The Path to Climate Neutrality
Measuring: the Basics
Housekeeping

1. Please mute yourself
2. Questions at the end
3. We will go over 1 hour if you need us to
4. Recording of the session
5. This is an introductory session
Measure

Calculating greenhouse gas emissions
Measure: Terminology

1- GHG inventory/carbon footprint

Greenhouse gas emissions that are attributable to the organization

2- Carbon¹

Generally understood as “carbon equivalent” or CO2e, includes all GHGs, not only CO2 or carbon-containing ones

3- Emission sources

Activities that generate GHG emissions.

4- Emission factors

Conversion factors from activities to GHG emissions.

¹ Note that this term can have other meanings for other organizations
Measure: Key principles

1- Completeness

All relevant emission sources must be included.

2- Consistency - Comparability

The same approach must be used year after year.

3- Transparency

All information (including assumptions and approximations) must be publicly disclosed.
Measure: GHG Protocol and its Scopes

Scope 1 – All Direct Emissions from the activities of an organisation or under their control.

Burning of fuels, driving owned cars.

Scope 2 – Indirect Emissions from electricity/heating/cooling purchased and used by the organisation.

Purchasing electricity, heat, steam, cooling

Scope 3 – All Other Indirect Emissions

Everything else! Business travel, commuting, waste, water, purchased goods and services of all types

Scope 3 is usually the biggest and the most complex, but also very important to work on
# Measure: Why different scopes?

<table>
<thead>
<tr>
<th>Scopes</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope 1</td>
<td>You control, you decide</td>
</tr>
<tr>
<td></td>
<td>· Generating electricity</td>
</tr>
<tr>
<td></td>
<td>· Generating heat – non-electric</td>
</tr>
<tr>
<td></td>
<td>· Business travel – owned company vehicles</td>
</tr>
<tr>
<td></td>
<td>· Industrial processes emissions</td>
</tr>
<tr>
<td>Scope 2</td>
<td>Be efficient!</td>
</tr>
<tr>
<td></td>
<td>· Purchasing of electricity</td>
</tr>
<tr>
<td></td>
<td>· Purchasing heat</td>
</tr>
<tr>
<td></td>
<td>· Purchasing steam</td>
</tr>
<tr>
<td>Scope 3</td>
<td>You can influence</td>
</tr>
<tr>
<td></td>
<td>· Business travel – flights</td>
</tr>
<tr>
<td></td>
<td>· Business travel – public transport</td>
</tr>
<tr>
<td></td>
<td>· Waste &amp; Wastewater</td>
</tr>
<tr>
<td></td>
<td>· Transmission and distribution losses</td>
</tr>
<tr>
<td></td>
<td>· Food consumption</td>
</tr>
</tbody>
</table>

**Difficult but important!!**
Measure: Scopes 2 and 3

Scope 2

Formally, organizations must report Scope 2 electricity-related emissions based on market-based and location-based method.

*For Climate Neutral Now purposes and our calculator, we use location-based method and emissions will be zero if there is a renewable energy contract or guarantee of origin in place.*

Scope 3

The GHG Protocol has detailed guidance on how to determine which emission sources to include in Scope 3.

*For Climate Neutral Now purposes, we encourage organizations to include all scope 3 sources where it is feasible to make an estimation.*
Measure: Emission factors

GHG emissions = activity level x activity emission factor

GHG emissions = 4000 kWh/year x 0.596 kg CO2e/kWh / 1000
= 2.38 tons CO2e/year

DEFRA Emission Factors

• Conversion factors allowing calculation of GHG emissions from a range of activities
• Developed by UK Government’s Department for Environment, Food & Rural Affairs (DEFRA)
• They are the basis for our simplified calculator, except for electricity-related emissions.
Demonstration of use of the calculator
Challenges of measuring: our approach
Challenge 1: Home Office/Remote working

Approaches to estimation of these emissions are being presented in different fora.

Our approach: aligned with EcoAct’s Homeworking emissions whitepaper

Emissions depend on:
1. Location and season (heating/cooling)
2. % working time
3. % working remotely
Challenge 2: Co-Working spaces

This occurs when an organization shares spaces, either in a building or in the same floor, with other organizations.

Our approach: allocate according to the % floor surface rented/used by your organization of the total rented/working space

Allocated impact = whole building x allocation factor

Example: Organization A rents 200 m2 of space in a building with a total of 2000 m2 of rented space.

Allocation factor: 200/2000 = 0.10

Electricity consumption = 15000 kWh x 0.10 = 1500 kWh for organization A
Water consumption = 2000 m3 x 0.10 = 200 m3 for organization A
Challenge 3: Third-party verification

Requirement for higher levels of recognition under Climate Neutral Now, and to ensure best practice.

But costly and complex for SMEs and organizations that are getting started.

**Recommendation:**

1. Get started on your own if you don’t have the resources for third-party support or verification.
2. Develop a self-declared inventory.
3. Improve in following years.
4. Look for potential opportunities for low-cost options coming up.
Hearing from One Carbon World

Experience and challenges
Questions & Answers
Thank you
Measuring: The Basics
Using the GHG emissions calculator
General

Disclaimer
• Self-assessment of your emissions
• Not verified GHG inventory
• Bronze level

Your entries
• Input only the relevant sources for you
• Only use the white cells

Emission factors (Third party publicly available)
Examples:
• IPCC: refrigerants
• DEFRA: transportation
• International Civil Aviation Organization (ICAO): flights

See the calculator
Fuels

We used 2 LPG cylinders (88 litres) for heating in the reporting year

2 * 88 = 176 litres per year

Do NOT include here the combustion of fuels in transportation devices

<table>
<thead>
<tr>
<th>Type</th>
<th>Fuel</th>
<th>Unit</th>
<th>Factors</th>
<th>Amount</th>
<th>kg CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaseous fuels</td>
<td>Compressed Natural Gas</td>
<td>liters</td>
<td>0.44327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaseous fuels</td>
<td>Liquefied Natural Gas</td>
<td>liters</td>
<td>1.15041</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaseous fuels</td>
<td>Liquefied petroleum gas</td>
<td>liters</td>
<td>1.55537</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaseous fuels</td>
<td>Natural gas</td>
<td>cubic metres</td>
<td>2.02266</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaseous fuels</td>
<td>Natural gas (100% mineral blend)</td>
<td>cubic metres</td>
<td>2.03017</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid fuels</td>
<td>Diesel (average biofuel blend)</td>
<td>liters</td>
<td>2.54603</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid fuels</td>
<td>Diesel (100% mineral diesel)</td>
<td>liters</td>
<td>2.68787</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid fuels</td>
<td>Fuel oil</td>
<td>liters</td>
<td>3.18317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid fuels</td>
<td>Gas oil</td>
<td>liters</td>
<td>2.75776</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

https://commons.wikimedia.org
Refrigerants

In the reporting year, we had a leakage on our AC and we used 3kg HFC-134a to replace it.

https://eggertcoolingandheating.com/what-is-freon
## Owned vehicles

We have one car:

![Car Image](https://commons.wikimedia.org)

- **Large, diesel**
  - Check the vehicle mileage in the beginning and end of the year.
  - Or, 200km per week -> $200 \times 52 = 10.400\text{km/year}$

### Passenger vehicles: please enter the total distance for each type of vehicle

<table>
<thead>
<tr>
<th>Type</th>
<th>Fuel</th>
<th>Factors</th>
<th>Distance (km)</th>
<th>kg CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small car</td>
<td>Diesel</td>
<td>0.13721</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Medium car</td>
<td>Diesel</td>
<td>0.16637</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Large car</td>
<td>Diesel</td>
<td>0.20419</td>
<td>10,400</td>
<td>2,123.58</td>
</tr>
<tr>
<td>Average car</td>
<td>Diesel</td>
<td>0.16844</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Small car</td>
<td>Petrol</td>
<td>0.14836</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>
Water

I just have access to one bill on the reporting year. It was 17,000 liters for 3 months
17,000 * 4 => 68,000 liters /1000 => 68 m³ in a year
70% of the water supplied returns to the sewage system = 68 * 70% => 47.60 m³

Electricity, heating, cooling

In the reporting year the total electricity consumption was 9,000 kWh

![Electricity and heating chart]

Electricity Grid
Market-based emissions from the generation of purchased electricity, heat, steam or cooling.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Country</th>
<th>Unit</th>
<th>Factors</th>
<th>Amount</th>
<th>kg CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>United Kingdom of Great Britain and Northern I</td>
<td>kWh</td>
<td>0.2520</td>
<td>9,000.00</td>
<td>2,268.20</td>
</tr>
</tbody>
</table>

Heat and steam
Emissions within organisations that purchase heat/steam energy for heating purposes or for use in specific industrial processes.*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Type</th>
<th>Unit</th>
<th>Factors</th>
<th>Amount</th>
<th>kg CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>District heat and steam</td>
<td>District heat and steam</td>
<td>kWh</td>
<td>0.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* For heating from other sources, please use the tab ‘Fuels’

https://www.pplelectric.com/
Material use

We bought a fridge weighted 158kg
158kg / 1000 = 0.16 t

We used 10 boxes of A4 paper =
12.5kg * 10 = 125 kg
125 kg / 1000 = 0.13 t

https://ebay.de
https://pixabay.com/vectors/fridge-kitchen-refrigerator-158792/
Waste

We disposed 200kg of paper in the reporting year

\[
200kg / 1000 = 0.2 \text{ tonnes}
\]
A reference to estimate the weight of your waste

<table>
<thead>
<tr>
<th>Type of waste generated</th>
<th>Bin size</th>
<th>Typical weight when full</th>
</tr>
</thead>
<tbody>
<tr>
<td>General residual waste</td>
<td>240 litre</td>
<td>30 kg</td>
</tr>
<tr>
<td>General residual waste</td>
<td>140 litre</td>
<td>20 kg</td>
</tr>
<tr>
<td>General residual waste</td>
<td>80 litre</td>
<td>18 kg</td>
</tr>
<tr>
<td>Recyclables (highly variable)</td>
<td>1100 litre</td>
<td>60 kg</td>
</tr>
<tr>
<td>Recyclables (highly variable)</td>
<td>240 litre</td>
<td>16 kg</td>
</tr>
<tr>
<td>Recyclables (highly variable)</td>
<td>140 litre</td>
<td>8 kg</td>
</tr>
<tr>
<td>Organic bin</td>
<td>140 litre</td>
<td>38 kg</td>
</tr>
<tr>
<td>Organic bin</td>
<td>240 litre</td>
<td>100 kg</td>
</tr>
<tr>
<td>Bag of mixed waste</td>
<td>240 litre</td>
<td>3.5-6.5 kg</td>
</tr>
</tbody>
</table>

https://www.epa.ie/pubs/forms/wreport/nwr/Reporting%20on%20waste%20generated%20by%20on-site%20activities.pdf
Material use x waste disposal

An example of paper life cycle
Home office

In the reporting year, a full time employee worked from home in Germany. The heating was used during 5 months of the year.

<table>
<thead>
<tr>
<th>Type of home office</th>
<th>Country</th>
<th>Unit</th>
<th>Consumption kWh/hour</th>
<th>Factors</th>
<th>Number of employees</th>
<th>Working time (For full-time: 100%)</th>
<th>% working from home (e.g. 50% from home)</th>
<th>Number of months</th>
<th>kg CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>With heating</td>
<td>Germany</td>
<td>kWh</td>
<td>5.15</td>
<td>0.37</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>5</td>
<td>1,506.81</td>
</tr>
<tr>
<td>No heating/No cooling</td>
<td>Germany</td>
<td>kWh</td>
<td>0.15</td>
<td>0.37</td>
<td>1</td>
<td>100%</td>
<td>100%</td>
<td>7</td>
<td>61.44</td>
</tr>
</tbody>
</table>
Flights

The ICAO calculator

https://applications.icao.int/icec
The report is automatically updated as you input the data in each tab.
Thank you!
One Carbon World
Carbon Footprint Practitioner
Introduction to One Carbon World

- One Carbon World (OCW) is a **not-for-profit and carbon neutral organisation**, whose core business is to promote voluntary climate action.

- We are a **resource partner with the United Nations Climate Neutral Now Initiative** and we help organisations measure, verify, reduce and compensate their unavoidable emissions to create a greener Earth.

- We have achieved commitment for reduction or offsetting for **20 millions tons of CO2 from the atmosphere**.

- We offer an International Certification to recognise Carbon Neutrality, as apart of our in-house **Carbon Neutral International Standard Program**.

One Carbon World was created to offer organisations an easy, **straight-forward process** and serve as a **climate partner** for our clients.
Some of our partners

- Ørsted
- NHS Digital
- BUPA
- UK Embassies

High profile events

- ATP Tennis Finals
- SailGP
A global challenge

- **Measure and reduce** GHG emissions in line with the climate science.
- Organizations under increasing pressure to **demonstrate action**.
- **First understand and measure**, this is the starting point so you can **make a plan** of how to achieve reduction targets and goals.
- That first step is measuring the **carbon footprint** and baseline.

At One Carbon World we keep this process streamlined and robust, and we’re on hand for **support and guidance** at every stage of the journey!
The Solution: A Consultative Approach

- Technical Call
  1 – OCW-Assessment
  2 – Self-Assessment Verification

- Data Collection

- Calculation or Verification

- Carbon Footprint Report

- Next Steps – Reduce – Contribute
Thank You

One Carbon World

MEASURE | REDUCE | CONTRIBUTE

hello@onecarbonworld.com