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Public consultation for a roadmap for the reduction of whole life carbon emissions of buildings in the EU

Fields marked with * are mandatory.

Introduction

Background

In the European Climate Law, the EU has set the target to reduce its net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels, and to become climate-neutral by 2050. The buildings and construction sector is a major consumer of both materials and energy, making it an important contributor to overall greenhouse gas emissions. While the operation of buildings is responsible for about 40% of the EU' s total energy consumption, and for 36% of its greenhouse gas emissions from energy[1], buildings also contribute to greenhouse gas emissions at other stages of their life cycle, before they are occupied (manufacture and construction) and afterwards, at end of life. The International Resource Panel (IRP), in its Resource Efficiency and Climate Change Report, 2020, and the UN Environment Emissions Gap Report 2019, conclude that the carbon emissions related to the use of materials in construction is estimated to account for about 10% of total yearly greenhouse gas emissions worldwide. The Renovation Wave called for the EU to make our buildings more energy-efficient and less carbon-intensive over their full life-cycle and more sustainable.

The so-called 'whole life carbon' approach to buildings combines the greenhouse gas emissions from the material production and transport, caused by the construction process phase and processes at end of life (also called "embodied carbon"), and the greenhouse gas emissions linked to the operation of the building during its lifetime (also called "operational carbon")[2]. This approach could support Europe's path to climate neutrality in the buildings and construction sector by promoting whole life carbon reduction solutions in the sector, complementary to the existing policies that decarbonise material production, electricity generation, and operation emissions of buildings.

As part of the Renovation Wave, the Commission committed to develop a roadmap leading up to 2050 for reducing whole life-cycle carbon emissions in buildings." The present consultation is designed to inform the Commission's work on this roadmap.

Public consultation

This open public consultation offers all stakeholders in the buildings value chain the opportunity to express their views on how they perceive the relevance of the matter and how to best address the whole life cycle

emissions associated with buildings. Your feedback, together with evidence from different sources including desk-research and other consultations, will contribute to the preparatory analysis and the development of the roadmap. The Commission has recently procured a study, which sheds new light on the building stock and its whole life carbon emissions. You can find a link to the final report of this study, next to the questionnaire.

Individual contributions to this public consultation will not be published. Instead, the contributions will serve as input for analysis by Ramboll Management Consulting SA/NV and an aggregated report will be delivered to the European Commission.

The Commission and Ramboll Management Consulting SA/NV are committed to protecting your personal data and to respecting your privacy. By filling out the questionnaire you agree to the collection, processing and use of your data in line with existing EU regulations, i.e. Regulation (EU) 2018/1725 on processing of personal data by the EU institutions. See the privacy statement, available under background documents for more information.

If you have any questions on the consultation, please contact WholeLifeCarbonRoadmap@ramboll.com

Your opinion matters and we are grateful to you for taking the time to complete this questionnaire.

[1] These figures refer to the use and operation of buildings, including indirect emissions in the power and heat sector, not their full life cycle. The embodied carbon in construction is estimated to account for about 10% of total yearly greenhouse gas emissions worldwide, see IRP, Resource Efficiency and Climate Change, 2020, and UN Environment Emissions Gap Report 2019.

[2] The applied system boundary is 'cradle to grave' as defined by EN 15978, i.e. from the production of building materials to the end of the building's useful life and the subsequent demolition and recovery of the building materials. It is defined in terms of life cycle stages, which are in turn split into modules as defined by EN 15978: the product stage (A1-5), the use stage (B1-6), the end of life stage (C1-4) and benefits and loads beyond the system boundary (D). Emissions are accounted for in the life cycle stage where they occur so, if for example a renovation takes place, the emissions associated with new building materials are allocated to the use stage

About you

This section ask for personal data about you as respondent to the questionnaire. This data will be used to enable the analysis of results in an aggregated way and to be able to reach out with clarification requests if necessary. Your personal data will not be published.

* **I am giving my contribution as:**

- ○ Academic/research institution
- ○ Business association
- ○ Company/business organisation
- ○ Consumer organisation
- ○ EU citizen
- ○ Environmental organisation
- ○ Non-EU citizen
- ◉ Non-governmental organisation (NGO)
- ○ Public authority

- ( ) Trade union
- ( ) Other

* **First name**

Oscar

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Planells

* **Email**

oscar.planells@rreuse.org

* **Organisation name**

RREUSE (Reuse and Recycling European Union Social Enterprises)

* **Organisation size**

- (•) Micro (1 to 9 employees)
- ( ) Small (10 to 49 employees)
- ( ) Medium (50 to 249 employees)
- ( ) Large (250 or more)
- ( ) Do not know/not relevant

* **Country of origin**

Belgium

* **Privacy statement**

- [x] I agree with the personal data protection provisions in line with Regulation (EU) 2018/1725 described in the attached statement.

Your current engagement in this topic

* **Q1: How would you assess your own understanding of whole life carbon of buildings?**

- ( ) Good understanding
- (•) Some understanding
- ( ) Low or no understanding

* **Q2: How often do you or the teams you are working with take into account whole life carbon considerations?**

- ( ) It is often taken into account ahead of decisions
- ( ) It can occasionally impact decisions

- ○ It is rarely considered
- ◉ I don't know / Not applicable

EU policies addressing whole life carbon emissions of buildings

*** Q3: Do you feel that current EU policies [3] relevant to whole life carbon of the building sector are sufficient to ensure that the building stock is aligned with a climate neutral trajectory?**

[3] The EU Emissions Trading System (EU ETS), setting a carbon price and emissions cap on emissions, including from manufacturing installations for steel, aluminium, glass, mineral wool, cement, lime, ceramics; the Effort Sharing Regulation; the EU Emissions Trading System for fuel combustion in buildings and road transport; the Carbon Border Adjustment Mechanism; the Energy Performance of Buildings Directive; Ecodesign Directive; Energy labelling Regulation; Renewable Energy Directive; Construction Products Regulation; Energy Efficiency Directive; and Waste Framework Directive.

- ○ Yes, there is a sufficient EU policy framework in place
- ○ There is a suitable EU framework in place, but it needs strengthening
- ◉ The current EU policies are not enough, additional policy is needed to complement the existing framework
- ○ No opinion

Q3a: Please explain your answer [up to 200 words].

2000 character(s) maximum

Current EU policies primarily target reducing carbon emissions from buildings through improved energy efficiency. However, these policies overlook a critical aspect: embodied carbon emissions, which account for 21% of the WLC emissions in the buildings sector. These emissions stem from construction, maintenance, renovation, and demolition activities and contribute 5-12% of total emissions.

While the study procured by the Commission projects a 44% reduction in operational emissions by 2050, embodied emissions are expected to rise due to increased construction and renovations. For newly constructed buildings with advanced energy performance, embodied emissions can make up to 74% of WLC emissions. That means that circularity of building components and materials will become an increasingly important strategy to cut down WLC emissions.

Therefore, future EU policies must not neglect material efficiency and circularity. An integrated approach is crucial to avoid trade-offs between operational and embodied emissions.

While the Waste Framework Directive has improved construction and demolition waste recovery rates, it often involves low-grade recovery activities like backfilling and using waste for road sub-bases, causing loss of materials' environmental and economic value. Therefore, future policies should align with the Waste Hierarchy, prioritizing deconstruction, re-use of building components, and high-quality recycling.

*** Q3b: What levels of governance do you think are the most appropriate to tackle whole life carbon emissions? Multiple answers possible.**

- ☑ European
- ☑ National or regional
- ☐ Local

Possible areas for actions to reduce whole life carbon in buildings

Q4: Please assess the following areas in terms of both their potential for reducing whole life carbon emissions and the feasibility to act (via policy or sector initiatives or other) to achieve substantial reduction of emissions.

Demand for new built space

Q4a: Making use of currently empty buildings

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	◉	○	○	○

Q4b: Extending the lifespan of buildings through e.g. flexible, future-proof design and layout, use of durable materials, climate change resilience, adaptive building systems regular maintenance

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	◉	○	○	○

Q4c: Using buildings more intensively (e.g. by encouraging different activities taking place in a building at different times of day or week)

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	○	○	○	◉

Q4d: Ensuring that residential buildings do not remain under-occupied over the long term by facilitating change of residence through various means (e.g. reduced transaction costs, practical support, urban planning, accessibility of affordable housing, review of rental and ownership models)

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	○	○	○	◉

Q4e: Prioritising of renovation, repair and maintenance over demolition and new construction

	Very high	High	Low	None	No opinion

* Potential for reducing whole life carbon emissions	◉	○	○	○	○
* Feasibility to act	◉	○	○	○	○

Demand for materials

Q4f: Construct with less material overall while achieving the same functional result (i.e. resource efficiency)

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	◉	○	○	○

Q4g: Design and use elements that can be easily dismantled for re-use at the end of their service life

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	◉	○	○	○	○
* Feasibility to act	○	◉	○	○	○

Q4h: Apply waste prevention strategies, such as waste audits and selective demolition, to divert material from landfill and encourage reuse and recycling

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	◉	○	○	○	○
* Feasibility to act	◉	○	○	○	○

Q4i: Increase the share of re-used construction products on the market

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	◉	○	○	○	○
* Feasibility to act	◉	○	○	○	○

Supply of materials

Q4j: Reduce the carbon footprint of materials and construction products in their manufacturing processes, e.g. through the use of renewable energy

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	○	◉	○	○

Q4k: Increase the recycled content of new construction products

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	◉	○	○	○

Q4l: Encourage the use of carbon storage in construction products, contributing to carbon removals

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	○	◉	○	○

Use of energy in buildings

Q4m: Reduce the greenhouse gas intensity of energy supply

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	○	○	○	◉

Q4n: Improve the management of energy use in existing buildings

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	○	○	◉
* Feasibility to act	○	○	○	○	◉

Q4o: Promote energy efficient renovation to reduce the energy use of existing buildings

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	○	◉	○	○	○

Q4p: Ensure that any new buildings are designed to be high energy performing

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	◉	○	○	○
* Feasibility to act	◉	○	○	○	○

Other sources of emissions relating to whole life carbon

Q4q: Reduce emissions from the construction site, e.g. from machinery

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	◉	○	○	○

Q4r: Minimise transport related emissions of material and waste

	Very high	High	Low	None	No opinion
* Potential for reducing whole life carbon emissions	○	○	◉	○	○
* Feasibility to act	○	○	○	○	◉

Q5: If you have examples of other areas for action to reduce the whole life carbon emissions of buildings, please share them here [up to 200 words]:

There are three other important areas for action:

- Promote the adaptive re-use of buildings (leaving the structure intact and refurbishing). Redesigning a building can prevent its full demolition. This strategy can be combined with selective demolition and the re-use of building components.
- Combine renovation works to improve energy efficiency and the re-use and recycling of building components and materials. This is necessary to prevent trade-offs between operational and embodied emissions. This also applies to the construction of new, highly energy efficient buildings. Energy efficiency and circularity must always go hand in hand.
- In many cases, existing building codes and standards are an obstacle to the promotion of circularity in the buildings sector. Prescriptive codes may dictate specific materials or components to use, blocking the possibility of using other re-used or recycled components and creating lock-ins. There should be a move from prescriptive codes towards performance-based codes.

Supportive policies for reducing whole life carbon

Q6: Please assess the following factors in terms of both their potential effectiveness for driving reduction of whole life carbon emissions and the feasibility for policy to be enacted.

Market push

Q6a: Mandatory reporting of whole life carbon

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	○	◉	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6b: Requirements to set national whole life carbon roadmaps with quantified targets

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	◉	○	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6c: Include consideration of whole life carbon in national construction and new housing plans and targets

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	◉	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6d: Include consideration of whole life carbon in national plans for renovation

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	◉	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6e: Mandatory carbon footprint declaration of construction products

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	◉	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Market pull

Q6f: Public sector leading by example

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	◉	○	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6g: Link public funding to whole life carbon performance

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	◉	○	○	○	○
* Feasibility for policy to be enacted	◉	○	○	○	○

Q6h: Use of sustainability scores such as the EU Taxonomy for Sustainable Actvities to identify sustainable whole life carbon

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	◉	○	○	○
* Feasibility for policy to be enacted	○	◉	○	○	○

Knowledge

Q6i: Support capacity building of public authorities and their mandated bodies to assess whole life carbon

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	○	◉	○	○
* Feasibility for policy to be enacted	○	◉	○	○	○

Q6j: Targeted support to facilitate upskilling and/or reskilling of different parts of the supply side (engineers, architects, construction workers etc)

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	◉	○	○	○
* Feasibility for policy to be enacted	○	◉	○	○	○

Q6k: Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector)

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	○	◉	○	○
* Feasibility for policy to be enacted	○	◉	○	○	○

Q6l: General awareness raising and media campaigns

	Very high	High	Low	None	No opinion
* Potential effectiveness for driving reduction of whole life carbon emissions	○	○	○	◉	○
* Feasibility for policy to be enacted	○	◉	○	○	○

Q7: If you have examples of policies to reduce the whole life carbon emissions of buildings at national, regional or local level whole life carbon, please share them here [up to 200 words]:

2000 character(s) maximum

- Mandate pre-demolition audits oriented to maximum re-use of building components and implement landfill bans.
- Prioritise the re-use and maintenance of building components and materials (e.g. steel cladding, mineral wool for insulation) in renovation works and the construction of new highly energy-efficient buildings.
- Include circularity requirements such as reusability and durability in public procurement to reduce embodied emissions.
- Promote the creation and use of online platforms for the resale of building components.
- Modify building codes and standards to ensure the removal of unnecessary obstacles to the re-use and recycling of building components and materials.
- Create economic incentives to promote circularity through different tools (e.g. virgin material tax, carbon tax, landfilling tax, reduced or exempted VAT rates).
- Promote upskilling and reskilling in the construction and demolition sector in line with the skills required for a circular economy (e.g. prioritise work-based training; promote partial qualifications, skills passports, and low-level qualifications; foster synergies between conventional VET programmes and social enterprises).
- Implement separate preparation for re-use targets of construction and demolition waste.

Whole life carbon values for individual buildings

* **Q8: Do you think that whole life cycle emissions of individual buildings should be measured in the same way across the EU?**

- ○ Yes
- ○ No, regional or national variations should be allowed
- ◉ No opinion

* **Q9: Do you think it is necessary to define maximum values for whole life carbon for some or all categories of individual buildings?**

- ○ Yes, mandatory
- ○ Yes, but start with voluntary and later on make them mandatory
- ○ Yes, but keep them voluntary
- ○ No
- ◉ No opinion

Q9a: Please explain your answer [up to 200 words]:

2000 character(s) maximum

-

* **Q10: If maximum whole life carbon values were to be applied, what type(s) of values do you consider most appropriate?**

- ○ Building-level maximum values combining operational and embodied emissions in a single indicator of whole-life carbon
- ◉ Building-level maximum values with separate indicators for embodied and operational emissions
- ○ Building-level maximum values with separate indicators for embodied and operational emissions and a combined whole-life carbon indicator

- Others, including whole life carbon maximum values for groups of buildings or at the entire building stock level, as opposed to on individual buildings – please spell out in the comment box
- No opinion

Q11: If maximum whole life carbon values were to be applied, for which categories of buildings should they apply?

* **Q11a: New residential buildings**
- All new residential buildings
- A subset of new residential buildings to be defined – please explain your answer
- No maximum thresholds should be applied
- (•) No opinion

* **Q11b: New non-residential buildings**
- All new non-residential buildings
- A subset of new non-residential buildings to be defined – please explain your answer
- No maximum thresholds should be applied
- (•) No opinion

* **Q11c: Renovations of residential buildings**
- All major renovations of residential buildings
- A subset of major renovations of residential buildings – please explain your answer
- No maximum thresholds should be applied
- (•) No opinion

* **Q11d: Renovations of non-residential buildings**
- All major renovations of non-residential buildings
- A subset of major renovations of non-residential buildings – please explain your answer
- No maximum thresholds should be applied
- (•) No opinion

Q11e: Do you have other comments on the categories of buildings for which maximum values should apply? [up to 200 words]

2000 character(s) maximum

-

Q12: Are existing European standards and methodologies sufficiently mature to define whole life carbon reporting formats and maximum values?
- Yes, they are ready to be used for this purpose
- Yes, with some harmonisation work, this will be ready to apply
- No, much more work is needed to develop a new methodology for this purpose
- (•) No opinion

Concluding question

Q13: Do you have any further comments on policy aspects relevant to whole life carbon of buildings, which are not covered in your answers? [up to 200 words]

2000 character(s) maximum

Obstacles to the re-use of building components and its scaling up includes lack of experience and knowledge, increased labour intensity and design costs when working with re-used components, lack of or high cost of storage space, standardization and regulation of materials and components permitted in new construction projects that prevent re-use of components, tight project schedules not compatible with the time required for the deconstruction and re-use of components, and lack of an established market.

The use of recovered components and materials requires flexibility in the design and/or time frame of a construction project, since there is some uncertainty in the availability of desired sections and extra efforts are needed to find certain components. In some cases, visual appearance and negative perceptions of re-used components can also decrease re-use rates.

Those barriers, however, do not exist in a vacuum: they are often shaped by specific regulations, policies, and economic incentives that can be reversed by a sound policy framework.

Q14: Do you have any other remarks? [up to 200 words]

2000 character(s) maximum

While the social impact of initiatives to reduce the WLC emissions of buildings has not been addressed, it must be added that re-use of building components has a high job creation potential.

These activities are more labour-intensive and require manual skills which are accessible for individuals with a low skills baseline. In that sense, the promotion of circularity in the sector, particularly through the involvement of social enterprises, is an opportunity to create jobs and promote social inclusion.

Social enterprises can contribute to a circular transition in the construction and demolition sector, leading to waste reduction, reduced carbon emissions, and the creation of jobs for those who have difficulties entering the job market.

For more information: https://rreuse.org/rreuses-briefing-on-the-construction-and-demolition-sector/

Useful links

Final technical study report (https://c.ramboll.com/whole-life-carbon-reduction)

Background Documents

Privacy Statement

Contact

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