Scope 3 Methodology

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Overview

Introduction

The intention of this summary, funded by the then Higher Education Funding Council for England (HEFCE), is to provide outline guidance and set out the key steps for calculating the Scope 3 carbon emissions for Higher Education Institutions (HEIs). It is not possible to set out the full methodology in such a summary but existing methodologies and additional tools to provide clarity on calculating a Scope 3 assessment are referenced.

Emissions scopes

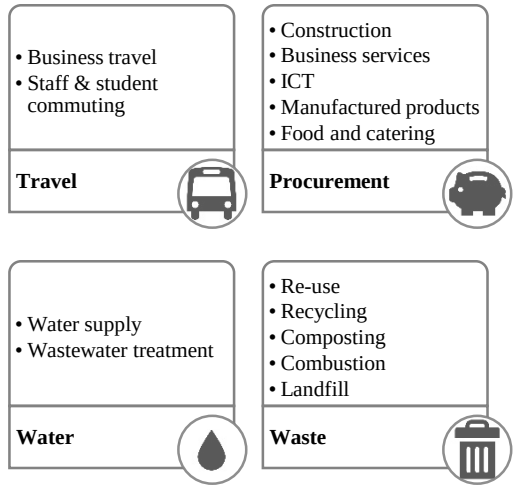
Carbon emissions are divided into three categories (shown in the diagram below):

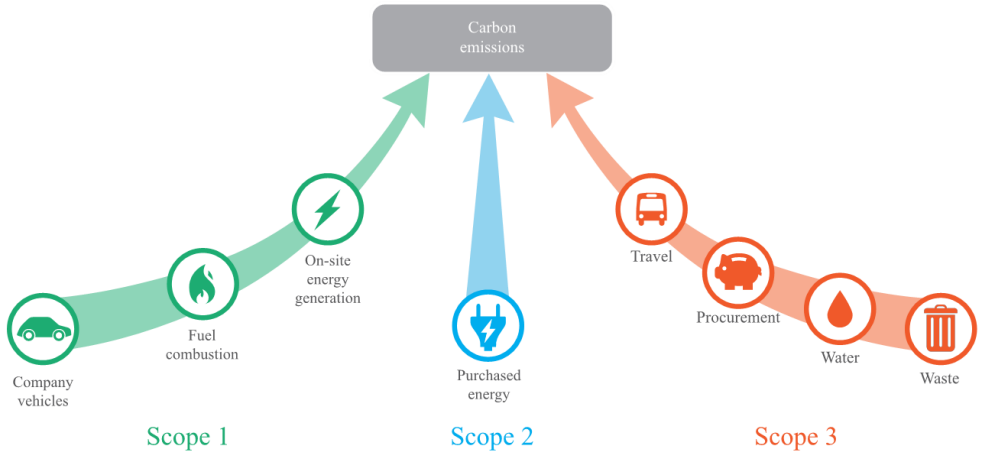
- **Scope 1 (direct)**: Emissions from sources you own or control, such as boilers and fleet vehicles you own.
- **Scope 2 (energy indirect)**: indirect emissions from the generation of purchased electricity, heat, steam etc.
- **Scope 3 (other indirect)**: indirect emissions (i.e. those owned, controlled and generated by others) which result from the organisation's activities such as travel, procurement, water and waste.

This document focuses on Scope 3 emissions, highlighting the various calculation methods available and the information required for each type.

Scope 3 emissions

The Scope 3 emissions category is then broken down into several reporting categories. The key reporting categories for HEIs as set out within previous HEFCE guidance are listed below:





Calculating emissions

The formula for calculating carbon emissions is given below:

Activity data x **Conversion factor** = **Carbon emissions**

Different calculation methodologies are available for each of the reporting categories depending on the activity data and conversion factors available. Emissions are usually quoted as 'CO_2 equivalent' (CO_2e) which captures the effects of other gasses that cause climate change (such as methane or refrigerants).

For each reporting category, the calculation methodologies are arranged from most to least accurate. HEIs should select the most appropriate calculation methodology, aiming for the highest accuracy for the data available.

Bottom-up vs top-down calculations

The calculation methodologies can be categorised into two groups: bottom-up calculations and top-down calculations.

Bottom-up
Bottom-up calculations are based on life cycle assessments and specific process data. If all the information is available, the bottom-up calculations can provide a more accurate assessment of carbon emissions. However, errors may occur if information is missing from the life cycle assessment. These types of assessments can be quite time- and resource-intensive. Whilst bottom-up calculations can be good for self-assessment they do not always allow for comparisons against others due to differences in assumptions / methodology.

Top-down
Top-down calculations use environmentally extended input-output (EEIO) analysis to assign the carbon emissions to products and services. These types of assessments provide a broad estimate of the overall carbon footprint and are well suited for complex systems where it can be difficult to carryout individual life cycle assessments. However, top-down calculations are not able to show the impact of specific product types/ individual products or the impact of local policies.

The following pages set out the calculation methodologies and information needed for each of the reporting categories.

Travel emissions

Introduction

The travel emissions should be calculated for:

Business travel	Air travel, road vehicle travel, rail travel, taxi travel, bus and coach travel, ferry travel
Commuter travel	Staff commuter travel, student commuter travel

The travel included within Scope 3 should specifically exclude any in vehicles owned and operated by the institution which is categorised as Scope 1 – direct emissions.

Calculation methods

There are four calculation methodologies that can be used to calculate travel-related emissions.

Fuel — Based on the amount of fuel consumed for each mode of transport.

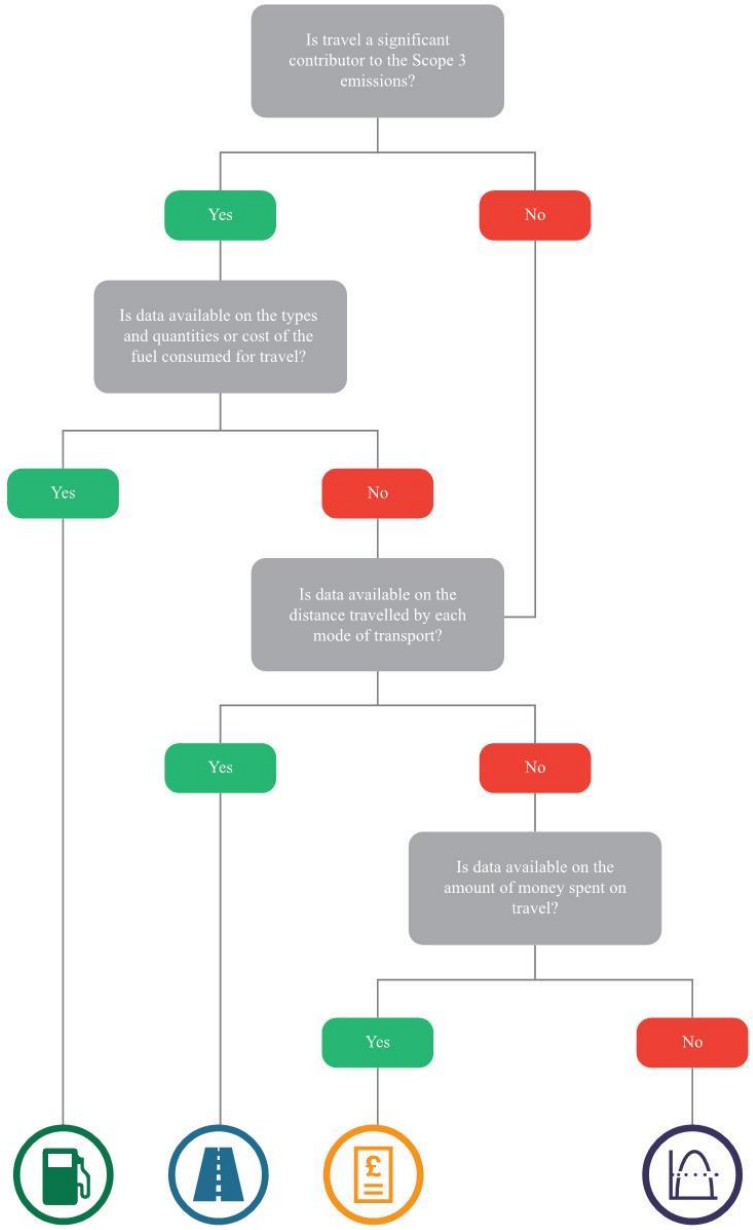
Distance — Based on the amount of distance travelled for each mode of transport.

Spend — Based on the amount of money spent on each mode of transport.

Average — Based on the average emissions estimated from commuting patterns.

A decision tree can be used to determine which calculation methodology would be most appropriate (right).

It might not be possible to assess all travel emissions using a single calculation method, in which case it is recommended that the more accurate method is used where possible and other calculation methodologies are used where that information is not available.



Travel emissions

Information required

Fuel
Quantity of fuel consumed and/or
Amount spent on fuel

Distance
Total distance travelled
Mode of transport used

Spend
Amount spent on transport types

Average
Number of employees and students
Average distance travelled per day (e.g. from travel survey)
Average breakdown of transport modes used
Average number of working days per year

What to collect

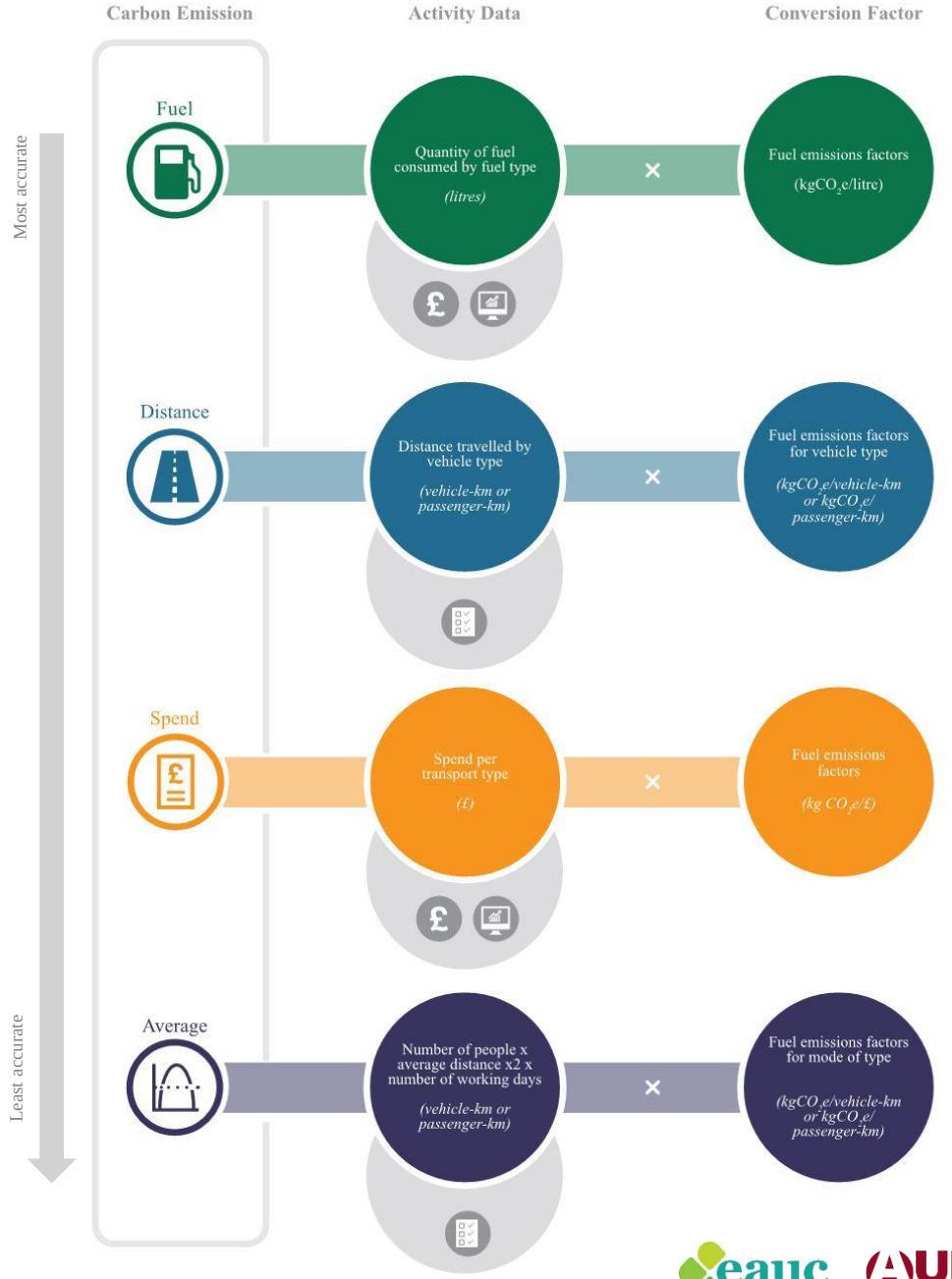
Information can be collected from:

- Fuel receipts
  Purchase records (e.g. train tickets etc.)
  Invoices
- Internal transport management systems
- University-specific travel surveys
  National travel surveys

Emissions factors

The emissions factors can be collected from:

- Transport emissions sourced direct from suppliers based on the amount of fuel consumed or distance travelled (possible but not typical practice).
- Government published carbon conversion factors on the carbon emissions for vehicle and fuel types.
- Environmentally-extended input-output (EEIO) database can be used estimating carbon emissions based on the amount of money spent



Procurement emissions

Introduction

The procurement emissions should be calculated for:

Construction	Products purchased as part of the supply chain, energy used during the construction activities
Business services	Equipment rental, security, travel and business services, catering
ICT	Manufacture of ICT products, such as PCs, monitors, printers and associated consumables
Manufactured products	Furniture, products, specialist machinery

Calculation methods

There are four calculation methodologies that can be used to calculate procurement related emissions.

Supplier — Based on the cradle-to-gate emissions collected from goods and services suppliers

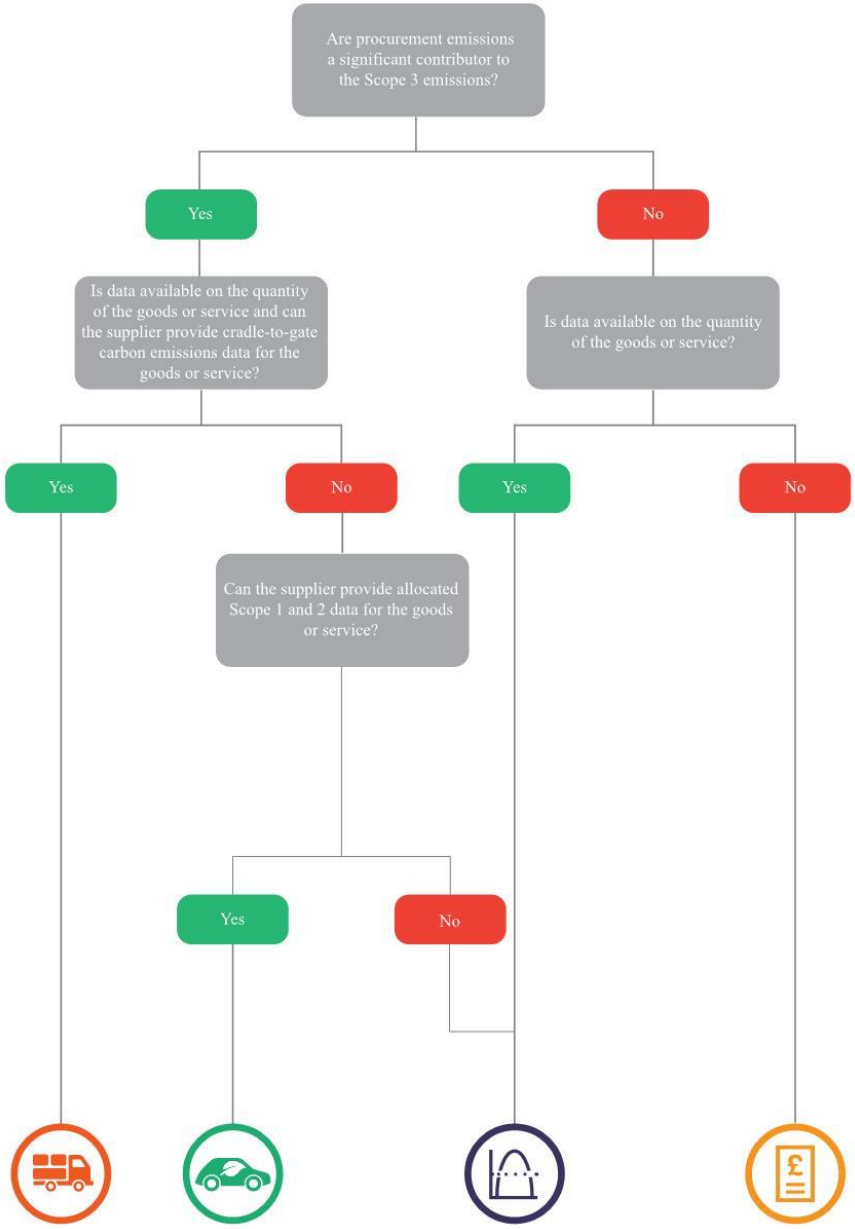
Hybrid — Based on the Scope 1 and Scope 2 data collected from goods and services suppliers

Average — Based on the physical quantity of goods and services used

Spend — Based on the amount of money spent on goods and services

A decision tree can be used to determine which calculation methodology would be most appropriate (right).

It might not be possible to assess all procurement emissions using a single calculation method, in which case it is recommended that the more accurate method is used where possible and other calculation methodologies are used where that information is not available.



Procurement emissions

Information required

Supplier
- Mass or number of product/material
- Amount spent on product/material

Hybrid
- Allocated scope 1 and scope 2 supplier emissions
- Materials input emissions
- Transport emissions
- Waste emissions

Average
- Mass or number of product/material

Spend
- Amount spent on product/material

What to collect

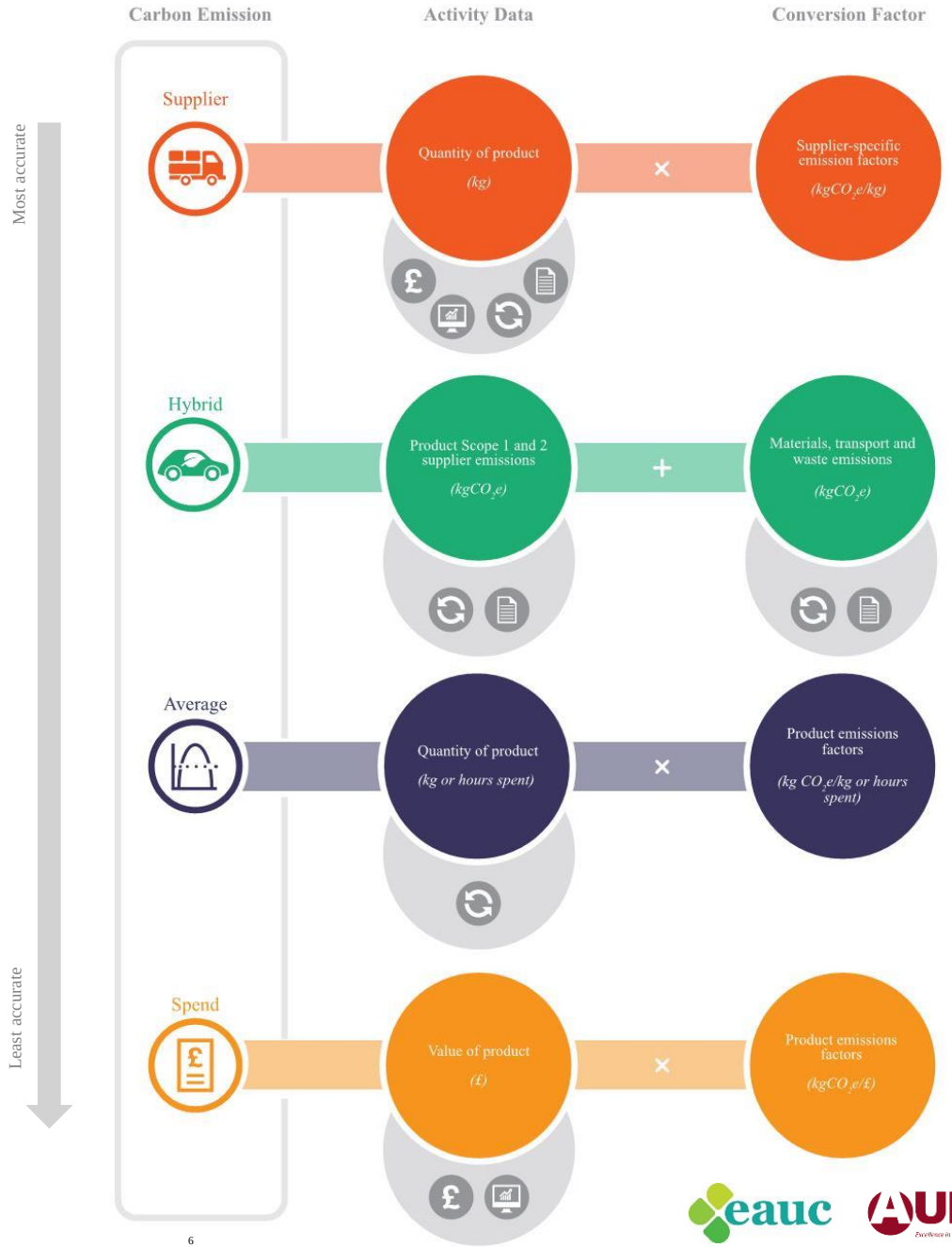
Information can be collected from:

- Lifecycle GHG emissions
- Inventory data
  Bill of materials
- Purchase records
  Invoices
  Expenses
- Financial management system
  ProcHE Annual Returns Database
  Ideally using a recognised categorisation system such as the United Nations Standard Products and Services Code (UNSPSC - https://www.unspsc.org/)

Emissions factors

The emissions factors can be collected from:

- Emissions sourced direct from suppliers based on the specific goods and services used.
- Government published carbon conversion factors.
- Environmentally-extended input-output (EEIO) database can be used estimating carbon emissions based on the amount of money spent.
- IPCC Emission Factor Database



Water emissions

Introduction

The water emissions should be calculated for:

Water supply	Water supplied by water companies or from borehole extraction
Wastewater treatment	Wastewater treated by the institution or a third party including greywater, rainwater, borehole extraction water

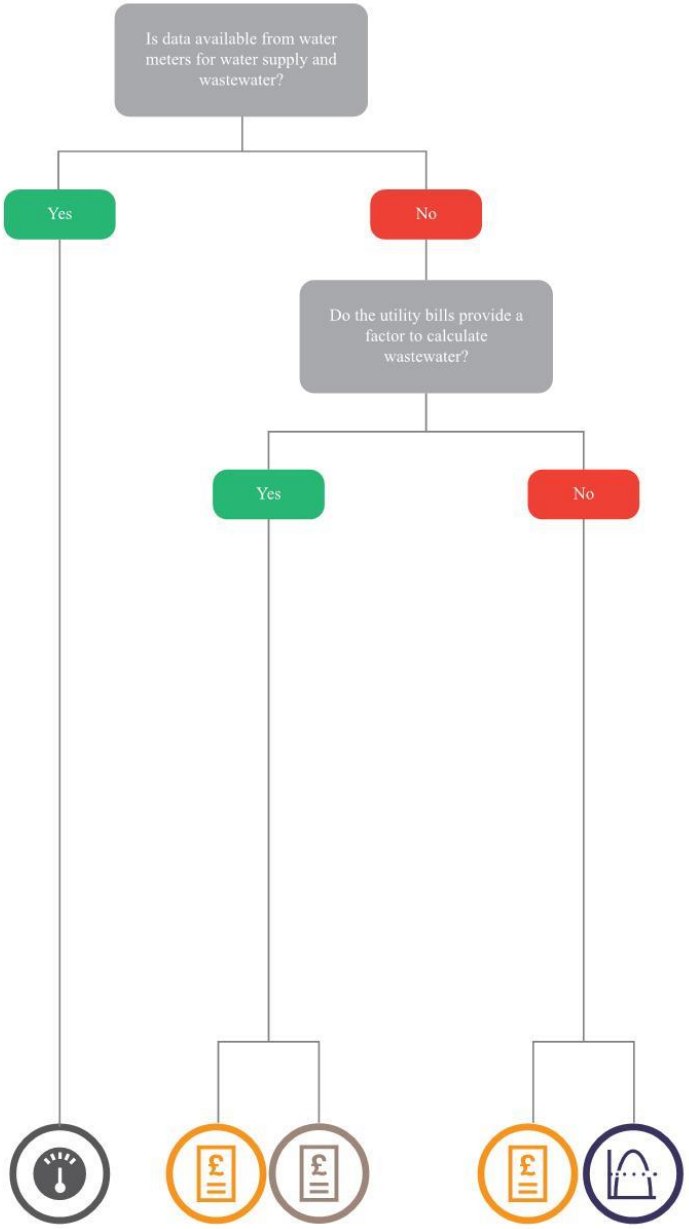
Calculation methods

There are four calculation methodologies that can be used to calculate water-related emissions.

Metered	Based on meters on-site for waste supply volume and wastewater volume
Spend	Based on the water supply information provided by the utility provider
Spend	Based on the wastewater factor provided by the utility provider
Average	Calculated wastewater based on the water supply volume

The decision tree can be used to determine which calculation methodology would be most appropriate.

It might not be possible to assess all water emissions using a single calculation method, in which case it is recommended that the more accurate method is used where possible and other calculation methodologies are used where that information is not available.



Water emissions

Information required

Metered

Water consumption volume
Wastewater volume from water consumption, greywater volume, rainwater volume, borehole extraction water volume

Spend

Water consumption volume
Total waste water volume

Spend

Water consumption volume
Total waste water volume
Wastewater factor

Average

Water consumption volume

What to collect

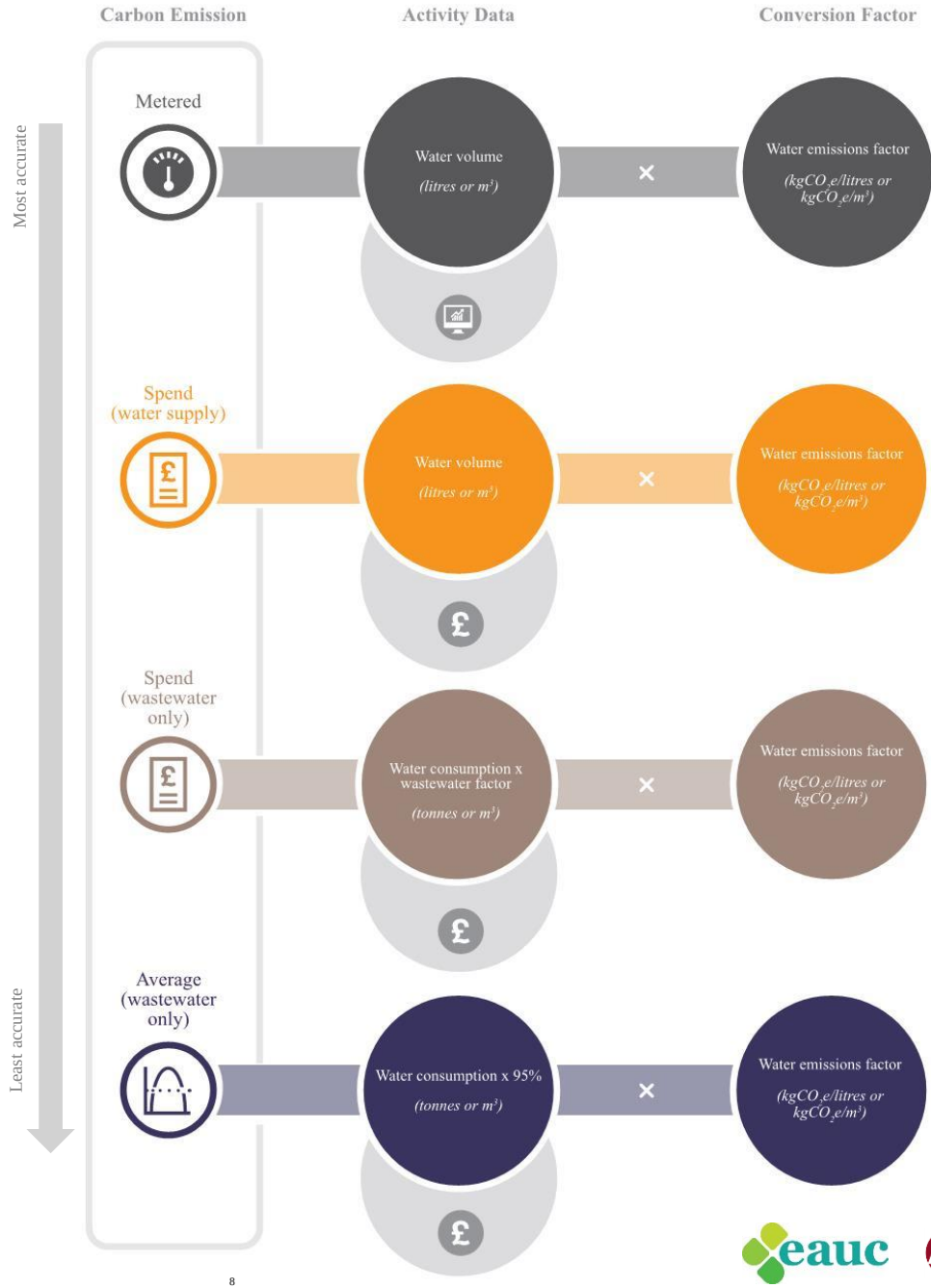
Information can be collected from:

- Utility bills
- Automatic meter readings
  Manual meter readings

Emissions factors

The emissions factors can be collected from:

- Government published carbon conversion factors on the carbon emissions for water supply and water treatment.



Waste emissions

Introduction

The waste disposal emissions should be calculated for the following using the UK Government GHG Conversion Factors for Company Reporting:

Re-use	Construction waste, glass, clothing, electrical items
Recycling	Construction waste, books, glass, refuse, electrical items, metal, plastic, paper
Composting	Timber, books, refuse (organic waste), paper
Waste to energy	Timber, books, glass, clothing, refuse, electrical items, metal, plastic, paper
Landfill	Construction waste, books, glass, clothing, refuse, electrical items, metal, plastic, paper

The list above describes the potential sources of emissions from waste, however, it is recommended that the waste hierarchy is followed for managing waste streams.

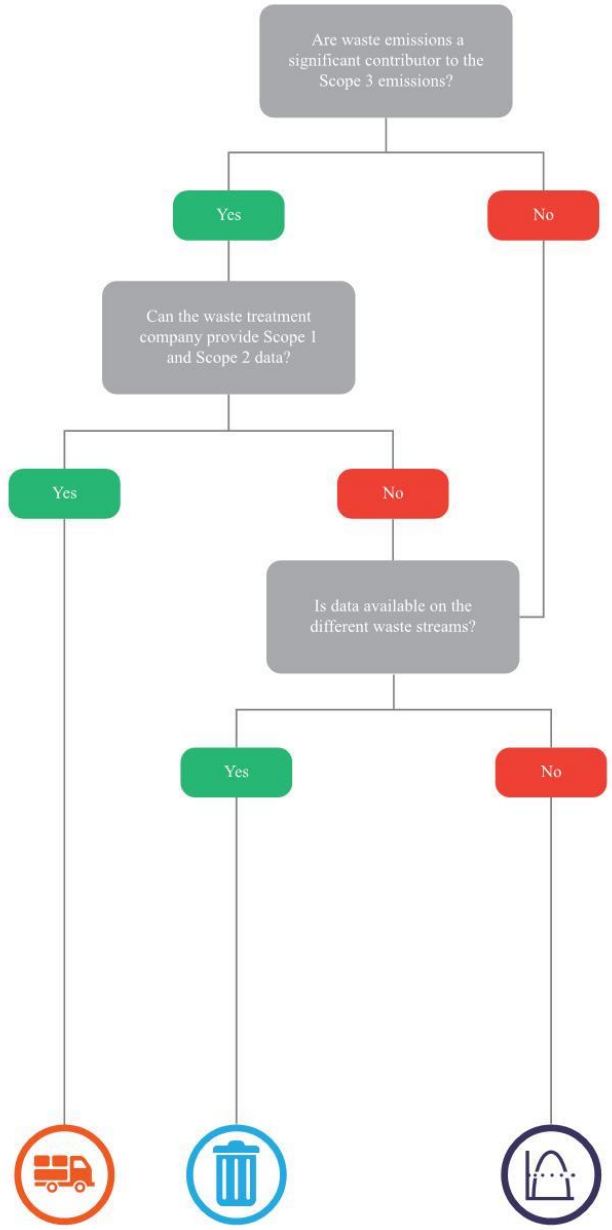
Calculation methods

There are three calculation methodologies that can be used to calculate waste-related emissions.

Supplier	Based on the emissions provided from the waste treatment/disposal companies
Waste stream	Based on the amount of waste produced for each waste stream
Average	Based on the total waste produced and the proportion allocated to each waste stream

A decision tree can be used to determine which calculation methodology would be most appropriate (right).

It might not be possible to assess all waste emissions using a single calculation method, in which case it is recommended that the more accurate method is used where possible and other calculation methodologies are used where that information is not available.



Waste emissions

Information required

Supplier
Amount of waste produced (mass or volume)
Waste streams

Waste stream
Amount of waste for each waste stream (mass or volume)

Average
Total mass or volume of waste generated
Proportion of waste allocated to each waste stream

What to collect

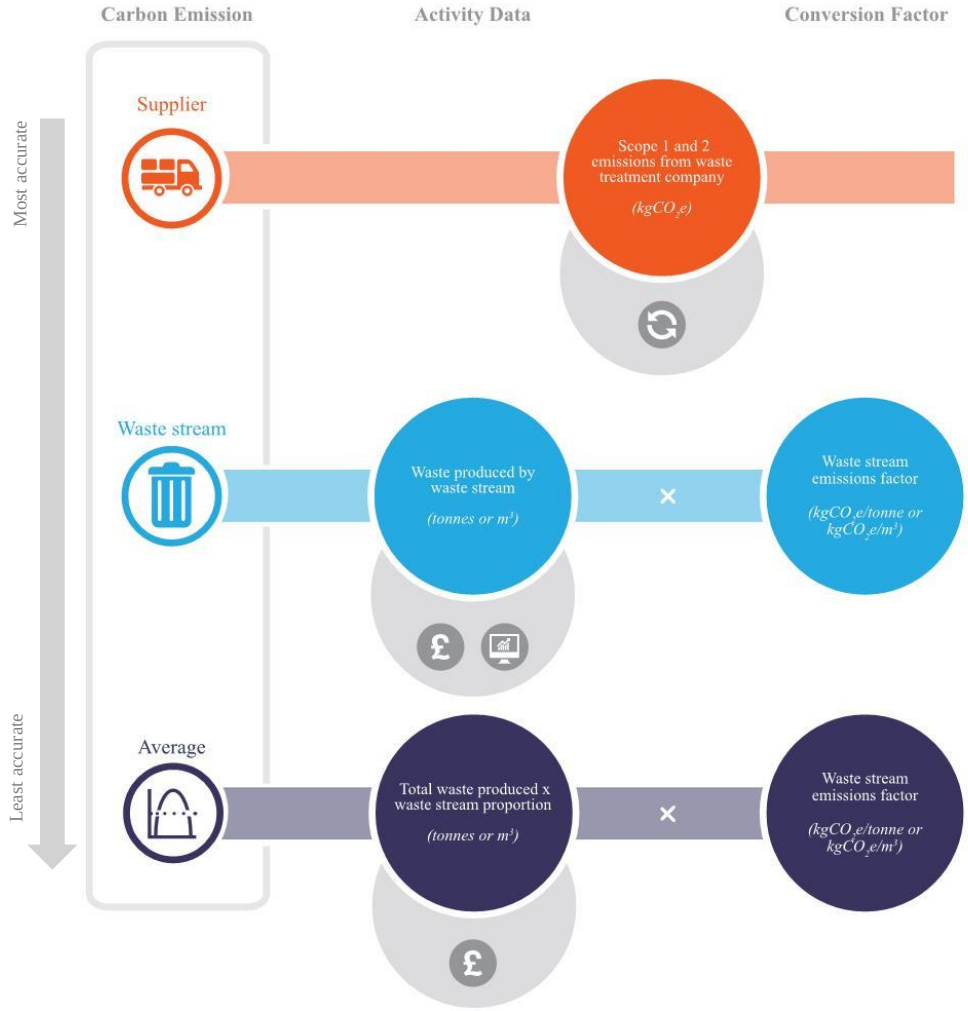
Information can be collected from:

- Waste treatment emissions
- Internal management systems
- Utility bills

Emissions factors

The emissions factors can be collected from:

- Emissions sourced direct from waste treatment company.
- Government published carbon conversion factors on the carbon emissions for vehicle and fuel types.
- Environmentally-extended input-output (EEIO) database can be used estimating carbon emissions based on the amount of money spent.



Further guidance

Tools

Many tools are available to help calculate carbon emissions such as those available on the Greenhouse Gas Protocol website. Whilst many of these are specialised for industries and countries so are unlikely to be directly applicable, they may give insight into practical calculation techniques or up to date carbon emissions factors. Third party databases and tools are also available for calculating Life Cycle Assessments:

- GaBi
- SimaPro

Emissions factors

The most comprehensive set of emissions factors are published by the Department for Business, Energy & Industrial Strategy. 'Greenhouse Gas Reporting: Conversion Factors 2017' is the most up-to-date at the time of writing. They are updated on an annual basis, currently being renewed in August of each year. However, they mainly cover energy, travel, waste and water.

Procurement-related emissions factors that allow emissions levels to be calculated from levels of spend are challenging to calculate. The most recent publicly available data was last included in the 2013 version of the document mentioned above (then produced by Department for Energy and Climate Change)

An alternative set of data exists in the Inventory of Carbon and Energy, produced originally by the University of Bath and now available from Circular Ecology. However, this again is based on relatively old data, dating from 2012.

The Higher Education Supply-Chain Emissions Tool (HESCET) is a spreadsheet that has been developed to calculate the CO_2e emissions associated with Higher Education Institutional procurement spend.

The final option for those looking to use the spend category for procurement is to examine the resources available for industry bodies (such as the Concrete Society).

Unfortunately, there is no one single source of up-to-date emissions factors for procurement emissions. Those seeking information should be aware of the age of the data, its source and the origins of the base data. 3rd Party verification should be sought if possible.

Scottish institutions completing Public Bodies Climate Change Duties (PBCCD) annual report should use the emissions factors included in the platform. If Scottish institutions want to account for their footprint outside of the PBCCD Reporting template, or calculate their procurement emissions in addition, they should use the factors as described within this guidance document.

Guides

The guides shown here provide useful information for the calculation of Scope 3 emissions. Others are available, including more academic-style papers. However, these are considered the most accessible and useful for the calculation of Scope 3 emissions with higher education institutions.