Guide to the Aga Khan Development Network's Carbon Management Tool

Manuscript and tool author: Jerome Baddley

Contributors: Abbas Mirza, Abbas Syed Nadeem Husain, Abdi Mohammad, Aboumayaleh Maher, Adhiambo Beryl, Adhiambo Lucy, Agarwal Anju, Ahmad Bashir, Akram Nusrat, Akungo Robert, Alhamwy Dalal, Alibekova Kimiyo, Amadiva Stanley, Amin Ahmad, Amin Hunzai, Amirali Assad, Amwani Abdul Rahim, Anam Paul, Ashfaq Hafsah, Ashraf Karim, Aziz Sher, Bahromov Mahbat, Bandali Shakir, Baseer Saadat, Berdikozhoeva Anara, Bhojani Khurram, Bolouki Shawn, Delawar Ghulamuddin, Dharani Farhan, Dharani Karim, Dharsi Amin, Dorgabekov Alim, Dorghabekova Husniya, Dubosson Loise, Eshiwani Patrick, Esmati Seyar, Farooq Harris, Farooq Yousuf, Frotan Humayoon, Gohil Jaimini, Gottipamula Jyothi, Haider Rasha, Haji Al-Karim, Hameedi Mir Ahmad, Harmon Philip, Hassan Shagufta, Hussain Imtiaz, Hussain Sajid, Hussein Osman, Imran Muhammad, Ismael Hasan, Iyer Shekar, Jaffer Rahim Nizar, Jamal Khurram, Jan Aziz, Jha Swati, Jivraj Amir, Jiwani Amin, Jusabani Ahmed, Kamau Elizabeth, Kamawi Khalil, Kanji Jamil, Karim Hussain, Kariuki Alice, Keville Edmund, Khan Basharat Ullah, Khan Shabana, Khan Younus, Khansa Hasan, Khawaja Rahim, Khudoyorov Aliyor, Kimolo Lawrence, Kimtai Mercy, Kiprotich Stanley, Kiptoon Edna, Kiviri Willy, Koech Bernard, Konteh Sisawo, Kugele Miriam, Lakhani Salim, Latif Asad, Liévin Cécile, Macharia David, Madhani Falak, Madibela Eteng, Manu Alex, Mashiter David, Masinde Michael, Maskar Vidya, Mativa Boniface ,Mbaya Karen Mbayi Jared, Mbwambo Omari, Merali Saf, Merchant Mohin, Miraj Mirajuddin, Mohere Theresia, Mongi Aika, Mongi Emmanuel, Muita Gloria, Mukamusangwa Pacifique, Mukhtar Murtaza, Mung'atia Aquinius, Muriithi Bernard, Mushi Lusia, Musyimi Florence, Mutwiri Ashford, Mwangi Nancy, Naikpai Mohammad Saleem, Nazrishoev Umed, Ndemaki Lynette, Ngugi Mercy, Njagi Wanjiru, Noormohamed Fayaz, Nyaga Peter, Ochieng Eric, O'Donnell Elizabeth, Ogova Howard, Omar Yakub, Ombala Mildred, Omollo Selline, Onguru James, Oruko Joab, Orya Nasrullah, Otieno George, Ouma Joyce, Oyier Anton, Patel Sofia, Peermohammad Habib, Peermohammad Yasmin, Proust Nathalie, Rahimjonov Alijon, Rajabali Cassem, Rasheed Fawzia, Rasul Firoz, Rughani Mili, Saadat Azizullah, Sadonshoeva Guldarbog, Sadruddin Iqbal, Samnani Anil, Seleman Athuman, Sezarius Emmanuel, Shafi Shahid, Shah Jawad, Shah Qayum, Shahabuddin Sulaiman, Shaikh Yasmeen, Shams Alya, Shenwari Abdullah, Sherman Sultane, Shihab Salah, Sidiqyar Nawid, Sohail Syed, Sohani Nauman, Somji Nizar, Sulaiman Zeenat, Temo Frederick, Thawer Fatima, Tiwari Anuj, Twahir Hemed, Valji Mujahid, Wali Sifat, Walli Saqifa Walraven Gijs, Wambui Joan, Wang Christina, Wanyama Jane, Wasi Sana, Yousufzai Ikram, Yusuf Muhammed Yakub, Zubairi Ali..

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Guidance

Introduction

The Aga Khan Development Network's (AKDN) Carbon Management Tool has been developed to provide an all-in-one resource - which we refer to as the 'Tool', to calculate and track the carbon footprint of healthcare operations. It has been developed by the Aga Khan Health Services and the Aga Khan University of the Aga Khan Development Network.

For a copy of the latest version of the Tool, please contact: healthcarbonfootprint@akdn.org

This Tool was designed for, and is in use in, Low- and Middle-Income Countries. However, it can be used for healthcare organisations anywhere. Most functionality in the Tool is also appropriate for use by non-healthcare organisations. The Tool was specifically designed to help managers to both calculate the carbon footprint of their operations, and to use this information to build and track progress of actions to reduce those emissions.

Features of the Tool include:

- Simple to use – no need for any additional training.
- Converts readily available data into carbon equivalents[1].
    - Covers all areas related to typical health operations and includes the health care supply chain – all items procured and used, as well as specific high carbon products, such as anaesthetic gases, and inhalers. The Tool also covers volumes of water used and waste generated, on account of their importance in environmental protection.
- Instructions for data entry which educate users in the areas covered.
- Generation of graphics of total carbon footprints and the individual components, to help identify 'hotspots'.
- Provides guidance on areas of action.
- Contains features for costing interventions, identifying, and correcting errors in data entry, and for building an action plan to track progress over time.
- Can be used at multiple levels – e.g., facility, project, program, or organisation.

[1] The majority of conversion factors are based on the UK government (DEFRA) data sets, unless otherwise stated in individual sections. Carbon emissions figures are calculated by multiplying each unit of resource use with an appropriate emissions factor. e.g., burning 1 litre of diesel releases 2.69kg of greenhouse gases, 1 litre of diesel has an emissions factor of 2.69.

Scope and purpose of this Tool

This Tool is designed to comprehensively calculate the carbon emissions for healthcare organisations.

The Tool is designed to accept data from up to 30 sites, buildings, or campuses in one country. If your work spans several countries, you will need to use a separate Tool for each country.

The methodology used and the way in which the data is ultimately organised, follows the international standards of the Global Greenhouse Gas Protocol. The Global Greenhouse Gas Protocol organises carbon emissions by 'Scopes'. The purpose of having data organised by different Scopes is to avoid double counting the same data. It is worth saying that many find the concepts confusing to begin with. Fortunately, users of the Tool do not need to know the differences between scopes, as the Tool automatically assigns data correctly to the right 'Scope'. However, with time, all users can expect to become familiar with what is included under each area.

- Scope 1 emissions cover the emissions which arise directly from your organisation's activity. This may include, for example, fuel or waste that is burnt on your premises, or the use of anaesthetic gases, which are subsequently released to the atmosphere. These are referred to as 'direct' emissions.
- Scope 2 emissions cover 'indirect emissions'. This Scope includes items such as energy which your organisation buys and consumes (rather than generates itself). This covers electricity (this is the most common item), steam, heat, or cooling that your organisation might buy from local authorities.
- Scope 3 emissions also relates to indirect emissions. But in this case, Scope 3 emissions cover those that are released by others to supply you with products or services that support your operations. For example, this may include medicines that you buy, or public transport that you use. These emissions are ultimately counted as someone else's direct responsibility. They will feature as your suppliers' Scope 1 or 2 emissions.

It is not necessary to complete all the data collection sheets. However, it is likely that you will need to complete most of the sheets to produce a comprehensive Scope 1,2 and 3 carbon footprint.

The sheets provide an opportunity to collect data on costs to help with making decisions on prioritising and budgeting for actions. For example, if you input data on the cost of the fuel that you use, this will help you to calculate the impact of reducing the fuel you use, both on carbon and on cost.

The majority of emissions factors have been derived from the UK government (DEFRA) data sets, unless otherwise stated in individual sections. The UK DEFRA data set is based on GHG protocol reporting practice and updated annually. Factors in the Tool are updated accordingly.

Once complete, the Tool organises emissions totals by source and by Scope. Emission data is also presented on a number of charts and graphs. These charts and graphs can be filtered to only show areas that you wish to highlight.

If floor area data is entered for each building, the Tool also generates per floor area carbon intensities. This information can be used to compare carbon emissions between buildings. It can also help target investment at the most carbon intensive parts of your estate.

If spending or finance data is entered (T2), the Tool will enable you to identify carbon hotspots among the items your operation buys – or your 'supply chain'. These hotspots are the areas where focussed attention will lead to the largest carbon savings. This can help to identify which of your suppliers you may need to engage with, and which types of products need special attention.

While footprinting at the T2 level is only suitable for identifying hotspots, a reasonably accurate supply chain footprint can be built up with the Tool. To do this you would need to enter the amount your organisation spends with your largest suppliers, and their published carbon intensities, into the supplier carbon emissions worksheet (T3).

How to complete the Tool

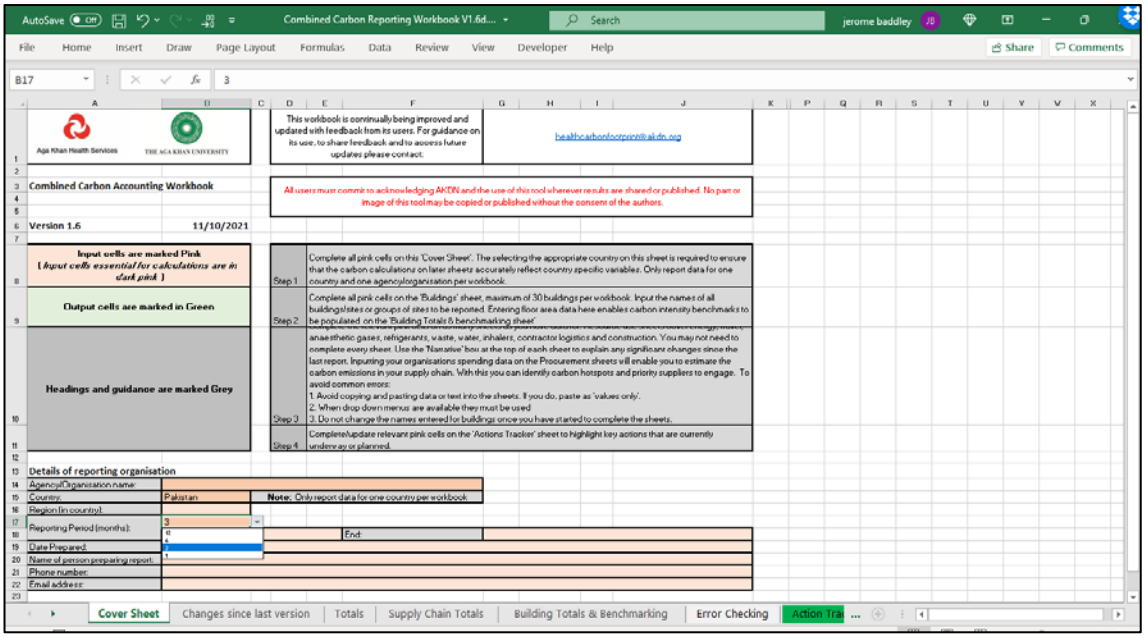
It is essential that the sheets of the Tool are completed in the following order to get correct calculations.

1. *First complete the 'Cover sheet'.*

Read the basic guidance on how to complete the Tool provided on the 'Cover Sheet' tab.

Note the colour coding of cells which is designed to help guide you through the steps.

Cells that you should *ideally* fill are shaded pink (These are unlocked). **Cells that you *must* fill (no option) and are needed to drive calculations are shown in a darker pink**
Output cells with the results of calculations are marked in green (These are locked)
Headings, notes, and guidance cells are grey (These are locked)



You will not need to fill every pink cell. However, if you start to fill out a row you should try to complete all relevant cells in that row.

Darker pink cells are necessary to drive core calculations. If any of these are left blank in a row a carbon emissions calculation will not be possible.

Lighter pink cells allow you to gain deeper insights into your footprint. Completing these cells will help you to improve the quality of your footprint. Completing lighter pink cells will also help you to identify and justify areas for action.

Some cells may become unnecessary as you complete other cells in that sheet. If a pink cell turns grey, you have already provided sufficient data. In other words, do not try to add data to a cell which turns from pink to grey.

On the Coversheet you should enter details such as your name and the date of completion.

It is essential that you select the Country and the number of months you are reporting for.

The Country entered on the 'Cover sheet' determines the carbon intensity that is assigned for your electricity supply. The number of months being reported on affects calculations on refrigerant containing systems.

In the screenshot provided, the country selected is Pakistan and the number of months selected is 3.

2. *Second complete the 'Buildings' sheet.*

Enter the details of each building, site, or campus to be reported on. The names entered here will automatically populate drop down lists throughout the rest of the Tool. **Once you start to complete the Tool, you should not come back and change or correct the names that you have entered on this sheet. To do so will result in calculation errors, unless you also update every sheet in the Tool to reflect any name changes made on the buildings sheet.** However, if necessary, you may come back and add new buildings to the buildings sheet at any time.

Reporting should aim to cover the smallest unit you have in your operations. For instance, you may have a group of buildings named 'X Hospital', but separate buildings within this – each with separate electricity meters. In such

instances, give each of the smaller buildings a name and enter the data for each. This will help when it comes to identifying where energy is being consumed, what actions you might wish to take, and where.

In addition to the building names you enter here, the drop-down lists throughout the Tool always contain 3 non-site-specific options, 'all sites', 'not linked to a site' or 'several sites.

If there are many small sites that would be impractical to report on separate lines (such as a network of very small phlebotomy collection units) these may be grouped into a single bulk entry. A group of sites could occupy a single line on the 'Buildings' sheet. You could give it the name "Phlebotomy units". This group would then need to be reported consistently throughout the Tool as a single entry.

Only 3 cells are essential to fill for each building: name, ownership[2] and floor area. The answers to these questions drive calculations or content on other sheets.

As far as possible you should try to complete all the responses to the questions on the 'Buildings' sheet for each site. This information will help you later in identifying opportunities to reduce your emissions.

3. Complete the data input sheets.

Before you start entering data, look through all the tabs on the Tool to familiarise yourself with the data it captures and how it is organised. You will note the following:

There is 1 Currency conversion rate sheet

There is 1 'Quickstart' sheet

There are 9 resource use sheets:

- **Energy**
- **Vehicle fuel**
- **Vehicle distance**
- **Travel other vehicles**
- **Anaesthetic gases**
- **Refrigerant gases**
- **Water**
- **Waste**
- **Inhalers**

There are 5 supply chain sheets:

- **Construction materials**
- **Contractor logistics**
- **Procurement_T2**
- **Procurement_T3**
- **Spend Mapping**

There is 1 Action tracker sheet

There are 4 data output sheets

Emissions outputs appear on each line and totals appear at the top of each sheet as a sheet is completed. Four separate sheets provide dashboards and charts to help you consolidate and interrogate the data. These sheets will help you to identify your carbon hotspots.

- **Error checking**
- **Totals**
- **Supply chain totals**
- **Building totals and benchmarking**

4. Complete the 'Current Action Tracker' sheet

The action tracker is designed for you to report progress being made over time on initiatives to reduce your footprint.

2 The answer to the ownership question is important. Data from a rented building is allocated to a different scope to one owned by the organisation.

Basic sheet structure

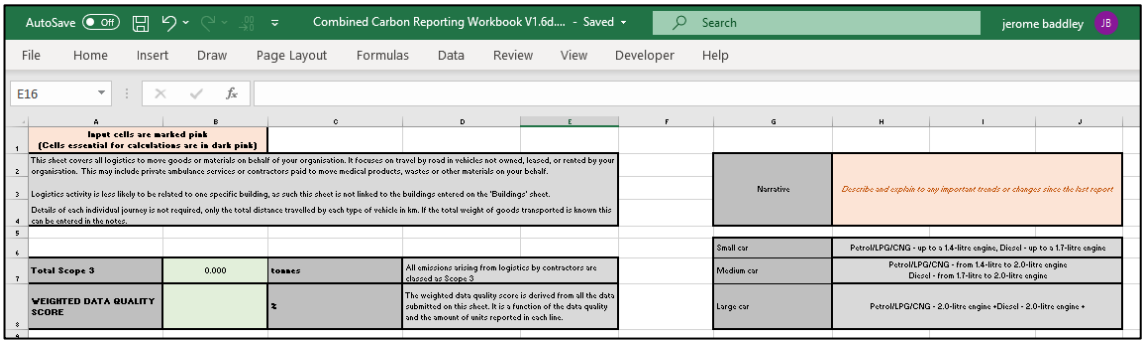
All the main data input sheets have a common structure.

At the top left of each sheet is a grey guidance box. This provides specific information to help you complete that sheet. Some of this is general information to help you learn more about the topic and why it is important.

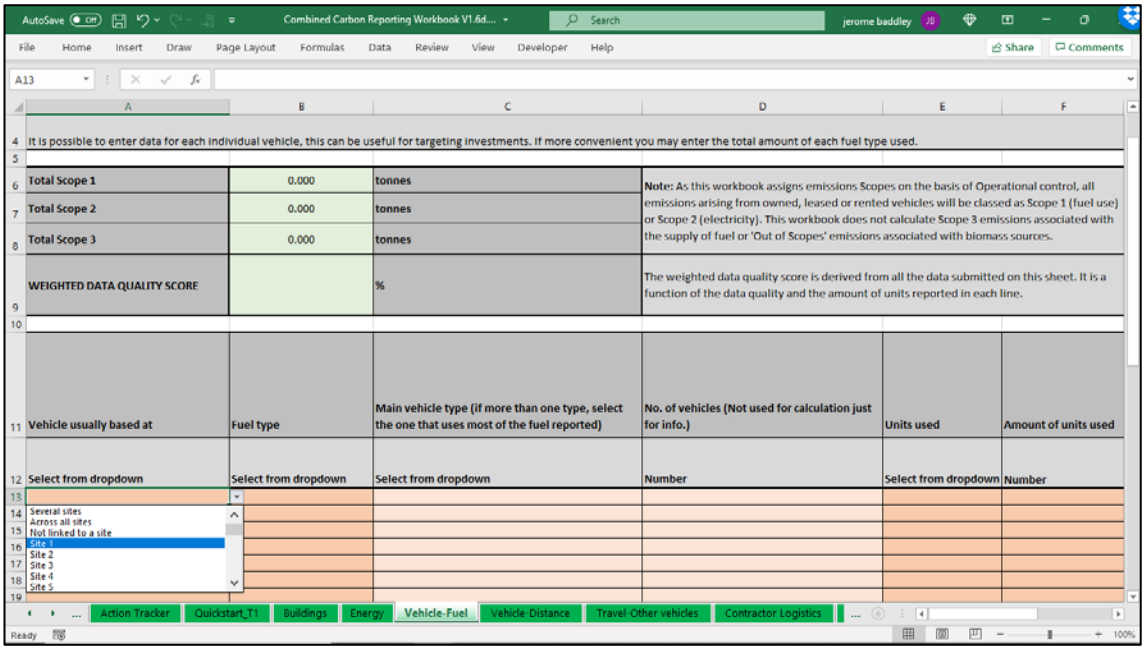
Below the grey guidance box are boxes showing the total emissions, by Scope, for all entries on the sheet.

To the right of the grey guidance box is an area for narrative or notes. This is provided for you to record any important context to the data, or to communicate issues with colleagues.

Below or adjacent to the narrative box, some sheets have calculators, resources, or links to external material to help you complete the Tool.



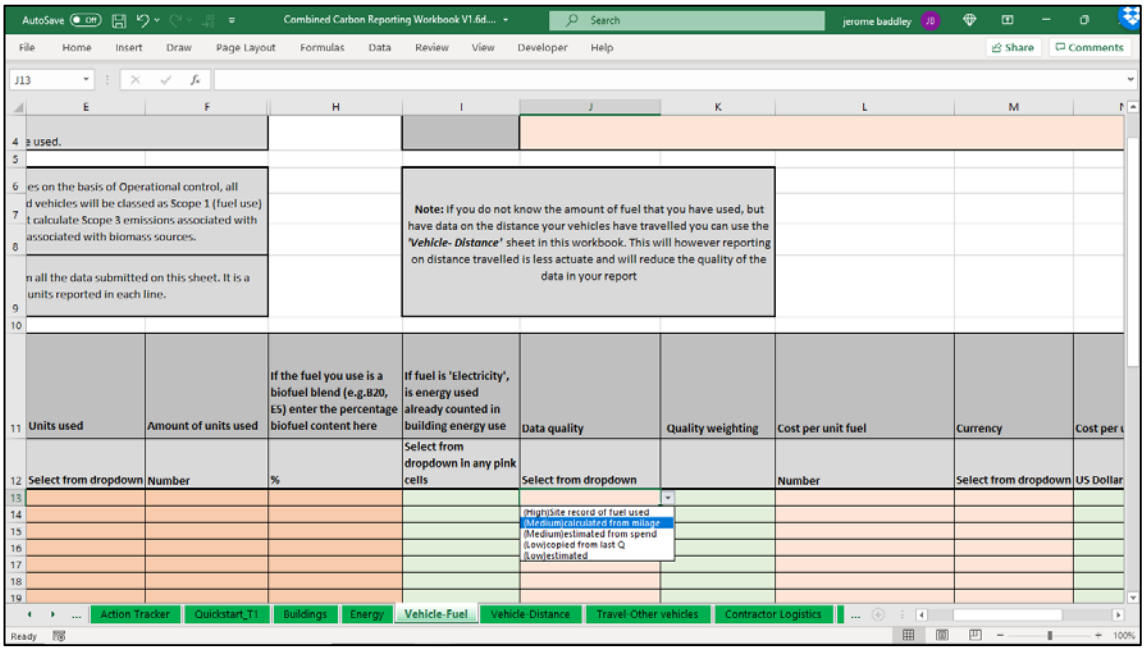
The first column on most sheets requires the selection of a building or site.



The dropdown list for the site or building name will already contain all of the names that you entered on the 'Buildings' sheet. If the dropdown list looks empty, you may need to scroll up the list to the top to see your building names.

Wherever possible, resource use should be entered against the specific site it relates to. In the case of travel, this will be the site where staff or vehicles are based or parked.

The sites dropdown box on all sheets will always contain 3 non-site-specific options. These are: 'Several sites', 'Across all sites' and 'Not linked to a site'. These are provided to accommodate cases where it is not possible to link resource use to a specific site.



In addition to collecting data on the amount and type of resources used, each line includes the option to assign a data quality score for the data provided on that line. Data quality can be assigned by selecting an option for the data source from the drop-down list: e.g., 'from supplier's bills' or 'estimates'.

As well as an emissions calculation, each sheet generates a data quality score. This score is a result of all the individual data quality entries provided. The score is a weighted factor based on the amount of resource use and level of quality assigned, on each line. This score is shown below the total carbon emissions figure, in the top left of the sheet.

Most sheets provide an opportunity for you to input the unit cost of the resource used. e.g., cost per litre for diesel, or cost per tonne for waste disposal. Data on the costs of the resources you use will be helpful later, when you come to prioritise and justify investments in carbon reduction.

If your local currency is not one of the 23 pre-populated in the Tool, or the US dollar exchange rates need to be updated, you will need to go to the $ conversion sheet and enter some details (see the 'Currency conversion rate' section).

To the right-hand side of each sheet, you will find carbon emissions calculated for the resource use entered on each line. Here you will find the carbon factor that has been used, the calculated emissions and the assigned GHG protocol Scope for the data entered on each line.

Emissions outputs for each table are automatically ranked by colour, from Red (highest), Amber to Green (lowest). This is to help you identify emissions hotspots easily and consider how best to prioritise actions. If there is only one entry on a table, the calculated carbon emissions will be highlighted Red

All sheet Scopes totals link to the 'Totals' sheet. Building level data is collated in parallel on the 'Buildings and benchmarking sheet'

If you have entered unit cost data, the total cost for the supply of the resource will be shown in the final column. As well as carbon emission totals, some sheets also include totals for units of resource used, such as miles travelled, weight of waste or volume of water. At least 40 data input lines are provided for each resource.

Some sheets include additional output columns to the right, with the emissions sources broken down by separate greenhouse gases: Methane (CH4), Nitrous Oxide (N2O) and Carbon Dioxide (CO2).

Detailed guidance on completing sheets

Types and sources of data required

This Tool is designed to use the types of information that are routinely collected in health operations. Depending on the size of operation, a single or many people may manage the data required. So, before starting work on calculating the carbon footprint of your organisation, review each of the sheets and familiarise yourself with the information that will be required. Start with compiling a list of all your facilities and determine which facilities are owned or rented by your organisation.

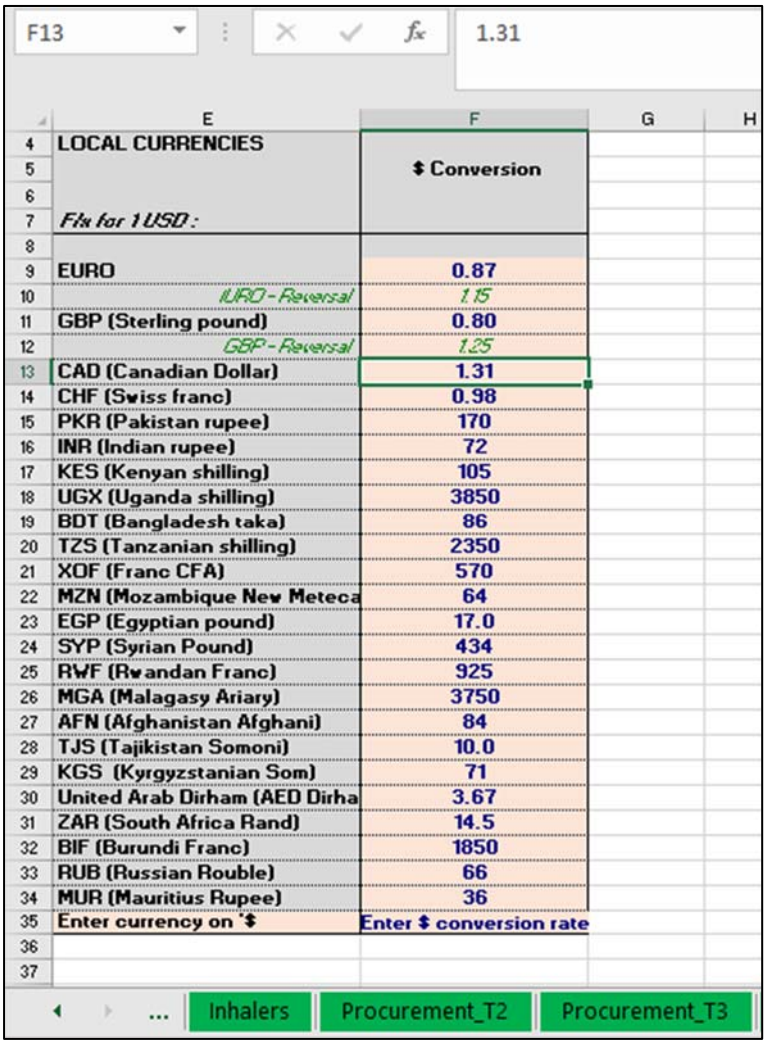
Currency conversion rate sheet

The '$ Conversion' worksheet provides all the exchange rates from local currency to US dollars that are used in the Tool. This is intended to support benchmarking and comparison.

Factors for 23 common currencies are pre-populated in the tool. There is also a field for a user-defined local currency.

To ensure that the figures provided in the Tool for costs in US dollars are reasonably accurate, it is possible to edit all the exchange rates on this sheet.

It is also possible to enter a named additional local currency in cell E35. The relevant US dollar conversion rate may be entered in Cell F35. Once local currency data is entered in these cells, this currency will appear as an option in all relevant dropdown lists in the workbook.



Quickstart sheet

The Quickstart sheet is designed to provide a very high-level estimate of the scale of your footprint. The data you will need for this will come from your finance team.

Several academic papers have been published that include high level figures for the carbon intensity of healthcare. This type of data is available for many countries.

From this published data we have derived very rough carbon intensity factors for healthcare for a range of countries. As data is not available for all countries, we have also provided averages for geographic regions and economic groups.

To generate a Quickstart emissions estimate, enter your full turnover for the period, in 1000s US Dollars, and select the appropriate country, region, or economic group.

A full turnover figure should include all pay and non-pay expenditure.

The Quickstart estimate is not intended to provide an accurate footprint. The estimate simply provides an indication of the rough scale of emissions you might expect for a healthcare organisation of your size, operating in your country or region. The estimate generated includes direct (Scope 1), indirect (Scope 2) and supply chain (Scope 3) emissions.

If you only use the rest of the Tool to calculate your Scope 1 and 2 emissions, the difference between your Scope 1 and 2 total and the Quickstart estimate can give you a rough indication of the emissions that remain to be accounted for in your supply chain. Emissions in the supply chain of a healthcare organisation can often account for well over 70% of the total footprint.

Unfortunately, some regions and economic groups, particularly LMICs and LICs, are very poorly represented in the literature. As such, some averages are based on a very small number of reference points.

For example, as shown below a turnover of $5m has been entered for a healthcare organisation in Pakistan.

- If selecting the country as Pakistan, no national data is available for the carbon intensity of healthcare.
- If selecting The WHO East Mediterranean region, data is available for only 2 countries in the region.
- If selecting LMICs, there is reference data for only 9 LMICs. While this is still a fairly small reference data set, it is probably most appropriate to use the estimate for LMICs as a rough guide.

4	Select the name of your country, region or international economic classification (Only a few countries have nation specific factors)	Pakistan	Emissions estimate (Tonnes CO2e)	Number of country data points used to generate
5	Enter your total spend over the period in US$1000's (This must include all spend, both Pay and Non-Pay)	$ 5,000	No Data-Select a region or economic classification group	0

4	Select the name of your country, region or international economic classification (Only a few countries have nation specific factors)	East Mediterranean_average	Emissions estimate (Tonnes CO2e)	Number of country data points used to generate
5	Enter your total spend over the period in US$1000's (This must include all spend, both Pay and Non-Pay)	$ 5,000	3,826	2

4	Select the name of your country, region or international economic classification (Only a few countries have nation specific factors)	Low-Mid Income_ average	Emissions estimate (Tonnes CO2e)	Number of country data points used to generate
5	Enter your total spend over the period in US$1000's (This must include all spend, both Pay and Non-Pay)	$ 5,000	5,742	9

Energy resource use sheet

Energy use in is often the largest source of emissions in healthcare facilities. In low and middle-income countries national grid electricity supply can often be less reliable. This means that backup generators and alternative fuel sources are commonly used. In hotter countries cooling technologies can contribute a large proportion of a healthcare facility's energy use.

All the data you need for this sheet should be available from your facilities or finance teams.

NOTE: A recent study showed that less than two thirds of hospitals providing surgical care in 21 LMICs had a continuous electricity source or a generator[3]. Health outcomes have also been linked to sustainable power supply. [4]

The use of fossil fuels and solid fuels to provide heat, cooling and power usually results in significant greenhouse gas emissions, air pollution, and often noise. As well as being at times unreliable, energy sources can also be expensive. Any measures to improve energy efficiency and move towards renewable energy sources can reduce costs, pollution and increase the resilience of healthcare facilities.

It is important to capture as much information as possible about your organisation's use of energy, to help target measures to reduce emissions and costs, while improving resilience and efficiency.

Before following the guidance on the energy sheet, you must have accessed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

This sheet is to capture information on all fuels (solids, liquids, and gases) and all electricity used or generated by your organisation.

As fuel and electricity use represent such significant sources of carbon emissions for an organisation, it is essential to make sure that all data provided is as accurate as possible.

Scrolling down on this sheet you will see 7 tables to complete**:**

- **Table 1: Grid supplied electricity**
- **Table 2: Renewable electricity generated**
- **Table 3: Grid supplied gas**
- **Table 4: Gas cylinders or tanks**
- **Table 5: Solid fuel**
- **Table 6: Liquid fuel**
- **Table 7: Heat networks**

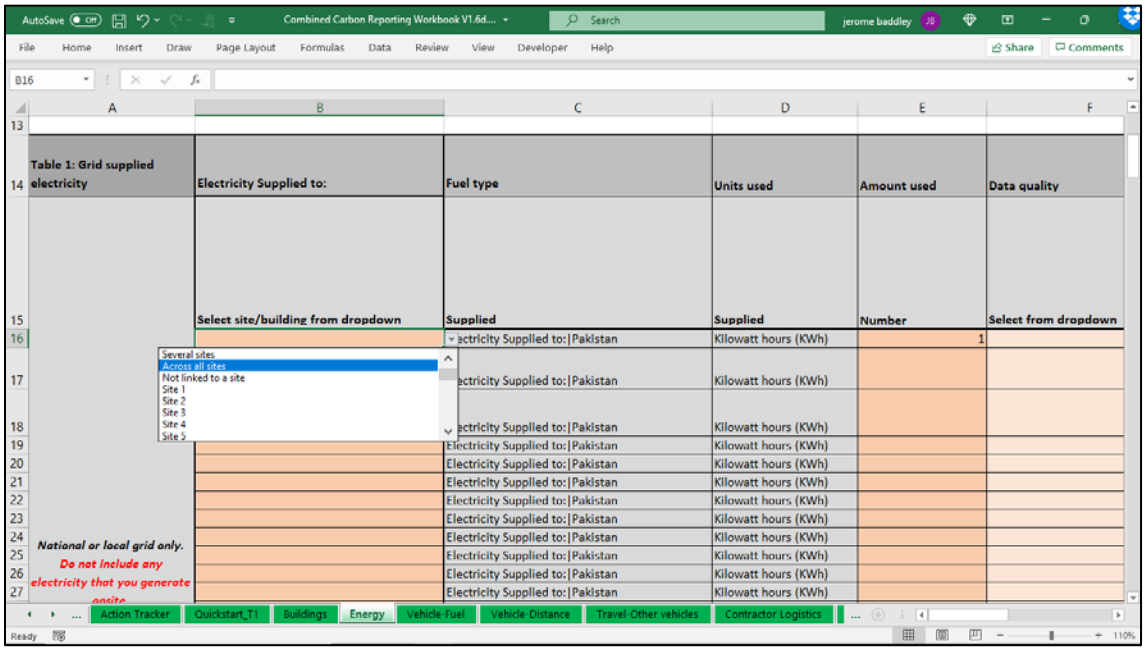
As the sheet is quite extensive, quick links are provided at the top of the sheet to allow you to jump directly to each section if required.

It is likely that your organisation does not use energy from all of these sources. You will only need to fill out the pink cells for the energy resources that you use or generate (renewable energy).

On each line you must first select the site that you are reporting data for. The site names that were entered on the buildings sheet will be visible in the drop-down menu. If the list appears blank you may need to scroll up to the top of the list. You must then enter how much of each energy source has been consumed, the units you are reporting in and, if known, the cost for each unit.

You can enter several lines for each site if needed.

[3] doi:10.1016/j.jss.2017.10.016
[4] https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0235760



Ideally, any data entered on the energy sheet should be from your own records, rather than suppliers' bills. Data from suppliers' bills can sometimes contain errors. Collecting data yourself, from your own delivery records or meter readings, can help to ensure accuracy. Comparing this data with suppliers' bills, or 'bill validation', can sometimes identify errors or over-charging.

Table 1- Grid supplied electricity: This is for any electricity supplied to your site from a local or national grid. This is always reported in Kilowatt hours (KWh).

Ideally, all data should be collected by you from your own electricity meters. Data may also be available from your supplier's bills.

The carbon emissions for electricity supplied from the national grid vary from country to country. A carbon factor for your country will have been automatically assigned, as you will already have selected the appropriate country on the 'Cover sheet'.

The source for the emissions factor being used is shown in column S. This will normally default to the UNFCC 2019 Combined Margin Average Factor, or another freely sourced factor set that has been pre-loaded into the tool.

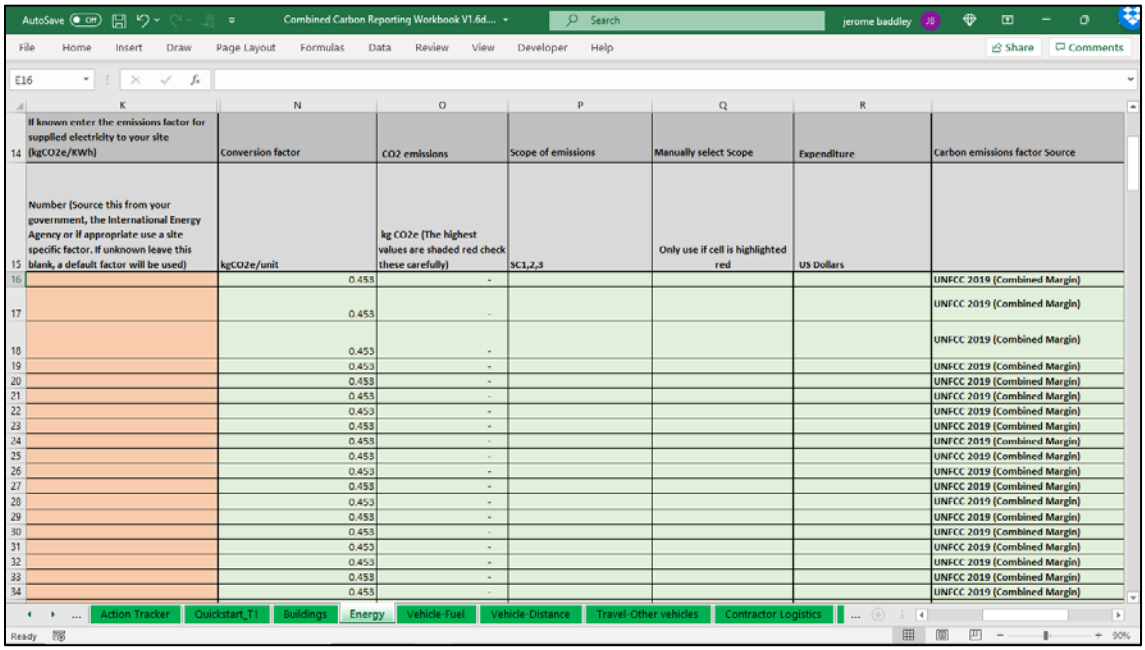
These factors are valid to use to generate a reasonably accurate figure for your emissions, however, as emissions intensities for grid electricity change over time, they may not be the best or most recent factor available for the national grid in your country.

We would recommend that you also review whether your national government publishes a grid emissions factor.

You should also consider whether you are able to get annually updated independent data on grid emissions factors from The International Energy Agency – while this is at present the most accurate source of updated information, you may need to pay for this data through a license agreement.

If you do source an emissions factor from a national or international source, this user supplied emissions factor can be entered in column K. This will override the default factor in column N.

Emissions arising from your use of electricity are normally classed as Scope 2.



	K	N	O	P	Q	R	
14	If known enter the emissions factor for supplied electricity to your site (kgCO2e/KWh)	Conversion factor	CO2 emissions	Scope of emissions	Manually select Scope	Expenditure	Carbon emissions factor Source
15	Number (Source this from your government, the International Energy Agency or if appropriate use a site specific factor. If unknown leave this blank, a default factor will be used)	kgCO2e/unit	kg CO2e (The highest values are shaded red check these carefully)	SC1,2,3	Only use if cell is highlighted red	US Dollars	
16		0.453	-				UNFCC 2019 (Combined Margin)
17		0.453	-				UNFCC 2019 (Combined Margin)
18		0.453	-				UNFCC 2019 (Combined Margin)
19		0.453	-				UNFCC 2019 (Combined Margin)
20		0.453	-				UNFCC 2019 (Combined Margin)
21		0.453	-				UNFCC 2019 (Combined Margin)
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31		0.453	-				UNFCC 2019 (Combined Margin)
32		0.453	-				UNFCC 2019 (Combined Margin)
33		0.453	-				UNFCC 2019 (Combined Margin)
34		0.453	-				UNFCC 2019 (Combined Margin)

As you enter data into the electricity use table, emissions figures will appear in Column O. A Scope allocation will appear in Column P. If you have entered data for the per unit cost of electricity, a total expenditure figure will appear in Column S.

The carbon figures in Column O will be automatically highlighted in colours from green to red. The red cells are to highlight the areas of highest carbon emissions, orange is in between, while green shows the areas of lowest emissions.

NOTE: The installation of low-energy 'LED' lights, efficient air conditioning systems, efficient fridges, fans, and pumps can all help reduce electricity use.

Energy technology is improving all the time. For example, split unit Air Conditioning (AC) systems are now typically at least 2 times as efficient as they were only a few years ago. Upgrading AC systems with the most efficient available units can pay for itself very quickly, as well as saving carbon emissions. Fitting external shades or tinted window films to keep rooms cooler, can also reduce the energy use of AC systems by up to 30%.[5]

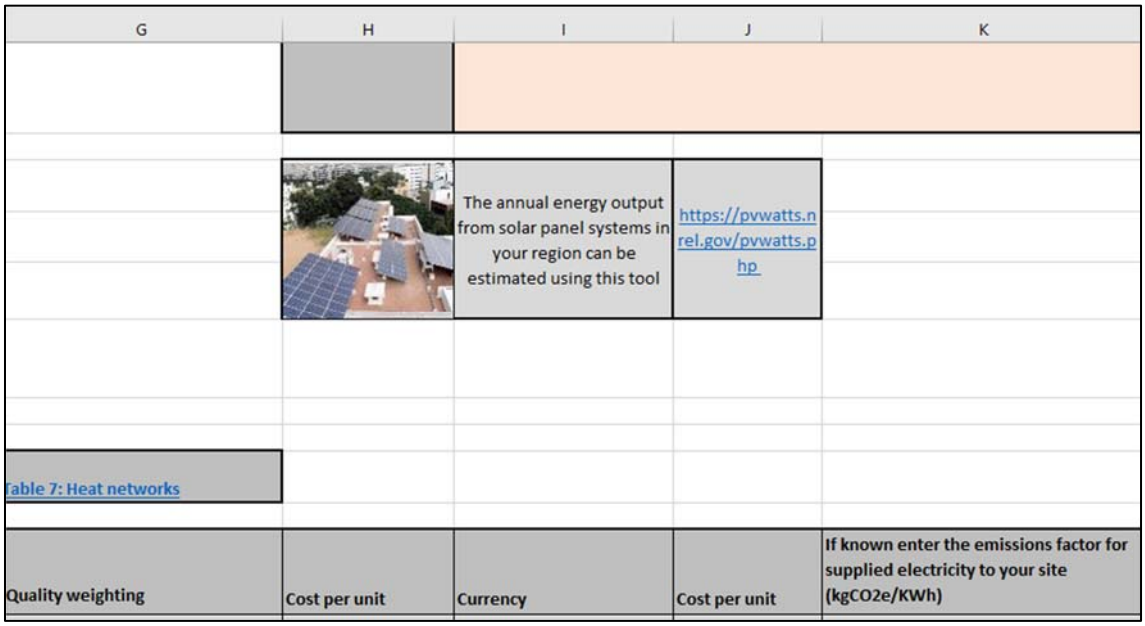
Table 2- Electricity supplied from own renewable energy generating systems: Data entered here does not count towards your carbon footprint. Nevertheless, it is useful to track the amount of power you are generating from renewables. This is a useful indicator of progress in sustainable healthcare.

Please select the type of renewable energy generating technology from the dropdown list. The most likely source of on-site renewable electricity generation is from solar electric panels.

The total electricity generated should always be reported in Kilowatt hours (KWh).

Ideally, data should be collected from an electricity meter attached to your renewable energy system. Alternatively, for solar electric systems, the output can be estimated. There is a link to a Solar electric system output calculator at the top of the sheet.

[5] https://www.mdpi.com/2071-1050/9/5/731/pdf



G	H	I	J	K
		The annual energy output from solar panel systems in your region can be estimated using this tool	https://pvwatts.nrel.gov/pvwatts.php	
Table 7: Heat networks				
Quality weighting	Cost per unit	Currency	Cost per unit	If known enter the emissions factor for supplied electricity to your site (kgCO2e/KWh)

If you know the amount of electricity generated by your solar panels you may find it useful to compare this to the expected output calculated by the calculator. If your system generates less than expected, there may be a need to investigate the causes. Sometimes small amounts of shading, such as the shadow from a rooftop ariel or a tree, can have a large effect on output.

If not all of the generated electricity is used on-site, and a figure for the amount of electricity exported to your local grid is known, you can enter figures for both the amount of electricity used on-site and the amount that is exported off-site, for use by others.

Table 3- Grid supplied gas: This table is for gas supplied through a local, municipal, or national grid gas supply network. There are only 3 fuel options, natural gas, biogas and biomethane. Fuel should be reported grouped by fuel type.

Ideally, all data should be collected by you from your own gas meters. Data may also be available from your supplier's bills.

If your gas is supplied by tanker truck, or in cylinders, you must use Table 4 to report data on gas supplied in cylinders or tanks.

You will need to select the fuel type from the dropdown menu and then select the units in which the gas is supplied. The options for units of gas supplied this way are Kg, Litres, KWh or M^3. If your gas is supplied in cubic feet, or another unit, this will need to be converted to one of these units before entry into the table. NOTE: Biogas and biomethane will return low emissions figures, as these are renewable fuels. The emissions for biofuels relate only to the greenhouse gases methane and nitrous oxide, which are also released as a result of their use.

Table 4- Gas cylinders or tanks: This table is for all gas stored in cylinders, tanks or supplied to the site by tanker truck.

The emissions calculation only covers the combustion of gas, not the emissions from the delivery vehicles.

There are a number of fuel options, including three types of compressed or liquified gas. The options for units of gas supplied in a cylinder are Litres, Kg or KWh.

Ideally, all data should be collected by you from your delivery records. Data may also be available from your supplier's bills.

Table 5- Solid Fuel: This table is for all solid fuel burnt at each site, including coal, charcoal, wood, and crop residues.

NOTE: Wood, charcoal, and crop residues (called biomass fuels) do not have high carbon impacts and are technically classified as renewable fuels. However, a small impact is accounted for the greenhouse gases methane and nitrous oxide released during the combustion of these fuels.

Combustion of all solid fuels (Including biomass) results in air pollution, which can impact the health of building users and those nearby. Energy efficiency measures such as insulation, when installed in buildings heated by biomass, do not-have a large direct impact on reducing greenhouse gas emissions. However, they reduce the volumes of solid fuels needed to be harvested and transported, therefore these measures have an indirect impact on reducing CO2 emissions. They can also be effective at reducing air pollution. Reducing air pollution can help protect the health of patients, staff, and the local community.

The only options for units of solid fuels are kg or kWh. If the amount of solid fuel that you use is measured in other units, this will need to be converted to one of these units before entry into the table.

Ideally, all data should be collected by you from your own delivery records. Data may also be available from your supplier's bills.

Table 6-Liquid fuels: This table is for all liquid fuel burnt at the site, including petrol, diesel, naphtha, kerosene, and others.

The only options for units of liquid fuels are kWh, Kg or litres. If the amount of liquid fuel that you consume is measured in other units, this will need to be converted to one of these units before entry into the table.

Ideally, all data should be collected by you from your own delivery records. Data may also be available from your supplier's bills. Data from suppliers' bills can sometimes contain errors. Collecting data yourself, from your own delivery records, can ensure accuracy. Comparing this data with suppliers' bills can also sometimes identify errors in billing.

The majority of the data you input here is likely to be fuel used in generators, though some liquid fuel may also need to be included if you use fuel for cooking, heating, and hot water systems.

Generator fuel and non-generator fuel should always be reported on separate lines. There are two options in the dropdown menu to allow you to separately report generator and fuel used for other purposes.

Separate reporting of generator and non-generator fuel is important, as this will help with developing action plans and thinking through the decisions including costings of investments in energy and carbon saving measures. Additional lines are available on this table to accommodate up to 2 liquid fuel entries for each building.

The units available to select from are litres, kg, or kWh.

In some countries and regions, local fuel is supplied pre-mixed/blended with biofuel. Ethanol is added to petrol and biodiesel is added to diesel fuels. This blending serves to reduce the carbon emissions from the fuel.

If you are aware that your fuel is blended with biofuels, there is an opportunity to provide a % biofuel content in column K. This will reduce the emissions calculated from your use of this fuel.

NOTE: Installing solar electric panels and batteries can help reduce the use of generator fuels and increase the reliability of the power supply for health operations. Similarly, installing solar water heating systems will reduce the need for fuel for heating water.

Table 7-Heat networks: This table is for any heat or steam supplied to your facilities through district heating networks.
Heat use reported here must have been generated by a separate company using fuel that has not already been accounted for elsewhere on this sheet.

Emission arising from your use of district heat or steam are normally classed as Scope 2.

The only option for units of supplied heat is kWh.

Ideally, all data should be collected by you from your own heat meters. Data may also be available from your supplier's bills.

There are 2 options for assigning a carbon emissions factor on this table.

1. If your heat provider can tell you the carbon intensity of the heat that they supply, this can be entered in column C.
2. If you do not know the carbon intensity of the heat that you are supplied with, leave column C blank. A default factor will be applied. This factor is taken from the UK government data set and is based on heat generated from natural gas combined heat and power.

Vehicle fuel

Transport makes up 23% of energy-related carbon emissions globally[6]. The use of fossil fuels in vehicles contributes to air pollution, noise, and climate change.

NOTE: Vehicle fuel is often the second largest area of direct (Scope 1 and 2) emissions for an organisation. Fuel supply and costs can be highly variable and create challenges in the cost and reliability of health services. Health organisations can show leadership in good practice by moving away from using fossil fuels for transport. This can demonstrate health and cost benefits, as well as a reduced impact on the environment.

This sheet captures information on all fuel used in vehicles that are owned, rented, or leased by your organisation. You should not report fuel used by your contractors in their vehicles; that should be reported separately on the 'Contractor logistics' sheet.

Before following the guidance on the vehicle fuel sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'.

First think through where the vehicles you have are usually used and parked. Select the building or site in Column A for where the vehicle/s are usually based. If some vehicles are shared and move from place to place, there are also options provided in the dropdown for vehicles without a fixed base. Wherever possible, assign vehicle fuel use to the site where the vehicle is usually based.

If you do not have enough lines to enter data for each vehicle, you can enter the total fuel used for all vehicles by site and by fuel type.

NOTE: The benefits of entering data for each vehicle on a separate line is to help you analyse the fuel use of individual vehicles. This will help you prioritise which vehicles to use and which you might want to replace. For this reason, even if you do not have space to enter in all data, keep a record of individual vehicle use to examine later.

Carbon emissions for all fuel used will automatically be calculated from the figures you enter.

In some countries and regions, local fuel is supplied pre-mixed/blended with biofuel. Ethanol is added to petrol and biodiesel is added to diesel fuels. This blending serves to reduce the carbon emissions from the fuel.

If you are aware that your fuel is blended with biofuels you may provide a % biofuel content in Column K. This will reduce the emissions calculated from your use of this fuel.

If you have selected 'electricity' as the fuel type, you will need to identify if the electricity used by the vehicle has already been reported on the energy sheet, as part of the electricity used by your facility. To do this you will need to select Y or N in Column I. This is to ensure that you do not double count the emissions arising from the electricity used by your vehicles.

If your vehicles have been partly or totally supplied with electricity from sources outside your organisation, such as a member of staff's home or public charging points, you should select N in column I and provide a figure for the amount of electricity that has been supplied from these sources.

The carbon intensity for electricity is automatically assigned, according to the country selected on the cover sheet. As with the energy sheet, you can adjust the default carbon intensity with a user defined figure. To do this, enter the carbon intensity for electricity in your country in Column J. Only enter data in cells that are shaded pink

Ideally, actual amounts of fuel used are reported for all vehicles. However, if this data is not available a less accurate readout of the vehicle use footprint can be achieved through reporting on the distance travelled by vehicles.

Where only vehicle distance is known, use the 'Vehicle-distance' sheet. If you report both fuel use and distance travelled for the same vehicles, you must ensure that this is identified on the vehicle distance sheet, to avoid double counting of emissions.

[6] https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter8.pdf

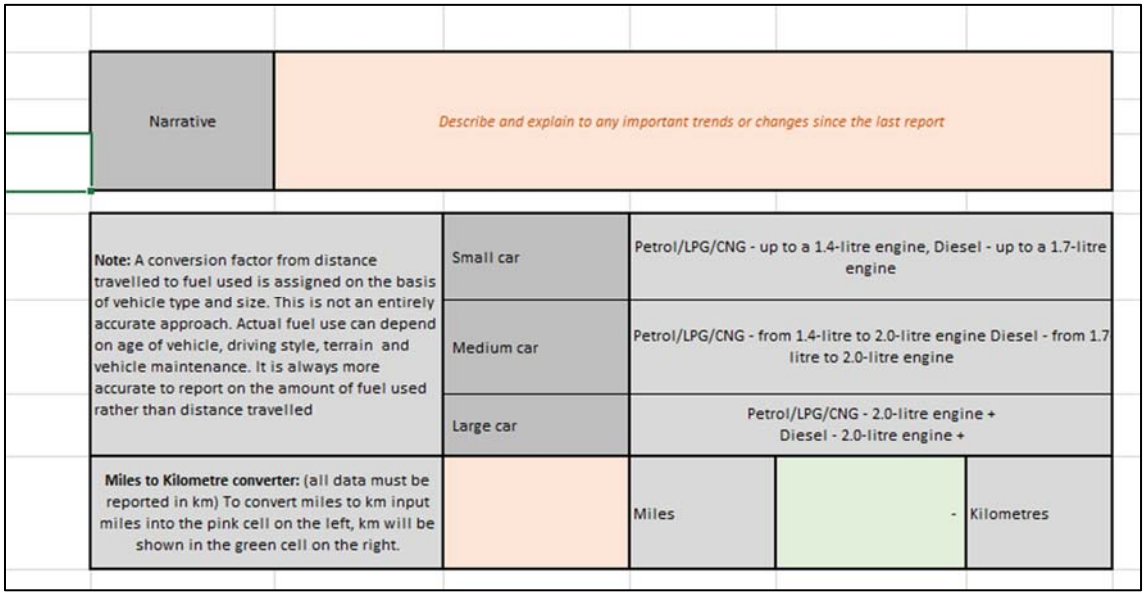
NOTE: Even if they are not yet in common use everywhere, electric vehicles are already economically viable in most countries. Depending on the carbon intensity of the national electricity grid, and the fuel efficiency of the vehicles being replaced, moving to EVs can cut travel emissions by well over 80%. Vehicles are now available with ranges of over 450km, able to charge anywhere there is an electricity source. infrastructure constraints are not necessarily a barrier and can be simple to cater for. EVs also tend to have less maintenance needs than fossil fuel vehicles.

Vehicle-distance

If data on fuel use is not available, use the vehicle distance sheet to enter information on the distance travelled by vehicles owned, rented, or leased by your organisation. This data may also be useful to identify vehicles to replace.

Before following the guidance on the vehicle distance sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

All data must be reported in Kilometres. There is a conversion tool at the top of the sheet to help convert miles to km.



Narrative	*Describe and explain to any important trends or changes since the last report*			
Note: A conversion factor from distance travelled to fuel used is assigned on the basis of vehicle type and size. This is not an entirely accurate approach. Actual fuel use can depend on age of vehicle, driving style, terrain and vehicle maintenance. It is always more accurate to report on the amount of fuel used rather than distance travelled	Small car	Petrol/LPG/CNG - up to a 1.4-litre engine, Diesel - up to a 1.7-litre engine		
	Medium car	Petrol/LPG/CNG - from 1.4-litre to 2.0-litre engine Diesel - from 1.7 litre to 2.0-litre engine		
	Large car	Petrol/LPG/CNG - 2.0-litre engine + Diesel - 2.0-litre engine +		
Miles to Kilometre converter: (all data must be reported in km) To convert miles to km input miles into the pink cell on the left, km will be shown in the green cell on the right.		Miles	-	Kilometres

If you wish to report the distances travelled for any vehicle already covered on the 'Vehicle-fuel' sheet, you must select Y in column D. This will avoid double counting of emissions.

Relying on vehicle distance data will generate a less accurate readout of the carbon footprint of vehicle use. This method relies on estimates of carbon emissions per kilometre for the kind of vehicles reported. Using vehicle distance instead of actual fuel use also means that the quality of these estimates will depend on describing the type of vehicle used, which is never as accurate.

This reduction in accuracy will be reflected in the 'Weighted data quality score'. It is not possible to achieve a weighted data quality score of 100% using vehicle distance.

As with the earlier section on Vehicle Fuel, wherever possible you should attempt to assign each vehicle to a specific site. This should be the site where the vehicle is usually based.

It is not necessary to enter data separately for individual named vehicles, only the total distance travelled for all vehicles, grouped by **vehicle type**.

For each entry, you must:

- **Select the type of vehicles being reported**. There is a long list of options. Report on one type of vehicle per line. Most types of vehicles should be clear from the dropdown. A definition of what constitutes a small, medium, or large car, is provided at the top of the sheet.
- **Select the fuel type**. Only petrol or diesel are currently available as options here. Separate reporting lines by fuel types. I.e., if you are reporting on 'medium cars', some of which are petrol and some of which are diesel, split this into two lines, one for each fuel.

- **The number of vehicles of this type**. While details of each vehicle are not required, this figure helps to provide some assurance that the distance travelled data is reasonable for the number of vehicles covered. No vehicles should be double counted.
- **Kilometres travelled**. Data can only be submitted in kilometres. There is a conversion tool at the top of the sheet to aid miles to km conversions.

Travel - Other vehicles

Air travel accounts for around 2.4% of all global carbon emissions.[7] While regular work-related travel tends to be a significant part of the footprint for health operations, small amounts of air travel can make a very large contribution.

Before following the guidance on the 'Travel-other vehicles' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

This sheet covers official business-related travel, undertaken by staff and people working for your organisation. It includes emissions from vehicles other than those owned, rented, or leased by the organisation – such as when using government or corporate owned buses, trains, taxis, aeroplanes, and boats – or even privately owned staff vehicles. All emissions for this area of travel are assigned Scope 3.

[For regular travel that occurs in vehicles owned leased or rented by your organisation, use the 'Vehicle-fuel' or 'Vehicle-distance' sheets. These emissions are categorised as Scope 1. For travel in contractor's vehicles, e.g., the delivery of goods to your organisation, use the 'Contractor logistics' sheet, which falls under Scope 3]

Business travel often relates to specific staff based at specific sites, although with increasing home working this is not always the case. Wherever possible you should attempt to assign travel to the site where staff are usually based, report to, or are hired from.

Data to record this area of travel usually comes from staff travel claims, tickets etc.

It is not necessary to enter data separately for individual journeys, though you may want to consider doing this, as it may become useful later when developing your carbon reduction plans.

For each line you should enter the total distance travelled by staff, grouped by **travel method** (e.g., international air travel, taxi, foot-ferry). For each entry you must:

- **Select the method of travel.** There is a long list of options. Report on one method of travel per line. Most methods of travel should be obvious from the dropdown list. A definition of what constitutes a small, medium, or large car is provided at the top of the sheet.
- **Number of people travelling.** Emissions for public transport are calculated per passenger km. If you are reporting for 5 people travelling 2,000km in a plane, this group will have travelled 10,000 passenger km.
- **Select the units of distance**. Three units of distance are provided; miles, km and passenger.km. Where a whole vehicle with a single occupant has been used, such as a taxi or rental car, use miles or km. Where the distance travelled has been in public transport, such as an aircraft, ferry or bus, the distance travelled should be reported in passenger.km.
- **Distance travelled**. Enter distance in the units selected. This data may be from staff travel claims, or for international travel, by measuring the round-trip distance between two stations, ports, or airports. If needed there is a 'miles to km' conversion tool at the top of the 'Vehicle distance' sheet. If you have already provided the number of people travelling, you only need to enter the round-trip distance from the point of departure to point of final destination. The Tool will multiply this by the number of passengers to calculate the passenger km and show this in Column F. To help avoid errors, if a single journey distance of over 10,000km is entered, this will be highlighted red to indicate a possible error.

At the top of the sheet there is a link to an air travel distance calculator. This can be used to calculate the distance travelled on multi-stop journeys.

NOTE: Video conferencing and public transport are low carbon options. A change from business class to economy class, for any necessary international air travel, can reduce emissions for that journey by around 65%.

[7] https://www.eesi.org/papers/view/fact-sheet-the-growth-in-greenhouse-gas-emissions-from-commercial-aviation#2

Anaesthetic gases

Eight hours of surgery using nitrous oxide and oxygen has a similar impact on climate change to driving 1,000 km in a car.

This sheet is intended to cover anaesthetic gases. **Before following the guidance on the 'Anaesthetic gases' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'**

Most anaesthetic gases are potent greenhouse gases. While a small amount of gas may be metabolised by the patient, once these gases have been used, they are mostly exhaled by the patient and eventually reach the atmosphere. In some cases, gases may be captured temporarily by a gas scrubbing system. Even gases captured by scrubbers eventually make their way into the atmosphere.

The Tool adjusts all emissions calculations to account appropriately for the metabolization of different gases.

All anaesthetic gas release contributes to Scope 1 carbon emissions. These are considered 'Fugitive gases' in carbon accounting.

NOTE: Besides being powerful greenhouse gases, several anaesthetic gases are also powerful ozone depleting substances. Halothane in particular is as strong in destroying the Ozone layer as CFC12; a gas that has been phased out globally under international law.

The most commonly used anaesthetic gases in LMICs are nitrous oxide, halothane, isoflurane, sevoflurane and desflurane.

Data on the number of bottles or cylinders of these gases that are used, may need to be sourced from your pharmacy or stores.

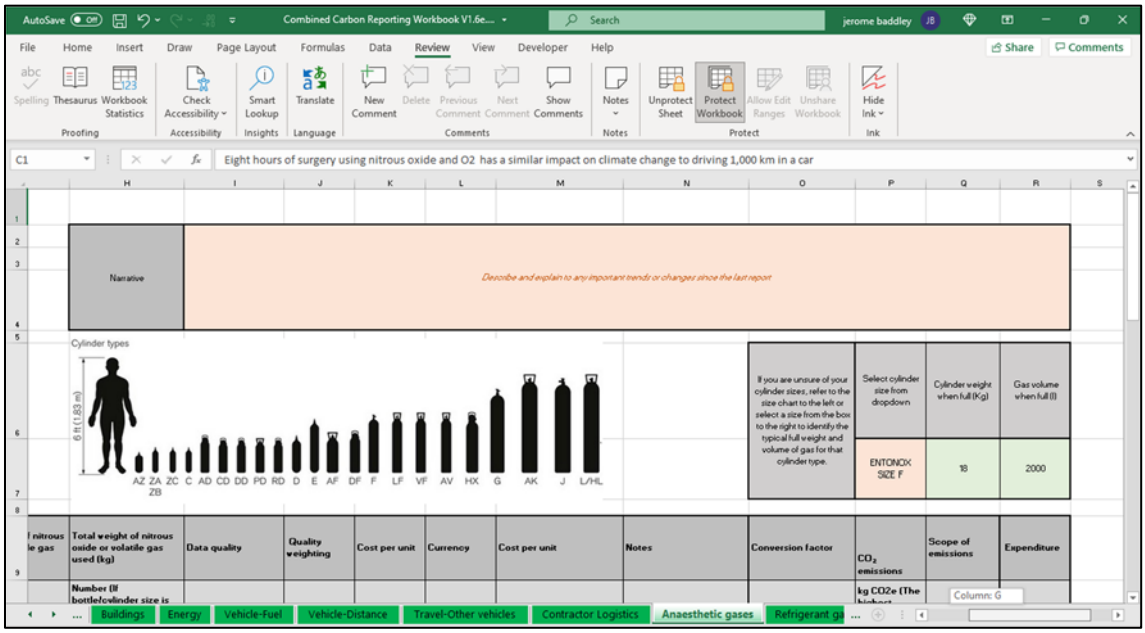
Anaesthetic gases will commonly be used in surgical areas and theatres. Nitrous oxide may also be used in a number of other contexts, such as health clinics, dentistry, and maternity wards. In hospitals, Nitrous oxide may be attached to manifolds outside of your building and supplied by pipeline to surgeries or theatres. Manifolds and pipelines can develop leaks, which can add significantly to your anaesthetic gas use, costs, and carbon footprint. Manifolds and pipelines should be checked regularly for leaks.

On this sheet you should first select the site at which the gases are used.

For each entry you must:

- **Select the anaesthetic gas used.** There are six options. Report on one gas per line. Note that Entonox, equinox, or other nitrous and oxygen mixtures, or gas and air, must be reported as 'nitrous oxide'
- **Identify the main purpose of the gas at the site.** This will help ensure that we are engaging with the right clinicians to address any identified impact**.**
- **Identify the number of bottles or cylinders used** at each site in the reporting period
- **Select bottle size**. Most gases, other than nitrous oxide will be supplied in one type or size of bottle to fit the anaesthetic machines at the site. Bottle sizes for these gases, sourced from the largest manufacturers, are provided in litres. Some nitrous cylinders will contain pure nitrous oxide, some will contain a mixture of nitrous oxide and oxygen (often called Equanox or Entonox). The emissions resulting from cylinders containing nitrous and oxygen will be lower than cylinders containing the same volume of pure nitrous oxide. It is important to select the correct cylinder size. For nitrous oxide, several sizes of cylinder may be used in each location. Please report different cylinder sizes on separate lines. i.e., if your site uses 5 cylinders of Entonox size D and 2 cylinders of Size E Nitrous, report these on 2 separate lines. The size chart and calculator at the top of the sheet should help you identify the correct size cylinder. If the size of your cylinder or bottle is unlisted, select 'unlisted' and provide a figure in column H for the weight of anaesthetic used.

At the top of the page is a guide and a calculator to help you work out the size of nitrous oxide cylinders that are used at your facility.



NOTE: One of the fastest and most effective ways to reduce the carbon footprint of anaesthetic practice, is to change to using medical air and oxygen in surgery, instead of nitrous oxide. Where clinically appropriate, favouring lower carbon anaesthetics and increasing the use of total Intravenous anaesthesia, can also reduce the climate impact of surgery.

Refrigerant gases

A leak of 1 kg of a typical refrigerant can cause approximately the same environmental damage as driving a van 10,000 miles.[8]

This sheet is intended to cover refrigerant gases that have been identified as potent greenhouse gases.

Before following the guidance on the 'Refrigerant gases' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

These gases are used in air conditioning systems and other refrigerating and cooling equipment. Over time these gases slowly leak out of cooling systems into the atmosphere and may need to be topped up.

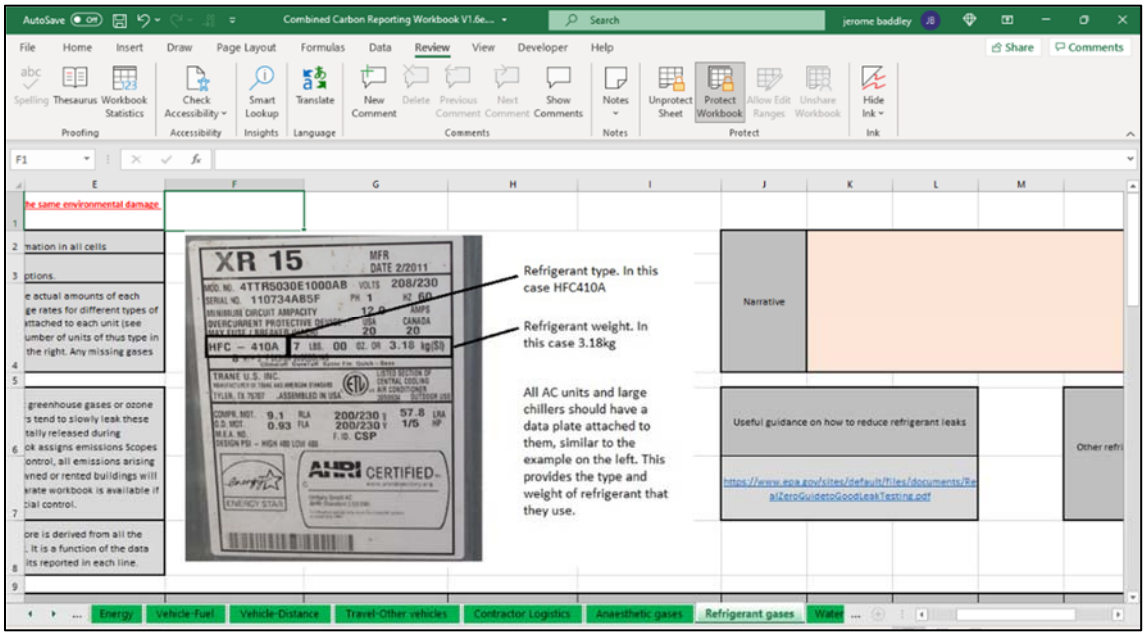
Most refrigerant gases are greenhouse gases, some are far more potent than carbon dioxide.

Their release can contribute to your Scope 1 carbon emissions. These are considered 'Fugitive gases' in carbon accounting. Some refrigerant gases are also potent ozone depleting substances.

Sometimes more significant leaks can result from servicing or maintaining older systems. These leaks can have a very large impact on your carbon footprint.

There are dozens of commonly used refrigerant gases. The type and amount of gases in use at your sites can be determined by inspecting the technical data plates secured to the cooling units. The worksheet provides an example of a technical data plate with the key information highlighted.

[8] https://www.epa.gov/sites/default/files/documents/RealZeroGuidetoGoodLeakTesting.pdf



These data plates should state the type of refrigerant and the weight of refrigerant normally held in the equipment. Alternatively, you may have bottles of refrigerant stored onsite, purchase records, or the engineers that service your equipment may have records of refrigerant used.

You should submit all the data you can find, even if it is incomplete.

Wherever possible you should attempt to assign gas use to a specific site.

For each site you must:

- **Select the refrigerant gas used.** There are many options. Report on one gas per line. If you find a refrigerant that is not listed in the dropdown add this gas to the pink cells at the top of the sheet.
- **Identify the number of chillers at the site that use that type of gas.** This will help to gauge the scale of work that may be needed to address any identified issue and help provide some assurance on the data.
- **Identify the total weight of the gas normally held in all the chillers at the site.** i.e., add together the weight of gas listed on the technical data plates on each chiller and enter the total number. With a known amount of gas held in equipment at each site, the type of system and the reporting period supplied on the cover sheet, the Tool will apply a nominal percentage leakage rate to estimate the amount of gas escaping into the atmosphere over the reporting period.
- **The type of system**. Select the option that best describes your chillers from the dropdown.
- **Amount of gas used to top up chillers.** If known, please provide the amount of refrigerant gas that has been used to top up cooing systems in the reporting period. This may be from your own records or from the records of a company servicing your equipment. If a known weight of gas is entered, the worksheet will default to using this instead of the estimated leakage rate.

There is a link provided at the top of the worksheet to helpful guidance on reducing refrigerant leaks from cooling systems. All new cooling systems can be specified to use low carbon refrigerants.

Water

This sheet covers all water use. Usually this should capture water that is used for drinking, sanitation, or cooking.

Before following the guidance on the 'Water' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

While mains water supply is not normally very carbon intensive, water is a limited natural resource that needs to be used efficiently. This is especially the case in areas where water shortages are a problem. Water use can put pressure on the local environment and water supply can be impacted by climate change. As such it is important to measure, manage and report the amount of water used.

NOTE: The use of bottled water can be very carbon-intensive, in part due to the use and eventual disposal of plastic bottles. Many comparison studies have shown that the carbon footprint of bottled water is between 300 and 1000 times higher than tap water. Plastic bottles are also a highly visible waste product that creates problems in the environment.
NOTE: Water treatment and supply systems are different in every country. There is the potential for double counting when entering data on waste emissions as far as bottled water is concerned. Currently this sheet does not generate a carbon emissions output. Nevertheless, you should consider recording and reporting water use. You may wish to use this resource to help build a case for initiatives to reduce the use of bottled water. This might include alternatives such as reverse osmosis systems. Investing in water filtration to provide clean drinking water to taps in healthcare facilities can cut carbon emissions, plastics waste and protect health.

The totals for this sheet include the amount of water supplied by 3 different methods; 'Bottled', 'Tanker' and 'Local supply'. Local Supply refers to water sourced from a well, borehole, rainwater collection or a locally piped water supply.

Plastics waste from the use of bottled water will also be picked up as part of the reported weight of waste through the 'Waste' sheet.

Water transport can also contribute to carbon emissions from delivery vehicles.

Water pumping and purification on-site can use energy, this will be captured through the calculations on the 'Energy' sheet.

Typically, locally supplied water, if available, will have the lowest carbon impact, due to the reduced use of plastics and delivery vehicles. However, if local water supply is under stress, some forms of local water extraction may require too much energy to be an environmentally sustainable option.

All GHG emissions arising from the supply and treatment of water are Scope 3.

Wherever possible you should attempt to assign water use to a site.

For each site you must:

- **Select the type of water source.** There are six options. Report on one type of water supply per line. If you select 'Other', enter the type of water supply in the notes.
- **Identify the main purpose for water use.** This will help to identify what may be possible in reducing the impacts of water use and help provide a way to double check the data.
- **Identify the units being used.** There are four options, litres, gallons, kg, or cubic metres
- **Enter the total units of water used.** If known, please provide the quantity of water of each type used in the reporting period. This may be from your own records or from the records of a company supplying you with water.

Waste

This sheet covers all waste arising from each site. Depending on the site, this can cover a variety of waste types and waste disposal routes.

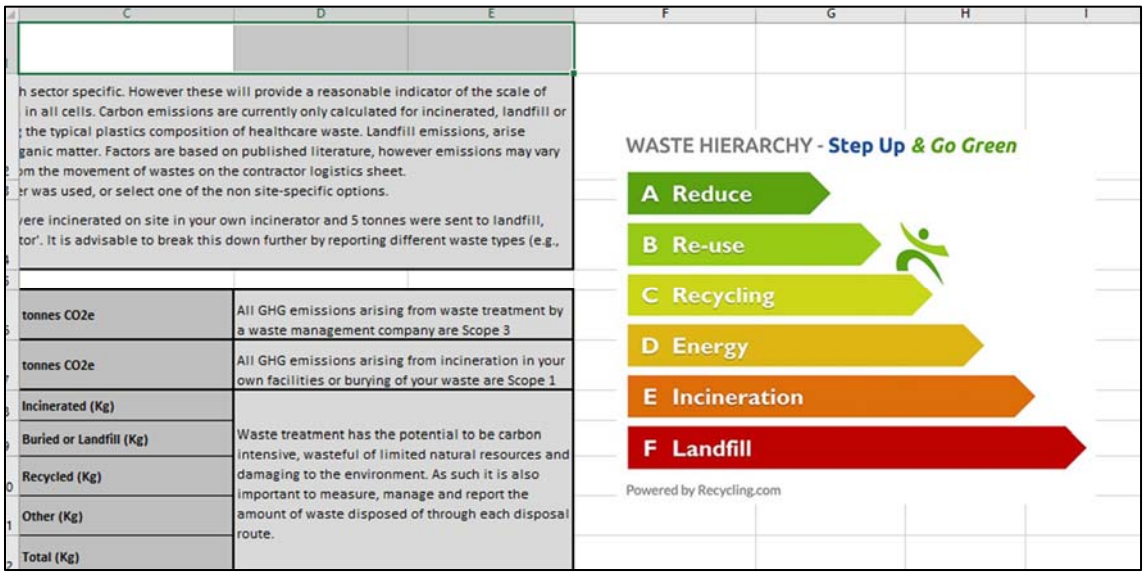
Before following the guidance on the 'Waste' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool and 'Basic sheet structure'

Waste treatment has the potential to be carbon intensive, wasteful of limited natural resources and damaging to the environment. Poorly managed waste can create direct risks to human health.

On the other hand, after actions to reduce waste have been implemented, residual waste can present opportunities for income, local economic activity, and energy generation.

It is important to manage, measure and report the amount and types of waste disposed, as well as the final disposal route. For some types of waste disposal, we can also account for the carbon emissions that arise from waste treatment.

This sheet calculates totals for both carbon emissions and the weight of waste 'Incinerated', 'Buried' and 'Recycled'.



The most sustainable form of waste management is to reduce waste in the first place. Choosing products and processes that generate less waste. However, if waste is produced, wherever appropriate and possible, materials should be reused, recycled, or sent for material recovery.

If recycling is not appropriate or possible, incineration to generate energy is the next best option, followed by incineration without energy generation, and finally landfill or burying. This is known as the waste hierarchy and is represented graphically on the sheet as a pyramid.

Incineration and landfill (or burying) both result in greenhouse gas emissions.

For landfill or burying, most emissions are a result of the methane released in the breakdown of organic material in the ground.

For incineration, most emissions arise from the burning of plastics and fossil fuel derived materials.

Where there is a risk that buried or landfilled wastes could contaminate the environment, local water supply or create a health hazard, such as for clinical or hazardous wastes, incineration is often the preferred disposal route. These wastes may be hazardous to treat by any other method.

Incineration of contaminated plastics, while increasing carbon emissions, can reduce the risk of these materials entering the environment as pollutants, or posing a risk to people handling wastes.

Usually, the emissions arising from waste treatment are Scope 3, however, if waste is burnt in a facility owned by the reporting organisations or buried directly by your organisations staff, these emissions are Scope 1.

Waste treatment practices and infrastructure vary between countries. The local climate can also affect the rate that organic matter decomposes in landfill. As such, it is not possible to provide a fully accurate figure for the carbon impact of waste treatment.

However, there are relevant indicative emissions factors available from Greenhouse Gas protocol and IPCC sources for incineration of healthcare wastes, managed landfill, and unmanaged landfill (burying). As a result, a GHG emission impact is calculated for these 3 disposal routes.

The factor for disposal in landfill assumes that methane gas is not captured at the landfill site. This is based on typical practice in low- and middle-income countries.

Wherever possible, you should attempt to assign the weights of waste that you report to each specific site.

For each site or line, you must:

- **Select the type of waste disposal.** Report on one type of waste disposal method on each line. If you select ‘Other’ as the waste disposal method, describe the type of waste disposal method in the notes. Reporting ‘Incinerated-on site in owned incinerator’ or ‘off site in owned incinerator’ will assign emissions as Scope 1. Emissions arising from treatment of your waste in a waste company incinerator will be classed as Scope 3. If site staff bury wastes themselves, report this as ‘Buried by staff’. This will assign these emissions as Scope 1. Otherwise report buried waste as ‘Landfill’. This will assign emissions as Scope 3. Wastes that are composted,

supplied for animal feed, or sold can be marked as recycled. Emissions are not calculated for wastes marked as 'recycled', or 'other'.

- **Identify main type for waste disposed.** There are 11 options related to international waste codes. These will help to identify what may be possible in reducing the impacts of waste disposal and help provide some assurance on the data.
- **Units being used.** Waste disposal can only be reported in Kg.
- **Enter the total units of waste disposed.** If known, please provide the weight of each type of waste that has been disposed in the reporting period. This may be from your own records or from the records of a company removing your waste.[9]

Construction materials

This sheet is intended to cover materials used in construction of new, extended, and refurbished buildings.

Before following the guidance on the 'Construction materials' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

The construction materials sheet will help to identify the scale of impact that construction materials have, in relation to the rest of your footprint. This sheet should help identify which materials should be focussed on to reduce the carbon emissions resulting from your construction activity.

Emissions related to fuels and building materials used in construction are all classed as Scope 3. Note that while these constitute Scope 3 emissions for you, these emissions are Scope 1 and 2 emissions for your suppliers, contractors and the companies involved in manufacturing your building materials. They have direct responsibility for controlling emissions related to these products.

'Embodied' carbon emissions are calculated on this sheet. The term embodied means emissions that arise in the process of producing and supplying these materials. This includes extraction of raw materials and any manufacturing processes required. This does not include the transport of these materials to your site. If you wish to include emissions from the transportation of building materials, report this on the 'Contractor logistics' sheet.

The carbon factors used in the Tool have been sourced from a UK government dataset. Only a small number of high-level factors are included for the highest carbon construction products. If you purchase recycled or sustainable products the carbon impact of your construction projects may be substantially lower than indicated.

In specifying new buildings, architects, designers, and procurers should be asked to reduce the embodied carbon emissions in the materials used. The Tool can highlight some of the highest carbon materials to focus on, such as metals, concrete, and plastics. However, construction industry-specific software is available that can be used to generate carbon footprints in far more detail and accuracy. In the design process, architects and engineers should be required to use credible and comprehensive construction industry foot printing tools. These should be specifically designed for the construction industry and include both embodied and in-use carbon emissions.

To report on the impact of construction materials:

- **Select a site where construction has taken place**. In the dropdown you should see all the sites entered on the 'Buildings' sheet and 3 options of 'several sites' 'across all sites' and 'not linked to a site'. If this is for an entirely new building, you may need to add in a name for this building on the buildings sheet.
- **Select a material from the dropdown list**. Only a short list of materials is provided for now. If you wish to provide details of materials that are not on the list, you may select the option of 'Average construction' and enter the material type in the notes. This may considerably over or under-estimate emissions from the specific material you are reporting on. However, a record of the types and amounts of materials used may help you in engaging with your design teams in the future.
- **Units.** This field automatically populates with Kg or litres. Litres will only be available as a reporting unit for petrol and diesel used in construction machinery.
- **Amount of material used.** Enter the weight or volume of material used.

[9] One example of waste gasification technology for remote areas is the Terragon MAGS unit. https://terragon.net/resource-recovery-solutions/energy-from-waste/#:~:text=MAGSTM%20uses%20Terragon's%20patented,as%20a%2055%20gallon%20drum

Sourcing steel with a high recycled content and concrete from companies that are actively working on reducing their emissions can have a major impact. Opting to refurbish old buildings rather than construct entirely new buildings can also substantially reduce embodied carbon emissions.

Contractor logistics

This sheet covers all contracted logistics to move goods or materials on behalf of your organisation. It covers travel by road, water, or air in vehicles not owned, leased, or rented by your organisation. This may include logistics activities such as contracted-

- movement of wastes between sites by waste contractors
- delivery of goods or supplies to pharmacies
- movement of clinical samples from point of collection to central labs
- private ambulances or patient travel
- movement of building materials to site
- water deliveries

Before following the guidance on the 'Contractor logistics' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

It may not be appropriate or possible to report on all contractor logistics, however if these are a core or significant part of the delivery of a service, they should be reported. The following examples would be core to the delivery of a service:

- the regular movement of phlebotomy samples from local labs to a central lab.
- the distribution of medical goods from a central warehouse to your pharmacies.
- the movement of wastes from local health centres to your central incinerator.

Logistics activity, such as the above, are less likely to be related to one specific building, which is why this sheet is not linked to the buildings entered on the 'Buildings' sheet.

Unless the organisation is an ambulance service operator, or has a role focussed on healthcare logistics, such as the movement of blood or clinical samples, contractor logistics is unlikely to make a very large contribution to a healthcare organisations footprint.

It is possible to build a more accurate calculation of emissions with more detailed information provided on every journey, including vehicle type, distance travelled, and the weight of products moved. If your organisation is heavily or primarily involved in logistics this may be worth deeper investigation than is provided in this tool.

All emissions arising from contracted logistics are Scope 3.

- **Select the vehicle type.** There is a long list of options. Report on one vehicle type per line. Most types of vehicles should be clear from the dropdown. A definition of what constitutes a small, medium, or large car is provided at the top of the sheet.
- **Select the fuel type.** There are currently only 2 fuel types listed, petrol and diesel. Some vehicle types are only able to use one fuel type. For example, if you select 'Articulated truck >33t' and petrol as the fuel, an error message will appear in the carbon factor column, prompting you to select diesel instead.
- **Kilometres travelled**. Enter distance in km. This data may be available from contractor records or by measuring the round-trip distance between pick up and drop off points for known routes. If needed there is a 'miles to km' conversion tool at the top of the 'Vehicle distance' sheet.
- **Units**. The only units available are km.

Inhalers

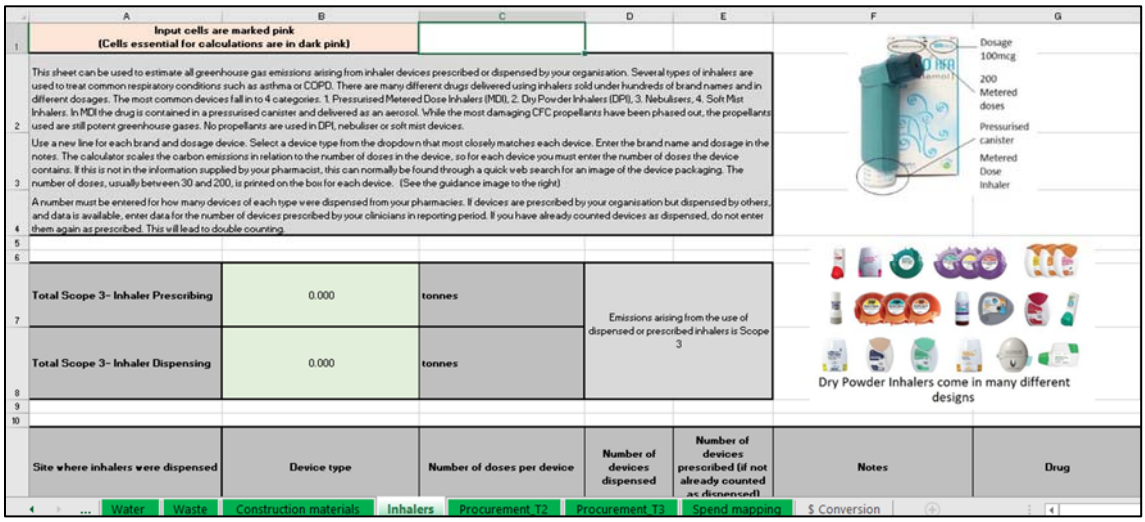
This sheet is intended to cover the prescription and dispensing of respiratory inhalers, usually used in the treatment of asthma or COPD.

Before following the guidance on the 'Inhalers' sheet, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

NOTE: Respiratory illnesses are often caused, or exacerbated, by poor local air pollution.[10] This is particularly a problem in regions where the use of diesel generators and solid fuels are more common.[11] Unfortunately, some of the treatments for respiratory illness also contribute to climate change.[12]

The treatment of conditions such as asthma or COPD often requires the use of inhaler devices to deliver drugs to the lungs. There are many different devices available, however the most common types of devices fall into 2 categories, Dry Powder Inhalers (DPI) and Pressurised Metered Dose inhalers (MDI).

The worksheet includes a graphic at the top of the sheet to help you identify the types of inhalers prescribed. This will help you find some of the key data required.



MDIs currently use propellants that are highly potent greenhouse gases, well over 1000 times more potent than CO2.

Over 95% of the carbon footprint of MDI comes from the propellant gases these devices use.[13] The remaining 4% comes from the metals and plastics in the device and manufacturing of the drugs.

Metered Dose Inhalers are currently some of the most carbon intensive medical products available. While these devices are very small, releasing even small amounts of the gases they use can be equivalent in impact to emitting very large amounts of CO2.

A single MDI, if fully used, can release as much greenhouse gas emissions as a small car driven for 180miles.[14] One patient may use more than 12 of these devices a year.

Emissions related to the metered dose inhalers your organisation dispenses or prescribes, are all classed as Scope 3. These would be Scope 1 emissions for the patient that uses these products.

To report on the impact of inhalers:

- **Select the site where the devices are prescribed or dispensed**. In the dropdown you should see all the sites entered on the 'Buildings' sheet and 3 options of 'several sites' 'across all sites' and 'not linked to a site'
- **Select the type of inhaler from the dropdown list**. Specific carbon emissions data is only available for a few devices. If you do not see your device listed, pick the generic option that best describes your device. Only enter data for one type of device per line.
- **Enter a figure for the number of doses in each device of the type being reported on this line.** This data will be on the boxes and the devices themselves, see the graphic to help you find it. It will usually be between 30 and 200. This data is used to proportionally scale the carbon impact of the device.

[10] Https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4740163/#:~:text=Long%2Dterm%20ambient%20air%20pollution,cancer%20(14%2C15)
[11] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5615585
[12] https://bmjopen.bmj.com/content/9/10/e028763
[13] https://www.mdpi.com/2071-1050/9/10/1725
[14] https://www.sduhealth.org.uk/nhs%20long%20term%20plan/carbon-reduction/anaesthetics-and-inhalers.aspx

- **Enter a figure for the number of devices prescribed or enter a figure for the number of devices dispensed.** As you enter data in one of these columns, the other will turn grey. You only need to enter data in one column. Some organisations will both prescribe and dispense devices, however entering the number twice will count the emissions twice.
- **Add any notes.** It is particularly helpful to highlight the actual brand name and drug that is being reported, if you have selected a generic option for the inhaler

It is likely that your organisation's largest impact will be from salbutamol devices. These are often used for relieving mild conditions or providing immediate relief when someone is having breathing difficulties. Over-use of salbutamol relievers itself can be harmful and is a possible warning sign of a poorly managed condition. International guidelines (GINA) are now increasingly discouraging the use of salbutamol to treat mild conditions.

You can reduce emissions and improve health by ensuring patients are prescribed, and are correctly using, an appropriate DPI preventer device.

Procurement

Before following the guidance on the 'Procurement_T2 and Procurement_T3' sheets, you must have read and followed the guidance on the 'Scope and purpose of the Tool', 'How to complete the Tool' and 'Basic sheet structure'

Procurement_T2
This sheet is intended to help you identify, at a high level, the carbon hotspots in the goods and services that you purchase. This data can then be used to prioritise activities to reduce emissions in your supply chain.

For healthcare organisations, emissions associated with the supply of medicines, medical consumables and other products can be substantially higher than emissions from the delivery of services. Often these emissions will be 60-90% of a health care providers' footprint.

These emissions are always classed as Scope 3 for a health operation, although the same emissions would represent Scope 1 and 2 emissions of the company that manufactures and supplies the products and services you consume.

Calculating a carbon footprint for your entire supply chain could be a time-consuming process. This tool allows you to prioritise which areas of your supply chain to footprint first.

The calculations on this sheet are based on carbon intensity factors from the UK. These are not specific to your country and will not provide a fully accurate carbon footprint. The costs, typical geographic origin, and resulting carbon intensity for products vary between countries. Nevertheless, the relative carbon intensities of different types of products and services are unlikely to vary greatly between countries. For example, pharmaceuticals and some foods will be carbon intensive in all countries, while telecoms and financial services would be less so.

For a more accurate calculation of your supply chain emissions, you will need to refine your carbon footprint calculation with data that comes from your individual suppliers. This is the purpose of the T3 sheet, which is covered in the next section.

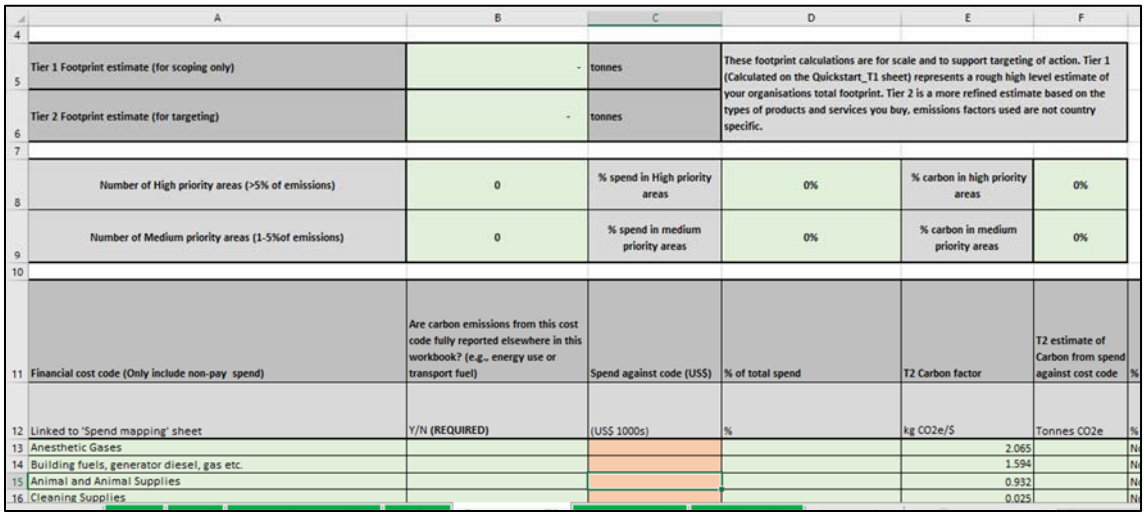
To help simplify footprinting, we have provided emissions factors for 56 different typical categories of spending. If you wish, it is also possible to add new categories using the spend mapping sheet.

To identify your carbon hotspots and estimate your procurement footprint:

1. Group your organisation's major spending data against as many of the categories as is necessary. You do not need to use them all.
2. As far as possible, to avoid double counting of emissions, ensure that any spending on areas that may have been covered elsewhere in the Tool, is grouped into the relevant categories. I.e., spending on 'Staff travel by air', 'Electricity', 'Gas (utility)', 'Vehicle fuel', 'Fuel and lubricants', 'Construction', 'Water', 'Anaesthetics', 'Refrigerants', 'Building fuels, generator diesel, gas etc.'
3. In Column C enter the expenditure for the reporting period against each category in $1000's
4. In Column B Select Y or N in any cells that have turned pink. Select N for areas that have not been covered in the rest of the Tool and Y for areas that have been covered in the rest of the Tool. This process ensures that emissions already calculated elsewhere are excluded to avoid double counting. **There are 3 exceptions**: Anaesthetics, refrigerants, and water. The T2 sheet calculates the emissions in the manufacturing and supply of

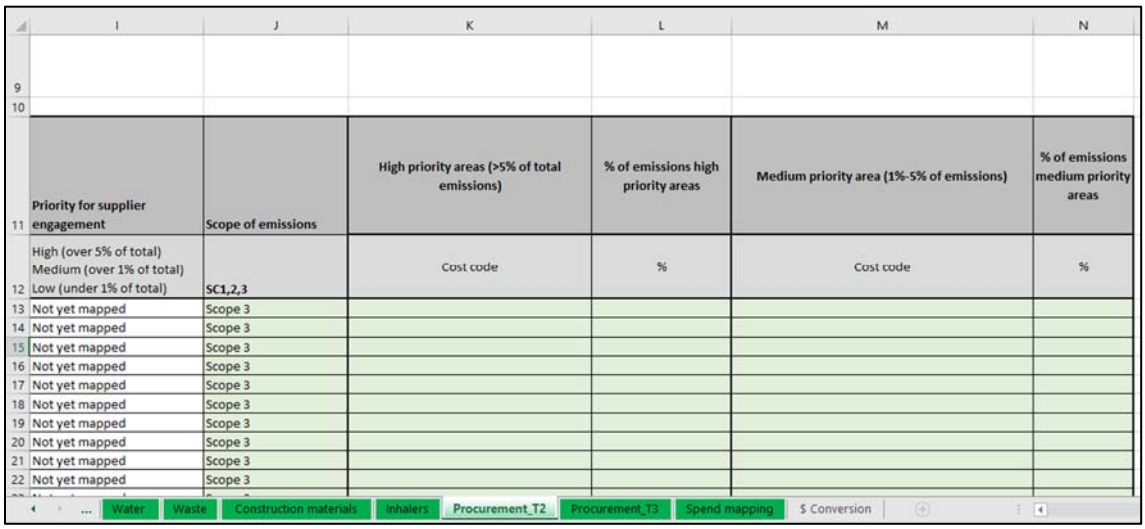
anaesthetics and refrigerants, the other worksheets in the Tool calculate emissions from their direct release. As such, in column B these should be marked as N. As the Water sheet does not calculate emissions, water should also be marked as N. For the calculations to work, either Y or N must be selected against all entries, where you have entered data. You must always complete any dark pink cells.

Once completed, the worksheet will identify any areas that make up more than 5% of your footprint (High priority areas) and 1-5% (Medium priority areas). The number and % of your footprint covered by these will be indicated at the top of the sheet.



	A	B	C	D	E	F
5	Tier 1 Footprint estimate (for scoping only)	-	tonnes	These footprint calculations are for scale and to support targeting of action. Tier 1 (Calculated on the Quickstart_T1 sheet) represents a rough high level estimate of your organisations total footprint. Tier 2 is a more refined estimate based on the types of products and services you buy, emissions factors used are not country specific.		
6	Tier 2 Footprint estimate (for targeting)	-	tonnes			
8	Number of High priority areas (>5% of emissions)	0	% spend in High priority areas	0%	% carbon in high priority areas	0%
9	Number of Medium priority areas (1-5%of emissions)	0	% spend in medium priority areas	0%	% carbon in medium priority areas	0%
11	Financial cost code (Only include non-pay spend)	Are carbon emissions from this cost code fully reported elsewhere in this workbook? (e.g., energy use or transport fuel)	Spend against code (US$)	% of total spend	T2 Carbon factor	T2 estimate of Carbon from spend against cost code
12	Linked to 'Spend mapping' sheet	Y/N (REQUIRED)	(US$ 1000s)	%	kg CO2e/$	Tonnes CO2e
13	Anesthetic Gases				2.065	
14	Building fuels, generator diesel, gas etc.				1.594	
15	Animal and Animal Supplies				0.932	
16	Cleaning Supplies				0.025	

Scrolling right to columns K and M, you will see these areas listed next to the % of your footprint that they contribute.



	I	J	K	L	M	N
11	Priority for supplier engagement	Scope of emissions	High priority areas (>5% of total emissions)	% of emissions high priority areas	Medium priority area (1%-5% of emissions)	% of emissions medium priority areas
12	High (over 5% of total) Medium (over 1% of total) Low (under 1% of total)	SC1,2,3	Cost code	%	Cost code	%
13	Not yet mapped	Scope 3				
14	Not yet mapped	Scope 3				
15	Not yet mapped	Scope 3				
16	Not yet mapped	Scope 3				
17	Not yet mapped	Scope 3				
18	Not yet mapped	Scope 3				
19	Not yet mapped	Scope 3				
20	Not yet mapped	Scope 3				
21	Not yet mapped	Scope 3				
22	Not yet mapped	Scope 3				

Water | Waste | Construction materials | Inhalers | Procurement_T2 | Procurement_T3 | Spend mapping | $ Conversion

This hotspot analysis and the total footprint calculation will also appear summarised on the 'Supply Chain Totals' sheet. The 'Totals' sheet will use the supply chain footprint from the T2 sheet (less accurate estimates) if the T3 sheet has not been populated.

You should consider early engagement with suppliers in areas identified as high and medium priority. The T3 sheet can be used to collate and refine emissions and other key data from suppliers in these areas. This will both improve the accuracy of your footprint, and also help you to engage with your suppliers to encourage them to reduce their emissions.

Procurement_T3

This sheet is intended to help you to get even more accurate, refined carbon emissions calculations for your supply chain, using actual data available from your suppliers. This sheet also allows you to track the information your suppliers share and gain some insights into how committed your suppliers are to reducing their emissions.

The sheet can also help you quantify the proportion of your supply chain that comes from suppliers with carbon reduction targets and green policies. The more you purchase from suppliers that have carbon reduction targets, the more you can hope to reduce your own Scope 3 emissions over time. You will also be able to measure improvements,

as your suppliers make and report on their progress. As such, you should work to increase the proportion of your spending that is with suppliers that provide this information and share their targets publicly.

So, in summary, while the T2 sheet helps identify high level carbon hotspots in your supply chain, the T3 sheet enables you to calculate your supply chain carbon footprint more accurately. The more data you can provide here, the more accurate your supply chain carbon footprint will be.

Critically this level of data will also allow you to measure the impact of actions to *reduce* your supply chain footprint. This cannot be done using the T2 sheet alone.

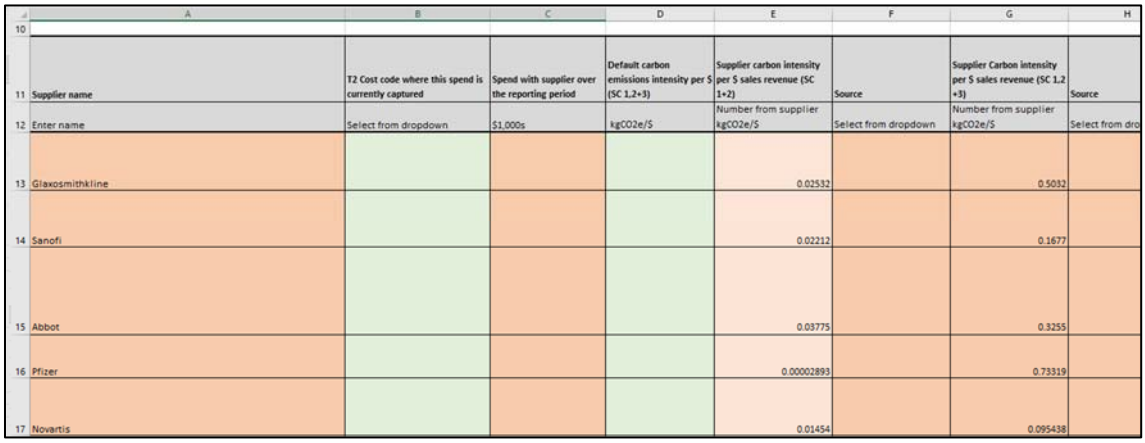
Completing this sheet requires you to either request carbon intensity data from your suppliers, or to calculate this data from the information that many of them already share on their websites.

AKDN has calculated a few carbon intensities, for some of the largest companies, using their published and publicly available data. These are included in the tool only as a guide. Note that these figures have not been validated with the companies themselves.

To calculate your supply chain carbon footprint, the sheet requires carbon intensity data from suppliers in the form of Kg of Scope 1+2 CO2 emissions per US dollar revenue and Kg of Scope 1,2 and 3 CO2 emissions per US Dollar revenue.

Annual revenue data is available online for the significant majority of large companies. Most multinational companies now also publish at least their Scope 1 and 2 carbon footprints. However, not all have published Scope 1,2 and 3 footprints and not all Scope 1,2 and 3 footprints cover the same level of depth.

If you wish to calculate Scope 1,2 and 3 carbon intensities for your suppliers yourself, see the section on 'Supplier carbon intensities'



	A	B	C	D	E	F	G	H
10								
11	Supplier name	T2 Cost code where this spend is currently captured	Spend with supplier over the reporting period	Default carbon emissions intensity per $ (SC 1,2+3)	Supplier carbon intensity per $ sales revenue (SC 1+2)	Source	Supplier Carbon intensity per $ sales revenue (SC 1,2 +3)	Source
12	Enter name	Select from dropdown	$1,000s	kgCO2e/$	Number from supplier kgCO2e/$	Select from dropdown	Number from supplier kgCO2e/$	Select from dro
13	Glaxosmithkline				0.02532		0.5032	
14	Sanofi				0.02212		0.1677	
15	Abbot				0.03775		0.3255	
16	Pfizer				0.00002893		0.73319	
17	Novartis				0.01454		0.095438	

To use the T3 sheet to refine your footprint:

1. Enter the name of your supplier or manufacturer in column A. If you buy products from a global brand via a local supplier enter the name of the global brand, rather than the name of the local agent or supplier.
2. In Column C, enter the amount you spent with each supplier or manufacturer in $1000's. If you bought products from several companies from the same global group, you should consider, at least initially, reporting all this spending against the parent company. It is unusual, even for major manufacturers, to report separate emissions figures for subsidiaries.
3. In Column B, a dropdown list contains all the T2 spending categories. Select the category of spending that purchases with this supplier normally fall into. The data you enter on the T3 sheet is improving the quality of the data already entered on the T2 sheet. As such, before you select a category, first make sure that there is already spending reported against this category on the T2 sheet. Also check that the amount of spending to be reported against this category on the T3 sheet is less than or equal to the amount that you have already reported on the T2 sheet.
4. Having selected a category, a default emissions intensity will populate Column D, this is the same as the intensity used for spending against the same category on the T2 sheet.
5. If available, enter a Scope 1 and 2 emissions intensity for the specific supplier in Column E

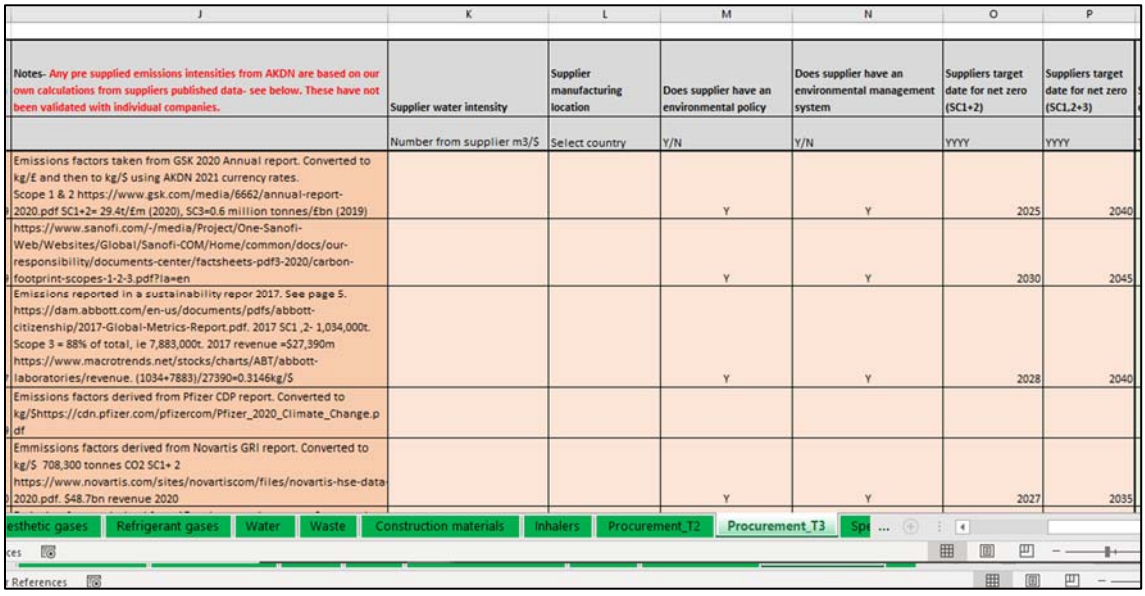
6. In Column F, select the source of the emissions intensity figure from the dropdown options. If this figure has been calculated from the supplier's published data, or provided by the supplier themselves, select 'Supplier data- see notes', otherwise select 'Default' or 'No data'.
7. Enter a Scope 1,2 and 3 emissions intensity for the supplier in Column G. Again, select the source of the data from the dropdown in the adjacent box.
8. Finally, enter the year that the emissions intensity data applies to. Not all data is maintained annually by suppliers, though the latest available data should always be used.

As the steps above are completed for individual companies, your supply chain footprint, shown at the top of the sheets as 'Tier 3 footprint for reporting', will be adjusted. This is a refinement of the Tier 2 footprint, now with part of your footprint calculated from the data you have provided on your own suppliers.

There are several optional fields in columns K to P. These can help you get the most out of the Tool and track the progress your suppliers are making.

If you select whether your suppliers have net-zero targets, environmental policies, or environmental management systems in place, the Tool will calculate the % of your total spend that is covered by companies that have made these commitments. These are valuable metrics to track your progress in cutting your supply chain carbon emissions.

The metrics and total footprint outputs appear at the top of the worksheet and on the 'Supply chain totals' sheet. The 'Totals' sheet also uses the supply chain footprint from the T3 sheet if this sheet has been populated.



J	K	L	M	N	O	P
Notes- Any pre supplied emissions intensities from AKDN are based on our own calculations from suppliers published data- see below. These have not been validated with individual companies.	Supplier water intensity	Supplier manufacturing location	Does supplier have an environmental policy	Does supplier have an environmental management system	Suppliers target date for net zero (SC1+2)	Suppliers target date for net zero (SC1,2+3)
	Number from supplier m3/$	Select country	Y/N	Y/N	YYYY	YYYY
Emissions factors taken from GSK 2020 Annual report. Converted to kg/£ and then to kg/$ using AKDN 2021 currency rates. Scope 1 & 2 https://www.gsk.com/media/6662/annual-report-2020.pdf SC1+2= 29.4t/£m (2020), SC3=0.6 million tonnes/£bn (2019)			Y	Y	2025	2040
https://www.sanofi.com/-/media/Project/One-Sanofi-Web/Websites/Global/Sanofi-COM/Home/common/docs/our-responsibility/documents-center/factsheets-pdf3-2020/carbon-footprint-scopes-1-2-3.pdf?la=en			Y	Y	2030	2045
Emissions reported in a sustainability repor 2017. See page 5. https://dam.abbott.com/en-us/documents/pdfs/abbott-citizenship/2017-Global-Metrics-Report.pdf. 2017 SC1 ,2- 1,034,000t. Scope 3 = 88% of total, ie 7,883,000t. 2017 revenue =$27,390m https://www.macrotrends.net/stocks/charts/ABT/abbott-laboratories/revenue. (1034+7883)/27390=0.3146kg/$			Y	Y	2028	2040
Emissions factors derived from Pfizer CDP report. Converted to kg/$https://cdn.pfizer.com/pfizercom/Pfizer_2020_Climate_Change.pdf						
Emmissions factors derived from Novartis GRI report. Converted to kg/$ 708,300 tonnes CO2 SC1+ 2 https://www.novartis.com/sites/novartiscom/files/novartis-hse-data-2020.pdf. $48.7bn revenue 2020			Y	Y	2027	2035

You will need to review your suppliers carbon intensity data periodically, at least annually, to update figures. As your suppliers reduce their emissions intensities, or you spend more with lower carbon suppliers, your supply chain footprint will fall.

While your larger international and multinational suppliers are likely to have calculated their carbon emissions and carbon intensities, your smaller or national suppliers may not have done this. In this case, you may want to consider sharing this AKDN carbon management tool with these companies and encouraging them to undertake a carbon footprinting exercise and begin to manage their carbon footprint on their own.

Guidance on Tool totals and outputs

Error checking

The error checking sheet helps with identifying common errors or inconsistencies in data entry that may introduce errors into the calculations. The sheet also provides you with guidance on how to fix these.

Errors are most likely to arise if:

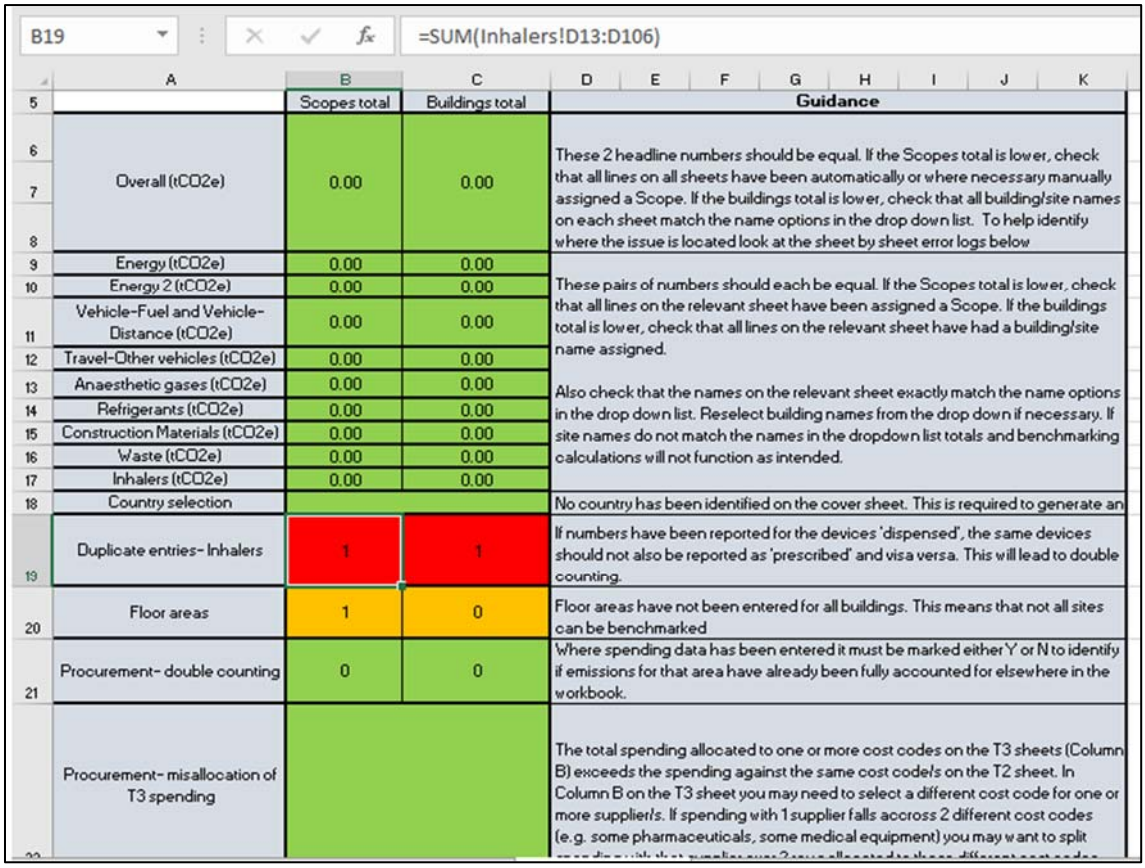
1. You copy and paste data into the Tool instead of using the dropdown menus provided
2. You change the names of buildings or sites in the buildings sheet, after completing the Tool

3. You fill out cells that are shaded grey: i.e., do not need to be completed
4. You do not fill out cells that are shaded dark pink: i.e., must be completed.
5. You enter data in a format that is not recognised: e.g., 100**km** rather than 100.

This Tool has been constructed to guide you in completing it correctly, however mistakes happen. Mistakes are usually very easy to fix once they are identified. The error checking sheet helps you quickly narrow down where there is an error.

If cells on the table are highlighted red, this means that there is an important error that must be fixed to ensure the accuracy of your calculations.

If cells are highlighted amber, this means that there is a non-critical error or omission. A correction here could allow you to get more value out of the analysis.



	A	B	C	D–K
5		Scopes total	Buildings total	Guidance
6–8	Overall (tCO2e)	0.00	0.00	These 2 headline numbers should be equal. If the Scopes total is lower, check that all lines on all sheets have been automatically or where necessary manually assigned a Scope. If the buildings total is lower, check that all building/site names on each sheet match the name options in the drop down list. To help identify where the issue is located look at the sheet by sheet error logs below
9	Energy (tCO2e)	0.00	0.00	These pairs of numbers should each be equal. If the Scopes total is lower, check that all lines on the relevant sheet have been assigned a Scope. If the buildings total is lower, check that all lines on the relevant sheet have had a building/site name assigned. Also check that the names on the relevant sheet exactly match the name options in the drop down list. Reselect building names from the drop down if necessary. If site names do not match the names in the dropdown list totals and benchmarking calculations will not function as intended.
10	Energy 2 (tCO2e)	0.00	0.00	
11	Vehicle-Fuel and Vehicle-Distance (tCO2e)	0.00	0.00	
12	Travel-Other vehicles (tCO2e)	0.00	0.00	
13	Anaesthetic gases (tCO2e)	0.00	0.00	
14	Refrigerants (tCO2e)	0.00	0.00	
15	Construction Materials (tCO2e)	0.00	0.00	
16	Waste (tCO2e)	0.00	0.00	
17	Inhalers (tCO2e)	0.00	0.00	
18	Country selection			No country has been identified on the cover sheet. This is required to generate an
19	Duplicate entries- Inhalers	1	1	If numbers have been reported for the devices 'dispensed', the same devices should not also be reported as 'prescribed' and visa versa. This will lead to double counting.
20	Floor areas	1	0	Floor areas have not been entered for all buildings. This means that not all sites can be benchmarked
21	Procurement- double counting	0	0	Where spending data has been entered it must be marked either Y or N to identify if emissions for that area have already been fully accounted for elsewhere in the workbook.
	Procurement- misallocation of T3 spending			The total spending allocated to one or more cost codes on the T3 sheets (Column B) exceeds the spending against the same cost code/s on the T2 sheet. In Column B on the T3 sheet you may need to select a different cost code for one or more supplier/s. If spending with 1 supplier falls accross 2 different cost codes (e.g. some pharmaceuticals, some medical equipment) you may want to split

In the screenshot example above, Inhalers are highlighted red because the same number of inhalers have been reported as ‘dispensed’ and ‘prescribed’. This suggests that there could be double counting of emissions. For example, if inhalers have already been reported as ‘dispensed’, they should not also be reported as ‘prescribed’. The red highlight indicates that there is potentially a mistake in data entry that will affect the total carbon calculation for inhalers.

In the example above, the ‘floor area’ cells are highlighted orange. This is because not all buildings on the ‘Buildings sheet’ have a reported floor area. While this is not critical in generating a carbon footprint, having this information would generate useful benchmarking information on the ‘Buildings Totals and Benchmarking’ sheet.

Any errors highlighted in rows 9-17 will also show as an error in the ‘Overall emissions’ cells. A red highlight in the overall emissions cells would indicate that there is an inconsistency overall, the cells below will help you narrow down which specific sheet or sheets are contributing to that inconsistency.

Error checking on this sheet works by checking the carbon calculations in 2 different ways. For each sheet it compares the total emissions by Scopes, with the total emissions by sites or buildings. However, both totals rely on a carbon calculation having been completed in the first place.

In some rare cases, carbon emissions may not have been generated for a particular row. This usually means that a key piece of data has not been entered into a dark pink cell or has been pasted into the workbook in a format that cannot be used (e.g., including text in a number only field).

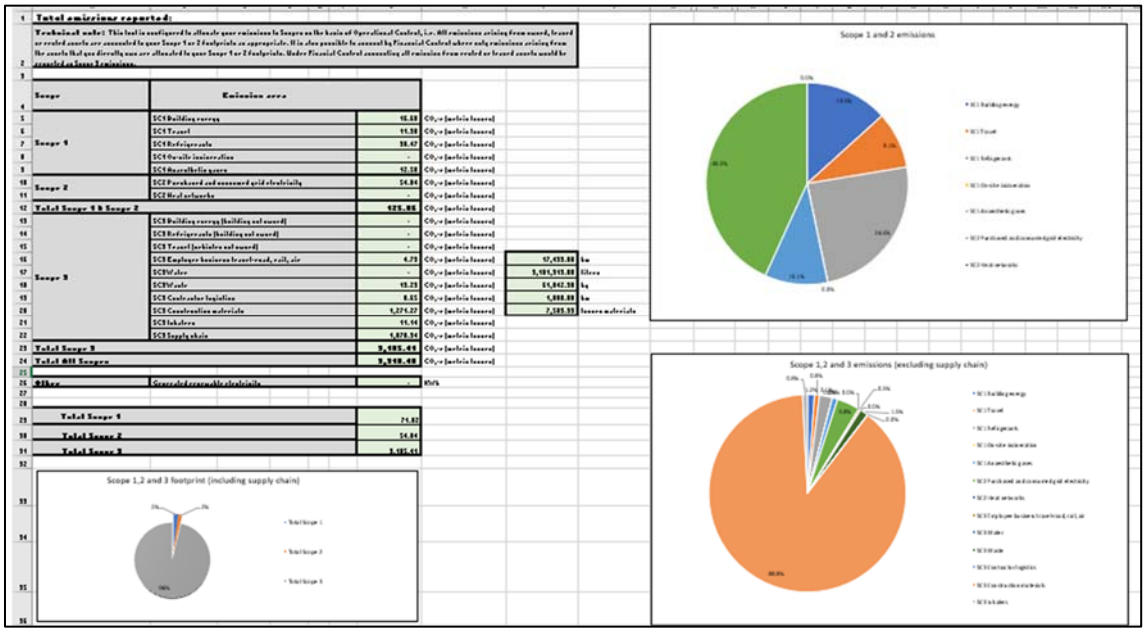
You should always check that a carbon figure has been generated for each line where you have entered data.

Totals

The 'Totals' sheet consolidates all the totals calculated on the individual data sheets. This sheet provides an overall summary of your emissions. Emissions are shown both by source (e.g., energy or anaesthetics) and by Scope (i.e., Scope 1,2 or 3). All emissions are shown in Tonnes of CO2 equivalent (tCO2e).

In addition, totals are provided for a number of other environmental indices, such as water use and renewable energy generated. Units are indicated as appropriate.

Three summary charts are provided, these charts can also be filtered to hide areas where you may not yet be calculating emissions.



The three charts (shown above) cover:

- Emissions by Scopes (Scope 1,2 and 3, inc. supply chain)
- Emissions by Source for Scope 1 and 2 emissions (ex. supply chain)
- Emissions by Source for Scope 1,2 and 3 emissions (ex. supply chain)

More detail on supply chain emissions is provided on the 'Supply Chain Totals' sheet.

	Scope	Emission area				
4						
5		SC1 Building energy	16.60	CO_2-e (metric tonnes)		
6		SC1 Travel	11.38	CO_2-e (metric tonnes)		
7	Scope 1	SC1 Refrigerants	30.47	CO_2-e (metric tonnes)		
8		SC1 On-site incineration	-	CO_2-e (metric tonnes)		
9		SC1 Anaesthetic gases	12.58	CO_2-e (metric tonnes)		
10	Scope 2	SC2 Purchased and consumed grid electricity	54.04	CO_2-e (metric tonnes)		
11		SC2 Heat networks	-	CO_2-e (metric tonnes)		
12	**Total Scope 1 & Scope 2**		**125.06**	CO_2-e (metric tonnes)		
13		SC3 Building energy (building not owned)	-	CO_2-e (metric tonnes)		
14		SC3 Refrigerants (building not owned)	-	CO_2-e (metric tonnes)		
15		SC3 Travel (vehicles not owned)	-	CO_2-e (metric tonnes)		
16		SC3 Employee business travel-road, rail, air	4.73	CO_2-e (metric tonnes)	17,439.00	km
17	Scope 3	SC3 Water	-	CO_2-e (metric tonnes)	9,181,919.00	litres
18		SC3 Waste	19.29	CO_2-e (metric tonnes)	61,842.30	kg
19		SC3 Contractor logistics	0.65	CO_2-e (metric tonnes)	1,000.00	km
20		SC3 Construction materials	1,271.27	CO_2-e (metric tonnes)	7,503.39	tonnes materials
21		SC3 Inhalers	11.14	CO_2-e (metric tonnes)		
22		SC3 Supply chain	1,878.34	CO_2-e (metric tonnes)		
23	**Total Scope 3**		**3,185.41**	CO_2-e (metric tonnes)		
24	**Total All Scopes**		**3,310.48**	CO_2-e (metric tonnes)		
25						
26	**Other**	Generated renewable electricity	-	KWh		
27						
29	**Total Scope 1**		71.02			
30	**Total Scope 2**		54.04			
31	**Total Scope 3**		3,185.41			

Key headline figures are the 'Total Scope 1 & Scope 2' figure and the 'Total All Scopes' figures. It is worth noting that if you are reporting on your supply chain, the figures for this area will normally be several times (typically 3-8 times) larger than the rest of your emissions.

The smaller table to the right provides additional data for the resources identified in the table to the left. For example, the emissions calculated for 'SC3 employee business travel- Road, air, rail' were 4.73 tonnes and the total distance travelled was 17,439km.

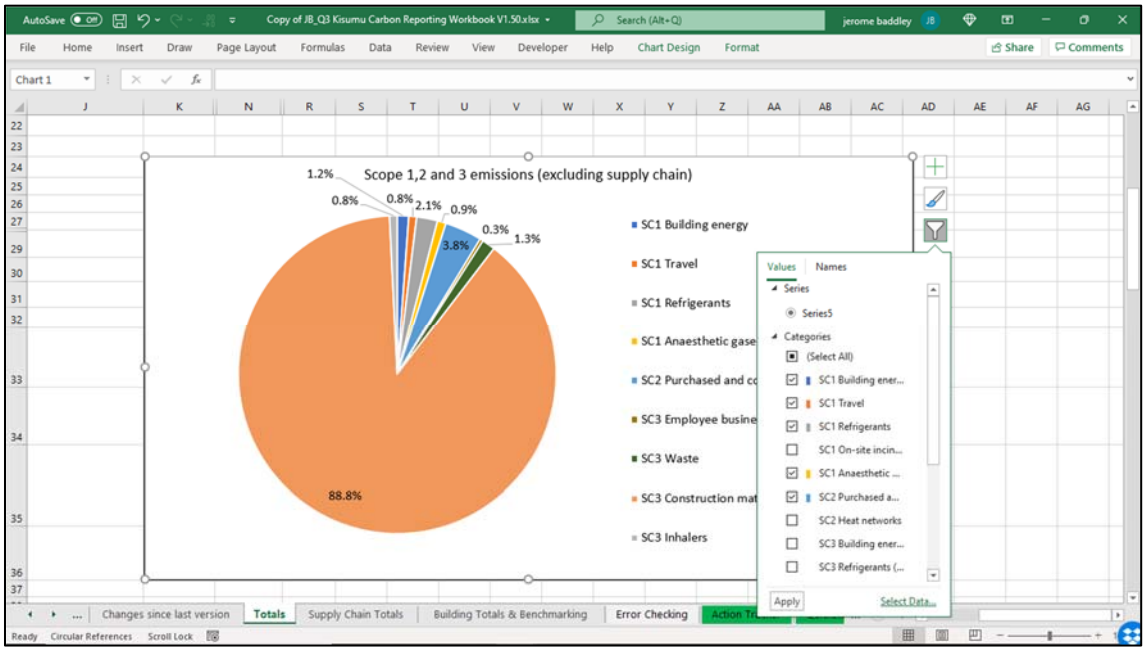
The tool does not yet calculate carbon emissions for SC3 Water, however in the example above 9,181,919 litres of water were consumed.

It is normal practice for an organisation to be able to calculate its Scope 1 and 2 figures accurately and completely. Most organisations will then set targets to reduce these emissions. The tool can allow you to track progress against these targets.

Scope 3 figures are not always based on accurate data. Exact Scope 3 emissions factors are not always available, so Scope 3 calculations often represent the best possible estimate, based on current data. Nevertheless, the Tool allows you to identify which areas of your Scope 3 emissions are most significant. The outputs of the tool will also help you set targets and track progress with reducing these emissions.

The additional metrics provided for water, waste, travel, and renewable energy also provide an opportunity to set targets and measure progress in these areas.

It is straight forwards to filter the charts to show only the data you need to see. First click on the chart. Then click on the funnel shaped icon to the top right of the chart.



In the drop-down menu that appears, ensure that there are ticks only against the data that you would like to show on the chart. Then click 'Apply' at the bottom of the box.

If you need to move any data labels around, to avoid crowding and overlapping, you can click on individual labels and drag them into position.

If you need to adjust the colour allocated for any segments of the chart, click on the paint brush icon  or right click on an individual segment on the chart.

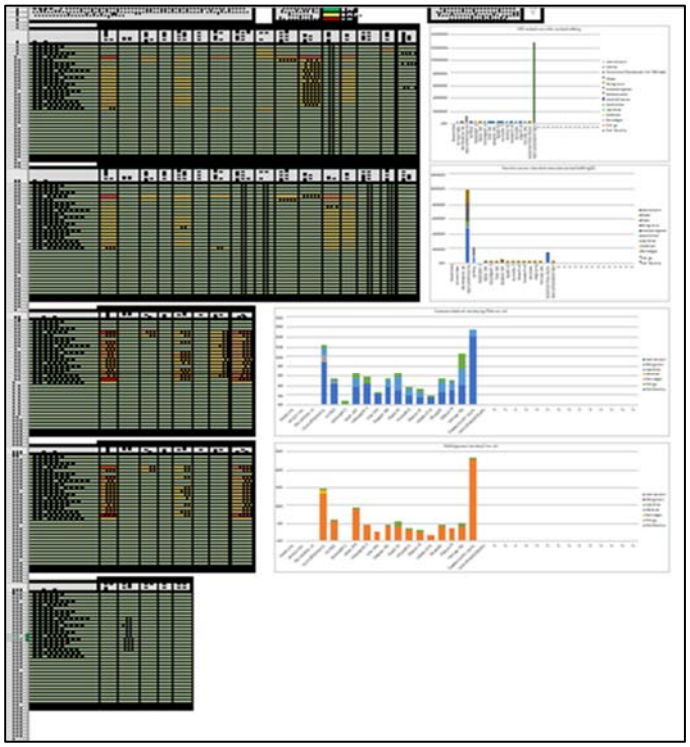
These charts are designed to be editable and can be copied and pasted out of the workbook into reports and presentations.

Buildings and benchmarking

The 'Buildings and benchmarking' sheet shows emissions by source and for each building. If you have provided floor areas on the 'Buildings' sheet, an emissions intensity breakdown will be shown for each building. If you have provided energy cost data on resource use sheets, cost intensity and spending data will be shown for each building.

This level of data allows you to identify which sites contribute most towards your emissions and if any sites are outliers, having higher or lower emissions and emissions intensity than the rest of your estate.

The Buildings and benchmarking sheet consists of 5 tables and 4 charts. The layout is shown to the right.



The tables and charts cover:

1. Emissions by source for each building or site (table and chart)
2. Expenditure by source for each building or site (table and chart)
3. Emissions intensity per m2 for each building or site (table and chart)
4. Expenditure intensity per m2 for each building or site (table and chart)
5. Non carbon related impacts for each building or site (table)

Reviewing the sheet for outliers can help to identify potential reporting errors, as well as areas of good practice and areas that need early focus in developing an emissions reduction plan.

There should be data here for all buildings that you have entered on the buildings sheet, as well as the 3 non-site-specific options.

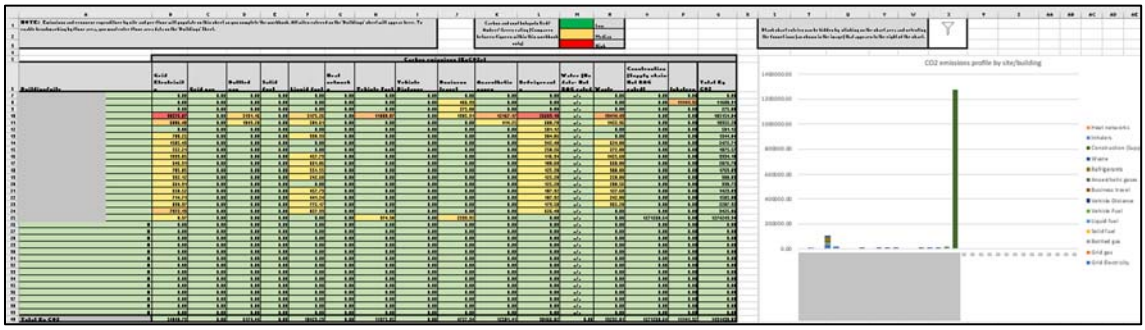
A Red, Amber, Green (RAG) rating is applied to the tables. This means that figures that are relatively high, compared to the rest of the table, will show as red. Figures that are low compared to the rest of the table will show as green. There is a graded scale through amber for values that fall in between the highest and lowest figures.

This RAG rating does not mean that the figures shown as red are necessarily higher than any national or international benchmark. Instead, red simply means that these values are high in relation to the rest of your buildings.

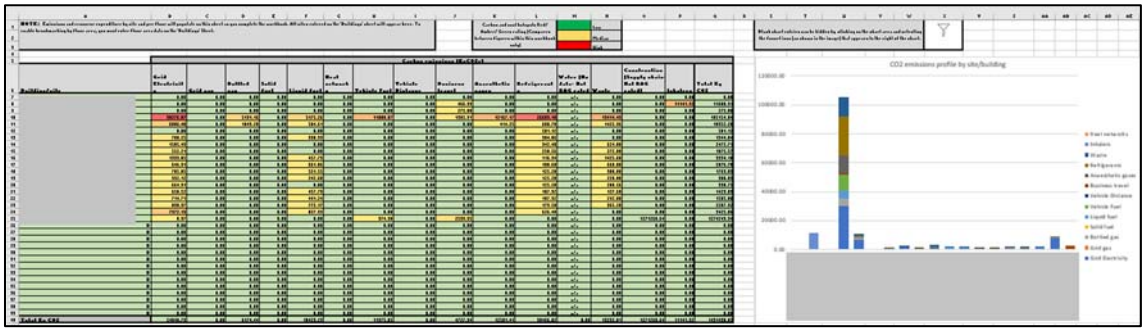
Charts should be filtered in the same way as charts on the ‘Totals’ sheet. See the Totals section on instructions on how to filter charts. All charts on this worksheet automatically show data for all lines in the table. You may only have data on a few lines of the tables. You should use the filter option to remove all empty lines.

You may also want to filter out one or more areas that are far higher than others to allow you to inspect the data for smaller sites in more detail

Before filtering the chart:



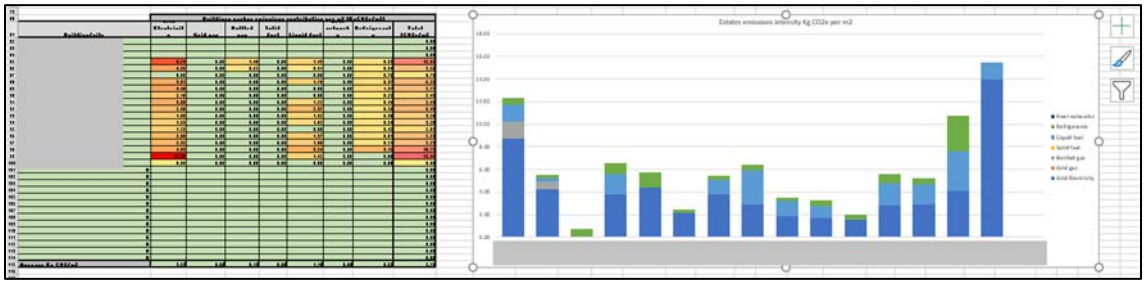
After filtering the chart:



In the example above, the first chart includes empty space to the right for lines in the table where there was no data. A single data set for one site also dominated the chart.

In the filtered chart, bars for sites where there was no data have been filtered out. The single data set that was dominating the chart has also been filtered out. This makes it easier to read which emissions sources and sites are contributing most to the footprint.

The per floor area carbon and cost intensity charts (see example below) are likely to be some of the most useful in targeting and justifying investment in an estate-wide strategy. This chart specifically looks at energy-related resources including electricity, fuels, and refrigerant gases used in AC systems. Emissions in these categories are likely to be Scope 1 and 2 and may often require capital investment to address.



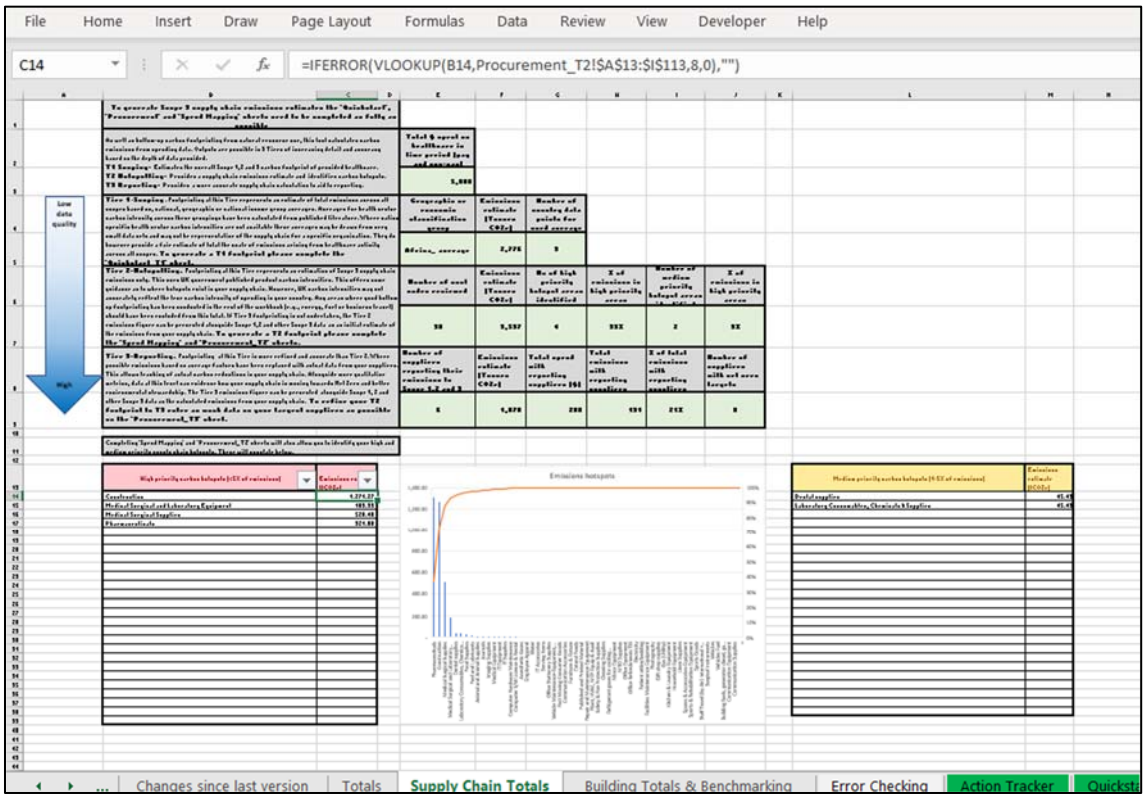
Supply chain totals

The ‘Supply chain totals’ sheet summarises carbon emissions and carbon hotspots calculated from your spending data.

This worksheet also provides several useful Key Performance Indicators to help you track your progress in supplier engagement and in reducing your supply chain emissions.

Depending on the data that you have entered, the sheet shows upto three different calculations of your supply chain emissions. These have been called ‘Tier 1, 2 and 3’.

Each ‘Tier’ provides increasing levels of accuracy in emissions calculations and increasing value in supporting you to target and measure change. Tier 1 is the least accurate while Tier 3 is the most accurate. Increased accuracy towards the bottom of the table is indicated by the blue arrow on the left.



Overview:

- **Tier 1 helps with a high-level overview**- This provides a rough estimate of your supply chain emissions based on national or regional averages for the carbon intensity of healthcare.
- **Tier 2 helps you identify emissions hot-spots**- This provides a more granular supply chain emissions estimate. This is based on indicative carbon intensities of the types of goods and services that you buy. This helps to identify carbon hotspots and prioritise actions.
- **Tier 3 supports tracking and reporting progress**- This provides more accurate supply chain emissions calculations. These are based on refining your Tier 2 footprint with data from your actual suppliers. This information helps you track and report progress.

Tier 1-Scoping. Footprinting at this Tier gives you an estimate of your total supply chain emissions based on, national, regional, or national economic classification averages.

Geographic or economic classification group	Emissions estimate (Tonnes CO2e)	Number of country data points for used average
Low-Mid Income_ average	3,445	9

Averages for the carbon intensity of healthcare have been calculated for countries and regions from the available published literature.

Where nation-specific carbon intensities are not available, averages may be drawn from very small data sets. In the example above an average carbon intensity has been calculated using data from 9 Low- and Middle-income Countries.

Carbon intensities are also averaged across all healthcare, so may overestimate or underestimate emissions for organisations only providing primary care or secondary care.

However, Tier 1 footprinting should provide a reasonably fair sense of the total *scale* of the carbon emissions arising from the healthcare supply chain, in comparison to your Scope 1, 2, and other Scope 3 emissions. This should help you in justifying more detailed work to address these emissions.

If you are aiming to set targets aligned to a global initiative, such as the Science Based Targets initiative (SBTi), you will need to identify the rough percentage of your emissions that come from your supply chain. In the case of the SBTi for example, if this exceeds 40% of your total footprint, you will be required to account more accurately for these emissions and engage with your suppliers to reduce them.

The Tier 1 footprint figure is drawn from the 'Quickstart_T1' sheet, minus any non-supply chain emissions that have been calculated in the rest of the workbook.

Tier 2-Hotspotting. Footprinting at this Tier represents a more refined estimation of your supply chain emissions. While this is still not an accurate calculation of your supply chain footprint, this will allow you to identify emissions hotspots. Unlike T1, T2 data can help you see where you need to prioritise action. To generate a T2 footprint, the 'Procurement_T2' sheet must have been completed.

Number of cost codes reviewed	Emissions estimate (Tonnes CO2e)	No of high priority hotspot areas identified	% of emissions in high priority areas	Number of medium priority hotspot areas identified	% of emissions in Medium priority areas
38	3,537	4	93%	2	3%

The Tier 2 calculation relies on product carbon intensities published by the UK government. While UK product carbon intensities are unlikely to accurately reflect the true carbon intensity of spending in your country, the relative carbon intensities of different types of products tend to be fairly consistent between countries. Also, the healthcare supply chain tends to be dominated by a few large suppliers that are common to the UK and the rest of the world.

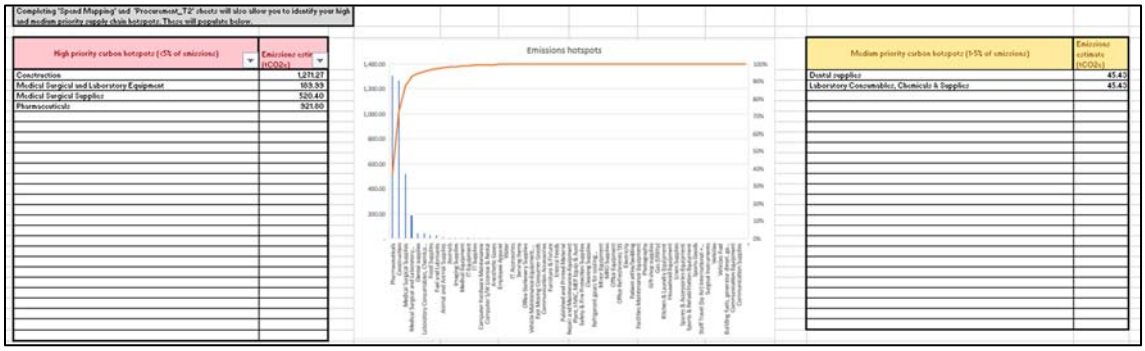
As well as an emissions estimate, the Tier 2 table identifies:

- How many spending categories your organisation has provided data against; in the example, it is 38.
- How many spending categories need to be addressed as a high priority, i.e., they represent 5% or more of your emissions; in this example it is 4.
- The total percentage of your emissions that fall into these high priority areas; in this example 93% of emissions fall into these 4 high priority areas.
- How many spending categories need to be addressed as a medium priority, i.e., they represent between 1 and 5% of your emissions; in this example it is 2.
- The total percentage of your emissions that fall into these medium priority areas; in this example 3% of emissions fall into these 2 medium priority areas.

Any areas where footprinting has been conducted in the rest of the Tool (e.g., energy, fuel use or business travel) have been excluded from this total.

If Tier 3 footprinting has not been undertaken, the Tier 2 emissions figure is the same number that is visible in the 'Totals' sheet as the SC3 Supply Chain emissions total.

In addition to the totals, shown in the table above, the identity of hotspot areas are also shown on this sheet. These are shown in the two tables and the chart at the bottom of the sheet.



High priority, high carbon spending categories are shown on the table to the left of the chart, with the red header. In this example 4 high priority areas are listed. They are named in the lefthand column. The carbon emissions associated with each area are provided in the righthand column.

These are the areas of spending where it is most worth focussing attention. Actions might include engaging with suppliers to ensure they are reporting their carbon emissions and have commitments to reduce these to Net Zero (see Tier 3 reporting). In addition, you may wish to work with staff to identify ways to reduce the volumes of products purchased in these categories and identify ways to minimise waste.

Medium priority spending categories are shown on the table to the right of the chart, with the yellow header.

Tier 3-Reporting. At Tier 3, supply chain calculations become more useful. At this Tier you will go beyond simply scoping or hotspotting, to actually footprinting your supply chain and measuring change over time.

To footprint to Tier 3 requires obtaining data from, or about, your own suppliers' carbon emissions. This data is reported as carbon intensity per dollar revenue for each supplier.

Tier 3 is more refined and accurate than Tier 2. Wherever you have provided data on your specific suppliers on the 'Procurement_T3 data', this will have resulted in a refining of the T2 footprinting estimate.

As more of your supply chain is covered by suppliers who are providing data on their Scope 1,2 and 3 carbon intensity, you will be able to track actual carbon reductions in your supply chain.

% ($) Supply chain with environmental policies	Emissions estimate (Tonnes CO2e)	% ($)of Supply chain reporting Sc1,2 emissions (%)	Number of suppliers reporting Sc1 and 2 emissions (No.)	% ($) of Supply chain with Sc1 and 2 Net zero emissions targets (%)	% ($) of Supply chain with Sc 1,2 and 3 Net zero emissions targets (%)
52%	2,257	52%	6	52%	48%

The aim of the data outputs at this level (shown on the table above) is to help track the proportion of your supply chain that is covered by suppliers with commitments to cut their carbon emissions. The more suppliers that do this, the more you can assume that the products you buy from them will represent lower and eventually no carbon emissions (as suppliers' operations eventually become Net Zero).

The commitments of suppliers can be tracked and recorded in the Tool through several levels of engagement. From recording whether suppliers have simple environmental policies in place, through to reporting their carbon emissions and finally committing to full net zero targets for their own operations and their supply chain.

In the example table above:

- 52% of spending is with suppliers who have in place an environmental policy.
- 52% of spending is with suppliers who are reporting their Scope 1 and 2 emissions.
- 52% of spending is with suppliers who have scope 1 and 2 Net Zero targets.
- 48% of spending is with suppliers with Scope 1,2 and 3 Net Zero targets.

In the example above, given that only 6 suppliers are reporting Scope 1 and 2 emissions and that only 48% of spending is with suppliers with Net Zero targets – these are figures that an operation should aim to increase.

If Tier 3 footprinting has been undertaken:

- The Tier 3 emissions figure is the same number that is visible in the 'Totals' sheet identified as the SC3 Supply Chain emissions total.
- The carbon figures in the high and medium priority hotspots table shown above, will also have been updated to reflect any T3 level data provided.

Action Tracker

Developing a detailed and costed action plan is an exercise that will use data from the Tool as well as other information. To help you manage your work and track progress, a sheet has been provided to help teams record and report on actions that are being taken to reduce emissions, the progress being made, carbon saved, and costs reduced over the reporting period.

The action tracker sheet is intended to encourage actions to be developed that cover the main areas of identified emissions. For example, if anaesthetics are identified as an area of significant emissions, actions should be developed to address this. Alternatively, if a particular building or site is identified as a major source of emissions, actions should be developed to address this.

The action tracker sheet is very simple. First, select within the buildings column, the building where the action is taking place, or select one of the general options, if the action is across several sites or is not site-based.

Secondly, select the 'Action area'. What type of action is this? Which emissions does it address? There are 14 options here, including behavioural and engagement actions and more direct areas. A description of each area is provided in the grey box at the top of the sheet.

Then enter the start and expected end dates in MM/YYYY format, such as 01/2022 for January 2022.

Then select the description that best describes progress made on this action to the end of the reporting period.

- Planned
- Started
- In progress (25%)
- In progress (50%)
- In progress (75%)
- Completed
- Delayed
- Cancelled

The next column provides space to describe the action and its intended impacts. Complete the account by entering an indicative or agreed budget set for the project.

As each project progresses, and after completion, there should be measurable carbon and very often financial savings. It is essential to capture data on these savings, during and after project completion. This real-world impact measurement, as opposed to pre-project estimates, can be used to identify areas where progress has been made, justify further investment, celebrate successes, or to help encourage others to undertake similar initiatives.

Emissions Factors

Emissions factors used in this Tool

Most emissions factors used in this Tool have come from The UK Government published factor sets (Department of Food and Rural Affairs/DEFRA).

Some factors in the UK DEFRA set are specific to the UK. e.g., average diesel and petrol blend in the UK contains a % biofuel, these figures have not been used. Instead, default factors from the same data set, reflecting 100% mineral blend for each fossil fuel have been used.

Similarly, as DEFRA averages for vehicle efficiency are based on the UK vehicle market, the use of these UK specific market average factors has been avoided.

Some specialist and country specific factors have been derived from other sources. Emissions factors for anaesthetic gases are based on IPCC AR5 for nitrous oxide and recent published academic literature on the 100-year global warming impact for fluorinated gases.

Emissions factors are currently not available for waste and water in all countries. The IPCC Emissions Factors database and GHG protocol publications have been used to source factors for waste incineration and waste disposal via landfill or burying.

There is currently a limited range of factors for construction materials. These have been sourced from UK DEFRA. Should better or more complete data become available, these will be used to update this Tool.

Currently, Scope 3 emissions relating to the 'transmission and distribution' and 'well to tank' impacts of electricity and combustion fuels are not separately reported. A freely available carbon factor source for these Scope 3 aspects is yet to be identified.

Most default emissions factors for electricity are based on UN FCC 2019 figures (Combined Market Average). These cover all Scope 2 emissions for electricity. However, these may also include some Scope 3 emissions from

'transmission and distribution' and 'well to tank' impacts. More up-to-date country level factors for electricity with Scope 2 and Scope 3 aspects separately reported are available to purchase from the International Energy Agency.

Some areas of emissions reporting have been deliberately simplified for this Tool:

Carbon emissions from the combustion of biomass fuel sources are not currently calculated. These would be cited as 'Out of Scopes' emissions, as the CO2 released is not related to the combustion of fossil fuels. This segregated reporting output is expected under the GHG reporting protocol and will be added as a high-level output in a future revision. This will not add any further reporting fields.

Supplier carbon intensities'- Calculation protocol

To generate carbon emissions intensities for your suppliers, emissions data and total annual revenue for the same year will need to be available for that supplier.

For large companies, figures for suppliers' own emissions can often be drawn from annual environmental or carbon reports. Total annual revenue data is usually available from annual financial reports. This data may also be available from third parties such as the Carbon Disclosure Projects (CDP). For consistency of methodology, wherever possible, a company's CDP submissions are the best place to start, if these are available.

Data on emissions and revenues should be taken from the highest parent company. This company is normally expected to include all subsidiaries and global operations. For instance, this would mean using data for, Canon global, rather than a national subsidiary of the same company.

First, identify the total annual revenue in US dollars for the company for the reporting year. This may need to be converted to dollars from the company's normal reporting currency.

Then, identify the company's total Scope 1 and 2 emissions for the same year. Where possible, use *market-based* Scope 2 emissions. A supplier may report both 'Market based' and 'Location based' emissions. Market based emissions credit suppliers for carbon reductions from the purchase of green electricity tariffs.[15] However, if only *location-based* Scope 2 emissions are provided, use these instead. Convert the emissions from the reported tonnes or thousands of tonnes into an equivalent amount in Kg.

Finally divide the Scope 1 and 2 emissions in kg by the annual revenue in US Dollars.

For Scope 3 emissions there are some additional challenges. Not all companies report all their Scope 3 emissions. Full Scope 3 reporting is necessary to produce a company's Scope 1,2 and 3 carbon intensity for use in the Tool. Some companies also report aspects of Scope 3 emissions that could lead to double counting with Scope,1 2 and 3 emissions that you may have accounted elsewhere in the Tool.

If the company is reporting to international industry standards, its Scope 3 emissions will be likely to be split into 2 high level categories and up to 12 secondary categories.

Upstream emissions

- Purchased goods and services
- Capital goods
- Fuel-and-energy-related activities (not included in Scope 1 or 2)
- Upstream transportation and distribution
- Waste generated in operations
- Business travel
- Employee commuting
- Upstream leased assets

Downstream emissions:

- Product processing,
- Product use
- End of life disposal
- Downstream transportation and distribution

To produce a Scope 1,2 and 3 emissions intensity, to avoid the potential for double-counting, all upstream emissions should be included, and all downstream emissions excluded. The only exception is where downstream transportation

[15] https://ghgprotocol.org/sites/default/files/Scope2_ExecSum_Final.pdf

and distribution is clearly identified as being to bring products to the point of sale, such as shipping products from the manufacturer to the market or transporting these to a customer's gate or warehouse.

As 'Purchased goods and services' is almost invariably the most significant area of Scope 3 emissions, where this has not been covered in a company's reported Scope 1,2 and 3 carbon footprint, a carbon intensity figure cannot be calculated.

To calculate the Scope 1,2 and 3 emissions intensity, add together all emissions reported against all the upstream Scope 3 areas identified, plus downstream transport and distribution, if applicable. Add the Scope 1 and 2 emissions. Ensure that the emissions figure is in Kg not tonnes. Finally divide this figure by the annual revenue in US dollars.

You can at this point decide if a company's purchased offsets should be included in the carbon footprint or carbon intensity figures that you will use. Credits for offsets have not been included in any of the figures pre-provided in this Tool.

Generating Scope 1,2 and 3 emissions intensities in this way, should ensure that intensity figures are comparable between companies. This will also ensure that figures are complete enough to include all the emissions from the products or services that the company supplies.

Feedback

This carbon management Tool has been developed specifically by AKDN with healthcare providers in Low- and Middle-income Countries as the primary intended audience. This tool can also be used for operations other than health by excluding the Quickstart, anaesthetics and inhalers sheets.

If you find any errors, or have any suggested improvements, that relate to this Guide or the Tool itself, please do contact us. We welcome feedback to improve both. Please be aware that we are continually making refinements with new data and based on user's feedback. To send your feedback and to access updated versions, please write to healthcarbonfootprint@akdn.org .

Version control

This Guide is version 1.0, Dated 11/10/2021
Refers to Tool Version 1.6, Dated 11/10/2021. Tool First created 13/10/2020