# Standardised Carbon Emissions Reporting for Further and Higher Education

The aim is to help standardise greenhouse gas (GHG) emissions reporting across the HE & FE sectors by signposting institutions to good practice, guidance and methodologies. The Framework will help develop a fuller understanding of how their operations contribute to the climate emergency and enable them to take action across a broader range of areas. The Framework is based on the GHG Protocol and will lay the foundation for organisations that may wish to subsequently take a Science-Based Target approach. The Framework will also contribute to capacity building of the sector. The Framework is being developed as part of the Queen’s Platinum Jubilee Challenge and funded by the Department for Education. This guidance has been created by an EAUC Working Group of experts from the sector and with pro bono support from Avieco.

This is intended to be a high-level aggregated reporting Framework to develop good practice guidance for the HE/FE sector. We encourage that reporters report emissions that are material to their activities under the appropriate GHG protocol category/scope, with commentary on data and methodology maturity. Individual institutions can have disaggregated data underneath this to help inform understanding and decision making. “Splitting” should only be done where methodologies are considerably different.

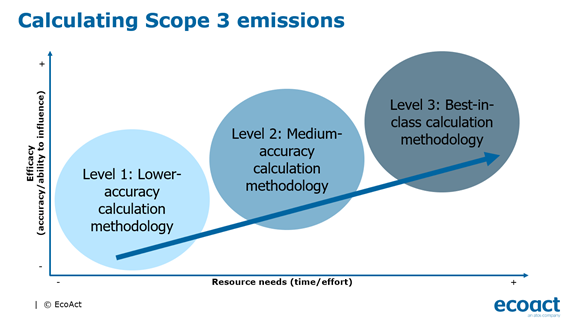
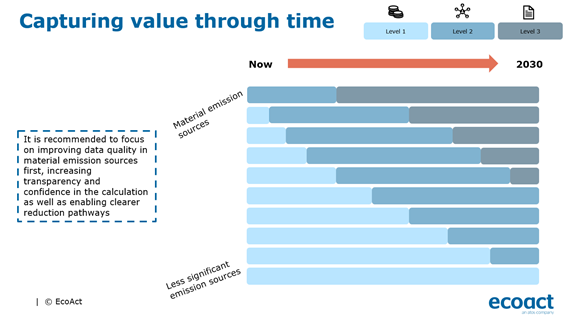
# Standardised Carbon Emissions Reporting Guidance

This document is to provide guidance to institutions on how to interpret the Framework. This document includes the GHG Protocol areas, a plain English interpretation and methodologies and guidance on how to collect and report carbon emissions data. The data collection process for the reporting will be developed by the Department for Education and is not part of this work. The outline Framework provides a guide on how the reporting could be presented but the final data collection method may differ from this.

# Organisation & Emission Inventory Boundaries

All *relevant* Scope 1, 2 and 3 categories must be included and be part of the core reporting requirement. A Scope 3 screening must be conducted to ascertain the magnitude of Scope 3 emissions. This screening, in line with SBTi, covers the “minimum boundary of each scope 3 category per the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard”. It can be done relatively quickly using tools such as the Scope 3 Evaluator (https://quantis-suite.com/Scope-3-Evaluator/).

The Reporting Levels have been included to allow institutions that are at the beginning of their reporting journey with a starting point with a lower accuracy calculation at Level 1. This can be achieved with little up-front time spend where easy-to-use calculation tools are available. For more advanced institutions there is an opportunity to refine the data and calculation to provide a deeper insight into how to reduce emissions (moving up to Level 2 and 3), which allows institutions to build up their measurement approach over time and over time to further develop their accuracy with the aim of all reporting to be at Level 3 over time.



For the majority of institutions, ‘operational control’ is likely to be the most appropriate approach to defining their GHG inventory boundary. However, those with more complex operations (e.g. not exclusively, those that operate hospitals, own and rent property, have a stake in other organisations or joint venture/partnerships with other organisations) may wish to refer to GHG Protocol “A corporate accounting standard” for guidance on setting organisational and inventory boundaries for the purposes of GHG reporting.

GHG inventories must include emissions from:

* All institution **operations** (e.g. energy, water, waste) regardless of location.
* Activities/services directly **paid** for by the institution (e.g. accommodation and supplies) - if nominated accommodation then do not include as assume that the accommodation provider would account for this.
* Other activities/services that are **material** to university/college operations (e.g. commuting and student travel home) and which they (university/college) can influence.
* Ensure that the GHG Protocol reporting principles (relevance, completeness, consistency, transparency and accuracy) are reflected in the resulting GHG inventory.

For national facilities that institutions house these should be included – if your institution doesn’t proportion the carbon out then select Level 1, if your institution does proportion out the carbon to relevant partners then select Level 2 or 3 as appropriate.

Notes on:

* Emission factors: With the exception of international air travel, emission factors should be for the country the emissions occur in. For international travel for UK based staff should be that provided by DEFRA. KgCO2e factors to be used. Emission factors (EF) are highlighted in green.
* Data hierarchy: activity/consumption data > intensity data. However, intensity data (e.g. HESCET data) can be used to ascertain/gauge the magnitude of emissions from a particular activity before a commitment is made to sourcing activity/consumption data. Data sources are highlighted in blue.
* Data source examples: Examples are included on where data could for sourced from. Data source examples are highlighted in grey.
* Materiality: having calculated as full an inventory as possible, where emissions are not material (<1% of total reported), institutions may wish to come to a view on the merits of continually reporting that particular emission category on the balance between increased accuracy and the effort required to source appropriate consumption data (this might be the case for activity with insignificant emissions).
* Materiality assessment: While higher-level calculation methodologies take a longer time (resource needed) they also have higher “efficacy” inability to influence and reduce emissions. We recommend to focus on significant (here used to express magnitude) emissions sources first. This means that for significant sources of emissions such as procurement, understanding the scale and main sources of emissions within this category can be done with a “level 1” assessment. However, to reduce emissions it is critical to have a more granular calculation approach as “level 1” is often averages and does not reflect the actual situation. Therefore, more refined calculations of level 2 and 3 are needed. Insignificant sources of emissions may therefore potentially not move beyond “level 1” assessment in the short term.

The tables below provide examples of methodologies, with different degrees of accuracy, for estimate GHG emissions from a range of activities associated with university/college operations.

# Scope 1: Direct GHG emissions

| Scope 1: Direct GHG emissions | GHG protocol description | Plain English description | Level 3: Best-in-class calculation methodology | Level 2: Medium-accuracy calculation methodology | Level 1: Lower-accuracy calculation methodology | Observations |
| --- | --- | --- | --- | --- | --- | --- |
| 1. Natural gas | Combustion in controlled boilers, CHP, furnaces, etc.; emissions from chemical production in owned or controlled process equipment. This must include both owned and rented or leased buildings | Combustion of natural gas in on-site boilers, CHP etc. | Collect metering data (kWh), apply emission factors. All operated buildings must be included (including owned, leased (operated/occupied) and rented buildings – if it is leased out then the tenant should report as their Scope 1).  Data: meter readings  Data source example: kWh gas (from energy bills)  EF: Natural gas |  | National/Institutional averages (kWh.m2) with relevant emission factor applied.  Data: area of buildings (m2) that benefit from use of gas; national/regional intensity factor (kWh.m2)  EF: Natural gas | For shared premises without individual meters, consumption may be determined based on the % area occupied.  Consumption data also to be used in Scope 3 - 3. Fuel- and energy-related activities. |
| 1. Fleet (owned/operated) | Fuel combustion in controlled vehicles (including watercraft and aircraft). This includes owned and leased vehicles, but excludes rental vehicles/grey fleet (to be included in scope 3 cat. 6: business travel) | Fuel (e.g. diesel, petrol) combusted in vehicles owned or leased by the organisation. This captures where the organisation purchases the fuel itself | Fuel records (e.g. fuel card or supply invoices) with appropriate emission factor applied for quantity used of each fuel used.  Data: Quantity of fuel/power used  Data source example: Fuel card reports. Fuel purchase records (e.g. pump receipts).  EF: Fuel/power specific | Distance travelled for particular vehicle type with appropriate emission factor applied.  Data: Distance travel by vehicle type (including fuel)  Data source example: (for motor vehicles - annual MOT records (which highlight distance the vehicle has travelled).  EF: Fuel specific |  | Consumption data also to be used in Scope 3 - 3. Fuel- and energy-related activities. |
| 1. Refrigerants & researched-based f-gas, VOC | Fugitive emissions from refrigerants | Emissions from leakage of refrigerants where these have a Global Warming Potential (GWP) in their own (e.g. R134a has a GWP (CO2e) 1430 times CO2). | Collect consumption data (kg), apply updated DEFRA emission factors. All operated buildings must be included (including owned, leased and rented buildings). For shared buildings, determine occupation % and apply to result (also allocate common areas)  Data: Quantity of refrigerants lost (by refrigerant type) - top-up gas data from maintenance team  Data source example: F-gas contractor maintenance records (a legal requirement in the UK).  EF: Refrigerant specific |  |  | In the UK (and EU) organisation working with f-gases must keep adequate records which will facilitate the calculation of the quantity of refrigerant losses.   * Regulation (EU) 517/2014 (OJ: L150/195/2014) on fluorinated greenhouse gases * Fluorinated Greenhouse Gases Regulations SI 2015/310 |
| The major source of man-made volatile organic compounds (VOC) are fossil fuel use, solvents (coatings, paints, inks), compressed aerosol products, biofuel use and biomass combustion | Emissions of volatile organic compounds (VOC) to the atmosphere where they are degraded to CO2 or are GHGs themselves | Determine % of VOC loss as fugitive emission. Apply to quantity used (kg) and apply appropriate EF.  Data: Quantity VOC used x fugitive rate (% lost) - from purchasing records  EF: VOC specific (refrigerant and other) |  |  | AEA Energy & Environment (2007) ‘[Climate Change Consequences of VOC Emission Controls](https://uk-air.defra.gov.uk/assets/documents/reports/cat07/0710011214_ED48749_VOC_Incineration_-_CC_Report_v3.pdf)’ (accessed 17/2022) provides a list of common VOC, example applications and GWP in Annex B (pp.24/27).  Use purchase records to ascertain level of use and materiality.  DEFRA provide EF for VOC as are “Refrigerant & Other”.  IPCC for GWPs possible estimate losses of these gases <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07.pdf>. |
| 1. Other fuels | Combustion of other fuels (e.g. diesel) in owned or controlled premises e.g. used in generators | Combustion of fuels (e.g. diesel, fuel oil) in on-site boilers, generators etc. | Collect consumption data (kWh or litres), apply updated emission factors. All operated buildings must be included (including owned, leased and rented buildings). For shared buildings, determine occupation % and apply to result (also allocate common areas)  Data: Quantity of fuel used  Data source example: Fuel purchase records/receipts.  EF: Fuel specific |  |  | Consumption data also to be used in Scope 3 - 3. Fuel- and energy-related activities.  Biomass and similar bio-based sources of fuel are considered zero carbon in terms of Scope 1 emissions. Upstream “Well-To-Tank (WTT)” emissions for production of the bio-based fuel itself should be captured in Scope 3 Category 3. |
| 1. Land-related emissions & Livestock | Institution owned and managed land (‘non-functional’ estate).  Land-related emissions include, but not limited to   * CO2 from direct LUC deforestation and forest degradation * CH4 and N2O emissions from manure management * Enteric CH4 emissions (Meat-Beef, Dairy) * Fertilizer: N2O emissions from soil due to fertilizer application * N2O emissions from crop residues * CH4 and N2O emissions from agricultural waste burning   Currently, the GHG protocol does not allow inclusion of removals into the inventory, but currently new guidance is being developed: <https://ghgprotocol.org/blog/new-greenhouse-gas-protocol-land-sector-and-removals-guidance> | Direct emissions associated with the use of land. These vary depending on the exact use, but can include conversion of nitrogen in fertilizers to NO, methane emissions from waste or manure, and conversion of land to other uses | The currently best standard EFs for this area is IPCC (2006 and 2013 update): [https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4\_Volume4/V4\_04\_Ch4\_Forest\_Land.pdfhttps://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4\_Volume4/19R\_V4\_Ch04\_Forest%20Land.pdf](https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_04_Ch4_Forest_Land.pdf)  Quantis guidance can also provide data and approaches:  <https://quantis-intl.com/report/accounting-for-natural-climate-solutions-guidance/>  Currently, the GHG protocol does not allow inclusion of removals into the inventory, but currently new guidance is being developed: <https://ghgprotocol.org/blog/new-greenhouse-gas-protocol-land-sector-and-removals-guidance>. Until this is published only emissions ‘gross’ are to be included, they may be amended to account for removals. In this case, both emissions and removals should be reported separately.  Land clearance in urban and brownfield settings should as far as feasible be included if biomass stock is present and lost due to land use change. | [Oxford University Saïd Business School and Oxford University Estates Services (2021) Emission Accounting Report 2019-20 pp. 13-16/57](https://sustainability.admin.ox.ac.uk/files/emissionsaccounting.pdf)<https://sustainability.admin.ox.ac.uk/files/emissionsaccountingreport.pdf> |  | University/college owned land leased to third parties should be reported under Scope 3 - 13. Downstream leased assets.  GHG Protocol guidance on land use is due to be published in June 2022.  GHG guidance for trees and forested areas to aid sequestration, [available here](https://ghgprotocol.org/gpc-supplemental-guidance-forests-and-trees).  Land emissions should align with upcoming standards on agriculture and land emissions |
| Direct emissions from owned or controlled livestock (e.g. methane) | Direct emissions of methane from livestock (enteric fermentation) | Actual measurements  Data: Emerging techniques |  | Collect livestock data (number of heads), apply updated DEFRA emission factors  Data: Livestock numbers and manure management practices  EF: [DEFRA EF for livestock (1990-2000)](https://uk-air.defra.gov.uk/assets/documents/reports/empire/ghg/ukghgi_90-00_appendices_5-6.pdf) | Potential methodologies/EF (same principle as DEFRA):   * [McGill University (Canada) 2020 GHG Inventory – detailed Appendix (pp. 17-18)](https://www.mcgill.ca/sustainability/files/sustainability/detailed_appendix_2020_final.pdf)   Latest IPCC Global Warming Potentials for a 100-year timeframe (GWP 100) should be used to convert methane into CO2e. The latest data is currently IPCC AR6 <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter07.pdf> |

# Scope 2: Indirect GHG emissions from [purchased] electricity, heat and steam

| Scope 2: Indirect GHG emissions from electricity consumption | GHG protocol description | Plain English description | Level 3: Best-in-class calculation methodology | Level 2: Medium-accuracy calculation methodology | Level1: Lower-accuracy calculation methodology | Observations |
| --- | --- | --- | --- | --- | --- | --- |
| 1. Purchased Electricity & REGO | Generation of purchased electricity and district heating consumed by the company (market-based). Purchased is defined as electricity or district heating that is purchased or otherwise brought into the organizational boundary of the company | Purchased electricity and district heating. I.e. fuel is combusted by another organisation but the energy created is purchased by the reporting organisation. | Market-based and location-based approaches: collect metering data (kWh), apply specific emission factors sourced directly from suppliers or energy attribute certificates reflecting the true emissions associated with the energy mix purchased. Where supplier mix is unknown or no certificates have been purchased, the residual mix must be used (e.g. <https://www.aib-net.org/facts/european-residual-mix>)  All operated buildings must be included (including owned, leased and rented buildings).  Data: meter readings  Data source example: kWh electricity (from energy bills)  EF: Supplier EF, residual mix EF (UK/country specific) | Location-based approach: collect metering data (kWh), apply updated and country-specific emission factors (DEFRA for UK sites, IEA for others) to get the average emissions intensity of grids in which energy consumption occurs  Data: meter readings.  EF: Grid electricity UK/country specific EF | National/Institutional averages (kWh.m2) with relevant emission factor applied.  Data: meter readings.  EF: Grid electricity UK/country specific EF | For shared premises without individual meters, consumption may be determined based on the % area occupied.  Consumption data also to be used in Scope 3 - 3. Fuel- and energy-related activities.  The location-based emissions data can be further refined by utilizing half hourly emissions factors and power data. This can help institutional decision-making, but is an optional refinement for level 3 measurement. |
| Any type of renewable electricity can be used to lower an organisation’s gross market-based scope 2 emissions from purchased electricity. If feasible on-site generation either by the institutions or 3rd party provider should be prioritised. Alternatively, the organisation can engage in a direct contract with a supplier (e.g. Power Purchase Agreement, PPA). Renewable energy certificate can also be used separately in the form of Renewable Energy Guarantee of Origin (REGO).  For further guidance and description, please refer to RE100 guidance, [available](https://www.there100.org/sites/re100/files/2020-10/RE100%20Technical%20Criteria.pdf) here | REGOs describe credits created by renewable electricity generators, they can be used to lower an organization’s gross market-based scope 2 emissions from purchased electricity  Adapted from:  <https://www.epa.gov/sites/default/files/2018-03/documents/gpp_guide_recs_offsets.pdf> | Data source example: 3 reporting fields for renewable energy   * On-site generation (1 & 2 in RE100 guidance) * Power Purchase Agreement (3 & 4 in RE100 guidance) * Renewable energy certificate (5 & 6 in RE100 guidance) |  |  | Offsets represent a metric ton of emissions avoided or reduced; RECs represent attributes of 1 MWh renewable electricity generation. Offsets and RECs, however, are fundamentally different instruments with different impacts:  Offsets describe the generation of credits based on projects that avoid or reduce greenhouse gas outside the value chain. They cannot be used to reduce a GHG inventory and should be reported separately. |
| 1. Purchased heat or steam | Defined as district heating or steam that is purchased or otherwise brought into the organizational boundary of the reporting Institution. |  | As above.  Data: meter readings  Data source example: heat bills/supply reports.  EF: Supplier EF | As above.  Data: meter readings  EF: UK heat/steam EF |  | Consumption data also to be used in Scope 3 - 3. Fuel- and energy-related activities.  Scope 2 emissions should not include Well-To-Tank (WTT) or Transmission & Distribution (T&D) emissions. These should instead be captured in Scope 3 Category 3. |

# Scope 3: Other indirect GHG emissions

| Scope 3: other indirect GHG emissions | GHG protocol description | Plain English description | Level 3: Best-in-class calculation methodology | Level 2: Medium-accuracy calculation methodology | Level 1: Lower-accuracy calculation methodology | Observations |
| --- | --- | --- | --- | --- | --- | --- |
| 1. Purchased goods and services | Extraction, production, and transportation of goods and services purchased or acquired by the reporting company in the reporting year, not otherwise included in Categories 2 - 8. This may include intermediate goods (e.g., materials, components) and final products for resale. | Upstream (supply chain) emissions of goods and services purchased for the operation (OPEX) of the organisation | Hybrid approach covering all categories of purchased goods & services, including outsourced activities (e.g. catering, accommodation):  a) Process-based emissions reporting: where actual consumption or use data is available (e.g. weight for materials used or food delivered, energy use for outsourced student accommodation or data centres), use this data to calculate emissions by applying relevant emission factors (e.g. CO2e/kg, CO2e/unit, CO2e/kWh).  b) Collect supplier-based spend data (i.e. CO2e/£) – short term likely this would only be the suppliers Scope 1 & 2, so could use EIO for the Scope 3 part. But as more suppliers will measure complete upstream supply chain footprint, then complete Scope 1-3.  c) Extended input-output (EIO) modelling: for all other spending categories (excluding spending on goods & services that fit in other Scope 3 categories, e.g. capex, business travel) as well as suppliers' relevant revenue or cost data in certain cases (e.g. outsourced student accommodation and catering), apply EIO models by applying spending-based emission factors (CO2e/GBP) | Collect supplier-based spend data (i.e. CO2e/£) – short term likely this would only be the suppliers Scope 1 & 2, so could use EIO for the Scope 3 part. But as more suppliers will measure complete upstream supply chain footprint, then complete Scope 1-3. | Extended input-output (EIO) modelling only, applied to the entire procurement datasets (excluding spending on goods & services that fit in other Scope 3 categories, e.g. capex, business travel) as well as suppliers' relevant revenue or cost data in certain cases (e.g. outsourced student accommodation and catering). | Some procurement consortia can provide EIO-derived data through the HESCET dataset. However, it should be noted that this dataset includes all institution non-payroll spend and as a result include emissions that would be categorised as Scope 1 and 3 (e.g. utilities, travel, etc). There is currently no tool available for FE.  It is therefore good practice to exclude (a) non-scope 3 emissions and (b) all scope 3 emissions for which consumption (i.e. more accurate) data is available (by excluding specific supplier data such as water).  Where emissions are material, reporters should calculate or estimate emissions at the highest level of granularity available to them. |
| Purchased water - consumption data (meter readings).  Water:  Data: Fresh water supply volume  Data source example: water bills or meter readings.  EF: Freshwater (local/regional) EF | Purchased water - consumption data (meter readings).  Water:  Data: Fresh water supply volume  Data source example: water bills or meter readings.  EF: Freshwater (national) EF |  | In the absence of wastewater meter readings, purchased water volume data is used to estimate wastewater volume (used to report Scope 3 - 5. Waste generated in operations). |
| 2. Capital goods | Extraction, production, and transportation of capital goods purchased or acquired by the reporting company in the reporting year. Capital goods are final products that have an extended life and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or as plant, property, and equipment (PP&E). | Equivalent to category 1, but this focuses on fixed assets (CAPEX), so captures construction, refurbishment etc. (not continuous maintenance) | Extended input-output (EIO) modelling only, applied to the capex spending  Could potentially be project-based emissions calculations, e.g. whole-life carbon for new builds |  |  | Theoretically possible with HESCET if supplier name is known, but susceptible the inclusion of non-capital element if spend includes non-capital elements (e.g. installation and commissioning).  For big projects, it is recognised that in years with high capital expenditures Category 2 emissions will be high. It is based on current GHG guidance not possible to “amortize” emissions over a period of time (unlike financial accounting). Narrative around the reporting can therefore be created to describe this. |
| 3. Fuel- and energy-related activities | Extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in scope 1 or scope 2, including: a. Upstream emissions of purchased fuels (extraction, production, and transportation of fuels consumed by the reporting company) ; b. Upstream emissions of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling consumed by the reporting company) ; c. Transmission and distribution (T&D) losses (generation of electricity, steam, heating and cooling that is consumed (i.e., lost) in a T&D system) – reported by end user ; d. Generation of purchased electricity that is sold to end users (generation of electricity, steam, heating, and cooling that is purchased by the reporting company and sold to end users) – reported by utility company or energy retailer only | Upstream (supply chain) emissions associated with fuels and energy in Scope 1 & 2. This reflects emissions associated with getting fuel/energy to point of use (i.e. well-to-tank, transmission & distribution) | Obtain data from fuel, electricity purchased and energy from steam for all operated sites (including owned, leased and rented buildings). For fuels, apply the suitable DEFRA well-to-tank (WTT) emission factors. For electricity transmission and distribution, apply DEFRA WTT emission factors  Data: Fuel (scope 1) and electricity, heat and steam (scope 2) quantity used (kWh from scope 1 and 2)  Data source example: same data sources as those used for Scope 1 and 2 energy emissions.  EF: WTT specific for fuel/electricity; T&D losses for electricity, steam and heat |  |  | Use quantities of energy used to report scope 1 and 2 emissions. |
| 4. Upstream transportation and distribution | Transportation and distribution of products purchased between a company’s tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company). Including inbound logistics, outbound logistics (e.g., of sold products), and transportation and distribution between a company’s own facilities (in vehicles and facilities not owned or controlled by the reporting company). | Transportation of goods to the organisation and transportation services paid for by the organisation | Process-based emissions reporting: collect actual mileage data (including info on the transport mode). Use generic emission factors where vehicle type and load level are unknown. DEFRA provide average HGV emissions if vehicle type is unknown.  Data: Supplier data for distance travelled  EF: vehicle class specific EF (under “freighting goods”) - i.e. well-to-wheel) + associated well-to-tank EF | Collecting supplier-based spend data (i.e. kg CO2e/£) – short term likely this would only be the suppliers Scope 1 & 2, so could use EEIO for the Scope 3 part. But as more suppliers will get, then complete Scopes 1-3.  Secondary option: Extended input-output (EIO) modelling |  | [Example from NATS](https://www.nats.aero/wp-content/uploads/2021/08/NATS-GHG-report-2020-21_v1.pdf) (Page 9/32) includes courier services. Would require that proportion of daily distance travelled by couriers/deliveries on behalf of organisation be determined.  Suggest that only journeys made exclusively for reporting organisation be included. |
| 5. Waste generated in operations | Disposal and treatment of waste generated in the reporting company’s operations in the reporting year. This category includes emissions from disposal of both solid waste and wastewater. Waste is upstream because a company will typically pay for waste management services. | Disposal and treatment of waste | Process-based emissions reporting: collect actual mileage data (including info on the waste destination, e.g. incineration, recycling, landfill), apply appropriate DEFRA emission factors. All waste generated from activities in control of universities (including from student catering and accommodation, even if outsourced) should be included  Waste & Recycling:  Data: Waste contractor reports (tonnage data) for different waste streams and treatment routes  Data source example: tonnage reports from waste contractor. Service invoices.  EF: material and treatment specific EF  Wastewater:  Data: Water supply volume (e.g. meter readings) and assume 95% of incoming water plus 95% of harvested water  Data source example: supply water meter readings/invoices. For harvested water, estimate of volume harvested (e.g. based on annual precipitation or meter readings if in place).  EF: Wastewater (local/regional) EF | Waste & Recycling - Weight based calculation from tonnage reports (by material/treatment option) provided by waste contractor. Apply weight-based emission factor.  Waste & Recycling:  Data: Waste contractor reports (tonnage data) for different waste streams and treatment routes  Data source example: tonnage reports from waste contractor. Service invoices.  EF: material and treatment specific EF  Wastewater:  Data: Fresh water supply volume (assume 95% becomes waste water)  Data source example: supply water meter readings/invoices.  EF: Wastewater (local/regional) EF | Waste & Recycling – volumetric estimate of weight (container size x proportion filled x waste/material density) multiplied by annual number of collections for each waste stream/treatment option. This approach has significant potential to under-/over-estimate emissions.  Waste & Recycling:  Data: Waste contractor reports (number and size of containers plus collection frequency) for different waste streams and treatment routes  Data source example: Service invoices.  EF: material and treatment specific EF  Wastewater:  Data: Fresh water supply volume (assume 95% becomes waste water)  Data source example: supply water meter readings/invoices.  EF: Wastewater (national) EF |  |
| 6. Business travel | Transportation of employees for business-related activities. Leased transport must be included in lead assets. This includes student field trips and academic trips regardless of funding source. | Emissions associated with transportation (and related, e.g. hotels) of employees for business-related activities | Process-based emissions reporting: collect actual mileage data (including info on the transport mode), apply appropriate DEFRA well-to-wheel (WTW, i.e. TTW+WTT) emission factors. For flights to include Radiative Forcing (RF) uplift as recommended by DEFRA. |  | Extended input-output (EIO) modelling: collect travel spending data (including info on the transport mode), apply spending-based emission factors (CO2e/£). | Due to data availability and Institutional-level arrangements, it may be necessary to combine methodologies with different degrees of accuracy: e.g. Taxis booked via corporate accounts and taxi journeys booked by staff and claimed as expenses.  For transparency, different types of data should be reported separately. |
| Flights/train - TMC reports on distance travelled by mode of transport and class. Flights categorised as Domestic, short-haul, long-haul and international. Train as either National/International.  For flights:  Data: ‘Distance travelled’ by ‘class’ by ‘haul’ category (dom.; s-haul; l-haul; int.)  Data source example: TMC flight reports  EF. EF for specific ‘class’ and ‘haul’  Comparable approach for train. | Distance travelled for flights/trains but not distinguishing between travel class. Train as either National/International.  For flights:  Data: ‘Distance travelled’ by ‘haul’ category (dom.; s-haul; l-haul; int.)  Data source example: TMC flight reports  EF: EF for ‘average passenger’ and specific ‘haul’  Comparable approach for trains. | Spend data converted to distance for flights/train and relevant emission factor applied. Unlikely to be able to distinguish between travel ‘class’.  Data source example: spend data. But may require manual calculation to work out £. mile/km flown. Other institutions could potentially provide intensity factor (e.g. £. mile/km). Use EIO EFs. |
| Taxi/coach – Operator reports with distance for journeys booked.  Data: ‘Distance travelled’ (operator records) x number of passengers (booking records) mode of travel (taxi type/coach). individuals’ ‘class’ by ‘haul’  Data source example: Taxi operator reports (might not be available for all taxi bookings).  EF: EF for specific mode of transport |  | Above methodology could also be applied to taxi/bus travel. However, low accuracy due to differences in local/regional intensity factors. |
| Car hire – Hire supplier provides booking reports ‘fuel used’ per hire or distance travelled by vehicle size/emission class.  Data: Hire company records of quantity of fuel used, distance travelled and vehicle size  Data source example: car hire summary report (type of car, distance travelled, fuel type, CO2e emissions).  EF: Either EF for fuel used/distance travelled for specific vehicle size | Car hire – Hire supplier provides booking reports with total distance and assumptions made about vehicle size and fuel.  Data: Hire company records of distance travelled  Data source example: car hire summary report (distance travelled, fuel type).  EF: EF for distance travelled for ‘average’ vehicle |  |
| Grey fleet – expense claims system (detailing distance/mileage payment and, vehicle size and fuel type).  Data: Expenses claim reports - e.g. payment amount on mileage claims; mileage rate; vehicle fuel type/size  Data source example: Expenses claims systems (to include distance travelled, vehicle fuel/CO2e class) and mileage rate.  EF: Either EF for fuel used/distance travelled for specific vehicle size  NB.: Different mileage rates may apply to different types of vehicles. Tiered mileage rates may also be in operation. | Grey fleet – total mileage claim value paid by institution divided by mileage rate. Assumptions made about vehicle size and fuel  Data: Expenses claim reports - e.g. payment amount on mileage claims; mileage rate  Data source example: Total mileage payment (from Finance), mileage rate. Assume “unknown” vehicle type.  EF: EF for distance travelled for ‘average’ vehicle  NB.: Different mileage rates may apply to different types of vehicles. Tiered mileage rates may also be in operation. |  |
| 7. Employee commuting | Transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)  Even though employee commuting is not always purchased or reimbursed by the reporting company, it is categorized as an upstream scope 3 category because it is a service that enables company operations, similar to purchased or acquired goods and services. Companies may include emissions from teleworking (i.e. employees working remotely) in this category. | Emissions from transportation of employees between their homes and their worksites. This also includes emissions associated with remote working. | Process-based emissions reporting: collect information on staff commuting (through a commuting survey: distance travelled by each transport mode), apply appropriate DEFRA well-to-wheel (WTW, i.e. TTW+WTT) emission factors  Data: Estimate distance travelled (Institution specific survey) by mode of transport by staff in reporting period  Data source example: organisation specific travel survey.  EF: EF for specific mode of transport  Measuring Scope 3 carbon emissions for transport Methodology paper available from [here](https://dera.ioe.ac.uk/13476/1/12_02.pdf). |  | Process-based emissions reporting: take assumption on staff commuting habits (taking national average distance travelled by each transport mode), multiply by number of staff, apply appropriate DEFRA WTT emission factors  Data: Estimate distance travelled (national/regional) by mode of transport by staff in reporting period  EF: EF for specific mode of transport  Sample representativeness should be determined by the institutions reporting/data maturity and materiality of emission activity. [Tools to determine sample size](https://www.qualtrics.com/uk/experience-management/research/determine-sample-size/). | NB: the same survey can be used for student and staff commuting. |
|  | Working from home (staff) |  | Homeworking emissions whitepaper enhanced methodology [available from here](https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020). | Homeworking emissions whitepaper enhanced methodology [available from here](https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020). | From [SSN Guidance on Completing Public Bodies Climate Change Duties Annual Report - 2020/21 Reporting Period](https://sustainablescotlandnetwork.org/uploads/store/mediaupload/1592/file/CC%20Reporting%20Master%20Guidance%202021%2005.10.2021.pdf) (Published July 2021) p 10/28 "Recording Homeworking Emissions" (derived from a Carbon Trust report).  A default emission factor of 0.3 tCO2e/FTE/annum is suggested to calculate homeworking emissions.  Data: Staff FTE  Data source example: human resources records on staff nos.  EF: 0.3 tCO2e/FTE/annum |  |
| 8. Upstream leased assets | Operation of assets leased by the reporting company (lessee) in the reporting year and not included in scope 1 and scope 2 – reported by lessee. For example, if the university/college uses another organisation's assets. In the case of building or cars, their use would already be accounted for in scope 1 and 2, but the university/college could report here emissions from the asset production (as opposed to its use) | Emissions from use *by* the institution (lessee) of leased buildings and vehicles  Institutions would need to determine if they are “lessors” (who leases or lets a property to another, a landlord), “lessee” (who holds the lease of a property, a tenant) or both (who can lease out assets whilst at the same time lease assets from others). | To be defined on case-by-case basis, only if applicable |  |  | Current GHG protocol guidance only specifies the required collection of Lessor’s Scope 1 & 2 emissions. Embodied carbon emissions are therefore not a requirement, however if the collection helps in the institution’s decision-making and reinforcing emissions reduction inclusion is encouraged.  Emissions that are appointed according to use/access/ownership, it is dependent on the reporter to agree with who they share assets on how they will apportion emissions.  For empty offices and hubs assets to include until transfer date and to include any emissions under control even if the building is empty. |
| 9. Downstream transportation and distribution | Transportation and distribution of products sold between the reporting company’s operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company). Only includes transportation- and distribution-related emissions that occur after the reporting company pays to produce and distribute its products | Transportation of produced goods and services *if not* paid for by the institution | To be defined on case-by-case basis, only if applicable (see decision tree below) |  |  | Likely only to apply if the institution owns a commercial entity producing goods |
| Transportation of students to the institution including daily commuting and to home | Process-based emissions reporting: collect information on student commuting (through a student travel survey: Survey to understand origin, stop-overs and destination, mode of travel and frequency of travel), apply appropriate DEFRA well-to-wheel (WTW, i.e. TTW+WTT) emission factors to include start and end term travel.  Data: Student travel survey data (as above); Student numbers (country for international, postcode/out code for UK domiciled); modal distribution (UK)  Data source example: organisation specific travel survey.  EF: EF for specific mode of transport | Survey to understand origin and destination, mode of travel and frequency of travel.  Data: Student travel survey data (as above); Student numbers (country for international, postcode/out code for UK domiciled); modal distribution (UK)  EF: Mode of transport specific EF | Process-based emissions reporting: take assumption on student commuting habits (taking national average distance travelled by each transport mode) and for international students’ assumptions on travel frequency based on a minimum of 2 return trips per year, multiply by number of students, apply appropriate DEFRA WTT emission factors  Data: Estimate distance travelled (national/regional) by mode of transport by students in reporting period  Data: Student numbers (country for international, postcode/out code for UK domiciled); modal distribution (UK)  EF: Mode of transport specific EF | NB: the same survey can be used for student and staff commuting. |
| Student accommodation and halls of residence that are on-site but owned/managed by an external organisation  If the institution has agreements in place with providers and can encourage living in efficient organized housing. |  |  | CIBSE energy benchmarking tool, [available from here](https://www.cibse.org/knowledge-research/knowledge-resources/knowledge-toolbox/benchmarking-registration#:~:text=CIBSE's%20Energy%20Benchmarking%20Tool%20is,Access%20via%20this%20form). |  |
| 10. Processing of sold products | Processing of intermediate products sold in the reporting year by downstream companies (e.g. manufacturers) |  | To be defined on case-by-case basis, only if applicable (see decision tree below) |  |  | Likely only to apply if the institution owns a commercial entity producing goods |
| 11. Use of sold products | "End use of goods and services sold by the reporting company in the reporting year. The direct use-phase emissions of sold products over their expected lifetime (i.e., the scope 1 and scope 2 emissions of end users that occur from the use of: products that directly consume energy (fuels or electricity) during use; fuels and feedstocks; and GHGs and products that contain or form GHGs that are emitted during use)  Optional: indirect use-phase emissions of sold products over their expected lifetime (i.e., emissions from the use of products that indirectly consume energy (fuels or electricity) during use) " |  | To be defined on case-by-case basis, only if applicable (see decision tree below)  If an institution owns a commercial entity producing goods, the decision tree below should be used to determine the relevant/inclusion of Category 11. Use of sold products in the reporting institutions’ GHG inventory. (Click on the image below to increase size)  C:\Users\s2106311\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\67DE591C.tmp |  |  | Likely only to apply if the institution owns a commercial entity producing goods |
| 12. End of life treatment of sold products | Waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life. |  | To be defined on case-by-case basis, only if applicable (see decision tree below) |  |  | Likely only to apply if the institution owns a commercial entity producing goods |
| 13. Downstream leased assets | Operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in scope 1 and scope 2 – reported by lessor. For example, if the university/college leases some of its assets to another organisation. In the case of building or cars, their use would already be accounted for in scope 1 and 2, but the university/college could report here emissions from the asset production (as opposed to its use) | Emissions from use of buildings and vehicles *leased by* the institution (lessor) | To be defined on case-by-case basis, only if applicable |  |  |  |
| Land-use |  | [Oxford University Saïd Business School and Oxford University Estates Services (2021) Emission Accounting Report 2019-20 pp. 13-16/57](https://sustainability.admin.ox.ac.uk/files/emissionsaccounting.pdf) **-** <https://sustainability.admin.ox.ac.uk/files/emissionsaccountingreport.pdf> |  | University/college owned and managed land should be reported under Scope 1. |
| 14. Franchises | Operation of franchises in the reporting year, not included in scope 1 and scope 2 – reported by franchisor. |  | To be defined on case-by-case basis, only if applicable |  |  |  |
| 15. Investments | Operation of investments (including equity and debt investments and project finance and pensions) in the reporting year, not included in scope 1 or scope 2 |  | To be defined on case-by-case basis, only if applicable  PCAF: <https://carbonaccountingfinancials.com/standard> |  |  | PCAF: <https://carbonaccountingfinancials.com/standard>  Emissions involved in pensions and endowment is an evolving area with little guidance available to date. Updates to the guidance once they have been released. |