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Written evidence submitted by UK nominated national experts to IEA Annex 89

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Summary

- The embodied carbon of buildings is responsible for around 9% of the UK's total annual carbon footprint, comparable with operational carbon.
- The planned increase in construction activity will increase these emissions, unless there is robust intervention in planning policy and Building Regulations.
- Previous recommendations, by this Committee and by the CCC, have been to legislate for the mandatory measurement and progressive reduction of embodied carbon but these recommendations have not been enacted.
- The construction industry, and leading Local Planning Authorities, are aware of this issue and are asking for national regulation to provide certainty and a level playing field.
- While a lack of regulatory certainty persists in the UK, the economic opportunities from climate tech start-ups with assessment tools and low carbon material innovations are being lost to competing countries
- An increasing number of countries have already introduced embodied carbon reporting requirements and limits into regulation; the most recent cast of the European Energy Performance of Buildings Directive will ensure that in the next few years this will be the case across Europe.
- We propose specific revisions to the NPPF to explicitly include embodied carbon as a consideration within planning, and recommend a range of supporting activities that MHCLG & DESNZ could undertake to restore the UK's position as an international leader on this topic.

Evidence

The following evidence addresses enquiry Q5, offers recommendations for action by the Government, and concludes with a summary of the authors' relevant expertise and reasons for submitting evidence to this inquiry.

Q5 What contribution can the NPPF make to meeting Government targets for the reduction of greenhouse gas emissions? What account does the NPPF take of advice from the Climate Change Committee on reducing the use of embodied carbon as well as operational carbon in the built environment?

1. The NPPF (December 2024) does not include consideration of embodied carbon and takes insufficient notice of advice from the Climate Change Committee (CCC). However, it could be revised in conjunction with other policy instruments to include embodied carbon, and thereby increase its contribution to Government targets for the reduction of greenhouse gas emissions. The following evidence articulates the significance of embodied carbon, the potential for its reduction, prior recommendations and actions, industry preparedness, growing international precedents for regulatory responses, the

opportunity costs and risks of continued inaction, and considers the role of the NPPF versus other policy instruments.

Significance of embodied carbon and reduction potential

- The embodied carbon of a building is the impact of its materials and components: that is, the greenhouse gases emitted during the manufacture, transport, and construction of the building ('upfront emissions'), then during maintenance, repair and replacement over the building lifetime, and finally during demolition, transport and waste processing activities at the end of life. The total embodied carbon of building construction represents approximately 9% of the UK's total carbon footprint, making it comparable in impact to operational carbon (from heating, lighting, etc). Unlike operational carbon however, the majority of embodied carbon (certainly for a domestic building) are the upfront emissions, emitted before the building is inhabited.
- The total annual embodied carbon emissions in the UK have not reduced significantly since 1990. Figure 1 illustrates embodied and operational carbon relative to the UK's total territorial and consumption-based emissions accounts (based on UKGBC recent [progress report](#) and [Net Zero Whole Life Carbon Roadmap for the Built Environment](#)). The only reductions in total embodied carbon were following the global financial crisis and during the COVID pandemic which coincided with [significant drops in construction output](#). Meanwhile modest reductions in carbon intensity of materials over the last few years have been offset by increased construction activity. Over the next 30 years construction activity is set to rise further with targeted delivery of >300,000 new homes a year, retrofitting a home a minute, adapting much of our non-domestic building stock and transforming our infrastructure systems. Embodied carbon is therefore highly [likely to increase](#) rather than decrease, in the absence of additional policy interventions.

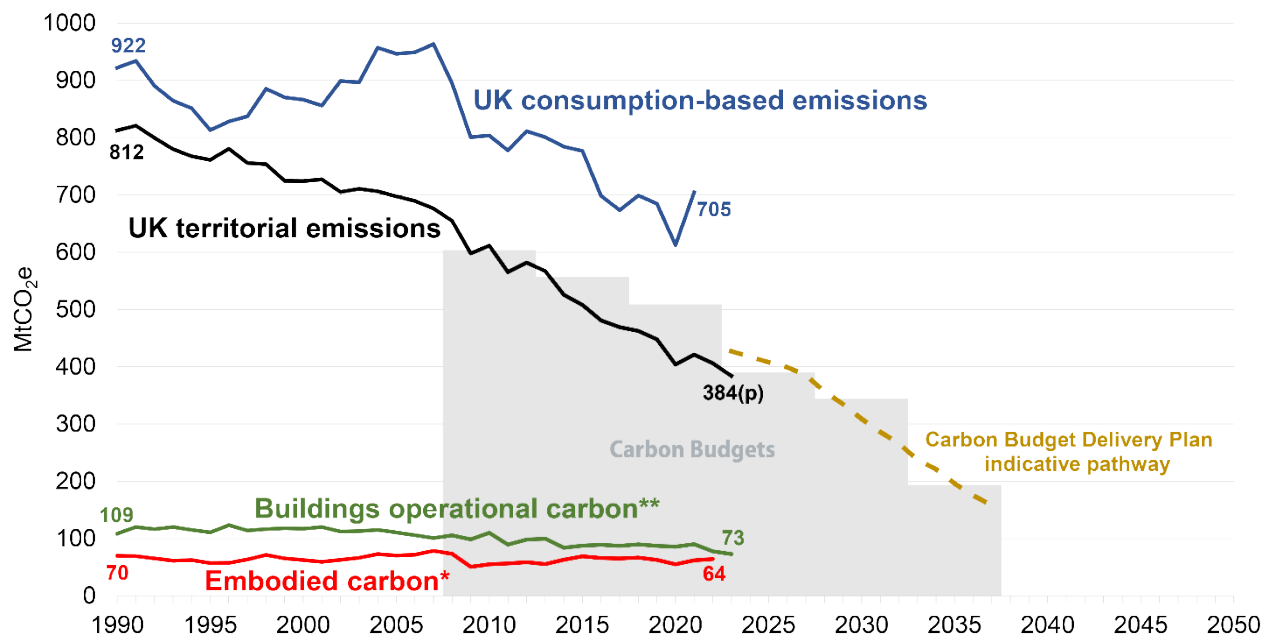


Figure 1 - Embodied carbon emissions from the UK built environment relative to national greenhouse gas emission accounts¹

- The [UKGBC's Net Zero Whole Life Carbon Roadmap for the Built Environment](#) estimated that during the period 2024-2050, the built environment will be responsible for the release of around 1.7 GtCO₂e. Less than one tenth of these emissions are tackled by existing regulation and the forthcoming Future Homes Standard and the Future Buildings Standard.

¹ Territorial emissions from DESNZ's March 2024 release of [provisional national statistics to 2023](#) and consumption-based emissions from Defra's May 2024 release of [UK's Carbon Footprint](#).

*Embodied carbon of built environment from [UKGBC 2023 Whole life carbon roadmap progress report](#).

**Buildings operational carbon from [CCC 2024 Progress report to Parliament](#).

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5. Though significant reductions in the carbon intensity of key UK construction supply chains such as steel and cement were achieved in the 1990s and 2000s, recent improvements have been marginal, with [analysis from the UKGBC](#) suggesting that the overall average carbon intensity of UK construction activity has declined by <1%/year over the past decade. Though the Government has set out a range of long-term supply-side policies to support domestic industrial decarbonisation, these will take decades to roll out and will not address the growing volume of imported construction materials. In the meantime, demand-side measures and policies addressing carbon leakage (e.g. UK CBAM) are essential to support the development of a market for low-carbon products and to reduce the overall costs of decarbonisation. Measures, such as whole life (operational + embodied) carbon assessments and embodied carbon limits for buildings have been repeatedly identified through prior [research](#) and [consultations](#) as one of the most effective demand-side measures.
6. [Analysis from the Future Homes Hub](#), based upon 35 designs from 10 of the UK's prominent homebuilders, suggests that the upfront carbon intensity of UK housing varies from approximately 200-800 kgCO₂e/m² with averages of 417 kgCO₂e/m² (low-rise) & 635 kgCO₂e/m² (medium/high-rise). Meanwhile whole life embodied carbon varies from approximately 300-1000 kgCO₂e/m² with averages of 615 kgCO₂e/m² (low-rise) & 866 kgCO₂e/m² (medium/high-rise). The significant variation in embodied carbon for the same functionality suggests that there is substantial potential to reduce embodied carbon through changes in design.
7. This would suggest construction of 300,000 homes per year with current UK designs would incur upfront carbon emissions of roughly 15 MtCO₂e/yr (range 5-35) and total embodied carbon over the whole life of the building of 22 MtCO₂e/yr (range 7-45)². Other estimates are offered by [Drewniok et al. \(2023\)](#) of 9.4 MtCO₂e upfront carbon for domestic buildings in 2018, and [UKGBC](#) of 17.6 MtCO₂e for 2022.
8. It is important to also consider, and seek to minimise, the embodied carbon of non-domestic buildings within the planning framework. Housing only constitutes [38% of construction output](#) in the UK, and the embodied carbon of non-domestic buildings is estimated to [account for a larger share of the sector's total emissions](#). There are fewer perceived barriers to implementation of embodied or whole life carbon assessment for large non-domestic developments (e.g. costs associated with assessment will typically be <<1% of overall project costs) and a significant minority of developers already undertake such assessments on a voluntary basis, driven by factors such as corporate sustainability reporting requirements and voluntary reduction targets such as those set under the [Science-Based Targets Initiative](#)³.

Prior recommendations and actions

9. The Environmental Audit Committee's 2022 [inquiry into the sustainability of the built environment](#) recommendations included that: *"the Government introduce, not later than December 2023, regulations to mandate whole-life carbon assessments for buildings above a gross internal area of 1000m², or which create more than 10 dwellings. This requirement should be established in Building Regulations, and ought to be reflected in the planning system through national planning policy. Local authorities should be encouraged and supported to include this requirement within their Local Plans ahead of the introduction of national planning requirements"*. Furthermore, *"that following the introduction of whole-life carbon assessments, the Government should develop progressively ratcheted carbon targets for the built environment, to match the pathway to net zero set out in periodic carbon budgets. These ratcheting targets should be reported on annually, and progress reports towards achieving these targets should be published annually as part of the Net Zero Strategy indicators"* and

² Central estimate assumes average new home size of 110 m² and average emissions intensity from Future Homes Hub analysis with 80% low-rise and 20% medium-high rise. Illustrative range assumes average home size varies from 60-155 m² and uses range of emissions intensities from Future Homes Hub analysis.

³ Over 1000 UK companies have adopted science-based targets, including over 200 involved in homebuilding, construction and real estate, including a majority of the UK's largest contractors.

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“that a clear timeframe for the introduction of mandatory whole-life carbon assessments and ratcheting targets should be set by Government by the end of this year.”

10. As noted by the Committee, in March 2022 the CCC also drew attention to the lack of a Government strategy to address the use of embodied carbon in new developments: *“The Government’s strategies do not address the issue of embodied carbon associated with constructing new buildings.”* Recommendations from the CCC on this topic date back to 2018, when they first compiled a set of [underlying research reports](#) which concluded that *“A new mechanism is needed to incentivise and drive whole-life carbon savings for new buildings. This should cover embodied emissions and carbon sequestration.”* This research underpinned a series of subsequent annual recommendations of similar character, for example a specific recommendation to MHCLG in their 2020 Progress Report to Parliament to *“Develop plans to rapidly scale up the levels of wood used in construction and support the assessment and benchmarking of whole-life carbon in buildings”* or their [2022 Progress Report to Parliament’s](#) recommendation that DLUHC should *“set out a plan to make an assessment of whole-life carbon and material use of public and private construction projects mandatory by 2025, to enable minimum standards to be set.”* The CCC have repeatedly noted the insufficient action in response to these recommendations, for example the later recommendation being classed as *“Overdue with some but insufficient progress”* in the subsequent annual progress report. In summary, 6 years of repeated recommendations have been insufficiently actioned by Government.
11. The [Government’s response to the EAC’s 2022 enquiry report](#) announced an intention to *“consult in 2023 on our approach and interventions to mainstream the measurement and reduction of embodied carbon in the built environment”*. No such consultation has been published. The Government response acknowledged *“calls for a clearer timeline setting out our long-term plan to mainstream assessment, management and reduction of embodied carbon”* but no such timeline has been published. The Government also recognised *“calls from stakeholders that WLCA in the built environment will benefit from the creation of a level playing-field and we will look at whether Government endorsement of specific standards, methodologies or tools for assessing whole life carbon is appropriate”*. No specific interventions have subsequently been made to ensure a level playing-field. The Government response also *“acknowledges some countries in Europe have started legislating whole life carbon assessments, and setting WLC targets for new builds, as described in the EAC report. This legislation has all been implemented relatively recently. The Government will review the different methodologies employed by these countries, and monitor the impact of their implementation, to help inform our future policy-making”*. No formal review of international practice has been published by Government. Following the 2022 enquiry, the authors of this response supported BEIS/DESNZ in bringing together 300 international stakeholders to a hybrid event that sought to make the requisite international connections. This subsequently led to the establishment of the Whole Life Cycle Policy Coalition (WLCPCo) under UNEP (of which 2 of the submitting authors remain core members) and civil servants within DESNZ, particularly Melanie Jans-Singh, should be commended for assembling this coalition and furthering international best practice. There has also been some progress by MHCLG in commissioning a package of background research conducted by AECOM. However, it is not clear that MHCLG have sufficient awareness of WLCPCo activities or mechanisms to incorporate insights from international best practice into domestic policy development.
12. Parliamentarians have unsuccessfully attempted to address the topic through two iterations of the [Carbon Emissions \(Buildings\) Bill](#) and [proposed amendments to the Levelling-up and Regeneration Act 2023](#). When the 2022 Carbon Emissions (Buildings) Bill received its 2nd reading, the then Labour shadow minister, Jonathan Reynolds (now Secretary of State for Business and Trade), offered support for the Bill, saying, *“We support it. I agree with [Jerome Mayhew MP’s] proposition that industry would welcome further regulation in this area”* ([Hansard](#)). However, since the change of Government in July 2024 there has been no public statement providing direction on this topic.

Industry and Local Authority preparedness

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13. Since publication of the report from the Environmental Audit Committee's 2022 [inquiry into the sustainability of the built environment](#), the industry has accelerated development of data, tools and standards to support embodied and whole life carbon assessment. Key examples include: the launch of the [Built Environment Carbon Database](#) (BECD) providing free-to-use repositories for whole-life carbon assessments of built assets and product data. Release of the pilot version of the [UK Net Zero Carbon Building Standard](#) - a voluntary standard, developed by industry, which includes limits on upfront carbon (the embodied carbon to practical completion). Development of the [Future Homes Hub whole life carbon conventions and simple free tool](#) designed with and for homebuilders. Updated and expanded versions of key industry guidance documents, such as v3 of the [Institution of Structural Engineers' How to calculate embodied carbon](#), the extension of [PAS 2080](#) in 2023 to encompass carbon management in buildings as well as infrastructure; and the development of widely endorsed [common definitions](#) by the Whole Life Carbon Network. In the meantime, availability of Environmental Product Declarations have increased several-fold with "likely [over 120,000 EPD for construction products](#) globally". However, in the absence of regulatory drivers many of these new resources remain underutilised (e.g. reporting to the BECD has been limited to date).
14. Related innovation in the start-up space has also grown. Imperial's hub for the UK's climate innovation and community, has launched a Retrofit Accelerator for SMEs, start-ups and scaleups. [Carbon13](#), the venture builder for the climate emergency which spun out of the Judge Business School in Cambridge, has already launched – and funded – 10 cohorts of climate tech entrepreneurs with at least [fifteen new start-ups](#) focusing on the built environment since the programme was launched in 2021. This growing number of start-ups seem able to be securing more funding than other sectors and other countries, as shown by PwC's fifth 'Global State of Climate Tech' report, [which showed a 24% increase in funding in the UK's climate tech sector](#). Collectively these and many other resources and innovations have significantly increased industry preparedness for regulation.
15. Local planning authorities have also increased their focus on and knowledge of this topic. Many authorities have followed the precedent set by the Greater London Authority in introducing mandatory requirements for the assessment of embodied carbon and, in some cases, introducing limits on large developments. For example, Bath and North East Somerset Council have introduced [Policy SCR8](#) which requires large scale new-build developments to submit an Embodied Carbon Assessment and demonstrate that a maximum value is not exceeded⁴. However, [a recent review by staff from Arup and the University of Sheffield](#) identified that while 62% of local planning authorities mention 'embodied carbon' in their local plans or supplementary planning documents, only 7% outside London mandate the undertaking of a whole life carbon assessment in any form (as of July 2024). This proportion is expected to expand with many authorities in the process of preparing technical evidence bases ahead of adopting similar requirements (see e.g. the technical evidence base prepared for [Essex](#)).
16. Several local authorities have also adopted positions that anticipate further imminent intervention from MHCLG. For example, the [Central Lincolnshire Local Plan](#), adopted in 2023, states: *"All major development proposals should explicitly set out what opportunities to lower a building's embodied carbon content have been considered, and which opportunities, if any, are to be taken forward. In the period to 31 December 2024, there will be no requirement (unless mandated by Government) to use any specific lower embodied carbon materials in development proposals, provided the applicant has at least demonstrated consideration of options and opportunities available. From 1 January 2025, there will be a requirement for a development proposal to demonstrate how the design and building materials to be used have been informed by a consideration of embodied carbon, and that reasonable opportunities to minimise embodied carbon have been taken. Further guidance is anticipated to be issued by the local planning authorities on this matter prior to 1 January 2025."* However, this lack of clarity is challenging for developers who cannot easily plan for guidance that does not yet exist.

⁴ Researchers have been studying the efficacy of this policy – see [Simaitis et al. \(2023\)](#) & [Hawkins et al. \(2024\)](#)

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17. The recognition of the need to create a level playing field, and for tools to enable routine processing of submissions to local authorities, is evident from a project recently funded by Innovate UK: the Planning Application Carbon Evaluation and Reduction (PACER) Platform. This lightning-fast project funded under the Net Zero Living Programme has filled a gap in equipping LPAs with the tool and the upskilling opportunity necessary to fulfil their roles of gatekeepers of our built environment. PACER is now fully referred in Section 6.2 of Westminster's Retrofirst [Policy](#).
18. Industry is also calling for national regulation of embodied carbon, with over 200 organisations providing statements of support to the [Part Z](#) initiative. Many of these [statements of support](#) express the need for a level playing field that can only be provided by national regulation. The current proliferation of differing formulations of requirements by local authorities adds complexity and costs of compliance to firms operating across the UK. In addition, many of the sector's professional institutions and membership organisations published a [joint policy position paper](#) calling for embodied carbon regulation ahead of the 2024 general election.

Economic costs and business risks of continued inaction

19. There is considerable economic potential in this area of UK climate tech, as proved by the growth in investment. However, companies struggle to thrive in the unregulated market of the UK, due to the lack of a sufficient driver for industry support. One example, Cercula Ltd, [a company selected and featured for its innovation and decarbonisation potential by CEMEX Ventures as a Top 50 startup](#), is no longer operational. This encourages investment to go elsewhere: London-based growth equity firm PSG has invested €40M in the incumbent tool and Finnish company OneClick LCA. This has represented a double loss for the UK, with OneClick LCA recently scaling up hiring and operations in the US and Germany rather than the UK, quite possibly due to the lack of a compelling and thriving market case.
20. The continued inaction and lack of clear policies to address embodied carbon also suppresses investment in the underpinning data. Despite pioneering expertise in the UK, the country is now falling behind comparator countries in terms of number of Environmental Product Declarations (EPD) being produced. In comparison, the regulated requirements for EPD in the USA and EU are driving innovation and investment. In the US, the Inflation Reduction Act includes six sections that address embodied carbon of construction materials, and included nearly [\\$160m in grants](#) to support EPD production. In the EU, environmental data is now a mandatory requirement for manufacturers under the Construction Product Regulation (CPR). This imposes compulsory indicators, and member states are obliged to adhere to these standards, eliminating disparate regulations. Unsurprisingly, these policies have generated in turn, thriving start-ups in the scene. For example, in the US, Pathways AI has secured \$2.5M investment from Spanish VC-fund Zacia Ventures. In the EU, Munich-based Emidat secured €4M from globally-leading VC General Catalyst (which has a London office since 2021).
21. The cost of inaction is further manifested in paralysis even where the willingness to act exists. One example is the recently-settled [case](#) of the M&S building in Oxford Street, London – whose demolition was authorised by the Government in early December 2024. Lack of clarity on whole life carbon policies, and how to evaluate new builds over demolition, led to a situation in which every assessment put forward by one party could be countered by another assessment by the other party. A regulated operational framework, where acceptable methodologies, methods, data and approaches/tool are clearly acknowledged would diminish the risk of such cases. At a smaller scale, similar ill-informed decisions take place all the time, with many buildings worth being refurbished facing instead wasteful, and carbon-intensive demolition.
22. In the absence of a routine national approach, industry has attempted to fill this void (as shown with the many examples of resources, guidance, standards, and methodologies highlighted at point 13 of this response), the result has been a rather complex, confusing and fragmented panorama, which at times has already required further work to clarify inconsistencies (e.g. target alignment work between RIBA and LETI). Stakeholders have poured thousands of hours into these activities, which might all be wasted if they are ultimately inconsistent with the Government approach.

International precedents

23. Since the Committee concluded their [prior inquiry on 'sustainability of the built environment'](#), there has also been a rapid acceleration in the adoption of embodied and whole life carbon policies internationally. For a summary of national interventions see maps, reports and briefings by the [Carbon Leadership Forum](#), [WGBC](#) & [BPIE](#) or [C40](#) for examples of policies adopted by cities and local authorities. Best practice has been led by the Nordic countries, synthesised in this [timeline of Nordic climate declaration and limit values](#) introduced through regulation. A [recent survey of OECD member countries](#) highlighted that whilst only 21% already have regulations on whole-life carbon (i.e. a mandatory declaration or limit value), a further 43% identified development of whole-life carbon policy as a future priority.
24. The most pertinent of these recent changes is the adoption of the [recast Energy Performance of Buildings Directive](#) (EPBD) by the EU. Articles 7(2, 3 & 5) and Annex III collectively require member states to ensure: life-cycle global warming potential is calculated and disclosed through the EPC for buildings >1000m² from 01/01/28 and for all new buildings from 01/01/30; and that member states publish by 01/01/27 roadmaps for the introduction of limit values from 2030 with downward ratcheting thereafter. The directive also empowers the Commission to develop a union framework for calculations by 31/12/25. The [WGBC provide a brief summary and overview](#) of the challenges with implementation. There are also [ongoing efforts](#) to clarify and implement the EPBD provisions that the UK Government should pay close attention to. Though the UK is already behind front-runner countries like France, Denmark, the Netherlands, Sweden, and Norway in adopting regulations that require assessment and/or limiting of embodied carbon, the adoption of the EPBD recast means that if we do not have an equivalent approach in place within this parliament we will be an outlier within Europe.
25. Evidence from front-runner countries has shown that industry can respond effectively to the introduction of mandatory embodied carbon reporting requirements and limits. For example, in Sweden submissions from the first two years of mandatory 'climate declarations' have [achieved lower average embodied carbon levels than anticipated](#); meanwhile in Denmark the Danish Authority of Social Services and Housing are intending to [tighten their limit values for new construction at a faster rate than initially anticipated](#). Although experience in these countries has highlighted some challenging areas in policy design (e.g. the need for consideration of exemptions or special conditions for buildings with certain functional requirements), they have also demonstrated the value of collaboration and harmonisation, such as the in the recent [Nordic work on harmonising limit values](#). As illustrated in the [discussion topics](#) at the latest annual Nordic Climate Forum for Construction, many of the challenges to implementing embodied carbon policy in the UK are also subjects of discussion in countries that have already moved forwards with the introduction of regulations.
26. When it comes to the interface between local and national policies, the UK should take inspiration from other countries in using local authorities as a testbed for national regulation. For example, the national methodology in Finland was rolled out first in Helsinki with learnings captured and informing subsequent revisions. There is currently no similar coordination with UK local authorities, and there does not appear to be any central capture of information generated by the range of local policies adopted to date, let alone a coordinated effort to gain insights from this natural experiment of differing approaches that could inform national policy development.

Role of NPPF versus other policy instruments

27. The recently revised [NPPF](#) notes that the planning system "*should support the transition to net zero by 2050*" and "*help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions*". To meet the challenge of climate change, local planning authorities should "*give significant weight to the need to support energy efficiency and low carbon heating improvements*" and "*planning applications for all forms of renewable and low carbon development*". The NPPF further states that "*new development should be planned for in ways that...help to reduce greenhouse gas emissions, such as through its location, orientation and design*" and "*Any local requirements for the sustainability of*

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buildings should reflect the Government’s policy for national technical standards.” In determining planning applications, local planning authorities should expect new development to: *“take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption”* but throughout there is no explicit mention of embodied carbon or the need to minimise this through design. The recent revisions, while strengthening certain aspects of low carbon development, do nothing to explicitly tackle embodied carbon. The [associated planning practice guidance](#) indicates that local authorities should promote low carbon design approaches but all the corresponding examples are focused solely on operational carbon.

28. The [National Design Guide](#) (R1, p43) notes that well-designed places and buildings *“follow the principles of whole life carbon assessment and the circular economy, reducing embodied carbon and waste and maximising reuse and recycling.”* However, despite acknowledgement in the national design guide, current planning practice guidance still only states that local authorities *“can set energy performance standards for new housing or the adaptation of buildings to provide dwellings, that are higher than the building regulations, but only up to the equivalent of Level 4 of the Code for Sustainable Homes”* and *“are not restricted or limited in setting energy performance standards above the building regulations for non-housing developments.”* This guidance should be urgently updated to provide clarity. Prior ministerial statements have also sought to clarify the extent to which local authorities can set more ambitious sustainability standards but have not provided clear guidance on the extent to which embodied carbon can be considered. This has resulted in an inconsistent range of approaches being adopted across the country, described in point 15 above and in the recent review by [Graham et al.](#)
29. In comparison, Scotland’s recently launched [National Planning Framework 4](#), includes policy 2(a) which explicitly states that *“Development proposals will be sited and designed to minimise lifecycle greenhouse gas emissions as far as possible”*. This clarity has supported Scottish local authorities in adopting embodied and whole life carbon guidance and requirements, such as [Moray County Council’s Carbon Guidance](#) which provides detailed requirements for developments above a threshold of 10 residential units and 1000m² of commercial, industrial, retail, leisure or infrastructure developments.

Recommendations

Policy recommendations

30. The NPPF should be amended to support Government targets for the reduction of greenhouse gas emissions by changing:
 - a. Clause 164(b) from “help to reduce greenhouse gas emissions, such as through its location, orientation and design” to “help to **minimise lifecycle** greenhouse gas emissions, such as through its location, orientation, **materials** and design”
 - b. Clause 166(b) to “take account of landform, layout, building orientation, massing and landscaping, **and material selection** to minimise energy consumption **and embodied carbon”**
31. In addition, policy levers beyond planning should be amended in tandem to integrate whole life carbon assessment requirements, and subsequently limit values, into Building Regulations – as previously recommended by the Committee. The Building Safety Act has introduced a more structured approvals process, increasing the accountability of designers and contractors in evidencing their compliance with safety and performance standards. This provides an opportunity to integrate embodied carbon considerations into this process, requiring stakeholders to demonstrate how they have accounted for embodied carbon impacts, as part of regulatory submissions. Building Regulations are therefore an appropriate policy instrument for introducing specific reporting requirements and subsequently limits. Such changes to both planning and Building Regulations to address embodied carbon [can and should be complementary](#) and should be viewed as a combined package not competing policy options.
32. In the interim, the Secretary of State for Housing, Communities and Local Government should issue a Ministerial Statement on the topic of embodied and whole life carbon emissions clarifying the acceptable interpretations of the current framework and guidance and providing template wording for the forms of additional local policy to address embodied carbon that may be adopted by LPAs. This should seek to encourage greater uptake whilst ensuring a more standardised approach.

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Additional activities which would support greater consideration of embodied carbon include:

33. MHCLG should establish a project to synthesise information received by, and capture learning from, leading local authorities who have already introduced embodied or whole life carbon assessment requirements. This project should capture both quantitative information from planning submissions, and qualitative information on the efficacy of the policies and any supporting guidance. Any resources arising from the project should be updated and maintained until such time as a national approach is adopted.
34. MHCLG should publish the full set of deliverable evidence reports produced by AECOM on the economic, practical and technical impacts of whole life carbon assessments in the built environment, not just a single summary report.
35. The Government should support a level playing field for carbon assessment by either announcing the intent to establish a distinct national methodology for whole life carbon assessment or formally adopting an existing widely used standard (i.e. the [RICS Professional Standard on Whole life carbon assessment in the built environment – 2nd edition](#) as recommended by the EAC in 2022).
36. The upcoming [Net Zero Buildings Strategy](#) in preparation by DESNZ should consider the embodied carbon of non-domestic buildings. DESNZ should work with MHCLG to implement corresponding policies to assess and reduce embodied carbon (see point 31 above).
37. DESNZ should also work with MHCLG to ensure learnings from international precedents captured through the WLCPCo and ongoing research projects are not just used to promote improved international practice but are also cascaded into the development of national policy within the UK.

Expertise and reason for submitting evidence

IEA EBC [Annex 89](#) of the International Energy Agency Energy in Buildings and Communities programme is a four year (2023-2027) multinational project focused on '**Ways to Implement Net-zero Whole Life Carbon Buildings**'. This project builds on the work of previous annexes including IEA EBC Annex 72 '**Assessing Life Cycle Related Environmental Impacts Caused by Buildings**' (2017-2022) and IEA EBC Annex 57 '**Evaluation of Embodied Energy and CO2 Equivalent Emissions for Building Construction**' (2011-2016). Around 150 participants (national experts plus PhD students) from 31 countries are participating in IEA EBC Annex 89. The UK is represented by five nominated national experts and two PhD students. Brief author biographies can be found below.

The UK's national expert team have been exposed to a wide range of international practice through our participation in the Annexes and our many years of independent research and consultancy in the UK. Over this period the UK, once an international leader on this topic, has fallen behind emerging best practice in other countries. The expert team believe that intervention from Government is required to arrest this trend and help the Government achieve its stated goal of "[restoring our role as a climate leader on the world stage](#)". We welcome this timely inquiry and would be happy to provide further evidence and support.

Brief biographies

Dr Jannik Gieseckam is a Chancellor's Fellow in the University of Strathclyde's Department for Civil and Environmental Engineering and their Deputy Director of Knowledge Exchange: Policy Engagement. He has 13 years experience in research and consultancy on embodied and whole life carbon assessment. This includes work on this topic for the Department for Transport, Defra, the CCC, Green Construction Board, Zero Waste Scotland and the Scottish Government. He is a co-author of the Part Z proposals, the UKGBC Net Zero Whole Life Carbon Roadmap for the UK Built Environment and has sat on >20 related expert advisory groups for organisations such as the ICE, RICS and the Science Based Targets Initiative.

Dr Jannik Gieseckam (University of Strathclyde); Prof Alice Moncaster, (University of the West of England); Prof Francesco Pomponi, (York School of Architecture); Prof Aoife Houlihan Wiberg (University of Bath); Justin Bean (Hawkins\Brown & University of Bath); Dr Stephen Allen (University of Bath) ESH0068

Professor Alice Moncaster is Professor of Sustainable Construction at the University of the West of England, Bristol, and joint Director of the university Centre of excellence for Advanced Built Environment Research. She has been leading UK research into embodied carbon of buildings for 15 years, at the University of Cambridge, the Open University and now UWE, and has been a UK expert on the IEA Annexes since 2011.

Professor Francesco Pomponi holds the Chair of Sustainability & Environment at the University of York, is a World's 2% Top Scientist (Stanford/Elsevier rating), and the Chief Scientific Officer of Preoptima, an award-winning VC-backed startup providing AI-powered solutions for embodied carbon assessments. In addition to over 100+ scientific outputs, he has co-authored many key documents for industry and policy, such as the 1st Edition of the RICS professional statement and the Embodied Carbon Roadmap for the Scottish Government.

Dr Aoife Houlihan Wiberg is a UK and Norway national expert in IEA EBC Annexes since 2011 with 15 years expertise in Net Zero emission building design and early pioneer of the Norwegian embodied carbon calculation method, culminating in the Dynamic ZEB Tool. This work contributed to the early development of the Norwegian Standard NS3720:2018 – *Method for Greenhouse Gas Calculations for buildings*. She has also been responsible for developing research visualisation and immersive technologies to engage diverse stakeholders. She joined the University of Bath, Dept. of Architecture and Civil Engineering after previously serving as Full Professor and Chair of Research in Architecture at Ulster University in 2019. Previously, she worked for 10 years at NTNU Norway's Research Centres for Zero Emission Neighbourhoods in Smart Cities <https://fmezen.com/> and Zero Emission Buildings <http://www.zeb.no/index.php/en/>

Justin Bean is an Architect at Hawkins\Brown & PhD Researcher as a member of the Institute of Sustainability at the University of Bath. Justin contributes to conversations on climate change and sustainable development, currently participating in Annex 89 of the International Energy Agency. As an architect his work has ranged from large scale infrastructure including Thames Tideway & Crossrail to Primary and higher education projects in the UK & US.

Dr Stephen Allen is an Associate Professor in the [Department of Architecture and Civil Engineering](#), and Associate Director of the [Institute of Sustainability and Climate Change](#), at the University of Bath. With a background across academia, industry and Parliament, he has worked in the measurement and reduction of environmental footprints since 2006, including in the construction sector.

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