



The voice of our sustainable
built environment

EMBODIED CARBON

Scope 3 Measurement
and Reporting



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ADVANCING
NET ZERO

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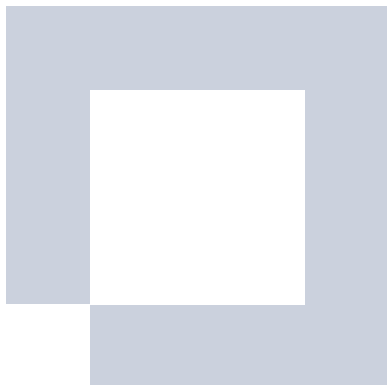
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FOREWORDS



The global climate system is now changing at an accelerated rate due to the impact of human activity. 2023 was the hottest calendar year on record since global temperature data started to be recorded in 1850, and the planet was 1.48°C warmer than

pre-industrial levels¹. The UK also recorded its second highest average temperatures on record after the hottest ever year in 2022, and rainfall levels in 2023 were 48% higher than average.

At COP26 the UK made stretching 2030 commitments in its Nationally Determined Contribution (NDC) – now only six years away. The rate of emissions reduction outside the power sector must quadruple, and for the built environment the rate of emissions reduction must double.

Measurement and reporting of Scope 3 emissions is the most effective way for organisations to fully assess their overall carbon footprint. Whilst Scope 3 disclosures continue to be voluntary there is an information gap for investors in assessing climate-related risks, and for end users and consumers wishing to make low carbon choices to reduce their own carbon footprint.

The release of this UKGBC guidance paper, alongside the recently released paper on **Embodied Carbon – Improving Your Modelling and Reporting**, is a timely prompt for organisations within the Built Environment sector to adopt a thorough approach to the measurement and reporting of all emissions from business activity, and to set out a trajectory to reduce emissions in alignment with the UK's national commitments. The primary aim of UKGBC's guidance is to align the use of embodied carbon assessments within Scope 3 reporting in order to set out a rigorous carbon reduction strategy to deliver net-zero emissions.

This paper should also be a prompt for government to commence regulation of embodied carbon emissions alongside in-use emissions within the Built Environment and make Scope 3 reporting mandatory for larger organisations.

Peter Conboy

DIRECTOR AT IGLOO
FOR PEOPLE, PLACE AND PLANET



Historically, embodied carbon has been largely overlooked, despite accounting for roughly 11% of total global carbon emissions. In recent years, the tide has turned, and as an industry we are now much more proactive about addressing embodied carbon,

which the publication of this report illustrates.

As it stands, guidance on how to measure embodied carbon is available, with the RICS whole life cycle carbon assessment standard set to become the world-leading standard for consistent carbon measurement. However, our industry is falling behind on measuring, reporting, and reducing Scope 3, including embodied carbon. This is a barrier to positive progress, and underlines why the publication of this report is so important. By drawing on cross-industry data, it represents a big step forward in terms of defining how we should approach embodied carbon.

This report establishes a vital link between Scope 3 reporting and embodied carbon assessments and will support organisations to establish more integrated and comprehensive approaches to carbon reporting in the built environment. It aligns with broader industry goals to accelerate the reduction of overall emissions, as well as enhancing the role of carbon reporting in decision-making processes.

We know that tackling embodied carbon in the built environment is essential for mitigating climate change, promoting resource conservation, complying with regulations, managing financial risks, and demonstrating a commitment to environmental safeguarding. Mitigating embodied carbon requires a holistic, forward-thinking approach to construction practices, considering the whole lifecycle of a project from the outset. It doesn't mean business as usual.

Multiplex are proud to have been a project partner, supporting the UKGBC to develop this guidance. It aligns with our own priorities on the road to net zero and represents a future where we can work together as an industry to significantly lower carbon emissions.

Maria Cachafeiro

HEAD OF SUSTAINABILITY
MULTIPLEX

[1] Copernicus, 2023 is the hottest year on record, with global temperature close to the 1.5°C limit. January 2024.



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1 EXECUTIVE SUMMARY

This guidance provides an overview of the overlap between Scope 3 reporting and embodied carbon assessments and shows how establishing a coherent link can support strategic emission reduction efforts. This is shown through the three main sections, as described below.

Firstly, the guidance shows how using embodied carbon assessments directly within Scope 3 reporting could represent a more effective solution when compared to the traditional spend-based approach. This is due to the use of LCAs and EPDs within embodied carbon assessments, which can be more accurate than activity-based emissions factors. Additionally, undertaking emissions assessments at project level and allowing those results to be fed into the Scope 3 reporting of multiple organisations would reduce multiplication of workload.

Secondly, this guidance explores the concept of 'yearly embodied carbon', which involves quantifying embodied carbon on a yearly basis throughout the construction phase of a project. This could reconcile the time-based disparities between Scope 3 reporting and embodied carbon assessments (as-built embodied carbon assessments are undertaken at practical completion, whereas Scope 3 reporting takes place annually).



Thirdly, the guidance discusses architects, engineers, and other professional service providers, and states that the 'designed embodied carbon' (that is, the embodied carbon of assets that they have designed) is not within their Scope 3 emissions. Nevertheless, it is important that such organisations take responsibility for their work and are held accountable for the emissions that they impact through their services. Therefore, it is recommended that architects and engineers do report the embodied carbon of their designs, but through a separate mechanism from the GHG Protocol. This could be a 'Projects Report': existing examples of which will be shown and discussed.

Overall, this guidance highlights how embodied carbon assessments can support and improve the understanding of Scope 3 emissions across the built environment. However, UKGBC recognises that for embodied carbon assessments to be used within Scope 3 reporting, would require such assessments to be undertaken across all projects, representing another reason why the call for mandating whole life carbon assessments through regulation is so strong.



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2 CALLS TO ACTION



1 Inclusion of Embodied Carbon Assessments within Scope 3 Emissions Reporting.

For Scope 3 emissions measurement and reporting to be an effective driver for reducing emissions, assessments need to be an accurate representation of an organisation's value chain emissions. By the nature of the built environment industry, the construction and operation of built assets is a large proportion of the Scope 3 emissions for multiple stakeholders, and they should be reporting those emissions as part of their value chain. This guidance demonstrates how to do this for embodied carbon and outlines the relevant methodologies.



2 Architects and Engineers should Report Project Emissions.

For design firms, there are two strong drivers for measuring and disclosing designed emissions. Firstly, doing so allows them to take responsibility for their influence on built environment emissions and their role in the rapid decarbonisation of their industry. Secondly, it allows them to show the value proposition that design firms can bring to Developers, Financial Institutions, and Contractors by providing Scope 3 emissions reductions through sustainable design. If design firms recognise the responsibility they have to reduce emissions in the built environment, they should be actively reporting the embodied carbon of their designs alongside their GHG Protocol reporting. Example approaches are introduced in this report in addition to suggested principles for effective 'project reporting'.



3 Whole Life Carbon Regulation

UKGBC calls for mandatory measurement and reporting of Whole Life Carbon for all projects with a gross internal area of more than 1000m² or that create more than 10 dwellings. This must be followed by legal limits on the upfront embodied carbon emissions of such projects, with future revision and tightening. As shown through this guidance, mandating Whole Life Carbon Assessments through regulation would support Scope 3 reporting by reducing multiplication of workload across organisations.



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3 INTRODUCTION

UKGBC's **Net Zero Whole Life Carbon Roadmap** shows that the built environment is responsible for 25% of UK emissions, with embodied carbon alone responsible for 5% [1]. With such a large proportion of emissions coming from construction projects, it is vital that the associated emissions reporting is credible, transparent, and consistent. Not only that, reporting needs to act as a driver for action, clearly highlighting emissions hotspots and directing efforts to ensure decarbonisation is substantial and swift.

The methodologies for measuring and reporting emissions at both project and organisational level are well established through the RICS Whole Life Carbon Assessment (WLCA) *Professional Standard* and the GHG Protocol respectively [2, 3]. However, the link between the two is less well established, and there is an opportunity to build a stronger connection between project measurements and organisational reporting. This would allow for greater transparency, which would facilitate effective organisation-wide efforts for reduction of embodied carbon emissions across project and built-asset portfolios.

This report aims to clarify how project-level embodied carbon assessments could be aligned with organisational-level Scope 3 reporting to address the following industry challenges:

- Organisational Scope 3 reporting is typically undertaken separately to project-level embodied carbon assessments, without a sufficiently well-established link between the two, therefore limiting an organisation's ability to make strategic decisions that would reduce embodied carbon across their portfolio of projects and built assets.
- The separation of embodied carbon assessments and Scope 3 reporting also results in multiplication of work, as emissions are calculated using both methodologies rather than using one to inform the other. Using project-level embodied carbon assessments for Scope 3 reporting would allow the calculation to be done centrally at the project, and then feed into the Scope 3 reporting of multiple stakeholders.
- For architects, engineers, and other professional service providers, clarity is required on the boundary of their Scope 3 emissions reporting and whether this includes the embodied carbon of their designs.

3.1 SCOPE

This guidance focuses on embodied carbon as part of Scope 3 emissions reporting. Therefore, it does not cover operational carbon and user emissions (Modules B6, B7, B8 within a Whole Life Carbon Assessment). It discusses how embodied carbon assessments can feed into Scope 3 emissions reporting and outlines the stakeholders who should include embodied carbon emissions within their Scope 3.



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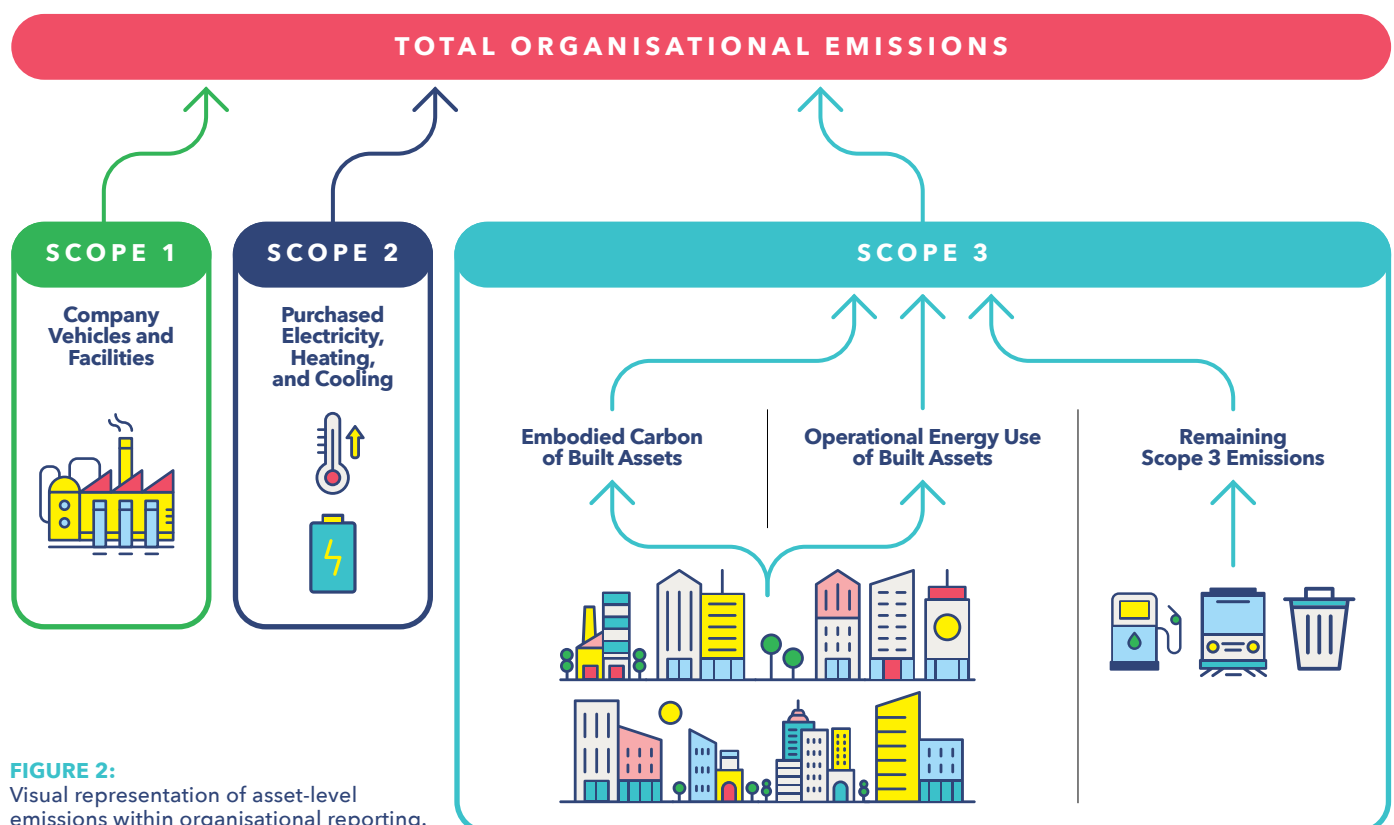
4 KEY FACTORS IN SCOPE 3 MEASUREMENT AND REPORTING

There are several factors that affect how measurement and reporting takes place. These are covered in this section with a focus on sharing key differences and potential opportunities for resolving them to ensure consistent measurement and reporting.

4.1 HOW ASSET-LEVEL EMBODIED CARBON LINKS TO SCOPE 3 REPORTING

By the nature of the built environment industry, the construction and operation of built assets is a significant proportion of value chain emissions. Because of this, embodied and operational emissions need to be included within Scope 3 for that reporting to be appropriately representative of the reporter's impact on GHG emissions.

This is visualised within Figure 2, where embodied carbon is shown alongside operational emissions. The proportion of Scope 3 emissions that embodied carbon takes up will vary per organisational type.



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4.2 DOUBLE COUNTING WITHIN GHG PROTOCOL

An important aspect of GHG Protocol is to understand that 'double counting' (multiple organisations reporting the same emissions) is currently an inherent part of reporting on Scope 3 emissions. For the built environment, there are many organisations involved in the construction of a building or infrastructure project, and therefore many organisations would include the same emissions from that project within their GHG Protocol reporting. The double (or multiple) counting of emissions within Scope 3 reporting should not cause any knock-on issues, as the intention of GHG Protocol reporting is to provide a year-on-year comparison for each organisation to track their emissions reductions – both from their direct activities, and from the value chain that they are a part of. For this purpose, it is not a problem that emissions are double counted, as it is a reflection of an industry where many organisations are involved in delivering a single project.

Clarification Point: The design of the GHG Protocol is that Scope 1 and 2 emissions are the direct emissions caused by the activities or energy purchases of the reporting organisation. Scope 3 emissions, however, are upstream or downstream within the reporting organisation's value chain. Therefore, an organisation's Scope 3 emissions are the Scope 1 or 2 of another organisation.



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4.3 KEY DIFFERENCES BETWEEN EMBODIED CARBON ASSESSMENTS AND SCOPE 3 REPORTING

There are two main differences between Scope 3 reporting and embodied carbon assessments:

1. The type of carbon factors used
2. The time at which emissions are reported

CARBON FACTORS

Scope 3 emissions are typically calculated using activity-based carbon factors. This approach uses activity data (e.g., £ of spend on material) and estimates the associated emissions using a carbon conversion factor [\[3\]](#).

FINANCIAL
SPEND (£)



CARBON
FACTOR



CARBON
EMISSIONS
(CO₂e)

Within the GHG Protocol, life cycle and cradle-to-gate emissions factors are the recommended source of carbon data [\[4\]](#). Life cycle emissions (via product and material-level Life Cycle Assessments and Environmental Product Declarations) are the foundation of asset-level embodied carbon assessments, as defined by EN15978 and the RICS WLCA Professional Standard.

KEY POINT

Although activity-based calculations are currently the common approach to Scope 3 reporting, it is possible to substitute this with data from embodied carbon assessments (or more broadly, whole life carbon assessments).


Two types of emission factors can be used for calculating emissions associated with a material or product:

- Life cycle emission factors, which include emissions that occur at every stage of a material/product's life, from raw material acquisition or generation of natural resource to end of life.
- Cradle-to-gate (sometimes referred to as 'upstream') emission factors, which include all emissions that occur in the life cycle of a material/product up to the point of sale by the producer.

In general, cradle-to-gate emission factors should be used to calculate emissions associated with goods or services (e.g. category 1 (Purchased goods and services) and category 2 (Capital goods).

GHG Protocol, Technical Guidance for Calculating Scope 3 Emissions [\[6\]](#).



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TIME-BASED DIFFERENCES

The second key difference between the GHG Protocol and embodied carbon assessments is that they are undertaken at different times across an asset's lifecycle. Asset-level embodied carbon assessments are done during design stages and after practical completion as a retrospective as-built analysis. Organisational emissions reporting, however, is an annual activity.

KEY POINT

To facilitate the use of embodied carbon assessments within annual Scope 3 reporting, it would be preferable that the embodied carbon assessment results are used in a manner that reflects the amount of work completed that year.

Using embodied carbon assessments on a yearly basis would avoid the scenario where a multi-year project is only included in an organisation's Scope 3 report at practical completion, despite the emissions having taken place across multiple previous years. This is especially relevant for large developments and infrastructure projects, which can easily span over a decade.

Calculating and reporting embodied carbon on a yearly basis can be visualised – as shown in Figure 3. This shows several hypothetical projects, with the yearly quantity of embodied carbon, and includes the aggregate figure. This figure would be the total amount of embodied carbon that is fed into Scope 3 reporting on an annual basis.

There are two potential options for calculating embodied carbon on a yearly basis to include within Scope 3 emissions reporting:

- Tracking the actual activities undertaken and materials used on the project that year
- Linking the embodied carbon reporting to project finances

Clarification Point: Project-level embodied carbon assessments include emissions across the full lifecycle: upfront, in-use, and end-of-life. The time-based differences are relevant to any action during the lifecycle that spans longer than a year; this would typically be the construction phase (upfront carbon), large fit outs or retrofits, or extensive end-of-life work.

Later in this guidance, clarification is given on which stakeholders should include either upfront, in-use, or end-of-life emissions within their Scope 3 reporting, and at which point in time.

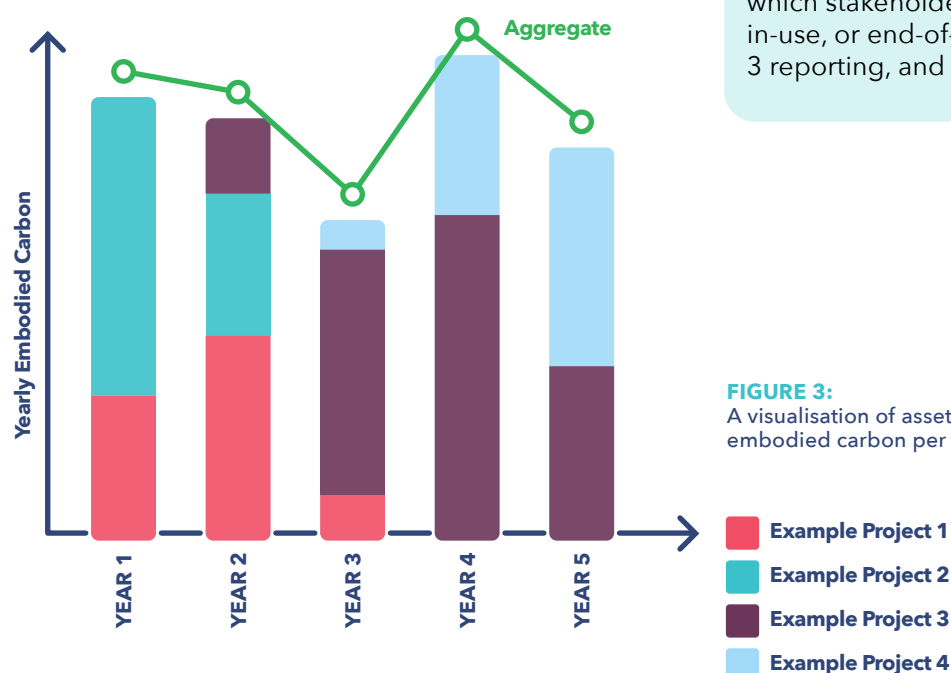


FIGURE 3:
A visualisation of asset-level embodied carbon per year.



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YEARLY EMBODIED CARBON THROUGH MATERIAL TRACKING

This method considers the construction activities undertaken each year, represented by 'Module A' within the RICS Whole Life Carbon Assessment process, and refers to the upfront carbon of the project in question. For any stakeholder who also needs to report in-use embodied carbon or end-of-life embodied carbon, these figures would be reported on at practical completion or point of sale.

Upfront carbon is built up of three elements, categorised by the following WLCA modules as defined by the Whole Life Carbon Network within Carbon Definitions for the Built Environment, Buildings and Infrastructure [7]:

- **A0-A3:** Product-related emissions (excluding biogenic carbon)
- **A4:** Transport-related emissions
- **A5:** Construction-related emissions

To calculate the upfront carbon on a yearly basis, there needs to be a method to quantify each of these modules on live projects.


To calculate modules A0-A3 requires quantifying the materials purchased for a project on a yearly basis. Two viable options for doing this include tracking invoices for purchased materials and tracking material deliveries to site. It is important that whichever method is chosen is kept consistent for the reporting period of that project. Tracking through either of these methods would create a list of materials from which an assessment of the A0-A3 embodied carbon specific to that year could be undertaken.

Additional to this yearly A0-A3 assessment, it would be necessary to measure the emissions from transport and construction activities, for modules A4 and A5. Measuring A4 and A5 emissions is already practiced in industry, but it is not widespread. Further guidance is given within the RICS WLCA Professional Standard.

The remaining in-use (Module B) and end-of-life (Module C) emissions would need to be included upon practical completion of the project, within the Scope 3 reporting for that year.

Measuring and reporting embodied carbon on a yearly basis throughout the construction process would represent the most accurate method of including embodied carbon emissions within Scope 3 reporting, as it closely reflects the emissions incurred that year. Despite this, it is recognised that undertaking these measurements yearly, and effectively accumulating the as-built embodied carbon assessment across the timespan of the construction process, would be a resource-intensive process. Therefore, this method of including embodied carbon assessments within Scope 3 reporting could be best seen as a long-term goal for industry.



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YEARLY EMBODIED CARBON THROUGH FINANCIAL TRACKING

This method relies on embodied carbon assessments undertaken at the Technical Design stage and apportions that embodied carbon per year of construction, dependent on the amount of financial value realised during that year.

For example, with hypothetical project figures:

- **Total Project Value:** £1m
- **Technical Design stage embodied carbon assessment:** 5000tCO₂e
- **Value of project realised in current reporting year:** £400k
- **Resulting quantity of embodied carbon reported in Scope 3 for that reporting year:**
 $(400000/1000000) \times 5000\text{t} = 2000\text{tCO}_2\text{e}$

As it uses the embodied carbon assessment from the Technical Design stage, rather than the as-built assessment, the method is less accurate than using the material data for what has been used on site that year. Secondly, if the as-built embodied carbon assessment is significantly different to the estimations made at Technical Design stage, the difference would need to be made up during the Scope 3 reporting year in which the as-built assessment was completed.

OVERALL

It is recognised that the calculation of 'yearly embodied carbon' would not be immediately implementable across all projects within industry. Nevertheless, the capability does exist and is worth considering as an option as the feasibility becomes more possible in the future. Consequently, the uptake of embodied carbon assessments within Scope 3 reporting is expected to be a progression, where a mix of activity-based calculations and asset-level embodied carbon assessments is used initially, until embodied carbon assessments are more widely used.

In a scenario where a mix of data sources is used, it would be especially important to effectively communicate the source of data used for Scope 3 reporting. This can be done by showing the quantity calculated via activity-based methods and the quantity calculated via embodied carbon assessments. A visualisation is provided in Figure 4, that shows the split of embodied carbon calculated via asset-level embodied carbon assessments vs the common organisational-level activity-based approach.

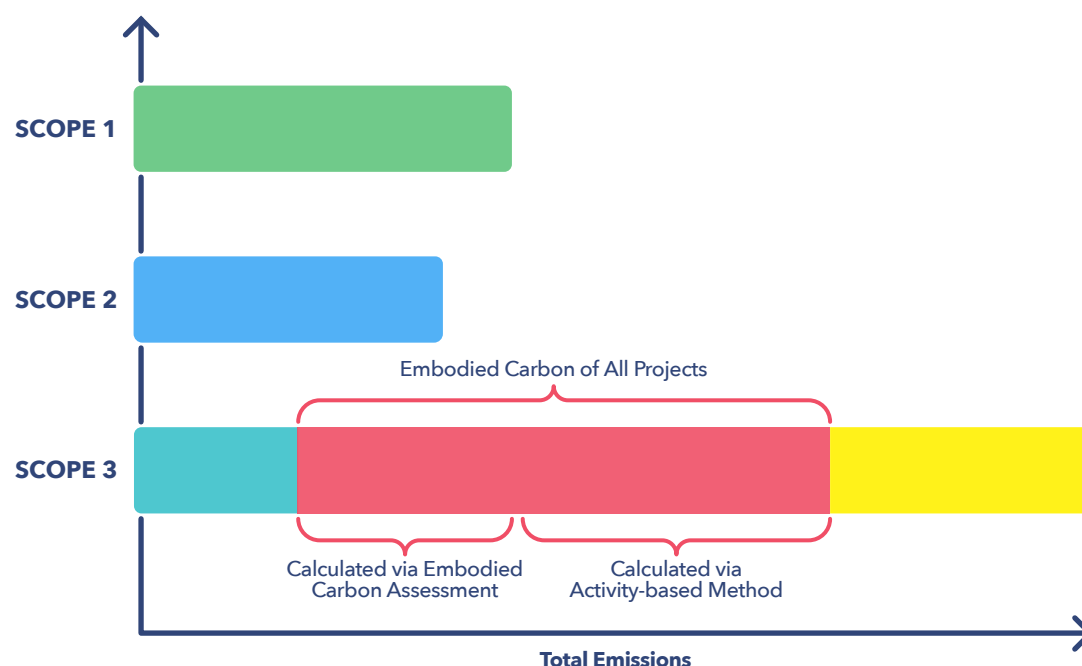


FIGURE 4: Shows how the embodied carbon sits within the total Scope emissions.



5 REPORTING ACROSS AN ASSET'S LIFECYCLE

The first section of this guidance outlines how embodied carbon assessments can be used to support Scope 3 reporting. This section will explore Scope 3 reporting of embodied carbon across an asset's lifetime.

The GHG Protocol Scope 3 standard is written with the goal of helping organisations understand the emissions across their full value chain, as a result of the company's activities and the products they buy, sell, and produce. GHG Protocol also highlight the overlap in data used to develop Scope 3 reports and product-level emissions assessments, as both include data collected from similar organisations throughout the value chain.


Due to this overlap, GHG Protocol state that 'companies may find added business value and efficiencies in developing Scope 3 and product inventories in parallel' [4]. For the built environment, this overlap in data can be seen when built assets are treated as the product under consideration. Through this lens, Scope 3 reporting can be understood across the lifetime of a built asset. Figure 5 (see next page) visualises the lifetime of a built asset, and pinpoints where the key stakeholders are involved according to the Scope 3 reporting boundary as defined by the GHG Protocol. In the following sections, each stakeholder is discussed in more detail.



Clarification Point: This section of the guidance considers Developers, Owners, Contractors, Tenants, and Facilities Managers as built environment stakeholders who should consider project embodied carbon emissions within their Scope 3. Designers and Professional Services are considered in the subsequent section.

Product Manufacturers are not included, as this guidance considers the building as a whole product, rather than looking at the constituent parts. Furthermore, GHG Protocol for manufacturers is relatively well understood, without the need for further guidance from UKGBC.



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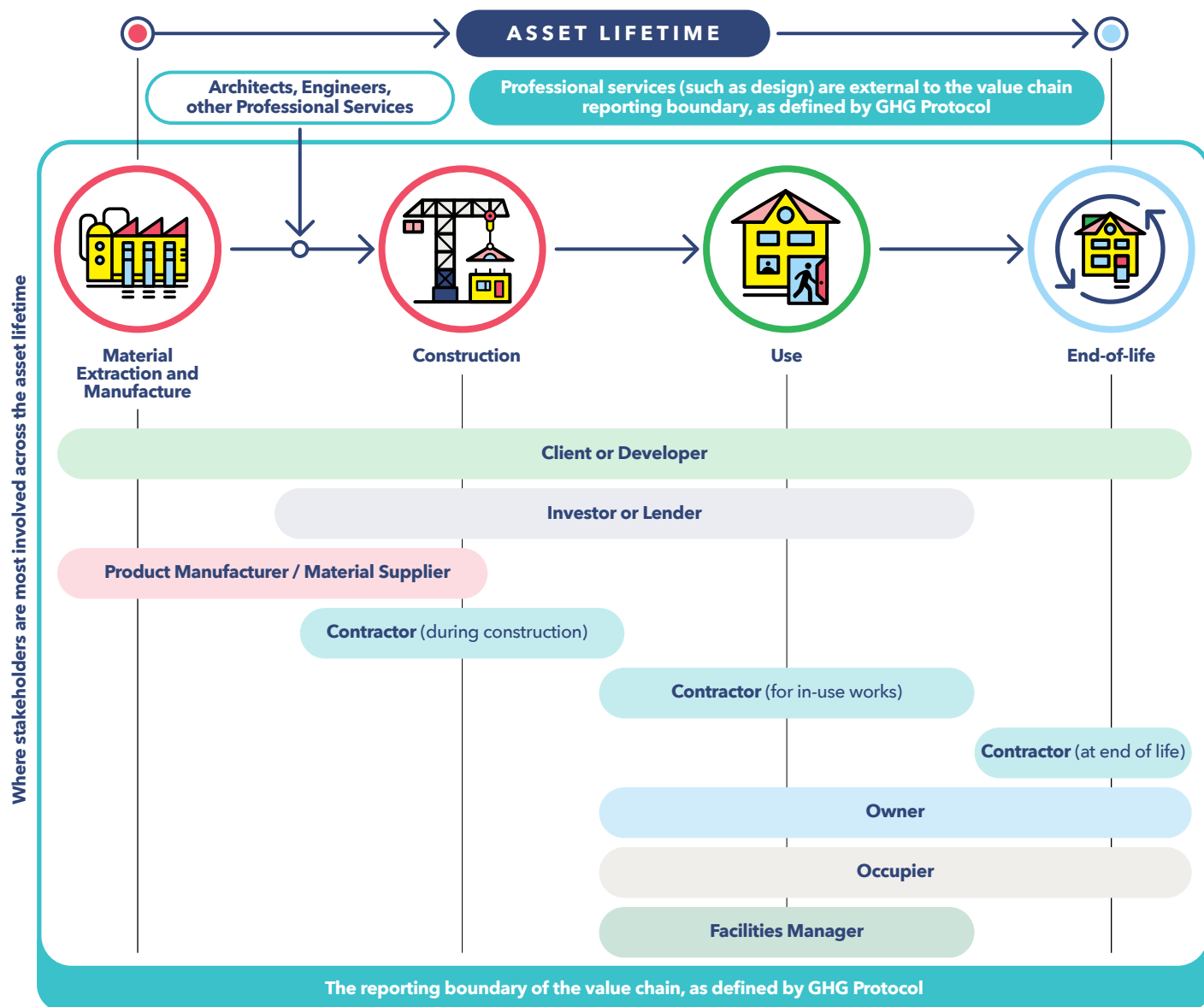


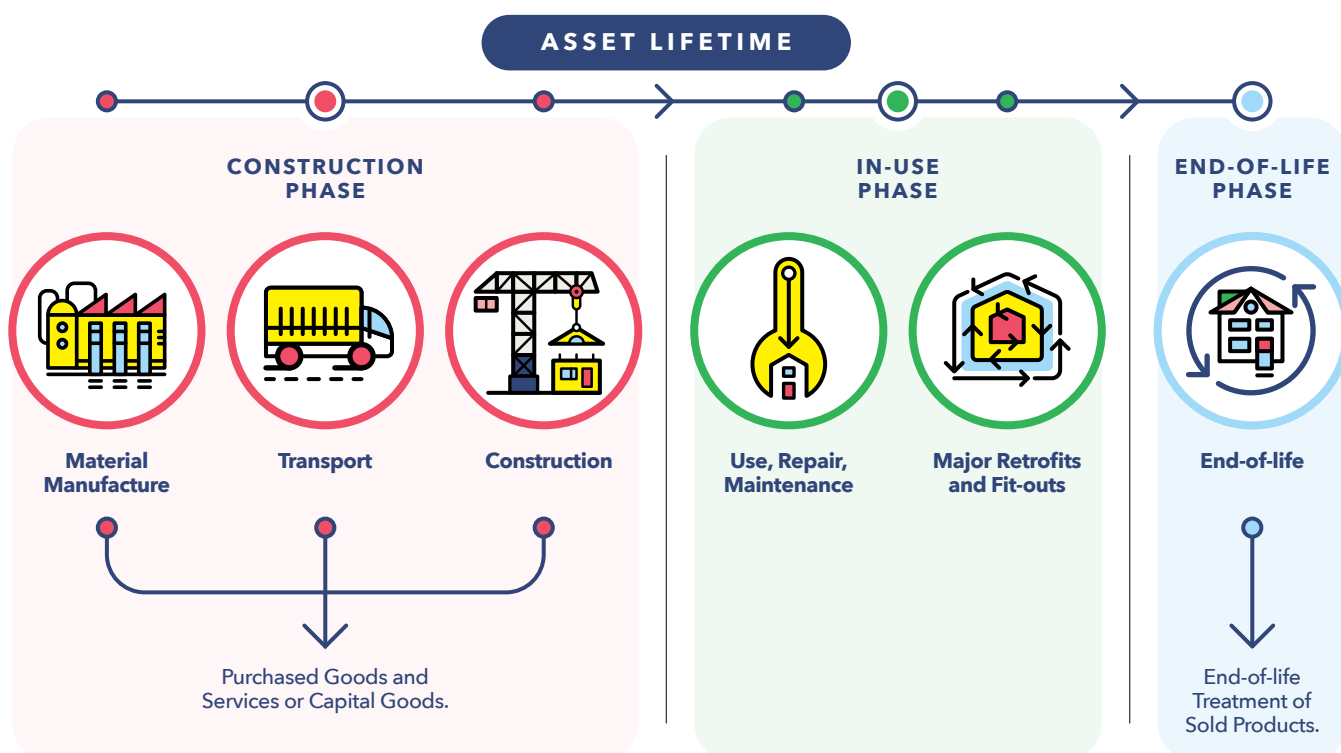
FIGURE 5:
GHG Protocol Scope 3 Reporting
boundary for stakeholders across
an asset's lifetime.

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NOTE

The Scope 3 categories 'Purchased Goods & Services' and 'Capital Goods' are often referenced together in this guidance. The choice of which category to use should follow the financial reporting of the organisation, depending on whether a purchase is recognised as a capital asset or not.

5.1 DEVELOPERS



1

For Developers, this diagram is derived from UKGBC's published **Guide to Scope 3 Reporting for Commercial Real Estate [5]**. This report should be referred to for full details on emissions reporting.

2

The upfront carbon (Modules A0-A5, excluding biogenic carbon) is reported either during construction (on a yearly basis) or at practical completion into the 'Purchased goods & services' or 'Services or capital goods' category accordingly.

3

In accordance with GHG Protocol, the 'Use of Sold Products' category usually refers to operational emissions, rather than the in-use embodied carbon. Therefore, Developers do not need to include the in-use embodied carbon (Module B) within their Scope 3 reporting. This topic is discussed in further detail within Guide to Scope 3 Reporting for Commercial Real Estate.

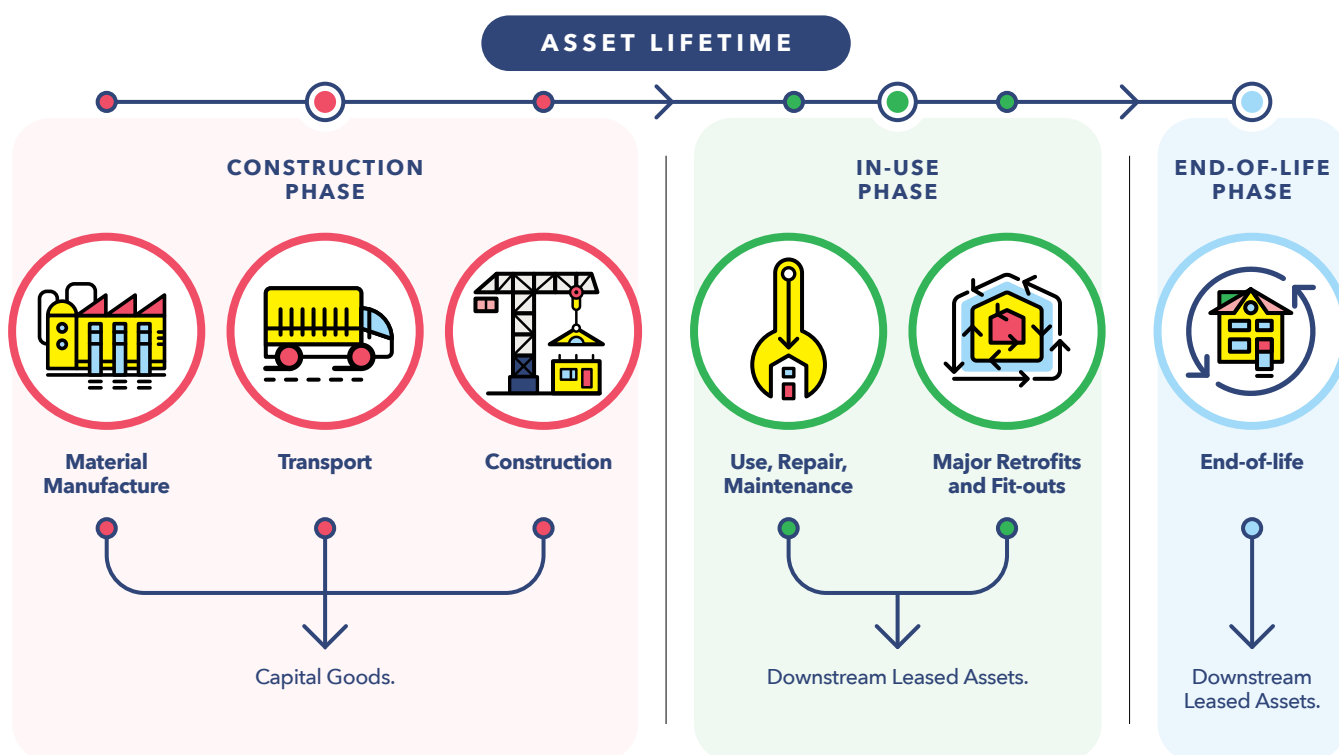
4

The end-of-life treatment of buildings should be reported within the Scope 3 category: 'End-of-life treatment of products'. For Developers, this is reported at point of sale, using Module C from the as-built embodied carbon assessment.



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5.2 OWNER-LESSOR



1

For Owner-Lessors, embodied carbon falls into their Scope 3 across the whole lifetime of the asset, but into different categories than Owner-Occupiers. For further information, refer to UKGBC's **Guide to Scope 3 Reporting for Commercial Real Estate [6]**.

2

Upfront carbon (Module A0-A5, excluding biogenic carbon) is reported at point of purchase using the as-built embodied carbon assessment, into the 'Capital Goods' category.

3

Repair, Refurbishment, and Replacement work is reported as and when it takes place, this is especially important for deep retrofit and fit-out work. The embodied carbon from these in-use emissions should be calculated from the work undertaken at the time. They can be viewed as new 'upfront carbon' each time such an action takes place.

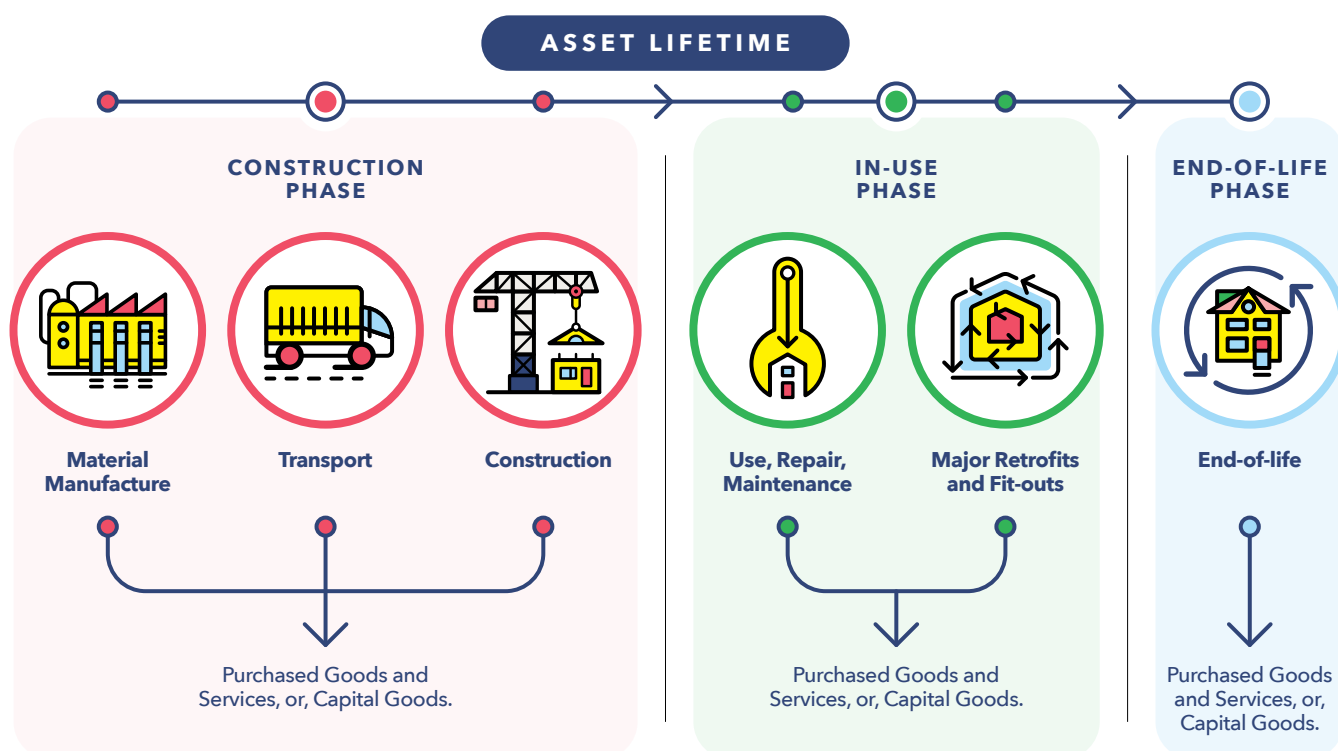
4

The owner at the time of end-of-life, should report the embodied carbon associated with deconstructing or demolishing the asset. As with the in-use embodied carbon, it is calculated through a new assessment at the time of activity undertaken.



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5.3 OWNER-OCCUPIER



1

For Owner-Occupiers, embodied carbon falls into their Scope 3 across the whole lifetime of the asset, but into different categories than Owner-Lessors. For further information, refer to UKGBC's **Guide to Scope 3 Reporting for Commercial Real Estate** [6].

2

Upfront carbon (Module A0-A5, excluding biogenic carbon) is reported for the year that the asset was purchased, using the data from the as-built embodied carbon assessment and reported into the 'Capital Goods' category.

3

Repair, Refurbishment, and Replacement work is reported as and when it takes place, which is especially important for deep retrofit and fit-out work. The carbon from these in-use emissions should be calculated from the work undertaken at the time. They can be viewed as new 'upfront embodied carbon' each time such an action takes place.

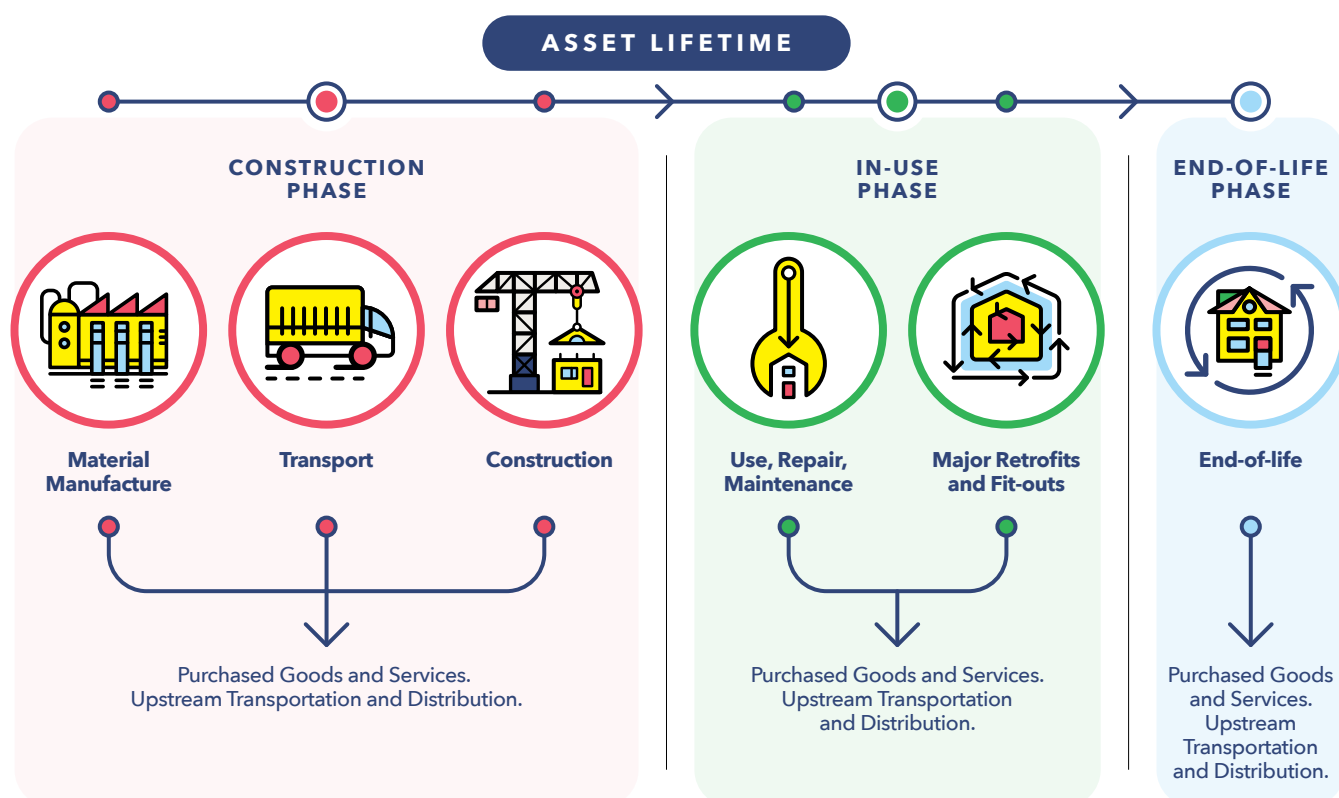
4

The owner at the time of end-of-life should report the embodied carbon associated with deconstructing or demolishing the asset. As with the in-use embodied carbon, it is calculated through a new assessment at the time of activity undertaken.



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5.4 CONTRACTOR



1

For Main Contractors, the as-built upfront carbon (Module A0-A5, excluding biogenic carbon) figures should be reported, preferably on a yearly basis for total construction that took place that year. If all work is sub-contracted out, the upfront carbon is reported within 'Purchased Goods & Services'.

2

If the work is undertaken directly by the contractor, then material purchases (Modules A0-A3) are reported within 'Purchased Goods & Services' and the transport of those materials (Module A4) are reported into 'Upstream Transportation'. The emissions from on-site activity (Module A5) would be reported within Scope 1 emissions reporting, as they are direct emissions.

3

Note that sub-contractors only report the emissions associated with the works they are responsible for.

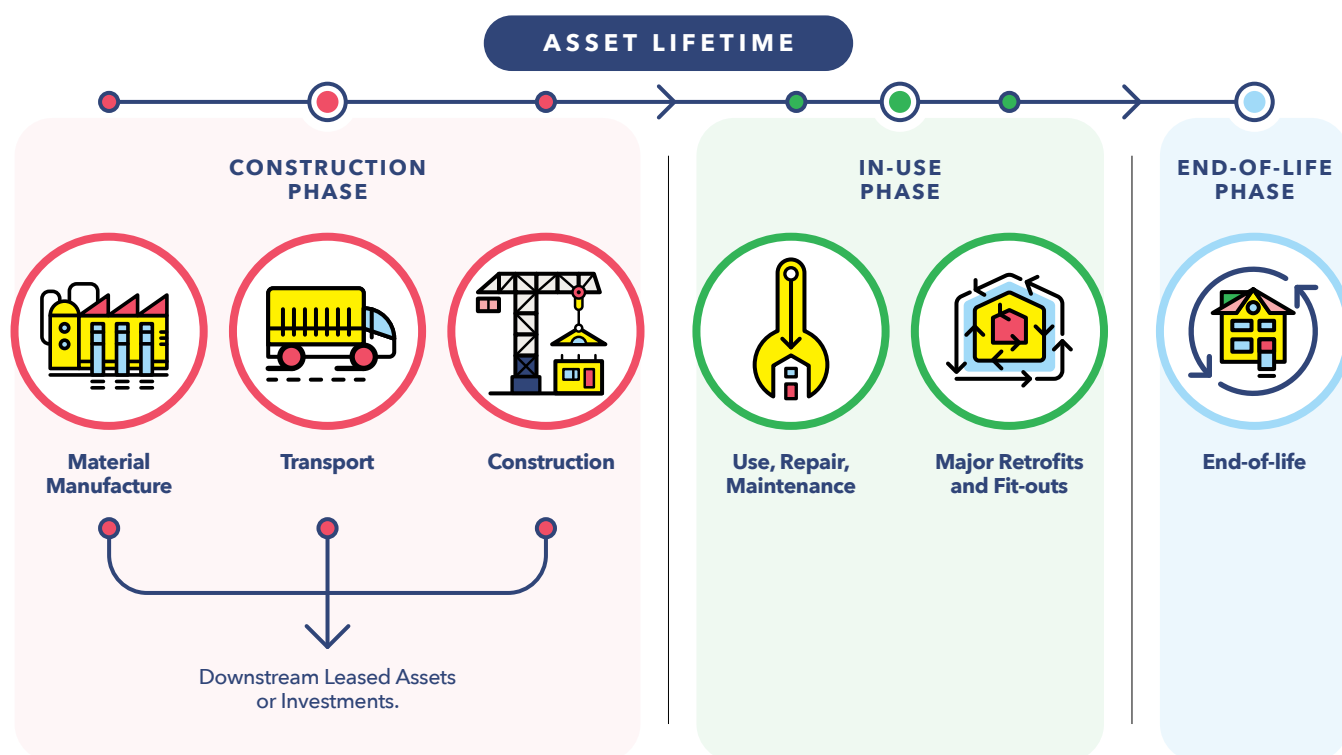
4

Any work that takes place during the lifetime of the asset, or at the end-of-life, follows the same pattern as undertaken during the original construction (i.e., reported within Purchased Goods & Services or Upstream Transportation).



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5.5 INVESTORS AND LENDERS



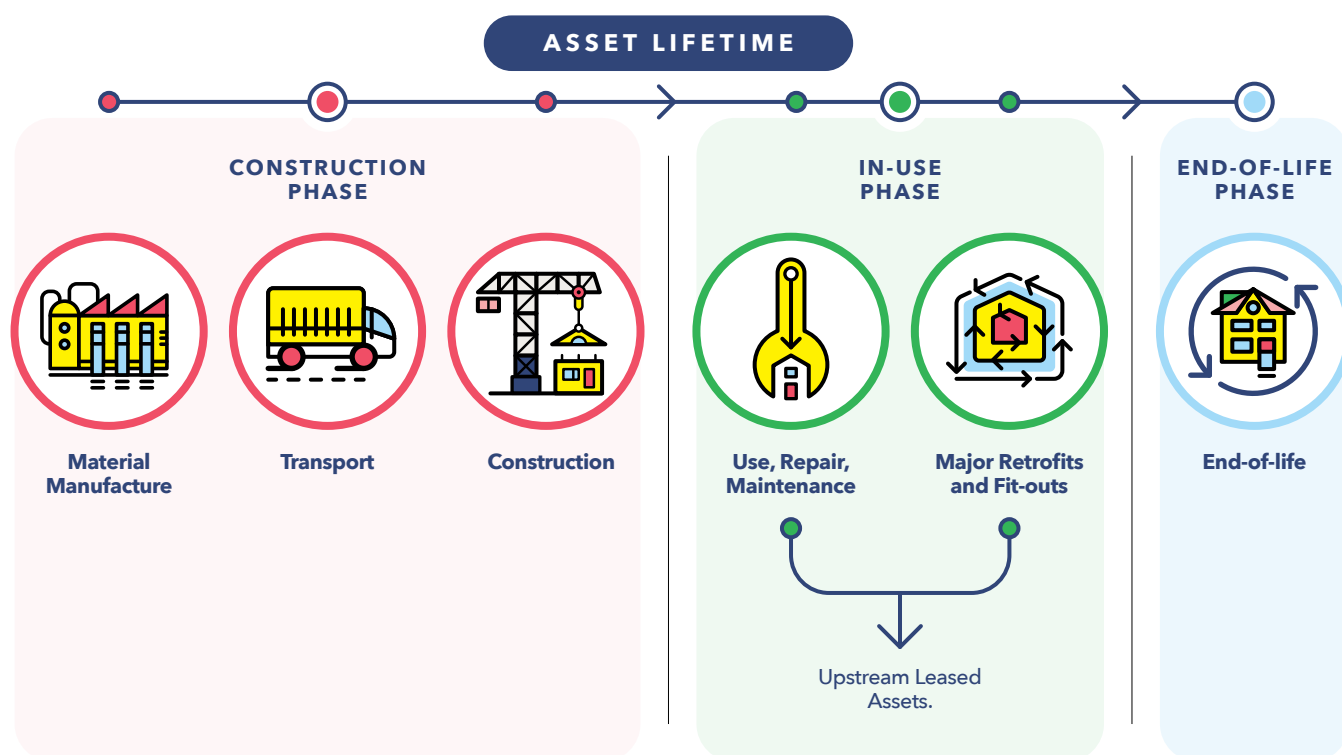
1

Investors & lender reporting is focused on the upfront carbon, fitting into 'Investments' or 'Downstream Leased Assets' accordingly. For detailed methodology, refer to guidance from PCAF, CRREM, and GRESB [8] on the reporting of operational emissions, and PCAF [9] for embodied carbon.



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5.6 OCCUPIER



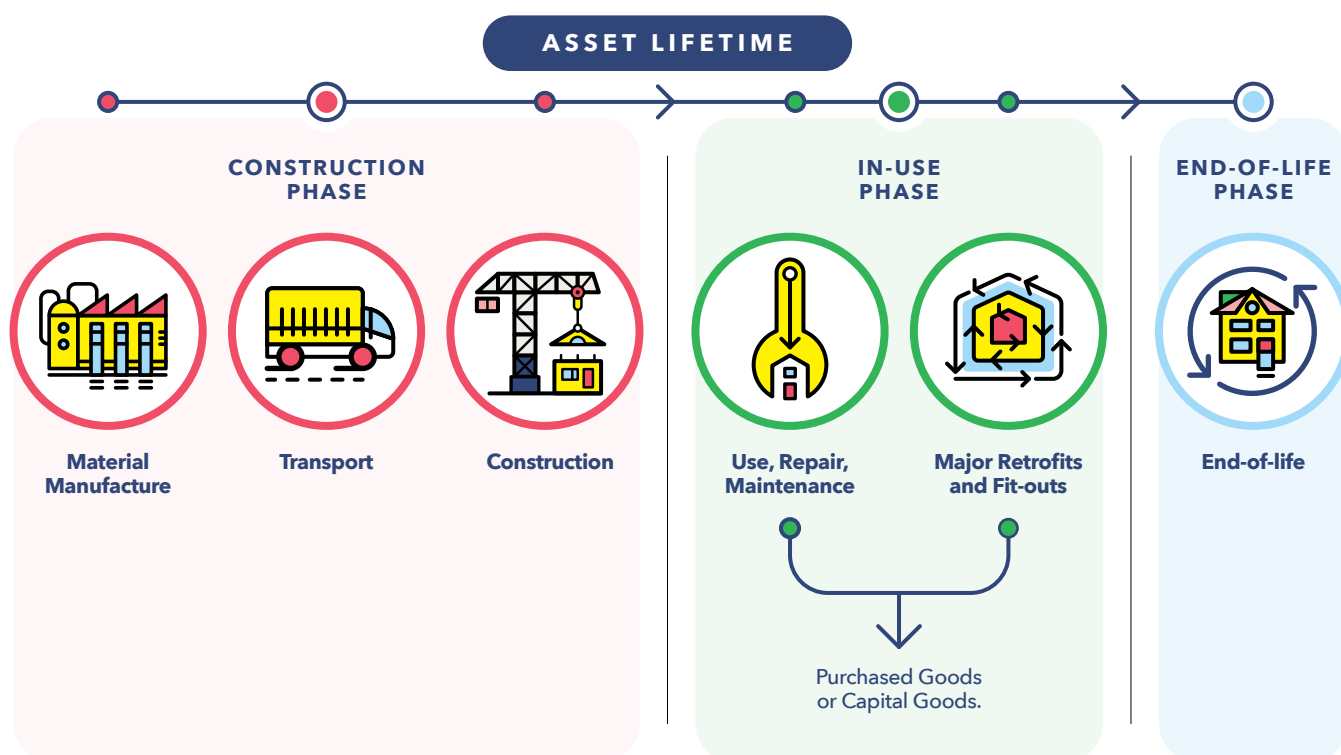
1

For Occupiers, embodied carbon falls into their Scope 3 during the lifetime of the asset and further information can be found within UKGBC's **Guide to Commercial Real Estate Scope 3 Reporting [6]**. Occupiers should report the embodied carbon emissions that occur due to repairs, retrofits, and refurbishments within the Upstream Leased Assets category.



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5.7 FACILITIES MANAGEMENT



1

For Facilities Managers, the guidance is derived from the SFMI **Scope 3 Emissions in FM Report**. For further information this guide can be referred to. Facilities Managers report the in-use embodied carbon, within the 'Purchased Goods and Services' or 'Capital Goods' categories.





6 REPORTING FOR DESIGNERS AND PROFESSIONAL SERVICES

6.1 INTRODUCTION


So far in this guidance, architects, engineers, and other professional service providers (e.g., project managers), have not been discussed. Architects and engineers have significant influence over embodied carbon through their design advice and expertise, but their services do not easily fit within the Greenhouse Gas (GHG) Protocol as it currently stands. Nevertheless, there has been growing debate within industry on whether these groups should report the embodied carbon of their designs (hereinafter referred to as 'designed embodied carbon').

This section of the guidance therefore centres around the GHG Protocol and whether it is the correct mechanism for achieving this goal, or whether an alternative mechanism is required for these stakeholders.

KEY POINT

With this in mind, it is important to emphasise that UKGBC encourages design firms to assume responsibility and accountability for the role they play in supporting their industry to reduce its emissions.



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6.2 UNDERSTANDING THE GHG PROTOCOL

The GHG Protocol has been developed to report the emissions from the development, manufacturing, use, and end-of-life treatment of products. It is focused on the purchase and use of materials, tracking the flow of that material and the associated emissions throughout the supply chain. When applied to the built environment, whole projects can be considered as the 'products'.

This is different for manufacturers and material suppliers, whose interpretation of GHG Protocol is relatively traditional, and they focus on the manufacture of their products, rather than the built asset as a whole.

As a result of GHG Protocol's focus on material and financial flow, the embodied carbon of a project is reasonably understood as being within the Scope 3 emissions for Developers, Owners, Contractors, Investors, Lenders, Tenants, and Facilities Managers. Each to varying degrees and at different points throughout the asset's lifetime. However, a strict interpretation of the GHG Protocol as it currently stands, would not include the requirement to report designed embodied carbon.

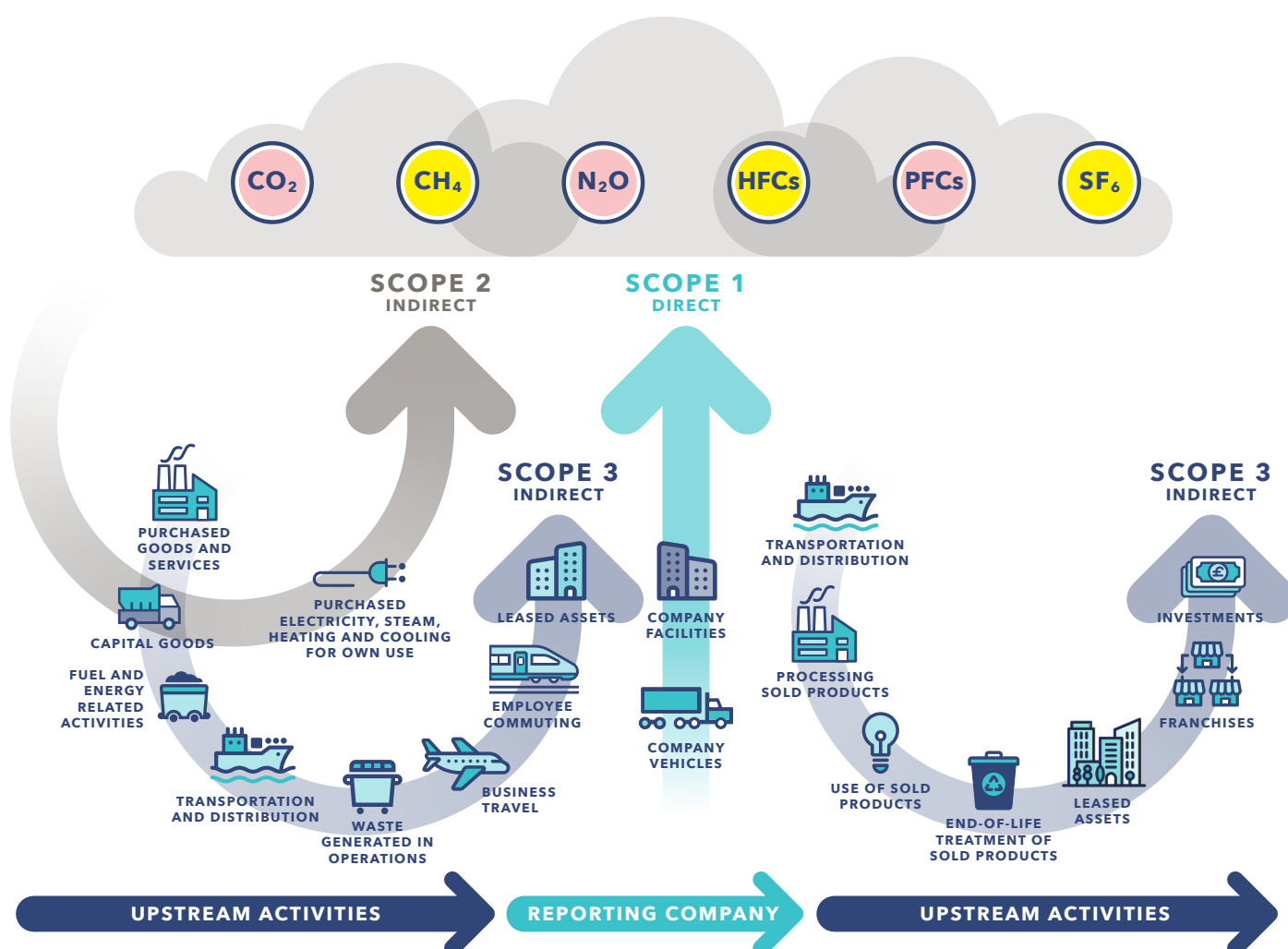



FIGURE 5:

Source: GHG Protocol, Corporate Value Chain (Scope 3) Standard.



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Nevertheless, the GHG Protocol does leave space to expand and clarify the definition of Scope 3 for specific sectors:


“The development of sector-specific implementation guidance and tools can drive more consistent corporate GHG measurement, reporting, and performance tracking practices for a particular sector. Helpful sector-level information could include guidance on interpreting the standard for a specific sector, guidance, and tools for calculating emissions from sector-specific activities, recommended performance metrics, specific guidance for identifying the largest sector emissions sources, and suggested data sources and emissions factors. Sectors should develop guidance through an inclusive multi-stakeholder process to ensure broad acceptance and facilitate increased consistency and credibility.”

Recognising this possibility, there has been increasing industry discussion around the potential for expanding the scope of the GHG Protocol specifically to include designed embodied carbon within Scope 3 reporting. These discussions suggest that designed embodied carbon could fit within one or more of the following categories:

Source: GHG Protocol, Corporate Value Chain (Scope 3) Standard.

POTENTIAL SCOPE 3 CATEGORY	DEFINITION OF CATEGORY WITHIN GHG PROTOCOL	HOW THIS COULD BE INTERPRETED TO INCLUDE DESIGNED EMBODIED CARBON
CATEGORY 10: 'Processing of sold products'	Processing of intermediate products sold in the reporting year by downstream companies.	This would treat a design as an intermediate product, which is 'processed' by developers and contractors to become a built asset.
CATEGORY 11: 'Use of sold products'	This category includes emissions from the 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.	This would treat a design as a product in itself, which is 'used' by developers and contractors to become a built asset.
CATEGORY 12: 'End of life treatment of sold products'	This category includes emissions from the waste disposal and treatment of products sold by the reporting company (in the reporting year) at the end of their life.	Building upon the interpretation of 'use of sold products', design teams would then also have to account for the end-of-life emissions of their designs, mimicking the reporting requirements for developers.




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For the purpose of this guidance the task group discussed and worked through the possibility of including embodied carbon within the Scope 3 of design teams in accordance with the above options. While this can work in theory, clear challenges were found that meant either the above proposals would struggle to work in practice or there could be unintended negative consequences. These include:

CHALLENGE	SOLUTIONS EXPLORED	REMAINING CHALLENGES
Including designed embodied carbon within the total scope of emissions reporting for design firms would dwarf the remainder of their Scope 1, 2, 3 emissions.	One argument in favour of this challenge, is that reporting in this way would focus emissions reductions efforts on the areas of greatest importance, namely the projects being constructed.	Mixing designed embodied carbon with the remainder of organisational emissions in this manner can create obscurity on how best to reduce emissions. Some design firms have tried this approach (inclusion within Scope 3) previously and since changed to separated reporting mechanisms.
Design firms are sometimes involved at concept design stage, but not during construction. Should these firms report designed embodied carbon within their Scope 3?	Design firms only report designed embodied carbon when they are involved during construction.	The boundaries between involvement at concept, technical and delivery stages are not always clear at an asset level, and therefore it is challenging to set practical rules on when a firm should include designed embodied carbon within their Scope 3.
Conversely, if a design firm becomes involved at technical design and construction, but were not involved at concept design phase, should these firms report designed embodied carbon within their Scope 3?	Following on from the above point, if a design firm were involved at the construction phase, then yes, the designed embodied carbon would be included within their Scope 3. Furthermore, only projects that move through to construction should be in Scope 3 reporting, therefore only including the emissions that have taken place.	No further challenges were identified, although implementation of the proposed solution would not be straight forward.



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CHALLENGE	SOLUTIONS EXPLORED	REMAINING CHALLENGES
Engineers are usually only responsible for the design of parts of a building, (e.g., the facade or primary structure). Should they report designed embodied carbon just for their element of the design, or for the whole building?	Engineers could report the designed embodied carbon just for their element of the design. Although some elements (facades and M&E) are more challenging to account for the embodied carbon of than others (structures). However, this is anticipated to become easier over the coming years, as this practice becomes more regular and data more widely available.	This approach moves the focus away from whole project embodied carbon to individual elements, which could create tension across project teams that is likely to be counter to a goal of reducing overall embodied carbon. A collaborative whole-building approach is preferred. Furthermore, while reporting at this level of detail is becoming possible, setting targets and benchmarks for embodied carbon reduction on individual design elements (a key aspect Of Scope 3 reporting) is a challenge. This should become easier over coming years as national databases, such as BECD, increase data availability.
Engineers reporting embodied carbon of their design elements could cause resistance to retrofit. even though the overall project would be lower embodied carbon than a new-build alternative. High embodied carbon installations are sometimes needed to meet EUI targets. This could penalise or dissuade, for example, a services engineer, whose designed embodied carbon may be lower in upfront emissions for a new-build rather than a retrofit.	Retrofits still need to be undertaken with embodied carbon in mind, making solutions that reduce upfront carbon without affecting EUI performance vital to pursue.	Again, this removes the focus from whole project embodied carbon, where overall emissions reductions are the key importance
Setting a boundary for which types of firms would report 'designed embodied carbon' within their Scope 3 emissions. Would sustainability consultants, ecologists, air quality consultants, etc, be included? What about other professional services, such as project managers? These firms all have a level of influence and responsibility in facilitating a project being constructed.	Although significant discussion was held within the task group, no clear solutions were identified as to where a suitable boundary could be placed.	Ongoing discussion is required as the initial challenges still remain. UKGBC will look to engage further with industry on this topic.



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In summary, multiple challenges were identified with writing sector-specific guidance that would adapt the GHG Protocol for the built environment to include 'designed embodied carbon' within Scope 3 emissions reporting. As legal consequences can arise for organisations based on their GHG Protocol reporting (e.g., through the Corporate Sustainability Reporting Directive) it is important that emissions reporting requirements are clear, consistent, and practical whilst driving and focusing emission reduction efforts in the most intensive industries.

As stated in the introduction, it is important that design firms are accountable for the embodied carbon of the projects they are involved in, and that they report and disclose the level of those emissions. However, it is not appropriate to suggest an adaptation to the GHG Protocol mechanism that would include the designed embodied carbon within Scope 3 reporting. As a result, there would need to be a separate option for reporting project-based emissions when they do not fall within the GHG Protocol reporting boundary.



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6.3 WHAT CAN BE DONE INSTEAD: PROJECT-EMISSIONS DISCLOSURE

For design firms, there are two strong drivers for measuring and disclosing designed emissions. Firstly, it is to take responsibility for their influence on built environment emissions and the role they have to play in rapidly decarbonising this industry. Secondly, it gives them the ability to show the value proposition that design firms can bring to Developers, Financial Institutions, and Contractors by providing Scope 3 emissions reductions through sustainable design.

If design firms recognise the responsibility they have to reduce emissions in the built environment, they should be reporting the embodied carbon of their designs. However, as it currently stands, the GHG Protocol does not present a suitable mechanism to enable this. This guidance acts as an alternative proposal on a way forward, around which UKGBC will actively engage with industry to build consensus on whether it is a viable option at scale.

It is critical that industry collectively determines a simple and effective means by which design firms can report their organisational emissions in a way that accounts for their influence on embodied carbon emissions.

Starting from first principles, the solution should:


- Report the embodied carbon of whole assets, identifying the split between upfront embodied carbon, in-use, and end-of-life.
- Be easy to understand and implement, without creating another complex reporting process.
- Meaningfully communicate the emissions that have taken place in that reporting year.
- Effectively communicate how the portfolio of projects and business strategy will need to change over coming years to reduce embodied carbon.

Examples in industry already exist which show that project-based reporting, as an addition to GHG Protocol, is an option that effectively reports the impact of designed embodied carbon. The undertaking of this reporting across organisations of various sizes also suggests that it is feasible for most firms.

This style of reporting should become widespread for architects and engineers, and the following metrics should be covered:

- Whole life embodied carbon (kgCO_2e)
- Whole life embodied carbon intensity ($\text{kgCO}_2\text{e}/\text{m}^2$)
- Upfront carbon (kgCO_2e)
- Upfront carbon intensity ($\text{kg CO}_2\text{e}/\text{m}^2$)
- Asset type (e.g. Retail, School, Office, etc)
- Asset type industry targets (e.g. Net Zero Carbon Building Standard targets)



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CASE STUDIES: EXISTING EFFORTS IN INDUSTRY

Several organisations have already developed a project report of this type. This section introduces a number of these organisations and summarises how they have disclosed the embodied carbon of the projects they have consulted on.

ARUP: Arup uses the project approach to emphasise the significance of the emissions from their project in comparison to their organisational GHG Protocol reporting. [Source](#).

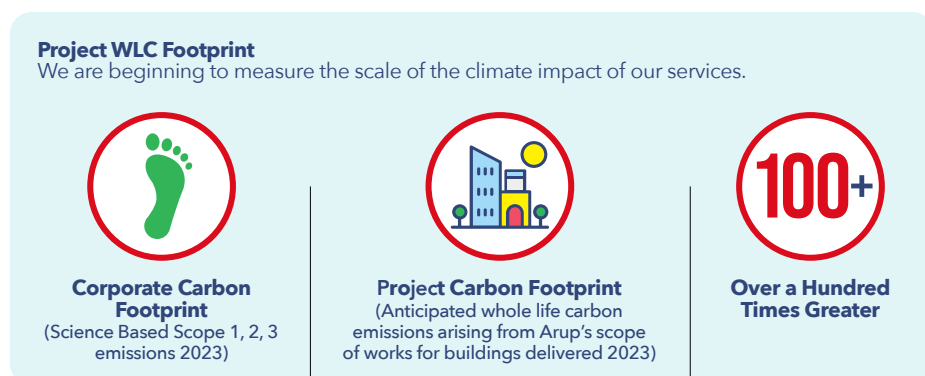


FIGURE 6:
Comparison of Arup's organisational emissions with the emissions of their projects.

Bennetts Associates: Bennetts Associates have reported both upfront carbon intensity and total upfront carbon across their projects. Similarly to Arup, they also compare the size of their organisational emissions to the total project emissions. [Source](#).

FIGURE 7:
Two images from Bennetts Associates' yearly sustainability Reports. Showing the size of designed embodied carbon compared to Scope 1, 2, 3 emissions.

Upfront carbon for projects completed in 2021

● Average employee footprint
● Practice footprint

382 tCO₂e upfront emissions at PC

80% of project started in last 2 years undertaking LCA



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Curtins: Curtins report the upfront carbon intensity of their designs, whilst also showing the reduction trajectory required to reach zero carbon by 2050.

Source.

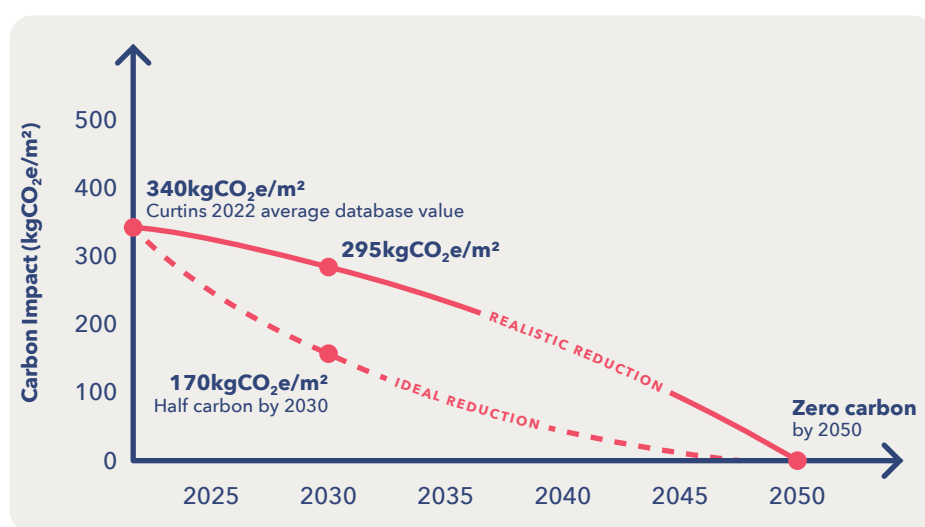


FIGURE 8: Curtins' designed embodied carbon trajectory to reach zero carbon by 2050.

Whitby Wood: Whitby Wood use the project approach to the asset-type mix and how this would need to change to reduce the total designed embodied carbon. The below example compares the split of asset type to the associated emissions. **Source.**

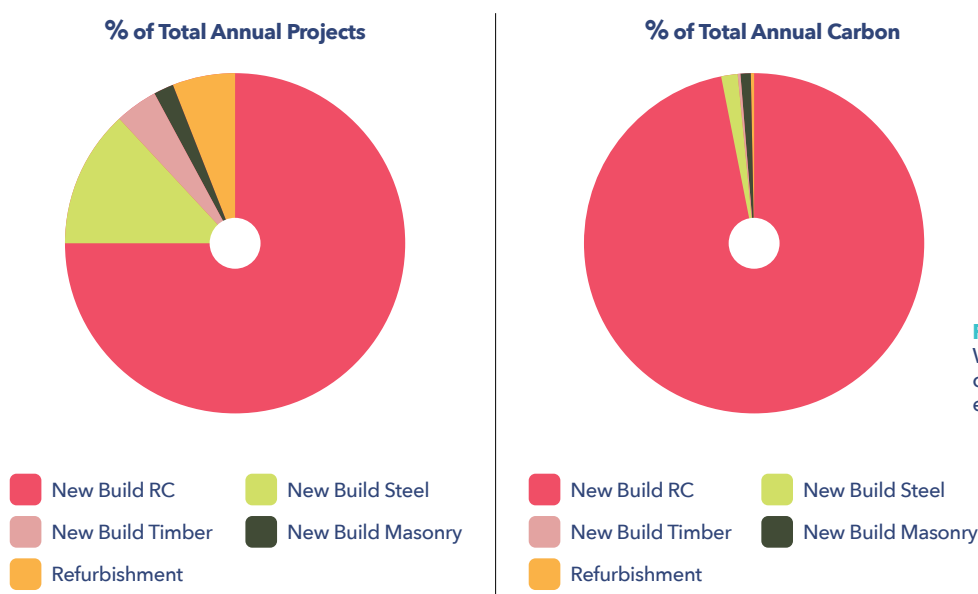


FIGURE 9: Whitby Wood's project mix by construction type and associated embodied carbon.

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6.4 WORKED EXAMPLE

To show this visually, Figure 10 has been created for a hypothetical design firm. It displays the total upfront carbon of all projects delivered in the reporting year. This indicative example shows upfront carbon increasing year on year, due to an increased number of projects delivered. The increasing emissions represent the importance of reporting total upfront carbon and not just carbon intensity. The focus is on overall emissions reduction and not just emissions efficiency.

This data can also be represented per asset type and as a carbon intensity per floor area, as seen in Figure 11 below. This shows an improvement in the retail assets, but not in other classes. While total emissions are the most important metric, as shown above, carbon intensity is a useful metric for understanding areas of progress and why overall emissions are either increasing or decreasing.

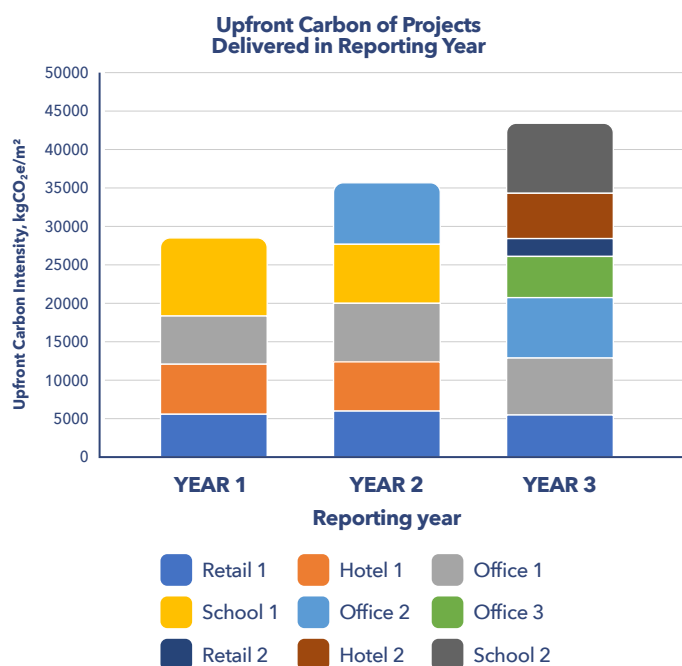


FIGURE 10: Yearly upfront carbon, split by project, for a hypothetical design firm.

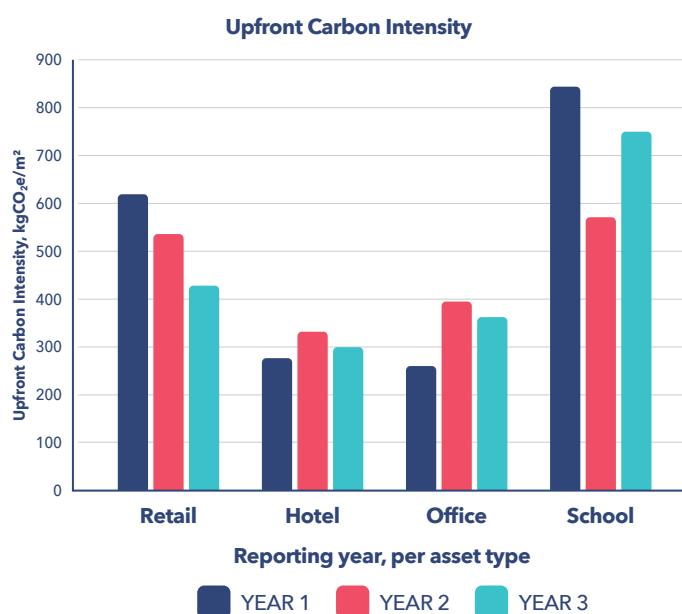



FIGURE 11: Yearly as-built upfront carbon intensity, per asset type, for a hypothetical design firm.



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A further option would be to understand how these embodied carbon figures compare to national targets, shown in Figure 12. The development of the Net Zero Carbon Building Standard in the UK will establish targets for multiple asset types. Consequently, the following graph could be an effective method to understand how the projects compare to such targets. Along the x-axis, we see as-built upfront carbon / m². The y-axis is the total floor area of that project, and along the x-axis, we have the Net Zero targets (indicative and not reflective of the Net Zero Carbon Building Standard).

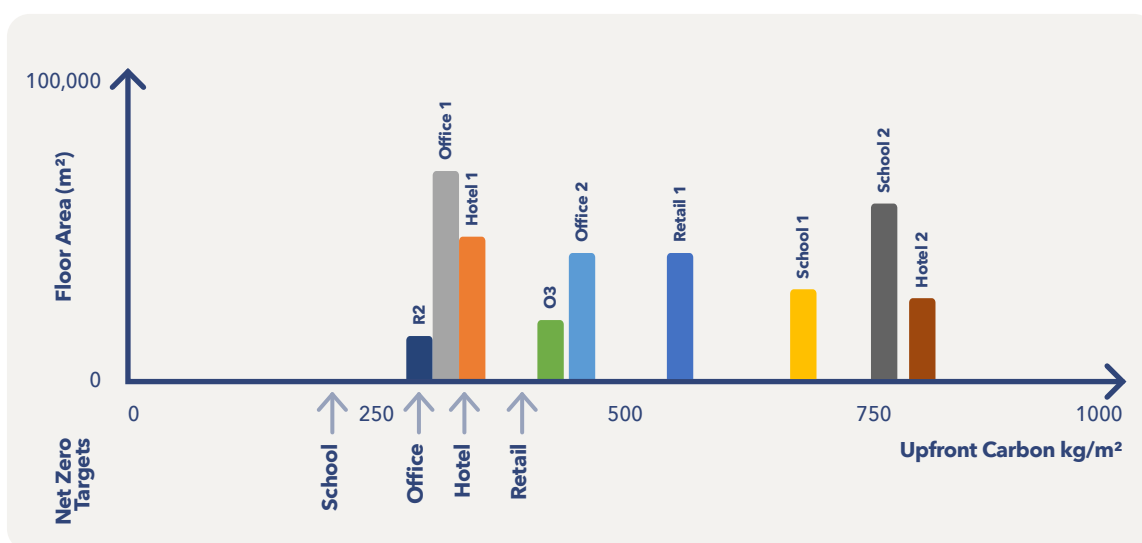


FIGURE 12:

Comparison of as-built upfront carbon to net zero asset-type targets, in relation to floor area, for a hypothetical design firm.

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7 SUMMARY

This guidance document has outlined how the embodied carbon of construction projects can be accounted for within the Scope 3 emissions reporting of key built environment stakeholders. It has set out an approach for Scope 3 and embodied carbon assessment interactions.

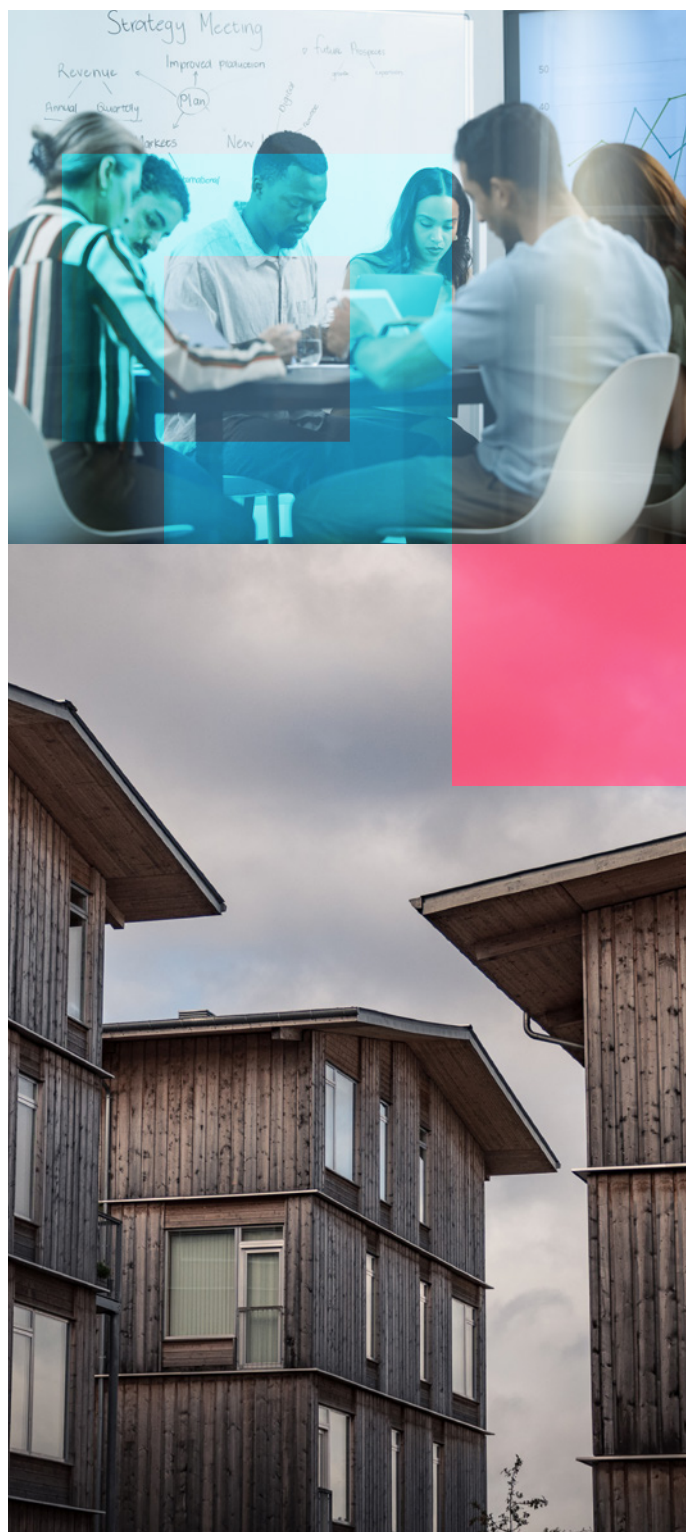
Using embodied carbon assessments directly within Scope 3 reporting could represent an easier and more detailed solution when compared to traditional activity-based approaches. Until embodied carbon assessments are widespread across industry, a split approach can be used alongside the typical activity-based method. Mandating the use of embodied carbon assessments (or more broadly, whole life carbon assessments) through regulation would be a significant help for realising this aligned approach between project-level and organisational-level emissions reporting.

Due to the necessity to accelerate emissions reduction across industry, and the importance of GHG Protocol reporting as a link to financial and business decision-making, it is expected that project-level emissions assessments within Scope 3 reporting will become standard industry practice.

Additionally, this guidance discussed design firms and professional service providers, exploring how such firms fit within the GHG Protocol. Following this discussion, it proposed that these firms undertake a project-based approach to reporting embodied carbon, that sits alongside GHG Protocol, rather than within it.

NEXT STEPS

Following the proposal for architects and engineers to disclose designed embodied carbon emissions through a 'projects report' that sits outside of GHG Protocol reporting, UKGBC will engage further with this sector of industry to understand the potential for implementation. Furthermore, it is evident from the public consultation that a clear methodology for project reporting would be beneficial, and this could form the basis of a future UKGBC project.





8 APPENDICES

8.1 HOW THIS GUIDANCE WAS CREATED

This guidance emerged from a collaborative effort, drawing insights from experts, industry standards, and previous UKGBC work based around these industry standards, such as the GHG Protocol and RICS WLCA Professional Standard. UKGBC worked with a group of industry professionals, across a series of workshops, to draw on the collective expertise of practitioners and researchers at the forefront of sustainability in the built environment.

The GHG Protocol sets out five principles, which steered its development. These are Relevance, Completeness, Consistency, Transparency, and Accuracy [4]. The aim is to ensure that reporting represents a faithful, true, and fair account of an organisation's emissions. Similarly, this guidance has been written upon the same principles; this section highlights how and why this is the case, to reinforce the importance of transparent and accurate emissions accountability.

By aligning with these principles, UKGBC has aimed to offer a clear and practical path forward, advocating for the integration of widespread embodied carbon assessments through regulation and centralised carbon project teams.





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GHG PROTOCOL PRINCIPLE	RELEVANT EXTRACT FROM GHG PROTOCOL OR OTHER INDUSTRY GUIDANCE	HOW THIS GUIDANCE SUPPORTS THIS APPROACH
Relevance and Completeness	<p>Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users - both internal and external to the company [4].</p> <p>An important aspect is the selection of an appropriate inventory boundary that reflects the substance and economic reality of the company's business relationships, not merely its legal form [4].</p>	<p>The embodied carbon of construction work contributes a major part of emissions reporting for the stakeholders represented in this guidance. Therefore, the inclusion of embodied carbon is necessary to reflect the substance and reality of that organisations operations. This guidance sets out an approach to facilitate that in an effective and transparent manner.</p>
Consistency	<p>Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series [4].</p> <p>By adopting a standard approach to measurement and reporting, the industry will have the greatest opportunity to work with stakeholders to reduce emissions [4].</p>	<p>This guidance recognises that it is not possible to immediately assess embodied carbon on all projects and include that within Scope 3 reporting. However, it highlights the need to move quickly towards that and the benefits it would bring in a consistent approach to reporting.</p>
Transparency	<p>When a construction company reports its emissions, it should state clearly and transparently which sources it has included, and which are excluded and the reasoning behind these decisions [6].</p>	<p>Should organisations begin to include project-level embodied carbon assessments within reporting, it would be important to highlight where this is done, as compared to activity-based reporting. Transparency at a project-level is encouraged through the RICS WLCA Professional Standard, BECD, and Net Zero Carbon Building Standard.</p>
Accuracy	<p>Companies should use their best efforts to use good data and emission factors, and to improve the robustness and accuracy of any estimated emissions over time [6].</p>	<p>Project level embodied carbon assessments represent an improved emissions estimation over the traditional activity-based approach.</p>



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8.2 HOW THIS GUIDANCE SITS WITHIN THE BROADER INDUSTRY CONTEXT

This guidance builds upon previous UKGBC work, including the [Net Zero Whole Life Carbon Roadmap](#), the [Guide to Scope 3 Reporting in Commercial Real Estate](#), and the [Embodied Carbon Developing a Client Brief](#) guidance. The Commercial Real Estate guide discusses all Scope 3 emissions for Developers, Owners and Tenants, whereas this document looks specifically at embodied carbon emissions across a broader stakeholder range.

Within the context of the broader industry, this guidance sits centrally as an interconnecting piece between key industry standards and regulations:

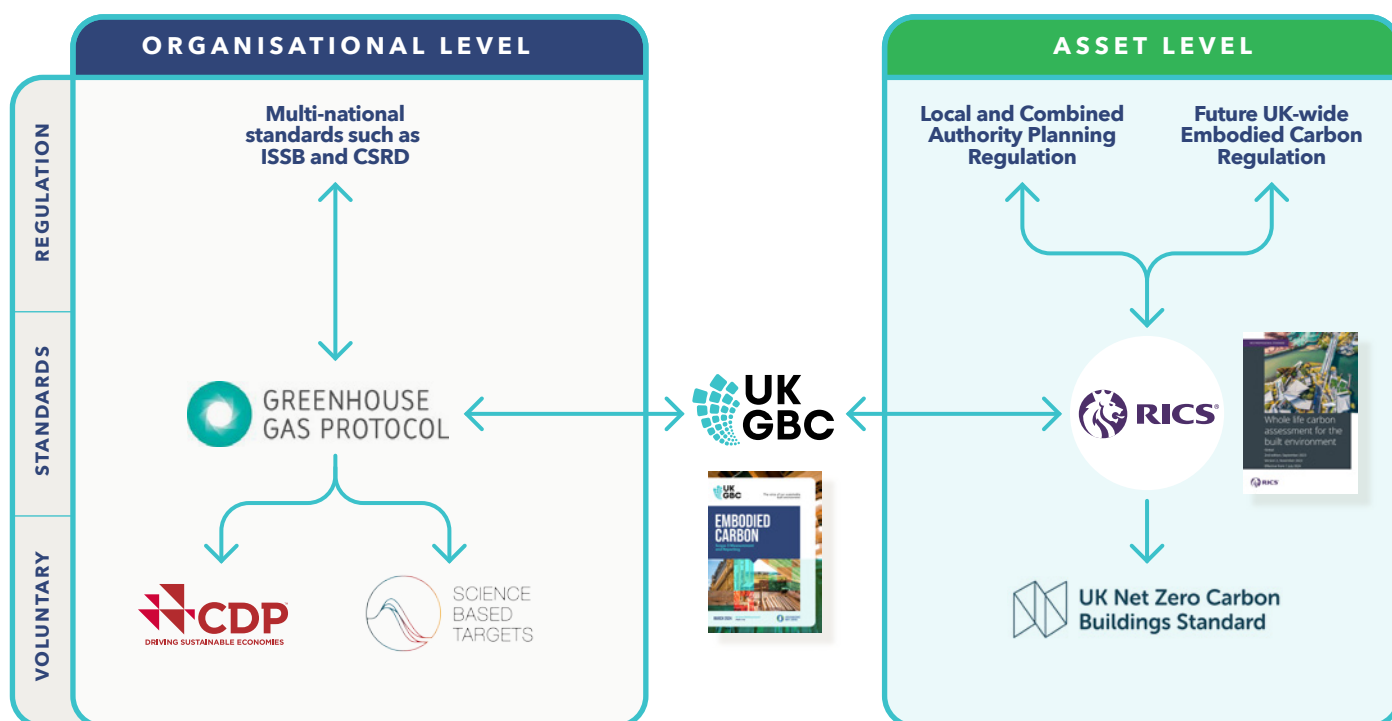


FIGURE 13:
Map of industry standards, guidance,
and regulation.

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Alongside previous UKGBC work, the RICS WLCA Professional Standard, and the GHG Protocol, this guidance also builds upon other key work, included here for reference:

1

ENCORD: CONSTRUCTION MEASUREMENT CO₂e PROTOCOL

Developed by ENCORD (European Network of Construction Companies for Research and Development), to provide guidance on how an organisation within the construction sector can measure and report its greenhouse gas (GHG) emissions.



2

GHG PROTOCOL: SECTOR SUPPLEMENT FOR MEASURING AND ACCOUNTING FOR EMBODIED EMISSIONS IN THE BUILT ENVIRONMENT

Guidance on how an organization can measure and report greenhouse gas emissions embodied in the materials that make up a built environment project. This document was developed as a supplement to the GHG Protocol's Scope 3 Standard with references to the Corporate and Product Life Cycle Standards.



3

SFMI SCOPE 3 EMISSIONS IN FM REPORT

The Sustainable Facilities Management Index (SFMI) and BAM FM provide a standardised approach for the FM community to measure emissions and the pathway that will guide FM providers to include a full inventory of material Scope 3 emissions, and then allocate those emissions to its customers.




4

ACCOUNTING AND REPORTING OF GHG EMISSIONS FROM REAL ESTATE OPERATIONS

Technical guidance for accounting and reporting of GHG emissions from real estate operations. Its purpose is to provide financial institutions with transparent, consistent, and harmonized guidelines for the accounting and reporting of real estate-related emissions.



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8.3 SUMMARY OF PUBLIC CONSULTATION

During November and December 2023, UKGBC held a public consultation on the original draft version of this guidance, providing an opportunity for UKGBC members and the wider industry to share their perspectives and feed into the development of this guidance. Feedback was sought on the three main aims of this guidance:

1. Providing direction on the allocation of embodied carbon into Scope 3 categories for multiple stakeholder types.
2. Defining how embodied carbon assessments can be used within Scope 3 reporting to improve simplicity and accuracy.
3. Bringing clarity to how architects, engineers, and other professional services providers should be considering embodied carbon as part of their emissions reporting.

The consultation targeted a minimum number of 50 responses to give a sufficient quantity of feedback which could be used for further development of the guidance; a total of 60 responses were received. There was an equal split between responses from individuals and organisations, giving a diverse range of perspectives.

The majority of responses were from architects, engineers, and other professional service providers, totalling 34 (57%). This was taken into consideration as they will significantly influence the overall feedback. On the other hand, with a significant portion of the guidance directly relating to architects and engineers, it is a positive that so many responses were received from these categories.

No responses were received from dedicated Facilities Managers (FM) or Financial Institutions (Investors and Lenders), although responses were received from organisations who include FM as part of their service offering. This was not deemed a significant issue, as both relevant sections signpost to detailed existing guidance from Acclaro Advisory (for facilities managers) and PCAF, GRESB, and CRREM (for investors and lenders).

KEY TAKEAWAYS


In general, there was agreement with the guidance, with three clear overarching themes present within the feedback:

- Clearer presentation was needed, especially for Section 5 'Scope 3 reporting across an asset's lifecycle'.
- There was positive reception to the feasibility of including embodied carbon assessments within Scope 3 reporting, but mixed feedback on the feasibility of doing this on a yearly basis through the construction stages.
- The recommendation for architects and engineers to disclose their 'designed embodied carbon' through a projects-report received sufficient positive feedback for UKGBC to maintain this recommendation. However, it was clear that to build momentum and positive action in this area, two further pieces of work are needed:
 - A. Active engagement alongside other key industry bodies to further build consensus and momentum across the built environment sector.
 - B. Development of a detailed, recommended methodology that can be used by design firms of all sizes.

SCOPE 3 REPORTING ACROSS AN ASSET'S LIFECYCLE

Clear agreement was seen in the responses to the recommendations for all stakeholders. It should be noted that the sections for both Occupiers and Facilities Managers received low numbers of responses, but the recommendations for both of these stakeholders are based on existing industry guidance and it was therefore not deemed an issue. The section for Contractors received the most feedback that clarity was needed in the description and UKGBC followed up directly with a small number of respondents to gather further clarity on their comments.



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FEASIBILITY OF INCORPORATING EMBODIED CARBON ASSESSMENTS INTO SCOPE 3 REPORTING

The proposal for using embodied carbon assessments to fulfil Scope 3 reporting was well received, but the feedback was that doing so on a yearly basis throughout the construction phase would be a challenge. Therefore, the wording around 'yearly embodied carbon' was adapted to reflect that this was a potential option and one that could be feasible to implement once embodied carbon assessments were more widespread throughout industry.

A second proposal was added for using embodied carbon assessments undertaken during design stage and apportioning on a yearly basis in line with the proportion of total project value realised in that year. This recommendation was added due to feedback from UKGBC members who are using this method already and have had it approved by third-party verification schemes.

EMBODIED CARBON AND SCOPE 3 EMISSIONS FOR ARCHITECTS AND ENGINEERS

- The draft guidance stated that 'designed embodied carbon' is not within the Scope 3 emissions of architects and engineers. The majority of responses supported this statement. The draft guidance subsequently proposed a Project Reporting technique for design firms, that would sit alongside GHG Protocol reporting. Again, the majority of responses were in agreement with this approach.
- It was clear from the responses that many believed design firms should actively report the embodied carbon of their design work. To further build momentum and positive action in this area, UKGBC plans to undertake more engagement work with relevant industry bodies.
- A clear methodology on how to undertake 'Project Reporting' was seen by many as a beneficial resource for design firms, which will help them establish consistency in their approach to this.

IN SUMMARY

Public consultations are an essential tool that help organisations such as UKGBC engage with industry, ensure written guidance is effective and suitable, and build consensus and momentum that drives action. This public consultation has brought clarity to the guidance, gathered support for the proposals given, and identified next steps where further work is needed. UKGBC would like to thank all survey participants for taking the time to provide their feedback.





9 GLOSSARY

TERMS	DEFINITION
BIOGENIC CARBON	Biogenic Carbon' refers to the carbon removals associated with carbon sequestration into biomass as well as any emissions associated with this sequestered carbon. Biogenic carbon must be reported separately if reporting only upfront carbon but should be included in the total if reporting embodied carbon or whole life carbon.
CARBON DIOXIDE EQUIVALENT CO₂e	CO ₂ e or Carbon Dioxide Equivalent is a unit used to equate the emissions of other greenhouse gases (GHGs) to emissions of carbon dioxide (see Global Warming Potential). It also allows the impact of activities that result in the emissions of a variety of different GHGs to be described by a single number.
CARBON EMISSIONS	In the context of sustainability, Carbon Emissions is used as a collective term to describe the emissions of any GHGs.
CARBON FACTORS	A measure of the emissions intensity of a process or fuel.
EMBODIED CARBON	'Embodied Carbon' emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset (Modules A0-A5, B1-B5, C1-C4, with A0 assumed to be zero for buildings).
EMBODIED CARBON ASSESSMENTS	The term 'embodied carbon assessment' is used to refer to the relevant embodied carbon modules from a whole life carbon assessment or life cycle assessment.
GHG PROTOCOL	The Greenhouse Gas (GHG) protocol establishes comprehensive global standardised frameworks to measure and manage greenhouse gas (GHG) emissions from private and public sector operations, value chains and mitigation actions.
GREENHOUSE GASES (GHG)	'Greenhouse Gases' are constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.
LIFE CYCLE ASSESSMENT (LCA)	A method for analysing the environmental impact of materials/products/systems/buildings. The environmental impact is expressed by environmental parameters, each of which shows the magnitude of predicted atmospheric pollution, water pollution, soil pollution, natural resources depletion and so on.
NET ZERO	Net Zero is where all related Greenhouse Gas (GHG) emissions have been reduced in line with a science-based target which aligns with what has been determined to be necessary to stand a reasonable chance of limiting the global temperature increase to 1.5°C above pre-industrial levels as a minimum. These residual emissions are subsequently responsibly offset to achieve a sum total of zero emissions.
OPERATIONAL CARBON	Operational Carbon are the GHG emissions arising from all energy consumed by a product in-use, over the product's whole life cycle.
PAS 2080	Is a standard covering carbon management in building in infrastructure. This looks at the whole life carbon across the lifespan of the building of infrastructure helping organisations to understand the impacts of their assets.





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TERMS

DEFINITION

**RICS WHOLE LIFE
CARBON ASSESSMENT
PROFESSIONAL STANDARD**

Developed by RICS this guidance sets out mandatory principles and supporting guidance for the interpretation and implementation of the EN 15978 methodology.

SCOPE 1

Direct emissions from sources that are controlled or owned by an organisation. This includes any onsite combustion (e.g., from gas boilers for heating, and from company vehicles).

SCOPE 2

Indirect emissions that result from the purchase of electricity, heat, or steam that is generated offsite.

SCOPE 3

Indirect emissions from sources that are not owned or controlled by an organisation, but that they indirectly affect in their value chain.

UPFRONT CARBON

The GHG emissions associated with materials and construction processes up to practical completion (Modules A0-A5). Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.

**WHOLE LIFE
CARBON**

Whole Life Carbon emissions are the sum total of all the associated GHG emissions and removals, for the embodied, operational and disposal of a product through its whole life cycle.

**WHOLE LIFE CARBON
ASSESSMENT (WLCA)**

A whole life carbon assessment (WLCA) is the calculation and reporting of the quantity of carbon impacts expected throughout all life cycle stages of a project, but also includes an assessment of the potential benefits and loads occurring beyond the system boundary.



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**ADVANCING
NET ZERO**