ISEP
Impact Assessment

ASSESSING GREEENHOUSE GAS EMISSIONS AND EVALUATING THEIR SIGNIFICANCE

Edition 2.1, April 2026
with Supplementary Guidance



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INTRODUCTION TO THE 2026 SUPPLEMENTARY GUIDANCE

In the four years since the Second Edition of the ISEP guidance 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' was launched in February 2022, the guidance has been widely employed and is frequently cited in ES chapters, planning decisions and court cases relating to development and climate change.

Mitigating GHG emissions is more crucial than ever for enabling development to proceed sustainably. In the UK, for example, this is reflected in the re-titled national Carbon Budget And Growth Delivery Plan re-launched in 2025. Globally, the updated Nationally Determined Contribution pledges made for COP30 suggest progress towards the Paris Agreement goals but with more to be done to secure and accelerate emission reductions.

After four years of use in EIA practice, it is timely to provide a supplement. The aim of this section is to provide clarifications and supplementary guidance to the 2022 guidance, to aid in interpretation and application of that guidance in practice. It has been informed by a broad review of UK EIA practice, planning decisions and court cases citing the guidance, undertaken by the ISEP GHG Working Group during 2025.

ISEP GHG Working Group contributors to this supplementary guidance have been:

- Tom Dearing and Grace Smith (Savills)
- James Blake and Paul White (Turley)
- Kieran Laxen (Kalaco)
- Andrew Tasker (RPS)
- Joanna Wright (LUC)
- Caroline Dinnage (Stantec)
- Kirsten Leggatt and George Vergoulas (Arup)

We are grateful to the ISEP Steering Group members who provided helpful comments on the draft.

The redesigned 2022 Second Edition guidance is appended to this supplement. All page numbers in this supplement refer to the redesigned guidance (2026 version).

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COMPETENCE AND SKILLS

1 Competent expertise is needed in assessment, co-ordination and decision-making

The requirement to consider GHGs in EIA is now well established, the ISEP guidance is available to use (and frequently referenced) in relevant Scoping Reports and ES chapters, and there have been a number of conference presentations and webinars which have discussed the various methodological stages, pitfalls which should be avoided and recent relevant case law.

To ensure the completeness and quality of an ES, current EIA Regulations in the UK require that the ES is prepared by 'competent experts', with a statement provided outlining the relevant expertise or qualifications of the experts in question. This is equally important when interpreting information provided under the EIA regulations in a decision-making context.

There are three aspects to competency when considering GHGs in EIA. Points i and ii are applicable to practitioners carrying out assessments (fulfilling the requirement for 'competent experts' under the EIA Regulations). Point iii is also important to support through knowledge-sharing, in line with ISEP's continuous professional development principles.

i. 'Technical' competency with respect to quantifying GHG emissions, including appropriate data sources and the need to identify and justify any exclusions and/or uncertainties (see Section 5 of the 2022 guidance). Importantly, expertise is also required to then consider the extent to which the emissions associated with a project are consistent with a trajectory towards net zero by 2050. This is covered in Section 6 of the 2022 guidance, including Section 6.2 which states that, 'the specific context for an individual project and the contribution it makes must be established through the professional judgement of an appropriately qualified practitioner, drawing on the available guidance, policy and scientific evidence' (p.20). It is this latter 'contextualisation' of project emissions that is particularly crucial, addressed further in supplementary guidance points below. Technical competency ought therefore to be interpreted as including more than the mechanics of GHG quantification: it requires a broad knowledge of UK climate mitigation policy, in the context of international obligations, to be able to form a judgement of significance.

ii. Wider competency within the EIA co-ordination team, which ensures that the relevant good-practice guidance is followed properly and ultimately that the consideration of the project's GHG emissions meets regulatory requirements. For example, this may include: scrutinising the justification if that GHG emissions are proposed to be scoped out, especially for example if the justification is framed around percentage of carbon budgets; looking for evidence that GHG emissions were considered at the design stage and/or that mitigation is meaningful and project-specific; or interrogating the level of information provided to support the judgement of impact significance. EIA co-ordinator competency therefore includes knowing when to seek input from technical experts (see Point i), particularly at the screening and scoping stage if climate change is not being led directly by the topic expert.

iii. Competency in interpreting information submitted under the EIA Regulations when making a planning decision, albeit not part of the requirement for applicants to employ 'competent experts' under the Regulations. This includes the same general knowledge-base described in Point ii, which is required to review and where necessary question climate change information. It also includes an understanding of effective planning condition or DCO Requirement wording, including reference where appropriate to relevant GHG mitigation frameworks and performance standards, to secure embedded/further mitigation that may be relied upon to avoid significant adverse effects.

2 Guidance should be applied as a whole

The guidance (the 2022 guidance and 2026 Supplement, together, Edition 2.1) is intended to be read and applied as a whole, including the approaches to screening, scoping, assessing impacts, determining significance of effects, and recommending mitigation and monitoring.

If a statement is made that an assessment has been carried out using or in conformance with this guidance, the guidance must be applied fully. Any exceptions or differences in approach should be transparently described and justified.

SIGNIFICANCE

3 <5% of a GHG emissions budget is not a threshold for non-significance

For avoidance of doubt: <5% of a GHG budget is not a threshold for non-significance under the guidance.

There are two mentions of 5% in the 2022 ISEP guidance, which have in some cases been subject to misinterpretation.

The first, on page 16, is about excluding de-minimis emission sources from quantification where information might be limited. Small sources, each <1% of total emissions and collectively estimated to be <5% of the total emissions of a project, can be excluded from detailed assessment if it would require disproportionate effort to gather information about these. Exclusions should be clearly stated. This relates only to exclusions of sources that are small, and the disproportionate effort to quantify, relative to the total project emissions. Where exclusions are applied, the competent professional should recognise the potential for slight underestimation of total emissions and exercise caution when forming conclusions and a judgement of significance, and could apply a percentage uplift to account for this.

The second, on page 22, is about projects with the very largest impacts. It suggests that a project so substantial that its emissions are >5% of the relevant national carbon budget, even after mitigation, would always remain significant. However, to be absolutely clear, this must not be interpreted as meaning the inverse, ie. that projects with emissions of <5% of the relevant national carbon budget (the majority of projects) are non-significant. In those cases, significance should be determined following the full approach set out in Section 6 of the guidance.

Figure S-1: Incorrect approach to the quantification of emissions.

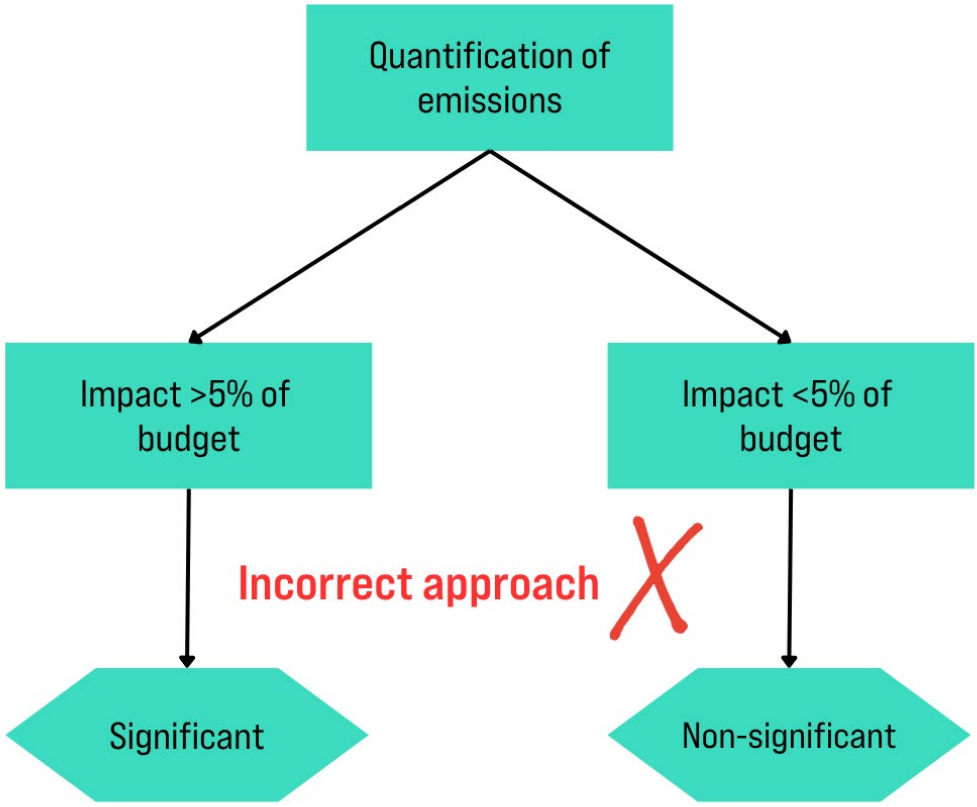
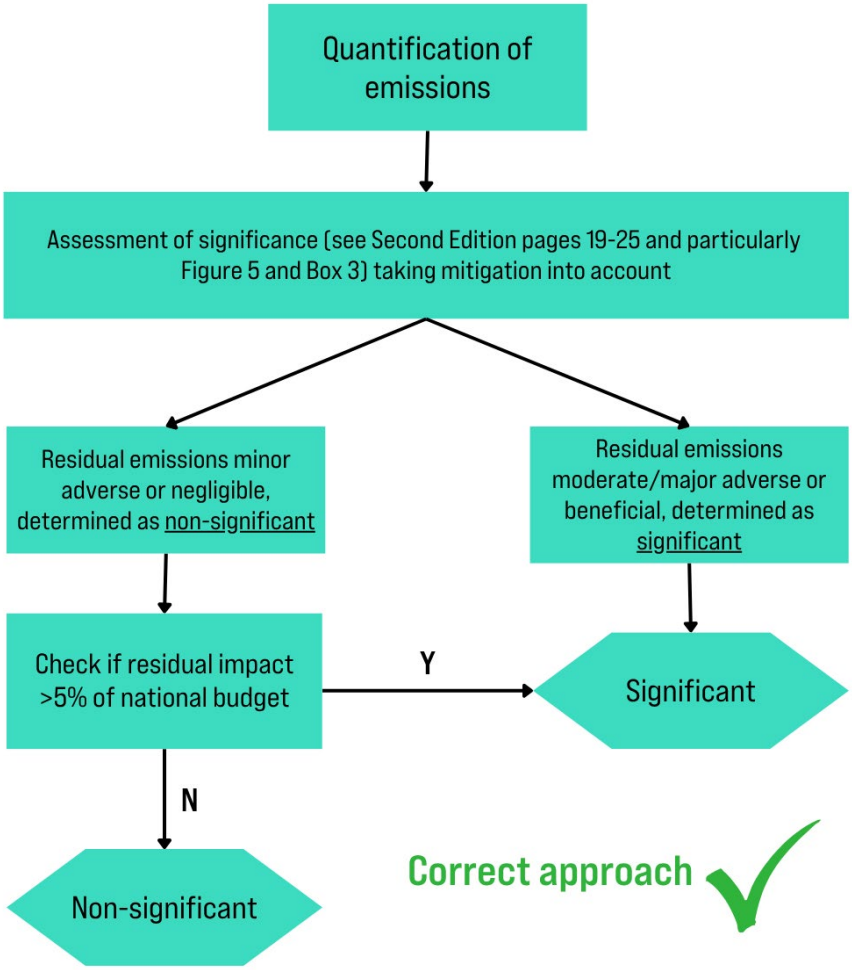


Figure S-2: Correct approach to the quantification of emissions.



4 <1% of a carbon budget is not a fixed threshold for non-significance

Similarly, there is no fixed percentage threshold (whether of a carbon budget or baseline emissions) that determines significance in the 2022 guidance. The reference to 1% on page 16, as discussed above, is only relevant to exclusions of sources that are small and disproportionate to quantify relative to the total project emissions.

Significance should be determined as set out in Section 6 of the guidance (pages 19-25 and particularly Figure 5 and Box 3), ie. with consideration to the magnitude of emissions, extent of mitigation and whether this aligns to an evidence-based 1.5 °C or net zero compatible trajectory) considering the appropriate context of carbon budgets, policy and expert guidance.

5 Evidence-based trajectories of percentage reductions in GHG emissions should be used

Figure 5 and Section 6.4 of the 2022 guidance explain that significance should be judged not just on the absolute magnitude of emissions from a project, but also the degree to which these are mitigated. The degree of mitigation should be judged relative to an applicable 1.5 °C or net zero compatible trajectory. Table 1 of Section 6.4 in the 2022 guidance suggested some sources of contextual information that can be used to determine such an applicable trajectory but, as Section 6.4 acknowledged, these sources of information were rapidly developing at the time of writing.

Some further examples of publications that provide sector and/or policy-specific decarbonisation trajectories are as follows. However, this remains an area of development, so the onus remains with the practitioner to review available evidence and select the most appropriate.

- Carbon Budget and Growth Delivery Plan (UK Government 2025) provides GHG reductions across the UK's 4th, 5th and 6th carbon budgets which are forecast by Government to be achieved through 169 policies that are proposed to meet these budgets. These policies and trajectories cover a wide range of sectors including agriculture & land use, buildings, transport, fuel supply, international aviation & shipping, industry, power, waste and F-gases.
- The Climate Change Committee's Balanced Pathway, as presented through each carbon budget recommendation report, provides a year-by-year UK-wide reduction trajectory compatible with the Climate Change Act 2008 net zero duty. It also provides broad economic sector pathways year by year.
- Industry- or sector-specific trajectories published by industry working groups may also be suitable for use but their evidence and up-to-date status should be reviewed by practitioners. Some examples are the UK Green Building Council's built environment roadmap[1], the Jet Zero strategy for aviation[2], Maritime Decarbonisation Strategy[3], Water UK's net zero routemap[4] and decarbonisation readiness[5].

Use of evidence and expert guidance to help to determine the degree of mitigation that is compatible with such UK and sector-specific trajectories is discussed in a further point below.

6 Significance of each project lifecycle stage should be assessed

Significance of each project lifecycle stage should be assessed (and where applicable mitigated) before reaching any overall lifecycle net effect conclusions.

It is noted in Section 7.4 that, 'due to the nature of GHG emissions, it is good practice to include a section that reports on the whole life GHG emissions associated with the proposed project, alongside the sections that assess construction and operation effects in isolation.'

For avoidance of doubt, likely significant effects should be assessed for each applicable project stage (ie. construction, operation and end of life, as applicable) before reaching a conclusion on whole-life effects. It is possible for impacts from individual project stages to constitute a significant effect and prompt the consideration of further mitigation, even if the combined whole-life effect were beneficial or non-significant (eg. where operational benefits 'pay back' construction impacts).

GHG emissions are cumulative, so for example a moderate adverse construction stage GHG effect + a negligible adverse operational stage GHG effect is likely to constitute a moderate adverse net GHG effect overall. Or in another example, a non-significant or even beneficial operational effect should not be assumed to offset a significant construction effect in purely qualitative terms – any payback period and net reduction would need to be quantified.

7 A conclusion of non-significant GHG effects is a high bar and requires clear evidence

Page 21 of the 2022 guidance explained that, 'A "minor adverse" effect [non-significant] or better is therefore a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.'

Where no sufficient and meaningful mitigation is proposed which supports an applicable 1.5 °C or net zero compatible trajectory, beyond minimum compliance with current regulations (such as Part L of the Building Regulations in the UK) then this would typically indicate a major or moderate, significant adverse effect.

Where a minor adverse, negligible or beneficial effects conclusion is founded on mitigation, such mitigation must be evidence-based, specific, meaningful and secured. Otherwise, effects should typically be judged to be at least moderate adverse and hence significant.

Where there is uncertainty concerning mitigation (for example, details of performance standards or feasible measures are deferred to a later stage of design/ approvals, or it is not clear that mitigation is yet secured through a specific planning condition or obligation), then it can be appropriate for residual effects conclusions to be couched, cautiously, in conditional terms, with the relevant uncertainties explicitly stated.

[1] UKGBC (2021) Net Zero Whole Life Carbon Roadmap: a pathway to net Zero for the UK built environment.
[2] Department for Transport (2022) Jet Zereo strategy: delivering net zero aviation by 2050.
[3] Department for Transport (2025) Maritime decarbonisation strategy.
[4] Water UK (2020) Net Zero 2030 Routemap.
[5] Part of the amended Environmental Permitting (England and Wales) Regulations 2016.

MITIGATION

8 1.5°C or net zero trajectory-compatible mitigation may need to go beyond the minimum required by regulation

On page 20 and footnote 33, the 2022 guidance recommends, 'drawing on the available guidance, policy and scientific evidence' as context for judging the necessary level of mitigation to be 1.5°C or net zero trajectory-compatible and avoid significant adverse effects.

For clarity, this does not mean considering only compliance with existing minimum regulatory standards such as Building Regulations at a certain point in time. Practitioners must judge whether such minimum regulatory standards in fact offer 1.5°C or net zero trajectory-compatible GHG emission performance or whether further mitigation should be recommended for a specific project.

This is explained further on page 22, stating that:

'Practitioners should note that existing policy and regulation may in some cases lag behind the necessary levels of GHG emission reductions (or types of actions to achieve those) that are compatible with the UK's or devolved administrations' targets and with a science-based 1.5°C compatible trajectory towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect, and it is recommended that practitioners consider and have reference also to emerging policy/standards and the guidance of expert bodies such as the CCC on necessary policy developments, particularly for multi-phased projects with long timescales. This must be evaluated by the practitioner as part of the evidence base used in the assessment of effects. References to 'existing' and 'emerging' policy in the principles of significance and example criteria above must be interpreted with this in mind.'

In this context is must be emphasised that 'available guidance, policy and scientific evidence' does not refer only to adopted planning policy or legislation, but includes evidence from expert or authoritative bodies such as the Climate Change Committee or advisory bodies for particular sectors.

It remains important that the need for any mitigation beyond minimum policy or regulatory compliance is considered. To clarify, this should include consideration of authoritative expert guidance in addition to adopted government policy and legislation. Box S-1 suggests some ways in which such guidance can be used.

As one example, the forthcoming Future Homes Standard and Future Buildings Standard in England are expected to be a material improvement in minimum standards for building fabric, energy use intensity, and use of low/zero-carbon technologies (such as ASHPs and PV). However, it remains for practitioners to use evidence to determine appropriate mitigation, taking into consideration any limitations such as how such standards address unregulated energy use, limitations of SAP/SBEM approaches, or the acknowledged performance gap to as-built buildings.

Box S-1: Ways in which published authoritative and expert guidance can be used

1. **Benchmarking:** compare design proposals against best-practice energy and carbon benchmarks.
2. **Design decision-making:** inform material choices, building fabric specifications and technology selection to exceed minimum compliance.
3. **Whole life carbon assessment (WLCA):** integrate embodied and operational carbon targets from expert guidance into WLCA processes.
4. **Alignment** with national trajectories: ensure project strategies support UK net zero pathways and sector-specific decarbonisation plans.
5. **Gap analysis:** compare current design or operational strategies against best practice standards to identify areas for improvement beyond compliance.
6. **Scenario testing and sensitivity analysis:** apply benchmarks and assumptions from guidance when modelling future climate scenarios or energy performance under different design options.
7. **Stakeholder engagement:** reference guidance to justify decisions to clients, planning authorities and investors demonstrating alignment with best practice and future-proofing.
8. **Post-occupancy evaluation:** use guidance to inform methodologies, closing the performance gap and feeding lessons learned into future projects.

9 Baseline GHG emissions and future baseline scenario must be clearly evidenced

Clear, evidenced baseline GHG emissions and a well-documented future baseline scenario are essential in EIA because they provide the objective reference against which project-related incremental emissions (or reductions) are measured. This is particularly important where emission reductions compared to the baseline are being predicted in the assessment or where improved performance compared to a future baseline is being considered as mitigation.

The starting point for an assessment would be the 'do nothing' scenario in which activity within the GHG assessment boundary (or lack thereof) prior to the project's construction and operation are presented. In addition, a sectoral baseline can also be relevant to consider changes caused by a project's impacts beyond the project site boundary. In the energy sector, for example, appropriate and justified future baseline scenarios with appropriate sensitivities (for example a long-run marginal generation scenario, if applicable) based on available data should be used, and they ought to enable a project's contribution to those scenarios to be understood in context.

Future baseline scenarios must be evidence-based and conservative, where there is uncertainty, if comparisons are made to the proposed development scenario. This may mean it is not appropriate to assume continuation of existing emissions at historical or current levels in the future baseline. Infrastructure lifetime and replacement in the future baseline may also be relevant to consider: for example, in the energy sector, the need to maintain the supply of low/zero carbon generation as demand increases and as existing and proposed new low/zero generation reaches end of life, requiring replacement.

When defining the baseline scenario(s), practitioners should consider and document:

- Clarity as to the site-level baseline and, where applicable, a wider geographic or sectoral baseline
- Description of geographic, temporal and sectoral scope (what's included/excluded and why)
- Baseline period and justification for that
- Data sources (activity data, emission factors)
- Calculation methods and formulas, where applicable
- Scenario development steps for the future baseline (ie. comparison against business-as-usual and other applicable trajectories, policy context)
- Sensitivity analysis and uncertainty quantification where necessary
- Comparison with independent data or benchmarks where possible and relevant.

10 Construction-phase mitigation should, in most cases, include embodied carbon to be meaningful

Section 2 of the 2022 guidance highlights that, within the PAS 2080 framework and ISEP GHG Mitigation Hierarchy, reducing material use and selecting low carbon materials provide far greater carbon savings than improving construction-site efficiencies. This is because embodied carbon dominates construction-stage impacts, with emissions from materials such as steel, concrete, aggregates, façades and mechanical, electrical and plumbing (MEP) systems far exceeding those from fuel use, machinery or logistics. As a result, generalised measures in a CEMP or sustainability statement cannot be relied upon to materially reduce significance unless they directly address embodied carbon.

Meaningful construction phase mitigation must usually therefore explicitly address embodied carbon, that is the GHG emissions associated with materials within the design, as such emissions are fundamentally determined before a project ever reaches site. As presented in the IEMA (as was) 2024, 'Impact Assessment Guidelines Implementing the Mitigation Hierarchy from Concept to Construction', and referenced in the ISEP 2022 guidance, the mitigation hierarchy should be applied iteratively from the earliest concept and feasibility stages, when the ability to avoid or prevent impacts is greatest, and design decisions are still flexible. For example, recent research by Expedition Engineering[6] (November 2025) states that early-stage decisions have the ability to almost halve the embodied carbon for infrastructure on masterplans. As a result of this, as highlighted in Section 2.1 of the 2022 guidance, it is good practice to ensure there is a Carbon Coordinator within the design team focusing on GHG emissions saving opportunities and to ensure the design team considers GHG emissions reduction a priority focus.

As embodied carbon is influenced by procurement and supply chain choices, detailed design, and construction methods, contractors and designers must be equipped—through tender specifications, clear mitigation registers, and robust monitoring—to deliver the low-carbon outcomes

[6] Expedition Engineering (2025) Beyond the Buildings: Decarbonising Infrastructure on Masterplans.

envisaged at consent stage. Without embedding evidenced embodied carbon reductions within the design, projects risk 'paper mitigation', that is to say, commitments made in assessment documents (such as CEMPs or Code of Construction Practices) that do not translate into tangible reductions. Whole-life carbon assessment and requirements to measure and report as-built outcomes are therefore important.

For projects at an outline planning or very early design stage, this may mean securing such mitigation through a recognised carbon management framework that provides for robust target-setting, measurement and monitoring of outcomes.

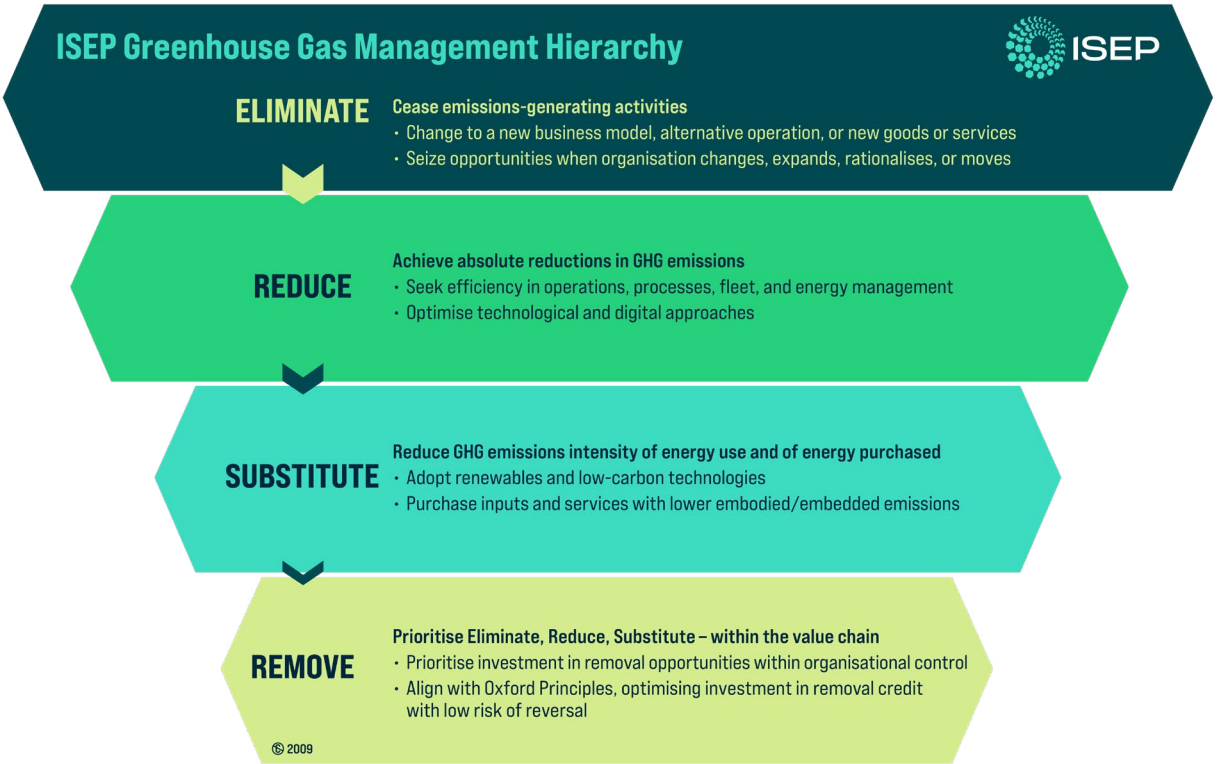
11 Use of the refreshed ISEP GHG Management Hierarchy

Section 2.1 of the 2022 guidance refers to the IEMA (as-was) GHG principles and management hierarchy, providing a summary of these in Figure 3. This emphasised that eliminating/avoiding or directly reducing project emissions, or substituting lower-carbon choices, were preferable to compensating or offsetting for emissions, though this remained as an option once the preceding steps in the hierarchy had been exhausted.

ISEP has published an updated GHG Management Hierarchy in 2026 that changes 'compensate' to 'remove' as the last item in the hierarchy, among other changes. This update changes the emphasis of this item from use of 'offset'-type credits for avoided third party activity, to mitigation through atmospheric carbon removals within a company/project's own value-chain. For the avoidance of doubt – the 2026 ISEP GHG Management Hierarchy principles should be applied for EIA work and Figure S-3, which is reproduced from the 2026 ISEP GHG Management Hierarchy, supersedes Figure 3 from the 2022 guidance.

In an impact assessment context, it remains appropriate to consider the system-wide effects of a project, including emissions displaced or avoided in the future baseline outside the immediate project value-chain, where evidence supports this.

Figure S-3: ISEP Greenhouse Gas Management Hierarchy (2026). This supersedes Figure 3 from the 2022 guidance.



12 Embedded and committed mitigation

Section 6.5 (page 25) of the 2022 guidance explains what kind of mitigation should be considered when determining significance. Section 6.5 further clarifies what should be considered as constituting embedded or committed mitigation – ie. measures that are evidenced and can be relied upon by the practitioner and determining authority.

The guidance lists three points the practitioner must be clear on with respect to embedded or committed mitigation:

1. that mitigation is evidenced in the design of the project;
2. that mitigation is committed and secured, eg. through description of the development, planning condition or legal requirement; and
3. that mitigation is realistic and achievable.

All three points above must be evidenced together.

A generalised or qualitative project or corporate policy or target alone would not constitute an embedded or committed mitigation measure in EIA if it is not supported by project-specific evidence as set out above.

For tertiary mitigation (ie. 'inexorable' mitigation, meaning actions that would occur with or without input from the EIA, such as to meet legislative requirements), *IEMA's Impact Assessment Guidelines: Implementing the Mitigation Hierarchy from Concept to Construction* (2024); *Annex A Classifying Impact Assessment Mitigation* advises this mitigation must be very likely to occur (ie. >90% likelihood).

13 Assessment and mitigation must be evidence-led in EIA

In the UK, local planning policies regarding climate change mitigation are varied and policy updates typically have a long lead time over many years of consultation and examination. At a national level, new national development management policy is under consultation at the time of preparing this guidance supplement. Updates to Building Regulations, including the forthcoming Future Homes Standard and Future Buildings Standard, also typically have long lead and transition periods, and do not cover all aspects of development design (for example, excluding embodied carbon). Policy and regulation may therefore in some cases lag behind climate evidence.

The requirements of the various EIA Regulations concerning assessment and mitigation of GHG emissions are independent of planning policy. The scope of assessment, the significance of effects, and the recommended mitigation must be evidence-led. As set out in the 2022 guidance, up-to-date planning policy and broader climate-related policy can offer a valuable steer but the onus remains on the practitioner to consider the evidence of what measures are recommended for a development proposal to be 1.5°C or net zero trajectory-compatible and avoid significant adverse effects.

SCOPES 2 AND 3

14 Market-based and location-based Scope 2 accounting

Assessments of development proposals drawing their power from the electricity grid should report location-based Scope 2 electricity consumption emissions. In line with Defra's environmental reporting guidance for businesses[7], market-based Scope 2 emissions can also be reported alongside the location-based emissions. However, for a market-based emissions factor to be relied upon as mitigation, the assessment should provide evidence of the specific reduction in emissions from supply of the electricity that is achieved. In this respect, approaches such as half-hourly matched low/zero carbon Power Purchase Agreements (PPAs)[8] or a private wire supply to a specific low-carbon or renewable generation source are likely to offer stronger evidence of mitigation.

[7] Defra & DBEIS (2013, updated 2019) Environmental reporting guidelines: including Streamlined Energy and Carbon Reporting requirements.
[8] Constituting firm long-term contracts for a specific low-carbon energy supply that provide bankability to third party lenders for investment in developers' additional low/zero carbon generation projects.

15 Scope 3 upstream and downstream impacts following the Finch judgement

As confirmed in the Supreme Court's judgment in the *Finch* decision[9], in the UK context the EIA Regulations require an ES to assess likely significant effects from indirect as well as direct causes of GHG emissions. Good practice and the requirement of the EIA Regulations has always been to include direct and indirect impacts where these are causal and capable of being assessed, so the Finch judgment does not change this, but re-emphasises existing good practice.

Scoping of a GHG assessment should therefore consider the potential impact pathways of the proposed development, and then consider whether there is a causal connection between that impact pathway and a likely significant effect. The Finch case considered in detail the different standards of causal connection, including whether the emissions would arise or not arise 'but for' the proposed development, or a more stringent test of whether the proposed development is necessary and sufficient to give rise to the emissions. In the Finch case it was agreed on the facts between the parties that the oil combustion Scope 3 emissions were 'inevitable' and so a conclusion on the correct causality test did not need to be reached in the judgment. However, as emphasised in the ruling[10], an ES should report 'likely significant effects' (emphasis added). Whether an effect is likely requires evidence, and so if a possible effect is a matter of conjecture and speculation, it would not be possible to rationally conclude under the EIA Regulations that it is 'likely'.

Practitioners should therefore consider the causality of indirect GHG emission impacts, scoping these impacts in or out of EIA with consideration to whether (a) the evidence of causality rises above speculation and conjecture and (b) where such an impact is judged, at the scoping stage, to have the potential for likely significant effects.

The implications of the Finch judgment also concern whether there is sufficient evidence, if an indirect GHG emission impact has been scoped in to the EIA, for a judgment on significance of effects from this to then be made in the ES[11]. Scoping and any assessment carried out must therefore be clear on the limitations and assumptions that have been applied, or explain why an assessment is not possible.

In doing so, it can be appropriate to make use of published benchmark data, proxy data from other projects, published emission factors or published lifecycle assessments to facilitate assessments of Scope 3 emissions. This can enable assessment where more detailed information is not available, and it can facilitate proportionate assessment.

Upstream GHG emissions, for example the embodied carbon associated with materials manufacturing are often well understood, however, downstream emissions can have both positive and negative impacts. While fossil fuel extraction and use will usually ultimately have a negative effect, consideration should also be given to beneficial effects. For example,, solar PV arrays or wind farms which generate renewable electricity, or projects such as the production of sustainable aviation fuel which has the potential to deliver downstream emission reduction.

16 Assessment of fit-out and tenant use of buildings

The EIA must consider likely effects associated with both 'direct' and 'indirect' impacts associated with the project. As such, when determining the scope and boundaries of GHG assessment, all material emissions sources should be considered, whether they are physically part of the project or lie beyond its immediate physical boundary.

Fit-out and occupant use of buildings (including both materials and energy use) are commonly, and correctly, included in EIA and whole-life carbon assessments. This should be applied consistently wherever this is material to a proportionate assessment and evidence allows.

An example of this could be a data centre. When assessing the potential climate change effects associated with the project it is likely that the servers and associated equipment that will be installed in the building will be the main source of embodied carbon and also energy use, over and above the building shell and mechanical and electrical (M&E) plant. In another example, tenant uses of industrial, logistics or commercial buildings will incur embodied carbon and energy use impacts over and above that for the building shell and core.

[9] Supreme Court (2022) R (on the application of Finch on behalf of the Weald Action Group) (Appellant) v SurreyCounty Council and others (Respondents).
[10] And as later reiterated by the High Court in R(Friends of the Earth Limited & Others) v the Secretary of State for Levelling Up, Housing and Communities, West Cumbria Mining Limited and Cumbria County Council [AC-2023-LON-000377 and AC-2023-LON-000378].
[11] As emphasised in paragraph 70 of R (Luton and District Association for the control of aircraft noise v SoST and London Luton Airport Limited [2025] EWHC 3206 (Admin).

17 Inclusion of all project stages when assessing upstream and downstream emissions

Section 5.3 and Figure 4 of the 2022 guidance explain that all relevant project life cycle stages should be included in the system boundary of the assessment, unless there is evidence-based reason to scope these out as unlikely to be significant. For avoidance of doubt, this should be interpreted as also applying to upstream and downstream indirect impacts where relevant.

For example, renewable energy projects may need to include the upstream embodied carbon of component manufacture in the assessment boundary. As set out in supplementary guidance point six, above, the significance of each project lifecycle stage should be assessed (and where applicable mitigated) before reaching any overall lifecycle net effect/benefit conclusions.

BIOGENIC & NON-KYOTO GHGS

18 Time horizon when assessing biogenic emissions

Biogenic emissions (eg. CO_2 from anaerobic digestion of organic matter) are often treated as neutral because the carbon released is assumed to be reabsorbed by future biomass growth. However, timing matters, especially when emissions occur rapidly and at scale.

Even short-term emissions can push earth systems past critical thresholds, leading to irreversible tipping points. These may include, for example, the collapse of ice sheets, dieback of major rainforest, abrupt thawing of Arctic permafrost or disruption of ocean circulation systems. Once triggered, these changes can self-propagate through positive feedback loops, such as permafrost thaw releasing methane, accelerating warming or ice sheet loss reducing albedo, increasing heat absorption. Even if biogenic carbon is later reabsorbed, the initial pulse may be enough to tip the balance, especially if it coincides with other stressors.

While a single development may not cause a tipping point, the cumulative effect of releasing biogenic emissions in a short timeframe could be significant for the climate. Therefore, it is important to understand if the development is contributing to large releases in biogenic emissions, particularly if such releases would be at a higher rate than likely re-absorption through natural processes. It is recommended that biogenic emissions associated with development are reported in assessment.

19 Non-Kyoto GHGs

Commonly the primary focus of GHG assessments is the 'Kyoto basket' of gases[12], which could be considered as core GHGs. When an assessment is scoped, the relevance and potential need to assess the impacts of non-Kyoto GHGs should also be considered. These should be assessed where they are relevant to the project, material to the likely impacts, and where the evidence is available to allow a proportionate assessment. Non-Kyoto GHGs include secondary short-lived climate pollutants and other emerging contributors such as black carbon, tropospheric ozone, ammonia, nitrogen oxides, and volatile organic compounds.

[12] Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), nitrogen trifluoride (NF_3), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (SF_6).

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ISEP
Impact Assessment

ASSESSING GREEENHOUSE GAS EMISSIONS AND EVALUATING THEIR SIGNIFICANCE

Edition 2.0, February 2022



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Working group

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The project was co-authored by the GHG Working Group, coordinated by Arup along with the assistance of Rufus Howard and Nick Blyth of ISEP.

The Working group is composed of:

- James Blake (Turley)
- Tom Dearing (RPS)
- Caroline Dinnage (Stantec)
- Roz Griffiths (Arup)
- Kirsten Leggatt (Sweco/Arup)
- Emma Marsland (Arup)
- Michael Pantling-Skeet (Ramboll)
- Joe Parsons (RHDHV)
- Tom Peacock (Buro Happold)
- James Peet (WSP)
- Andrew Tasker (RPS)
- George Vergoulas (Arup)
- Joanna Wright (LUC)

This is a redesigned edition of the 2022 Second Edition guidance, and is intended to be read in conjunction with the 2026 supplement (which forms the first part of this pdf).

Together, this redesigned guidance and the supplement make up Edition 2.1.

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ABBREVIATIONS AND GLOSSARY

Term	Abbreviation	Meaning
Business as Usual	BaU	
Building Information Modelling	BIM	
Building Research Establishment Environmental Assessment Method	BREEAM	
Civil Engineering Environmental Quality assessment scheme	CEEQUAL	
Construction Environmental Management Plan	CEMP	
European Committee for Standardization	CEN	
Climate change		Changes in general weather conditions over 30 years (seasonal averages and extremes)
Climate Change Adaptation		The process that a receptor or project must go through to ensure it maintains its resilience to climate change
Climate Change Resilience		A measure of ability to respond to changes in climate. If a receptor or project has a good climate change resilience, it is able to respond to the changes in climate in a way that ensures it retains much of its original function and norm
Climate Change Committee	CCC	
Department for Business, Energy & Industrial Strategy	DBEIS	
Department for Environment, Food & Rural Affairs	DEFRA	
Department for Transport	DfT	
Environmental Impact Assessment	EIA	
Environmental Management Plan	EMP	
Environmental Product Declaration	EPD	
Environmental Statement	ES	
F-gases		a group of greenhouse gases called fluorinated gases, consisting of HFCs, PFCs and SF6
Greenhouse Gases	GHG	

Term	Abbreviation	Meaning
GHG Practitioner		An environmental consultant with specific experience and knowledge pertaining to GHG modelling and reporting; not to be confused with EIA practitioners who typical have a wider EIA delivery role overseeing the coordination of all environmental topics in an ES
Impact Assessment	IA	
Intergovernmental Panel on Climate Change	IPCC	
The Institute of Sustainability and Environmental Professionals	ISEP	
kilowatt-hour	kWh	
Life Cycle Assessment	LCA	A cradle-to-grave or cradle-to-cradle analysis technique to assess environmental impacts associated with all the stages of a product's life, which is from raw material extraction through materials processing, manufacture, distribution, and use
Large Infrastructure Carbon Rating	LICR	
Local Planning Authority	LPA	
Land Use, Land-Use Change and Forestry	LULUCF	
Task Force on Climate-related Financial Disclosures	TCFD	
tonnes of carbon dioxide equivalent	tCO_2e	
United Kingdom	UK	
United Nations Framework Convention on Climate Change	UNFCCC	
World Business Council for Sustainable Development	WBCSD	
World Resource Institute	WRI	

1 INTRODUCTION

1.1 The aim of this guidance

The aim of this guidance is to assist greenhouse gas (GHG) practitioners (hereinafter referred to as 'practitioners') with addressing GHG emissions assessment, mitigation and reporting[1] in statutory and non-statutory Environmental Impact Assessment (EIA). It is a revision of the 2017 IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance[2] (Box 1 lists the key updates from the 2017 version of the guidance). It complements IEMA's latest guide on Climate Change Resilience and Adaptation[3] published in 2020 and builds on the Climate Change Mitigation and EIA overarching principles (as in the previous version of the GHG Guidance). The requirement to consider this topic has resulted from the 2014 amendment to the EIA Directive (2014/52/EU), the Town and Country Planning (Environmental Impact Assessment) Regulations 2017[4] and the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017[5], hereafter referred to as the 'EIA Regulations'.

A lot has changed since 2017. Climate change has moved up the national and international agenda with local authorities across the UK declaring a climate change emergency. The UK's legally binding Climate Change Act 2008[6] was amended in 2019[7] in response to the Paris Agreement, setting a new and challenging target to reduce UK GHG emissions to net zero by 2050, accounting for residual emissions which are offset. Devolved administrations in Scotland and Wales have also set net zero targets. In December 2020, the UK Government's independent advisors, the Climate Change Committee (CCC), set the sixth[8] carbon budget at 965 million tCO_2e from 2033 to 2037, which has since been enshrined in to law. There is a distinct requirement for deeper cuts in emissions across all sectors of the economy to meet the net zero target according to the CCC.

Box 1: Key updates to the 2017 guidance

Mitigation has taken a much more prominent role within EIA. It is no longer an element to be considered towards the later stages of the EIA process (after scoping, emissions assessment and significance determination). Instead, mitigation should be considered from the outset and throughout the project's lifetime, whilst also helping to deliver proportionate EIAs. Mitigation is addressed first in the guidance (Section 2) but also as part of the GHG Assessment Methodology (Section 5).

The guidance presents more nuanced levels of significance. The 2017 guidance stated that, '…in the absence of any significance criteria or defined threshold, it might be considered that all GHG emissions are significant…'. This update of the guidance does not change ISEP's position (or the science) that all emissions contribute to climate change, however specifically in the EIA context it now provides relative significance descriptions to assist assessments. Section 6 describes five distinct levels of significance which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero.

In November 2021 Glasgow hosted COP26 – widely regarded as the most important climate summit since the 2015 Paris Agreement and acknowledging the urgency (as evidenced by latest IPCC reports), the Glasgow Climate Pact was agreed. This set the agenda on climate change for the

[1] Note: Statutory EIA reports are called 'Environmental Statements' in England, Wales and Northern Ireland and 'Environmental Reports' in Scotland.
[2] ISEP (2017) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance.
[3] ISEP (2020) Climate Change Resilience and Adaptation. Updated guidance expected in late 2026.
[4] UK Legislation (2017) The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
[5] UK Legislation (2017) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
[6] UK Legislation (2008) Climate Change Act 2008.
[7] UK Legislation (2019) The Climate Change Act 2008 (2050 Target Amendment) Order 2019.
[8] UK Legislation (2021) The Carbon Budget Order 2021.

next decade. Pledges made to further cut emissions, and a plan set to reduce the use of coal and phase-out fossil fuel subsidies are some of the commitments made at COP26. The nations present at COP26 collectively agreed to work to reduce the 'emissions gap' and to ensure that the world continues to advance during the present decade, so that the rise in the average temperature is limited to 1.5 °C.

With climate change taking centre stage, projects are increasingly scrutinised and challenged for not mitigating GHG emissions in line with the net zero ambition and the associated required pace of reductions[9]. This critical change is known as the transition imperative. EIA Climate chapters are receiving a lot more attention with clients, project developers and stakeholders often asking: 'what do we need to do and how can we be net zero?'. Addressing significance and contextualising projects' emissions is an increasingly challenging exercise, especially under a tapestry of national and sectoral carbon targets and budgets, regional and local plans and sectors all on different pathways. This guide aims to provide practitioners with the best advice on how to tackle these questions.

Through a working group facilitated by Arup on behalf of IEMA, this guidance helps practitioners take an informed approach to the treatment of GHG emissions within an EIA. It sets out areas for consideration at all stages of the assessment and offers methodological options that can be explored. It highlights some of the challenges to the assessment, such as establishing study boundaries and what constitutes significance. However, this guidance is not a prescriptive 'how to' guide and is updated as the process of incorporating GHG assessment in EIA continues to mature. This is Editon 2.1; Edition 3.0 expected in 2027.

1.2 EIA and project linkage

EIAs can often be undertaken in silo, separate from the full design process, resulting in an accounting exercise rather than realising the full potential of the GHG emissions reduction opportunity. This can be addressed by delivering the EIA in close cooperation with the project design team.

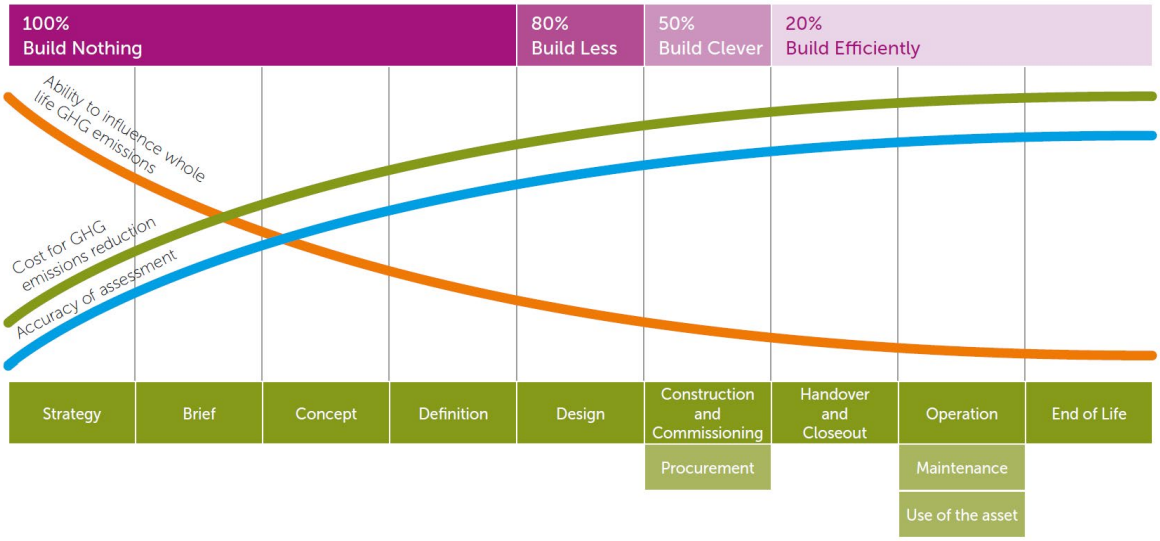


Figure 1: The ability to effect change to achieve GHG emissions reduction for the project reduces over time. This makes it important that the emissions reduction is considered from the outset or at the earliest practical point. (Source: Infrastructure Carbon Review & PAS 2080.)

Early stakeholder engagement is fundamental to maximising GHG emissions savings. GHG reductions are likely to be greater if mitigation is considered at project inception and throughout all subsequent work phases: planning, construction and operation stages – enabling mitigation measures to be identified and implemented throughout the life cycle of the proposed project.

Examples of stakeholders can be found in Appendix A. Figure 1 illustrates how the potential to achieve GHG emissions reduction declines with time over a project life cycle.

The interaction between the design process and EIA process is underpinned by four key principles:

1. Early, effective and ongoing interaction
2. Appropriate stakeholder engagement
3. Managing consenting risk
4. A clear narrative

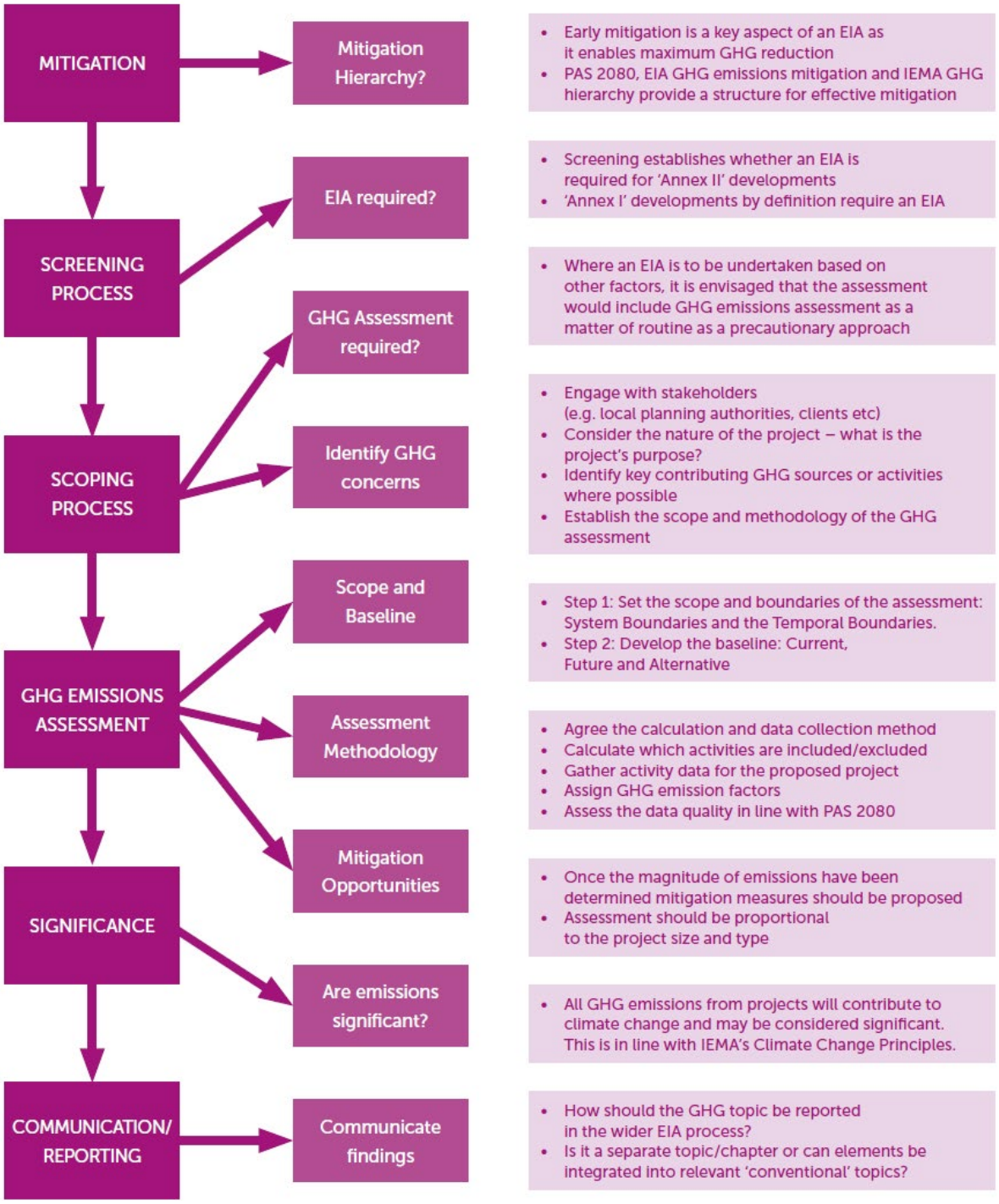
For further detail on these principles and ensuring that GHG mitigation measures are built in rather than bolted on at a later stage, refer to ISEP's guide on implementing the mitigation hierarchy[10].

The need to ensure that GHG mitigation measures are implemented does not end at the pre-application EIA stage, but extends after consent has been granted to the proposed project. To ensure that GHG mitigation measures are carried forward, the development of Environmental Management Plans (EMP) and Construction Environmental Management Plans (CEMP) are the primary mechanisms.

The scope of this document is presented in Figure 2.

[9] The pace of reduction should align with a credible 1.5 °C transition scenario (for example Science Based Targets Initiative Net Zero or Tyndall Centre aligned carbon budget).
[10] ISEP (2024) Implementing the mitigation hierarchy from concept to construction.

Figure 2:
The scope of this guide.



2 MITIGATION

2.1 Early design mitigation

(Column 2) See Supplement p.S-9: This management hierarchy has been superseded by ISEP's new 2026 version. Use the Use the refreshed ISEP GHG Management Hierarchy

It is important that project designers incorporate measures to reduce GHG emissions at an early stage. This means evaluating what GHG emissions reduction measures may be appropriate to include in the design. Mitigation should be considered at all stages of design development – from optioneering through to detailed design, not just as a part of the EIA process (see Figure 1). To successfully address GHG emissions at an early stage, it is good practice to ensure there is a 'carbon coordinator' within the design team, who focuses on promoting GHG saving opportunities and ensures GHG reduction is a focus of the design team.

GHG mitigation is best achieved by taking a planned and focused approach following the IEMA GHG management hierarchy principles[11]. There are many different variations on the use of hierarchies in environmental management and assessment, with the commonality that they set out a graded structure of interventions with generally more favourable options presented over others. Such structures typically start with first avoiding or reducing harm, before suggesting compensations. Depending on the proposed project and contextual setting, the practical outcomes of this can be many and diverse. In addition to mitigations listed in ISEP's GHG Management Hierarchy, BS EN ISO 14064-1: 2019[12] on GHG quantification and reporting provides an example list of GHG mitigation interventions such as:

- Energy demand and use management
- Energy efficiency
- Technology or process improvements
- GHG capture and storage in, typically, a GHG reservoir
- Management of transport and travel demands
- Fuel switching or substitution
- Afforestation
- Waste minimisation
- Alternative fuels and raw materials (AFR) use to avoid landfilling or incinerating the wastes
- Refrigerant management.

2.2 Mitigation hierarchy

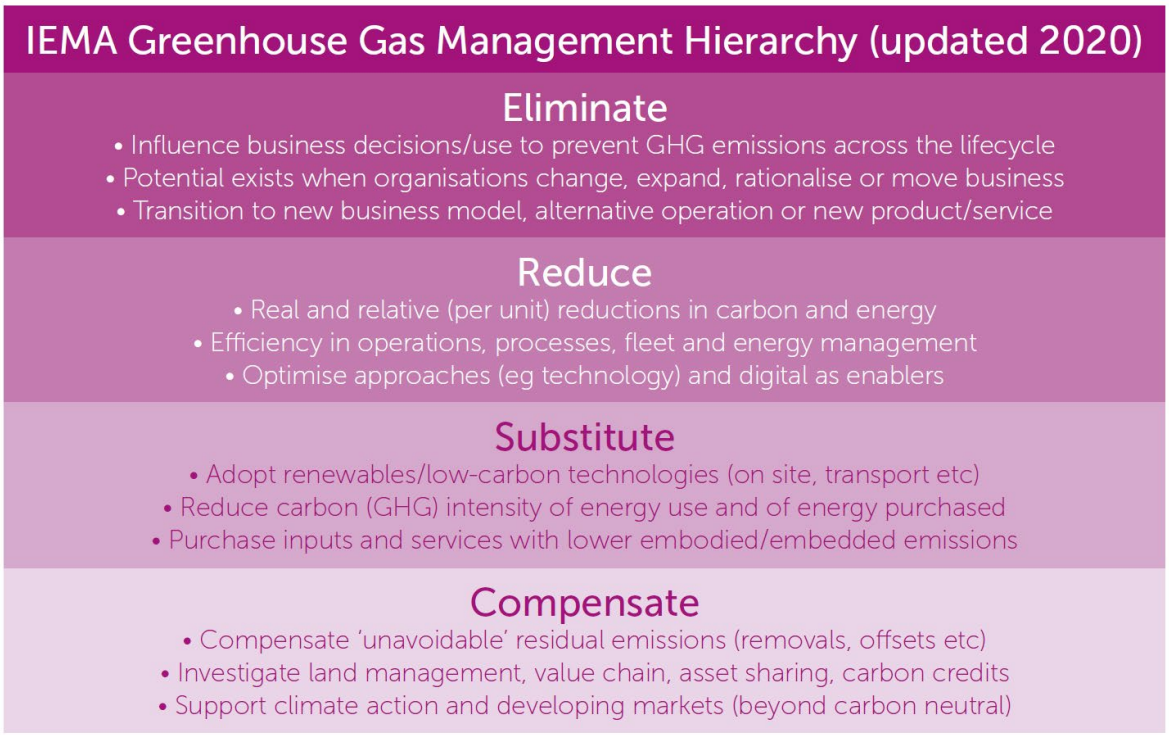
For EIA GHG emissions mitigation, PAS 2080 also provides a useful structure for working through and identifying potential opportunities and interventions. The ISEP GHG Management Hierarchy[13] (see Figure 3 and Figure S-3, which supersedes Figure 3) provides a similar structure set out as eliminate, reduce, substitute and compensate. A variation of these steps is set out below and can be followed by practitioners in the EIA to identify opportunities that direct GHG mitigation action for a project:

- **Do not build:** evaluate the basic need for the proposed project and explore alternative approaches to achieve the desired outcome/s.
- **Build less:** realise potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required.
- **Design clever:** apply low carbon solutions (including technologies, materials and products) to minimise resource consumption and embodied carbon during the construction, operation, user's use of the project, and at end-of-life.
- **Construct efficiently:** use techniques (eg. during construction and operation) that reduce resource consumption and associated GHG emissions over the life cycle of the project.
- **Offset and remove emissions:** as a complementary strategy to the above, adopt off-site or on-site means to offset and/or sequester GHG emissions to compensate for GHG emissions arising from the project.

[11] IEMA (2020) Pathways to Net Zero: Using the IEMA GHG Management Hierarchy.
[12] BS EN ISO 14064-1: 2019 Greenhouse gases – Part 1: specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals.
[13] ISEP (2014) Position Statement on Climate Change and Energy.

Figure 3:
ISEP GHG Management Hierarchy

Updated from the original IEMA GHG Management Hierarchy, first published in 2009.



See Supplement p.S-9: This management hierarchy has been superseded by ISEP's new 2026 version. Use the refreshed ISEP GHG Management Hierarchy

2.3 Offsetting residual emissions

Multiple terms are used to describe how offsets are used to mitigate residual emissions, and projects may sometimes be promoted as 'carbon neutral' or 'net zero'. It is important that the EIA is clear in defining any terms used. Figure 3 above sets out the position of carbon offsets (referred to as 'Compensate' in Figure 3) in the mitigation hierarchy. There is a distinction between carbon offsets that provide a financial payment to avoid emissions and offsets that remove and sequester atmospheric GHG emissions,

and this should be communicated transparently where offsetting is assessed in an ES chapter.

ISEP's October 2021 Net Zero Explained report[14] summarises the concept of net zero, its origin and science behind the definition. The report also links to alternative sites providing some clarity behind evolving definitions, such as net zero, carbon neutral and zero carbon. The UNFCCC's Race to Zero Lexicon[15] provides the following definitions:

- **Net Zero:** 'When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.' Net zero is achieved where emissions are first reduced in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.
- **Carbon Neutral:** 'When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period... irrespective of the time period or magnitude of offsets required.'
- **Absolute Zero or Zero Carbon:** 'When no GHG emissions are attributed' to an activity or project without the need for offsets.

After following the mitigation hierarchy, projects can seek to compensate residual emissions by the use of either carbon credits (purchased from credible eligible schemes) or by removals within the organisation or entity itself (eg. nature based solutions on owned land or land with partners). In order to avoid significant adverse effects, mitigation and compensation (if required) would need to be implemented at a magnitude and in a timescale that is consistent with measures required to achieve a 1.5°C compatible trajectories, as discussed in Section 6 on determining significance of effects.

[14] ISEP (2021) Net Zero explained.
[15] UNFCCC (2021) Race to Zero Lexicon.

3 SCREENING

The purpose of screening is to establish whether or not an EIA is required for 'Schedule 2' developments (Schedule 1 developments by definition require an EIA). The EIA Regulations require specific information at the screening stage. This includes the consideration of likely significant effects of the proposed project on the environment, taking into account the following:

- The magnitude and spatial extent of the impact (eg. the geographical area and size of the population likely to be affected)
- The nature of the impact
- The transboundary nature of the impact
- The intensity and complexity of the impact
- The probability of the impact
- The expected onset, duration, frequency and reversibility of the impact
- The cumulation of the impact with the impact of other existing and/or approved projects
- The possibility of effectively reducing the impact.

Applying screening criteria (Schedule 3) will allow a judgement to be made on whether there is potential for likely significant environmental effects to arise which may trigger the need for an EIA. Occasionally, this may apply to only a very limited number of topics, for example in a sensitive location for a relatively small-scale project. Generally, however, where an EIA is required, it is common for there to be several topics that require assessment. As the assessment of most topic areas is well established (eg. ecology, water, heritage), it is usually clear cut which topics trigger the need for EIA.

Sensitivity of receptor(s)

GHG emissions are not geographically limited. They have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The receptor for GHG emissions is the global atmosphere. The receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources.

It is always good practice to consider whether the effects associated with GHG emissions are likely to be significant enough to trigger an EIA. At the screening stage, proposed mitigation measures that the developer has committed to which aim to avoid or prevent significant adverse effects, may be taken into account when determining whether significant effects are likely to occur.

It should be noted that, as with most environmental topics, there are likely to be only limited cases in which GHG emissions alone are the decisive factor in whether an EIA is needed for a particular project, but in almost all cases GHG emissions are likely to be a relevant factor at the screening stage.

For proposed projects where the need for an EIA has been screened out, it is still important that its GHG emissions are minimised wherever possible, as emissions of any scale contribute cumulatively to global climate change. Undertaking a proportionate assessment of GHG emissions on non-EIA projects is therefore good practice to support decisions that reduce GHG emissions.

[11] ISEP (2020) Pathways to Net Zero: Using the IEMA GHG Management Hierarchy.
[12] BS EN ISO 14064-1: 2019 Greenhouse gases – Part 1: specification with guidance at the organizational level for quantification and reporting of greenhouse gas emissions and removals.
[13] ISEP (2014) Position Statement on Climate Change and Energy.

4 SCOPING

4.1 Introduction

The scoping process should be used to determine the approach to considering GHGs within the ES. The approach should be proportionate[16] to the proposed project and may, in some cases, not require an ES chapter where it can be justified that GHGs can be addressed within upfront sections of the ES (see further detail in Section 5: Methodology, Section 6: Significance and Section 7: Communication/Reporting). Additionally, ES chapters may differ in scope or assessment detail on a project-by-project basis. The scoping process should therefore consider both the scope of the EIA and the scope of the GHG assessment.

The scoping process should provide an explanation of the likely significant effects of a proposed project. Section 6: Significance sets out the principles in determining likely significant GHG effects which should be reviewed at the scoping stage.

The following should be considered when determining a proportionate approach:

- The type, size, location and temporal scale of the proposed project
- Whether other assessment work has already considered life cycle GHG emissions
- Whether mitigation has already been agreed with the design team, particularly if this is beyond minimum policy requirements
- Whether the proposed project has specific goals or aspirations (eg. achieving BREEAM certification).

In selecting or developing an approach for an EIA GHG emissions assessment, the aim should be to deliver a robust, proportionate, appropriate and consistent assessment.

During scoping, it is also important to set out in principle the methodological approach that will be taken to assessing project GHG emissions. This means documenting in outline aspects such as baseline setting, assessment approach, how significance will be determined and strategies for mitigation. These are commonly recorded in a project scoping report, and this can form a useful first record of the approach to delivering the GHG emissions assessment. Each of these steps for the EIA are addressed in the following sections, which should be consulted for further detail.

4.2 Stakeholder engagement

Stakeholder engagement is an important part of undertaking an EIA, especially during the scoping stage. It will provide useful information and support the goals of the GHG emissions assessment.

Stakeholder engagement will provide the practitioner better contextual understanding of the project including on key issues, opportunities, constraints and information pertinent to the assessment. Stakeholders will include clients, project developers and statutory consultees who all have an interest and influence on the project.

Depending on the nature of the proposed project, GHG emissions can be discussed during public consultation. Initial consultation with the project team and wider EIA topic specialists may also reveal parallel activities where input from the GHG assessment would be beneficial. For example, clients may wish to report on the sustainability performance of their projects using assessment schemes such as PAS 2080, CEEQUAL and BREEAM. Being able to report on the proposed project's GHG performance will help with such assessments. It may be sensible that a single GHG assessment is carried out which provides evidence for the EIA's GHG scope as well as CEEQUAL or BREEAM assessment requirements. Depending on contractual agreements there are efficiencies to be gained in minimising effort and avoiding duplication of work.

Other project management decisions may include the desire to manage the project in an integrated manner, combining 3D models with performance data (including environmental data) such as BIM (Building Information Modelling).

[16] ISEP (2017) Delivering proportionate EIA.

4.3 Benefits and challenges of raising GHG emissions as part of project scoping

By going through the scoping process, the practitioner gains an early and informed understanding of the project's impact and potential sources of GHG emissions. This provides an opportunity to influence and even mitigate GHG emissions early in the design process as well as consider emissions from alternative options.

The challenge at the scoping stage is that there is often limited project information available from the design team at this early stage, resulting in a qualitative-based decision and professional judgement from the practitioner. Nevertheless, by engaging with key stakeholders, the practitioner should be able to define the boundaries of the GHG assessment (see Section 5.3), as well as start to form a view of where the majority of emissions are likely to arise from and appropriate mitigation strategies.

Where the competent authority (eg. LPA) provides a scoping opinion, the subsequent ES must be 'based on' the expectations set out in the opinion, including any reference to GHG assessment. This underlines the importance of the scoping stage; however, case law has established that the ES can also adapt to development design evolution that occurs post-scoping.

5

GHG EMISSIONS ASSESSMENT METHODOLOGY

5.1 Introduction

There are many different assessment methods available for measuring and quantifying GHG emissions associated with the built and natural environment. These range from general guidance to formal standards, and many will be appropriate for use in EIA depending on the goals and scope of the assessment required. There is ample GHG quantification guidance in the public domain. However, undertaking an EIA is different to other GHG assessments as the total net impact of the proposed project must be quantified. Therefore, any assessment should follow the principles set out below (see Section 5.2). A list of relevant methods can be found in Appendix B.

Given the wide variation of working situations and the particular aims and objectives of the EIA process, this guidance does not recommend a particular approach. Rather, it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. This guidance does, however, outline a framework of six steps that an assessment should incorporate, which are set out in Section 5.3.

5.2 GHG quantification principles

- GHG quantification within EIA should follow the principles outlined in key documents such as the GHG Protocol Corporate Standard, BS EN ISO 14064-2 or PAS 2080 (see Appendix B) – Relevance, Completeness, Consistency, Transparency and Accuracy
- The assessment should seek to quantify the difference in GHG emissions between the proposed project and the baseline scenario (the alternative project/solution in place of the proposed project). Assessment results should reflect the difference in whole life net GHG emissions between the two options
- The assessment must include all material emissions (defined by magnitude, see Section 5.3, Step 3 for the exclusion threshold), direct or indirect (based on the point above), during the whole life of the proposed project. The boundary of the assessment should be clearly defined, in alignment with best practice
- The assessment should seek to present a reasonable worst case
- Any exclusions, limitations, assumptions and uncertainties should be justified and reported where appropriate.

5.3 Six Steps of GHG emissions assessment

In developing the approach, the aim should be to deliver a robust, proportionate, appropriate and consistent assessment. The following six steps outline the framework a GHG emissions assessment should incorporate:

1. Set the scope and boundaries of the GHG assessment
2. Develop the baseline
3. Decide upon the emissions calculation methodologies
4. Data collection
5. Calculate/determine the GHG emissions inventory
6. Consider mitigation opportunities and repeat steps 4 & 5.

The following sections explore these aspects in more detail. The contextualisation of emissions and determination of significance is addressed in Section 6: Significance.

Step 1: Set the scope and boundaries of the GHG assessment

In the first instance the assessment should set out the rationale for the assessment and its scope, as well as provide background and context. This will normally incorporate a description of the proposed project, its purpose and activities, the system boundary to apply and life cycle stages scoped in and out (including justification) of the assessment.

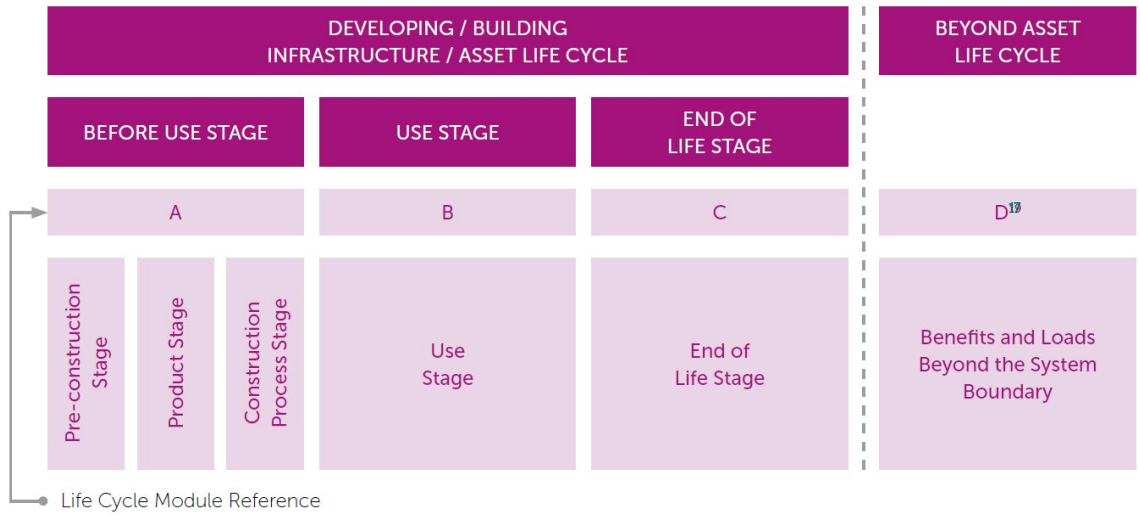
System boundaries

All material existing sources and removals of GHG emissions prior to project construction and operation (ie. without the project) should be identified and clearly described.

EIAs should use data that is consistent with and report using the modular approach (Figure 4). A detailed and complete GHG emissions assessment typically covers all life cycle modules.

As projects vary in size, so does the scale of GHG assessments in the spirit of delivering proportionate EIAs. Certain life cycle modules (or stages) can be excluded if these exclusions are clearly highlighted and justified by the practitioner using professional judgement and in accordance with the materiality and cut-off guidance.

Figure 4:
Modular approach of life cycle stages and modules for EIA GHG emissions assessment; the module references are widely used in construction GHG emissions assessment and reduction activities. The figure provides a simplified presentation of the modular approach that can be used for boundary definition and the gathering and reporting of information associated with the assessment. A more detailed presentation of this structure can be found in PAS 2080 and BS EN 15978[18].



Temporal boundaries

A reference study period shall be chosen as the basis for the GHG emissions assessment, and this should be based on the expected service life of the construction asset. Additional assistance is available in ISO 15686-1[19], RICS Whole life Carbon Assessment[20] and TAG GHG Assessment guidance[21].

[17] 'For clarity, Module D in Figure 4 (Benefits and Loads Beyond the System Boundary) refers to wider impacts that may not be appropriate to attribute (in part or whole) to the project when calculating net impacts within the study boundary but are nevertheless relevant context to consider. Examples include the benefits of a project sending waste materials for recycling rather than disposal (which is properly attributed to the user of recycled products, but still relevant to acknowledge) or where a major project such as an airport or rail line might affect regional or national travel patterns and emissions (properly attributable to a wider group of transport users, but relevant to acknowledge in the project context).'

[18] BS EN 15978:2011 Sustainability of construction works, Assessment of environmental performance of buildings, Calculation method.

[19] ISO 15686-1:2011Buildings and constructed assets — Service life planning — Part 1: General principles and framework.

[20] RICS (2021) Whole Life Carbon Assessment for the Built Environment, 1st edition.

[21] Department for Transport (2021) TAG unit A3 environmental impact appraisal.

Step 2: Develop the baseline

A baseline is a reference point against which the impact of a new project can be compared against; sometimes referred to as 'business as usual' (BaU) where assumptions are made on current or future GHG emissions. Baseline can take the form of:

1. GHG emissions within the boundary of the GHG quantification but without the proposed project
2. GHG emissions arising from an alternative project design and/or BaU for a project of this type.

The ultimate goal of establishing a baseline is being able to assess and report the net GHG impact of the proposed project.

Current baseline

The current baseline represents existing GHG emissions from the assessment prior to construction and operation of the project under consideration. This may include emissions from existing projects (eg. energy consumption from a building which is scheduled for refurbishment, demolition or replacement) and infrastructure (eg. current operational and end-user emissions of a road due to be upgraded).

Depending on the nature of the project, in addition to the project baseline, it may also be necessary to establish a sectoral baseline. For example, baseline emissions from BaU power generation would also be important to consider due to the interconnected nature of the electricity grid. This will equally apply to other project types that have wider interlinkages beyond a site level, eg. many transport, industrial and waste projects.

It may not always be possible to report on current baseline emissions, particularly with projects situated in areas with no physical development or activity. In this instance there would be zero GHG emissions to report at a site level, although particular attention should be paid where changes in land use are expected. For example, land use and land-use change such as woodland creation can sequester carbon over their lifetime and therefore contribute to climate change mitigation. Their disturbance or removal through construction will release previously sequestered GHG emissions.

Future baseline

Future baseline should capture both operational[22] and user[23] GHG emissions irrespective of their source (ie. direct and indirect emissions). The distinction between operational and user GHG emissions is important. For example, an existing motorway will have operational emissions (ie. lighting, maintenance, upgrades) as well as user emissions associated with vehicles travelling along the route. Current baseline travel patterns should be assessed as projected change (eg. changes in mode share, increased efficiency in vehicles and trip numbers). With regards to energy supply and demand (eg. electricity use in a commercial building), future baseline should report on operational GHG emissions and how these may change over time (eg. based on occupancy changes, UK grid decarbonisation projection scenarios or the adoption of renewables).

Box 2 lists potential sources of information which can be considered when establishing future baseline emissions.

Box 2: Potential sources of information on GHG and energy projections (see Appendix A for further details)

- Modelled or projected future scenarios and pathways to net zero published by authoritative bodies such as the CCC[24]
- The Department for Business, Energy & Industrial Strategy (previously DECC)[25]
- The Department for Transport (DfT) TAG (the Transport Analysis Guidance) – Data Book[26]
- BEIS Electricity emissions to 2100 factor projections[27]
- GHG emissions from the operation of existing buildings can be estimated using published benchmarks (eg. CIBSE Guide F – Energy Efficiency in Buildings (2012) or BSRIA Rules of Thumb Guidelines for Building Services (5th Edition, 2011)) where primary data such as annual metered energy consumption is not available
- GHG emissions associated with other sources or activities such as playing fields may be harder to estimate. It may be appropriate to assume zero baseline GHG emissions in such cases to ensure a reasonable worse-case approach to establishing the net GHG effect of the project. It could in such cases be important to also quantify (estimate) emissions release from the land used change and soil disturbance.

[22] PAS 2080:2016 Carbon Management in Infrastructure defines operational carbon as GHG emissions associated with the operation of infrastructure required to enable it to operate and deliver its service.
[23] PAS 2080:2016 Carbon Management in Infrastructure defines user carbon as GHG emissions associated with Users' utilisation of infrastructure and the service it provides during operation.
[24] Climate Change Committee (2020) The Sixth Carbon Budget.
[25] The Department for Business, Energy & Industrial Strategy.
[26] The Department for Transport (2021) Transport Analysis Guidance (TAG).
[27] The Department for Business, Energy & Industrial Strategy (2021) Energy and emissions projections – Net Zero Strategy Baseline.

Alternative baselines

Alternative baselines can be used to supplement the analysis and address uncertainty. For example, it may be unclear what baseline to adopt and compare a proposed project against if the site is 'empty' (ie. the project is not replacing an existing development). For example: different locations, designs or layouts for building developments; or alternative energy generation options in the instance of a wind or solar farm proposal. However, a realistic worse-case baseline should still be used for assigning significance.

In many instances, alternatives may not have been considered by the developer. Ideally, alternatives would have been considered earlier in the project life cycle, and the EIA is viewed as the platform for improving the preferred design. Nevertheless, where alternative baselines were considered, even a qualitative assessment of their GHG impact would be acceptable as part of the overall assessment.

Step 3: Assessment methodology

Once the scope and baseline is set, the calculation method can be agreed along with data collection. The methodology should result in a relevant, complete, consistent, transparent and accurate assessment

of the reasonable worst case. In most cases, the assessment should use activity data and emissions factors. However, where possible, it may be preferable to generate bespoke emissions factors (eg. through mass balance calculations) or use actual monitored data. The methodology chosen should follow best practice guidance, such as the GHG protocol, and it is not the aim of this guidance to provide this.

Inclusions & exclusions

The project boundary should include its spatial extent and life cycle stages relevant to the scope of the assessment.

Activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such exclusions total a maximum of 5% of total emissions; all exclusions should be clearly stated.

See supplement p.S-4: <5% of a GHG budget is not a threshold for non-significance

Step 4: Data collection

Project activity data

To calculate GHG emissions of a proposed project it is necessary to gather data on the activities occurring and associated GHG emissions factors. It is important that data for both these aspects, and particularly the activity data, is specific to the proposed project.

Activity data consists of information that defines and describes the size, magnitude and physical nature of the proposed project. It will take many different forms, including material specifications and quantity, energy and water demand, waste generation, transportation distances and modes, and works techniques/ technologies.

GHG emission factors

GHG emission factors are a value for 'GHG emissions per unit of activity'. Examples of this are:

- HGV: kg CO_2e/tonne.km
- UK electricity grid: kg CO_2e/kWh
- Concrete: kg CO_2e/tonne

GHG emission factors vary in their scope and coverage and will be representative of a single process/activity or multiple of these, sometimes incorporating multiple life cycle stages. Care should be taken to select and reference the right factors for the proposed project.

When undertaking a study, it is often necessary to apply multiple GHG factors for the same activity or material particularly when the assessment is studying a life cycle with a long time period. This may be appropriate when future GHG emissions for that activity are expected to change; this might occur, for example, when accounting for reduced GHG emissions associated with a national electricity grid and the benefit this brings to demand side GHG emissions of using electric trains.

For examples of sources of GHG factors refer to Appendix A.

Data quality

The following aspects, in line with PAS 2080[28], should be considered when collecting assessment data:

- Primary (measured), secondary (estimated) or benchmarks
- Age (age of data, and the period over which they have been collected)

[28] PAS 2080:2016 Carbon Management in Infrastructure.

- Geography (the region or country from where the data have originated)
- Technology (whether the data are specific to a particular technology or mix of many)
- Methodology (the approach applied to gather or calculate the data)
- Competency (proficiency of entity that developed the data).

Baseline GHG emissions from the operation of existing buildings can be estimated using published benchmarks (eg. CIBSE Guide F – Energy Efficiency in Buildings (2012) or BSRIA Rules of Thumb Guidelines for Building Services (5th Edition, 2011)) where primary data (eg. annual metered energy consumption) is not available.

Baseline GHG emissions associated with other sources or activities such as agricultural fields may be harder to estimate. It may be appropriate to assume zero baseline GHG emissions in such cases to ensure a reasonable worse-case approach to establishing the net GHG effect of project proposals.

Types of data

The type of data used by the practitioner will vary depending on how detailed the project design is. Most assessments are based on design-stage information, hence activity data specific to the project should in theory be available from the engineering and design teams. If this is not the case, an alternative approach would be to fall back on generic or publicly available information that best represents the project and its activities.

Studies undertaken as part of the planning application for the proposed project outside of EIA process can provide a useful source of information for GHG assessments, for example:

- BREEAM Pre-assessment (especially RIBA 2 evidence for Mat 01 Construction Materials LCA)
- Energy Statement
- Whole Life Carbon Assessment (eg. London Plan)
- Circular Economy Statement (eg. London Plan)
- Sustainability Statement.

Step 5: Calculate GHG emissions inventory

GHG emissions calculation method

Quantification of the GHG emissions for an EIA may be associated with either a measured or calculated approach or a combination of both for the emissions associated with the project. It is expected that in almost all cases a calculated approach for quantifying GHG emissions will be taken because an EIA is completed in advance of supply chain mobilisation and associated construction works.

When undertaking a quantification calculation the formula for determining a GHG emission (or removal value), associated with the construction works, should have the following structure:

GHG emission factor × Activity data = GHG emission or removal

Calculations may be taken at different scales reflecting specific activities, components or elements of construction. Therefore, individual calculations should be summed to form a GHG emissions inventory for the quantification as a whole.

Study uncertainty

Uncertainty can arise from quality of data, study boundaries and period of assessment, and can never be eliminated from a study. Uncertainty should be considered and if it significantly affects the outcome of the study, additional steps should be taken to reduce

it and provide confidence in results. As a reminder, a relevant, complete, consistent, transparent and accurate assessment of the reasonable worst case must be undertaken despite uncertainties.

Uncertainty can be considered by:

- Testing upper and lower limits
- Testing for different inclusions and exclusions
- Modifying study period
- RAG (red, amber, green) rating input data based on data quality criteria presented above
- If the scale of uncertainty provides findings that are likely to change any decision based on the data, then it should be appropriately reduced.

Cumulative GHG emissions

The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area of, for example, 10km would be included.

For example, air pollutant emissions are dispersed and diluted after emission and only the cumulative contributions of other relatively nearby sources contribute materially to the pollutant concentration, and hence effect, at a particular sensitive receptor in the study area. Due

to the persistence of GHGs in the atmosphere, that same dispersion effect contributes to the global atmospheric GHG emissions balance. There is no greater local climate change effect from a localised impact of GHG emission sources (or vice versa).

All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being of 'high' sensitivity to further emissions.

Effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other.

The contextualisation of GHG emissions, as discussed in Section 6.4, should incorporate by its nature the cumulative contributions of other GHG sources which make up that context. Where the contextualisation is geographically – or sector-bounded (eg. involves contextualising emissions within a local authority scale carbon budget, or a sector level net zero carbon roadmap), then the consideration of cumulative contributions to that context will be within that boundary.

Step 6: Mitigation opportunities

Once the magnitude of emissions has been determined (as discussed in Section 5.3, Step 4), mitigation measures (as discussed in Section 2) should be proposed. Any mitigation measures that are committed to need to be included within the assessment. This means recollecting new activity data where this has changed due to mitigation measures, and new emissions calculations need to be undertaken. Steps 4 & 5 should be repeated as necessary.

5.4 GHG assessment and proportionality

GHG emissions should be assessed and reported as part of a good practice approach to EIA.

Projects will vary by type and size, and so will GHG emissions. An effective scoping exercise ensures that a balance is struck between the amount of GHG emissions emitted or saved by the project and the effort committed to the actual GHG assessment. For example, if most impacts occur during a project's construction phase and operational impacts are negligible, then the GHG assessment can reflect this. A high-level or qualitative GHG assessment for certain project elements or activities can be carried out as long as it is justified and agreed during the scoping stage with stakeholders. This will help contribute towards delivering a proportionate assessment.

It should also be recognised that qualitative assessments are acceptable, for example: where data is unavailable or where mitigation measures are agreed early in the design phase with design and engineering teams.

6 SIGNIFICANCE

6.1 Introduction

IEMA's 2010 principles on climate change mitigation and EIA identify climate change as one of the defining environmental policy drivers and that action to reduce GHG emissions is essential. Specifically, three overarching principles are particularly relevant in considering the aspect of significance:

1. The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect
2. The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (eg. human health, biodiversity, water, land use, air quality)
3. GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit[29]; as such any GHG emissions or reductions from a project might be considered to be significant[30].

This document builds on those principles as follows:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its life time, which may be positive, negative or negligible
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The guidance in this document provides further detail of how those principles can be applied, particularly how the net effect of a project and its beneficial or adverse effects can be evaluated in the context of emission reductions on a trajectory towards net zero.

6.2 Background to significance

The goal of the Paris Agreement is to limit global temperature rise to well below 2°C, aiming for 1.5°C, compared with pre-industrial levels, in order to stand a greater chance of avoiding severe adverse effects from climate change.

The UK has set a legally binding GHG reduction target for 2050 with interim five-yearly carbon budgets which define a trajectory towards net zero. The 2050 target (and interim budgets set to date) are, according to the CCC, compatible with the required magnitude and rate of GHG emissions reductions required in the UK to meet the goals of the Paris Agreement, thereby limiting severe adverse effects. Further budgets are set by the devolved administrations in Wales and Scotland, which are also in line with advice from the CCC. Carbon budgets allow for continuing economic activity, including projects in the built environment, in a controlled manner.

To meet the 2050 target and interim budgets, action is required to reduce GHG emissions from all sectors, including projects in the built and natural environment. EIA for any proposed project must therefore give proportionate consideration to whether and how that project will contribute to or jeopardise the achievement of these targets.

[29] There is a global GHG emission budget that defines a level of dangerous climate change, and any GHG emission that contributes to exceedance of that budget or threatens efforts to stay within it can be considered as significant.
[30] The third principle is related to the IPCC carbon budget definition. The IPCC's Sixth Assessment Report (WG1: The Physical Science Basis, Table SPM.2) indicates that the remaining global carbon budget from 2020 that provides a two-thirds likelihood of not exceeding 1.5°C heating is 400 $GtCO_2$; for an 87% likelihood it is 300 $GtCO_2$.

However, it is important to note that:

1. The UK's and devolved administrations' GHG targets incorporate a staged set of reductions between the present day and 2045 or 2050, defined by five-yearly carbon budgets. A continuing, but, over time, reduced level of GHG emissions is compatible with national and international climate change commitments. Going above and beyond these commitments and achieving net zero at an earlier date is strongly desirable and a high priority
2. The necessary level and rate of GHG emission reductions will be unevenly distributed across different economic sectors, activities and types of projects. Net zero for the UK in 2050 (and in the interim) will include some activities with net negative emissions and some with residual emissions greater than zero.

(Column 2) See Supplement p.S-7: 1.5°C or net zero trajectory-compatible mitigation may need to go beyond the minimum required by regulation

A key goal of EIA is to inform the decision maker about the relative severity of environmental effects such that they can be weighed in a planning balance. Therefore, it is essential to provide context for the magnitude of GHG emissions reported in the EIA in a way that aids evaluation of these effects by the decision maker.

The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050[31].

Often a project will cause a change in GHG emissions compared to the baseline which should be assessed, as discussed in Section 5.3. When setting this impact into context to determine significance, it is important to consider the net zero trajectory in line with the Paris Agreement's 1.5°C pathway[32].

The timing of reductions is critical due to the cumulative effect of GHG emissions in the atmosphere. Achieving net zero or very low emissions by 2025 instead of 2040 would avoid 15 years of cumulative heating.

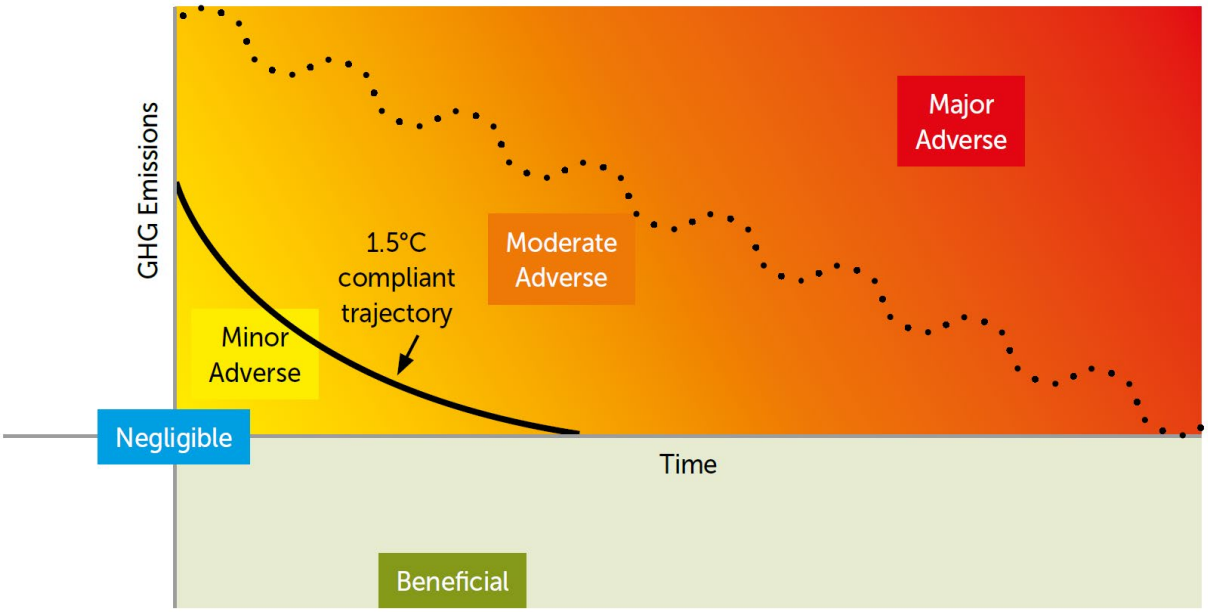
The specific context for an individual project and the contribution it makes must be established through the professional judgement of an appropriately qualified practitioner, drawing on the available guidance, policy and scientific evidence[33].

The following principles are a guide to determining significance.

6.3 Significance principles and criteria

Figure 5 illustrates how to determine significance depending on the project's whole life GHG emissions and how these align with the UK's net zero compatible trajectory. The following section provides further explanation on the different levels of significance and should be read in conjunction with Figure 5.

Figure 5: Different levels of significance plotted against the UK's net zero compatible trajectory[34].



[31] (or other date as defined in targets for devolved administrations or as may be defined for the UK or specific economic sectors in future).
[32] ISEP (2021) Net Zero explained.
[33] At the time of publication, the applicable evidence is that provided by the IPCC and UNFCCC, supporting the commitments defined in the Paris Agreement, and in the UK that provided by the CCC with regard to GHG budgets and policies that are compatible with the UK's Paris Agreement commitments. Evidence will continue to be developed, for example, through the IPCC's Sixth Assessment Report, future international treaty negotiations and further advice of the CCC or other expert bodies, and the practitioner must evaluate the prevailing evidence at the time.
[34] Ideally, the curve will be quantitative, derived from a set of carbon budgets that show the rate of reduction to be achieved; but where this is not available, it will need to be evaluated qualitatively based on policy goals and advice of expert guidance bodies on the actions needed to achieve the necessary rate of reductions.

A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the UK's net zero trajectory, or accepted aligned practice or area-based transition targets, results in a **significant adverse** effect. It is down to the practitioner to differentiate between the 'level' of significant adverse effects eg. '**moderate**' or '**major**' adverse effects (see Box 3 for an example of such a differentiation).

A project that is compatible with the budgeted, science-based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a **minor adverse** effect that is **not significant**. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net zero by 2050 with at least a 78% reduction by 2035[35] and thereby potentially avoiding significant adverse effects.



(Column 2) See Supplement p.S-6: A conclusion of non-significant GHG effects is a high bar and requires clear evidence.

A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a **negligible** effect that is **not significant**. This project is playing a part in achieving the rate of transition required by nationally set policy commitments.

A project that causes GHG emissions to be avoided or removed from the atmosphere has a **beneficial** effect that is **significant**. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

For the avoidance of doubt, a 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral (ie. zero on balance) but refers to the likelihood of avoiding severe climate change, aligning project emissions with a science-based 1.5°C compatible trajectory, and achieving net zero by 2050[36]. A project's impact can shift from significant adverse to non-significant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero.



A 'minor adverse' effect or better is therefore a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050. However, in the context of the severe threat of climate change, such an effect cannot be judged as significant beneficial – this category is reserved for projects with effects that directly or indirectly remove or avoid GHG emissions in the without-project baseline.

An example of how these principles may be applied in practice is given in Box 3.

Box 3: Examples of significance criteria

For the avoidance of doubt ISEP's position that all emissions contribute to climate change has not changed. This Box 3 provides practitioners with examples of how to distinguish different levels of significance. Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant.

Major adverse: the project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.

Moderate adverse: the project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.

Minor adverse: the project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.

Negligible: the project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.

Beneficial: the project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

[35] or other science-based 1.5°C compatible trajectory as may be defined for a specific sector or local area, as applicable.
[36] or other date as defined in targets for devolved administrations or as may be defined for the UK or specific economic sectors in future.

See Supplement p.S-4: <5% of a GHG emissions budget is not a threshold for non-significance

See Supplement p.S-7: 1.5°C or net zero trajectory-compatible mitigation may need to go beyond the minimum required by regulation

A modification to this approach is required for the very largest-scale developments, those that in themselves have magnitudes of GHG emissions that materially affect the UK's or a devolved administration's total carbon budget. An indicative threshold of 5% of the UK or devolved administration carbon budget in the applicable time period is proposed, at which the magnitude of GHG emissions irrespective of any reductions is likely to be significant. A project that meets this threshold can in itself materially affect achievement of the carbon budget.

Practitioners should note that existing policy and regulation may in some cases lag behind the necessary levels of GHG emission reductions (or types of actions to achieve those) that are compatible with the UK's or devolved administrations' targets and with a science-based 1.5°C compatible trajectory towards net zero.

Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect, and it is recommended that practitioners consider and have reference also to emerging policy/standards and the guidance of expert bodies such as the CCC on necessary policy developments, particularly for multi-phased projects with long timescales. This must be evaluated by the practitioner as part of the evidence base used in the assessment of effects. References to 'existing' and 'emerging' policy in the principles of significance and example criteria above must be interpreted with this in mind.

In following this guidance, the practitioner is contextualising the project to understand whether committed mitigation represents best endeavours, to avoid significant adverse effects in line with the principles and example criteria defined above.

The assessment process for GHG emissions will therefore require a review of the current and emerging policy/regulatory position together with a review of expert scientific advice from bodies such as the CCC or IPCC about where existing policy or regulation is insufficient or not, relative to the science.

It bears reiterating that an ES should inform decision makers about both adverse and beneficial effects, so that all significant effects can be weighed in decisions. Where the fundamental reason for a proposed project is to combat climate change (eg. a wind farm or carbon capture and storage project) and this beneficial effect drives the project need, then it is likely to be significant.

6.4 Contextualising a project's carbon footprint

The context of a project's carbon footprint determines whether it supports or undermines a trajectory towards net zero. Determining that trajectory and the position of a project within it, however, is the challenge for practitioners.

It is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact.

The UK has a defined national carbon budget and budgets set by devolved administrations which have been determined as being compatible with net zero and international climate commitments. The starting point for context is therefore the percentage contribution to the national or devolved administration carbon budget as advised by the CCC. However, the contribution of most indivdual projects to national-level budgets will be small and so this context will have limited value.

The available contextual information base is rapidly developing and will continue to grow in the coming years as developments such as sector initiatives, locally set carbon budgets and the Task Force on Climate-Related Financial Disclosures (TCFD) and transition risk scenario analysis progress.

Existing government policy will in many cases define goals and necessary action for GHG emissions reduction that is compatible with national climate commitments. However, it is also essential to evaluate this in the context of expert advice/commentary on policy gaps and emerging policy recommendations.

Industry bodies for many sectors crucial to reducing GHG emissions have published analyses, strategies and net zero compatible reduction trajectories for their sectors. This can provide useful and highly specific evidence of what constitutes the necessary type and rate of GHG reduction actions for a particular project type.

For example, the Green Construction Board[37] has calculated carbon budgets for each of the UK built environment sectors. Similarly, the CCC[38] has determined a UK wide carbon budget broken down into the following key sectors: surface transport, buildings, manufacturing and construction, electricity generation, fuel supply, agriculture and land use, land-use change and forestry (LULUCF), aviation, shipping, waste, F-gases, and greenhouse gas removals. Researchers at the Tyndall Centre at the University of Manchester have proposed local authority scale carbon budgets that are compatible with the UK's commitments under the Paris Agreement[39]. Further examples of sectoral strategies and budgets are given in Figure 6 below.

The good practice approach included in Figure 6 below provides an example of how to contextualise your project's carbon footprint against pre-determined carbon budgets or against emerging policy and performance standards where a budget is not available.

Where quantified carbon budgets or a net zero trajectory is lacking, a more qualitative or policy-based approach to contextualising emissions to evaluate significance may be necessary. In these instances, uncertainty and the likelihood of effect should be discussed.

[37] The Green Construction Board (2013) Low Carbon Routemap for the Built Environment.
[38] Climate Change Committee (2020) The Sixth Carbon Budget: The UK's path to Net Zero.
[39] Tyndall Centre for Climate Change Research (2022) Quantifying the implications of the United Nations Paris Agreement for local areas.

It is good practice to draw on multiple sources of evidence when evaluating the context of GHG emissions associated with a project. The practitioner should be aware that sources of evidence are still emerging, subject to revision as understanding develops and innovation occurs, and in some cases will be contested and conflicted. Professional judgement will therefore be vital in integrating these sources of evidence and evaluating them. Table 1 sets out further sources of contextual information against which the GHG emissions and reduction actions of project can be evaluated.

Figure 6:
Good practice approaches for contextualising a project's GHG emissions.

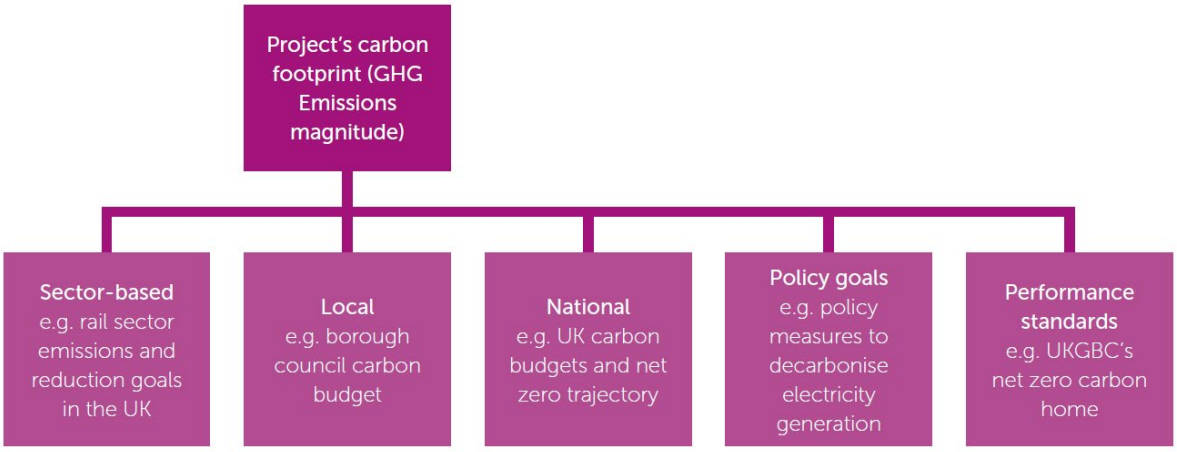


Table 1:
Sources of contextual information against which projects can be evaluated

CONTEXT	ADVANTAGES	LIMITATIONS
National or devolved administration carbon budget and NDC	• Clearly defined and based on robust scientific evidence	• Too high level for most individual projects
Local or regional carbon budgets developed by local authorities and researchers (eg. the Tyndall Centre at the University of Manchester[40])	• A more pertinent scale for individual projects and local decision-making • Will reflect regional factors such as concentration of industry	• Effects of GHG emissions are not geographically circumscribed, so a geographic budget (below a national budget defined based on negotiated NDCs to commitments to a global budget agreed through the UNFCCC) is not very meaningful • Displacing GHG emissions from one local authority or region to another within the UK has no benefit • It's unclear whether emerging local authority or regional budgets will add up coherently to the UK budget

[40] Tyndall Centre for Climate Change Research (2022) Quantifying the implications of the United Nations Paris Agreement for local areas.

CONTEXT	ADVANTAGES	LIMITATIONS
Sectoral budgets or reduction strategies	• These are available for many crucial sectors (eg. the Energy Transitions Commission[41] presents net zero strategies for a wide range of sectors) • They often contain detailed, staged measures (and several scenarios) for GHG reductions with interim targets, providing a clearly defined trajectory	• There is a risk that some sectoral strategies represent a lobbying position rather than science-based target setting
Current and future GHG emissions intensity of an activity	• This provides useful context in cases where a project is meeting an established demand, such as for electricity generation, and may have a GHG benefit by displacing a legacy source (eg. renewable generators displacing gas-fired baseload)	• This would not be applicable context for absolute emissions changes, (eg. construction emissions or land-use change at a site level), so would need to be combined with other sources of information
Existing and emerging national and local policy or regulation	• This is extensive, providing context for all development types • It will often provide relatively detailed and specific goals and implementation measures • Policy should be compatible with the UK's national GHG commitments and actions to achieve those	• There can be significant policy gaps or policy lag • It will not always be clear that compliance with policy measures, or a subset of them, amounts to a net zero carbon compatible trajectory
Expert advice of guidance bodies Voluntary performance standards (eg. the UK Green Building Council's 'Net Zero Carbon Building' framework[42])	• Extensive publications and strategies are available, providing context for all development types • Considerable reliance can be placed on the advice of the CCC, which has the statutory duty of advising the government on policy that is necessary to achieve national climate commitments • Expert advice of guidance bodies can identify existing policy/regulatory gaps • Expert advice of guidance bodies can be used as a source to define what constitutes achievable best practice for many development types • Voluntary performance standards provide a framework for evaluating what constitutes best practice for emissions performance, and the means to predict and then monitor this	• Guidance and advice may be contested or conflicting • There is a risk that some guidance represents a lobbying position rather than science-based GHG reductions
Company-specific TCFD reporting, transition risk assessments or Science-Based Targets	• This can provide context that is highly specific to the project in question, where the developer has already set science-based targets and/or undertaken climate risk assessments with scenario analysis that includes a best practice measures/ minimum climate risk scenario	• This may not be available for the majority of projects

[41] Energy Transitions Commission (2022) A global coalition of leaders from across the energy landscape committed to achieving net zero emissions by mid-century.
[42] UKGBC (2019) Net Zero Carbon Buildings: A Framework Definition.



See Supplement p.S-10: Embedded or committed mitigation

6.5 Embedded or committed mitigation

When determining significance, any embedded/ committed mitigation measures that form part of the design should be considered.

It is valuable and strongly encouraged for GHG emissions mitigation to be considered and embedded at the earliest stages of design, where the greatest influence can be achieved, as discussed in Section 2 and in IEMA's 'Pathways to Net Zero: GHG Management Hierarchy' guidance[43].

Where embedded/committed mitigation is relied upon in the assessment of effects, the practitioner must form a clear judgement that this mitigation is:

1. Evidenced in the design for the project
2. A committed goal that is secured, eg. forming part of the description of development, a specific planning condition/requirement, or a legal agreement
3. Realistic and achievable to deliver.

In some cases, mitigation commitments (especially in the form of targets or commitments to actions at a later design stage) may not offer sufficient certainty at the time of undertaking the assessment that the practitioner can rely upon in judging the significance of effects.

In this case, the significance of effects should initially be stated without this mitigation, and it should then fall into the assessment of additional mitigation and residual effects.

6.6 Additional mitigation and residual effects

Where the initial assessment identifies significant adverse effects, additional mitigation should be considered to reduce these effects to an acceptable and non-significant level where feasible.

As a matter of good practice, available mitigation to reduce non-significant effects or further enhance beneficial effects should also be considered where possible.

As noted above, where there is embedded mitigation in the form of project commitments to GHG emission reductions but the details of this are not secured within the project design at the time of assessment, further detail of the potential mitigation measures to achieve that commitment can also be considered within the additional mitigation section and assessment of residual effects.

The assessment of potential residual effects, with incorporation of additional mitigation, must be expressed in conditional terms. The residual effects would depend on the additional mitigation recommendations being accepted, secured and delivered in practice. An example of appropriate wording would be:

'*Residual effects: with the implementation of [the additional mitigation measures as set out above] and the achievement of [measurable GHG emissions goal] the residual effect could be [reduced to not significant/ negligible/beneficial]*'.

[43] ISEP (2020) Pathways to Net Zero: Using the IEMA GHG Management Hierarchy.

7 COMMUNICATION & REPORTING

When reporting on GHG emissions assessment in EIA, the text should conform to Schedule 4: Information for inclusion in environmental statements, of the EIA Regulations document.

7.1 Where should GHG emissions be reported within an ES chapter?

There are three main ways in which GHG emissions can be reported on within an ES chapter. These are as follows:

- Within a GHG emissions ES chapter that focuses on the effects of the proposed project on climate change only
- Within an integrated climate change ES chapter that focuses on both the effects of the proposed development on climate change and of the effects of climate change on the proposed development (ie. climate change resilience and adaptation)
- It may be proportionate for a section in the project description or an appendix to provide information on GHG emissions to support a conclusion about whether these are significant, without a full ES chapter

Regardless of where GHG emissions are reported within the ES chapter, it is crucial that the assessment is transparent and a conclusion on the significance of effects is reached and clearly stated.

7.2 How does reporting on GHG emissions fit with related EIA topics?

The effects of potential future climate change based on the net GHG impact from a project are likely to be interrelated with other key EIA topics. To ensure consistency is provided throughout the ES, the GHG team will need to liaise with other key EIA topics including (but not limited to):

- Logistics/Transport (Transport Assessment)
- Resources and waste management (construction and demolition)
- Noise/vibration and air quality (construction activities, hours of work, fuel uses, list of plant and energy use)
- Ecology, landscaping and Sustainable Urban Drainage Systems (green infrastructure and land-use change).

7.3 What should be included when reporting on GHG emissions within an ES chapter?

Consistent reporting of GHG emissions in EIA will highlight the importance of accounting for GHG emissions from project inception. It will encourage clients, project developers and engineering design teams to consider the impacts of GHG emissions during early design stages. It is suggested that a brief introduction to climate change and the role of GHG emissions as a contributing factor is included where the effects of GHG emissions are reported within the ES chapter. This will help explain the interrelationship between GHG emissions and climate change with other relevant topics to the readers. This may further be supported with relevant links to documents and information on the topic.

When reporting on GHG emissions and mitigation in EIA, the following steps should be presented where available:

- **Baseline emissions:** the existing and future emissions within the assessment boundary without construction and operation of the project
- **Net emissions (Year 1 and lifetime):** the direct and indirect emissions of the project during the first year of operation and for the full lifetime of the project expressed as a change compared to the current and/or future baseline
- **Significance:** a significance value should be assigned to effects based on the criteria set out
- **Further mitigation:** the GHG reductions that could be achieved through the application of further mitigation (this will be expressed conditionally and may be quantitative or qualitative)
- **Residual effects:** a new significance value is assigned to effects taking account the further mitigation measures that have been outlined

7.4 What are the challenges associated with reporting on GHG emissions in EIA?

There are a number of challenges, difficulties and opportunities associated with integrating GHG assessment into EIA practice. These challenges and ways to overcome them are presented below:

- The possible effects identified from a GHG emissions assessment can be interlinked with other EIA topic chapters. Therefore, it is important to liaise with other EIA topic specialists where necessary (eg. transport, waste management, air quality) – and indeed with practitioners providing assessments such as energy modelling and BREEAM/CEEQUAL. This also needs to be considered when reporting on significant effects within the ES.
- GHG emissions associated with a proposed project are often reported as a whole life figure that takes account of both construction and operation. This whole life approach is often at odds with the sub-headings set out in ES chapter templates provided by EIA co-ordinators. However, due to the nature of GHG emissions, it is good practice to include a section that reports on the whole life GHG emissions associated with the proposed project, alongside the sections that assess construction and operation effects in isolation. Additionally, if there is other data or information that needs to be included that doesn't fit into the provided ES chapter template, then additional sub-sections should be added in order to present all the data from the GHG emissions assessment; to inform the EIA and account for the possible effects on future climate change.
- It is challenging to identify fixed numerical thresholds against which to identify the significance of a proposed project regarding the net change in GHG emissions. The GHG assessment should therefore present context for the GHG emissions as discussed in Section 6: Significance.
- Where GHG assessment is used to inform early design stages, it is vital to get stakeholders to understand the importance of minimising the GHG contribution of a project and designing a project that will limit the net change in future GHG emissions.

A

APPENDIX A: POTENTIAL STAKEHOLDERS & SOURCES OF GHG INFORMATION

A1 Potential stakeholders, sources of environmental information and carbon tools

SOURCE	DESCRIPTION
Climate Change Committee (CCC) – The Sixth Carbon Budget[44]	The CCC reports on UK carbon budgets, by sector, and reductions that need to be achieved if the UK is to achieve its carbon reduction target of net zero by 2050. This includes reports for GHG emissions by UK industrial sector: surface transport, buildings, manufacturing and construction, agriculture & LULUCF, aviation, shipping, waste, F-gases and GHG removals. Reports for the UK's electricity and fuel supply are also reported.
The Department for Business, Energy & Industrial Strategy (previously DECC)[45]	The UK Government regularly reports on UK energy and emissions projections by source: agriculture, business, energy supply, industrial processes, land-use change, public, residential, transport and waste management. Currently, GHG emissions reach back to 1990 and project into the future up until 2035 and 2040 (for the 2019 projections).
The Department for Business, Energy & Industrial Strategy (previously DECC)[46] UK greenhouse gas emissions statistics	The UK Government also reports on GHG emissions from a geographical perspective, by UK local authority. Current and historical emissions are available which may be used to establish current baseline emissions.
The Department for Transport (DfT) TAG (the Transport Analysis Guidance) – Data Book[47]	TAG provides UK transport modelling values and information including projections on how the UK's modal mix (diesel, petrol, electric) is expected for change over time, current and future fuel efficiency projections (litres or kWh per kilometre travelled) up to 2050. Also reported are carbon dioxide emissions per litre of fuel burnt or kWh used for: petrol, diesel, gas oil and electricity used on road and rail travel.
The Green Construction Board – Infrastructure Carbon Review, Technical Report[48]	The GCB has developed a tool that allows stakeholders to model policy changes associated with the built environment and visualise what this means in terms of GHG emissions. Also available is the Low Carbon Routemap report[49] which explores various GHG emissions projections for both building and infrastructure at the UK level.

[44] Climate Change Committee (2020) Sixth Carbon Budget.
[45] Department for Business, Energy & Industrial Strategy (2021) Energy and emissions projections.
[46] Department for Business, Energy & Industrial Strategy (2018) UK greenhouse gas emissions statistics.
[47] Department for Transport (2021) TAG data book.
[48] The Green Construction Board (2013) Infrastructure Carbon Review Technical Report.
[49] Institution of Civil Engineers (nd.) Low Carbon Concrete Routemap.

SOURCE	DESCRIPTION
Inventory of Carbon and Energy (ICE) – University of Bath: Sustainable Energy Research Team[50]	The Inventory of Carbon and Energy (ICE) database is a leading embodied energy and carbon database for building materials.
The Department for Business, Energy & Industrial Strategy (previously DECC)[51] – Government emission conversion factors for greenhouse gas company reporting	The Government conversion factors for greenhouse gas reporting are suitable for use by UK based organisations of all sizes, and for international organisations reporting on UK operations.
Examples of publicly available carbon assessment tools. The list of carbon tools is non – exhaustive and constantly changing. It is up to the practitioner's professional judgement to decide which tool is most appropriate for the project at hand. It is perfectly appropriate to develop bespoke assessment sheets which may provide more flexibility and transparency.	• Scottish Government Windfarm Carbon Assessment tool[52] • Environment Agency Carbon Planning Tool[53] • RSSB Carbon Tool[54] • National Highways Carbon Tool[55] • MacKay Carbon Calculator[56] • Transport Scotland: Carbon Management System (CMS)

[50] Circular Ecology (2019) Embodied Carbon – The ICE Database.
[51] Department for Business, Energy & Industrial Strategy (2021) Government conversion factors for company reporting of greenhouse gas emissions.
[52] Scottish Government (2018) Carbon calculator for wind farms on Scottish peatlands: factsheet.
[53] Environment Agency (2016) Carbon planning tool.
[54] RSSB (2021) Rail Carbon Tool.
[55] National Highways (2021) Carbon emissions calculation tool.
[56] Department for Business, Energy & Industrial Strategy (2020) Carbon calculator.

B

LIST OF STANDARDS

This list is not exhaustive, and subject to updates.

STANDARD
BRE IMPACT LCA standard – allows the embodied carbon, life cycle environmental (LCA) and life cycle cost (LCC) performance of buildings to be measured and compared in a standardised way.
BS EN 15686-1:2011 – Buildings and construction assets – service life planning, general principles and framework.
BS EN 15804:2012 – Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.
BS EN 15978:2011 – Sustainability of construction works, Assessment of environmental performance of buildings, Calculation method.
BS EN ISO 14021:2016 – Environmental labels and declarations. Self-declared environmental claims (Type II environmental labelling).
BS EN ISO 14025:2006 – Environmental Labels and Declarations. Quantified environmental performance declarations (Type III Environmental Labelling) – guiding principles and procedures.
BS EN ISO 14044:2006 – Environmental Management. Life cycle assessment. Requirements and guidelines.
BS EN ISO 14064-1:2018 – guidance on reporting GHG emissions at an organisational level.
BS EN ISO 14065:2020 – guidance on principles and requirements for bodies performing validation and verification of environmental information statements.
BS EN ISO 14604-2:2018 – guidance on reporting GHG emissions at the project level.
ENCORD: the European Network for Construction Companies for Research and Development – a network for active members from the construction industry who have published a 'Construction CO2e Measurement Protocol'.
Greater London Authority – draft Whole Life-Cycle Carbon Assessments Guidance.
PAS 2050:2011 – Specification for the assessment of the life cycle greenhouse gas emissions of goods and services.
PAS 2070:2013 – Specification for the assessment of greenhouse gas emissions of a city.
PAS 2080:2016 – Carbon Management in Infrastructure – the world's first standard for managing infrastructure GHG emissions.
PD CEN ISO/TS 14067:2018 – Greenhouse gases. Carbon footprint of products. Requirements and guidelines for quantification and communication.
RICS (2021) Whole Life Carbon Assessment for the Built Environment, 1st edition.
UK Green Building Council – Net Zero Carbon Buildings: A Framework Definition.
WRI GHG Protocol – the World Resource Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) partnered to develop internationally recognised guidance and standards on GHG accounting and reporting, and includes advice on: • Corporate Standards • Corporate Value Chain (Scope 3) • Product Life Cycle assessments • Project Protocol (The GHG Protocol for Project Accounting) • GHG Protocol for Cities • Agricultural Guidance.

ISEP
Institute of Sustainability & Environmental Professionals

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+44 (0)1522 540069 • INFO@ISEPGLOBAL.ORG • IESEPGLOBAL.ORG

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