Department for Levelling Up,
Housing & Communities

Pre-Tender Market Engagement

Measurement and Reduction of Embodied Carbon in New Buildings
CPD4124072

Authority: Department for Levelling Up, Housing and Communities (DLUHC) (**"the Authority**).

Date Response required: **12:00 GMT on Friday 23rd September 2022**

1 PURPOSE

1.1 This Pre-Tender Market Engagement (PTME) seeks information in preparation for the potential procurement of a Supplier or a consortium of Suppliers ("**Potential Supplier**") to carry out research into the economic and technical impacts of whole life carbon assessments, the robustness of the data generated by assessments and modelling of the domestic and non-domestic design and construction choices encouraged by reducing embodied carbon in construction. The purpose of this PTME is to:

1.1.1 help define the requirement,
1.1.2 help provide a better understanding of the feasibility of the requirement,
1.1.3 understand the best approach,
1.1.4 understand the capacity of the market to deliver and possible risks involved,
1.1.5 provide the market with an opportunity to ask questions, raise queries and any issues to be addressed at an early stage.

1.2 The Authority shall maintain commercial confidentiality of information received during the PTME.

2 INTRODUCTION

2.1 The construction and use of buildings creates carbon emissions, and the whole life carbon emissions from a building can be split into:

- *Embodied emissions* - from construction processes and materials, including manufacturing, transport, lifetime maintenance and demolition.
- *Operational emissions* - from the running of a building and occupant behaviour.

2.2 Government's regulatory requirements to date and voluntary efforts from industry have focused on the operational carbon of buildings and have helped direct building heating emissions fall from 106 $MtCO_2e$ in 1990 to 87 $MtCO_2e$ in 2019[1]. While there is no definitive figure of the embodied carbon emissions from buildings, the UK Green Building Council reports[2] that in 2018 the total from buildings was 35.7 $MtCO_2e$, compared to operational carbon emissions of 124.5 $MtCO_2e$.

2.3 For the UK to reach its 2050 Net Zero target, the embodied carbon from buildings must be reduced as well as the operational carbon. As existing policies and strategies, such as the Industrial Decarbonisation Strategy and the Transport Decarbonisation Plan, take effect and industries that supply construction decarbonise, the embodied carbon of buildings will fall in turn. This alone, however, will not be enough. Our choice of materials and the way we design and construct buildings will also need to change. The 2021 Net Zero Strategy set out Government's ambition to help the construction sector improve

[1] 2021, Heat and Buildings Strategy
[2] 2021, UKGBC, Whole Life Carbon Net Zero Roadmap

reporting on embodied carbon in buildings and confirmed we are exploring the potential for maximum embodied carbon levels in new buildings in the future.

2.4 There are important building blocks that must be in place for the reduction of embodied carbon. One crucial block is sufficient data at both building and product level that Government can use to establish the right benchmarks or targets and industry can use to inform design and construction choices.

2.5 Widespread whole life carbon assessments (WLCAs) are a key step to reducing embodied carbon in buildings. At project-level, a robust WLCA helps carbon accounting and encourages low-carbon choices and efficient design. At a large scale, widespread adoption and reporting of whole life carbon assessments will give the data needed across building types, construction methods and developer sizes for decisions and interventions to be taken to reduce embodied carbon.

3 HIGH LEVEL OUTLINE PROJECT OUTCOMES REQUIRED

3.1 The Authority is planning to commission research to inform our policy development. The six broad areas of research are outlined below, and it is likely that research will include technical and practical modelling and economic analysis.

1) The robustness of WLCAs, uncertainties in data used and their results and the challenges that creates for decision-making:

- For decisions to be made on interventions to reduce embodied carbon, we must be assured of the robustness of data coming from WLCAs. This data will tell us at a micro-level what the major problem points are, what best practice looks like and, at a macro-level, where there are possible barriers across the construction market. However, there is always uncertainty baked into WLCAs as they are started during the design stage before final decisions are made on materials or processes to be used. Our review of some existing WLCAs shows specific figures used at stages when specifics can't be known and little acknowledgement or accounting for this uncertainty.
- Research is needed into where in the process those uncertainties lie, whether those are the same across different building types, etc., and what is needed to resolve those uncertainties so that we can be reassured of the robustness of WLCAs.

2) The impacts to business of carrying out WLCAs:

- A WLCA is an involved process done in stages throughout the design and construction of a project. While a large developer may have the in-house expertise to carry out WLCAs, an SME might need to hire consultants or tools per project. Through stakeholder engagement, we have heard quotes for WLCAs ranging from £2,000 - £15,000. It has been suggested this range could be down to specific client or planning requirements, especially if complex energy modelling is required. These costs change the bottom-line developers are working to, and we wish to understand the cost, time, resource (and any other) impacts of carrying out WLCAs for different developer types and sizes. This includes the project and programme level impacts, such as delivery timelines and the need for redesigns.
- Alongside this, the market must be capable of delivering enough robust WLCAs to support an increased demand for assessment. Research into the state of the market should evaluate its readiness and ability, or lack thereof, to meet an increase in demand.

3) The supporting structure needed for mandatory WLCAs:

- Sitting behind WLCAs are Environmental Product Declarations (EPDs) that give information on the carbon content of materials used. If there is not an EPD for a specific product, the WLCA may rely on generic data for that type of product, giving a potentially misleading overall result. There are questions about whether there is the critical mass of EPDs needed for the results of WLCAs to be valuable both to industry and to Government in using results to inform

policy. While increasing the carbon data available for products is BEIS-led, DLUHC needs information on the state of EPDs for construction products.

- Once a WLCA is done, the results should be logged and reported so that they can be compared to the results of similar projects and an understanding developed of "what good looks like". Some confirmatory research is needed into the existing mechanisms for this in the market. This could include an assessment of policy and systems used internationally and their applicability to the UK market.

4) The design and construction choices that are made following WLCAs:

- Research is needed across a wide range of building types and projects into whether carrying out WLCAs has affected the choices made at the design and/or construction stages and what the practical, economic and carbon impacts of those changes have been.

5) The appropriate areas for carbon savings and relative savings available:

- Once complete, a building has drawn on many supply chains, manufacturing and construction processes and consists of many materials. These aspects will differ across building types. While there is a presumption that there are big-ticket carbon items (e.g., on the material side: concrete and steel, and on the building-type side: high-rises or other buildings with deep foundations), a more thorough understanding is needed of where the embodied carbon lies across industry, across building types and, following that, where the relative and viable potential for carbon savings lie.

6) The design and material choices that would be encouraged by embodied carbon reduction and the impacts of those choices:

- There are plenty of ways to build with reduced embodied carbon. Some, however, will not be suitable for widespread use across the sector, as they will be too costly or innovative. We therefore need to understand what short- and long-term changes are likely to occur across the whole industry if there were widespread efforts to reduce embodied carbon. Large changes in construction practices or material use could have unintended consequences on building safety, the housing market, other economic sectors, regions of the country, the job market, etc. Another area for research is the potential effects that quick or widespread adoption of novel or niche materials could have on the mortgage and insurance markets.
- A key consideration will be the potential implications on building energy performance and safety that changes in design and material choices may have. For example, increasing the use of timber may have safety implications, and use of low-carbon products or different construction methods may result in less material being used, an unintended consequence of which could be weakening the structural integrity of buildings.

3.2 The potential Social Value Themes and Policy Outcomes for this research contract are:

- **Theme 2**: Tackling Economic Equality. **Policy Outcome**: Increase supply chain resilience and capacity.
- **Theme 3**: Fighting Climate Change. **Policy Outcome**: Effective stewardship of the environment.

4 OUTPUTS/DELIVERABLES

4.1 Given the relative novelty of the policy area, the Authority intends the contract to have a call-down element so that some research and outputs can be guided by emerging findings. The list of outputs below is an indicative baseline and will be refined/added to with information received from the PTME and through the procurement process:

- Literature Reviews on:
  - WLCAs across a range of building types to help feed into a proportionate set of building types for more detailed analysis and policy development (as is carried out for Part L impact assessments).

    - Existing benchmarks and targets for embodied carbon content across building types.
    - Research already undertaken that identifies the cost implications of building with reduced embodied carbon.
- A qualitative assessment of the uncertainties in the data and results of WLCAs. This should include the causes of these uncertainties, when and how they are resolved (i.e., from a WLCA being updated throughout construction), what uncertainties are built in to a WLCA and can't be resolved (e.g., we can't know at construction what will happen at the end-of-life stage), the relative impact of the uncertainties on the assessment result, and what the differences are between building types.
    - If appropriate, a corresponding quantitative assessment of these uncertainties.
- A quantitative assessment of existing public databases of WLCAs, their robustness and gaps in building types, products, construction methods, etc.
- A costed report on the impacts to business of carrying out WLCAs. This should consider developer size, cost, time, resource, impact on project timelines. This work should be of sufficient quality to feed into a published impact assessment and align with Green Book and related methodology and requirements.
- A qualitative report on sector-wide economic impact of widespread WLCAs. This should include an assessment of the availability of skills in the market to carry out WLCAs and the cost and time needed to train people to carry out WLCAs.
- A qualitative report on the carbon data availability of construction products following the carbon data sources ranking in the *RICS Professional Statement: whole life carbon assessment for the built environment*. This should be a sampled assessment scaled to provide a likely market-wide view.
- A report on methods for reducing embodied carbon across building types considering all embodied carbon inputs, not just products. This should include:
    - Abatement Cost Curves: carbon savings and £/tonne cost of the most common methods of reducing embodied carbon. For different building types (informed by types identified in Literature Review).
    - Micro and macro impacts of those methods: e.g., on building energy performance, on structural integrity, on supply chains, etc.
- A qualitative report on the international use of timber in construction, the regulatory systems that govern this in countries and applicability/lessons to learn for the English market.

5 KEY DATES & TENDERING PROCESS

PTME Response deadline	Friday 23rd September 2022 (12:00 noon GMT)
Issue of ITT	October 2022 (TBC)

5.1 If it is decided this service is required, it is anticipated that a procurement may start in October 2022 with the contract to commence in December 2022. These indicative dates are for information purposes only. The Authority reserves the right to amend these dates at any time, and Potential Suppliers rely on them entirely at their own risk.

5.2 The contract is expected to run until March 31st 2024.

5.3 The project, if progressed, is likely to be procured through the Crown Commercial Service (CCS) Dynamic Purchasing System (DPS) - RM6126 Research and Insights.

5.4 Suppliers are able to apply to join the DPS at any time. During application to join the DPS, suppliers indicate which services they may be able to provide under the DPS.

5.5 Please note that new suppliers are able to register with the DPS via the following link and that this process can take at least two weeks (Once you click on the link below, please

scroll down to see 'Research and Insights' under Communications Marketplace): https://supplierregistration.cabinetoffice.gov.uk/dps#research

5.6 If you have any questions about the DPS and would like to contact a member of the CCS team please use the links provided on the website above.

6 RESPONSE

6.1 Please respond by email to commercialtenders@levellingup.gov.uk with the following by 12:00 noon GMT on 23 September 2022 (the "Response Deadline").

Q1 Would you be interested in bidding for this project?
Q2 Is this project deliverable in the timeframe proposed?
Q3 Is what the Authority asking for clear?
Q4 What, if anything, has the Authority missed or overlooked in setting out their requirement?
Q5 Do you already have the relevant expertise and access to data to carry out this project?
Q6 Would you carry out this project alone or as part of a consortium?
Q7 Is there anything here that is irrelevant, outdated or unnecessary?
Q8 What would the indicative cost be for this project?
Q9 What would the indicative cost be for each output?
Q10 Are the proposed Social Value Themes, Policy Outcomes and Criteria appropriate for this requirement? Please elaborate on your reasons and/or suggest alternatives that could be applied and why these alternatives would be more relevant. Further information on The Social Value Model, sub-criteria, illustrative examples and relevant reporting metrics can be found here to help inform your response to this question: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940826/Social-Value-Model-Edn-1.1-3-Dec-20.pdf

Q11 In your opinion, what is the level of risk of modern slavery in your supply chain? Can modern slavery risks be managed/mitigated within the service?

7 QUESTIONS AND CLARIFICATIONS

7.1 Potential Suppliers may raise questions or seek clarification regarding any aspect of this PTME document at any time prior to the Response Deadline. Questions must be submitted by email to **commercialtenders@levellingup.gov.uk** only.

7.2 To ensure that all Potential Suppliers have equal access to information regarding this PTME exercise, responses to questions raised by Potential Suppliers will be published in a "Questions and Answers" document, which will also be circulated by email, with updates appearing at regular intervals (approximately two to three working days).

7.3 Responses to questions will not identify the originator of the question.

7.4 If a Potential Supplier wishes to ask a question or seek clarification without the question and answer being revealed, then the Potential Supplier must state this in their email and provide its justification for withholding the question and any response. If the Authority does not consider that there is sufficient justification for withholding the question and the

corresponding response, the Potential Supplier will be invited to decide whether:

- the question/clarification and the response should in fact be published; or
- it wishes to withdraw the question/clarification.

8 GENERAL CONDITIONS

8.1 This PTME will help the Authority to refine the requirements and to understand the potential level of interest in the delivering requirements. It will also aid Potential Suppliers' understanding of the requirements in advance of any formal competitive tender exercise.

8.2 The Authority reserves the right to change any information contained within this PTME at any time, and Potential Suppliers rely upon it entirely at their own risk.

8.3 The Authority reserves the right not to proceed with a competitive tender exercise after this PTME or to award any contract.

8.4 Any and all costs associated with the production of such a response to this PTME must be borne by the Potential Supplier.

8.5 No down-selection of Potential Suppliers will take place as a consequence of any responses or interactions relating to this PTME.

8.6 The Authority expects that all responses to this PTME will be provided by Potential Suppliers in good faith to the best of their ability in the light of information available at the time of their response.

8.7 No information provided by a Potential Supplier in response to this PTME will be carried forward, used or acknowledged in any way for the purpose of evaluating the Potential Supplier, in any subsequent formal procurement process.