Gwasanaeth Ynni
Energy Service

Welsh Public Sector Net Zero Reporting Guide

Guidance for 2026

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Llywodraeth Cymru
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About the Welsh Government Energy Service

The Welsh Government Energy Service can help progress your energy efficiency, renewable energy and low-emission vehicle projects.

The Energy Service supports community and public sector organisations in Wales to develop energy efficiency, renewable energy and low-emission vehicle projects that will lower carbon emissions and provide cost savings, income generation and wider community benefits.

We offer technical, commercial and procurement support through a team of experts with extensive experience in developing energy projects in Wales.

Glossary

Activity: an action that leads either directly or indirectly to emissions of greenhouse gases. Examples include combustion of fossil fuels for heat, generation of electricity, transport, treatment of waste and wastewater, and industrial processes. Activity data is the measure of how much of this activity is taking place and has a variety of different units e.g. kWh, passenger kilometres, tonnes of waste etc.

Bioenergy: plant or animal material, such as forestry by-products or agricultural waste, which is used as a fuel or energy source.

Carbon dioxide equivalent (CO_2e): a universal measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). For example, the global warming potential for methane over 100 years is 25. Therefore, 1 tonne of methane released is equivalent to 25 tonnes of CO_2 (measured on a 100-year time horizon). Therefore, CO_2e works as a single 'currency' for greenhouse gases.

Carbon emissions: used as a shorthand to refer to greenhouse gas (GHG) emissions that are included in the Kyoto Treaty. Carbon dioxide is the most common GHG and other gases can be measured in relation to it (see CO_2e).

Carbon leakage: the removal of carbon emission sources from a reporting system through changes in the operational or organisational boundary – the emissions still occur but are not reported by the organisation.

Carbon neutral: the balancing of carbon emissions against carbon removals and/or carbon offsetting with the net result being zero (see also net zero carbon).

Carbon reduction: an activity that reduces carbon emissions compared to a baseline scenario.

Climate change: the large-scale, long-term shift in the planet's weather patterns or average temperatures.

Conversion factor: a numerical ratio to express how to convert from one unit of measurement to another unit e.g. miles to kilometres, but also sometimes used instead of emission factor.

Decarbonisation: usually refers to the electricity sector and refers to reducing the carbon intensity of electricity generated (emissions per kWh) by increasing efficiency of supply or changing the generation fuel mix from fossil fuel to renewables and low carbon sources.

Emission factor: the average emissions of a given GHG for particular activity. Emission factors are also expressed as the average combination of GHGs for a particular activity, usually in units of kgCO2e. The UK Government publishes an annual set of emissions factors for company reporting.

Fugitive emissions: greenhouse gas emissions which result from the direct release to the atmosphere (often due to leaks) of GHG compounds from various types of equipment and processes.

Global warming: refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change impacts.

Greenhouse Gas (GHG): a gas in our atmosphere that absorbs and emits radiation within the thermal infrared range. There are naturally occurring greenhouse gases in our atmosphere which maintain surface temperatures in a range conducive to life. However, since the industrial revolution, anthropogenic sources of GHGs have increased hugely, leading to 40% increase in atmospheric concentration of carbon dioxide. This is causing increases in surface temperatures and is the main cause of climate change. There are seven GHGs covered by the Kyoto Treaty, but the main ones related to public sector activity are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), and action needs to be taken to reduce emissions of these.

Net Zero carbon: the balancing of carbon emissions against carbon removals and/or carbon offsetting with the net result being zero (see also carbon neutral).

Project lifetime: anticipated lifetime of an energy efficiency technology or low carbon behaviour, used to calculate lifetime savings.

Relative Standard Deviation: Standard deviation is a number used to tell how measurements for a group are spread out from the average (mean), or expected value. A low standard deviation means that most of the numbers are close to the average. A high standard deviation means that the numbers are more spread out. A relative standard deviation is a way of expressing the standard deviation as a percentage.

Removals: CO2 removals refer to a set of techniques that aim to remove CO2 directly from the atmosphere by either increasing natural sinks for carbon or using geo-engineering to remove the CO2, with the intent of reducing the atmospheric CO2 concentration.

Scope: a way of categorising emission sources in relation to the reporting organisation, used as a way of providing transparency in emissions accounting, making it clear the type of emission source and the level of control of the reporting organisation over the source. Three scopes have been defined and are used on a global basis.

Sequestration: a natural or artificial process by which carbon dioxide is removed from the atmosphere and held in solid or liquid form. The uptake of atmospheric carbon by plants and the growth of wood or increase of peat volume are examples of biological sequestration. Also see removals.

Well to Tank emissions factor: A Well-to-Tank emissions factor, also known as upstream or indirect emissions, represents the GHG emissions released into the atmosphere from the production, processing and delivery of a fuel or energy vector, expressed as average emissions per unit of fuel consumed.

1. Introduction

In March 2021, following advice from the Climate Change Committee, Welsh Government set a target to achieve Net Zero by 2050. In addition, interim targets were set, and a series of 5-yearly carbon budgets were established. The next interim target has been set as a 63% reduction in emissions by 2030 against a 1990 baseline. To complement this, Welsh ministers subsequently confirmed an ambition for the public sector to lead the way and achieve Net Zero by 2030.

Welsh Government recognise that the public sector is distinctly positioned to encourage emission reductions beyond its immediate sphere of influence. The annual reporting of carbon emissions is fundamental to taking informed action on climate change and monitor progress towards Net Zero.

This guide details the principles and priorities for the Welsh Public Sector Net Zero Reporting. Its operational and organisational scope and the data that public bodies in Wales will need to assemble annually in order to fulfil the reporting requirements. The Net Zero reporting template spreadsheet is be published alongside this guide.

The guide was developed by Welsh Government, alongside partners across the public sector in Wales. This 2026 version has been published with updates, based on feedback and experience gained from the most recent round of public sector reporting. Welsh Government would like to thank all those involved for their valuable input.

1.1. Aims

The aim of this guide is to develop a universal set of instructions for use by Welsh public bodies, to estimate baseline emissions, identify priority sources and to monitor progress towards meeting the collective ambition of a Net Zero public sector by 2030.

These aims are further elaborated below:

- Baseline: To understand the current quantity of organisational emissions and removals for a consistently drawn boundary. This helps to quantify the likely emission gap to Net Zero by 2030.
- Identify mitigation potential: An assessment to identify significant sources of emissions enabling organisations and the Welsh Public Sector to prioritise action needed to move to Net Zero by 2030.
- Monitor progress: A need to gather, collate and analyse data on an annual basis to assess whether organisations are on track to achieving their ambition of Net Zero by 2030.

Organisations should also report actions to reduce emissions and move to carbon neutral operations by 2030. This may be in the form of an annual report on progress against a published action plan or a separate document. Given this guide focusses on emissions data reporting it does not prescribe the content or format of the narrative. However, the management data used in collating an emissions report will provide a good basis for the narrative report.

1.2. Guide structure

The technical chapters of this guide provide details of emission reporting methods. They are structured to reflect the order of the sheets in the Net Zero Reporting template. The guide contains the following sections:

- Section 2 the thirteen reporting principles that inform the Welsh Net Zero Reporting approach and this guide. These principles were developed in partnership with Welsh public bodies.
- Section 3 covers the basics of emission reporting, including key concepts and an introduction to basic emission calculations and data requirements.
- Section 4 covers uncertainty in carbon reporting and identifies a strategy for estimating uncertainty from different data sources and reporting an estimated total with an expected range.

- Section 5 covers the basics of the reporting process, including teams, datasets and timescales.
- Section 6 identifies the operational boundary that has been agreed with the Welsh public sector and the organisational boundaries for the various types of organisations.
- Section 7 contains detailed instructions for data gathering and emission calculations for stationary assets, including electricity, heat, water and fugitive gases.
- Section 8 contains detailed instructions for data gathering and emission calculations for buildings transport related categories, including fleet and equipment, business travel, commuting and homeworking.
- Section 9 contains detailed instructions for data gathering and emission calculations for waste.
- Section 10 contains detailed instructions for data gathering and emission calculations for supply chain.
- Section 11 contains detailed instructions for data gathering and emission calculations for FLAG.
- Section 12 contains detailed instructions for data gathering and emission calculations for renewables.
- Section 13 contains sources of data for emission factors and advice about data conversions.
- Section 14 describes the additional organisational and contextual information that is requested as part of the annual reporting process.

2. Principles

The Welsh Net Zero reporting approach, and this guide, are informed by a set of thirteen principles. These were initially based on the common principles used to support the GHG Protocol series of standards for GHG reporting, as well as those common to international GHG emissions inventory compilation. They have been amended and extended to fit the requirements of the Welsh Net Zero reporting approach, its overall aims and the needs of its participants.

There are conceivable circumstances in which the principles are either contradictory or offer differing choices. The principles are set out in order of priority and, where a choice needs to be made between then, the higher ranked one will take precedence. Priority was determined in consultation with public sector organisation representatives.

Table 1 - Principles for the Welsh Net Zero reporting approach

	Principle name	Principle description
1	Transparency	Reporting needs to be transparent and clearly state the boundary, methods, data sources, uncertainty and assumptions used for estimation of emissions and removals.
2	Good decision-making	Welsh public sector organisations should focus resources on accurately estimating and reporting on the most important activities. That is those that make the largest contribution, including, but not limited to, those where significant action is targeted. This will ensure that the most relevant opportunities for achieving carbon neutrality are considered with the most care and attention.
3	Consistency	The methodology used to report emissions and removals should be applied consistently over the time period of the ambition, so that changes reported between time periods reflect actual changes to

		the quantity of emissions or removals, and not changes to the organisation or method. Organisations should ensure that carbon emitting and/or removing activities are not removed from the overall reporting system if an organisation outsources (or otherwise divests) its activities, although they may change “scope” definition as a result. These outsourced activities should still be accounted for in the overall public bodies reporting system, to avoid carbon leakage.
4	Partnership working	The 2030 ambition for the Welsh public sector can only be met by assessing carbon neutrality across the whole sector. Individual organisations do not have individual targets within this overall ambition (although they may have their own internal targets, independent of the overall Welsh public sector ambition) and therefore collaboration, not competition, should be the objective. All the organisations commit to partnership, open and honest communication and supportive networks.
5	Usefulness of data	Data reported should be directly useful for both measuring progress towards meeting the carbon neutral ambition and for the purposes of the reporting organisations. This can include decision making and tracking action and progress. Reported data should also have as wide a use as possible in informing stakeholders (including the public) on progress and ambition, and to support well informed collective decision making across public bodies.
6	Local Economic Growth	A key role for the Welsh public sector is to influence the wider economy through its demand for goods and services and its support for sustainable, low carbon economic growth. The data generated and reported through this approach should support activities to develop and sustain low carbon markets in Wales and to provide

		evidence for supporting existing and potential future suppliers to those markets.
7	Comparability	The carbon neutral ambition for the Welsh public sector covers the whole sector and therefore organisations need to report based on the same operational and organisational boundaries, adjusted for organisation type, using the same standardised methodology and emission factors. Variations in boundaries and methodology based on organisational or geographical variation should be clearly documented.
8	Completeness	Reporting should include estimates for all emission sources within the agreed organisational and operational boundary for the Welsh public sector, unless the organisation can provide reasonable evidence that the emission source is not relevant for their organisation. For existing emission sources, where activity data are not available, the organisation will follow the provided methodology for estimating activity data, for example, benchmark estimates based on estate size or employee numbers.
9	Proportionate reporting burden	The resources used to estimate emissions and removals should be proportionate to the significance of the source, firstly within the Welsh public sector, and secondly to the individual organisation. Whilst completeness and accuracy are important, organisations must balance the desire for perfect estimates with the required resources. There should be no additional reporting requirements without a reasonable degree of confidence that they will secure proportionate and additional benefits.
10	Improvement over time	Where possible, organisations should aim to improve the quality of their reporting data over time, within the context of the overall reporting system. Methodologies should only be changed where this

		results in an improvement in terms of accuracy. This means that, where emissions for significant source have been estimated using simple approximations and benchmarks of activity data, the organisation should aim to improve their methodologies, thus reducing uncertainty and improving accuracy.
11	Accuracy	Organisations should aim to reduce uncertainty in estimates of activity data and to improve the accuracy of reporting. The focus for reducing uncertainty should be on emission sources that are highly uncertain and make up a significant proportion of emissions whilst acknowledging that, for some emission sources, reducing the uncertainty further will be outside of the control of the individual organisation.
12	Maintenance and extension of ambition	If the Welsh public sector were to succeed in meeting net zero emissions as defined within the boundaries of this reporting system before 2030, it will look to go further and extend its ambition. This would include reducing emissions further where possible and seeking new opportunities for removals. The boundaries of this reporting system may also be revised to include emission sources outside the public sector's direct control and/or resetting its ambition to achieve net removals.
13	Peer review	To strengthen and share knowledge of the reporting system within public sector organisations, reported data should be peer reviewed by another reporting organisation. Consequently, a peer learning community should develop involving all reporting organisations across the public sector.

3. Basics of emission reporting

3.1. Greenhouse gases

There are several different gases that contribute to global climate change. These are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- F-gases (such as HFCS and CFCs used in air conditioning and refrigeration systems).

The impact of different gases on the atmosphere is complex and depends on their duration and behaviour in the atmosphere. For example, methane produces 25 times more warming effect than an equivalent amount of carbon dioxide over an equivalent time period.

To simplify reporting, data for all GHGs is translated into a single comparable unit – carbon dioxide equivalence (CO_2e), usually measured in kilograms or tonnes. Therefore, 1 tonne of CO_2e has the global warming impact of 1 tonne of CO_2 but it can be a mix of any of the seven Kyoto gases. A tonne of CH_4 is represented by 25 tCO_2e because CH_4 has 25 times the global warming potential of CO_2. The global warming potential (GWP) of N_2O is 298 times that of CO_2.

These GWP index values are not static. As better scientific information becomes available these values can be refined over time. To be consistent with UK Government reporting guidance and factors, the GWPs used in the calculation of CO_2e in this guide are based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) GWPs representing a 100-year period.

For shorthand, GHG emissions can be referred to more generally as ‘carbon emissions’; this is usually taken to mean carbon dioxide equivalents and can refer to a mixture of GHGs. This terminology is used throughout this guide.

3.2. Activity data units, conversion factors and emission factors

The standard approach to calculating carbon emissions from human activity is to multiply units of activity data by an emission factor (EF). The calculation used to estimate the quantity of carbon emissions produced by an action is:

$$Activity\ data\ (unit) \times Emission\ factor\ (kgCO_2e/unit) = Carbon\ emissions\ (kgCO_2e)$$

Worked example

Activity data:

Natural gas consumption in an organisation's operational building: 98,500 kWh

Emission factor:

Gross natural gas EF (direct) - 0.183 $kgCO_2e/kWh$

Well to tank EF: 0.030 kgCO2e/kWh

Source: Greenhouse gas reporting: conversion factors 2025 - GOV.UK

The component parts of the published emission factors are combined to give the overall EF: 0.183 + 0.030 = 0.213 $kgCO_2e/kWh$

Calculation:

Multiply kWh activity by the fuel specific EF to get total emissions from natural gas consumption:

$$98{,}500\ kWh \times 0.213\ kgCO_2e/kWh = 20{,}981\ kgCO_2e$$

Activity data refers to a measure of the amount of an action. This can be tonnes of fuel used, kilometres travelled, kilowatt hours (kWh) of electricity consumed, etc.

Emission factor describes the amount of carbon emissions produced from one unit of an activity. Emission factors are publicly available values, published by DESNZ, and other sources, that enable quantities of activity to be converted into carbon emissions.

Both the activity data and the emission factor need to be in the same units. For example, if an emission factor is based on kgCO_2e per kWh of fuel used, the activity data must be given in kWh as well. If the original activity data is given in tonnes, or even in the cost of fuel purchased, this must first be converted into kWh, before applying the emission factor to estimate the resulting carbon emissions.

Conversion factors are values used to change one set of units to another, by multiplying or dividing. For example, the conversion factor for converting from miles to kilometres is to multiply by 1.609.

The Net Zero Reporting template provides a limited choice of units for each row of activity data. The template will automatically convert the data from the selected units into standard units. The reason for setting standard units is to make it easier to compare similar activities within an organisation e.g. all energy units have been set to kWh, and also to compare consumption between organisations. If activity data are not in the units that are included in the drop-down list provided, users are required to manually convert their data into standard units before inputting it into the template. A table of relevant conversion factors is provided in the Net Zero Reporting template.

Finally, it is important to understand that emission factors come in various parts, which represent emissions from different aspects of activities. In total there are four categories of emission factor parts:

1. **Direct emissions** - Emissions that are released directly by your estate or asset, for example burning fuel in a boiler or combustion of fuel in a vehicle owned by the reporting organisation.

2. **Indirect emissions** - Emissions attributable to the activity but not occurring directly on the estate of the reporting organisation, e.g. generation of electricity causes emissions at power stations but the electricity is consumed by the reporting organisation.
3. **Well to tank** - Used to account for the upstream emissions associated with extraction, refining and transportation of the fuel sources to an organisation's site (or asset), prior to combustion.
4. **Outside of scopes** - Used to account for the direct carbon dioxide impact of burning biomass and biofuels. The emissions are labelled 'outside of scopes' because the direct impact of these fuels has been determined to be Net Zero (since the fuel source itself absorbs an equivalent amount of CO_2 during the growth phase as the amount of CO_2 released through combustion).

Not every emission source has more than one factor that should be used. The activity data needs to be multiplied by all the relevant parts of the emission factor.

All emission factors are incorporated into the Net Zero Reporting template and will be automatically applied to any activity data that is entered into the activity data columns. Users are not required to find or apply emission factors.

3.3. Carbon accounting rules

Carbon accounting rules ultimately derive from the United Nations Framework Convention on Climate Change and its associated protocols and agreements (such as the Kyoto Protocol or Paris Agreement). These define the targets which national governments are required to ratify and report on. The Intergovernmental Panel on Climate Change (IPCC) was set up to assess the scientific evidence around climate change and to define a set of standards for GHG accounting and reporting, to ensure that all countries provide information on their emissions on a consistent basis.

However, national governments are only required to report on emissions which occur within their territory. At a sub-national level, it becomes more difficult to clearly define geographical boundaries. Moreover, carbon accounting at the organisation or city level

tends to be less about legal compliance and more about providing a full account of the emissions for which that city or organisation is responsible. For example, from the point of view of a single organisation, the direct emissions associated with electricity generation won't be physically part of their operation because they do not own and operate the power station, but their activities have a role in increasing or decreasing electricity consumption, and hence the emissions, and as such they should be part of that organisation's "footprint". This consumption-based approach has become the accepted way to address sub-national carbon accounting.

Furthermore, the Environment (Wales) Act 2016 places a duty on Welsh Ministers to report consumption emissions, given the aim of our policy is to reduce emissions in a globally responsible way. We should not reduce emissions from within our own boundary only to increase emissions elsewhere in the world.

A consumption-based approach makes carbon accounting more complex and there is a huge potential for very different methodologies to be used, making the inter-comparison of different organisations emissions impossible. The most widely used set of sub-national carbon accounting standards are those developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), called the Greenhouse Gas Protocol.

The original standard was for corporate accounting, but the suite of standards has been expanded to include standards for cities and individual projects, among others. These standards are free to access and use and have been developed on a collaborative basis with partner organisations. The Welsh Net Zero Reporting approach has drawn heavily from the principles and approach used in the GHG Protocol standards, most especially the corporate standard and the US public sector standard. Central to this is the concept of "scopes" which is described in the next section.

3.4. Scopes

Scopes are defined by the Greenhouse Gas Protocol for GHG accounting and reporting purposes and are described in Table 2. Dividing emission sources into Scopes is a useful

way of breaking down the decision-making process as to what should be included within a company, organisation or even city scale emissions inventory.

Generally, all carbon accounts include Scope 1 and 2 emissions, whereas Scope 3 sources might be excluded or only partially included, depending on both the availability of data and the usefulness of its collection. It should be noted that one organisation's Scope 3 emissions are another organisation's Scope 1 or 2. Therefore, when multiple organisations are accounting under the same umbrella target, care must be taken to avoid double or triple counting the same emission source.

For the purposes of the Welsh Net Zero reporting, the scopes concept has been used to support the operational boundary setting process. Scope definitions in **Table 2** are taken from the GHG protocol and therefore include sources that may not be included in the boundary or relevant for Welsh Public Sector organisations. Further information on exclusions is given in **Section** Error! Reference source not found..

Table 2 – Scopes and emission sources from the GHG Protocol

Category	Description	Sources
Scope 1: Direct emissions	Emissions from operations that are owned or controlled by the reporting organisation	• Generation of heat • Onsite generation of electricity and heat e.g. Combined Heat and Power (CHP) • Physical or chemical processing* • Transportation of employees/goods in company-controlled vehicles • Fugitive emissions from company-controlled sources – specifically F-Gas leakage from refrigeration and air conditioning systems

Scope 2: Indirect emissions from energy	Emissions from the generation of purchased or acquired electricity, steam, heating, or cooling generated by a third party and consumed by the reporting organisation	• Generation of purchased electricity • Generation of purchased heat or steam • Generation of purchased district heating
Scope 3: Indirect emissions	All indirect emissions (not included in scope 2) that occur in the value chain of the reporting organisations, including both upstream and downstream emissions	• Purchased goods and services • Fuel and energy-related upstream activities • Upstream transportation and distribution* • Waste generated in operations • Business travel • Employee commuting • Upstream leased assets • Downstream leased assets* • Downstream transportation and distribution* • Processing of sold products* • End-of-life of sold products* • (Franchises) • (Investments)
Outside of Scopes	The emissions from combustion of fuels made wholly or partially of biogenic material since the fuel source itself absorbs an equivalent amount of CO_2 during the growth phase	• Short cycle carbon emissions from biofuels, blended diesel and petrol, biomass etc. • Biogenic land-based sequestration or emissions from estate

	All removals or emissions from activities from land that release or uptake carbon on the estate of the reporting organisation

***Note**: Sources in brackets () are excluded from Welsh Public Sector Reporting. Sources marked with * have been partially excluded from Welsh Public Sector reporting and organisations should consult the relevant sections of the guidance for further instruction.*

4. Uncertainty in Net Zero Reporting

Calculations of carbon emissions always contain uncertainty derived from various sources: activity data may be incomplete, contain double-counted data or be inaccurately measured. There is also inherent uncertainty from the emission factors, which are often averaged over many different situations. It is therefore not possible to eliminate all uncertainty from carbon reporting and equally difficult to calculate the degree of uncertainty with absolute accuracy. However, it is important to recognise and estimate the uncertainty resulting from each activity dataset, as this will help organisations understand the largest potential sources of inaccuracy in their overall carbon reporting and develop strategies to minimise the most significant sources of uncertainty under their control (see Principle 11 on accuracy). It also enables more nuanced communication with third parties.

Uncertainty can be estimated using a statistic called relative standard deviation (RSD) which measures the variation of the data relative to the size of the mean. Therefore, RSD is expressed as a plus or minus percentage of the mean; for example, for electricity meters, the uncertainty in measurement is around 2.5%, so if your meter reading is 100 units, the range is estimated at 97.5 to 102.5 kWh.

Uncertainty varies across emission sources and with the type of activity data used. Following feedback from organisations, the RSD estimates are provided automatically in the Net Zero Reporting template when the user selects a particular methodology tier for an emission source. The methodology tiers describe how the activity data has been collected; for example, whether it is metered data or estimated from invoices.

Addressing uncertainty in carbon reporting is an important part of any improvement plan and is supported by the principles outlined in this guide, i.e. accuracy and improvement over time. Whilst activity data may be highly uncertain in some cases, organisations should consider options for improving activity data for subsequent reporting cycles e.g. by discussing reporting requirements with data providers. It is important to prioritise categories where the highest levels of uncertainty are combined with the most significant emission

sources to ensure efforts are targeted appropriately, however, there are some emission sources where the accuracy is limited by the current available methodology, and it is not possible to eliminate all uncertainty from carbon reporting.

5. Process

5.1. Who needs to be involved

To complete the reporting, a team of individuals from across the organisation will need to be engaged in the process of data gathering, recording and processing. Engagement with these people should start early in the financial year, after the end of the reporting year, to make sure that there is adequate time to collate responses. It is ideal for the group to be established during the reporting year to ensure individuals are all aware of the data requirements and can make adequate arrangements for data availability and collection. The roles are likely to include:

- Energy manager
- Sustainability manager
- Waste Management Officer
- Head of Procurement
- Transport/fleet manager
- Finance/HR department
- Risk & resilience manager
- Chief Executive or other member of senior management team

To facilitate efficient data gathering and reporting, some additional organisational arrangements should be established:

- **Internal memoranda of understanding (MOUs):** while this may appear to be overly formal for an internal data gathering process, MOUs establish what data are required and in what format, when data are needed and who is responsible for it. They also provide a mandate to devote staff time towards data gathering and help protect against disruption caused by staff changes.
- **Data storage platforms**: while existing file storage systems can be used, it is often advantageous to set up a dedicated data storage system, preferably one that can be

accessed by all data providers, using a cooperative working platform such as Microsoft SharePoint or Teams. Not only does this allow data providers to access previous data, it helps preserve institutional memory in the event of staff changes.

- **Data users group**: it is helpful to discuss the data needs for the year ahead and experience in gathering data from the past reporting round with all of the data providers and processors. Such a group needn't meet often – once or twice in each reporting cycle should be enough – and the time spent can be invaluable in avoiding problems later on in the process.

5.2. Reporting structure

All reports should be submitted in the most recent version of the Excel-based Net Zero reporting template which accompanies this Guide. The template has been developed to enable organisations to submit in line with this Net Zero Reporting Guide. The aim of the template is to deliver regular, accurate and consistent reporting in an approachable format and to enable data to be aggregated efficiently at a public sector wide level. It also ensures data are provided related to standardised terms for source categorisation, fuel categorisation (or equivalent), activity data field, units and emission factors.

5.3. Types of data required

Section 6 to Section 12 of this guide provide details on the precise type of activity data required for the different emission sources and how to estimate emissions from this data using the appropriate factors. The emissions estimation methodologies provide up to three different methods for each source, and the choice made for each will depend on the data available. These different levels of method are described as Tiers. In each case the Tier 1 method is the lowest accuracy, but the data should be easiest to source. The Tier 3 methodology will provide the most accurate information but has a higher data requirement. Tier 2 is an intermediate choice.

In general, the Tier 3 methodology will require data on the actual amount of activity (this might be fuel in litres, kg or kWh or business travel in kilometres), as this gives the most

direct connection between activities and emissions. The preference should always be to use Tier 3 methodologies and organisations are encouraged to make data improvement plans for emission sources where Tier 3 methods are not currently possible.

Tier 2 and 1 use expenditure or other metrics such as floor area to provide an estimate of activity data from which emissions can be calculated. Note that these methods will usually result in a larger estimate of emissions and will tend not to reflect the way in which activities can be modified to reduce emissions. However, there may be some small emission sources for which the gathering of Tier 3 data is disproportionate. For such sources, Tier 2 or 1 may be more appropriate and should be used rather than leaving gaps in emissions reporting.

In recording activity data, the method of collection or other relevant information should also be recorded in the Notes column of the Net Zero reporting template. For example, was the amount of fuel used based on comprehensive data, or a sample from across the organisation? Is the information from the complete current year or a partial set from a previous year that has been scaled up? Was the data gathering process a one-off exercise which won't be repeatable for future years?

The principle of transparency requires that the method of calculation of emissions is clear to a third party, including both the activity data and emission factor used. The Net Zero reporting template provides a documented methodology for the calculations and emission factors, so organisations are only required to provide information in the Notes column about the activity data collection and processing.

5.4. Reporting timescales

The Welsh Net Zero reporting requires annual data reports to be submitted to the Welsh Government, based on financial years, and all data should apply to the relevant time period. The emission factors used in calculations will be for the calendar year which covers the majority of the period.

Final and complete, peer reviewed data submissions should be made 5 months after the end of the financial year, with a following 3 months allowed for data review and compilation.

The annual report for the whole of the Welsh public sector will be available in the March following the relevant year. The example below shows how these timescales will apply for the 2025/26 financial year.

- Financial year: 1 April 2025 to 31 March 2026
- Emission factors used: 2025
- Final and complete data reported by public bodies: second Monday in September 2026 (14th September 2026)
- Compiled Welsh public sector data published: March 2027

Universities and colleges who report their emissions based on an academic year can continue to do so but the same set of emission factors should be used as those reporting on the financial year. For example, for the financial year 2025/26, the latest available dataset for the universities will be the academic year 2024/25, and the 2025 emission factor should be used.

Experience has shown that it is not sufficient to wait until the end of the financial year to begin the data collection process. It is extremely important that all prospective data providers are aware of what data will be required and in what format at the start of the year, so that the appropriate data collection and recording systems can be set up. It is also helpful to conduct data collection exercises on a quarterly or half yearly basis, to identify and address any barriers to data collection and to spread the activity across the year.

5.5. Peer review process

The peer review process is the assessment of an organisational report by another organisation, with the aim of improving the overall accuracy of public sector reporting. Assessment should be made against the principles of transparency, accuracy, completeness, consistency and comparability. A helpful peer review will identify potential issues in reporting for partner organisations to support the improvement in emission estimates. A key benefit for participating in this process is that knowledge and best practice are shared within the reporting community, and this encourages collaboration.

The process developed for reporting in line with this Net Zero Reporting Guide allows organisations to report transparently on methodologies and activity data sources. It is therefore anticipated that peer review will be performed on officially submitted documents only, avoiding the need to exchange multiple documents (e.g. supporting spreadsheets). The peer review should aim to answer the following questions:

- Has the organisation drawn clear organisational boundaries for reporting?
- Has activity data been transparently documented?
- Is activity data complete according to the identified relevant emission sources?
- Are emission estimates realistic?
- What are the key points to improve the accuracy of reporting

The Welsh Government encourages public bodies to establish peer review networks during the early stages of reporting.

6. The operational and organisational boundary for Welsh Net Zero Reporting

Together, organisational and operational boundaries define which assets, operations and emissions sources are included in the organisational GHG inventory. Setting clear boundaries is a fundamental part of reporting, enabling organisations:

- to be consistent about what is reported;
- to be complete about reporting the emissions for which the public sector is responsible; and
- to be transparent about what is included and what is excluded.

The Introduction tab of the Net Zero reporting template includes questions to help you define the boundary for reporting and directs you to complete the relevant parts of the template.

6.1. Operational boundary – defining types of emission sources

The operational boundary for Welsh Net Zero reporting (see Table 3) is to be used by all reporting organisations. It was developed collaboratively during a workshop of public body representatives in October 2019.

An operational boundary defines the emission sources that are included in the reporting. Emission sources are divided into three scopes, plus a separate category of direct biogenic carbon and a reportable 'outside of scopes' category.

Setting a clear operational boundary defines which emission sources are included in the reporting and which ones are excluded. Organisations are then committed to reporting on these sources, unless they can demonstrate that they are not applicable e.g. the organisation has no upstream leased assets.

Where the emissions are thought to occur but there is no activity data available, benchmarks and other methods will be suggested to enable the organisation to

approximate the scale of the emissions. These approximation measures should be used to fill any gaps, rather than not reporting emissions that exist but for which there is no activity data, otherwise the Public Sector reported footprint will not be complete.

The operational boundary for the Welsh Net Zero reporting is shown in Table 3 below.

Table 3 – Source categories included and excluded from the Welsh Net Zero Reporting approach

Section	Category	Source
Included in reporting		
Estate	Buildings	• Consumption of electricity, heat or steam • Consumption and Transmission & Distribution (T&D) of purchased electricity • Consumption and T&D of purchased heat or steam • Fuel and energy-related upstream activities (also known as 'well to tank' emissions) • Upstream leased assets (only where not included elsewhere in public sector) • Downstream leased assets • Short cycle carbon emissions from biofuel • Water supply and treatment • F-gas leakage from refrigeration and air conditioning systems • Use of medical gases
Transport	Fleet and other mobile equipment	• Transportation of employees/goods in company-controlled vehicles • Fuel and energy-related upstream activities (also known as 'well to tank' emissions)

	Business travel	• Public transport • Service travel • Private car use for business (grey fleet)
	Employee commuting and homeworking	• Employee commuting • Employee homeworking
Supply chain	Procurement	• Purchased goods • Purchased services
Waste	Waste generated in operations	• Waste generated in operations • Municipal waste collected (where relevant)
Outside of scope	Land based emissions and sequestration	• Sequestration from owned estate
Excluded from reporting		
Exclusions	Not relevant	• Electricity sold for charging EVs used outside the organisation • Physical or chemical processing • Franchises • Downstream transportation and distribution* • Processing of sold products* • End-of-life of sold products*
	Other	• Upstream transportation and distribution • Investments

* NRW may report significant emissions under these categories at its discretion.

6.2. Organisational boundary – defining parts of the reporting organisation

An organisational boundary defines which parts of an organisation are included for the purpose of GHG reporting. In the context of Welsh public sector reporting, there are several reasons for wanting to set a consistent organisational boundary:

- In order to assess whether the public sector is carbon neutral in 2030, a clear definition of what constitutes the public sector organisation's edges (or boundaries) needs to be defined.
- To make sure that organisations are starting from the same point of effort, the boundary needs to be consistently applied.
- From a credibility and communication perspective, it is important that the public sees activities typically delivered by the public sector included in the report.

For this reason, a service-based approach will be used within the Welsh Net Zero reporting approach to set organisational boundaries. As the activities and operations of organisations across the Welsh public sector vary considerably, this will be defined on a sub-sector basis, taking into account what each sub-sector delivers, and draw the boundary accordingly. Where an individual organisation has outsourced one of the services listed, an alternative methodology for accounting would need to be used to fill in the gap, such as emissions based on service cost. Where all organisations in a sector have outsourced the activity, the need for inclusion would be assessed.

Table 4 below sets out the list of the services and activities to be included in the organisational boundary for each of the sub-sectors within the Welsh public sector. This table may not be an exhaustive list of all of the functions of each organisation type and should be used as a guide for which further decisions on the organisational boundary can be made.

Subsector	Services/activities included	Services/activities excluded

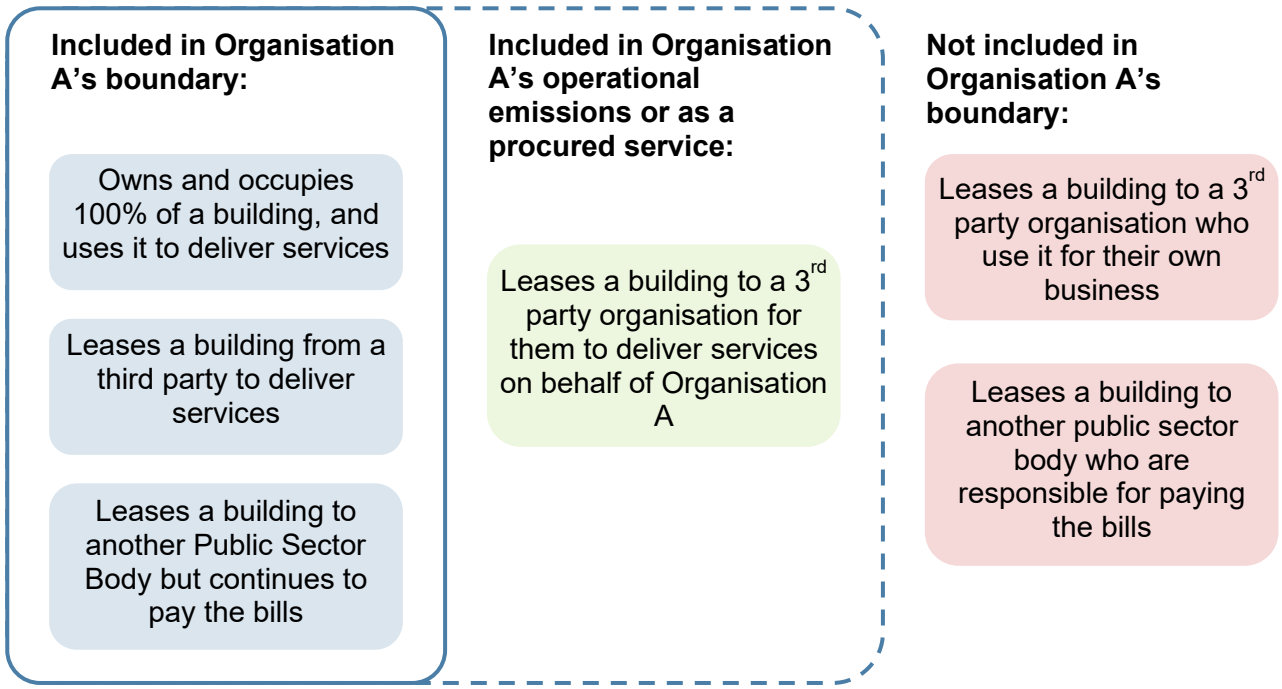
Welsh Government	• Corporate and departmental services • Transport infrastructure – operation & maintenance • Administrative estate • Property and land assets (e.g. offices let for economic development purposes) • Cadw (Historic Environment Service)	• Visitor travel • Electricity use related to charging EVs owned outside the organisation
Local Authorities	• School education and transport • Municipal waste collection and disposal, and street cleansing • Highways and street lighting • Libraries and archives • Environmental and animal health • Electoral administration • Registrar services (births, marriages and deaths) • Trading standards • Social services • Housing and homelessness services (except energy use by residents in council housing) • Planning and building control • Licensing services	• Energy use by residents in council rented housing and social housing • Public transport services • Electricity use related to charging EVs owned outside the organisation

	• Benefits administration • Disabled parking permits	
NHS Wales	• Secondary and tertiary healthcare • Inpatient, outpatient and accident and emergency services • Community hospitals • Specialist hospitals • Corporate services • Service travel (patient transport)	• Primary care services (dentists, GPs, opticians, pharmacies) except where they are under the control of the Health Boards • Patient travel (unless it is provided by the Health Board or Trust) • Visitor travel • Electricity use related to charging EVs owned outside the organisations
National Park Authorities	• Office buildings and visitor centres • Warden services • Maintenance of park services	• Visitor travel • Electricity use related to charging EVs owned outside the organisations
Fire and Rescue Authorities	• Fire and rescue services • Fire control • Fire safety • Corporate services	• Deliberately set fires for training purposes • Electricity use related to charging EVs owned outside the organisations
Natural Resources Wales	• Environmental regulation (marine, forest, waste industries)	• Electricity use related to charging EVs owned outside the organisations

	• Designation of SSSIs, AONBs, National Parks, National Nature Reserves • Emergency response • Flood risk management and protection • Woodland and National Nature Reserve management • Public Education advice • Official consultative and advisory functions • Research and evidence base generation • Corporate services	
Heritage, sports and education bodies	• Educational, sporting and visitor facilities • Site maintenance	• Electricity use related to charging EVs owned outside the organisations
Universities and Colleges	• Delivery of teaching • Research • Administration and other services • Consultancy activities • Owned or leased residential accommodation and hotel services	• Travel by students from overseas • Campuses outside Wales • Electricity use related to charging EVs owned outside the organisations

6.3. Leased assets

The approach to leased assets is informed by the desire to apply a consistent boundary to organisations in different sub-sectors. Therefore, if one organisation delivers a core service through its own staff and from its owned estate, whereas another organisation has leased estate to a third party who deliver this service on their behalf, the emissions resulting from the delivery of this service both need to be included in the reported emissions of each organisation. However, the methodology for calculating the emissions will depend on the data available. Figure 1 shows a variety of circumstances of leased assets.



Situation	Reporting	Exceptions
Public sector organisation as lessee	Scope 1 & 2	Some organisations may be able to demonstrate that they do not have operational control over a leased asset held under an operating lease. In this case, the organisation may report emissions from the leased asset as scope 3 but must state clearly in its GHG inventory

(leased by the PSB)		report the reason(s) that operational control is not perceived.
PSB as lessor (leased to others)	Scope 3	Some organisations may be able to demonstrate that they do have operational control over an asset leased to another organisation under an operating lease, especially when operational control is not perceived by the lessee. In this case, the lessor may report emissions from fuel combustion as scope 1 and emissions from the use of purchased electricity as scope 2. The lessor must clearly state in the GHG inventory report the reason(s) that operational control is perceived. e.g. if the public sector organisation is still paying the bills, it might be easier to class these as Scope 1 and 2 so they don't have to be separated from the rest of the billed electricity.

When leased assets are vacant, or the organisation pays the bills of communal areas, these should be reported as Scope 1 and 2 emissions in the footprint. When assets are leased out, the rules about whether these should be included or not should be followed.

It is acknowledged that if the reporting organisation does not maintain operational control of a building it may be difficult to access activity data. If data is unavailable for a leased asset, which according to criteria for reporting illustrated in Figure 2 should be included within the scope for reporting, then lower tier methodologies may be used to estimate emissions (see Tier 2 methodology from Section 7.1). Efforts should be made to gather the data required to report in line with the guidance.

7. Data and methods: Stationary Assets

7.1. Site Information

The Welsh Public Sector is responsible for many buildings in a variety of arrangements - as building owner and occupier, as lessee and as lessor. This section is intended to help organisations identify the circumstances under which they should report the emissions resulting from the asset (e.g. fuel use, electricity, water use etc), and when these emissions should be excluded as they are under the operational control of another public body or third party. It is also important in drawing a consistent boundary for the public sector that, as far as possible, the emissions reported represent the functions of the public sector; so where the organisation is sub-contracting delivery of services to a third party while also leasing buildings or assets to that third party to deliver the services, that this is captured somewhere in the footprint.

Buildings are included as part of the organisational boundary if:

- your organisation owns and occupies the building,
- your organisation leases the building from an organisation outside the Welsh public sector,
- your organisation owns the building and leases it to an organisation outside the Welsh public sector to deliver public sector services,
- your organisation owns the building and leases wholly or partially to another public sector organisation, but you continue to pay the bills (you should confirm with the other organisation that you have included the building in your boundary).

Under the following circumstances, you can exclude a building from your boundary:

- Your organisation owns the building but leases it to an organisation outside the Welsh public sector for their own business purposes, for example farm buildings, industrial estates etc.

- You lease the building from another public sector organisation and they have informed you that they have included the building in their boundary.

Where your organisation pays the fuel bill, specific consumption data in kWh (Tier 3), or a unit convertible to kWh should be relatively easily available. However, two alternative calculation methods exist, based on expenditure (Tier 2) or the floor area of the building (Tier 1).

Within the Net Zero reporting template, there are six drop down options under ownership structure in the 'Site Information' tab.

- Buildings we own and occupy
- Buildings we lease in from other organisations
- Buildings we lease out to deliver services
- Buildings we lease out to another public body
- Buildings - all our estate
- Renewable electricity generation site

You can either report activity data against the four categories of ownership (owned, leased in, leased out to private organisation, leased out to public body) or if building level data is not available, you can choose the option of 'Buildings – all of our estate'. There is also an option to report separately emissions from CHP plant.

The tab 'Site Information' asks public bodies to input building category, building type and floor area data on individual buildings. To fill in the activity data in the subsequent 'Buildings – Grid electricity', 'Buildings – Heat & Fuels' and 'Buildings – Water' tabs, you must first fill in the 'Site Information' tab.

Providing individual building and floor area data allows for comparable trend analysis and benchmarking. It will enable more accurate monitoring of the public sector's building fossil fuel usage and energy efficiency, particularly changes resulting from programmes like the Low Carbon Heat Grant and RE:FIT.

Individually reported sites should comprise standalone sites or standalone buildings within a site. Each of the individually reported sites should have an occupied floor area more than 500 m2. Sites smaller than 500 m2 can be reported as an aggregate input, for which a total floor area is not required.

Floor areas should equal the total internal floor area that is occupied by the reporting body, irrespective of ownership or tenure of the premises. Users should apportion the total occupied building floor area if you operate within a shared site.

Where areas have changed throughout the year (e.g. due to major developments or disposal) the figure quoted should be that current on 31 March at the end of the reporting year.

Once the 'Site Information' tab is filled in, you can fill in the subsequent 'Buildings – Grid electricity', 'Buildings – Heat & Fuels' and 'Buildings – Water' tabs.

If you have consumption data in different methodology tiers, these should also be separated. E.g. metered natural gas should be a separate line from natural gas estimated from floor area.

7.2. Electricity

Standard units = kWh

Unless the building has a dedicated power supply, e.g. through an onsite generator, solar panels, etc., all of the electricity used for lighting, power and possibly heating, will be supplied through the national grid. The emissions resulting from the use of grid electricity are indirect e.g. they do not occur directly under the control of your organisation but occur as a result of generation, transmission and distribution of the electricity by a third party.

The emission factor for grid electricity varies more through time than for other fuels and must be reported using the emission factor for the year in which the electricity is consumed. This takes account of the progressive shift in UK electricity generation towards generation from renewable sources (also known as grid decarbonisation). This category is for

purchased grid electricity – if your organisation generates electricity onsite, it should be reported as the input fuel, for example CHP natural gas in the Buildings table or diesel generators in the Fleet and equipment – fuel table.

There are various components of the electricity EF (see Table 2) but for the purpose of reporting these have been combined within the Net Zero reporting template so that it is simple to report the activity data only once. There is no need to enter electricity generation and electricity transmission & distribution as separate lines, as this is automatically calculated in the Net Zero reporting template.

Where your organisation pays the electricity bill, it should be a relatively simple job to get consumption data, however, two alternative methods for expenditure or floorspace have been provided below. Consumption is metered and measured in kWh.

If your organisation manages electric vehicle charging points that are available for public use, it is important that the amount of electricity use is monitored separately from the main building or estate so that the amount of electricity used by vehicles outside your organisation can be removed from your total electricity use. Charging of EVs owned outside your organisation is not in the scope of this reporting.

If you purchase electricity through a green tariff, you should still account for the electricity at the average grid factor, using the method in the table below. This is because the Welsh Public Sector has agreed to use a locational based approach to accounting. However, the Welsh Government recognises the value of public sector support for the renewables market by purchasing green tariff electricity. Prosperity for All: A Low Carbon Wales contains a proposal that Public Sector buildings should be supplied with renewable electricity by 2020, or as soon as contractually able and, where practicably possible, are supplied with low carbon heat by 2030. Therefore, organisations can also report that their grid electricity is purchased on a green tariff in the ‘Renewables’ sheet of the Net Zero Reporting Template. This is explained further in Section 12.

If you generate renewable electricity on site, or you purchase renewable electricity from a third party through a private wire (sometimes referred to as 'behind the meter') see Section 12.

Table 4

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	kWh	Template multiplies kWh by current grid electricity emission factor (which includes emissions from generation and T&D and WTT processes) to calculate indirect and WTT emissions	+/- 2.5%
Tier 2	Expenditure	Estimate kWh by dividing expenditure (in £) by the unit cost of electricity (in £/kWh) Template multiplies kWh by current grid electricity generation and T&D EFs to calculate indirect and WTT emissions	+/- 5%
Tier 1	Building Gross Internal Area GIA (m^2)	Estimate kWh by multiplying the GIA in m^2 by the appropriate energy benchmark for that building use type, see template. Template multiplies kWh by current grid electricity generation and T&D EFs to calculate indirect and WTT emissions	+/- 10%

7.2.1. *Street Lighting*

There is a table for entering streetlighting data. This category is mainly relevant to Local Authorities although some other organisations might also have external lighting, but it is unlikely to be separately metered. Street lighting can also include traffic signage and other lit street furniture, and public lighting if billed to the organisation. The only relevant emission source for street lighting is grid electricity. If your organisations has separately metered

supply for street lighting and other street furniture, these can be reported as a separate lines but otherwise it can all be reported under the category of street lights.

Table 5

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	kWh	Template multiplies kWh by current grid electricity emission factor (which includes emissions from generation and T&D and WTT processes) to calculate indirect and WTT emissions	+/- 2.5%
Tier 2	Expenditure	Estimate kWh by dividing expenditure (in £) by the unit cost of electricity (in £/kWh) Template multiplies kWh by current grid electricity generation and T&D EFs to calculate indirect and WTT emissions	+/- 5%
Tier 1	Installed capacity multiplied by approximate annual hours of use	Estimate kWh by multiplying the number and wattage of lamps by the estimated annual hours of use. Template multiplies kWh by current grid electricity generation and T&D EFs to get indirect and WTT emissions	+/- 10%

7.3. Fuels

Standard units = kWh

Space and water heating in buildings can use a variety of different fuel types, each of which has its own characteristics:

7.3.1. *Fossil fuels*

Natural gas: Natural gas is used as a fuel for boilers providing space and water heating. Consumption is usually measured in kWh but some older and/or smaller assets might have meters that measure consumption in volume based units (m3).The Net Zero reporting template provides the option of m3 or kWh for activity data. Other units will require conversion before entering data. If you are estimating kWh from expenditure or floor area, you will need to undertake this calculation before entering data.

LPG, kerosene, gas oil: Areas that are off the gas grid are likely to use other heating fuels such as kerosene (also called burning oil), liquid petroleum gas (LPG) and gas oil (also known as red diesel). Generally, these fuels are purchased in bulk and stored on site in fuel tanks. Gas oil may also be used in backup generators. This can make annual accounting for consumption slightly more difficult as a large purchase just before year end will distort annual figures. You can choose to report based on either the amount of fuel used in the financial year or, more simply, fuel purchased in that financial year, whether it is has been consumed or not. The Net Zero reporting template provides the option of litres or kWh for activity data. Other units will require conversion before entering data.

Solid fuel: Solid fuels are used for space and water heating, in particular in areas off the gas grid. Fuels include fossil fuels and fuels derived from fossil fuels, e.g. coal and manufactured solid fuels (MSF), also known as smokeless coal (biofuels are considered in the next section). Generally, solid fuels are purchased in bulk and stored on site, either in mass storage bunkers or bags. This can make annual accounting for consumption slightly more difficult as a large purchase just before year end will distort annual figures. You can choose to report based on either the amount of fuel used in the financial year or, more simply, fuel purchased in that financial year, whether it is has been consumed or not. The Net Zero reporting template provides the option of tonnes or kWh for activity data. Other units will require conversion before entering data.

Table 6

Methodology level accuracy	Activity data	Methodology	Template RSD
Tier 3	Energy unit consumption data	Convert to standard units, if required Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/- 2.5% if metered, +/- 5% if bulk purchase
Tier 2	Expenditure	Estimate kWh by dividing expenditure (in £) by the unit cost of fuel (in £/kWh) Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/-7.5%
Tier 1	Building Gross Internal Area (GIA) (m^2)	Estimate kWh by multiplying the GIA in m^2 by the appropriate energy benchmark for that building use type using the Energy use in buildings data in the Net Zero reporting template Benchmarking data tab. Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/-10%

7.3.2. *Bioenergy*

Standard unit = kWh

Accounting for the emissions from bioenergy is slightly different from fossil fuels. As for all combustion processes, burning the fuel releases CO2 but for fuels with a biological origin, these emissions are offset by the carbon absorbed while the source material was growing. The direct CO2 emissions are assumed to be short cycle carbon and therefore are reported separately as 'outside of scope'. The Net Zero reporting template calculates these emissions automatically and reports 'outside of scopes' as a separate line in the summary tab. Generally, these fuels are purchased in bulk and stored on site. This can make annual

accounting for consumption slightly more difficult as a large purchase just before year end will distort annual figures. You can choose to report based on either the amount of fuel used in the financial year or, more simply, fuel purchased in that financial year, whether it is has been consumed or not. The Net Zero reporting template provides the option of tonnes or kWh for activity data. Other units will require conversion before entering data.

Table 7

Methodology level accuracy	Activity data	Methodology	Template RSD
Tier 3	Energy unit consumption data	Convert to standard units, if required Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/- 2.5% if metered, +/- 5% if bulk purchase
Tier 2	Expenditure	Estimate kWh by dividing expenditure (in £) by the unit cost of fuel (in £/kWh) Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/-7.5%
Tier 1	Building Gross Internal Area (GIA) (m^2)	Estimate kWh by multiplying the GIA in m^2 by the appropriate energy benchmark for that building use type using the Energy use in buildings data in the Net Zero reporting template Benchmarking data tab. Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/-10%

7.3.3. *Heat and steam*

Standard unit = kWh

If your organisation purchases heat or steam from another organisation, this should be accounted for as indirect energy emissions. There is a national emission factor for

purchased heat and steam but this is an average factor based on an industry average fuel mix for combined heat and power (CHP) based heat and steam. The Net Zero reporting template does not contain functionality for entering a supplier-specific emission factor – if you are sure that the purchased heat is generated from renewable fuel, it can be entered in the Purchased Renewables table (Renewables tab) and does not need to be entered in the Buildings tab.

If your provider is another public sector organisation, you can agree between you how the emissions are accounted for. For example, if your organisation purchases only a small quantity of unmetered heat from another public sector organisation, it might make sense for the generating organisation to account for all the emissions resulting from fuel used and just make a note that some of the heat is exported to another public sector organisation.

Options for two different situations are provided below:

1. **Onsite** or adjacent heat and steam – where the generation of the heat and steam occurs close enough to the point of use to assume that the losses during transmission are minimal, both the onsite heat and steam and onsite heat and steam WTT emission factors are be applied.
2. **District heat and steam** – where generation of the heat and steam occurs at a distance and it is likely that the losses during distribution will be more significant, the district heat and steam indirect and WTT emission factors are applied, along with the distribution loss and distribution loss WTT emission factors.

Table 8

Methodology level accuracy	Activity data	Methodology	Template RSD
Tier 3	Energy unit consumption data	Convert to standard units, if required Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/- 2.5% if metered, +/- 5% if bulk purchase
Tier 2	Expenditure	Estimate kWh by dividing expenditure (in £) by the unit cost of fuel (in £/kWh)	+/-7.5%

		Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	
Tier 1	Building Gross Internal Area (GIA) (m^2)	Estimate kWh by multiplying the GIA in m^2 by the appropriate energy benchmark for that building use type using the Energy use in buildings data in the Net Zero reporting template Benchmarking data tab. Template multiplies kWh by fuel specific EFs to calculate direct and indirect emissions	+/-10%

7.4. Water

Standard unit = m^3

There are two parts to the footprint of water use; the supply of clean water and the treatment of wastewater. Both are considered Scope 3 emissions because they are not under the direct control of the supplied organisation. There are options in the Net Zero reporting template for both mains and onsite supply and treatment. The majority of organisations will use mains water and mains treatment but if your organisation uses water extracted from an onsite borehole or has onsite treatment, these options can be selected and a zero emission factor is applied.

For most organisations, wastewater will not be directly metered, therefore this is estimated in relation to the supply volume. Unless better data are available (e.g. through metered treatment), organisations should assume that 95% of the supply volume goes to treatment. Water supply and water treatment still have to be entered as separate lines in the Net Zero reporting template.

Compared to electricity and natural gas, water metering is often less widespread, and some organisations will not have complete coverage of sites or access to a full year's data. It is also acknowledged that emissions from water are not usually a large proportion of emissions and therefore approximate annual data is an acceptable level of detail. Temporal or building-based gaps in the dataset can be filled by:

1. Using a mixture of Tier 3 (for sites with metering) and Tier 1 (for sites without metering), or
2. Using a daily average to pro rata up to a full time series.

Water use is usually measured in units of m3 or litres and both of these options are available in the Net Zero reporting template.

Table 9

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Metered water consumption data	Convert to m^3, if required Template multiplies m^3 by water supply EFs to get indirect emissions from supply 95% of m^3 is the activity data for water treatment which should be added in a separate row in the table. The template then multiplies this by the EF for water treatment to calculate indirect emissions from treatment	+/- 5%
Tier 2	Expenditure	Estimate m^3 by dividing expenditure (in £) by the unit cost of water (in £/m^3) Template multiplies estimated m^3 by water supply EF to get indirect emissions from supply 95% of estimated m^3 by water treatment is the water treatment activity data which should be entered in a separate row in the table. Template multiplies by the water treatment EF to calculate indirect emissions from treatment	+/- 7.5%
Tier 1	Benchmark: staff	Estimate m^3 by multiplying the person working days by the appropriate water benchmark, see template.	+/- 12.5%

	numbers per building	Template multiplies estimated m^3 by water supply EF to get indirect emissions from supply 95% of estimated m^3 by water treatment is the activity data for water treatment which should be added in a separate row in the table. Template multiplies by water treatment EF to calculate indirect emissions from treatment

7.5. Fugitive Gases

7.5.1. *F-Gases*

Standard unit = kg

Emissions from leakage from air-conditioning, refrigeration units or the release to the atmosphere of other gases that have global warming potential (GWP) are within the scope of this reporting.

The gases are emitted directly to the atmosphere have a global warming influence themselves and so the emission factor is simply the global warming potential (GWP) of that gas, in terms of kilogrammes of carbon dioxide equivalent (kg CO2e). This is different to most of the emission factors where the emissions occur after combustion/use of the fuel/material etc.

For refrigeration F-gases it is necessary to report the quantity of coolant gases used for topping up air conditioning and refrigeration systems. It is not necessary to estimate leakage from systems that are not ever topped up.

A list of refrigeration F-gases has been included in the net zero reporting template, based on the lists available in the BEIS UK Government GHG Conversion Factors for Company Reporting dataset. These gases have very variable global warming potentials (GWPs), but

rather similar names or codes, so it is important to be accurate in reporting the correct type of gas used.

Table 10

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Amount of gas topped up	Template multiplies kg of gas used by gas specific EFs to calculate direct emissions	+/- 10%

7.5.2. *Medical Gases*

Standard unit = Litres

Medical gases included are Penthrox, Isoflurane, Desflurane, Sevoflurane, Nitrous oxide (N_2O) and Entonox (50:50 N_2O:Air). For reporting emissions of these gases, it is necessary to report the amount of each gas used or, if data on amounts of gas used are not available, the amount of each gas purchased in the year.

8. Data and methods: Transport

8.1. Fleet and Equipment

There are two tables in the ‘Fleet & equipment’ tab for entering fleet data. The ‘Fleet and equipment – fuel’ table should be used by most organisations because it is based on fuel consumption data which is more accurate. However, if your organisation only records vehicle distance, the ‘Fleet – distance’ table can be used.

This section is only for vehicles owned or leased (under long-term leases) by your organisation. Short-term hires (such as cars hired for specific time periods) should be included in the ‘Business travel, commute, home’ tab.

The ‘All fleet’ option has been removed to report more granular vehicle data. Though individual vehicle level data is not currently mandated, a new column has been added to input the number of each vehicle type and fuel usage. Having this more granular vehicle data will help improve the fleet decarbonisation support offered by the Welsh Government Energy Service.

8.1.1. *Fuel*

Standard unit = kWh

If your organisation owns or leases vehicles or equipment such as vans, generators or lawnmowers, emissions from the consumption of fuels such as diesel, petrol or other variants need to be accounted for. The majority of fuels can be entered as litres or kWh but data are converted in the Net Zero reporting template automatically into kWh to aid comparison. There are a number of fuel options available in the drop down list in the ‘Fleet and equipment – fuel’ table. Table 12 explains what these fuels are typically used for to help you select the correct one.

Table 11

Fuel	Variants	Common uses	Usual units
Diesel	Blended forecourt diesel which includes up to 5% biodiesel	Cars, light goods vehicles, heavy goods vehicles	Litres
	100% mineral diesel	Generators and other plant (however, this is more likely to be gas oil)	Litres
Biodiesel	HVO (Hydrotreated Vegetable Oil)	Renewable diesel alternative for generators and light goods vehicles, heavy goods vehicles	Litres
	ME (Methyl Ester)	Renewable fuel almost exclusively derived from common natural oils (for example, vegetable oils). Used as diesel alternative	Litres
Petrol	Blended forecourt petrol which includes up to 5% bioethanol	Cars and some light goods vehicles	Litres
	100% mineral diesel	Small plant and equipment	Litres
Biopetrol	100% biopetrol produced from biomass	Renewable petrol alternative where petrol is used	Litres
LPG	Proportions of butane and propane content can vary	Some vehicles and equipment	Litres
Gas oil	Also referred to as red diesel (it has a lower tax duty and therefore contains red dye for identification).	On-road vehicles such as agricultural and construction vehicles, generators and other plant and equipment. It can also be used as a heating fuel.	Litres
Grid electricity	Electricity purchased from the national grid	Battery operated vehicles and equipment	kWh

If your organisation has leased or owned electric vehicles that are charged onsite, these can be entered into the Fleet and equipment tables if the electricity supply is separately metered but if it is included in overall building electricity use, it does not need to be reported again in the Fleet and equipment table.

There are two likely sources of data for fleet and equipment fuel use:

1. Data from fuel cards or onsite tanks/pumps
2. Data from the purchasing system

It is worth being aware that fuel purchases collated from your organisation's purchasing system might be coded incorrectly and if there is any doubt, it is worth checking back with departments to make sure the fuel is coded accurately. However, getting the fuel type wrong is unlikely to seriously impact on your overall emissions estimate. Generally, road vehicles will use average biofuel blends of diesel and petrol as this is what is sold at pumps. If in doubt select diesel/petrol – average biofuel blend for road vehicles, and gas oil for equipment.

Where fuels are pure biofuels (biodiesel or biopetrol) or have a biofuel component (diesel or petrol – average biofuel blend), the combustion of the biofuel component releases CO2 but these emissions are offset by the carbon absorbed while the source plants or tree grew. The direct CO2 emissions are assumed to be short cycle carbon and therefore are reported separately as 'outside of scopes'. The Net Zero reporting template calculates these emissions automatically and reports 'outside of scopes' as a separate line in the summary tab.

Table 12

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Litres or kWh of fuel used	Template converts to kWh if required	+/- 5%

		Template multiplies kWh by fuel specific EFs to calculate direct, indirect and Outside of Scope emissions	
Tier 2	Expenditure	Estimate volume/mass units by dividing expenditure (in £) by the volume/mass unit cost of fuel (in £/unit) Template converts to kWh if required Template Multiplies kWh by fuel specific EF to calculate direct, indirect and Outside of Scope emissions	+/- 7.5%
Tier 1	Equipment based	Estimate volume/mass units by multiplying estimated fuel use per hour and number of hours used Template converts to kWh if required Template multiplies kWh by fuel specific EF to calculate direct, indirect and Outside of Scope emissions	+/- 12.5%

8.1.2. *Distance*

Standard unit = km

If your organisation owns or leases vehicles and you do not have fuel data available, the annual vehicle mileage can be entered into this table. This is only for vehicles that your organisation owns or controls. Cars are listed as 'pool cars', to distinguish them from private cars and hire cars listed elsewhere, but this can cover cars that are used for other purposes within the fleet. For short-term hire cars, grey fleet (staff owned vehicles) and public transport, use the Travel, commuting, homeworking tab instead. The standard units are vehicle km but the Net Zero reporting template converts from vehicle miles automatically.

If your organisation has leased or owned electric vehicles that are charged onsite, if the grid electricity is included in overall building electricity use, it does not need to be reported again in the Fleet – distance table.

Table 13

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Vehicle distance travelled	Template converts to vehicle km if required Template multiplies vehicle km by fuel specific EFs to calculate direct and indirect emissions	+/- 5%
Tier 2	Expenditure	Estimate vehicle km by dividing expenditure (in £) by the unit cost of fuel (in £/vehicle km) Template multiplies vehicle km by fuel specific EF to calculate direct and indirect emissions	+/- 7.5%
Tier 1	Equipment based	Estimate vehicle km by approximate average speed and hours used Template multiplies vehicle km by fuel specific EF to calculate direct and indirect emissions	+/- 20%

8.2. Business Travel

Emissions associated with business travel in vehicles not owned, operated, or leased by your organisation are classed as indirect emissions. This includes travel via employee-owned vehicles for business purposes, hire cars and public transport. Please note there are only Tier 2 and Tier 3 methodologies available for business travel.

It should be noted that there is no emission factor available for minibuses, and therefore for any business travel using this method the van option should be selected in the reporting template as vehicle type because this is the most applicable option.

8.2.1. *Private vehicles (grey fleet)*

Standard unit = vehicle.km

When staff use their private vehicles for business purposes, reimbursed expenses should be captured by your organisation's expenses system. It is important to check that business mileage is coded consistently and that the expenses system captures all the mileage. The recommended RSD for this data reflects the possible under (or over) reporting of business mileage by staff.

If your expenses system captures engine size and/or fuel, you can enter Tier 3 data but if there is no information on engine size or fuel, you can use the average size and/or unknown fuel option in Tier 2.

Table 14

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Private expense claims by engine size and fuel	Divide claimed expenses (in £) by standard mileage claim rates (in £ per mile) as set out by HMRC to estimate distance in miles Select appropriate engine size and/or fuel Template converts to vehicle kilometres (if required) and multiplies by the relevant EF	+/- 7.5%
Tier 2	Private vehicle expense claims for all vehicles	Divide expenses (in £) by standard mileage claim rates (in £ per mile) as set out by HMRC to estimate distance in miles Select average engine size and/or unknown fuel	+/- 12.5%

		Template converts to vehicle kilometres (if required) and multiplies by the relevant EF

8.2.2. *Hire vehicles*

Standard unit = vehicle.km

Information on hire car usage is likely to be held in a different location from expense claims. It might be included as a coded item in the expenses system if staff book hire cars directly and reclaim the cost, or if it is centrally booked, it might appear as spend categorised vehicle hire (or similar) in your organisation's finance system.

Table 15

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Hire car cost by engine size and fuel	Divide cost (in £) by average hire cost rates (in £ per mile) Select appropriate engine size and/or fuel Template converts to vehicle kilometres (if required) and multiplies by the relevant EF	+/- 7.5%
Tier 2	Hire car cost for all vehicles	Divide cost (in £) by average hire cost rates (in £ per mile) Select average engine size and/or unknown fuel Template converts to vehicle kilometres (if required) and multiplies by the relevant EF	+/- 12.5%

8.2.3. *Public transport and flying*

Standard unit = passenger.km

Information about your organisation's public transport (which for the purpose of this reporting can include rail, bus, tram, taxi, ferry or flights) for business purposes might be sourced from the expenses system if staff pay directly for travel and then are reimbursed or might be provided from the finance system or a travel provider. There could be multiple internal systems that capture expenditure on public transport.

Public transport emission factors are provided in units of passenger kilometres, which represent the emissions allocated to a single passenger in a shared travel mode. In some cases, you will be provided with estimated distance as well as cost of journey. In this case, you can work out a local £/mode km to estimate remaining costs that do not have distance data. Where only data on total cost by travel mode is available, and in the absence of any more accurate local estimates, the benchmark data in Table 19, estimates of £/passenger km, can be used to estimate kilometres travelled from spend.

In addition to this, it is likely that the coding system for public transport, whether by expenses or finance system, will contain some inaccurately coded items; for example, tram travel might be coded as bus travel. In terms of the overall footprint, it is unlikely that further attempts to assign accurate codes will be of benefit, as the impact on the overall footprint is likely to be very low.

Air travel: ideally air travel data should be collected and split by both distance e.g. domestic, short haul, long haul and international, and by class e.g. standard class or business class. Appropriate factors for these difference categories are available in the Net Zero reporting template.

Table 16

Methodology level accuracy	Activity data	Methodology	Recommended RSD

Tier 3	Estimated distance in passenger km or passenger miles by transport mode	Template converts to passenger kilometres (if required) and multiplies by passenger km by the EFs for that mode to calculate indirect and WTT emissions	+/- 10%
Tier 2	Cost through expenses or through finance by transport mode	Estimate a local £/transport mode km or use the benchmark public travel £/km Divide total modal cost in £ by £/km to calculate an estimate of passenger km travelled Template multiplies passenger km by the EFs for that mode to calculate indirect and WTT emissions	+/- 15%

Table 17

Travel mode	£/passenger km	Source
Rail	0.1632	Table 12.10 Revenue per passenger kilometre and revenue per passenger journey. Office of Rail and Road. UK Government
Bus	0.316	WRC estimation from Department for Transport and National Statistics – Table BUS01 https://www.gov.uk/government/statistical-data-sets/buses-statistical-tables-index
Taxi	£1.69	Average of maximum and minimum Welsh relevant data points https://www.walesonline.co.uk/news/wales-news/dragon-taxis-cardiff-cost-fares-17767633
Air	-	http://www.webflyer.com/travel/mileage_calculator/

		Calculate distance travelled for each of the journeys taken. Option to choose top ten frequent trips and work out an average £/passenger km to apply to remainder.

8.3. Commuting

Standard unit = vehicle.km or passenger.km

Commuting is travel to and from an employee's residence to place of work. Although, there are aspects of these journeys that are not under the full control of organisations e.g. the mode of transport and the commuting distance, organisations can influence it by:

- Availability of facilities promoting active travel such as secure bicycle parking facilities, showers and lockers
- Reducing availability of facilities which promote private travel such as employee parking
- Introducing working practices such as location flexibility so that employees can chose to work in an office closer to their residence or work from home part or full time

Therefore, the Welsh Public Sector has decided to include employee commuting in the Net Zero reporting boundary. It should be noted that this includes:

- Employed staff travelling from their own residence to their place to work (and not travel that would be reimbursed and counted as business travel)

It does not include:

- Commuting by service users such as students or patients
- Commuting by sub-contractors which would be captured under Section 10.2 Supply chain

The data for estimating emissions resulting from commuting is likely to be infrequently collected and potentially to suffer from sampling bias. Therefore, the uncertainty bands allocated are quite wide.

Information about commuting distance and mode are most likely to be available from a travel survey of staff. If no travel survey has been undertaken or the survey is several years out of date, organisations will need set up a system to collect this data. In the absence of actual information from staff, it is possible to use average distance and mode (see below).

Employee commuting distance should be measured in units of vehicle kilometres or passenger kilometres. Snapshot samples of a week or a month can be scaled up using a standard number of working days in a year.

Table 18

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Travel survey commuting distance in km by transport mode, multiplied by staff numbers and pro-rated for average working year	Template multiplies passenger or vehicle km by the EFs for that mode to calculate indirect and WTT emissions	+/- 10%
Tier 2	Average LA commuting distance by mode, multiplied by staff numbers and pro-rated for average working year	Template multiplies km by the EFs for that mode to calculate indirect and WTT emissions	+/- 15%

8.4. Homeworking

Standard unit = FTE.hours

Where public sector workers work from a home office to deliver services instead of in public sector buildings, additional emissions can occur due to increased use of domestic heating and electricity use for lighting and computing equipment. Before the Covid-19 pandemic, the proportion of homeworking by employees for most public sector organisations was sufficiently low to be able to reasonably exclude this as an emission source. In the original boundary for the Welsh public sector, commuting by staff was included in the footprint boundary (although commuting by service users such as students was excluded) but homeworking was excluded due to the complexity of data collection compared to the size of and lack of influence over the emissions. However, with the larger shift to homeworking, it is a logical to also map emission increases as well as the decreases. Homeworking is included as an optional category within the GHG protocol Scope 3 guidance and it has been decided that it should be include in the Welsh Public Sector boundary from 2022 onwards. It should be noted that the issues in terms of collecting accurate data and influencing net zero transition for both commuting and homeworking remain.

To simplify the data required to estimate emissions from home working, an overall homeworking emission factor in units of FTE years has been estimated from the Homeworking emissions whitepaper produced by Ecoact, in partnership with Lloyds and Natwest Group . The assumptions are:

- Electricity: assume 150W of electricity per hour and a 35 hour week, 46.4 week year, multiplied by total grid electricity factor.
- Heating: assume 5kWh per hour for boiler, 6 heating months a year, 135 working hours per calendar month average and 66.7% additional home working (no one previously at home), multiplied by total natural gas factor.

Therefore, organisations need to estimate how many FTE are working from home, and the average percentage of time that these staff are working from home. A worked example is provided below.

An organisation has 10 full-time and 10 part-time (0.6 FTE) staff and all the full-time staff work on average 2 days a week at home and the part-time staff work on average 1 day a week from home. This can be entered into the template in 2 lines, one for full time and one for part time staff. The FTE of full time is 10 and the % working at home is 40%. The FTE of part time staff is 10* 0.6 = 6 and the % working at home is 20%.

If it is not possible to produce an estimate of the number of staff working at home based on survey data, it is possible to make an initial estimate by applying an average rate based on ONS data collected in 2022 . Firstly, estimate the percentage of staff who can do their job from home (i.e. exclude those who have to be in the workplace to do their jobs) and then, if you have no better information, assume that 59% of the remaining FTE hours will be homeworking and use the resulting value as input into the template.

Table 19

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 2	Estimate the number of FTE and the average homeworking percentage (different working patterns can be entered in different rows)	Template calculates the FTE years and multiplies by the EF to calculate indirect emissions	+/- 20%

9. Data and methods: Waste

9.1. Introduction

Waste is one of the more complex areas of carbon accounting. The third-party collection and disposal of waste generated by organisations is a Scope 3 downstream emission for the purposes of carbon accounting. The emissions factors for waste produced by the UK Government follow the Scope 3 standard. Under this standard, to avoid double-counting, where there is material or energy recovery from the waste (recycling, energy recovery, composting and anaerobic digestion), the emissions are attributed to the user of the recycled material or energy and therefore only transportation and minimal preparation emissions are attributed to the organisation disposing of the waste. Conversely, where there is no further beneficial value extracted from the waste stream (landfill or incineration without energy recovery), all the scope 3 emissions are allocated to the organisation producing the waste.

There are opportunities for double-counting of emissions from waste; if the organisation accounts for waste emissions by tonnage but also accounts for expenditure on waste services in their supply chain, the emissions from transport and disposal will be double-counted. If the organisation also operates the waste collection vehicles, this can produce double counting from the fleet fuel usage and the waste tonnage.

This section of the Net Zero Guidance and the Waste tab in the template have been designed to enable organisations to avoid double-counting with supply chain, be able to report different waste types and disposal routes and avoid double-counting with fleet fuel. It is still possible that some minor double counting could occur, but this should be minimal.

The majority of the waste emission factors are sourced from the UK Government Conversion Factors for Company Reporting, however there are two further sources:

- Clinical waste factors have been sourced from a recent academic study because they are not provided in the UK Government publication

- A set of waste factors with no transport included has been created for household waste streams to enable Local Authorities to report waste collected from households and avoid double counting with fleet fuel.

In the Net Zero reporting template, waste data reporting is split into three tables:

- Organisational waste – this is produced by your organisation through its day to day activities.
- Municipal waste – this is collected by Local Authorities from households and other locations
- Project waste – this is produced as a result of a construction or other project and can be reported separately

Most organisations will only have to complete the first table for organisational waste but Local Authorities and larger organisations are likely to use two or all three of the tables. Every effort has been made to include relevant waste types and disposal routes but if the exact waste type is not available, choose the closest match and write in the notes what waste type it is..

9.1.1. *Organisational*

Standard unit = tonnes

The Organisational waste table is for waste generated in day-to-day operations. There are 19 waste types available with a variety of available disposal routes (Table 23). Not every waste stream uses all disposal routes. For non-segregated waste, use the commercial and industrial waste type; for segregated waste streams choose the most appropriate option. There are six clinical waste streams available. These will mostly be used by Health Boards, but other organisations might also produce small amounts of non-infectious offensive waste or sharps waste.

In the organisational waste table, there is only one category of construction waste (average construction waste for recycling). If you have significant quantities of separated waste streams from a construction project, this should be entered in the Project waste table.

There are currently no documented factors for reuse of waste in the UK Government. If your organisation sends waste for reuse, for example furniture or textiles, you can exclude waste disposed of this way from your waste tonnage (so it does not add any emissions to your footprint). This should incentivise finding reuse routes for waste.

Data on weight and type of waste and disposal route are likely to be sourced from your organisation's Environmental Management Systems or through waste transfer notes. Where weight of waste is not directly available, it can be estimated from volume (Tier 2) or from staff numbers (Tier 1).

Table 20

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Tonnes of waste by disposal route	Template multiplies the waste stream and waste disposal route by the appropriate EF to calculate indirect emissions from waste collection and disposal.	+/- 5%
Tier 2	Volume of waste by disposal route	Use the Waste density conversion factors in the Net Zero reporting template to estimate waste tonnage from density factor multiplied by volume and number of containers and number of collections in the reporting period. Template multiplies the waste stream and waste disposal route by the appropriate EF to calculate indirect emissions from waste collection and disposal.	+/- 10%
Tier 1	Benchmark: staff numbers per building	Estimate tonnes by multiplying the person working days by the appropriate waste benchmark (see template) Template multiplies the waste stream and waste disposal route by the	+/- 15%

	appropriate EF to calculate indirect emissions from waste collection and disposal.

9.1.2. *Municipal*

Standard unit = tonnes

In additional to waste produced by Local Authorities from their own operations, municipal (household and non-household) waste will also be collected. This waste should be included in the operational boundary as it is a service provided by the Local Authority. However, if the Local Authority operates the waste collection service, there is the risk of double counting the emissions from the transport of waste (which are part of the emission factor) with the fleet fuel reported by the organisation. Therefore, there is a question at the top of Municipal waste table in the Net Zero reporting template about whether your organisation collects this waste and includes the vehicle fuel in the fleet section. If you answer 'Y' to this question, the waste factors provided in the table do not include the transport of waste, just minimal processing or emissions from landfill.

If your organisation does not collect separate data on municipal waste and waste generated by your own organisation (e.g. these are collected in the same vehicles and same rounds), you will need to estimate the proportion of total waste collected that is produced by your organisation.

The data required to complete this return should be available through Waste Data Flow (www.wastedataflow.org). Where possible, the relevant waste types and disposal routes have been added to this table. However, in some cases there is no emission factor available for the waste stream or it is called a different name.

There are a lot of data reported to Waste Data Flow about different waste streams collected but the minimum data entry is for the disposal routes. Table 25 lists the relevant reports available from the Waste Data flow and the waste streams/disposal routes that should be

used. If data are quarterly, add up the relevant four quarters. It is assumed that Local Authorities will have access to the relevant data.

Table 21

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Tonnes of waste by disposal route	Template multiplies the waste stream and waste disposal route by the appropriate EF to calculate indirect emissions from waste collection and disposal.	+/- 5%

9.1.3. *Project*

Standard unit = tonnes

If your organisation has undertaken a construction or retrofit project, or regularly collects information on construction waste for delivery of public services, this data can be entered in the Project waste table. All the waste streams in this table are construction wastes, apart from a general category of Commercial and Industrial waste. Only Tier 3 is available. If no data are available on waste tonnage, it should be reported as part of the project cost in the Supply chain tab. It is possible that this section will be double-counted as part of a construction project (e.g. the project cost included waste management). If you have waste tonnage and you can separate out the waste management cost of the overall project, you can report waste tonnage in the project waste and remove this cost element from the supply chain.

Table 22

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	Tonnes of waste by disposal route	Template multiplies the waste stream and waste disposal route by the appropriate EF to get indirect emissions from waste collection and disposal.	+/- 5%

10. Data and methods: Supply Chain

10.1. Introduction

The role of public procurement in fostering more sustainable growth is covered in the Sustainable Development Goals (SDG 12.7). No opportunity should be missed to guide public procurement expenditure towards efficient low-carbon choices in products, services and public works. Supply chain emissions associated with the procurement of goods and services are categorised as indirect Scope 3 emissions. This includes all upstream emissions from the extraction, production and transportation of goods and services used by the organisation in the reporting year.

There are a variety of methodologies for estimating Scope 3 emissions resulting from the supply chain of goods and services. These differ in terms of how specific the approach is to individual suppliers or categories of purchase, with the most specific involving the collation of GHG data for individual goods and services directly from suppliers. Secondary methods are non-supplier specific and rely on industry average emissions per £ spend on different categories.

10.2. Supply Chain

10.2.1. *Tier 1*

Standard unit = £

In the absence of freely available calculated product footprints for the majority of goods and services, the spend-based approach is the recommended Tier 1 methodology to be used for estimating supply chain emissions.

The supply chain emission factors provided in the Net Zero reporting template are based on a model of the economy, known as the input-output model, which describes in monetary terms how the goods and services produced by different sectors of the economy are used by other sectors to produce their own output . These monetary accounts have been linked

to information about the greenhouse gas emissions of different sectors of the economy. By using the input-output model, the industrial emissions have been attributed to final products bought by consumers. The result is an estimate of the total upstream emissions associated with the supply of a particular product group. The categories are based upon the Standard Industrial Classification (SIC) used in classifying business establishments and other statistical units by the type of economic activity in which they are engaged.

The supply chain emission factors are expressed on a purchasers' price basis in real terms (i.e. the actual sales price in that year including taxes (VAT) on products and distribution margins). These factors can only be used to produce indicative estimates of the emissions relating to the production of goods and services purchased by your organisation, as they represent the average emissions relating to each product group, and the emission factors relating to actual products within the group may be quite different. As a result, estimates will not reflect any efforts made to reduce emissions through efficiencies in the supply chain e.g. through choosing an energy efficient supplier or working with suppliers to reduce material use. This accounting method does not therefore lend itself to setting targets and measuring emission reduction efforts.

Emission factors for the supply chain are detailed in the Net Zero reporting template. For the 2024 net zero reporting template the supply chain spend emission factors have been updated with new data representing 2020.

In order to avoid double counting by the Welsh Public Sector with other parts of the calculated carbon footprint, Table 32 contains details of the SIC codes where some sub-categories of spend might need to be removed.

Table 23

SIC code	Product category	Potential for double-counting
05	Coal, lignite, peat	

06 & 07	Crude petroleum and natural gas & Metal ores	If you have calculated both the direct and indirect WTT emissions from your organisation's use of fuels, expenditure on these categories should be excluded.
19	Coke and refined petroleum products	
20	Manufacturing	Exclude purchase of F-gases for air conditioning and refrigeration in 20A Industrial gases, inorganics and fertilisers (all inorganic chemicals) - 20.11/13/15 Exclude purchase of anaesthetic gases in 21 Basic pharmaceutical products and pharmaceutical preparations
35.2-3	Gas; distribution of gaseous fuels through mains; steam and air conditioning supply	If you have calculated both the direct and indirect WTT emissions from your organisation's use of fuels, expenditure on these categories should be excluded.
35.1	Electricity, transmission and distribution	If you have calculated the indirect and WTT emissions from your organisation's electricity generation and T&D losses, expenditure on this category should be excluded.
36	Natural water; water treatment and supply services	If you have calculated the indirect emissions from your organisation's water supply and water treatment, expenditure on these categories should be excluded.
37	Sewerage services; sewage sludge	
38	Waste collection, treatment and disposal services; materials recovery services	If you have calculated the indirect emissions from your organisation's waste disposal, expenditure on this category should not be included.
49.1-2	Railway transport	These factors relate to transport services for hire or reward (including public transport services), not to emissions from vehicles owned by your organisation (for which estimates of actual fuel use should be used). If you have calculated the indirect and WTT emissions from your organisation's business travel and/or service travel, expenditure on these categories should be excluded.
49.3-5	Road transport	
50	Water transport	
51	Air transport	

10.2.2. *Tier 2*

Standard unit = tCO_2e

Some organisations may also be able to use a Tier 2 method to report some of their supply chain emissions. For example, a construction company may provide a more accurate estimate of the carbon footprint for a particular project. In this case, organisations can additionally report these emissions in the Tier 2 table provided in the Net Zero reporting template. Organisations should provide notes about the methodology used and include the amount of spend in that category that the emissions are associated with. Providing higher tier estimates for supply chain emissions is optional. If an organisation chooses to report some of their supply chain emissions using a higher tier methodology, they must still include the cost associated with that project in the total cost for the category in the Tier 1 table. This will ensure that the screening exercise will provide a complete picture. Duplicated emissions between Tier 1 and Tier 2 are then reconciled in a combined column in the Tier 1 section of the template to ensure no double counting in the final reported emissions.

Table 24

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 1	£ spent by the organisation	Allocate expenditure against SIC codes Multiply £ by the SIC code EF	+/-25%
Tier 2	Various depending on type of goods and services	Collection of carbon emissions data from suppliers related to their operations and supply chain	Up to +/-20% depending on type of data used and should reflect any uncertainty information presented alongside suppliers reported data. If no data choose +/-20%.

10.3. Supplier Collection Forms

This year, for the first time, public sector organisations will be able to send a supply chain data collection form to suppliers, to enable higher tiered supply chain reporting. Results from completed supplier forms can be pasted into the new Supply Chain (Supplier forms) tab in the Net Zero Reporting template.

Guidance for Welsh public sector organisations on this separate template can be found on the gov.wales website.

11. Data and methods: Forestry, Land Use and Agriculture

11.1. Introduction

In addition to emissions resulting from the combustion of fuels and other processes, organisations with significant land management responsibilities can also estimate the carbon balance of the land area. Different habitat types can be net sinks (absorbing atmospheric carbon and storing it as biomass) or net sources (producing additional emissions into the atmosphere) depending on the habitat and the land management regime. The GHG Protocol Corporate Standard recognises the need for some organisations to account for sequestered atmospheric carbon to provide a complete and accurate picture of their GHG impacts. There is also an opportunity by the Welsh Public Sector to start proactively managing these resources to maximise their potential for carbon capture and storage.

It is important for the Welsh public sector to assess emissions and removals from land area because for some organisations this might make up a significant proportion of overall impact and the opportunities to reduce emissions or enhance removals would otherwise not be identified. However, for many organisations who own and directly manage very little land-based estate, this section will not be relevant. Therefore, the methodology below is preceded by a scoping exercise to identify the area of land within your organisation's boundary. For organisations with minimal or no managed land assets, this will be the end of the process. For organisations with larger areas, a simple Tier 1 methodology for assessing annual carbon sequestration is provided.

For organisations with significant land areas, and those who can demonstrate active sequestration, there is flexibility for organisation to identify and implement a more detailed and specific methodology such as following the example in the Carbon Positive report by NRW. For woodland planting where the organisation wants to demonstrate active sequestration, the calculator in the Woodland Carbon Code is a good example of a methodology which can be used to provide documentary evidence of additional

sequestered carbon and an auditable methodology for estimating these. The advantage of this methodology is that it will produce a time-specific annual sequestration rate, low to start with but ramping up as the trees grow.

11.2. Land Use

11.2.1. *Step 1 – setting a boundary for land-based emissions*

The same principles for setting the boundary for owned and leased assets should be applied to the land assets:

Land area that you own and manage

- Where your organisation owns and manages land areas, these should be included within your boundary

Land area that you own but do not manage

- Where your organisation leases land to a private organisation or individual and it is not used for delivering public services, for example tenant farms, it should be excluded from your boundary
- Where your organisation leases land to a private organisation or individual but it is still used for delivering public services, it should be included within your boundary
- Where your organisation leases land to another public sector body, the organisation responsible for management of the asset should include it within their boundary (you will need to agree this split with the other organisation)

Land area that you lease

- Where your organisation leases land from a private organisation or individual, and it is used for delivering public services, it should be included within your boundary
- Where your organisation leases land from another public sector body, the organisation responsible for management of the asset should include it within their boundary (you will need to agree this split with the other organisation)

11.2.2. *Step 2 – Scoping exercise for land assets*

Since a number of organisations will have little or no land-based assets, while other public bodies will own or lease significant assets, an initial scoping exercise and threshold for further analysis has been set.

- What assets does my organisation own or lease? Information could be available through:

a) Estates Manager/Department
b) Audited Accounts
c) Business Plans
d) Local Development Plan
e) Asset Register

Land area for each of the boundary categories listed in Step 1 should be entered in the Scoping table in the Land Use section of the Net Zero reporting spreadsheet. This table will give a scoping result depending on the land area entered; for organisations with no land assets, no further action is required; for organisations with minimal land assets, it is recommended that these are managed for biodiversity and recreation (see www.biodiversitywales.org.uk/)

Table 25

Total land area in hectares (ha)	Scoping result
0	No land assets within boundary, no further action required
<10	Minimal land assets within boundary - manage for biodiversity and recreation
>10	Complete Tier 1 methodology table

11.2.3. *Step 3 – Methodology for land based assets*

Where organisation own or lease and manage more than 10 hectares of land, they are required to complete the Tier 1 methodology table in the Land Use section of the Net Zero reporting spreadsheet. This uses the Carbon Stock Change (CSC) factors from the most recent National Inventory Report for the UK which are applied to a list of 6 land types, described in Table 29 below. In order to simplify the process, implied carbon stock change factors have been combined for living biomass, dead wood, litter and soils. A negative emission factor indicates that overall carbon is being removed from the atmosphere, whereas a positive emission factor indicates that the land use is likely to be producing net emissions.

Where the land type has changed category within the last 20 years, organisations are asked to enter the previous land type. Where the land type has stayed constant for over 20 years, the category can be held constant. Soil type is either classified as mineral or organic – where no information is directly available from data held by the organisation on the soil type, this can be estimated from national databases (for example www.landis.org.uk/soilscapes/)

Where information on the current land type, soil type, previous land type and area (in ha) are entered into the table, a suggested emission factor will be automatically selected. If no emission factor is available for the selected combination, it will select N/A.

This is a basic methodology for estimating annual carbon sequestration and emissions from land for the Public Sector in Wales. For organisations with significant land-based resources and/or additional expertise, alternative and more specific methodologies can be developed. An example of a more specific methodology can be found in the Carbon Positive report produced by NRW.

11.2.4. *Step 4 (Optional) – Tier 2 Methodology for land based assets*

Some organisations that own or lease large areas of land may wish to use a higher tier method to provide a more accurate estimate of land use emissions. In this case, the user

should provide activity data and calculated emissions in the 'Tier 2 methodology for land-based emissions' table in the Net Zero reporting template, providing notes on the methodology and data sources used. Organisations that choose to use a higher tier method to report land use emissions are not required to complete Step 3 of the land use emissions reporting process.

Table 26

Land use type	Definition
Forest land*	• Minimum area of 0.1 hectares; • Minimum width of 20 metres; • Tree crown cover of at least 20 per cent, or the potential to achieve it; • Minimum height of 2 metres, or the potential to achieve it. This definition includes felled areas awaiting restocking and integral open spaces up to 0.5 hectares. All forest areas in the UK can be regarded as managed from the point of view of regulation against deforestation and protection against fire, storms and disease. In general, forest areas are actively managed for landscape, soil protection, habitat conservation, amenity and recreation, which may or may not include active management for wood production.
Cropland	This category includes cropped land, including rice fields, and agro-forestry systems where the vegetation structure falls below the thresholds used for the Forest Land category.
Grassland	This category includes rangelands and pasture land that are not considered Cropland. It also includes systems with woody vegetation and other non-grass vegetation such as herbs and brushes that fall below the threshold values used in the Forest Land category. The category also includes all grassland from wild lands to recreational areas as well as agricultural and silvi-pastural systems, consistent with national definitions.
Wetlands	This category includes areas of peat extraction and land that is covered or saturated by water for all or part of the year (e.g., peatlands) and that does not fall into the Forest Land, Cropland, Grassland or Settlements categories. It includes

	reservoirs as a managed sub-division and natural rivers and lakes as unmanaged sub-divisions.
Settlements	This category includes all developed land, including transportation infrastructure and human settlements of any size, unless they are already included under other categories. This should be consistent with national definitions.
Other land	This category includes bare soil, rock, ice, and all land areas that do not fall into any of the other five categories. It allows the total of identified land areas to match the national area, where data are available. If data are available, countries are encouraged to classify unmanaged lands by the above land-use categories (e.g., into Unmanaged Forest Land, Unmanaged Grassland, and Unmanaged Wetlands). This will improve transparency and enhance the ability to track land-use conversions from specific types of unmanaged lands into the categories above.

The tree species covered include examples for coniferous species of spruces, pines, firs, larches, cedars, cypresses and all the major temperate and boreal broadleaf tree species. Growth rates in terms of mean annual increment (MAI) of stem volume can be represented in the range from in the range from 2 to 30 m3 per hectare per year.

The methodology for land-based removals and emissions for the Welsh Public Sector is likely to be under review over the next few years. Development of geospatial databases such as Living Wales (a strategic plan for Earth observation in Wales) are likely to lead to improved data resolution and more accurate assessment of carbon stocks and changes, as well as opportunities for the Welsh Public Sector to work jointly to identify and implement carbon sequestration projects

11.3. Agriculture

The majority of public sector organisations will not need to report agricultural emissions as farms that are owned by an organisation and leased out are not within the scope of this reporting process. An organisation should only report agricultural emissions if they both own and operate farmland.

Livestock emissions are calculated on a per head basis. Implied emissions factors have been calculated for each livestock type using both agricultural emissions reported in the UK's National Atmospheric Emissions Inventory (NAEI) and livestock numbers reported in the UK's Common Reporting Format Table from the 2021 UNFCCC submission. 2019 is the latest year reported in this dataset and is therefore used in the emission factor calculations. The emission factors account for emissions from both enteric fermentation and manure management.

Table 27

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 1	Livestock numbers	Template multiplies number of animals by livestock specific EF to calculate direct emissions	+/- 20%

Information about the area of arable land and improved grassland contained in farms that are owned and operated by an organisation is also required to estimate nitrous oxide (N2O) released from agricultural soils. N2O emissions from soils are calculated separately for cropland and grassland, rather than for all agricultural land as a whole. This is important to give an accurate value, as the UK average EFs for cropland and grassland are quite different. As with livestock emissions, the latest dataset available from the UK's NAEI has been used in conjunction with 2015 UK Centre for Ecology and Hydrology land use data to calculate implied emissions factors.

Table 28

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 1	Land area	Template multiplies land area by land use specific EF to calculate direct emissions	+/- 20%

Organisations may use their own emission factors for agriculture emissions where these are available and thought to be more accurate than the UK averages that are provided in the reporting template. These emission factors can be entered into the emission factor column of agriculture table in the reporting template, overwriting the emission factor that automatically appears.

12. Data and methods: Renewables

12.1. Introduction

The Welsh Government supports the Welsh Sector's leadership role in the governance, planning and delivery of regional and local energy plans.

In order to help the Welsh Government track the generation of renewable electricity and heat by public sector organisations, reporting on renewable generation is required within the Net Zero reporting template. Organisations should report the amount of renewable electricity generated per technology and, if known, how much is consumed directly and how much is exported. Purchase of renewable heat and electricity can also be reported. Accounting for carbon savings which could be associated with offsite renewable assets is under review in 2023.

This section explains the various different types of renewables and where to report these within the template. The situation with respect to renewable generation, contracting and purchase has been evolving over time and the carbon accounting for this generation will be updated in future to provide interpretation for new arrangements. Accounting for renewables within the public sector has always been a contentious topic and the increasing range of options for generation and ownership structures is adding to the complexity.

Collecting data about renewable generation and consumption enables organisations to report effort that has been made to decarbonise their electricity and heat supply at source, enables an estimate of overall carbon savings to the public sector from this investment and also enables tracking of trends and projects.

12.2. Renewable Electricity Generation

12.2.1. *Types of generation*

The data are complex because renewables energy types can be categorised in different ways:

Zero input (harvesting natural flows)

Some renewable energy is harvested from natural energy flows (hydro, wind and solar) and therefore, the units generated do not have any input fuel to be reported. When an organisation uses the energy they have generated, the benefit is the avoided use or displacement of grid average electricity. If instead the electricity is exported to the grid (usually for a financial payment), the benefit is transferred from the organisation to the electricity grid and helps to reduce the overall average grid emission factor for electricity. For solar thermal, which generates heat rather than electricity, the benefit to the organisation is the displacement of heat that would have been generated using fossil fuels.

Fuel input to get renewable output

These come in two main varieties (with a hybrid option):

Low carbon fuels: Some renewable energy is generated from fuel sources which are considered low carbon. Where the fuel source is biogenic (e.g. biomass, biomethane) or has a biogenic component (e.g. residual waste, average biofuel blend diesel), it is considered low carbon because the CO2 emitted during combustion is matched by the CO2 that was removed during the growing phase making this short-cycle carbon. However, there are still some direct non-CO2 (CH4 and N2O) to be accounted for, as well as the Well To Tank (WTT) required to process and transport the fuel. The CO2 from combustion should be calculated but reported separately from the main GHG account as Outside of Scopes. The organisation benefits from the displacement of whatever fossil fuel was being used for heat or transport.

Where the fuel source is an energy carrier (blue hydrogen) that has been produced from natural gas with Carbon Capture and Storage (CCS), the CO2 that is released as a by-product of the conversion process is captured and stored underground. The organisation needs to account for any WTT and fugitive emissions resulting from the fuel production chain. Where the energy carrier (green hydrogen) has been produced from hydrolysis of water using zero input renewable electricity, the organisation still has to account for the

WTT emissions resulting from the compression, storage and transport of the hydrogen but these should be lower than for blue hydrogen.

More efficient processes: Some renewable energy can be harvested from natural energy flows but require an energy input. For example, air source heat pumps require electricity as input, but they can extract more units of heat from the air than the input units of electricity. If the electricity used is renewably generated by the organisation, then the benefit to the organisation is the displacement of energy that would have been generated using fossil fuels. If the electricity used comes from the grid, the organisation gets the benefit of the energy that would have been generated using fossil fuels but has a small increase in electricity consumption to be accounted for (as the grid decarbonises, this 'carbon cost of harvesting' gets lower).

There is a special case of Biofuel Combined Heat and Power (CHP), where a low carbon fuel is used in a more efficient process that produces both electricity and heat. The biogenic fuel input should be accounted for as done for Low Carbon Fuels above. The organisation benefits from the displacement of both grid average electricity and fossil fuel used for heating. If the organisation sells the heat to another organisation, a proportion of the emissions can be allocated to the other end user.

It should be noted here that CHP which runs on natural gas does not count as a renewable energy technology because it does not involve capture of carbon at source or removal of short-cycle carbon from the atmosphere. Although it is likely to be more efficient than generating electricity without heat recovery and use, it should be accounted for in terms of the natural gas used as an input and the electricity and heat should not be reported as renewable generation. If the heat is sold to another organisation, a proportion of the emissions can be allocated to the other end user.

12.2.2. *Renewable energy ownership structures*

The second issue for generation of renewable is around ownership structure and what happens when consumption of electricity and/or heat generated is not by the reporting organisation. This becomes complicated when renewable electricity is exported to the grid,

the credit for it being renewable is generally absorbed into the electricity grid. Producing and exporting renewable electricity to the grid is beneficial because it reduces the overall average grid factor, but this benefit cannot then also be claimed as a 'carbon credit' by the generating organisation.

It is possible for organisations to enter into agreements with suppliers that appear to avoid this double-counting issue by using a variety of Power Purchase Agreements, private wire arrangement or sleeving agreements. In order for an organisation to claim this as renewable electricity with a zero emission factor, they need to demonstrate that the 'renewableness' is not being claimed anywhere else within the system by another organisation or by the national grid. Purchasing green tariff electricity from the grid clearly does not meet this requirement because the same renewable electricity is being counted towards the overall grid emission factor and therefore the credit is being double counted.

In reality, from a net zero strategy perspective, it is important that organisations reduce their energy demand through efficiency and conservation, maximise opportunities to generate and use renewable energy on a small scale (e.g. solar PV and solar thermal) where it is cost effective and consider carefully the implications of installing renewables that rely on an energy input of low carbon fuels. Finding different ways to capture the carbon credit of renewable generation to reduce their own footprint comes at a cost and is unlikely to produce an overall net benefit in their area.

12.2.3. *Onsite and offsite renewable electricity generation*

Onsite and offsite renewable electricity generation should be reported in kWh of output. All the onsite renewable electricity generation are zero output (harvesting natural flows) so there is no need to report any input fuels in the Buildings table. The sum of consumption and export should equal generation.

12.2.4. *Availability*

This year, we are enabling public sector bodies to record annual availability. This refers to the percentage of the year an electricity generating station is available to generate

electricity. While intermittent energy sources like sun and wind are out of our control, generation plants can be monitored and kept in optimum working condition. Availability is a crucial indicator that the Welsh generation capacity is delivering low carbon energy as expected, and that the maximum carbon and financial value is being realised.

Availability is best calculated by analysing half-hourly time-interval generation data from a Measurement Instrument Directive compliant generation meter. If using a generation measuring device installed at the inverter by the solar system supplier, first verify with the supplier (a) the measuring device is ‘balanced’ i.e., it measures only generated power, and (b) where a report of downtime hours is available to you on the supplier monitoring system, check how it is verified by the supplier for accuracy. Deduct the hours an electricity generating station was not available to generate from the total hours in the year. Express this as a percentage of how much time the station was available to generate. (e.g. 95%).

If you are new to calculating availability, we recommend discussing how to calculate hours the station, or part of the station, was unavailable to generate, with your monitoring service system provider. Not all unavailability impacts generation. For instance, if a solar array is offline when it’s dark, it is reasonable not to include those hours as unavailable. To calculate solar downtime, analyse generation meter data, or inverter data, and total all periods of zero generation during daylight hours, (when there was also demand from the grid/private wire/building) and subtract this figure from the total hours in the year."

Completion of this data field will be required in 2025/6.

For guidance on monitoring and maximising rooftop solar generation: Monitoring and maximising the performance of roof-top solar arrays: guidance and tools | GOV.WALES

For guidance on monitoring and maximising standalone generating stations: Managing standalone renewable generation: guidance | GOV.WALES

Table 29

Methodology level accuracy	Activity data	Methodology	Recommended RSD
Tier 3	kWh	Enter metered consumption and export data	+/- 2.5% electricity, +/-5% heat
Tier 2	kWh with estimated split	Enter overall generation kWh and estimate split between consumption and export	+/- 5%
Tier 1	kWh with estimated technology	Estimate generation kWh from installed capacity and average capacity factor or efficiency	+/- 10%

13. Conversions and emission factors

13.1. Conversion factors to standard units

The Net Zero Reporting Template allows for the reporting of standard activity data units and in some cases allows for more than one unit where these are commonly used. If organisation data is provided to you in alternative units you will need to make conversions outside the template structure, and standard units reported. You should make comments in the notes column about these conversions for your future reference.

13.2. Emission factors

In order to improve the ease of the data collection process, emission factors are incorporated into the Net Zero Reporting Template. Users are not required to find or apply them to activity data.

The main source of emission factors for GHG emissions reporting in the UK is the annually produced UK Government GHG Conversion Factors for Company Reporting . These are generally published in June each year and contain factors for fossil fuels, biofuels, grid electricity, waste, water and transport. Given the public sector is reporting for each financial year, the factors from the calendar year in which the greatest proportion of the data falls should be applied. For example, the 2025 factors should be applied to data reporting year 01/04/25 – 31/03/26, the 2022 factors should be applied to data in reporting year 01/04/21 – 31/03/22. The appropriate set of emission factors is incorporated into the Net Zero Reporting Template every year.

The supply chain emission factors are updated using the Defra ‘Conversation factors kgCO2 per £ spent, by SIC code 2022’ . Factors used are those published at the time of writing (March 2026). These emission factors have a four-year lag due to best available figures. For example, the 2022 factors are applied to submissions for the financial year 2025/26.

14. Organisational data and context

The Introduction tab of the Net Zero reporting template requests various organisational details such as annual budget / turnover (which should include grant funding to other organisations), number of full time employees and building internal floor area which are requested so that emissions can be normalised by relevant metrics to allow comparisons between the emissions reported by different organisations.

The Introduction tab also requests comments on the context of the report, such as scope and completeness and any significant changes in methods compared to last year. This information will aid interpretation and review of the data. There is also space to report on the outcome of the peer review process.

Gwasanaeth **Ynni**
Energy Service

The Welsh Government Energy Service ("**WGES**") is funded by the Welsh Government with the aim of developing energy efficiency and renewable energy projects that contribute to public sector decarbonisation and national energy targets. The WGES is delivered by the Carbon Trust, Energy Saving Trust and Local Partnerships (the "**Delivery Partners**"). This report (the "**Report**") has been produced by the Delivery Partners and, whilst the views expressed in it are given in good faith based on information available at the date of this Report:- (i) these views do not necessarily reflect the views of the Welsh Government, which accepts no liability for any statement or opinion expressed in the Report; (ii) the Report is intended to provide general guidance only, rather than financial, legal or technical advice for the purposes of any particular project or other matter, and no-one in receipt of the Report should place any reliance on it in substitution for obtaining their own advice from an appropriate third party advisor; and (iii) any person in receipt of this Report should therefore obtain their own financial, legal, technical and/or other relevant professional advice insofar as they require specific guidance on what action (if any) to take, or refrain from taking, in respect of any project, initiative, proposal, involvement with any partnership or other matter to which information contained in the Report may be relevant; and (iv) the Delivery Partners accept no liability in respect of the Report, or for any statement in the Report and/or any error or omission relating to the Report.