo | k | 1,000 | 10 3 |
| Mega | M | 1,000,000 | 10 6 |
| Giga | G | 1,000,000,000 | 10 9 |
| Tera | T | 1,000,000,000,000 | 10 12 |
| Peta | P | 1,000,000,000,000,000 | 10 15 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Energy | GJ | kWh | therm | toe | kcal |
| Gigajoule, GJ |  | 277.78 | 9.47817 | 0.02388 | 238,903 |
| Kilowatt-hour, kWh | 0.0036 |  | 0.03412 | 0.00009 | 860.05 |
| Therm | 0.10551 | 29.307 |  | 0.00252 | 25,206 |
| Tonne oil equivalent, toe | 41.868 | 11,630 | 396.83 |  | 10,002,389 |
| Kilocalorie, kcal | 0.000004186 | 0.0011627 | 0.000039674 | 0.000000100 |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Volume | L | m**3** | cu ft | Imp. gallon | US gallon | bbl (US,P) |
| Litres, L |  | 0.001 | 0.03531 | 0.21997 | 0.26417 | 0.0062898 |
| Cubic metres, m**3** | 1000 |  | 35.315 | 219.97 | 264.17 | 6.2898 |
| Cubic feet, cu ft | 28.317 | 0.02832 |  | 6.2288 | 7.48052 | 0.17811 |
| Imperial gallon | 4.5461 | 0.00455 | 0.16054 |  | 1.20095 | 0.028594 |
| US gallon | 3.7854 | 0.0037854 | 0.13368 | 0.83267 |  | 0.023810 |
| Barrel (US, petroleum), bbl | 158.99 | 0.15899 | 5.6146 | 34.972 | 42 |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Weight | kg | lb | ton (UK) | ton (US) | lb |
| Kilogram, kg |  | 0.001 | 0.00098 | 0.00110 | 2.20462 |
| tonne, t (metric ton) | 1000 |  | 0.98421 | 1.10231 | 2204.62368 |
| ton (UK, long ton) | 1016.04642 | 1.01605 |  | 1.12000 | 2240 |
| ton (US, short ton) | 907.18 | 0.90718 | 0.89286 |  | 2000 |
| Pound, lb | 0.45359 | 0.00045359 | 0.00044643 | 0.00050 |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Length/Distance | m | ft | mi | km | NM |
| Metre, m |  | 3.2808 | 0.00062137 | 0.001 | 0.00053996 |
| Feet, ft | 0.30480 |  | 0.000 | 0.0003048 | 0.00016458 |
| Miles, mi | 1609.34 | 5280 |  | 1.60934 | 0.86898 |
| Kilometres, km | 1000 | 3280.8 | 0.62137 |  | 0.53996 |
| Nautical miles, nmi or NM | 1852 | 6076.1 | 1.15078 | 1.852 |  |

