



Supporting the development of a roadmap for the reduction of whole life carbon of buildings

Public consultation analysis

Ramboll, BPIE
February 2024

RAMBOLL



EUROPEAN COMMISSION

Directorate-General for Environment

Directorate B — Circular Economy

Unit B.1 — Circular Economy, Sustainable Production & Consumption

Contact: Josefina Lindblom

European Commission

B-1049 Brussels

Supporting the development of a roadmap for the reduction of whole life carbon of buildings

Public consultation analysis

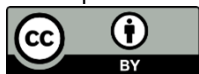
Manuscript completed in February 2024

Final edition

This document has been prepared for the European Commission however it reflects the views only of the authors, and the European Commission is not liable for any consequence stemming from the reuse of this publication.

Luxembourg: Publications Office of the European Union, 2024

© European Union, 2024



The reuse policy of European Commission documents is implemented by Commission Decision 2011/833/EU of 12 December 2011 on the reuse of Commission documents (OJ L 330, 14.12.2011, p. 39). Unless otherwise noted, the reuse of this document is authorised under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence (<https://creativecommons.org/licenses/by/4.0/>). This means that reuse is allowed provided appropriate credit is given and any changes are indicated.

PDF ISBN 978-92-68-12811-4

doi: 10.2779/138684

KH-05-24-096-EN-N

SUPPORTING THE DEVELOPMENT OF A ROADMAP FOR THE REDUCTION OF WHOLE LIFE CARBON OF BUILDINGS ANALYSIS REPORT

Intended for

European Commission, DG Environment

Date

February 2024

Reference

1st Amendment to contract:

No 90202/2022/865822/SFRA/ENV.B.4



Contents

Executive summary	3
1. Introduction	4
2. Description of respondents	5
2.1 Type of stakeholders	5
2.2 Country of origin	7
3. Results of survey responses	9
3.1 Respondents' current engagement in this topic	9
3.2 EU policies addressing whole life carbon emissions of buildings	12
3.3 Possible areas for actions to reduce WLC in buildings	16
3.4 Supportive policies for reducing whole life carbon	25
3.5 WLC values for individual buildings	33
3.6 Concluding questions	50
Annex 1 – List of policy examples and suggestions in response to 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)	52
Annex 2 – Breakdown of Q10 by different respondent characteristics	68
Annex 3 – Further documentation, recommended by respondents in Q14	70

Executive summary

The public consultation for a roadmap for the reduction of whole life carbon emissions of buildings in the EU collected **250 responses**. The majority of these contributions came from **individual companies (40%) as well as business associations (16%)**. Additionally, NGOs and academia accounted for over 10%, while EU citizens and public authorities made up 8% and 6% of the respondents, respectively.

Private sector respondents are primarily active in material supply, consulting and the design of buildings, followed by around property developers, owners and managers, as well as contractors.

The survey received **responses from stakeholders in 21 EU Member States and 7 non-EU countries** with a stronger representation from Western Europe compared to Eastern Europe.

A good degree of understanding of whole life carbon and current consideration of whole life carbon in decisions means that the survey managed to capture perspectives from those actively involved in reducing whole life carbon as a means to contribute to climate neutrality. **The results therefore encompass a wide array of insights and expertise from stakeholders, authorities and citizens, who already encounter whole life carbon aspects in their day-to-day business and professional practices.**

The key results in relation to the consultation questions can be summarised as follows:

- Stakeholders are **highly confident about the potential and feasibility of currently available measures** and low carbon solutions to reduce whole life carbon through a range of material selection, efficiency and sufficiency areas. 11 of the reduction measures reach 80% or more for at least high potential, while two more measures are well above 60%. Out of these 13 actions, 8 obtain at least high feasibility from 70% or more of the respondents, while two more are above 60% as well.
- There is a **need for robust whole life carbon policies** in addition to the existing framework. All twelve options of policy instruments are considered effective and feasible by at least 50% of respondents.
- **Respondents give overwhelming support for the introduction of mandatory maximum values for buildings** (85%) with an almost equal split between those who prefer immediate implementation and those who would favour a stepwise approach starting with a voluntary approach.
- Stakeholders see a **clear role for the EU to develop a harmonised methodology** (70% support), instruments and guidance on maximum values to ensure consistency and comparability.
- Based on an EU harmonised assessment approach, a majority (67%) prefers that the actual **target setting is done at the national level, with guidance from indicative EU values**. 27% prefer EU values.

1. Introduction

As part of the development of the “2050 Roadmap for the reduction of whole life carbon (WLC) emissions of buildings in the EU” initiative, the European Commission conducted a public consultation to invite input from stakeholders interested in the subject. The consultation was open between July 17th and September 15th, 2023, and received a total of 250 responses. It is important to note that not all respondents answered every question, so the response rate for specific questions may be less than 250. This is denoted by the ‘N=’ for each question, reflecting the number of respondents who provided answers to that particular question.

In line with the Better Regulation Guidelines of the EU Commission, a check for campaigns of coordinated answers was carried out, but none were found that exceeded 10 responses. Only some smaller clusters of largely similar responses were identified, originating from a variety of sources, including NGOs, business associations, and companies. These clusters are likely associated with EU-level organisations and some of their member entities submitting similar input.

The analysis of the survey mirrors the structure of the questionnaire, organised into six categories of questions outlined in Chapter 3:

1. Questions about the respondents’ current engagement in the topic,
2. Questions regarding EU policies addressing WLC emissions of buildings,
3. Questions concerning possible areas for actions to reduce WLC in buildings,
4. Questions about supportive policies for reducing WLC,
5. Questions on WLC values for individual buildings,
6. Concluding questions.

The analysis of data was conducted in Excel. Pivot tables and related graphs were created for most of the questions (when relevant), facilitating the analysis of correlation for stakeholder types and other response parameters when applicable.

The subsequent sections of this report provide an analysis of the respondents (Chapter 2), and their responses across each question categories (Chapter 3). Graphs are included to enhance comprehension, facilitate interpretation of the results, and highlight distinctions among stakeholder categories.

2. Description of respondents

This section presents the demographic background of the respondents focusing on their country of origin, stakeholder categories and the sectors they are involved.

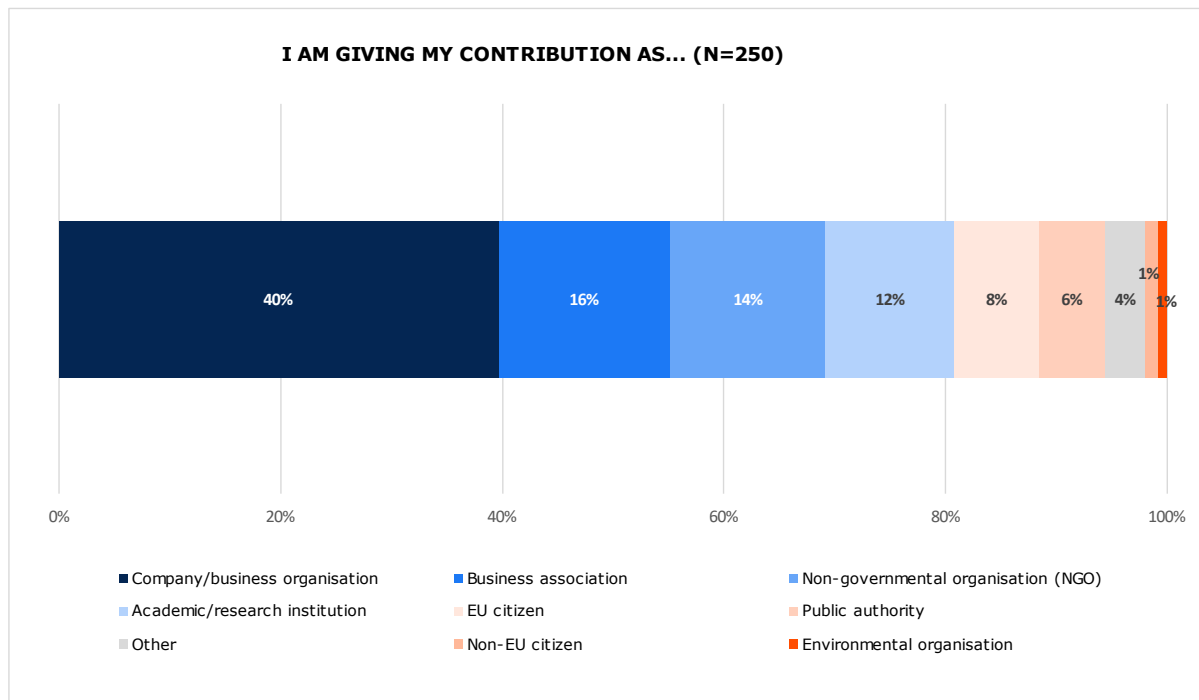
2.1 Type of stakeholders

In total, 250 respondents filled out the survey.

Firstly, they were asked to indicate the **type of stakeholder category** they represent (Figure 1). Among these categories, companies and business organizations emerged as the largest group, constituting 40% of all respondents. Then, business associations accounted for 16%, while non-governmental organizations (NGOs) and academics/research institutions represented 14% and 12% respectively. European Union (EU) citizens contributed 8% of the responses, while public authorities made up 6%. The least represented groups were non-EU citizens and environmental organisations, each comprising 1% of the respondents, with another 4% falling into the 'other' category.

The size of the respondent pool from each stakeholder group should be taken into consideration when interpreting the results. Where disagreement between the stakeholder categories is observed, these differences are highlighted in detail. The viewpoints of non-EU citizens, environmental organizations, and respondents identifying as other types of stakeholders are notably underrepresented in the dataset.

Figure 1. Distribution of stakeholder categories

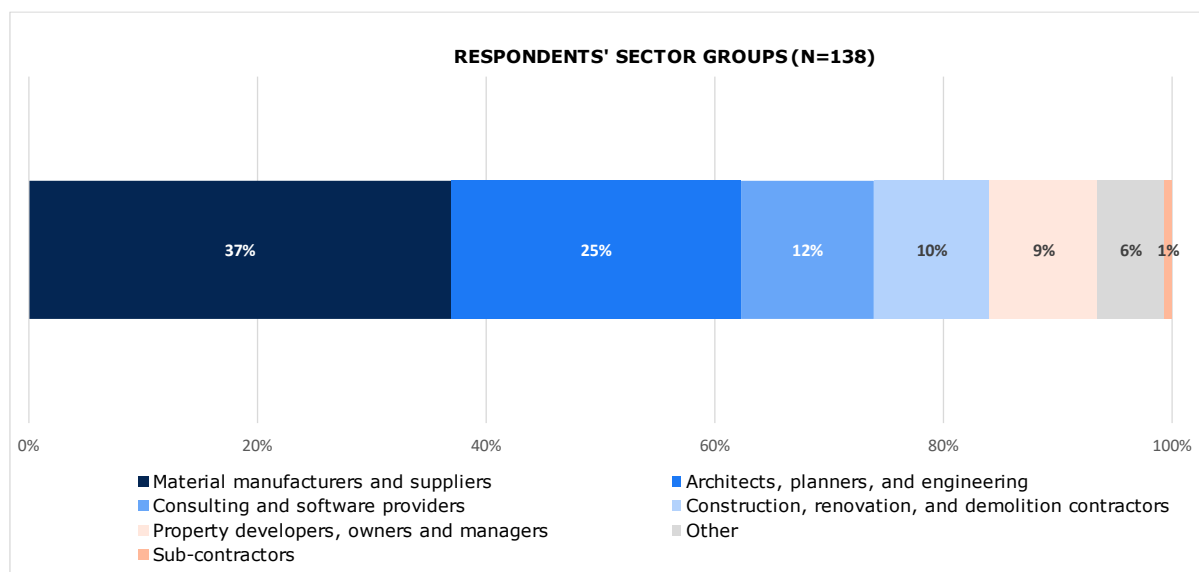


Secondly, respondents from companies and business associations were asked to further describe themselves, through the **sector group that best describes their activities** (Figure 2). Material manufacturers and suppliers (37%) and architects, planners and engineers (29%) are the most

represented professions. They are followed by consultants and software providers (12%)¹ and construction, renovation, and demolition contractors (10%). Property developers, owners and managers and sub-contractors represent 9% and 1% of all responses, respectively. Finally, other sectors represent 6%.

Although three additional categories were provided (Logistics and transport services, operational and maintenance service providers, and property investors and financial institutions), no respondents from these sectors took part in the survey. It is perhaps not surprising that manufacturers and designers are prominently represented, given that it is they who would usually be responsible for carrying out life cycle analyses at the level of products and buildings. The perspectives of suppliers and those involved in the design phase are more prominently represented compared to individuals and entities active on construction sites and in financing roles.

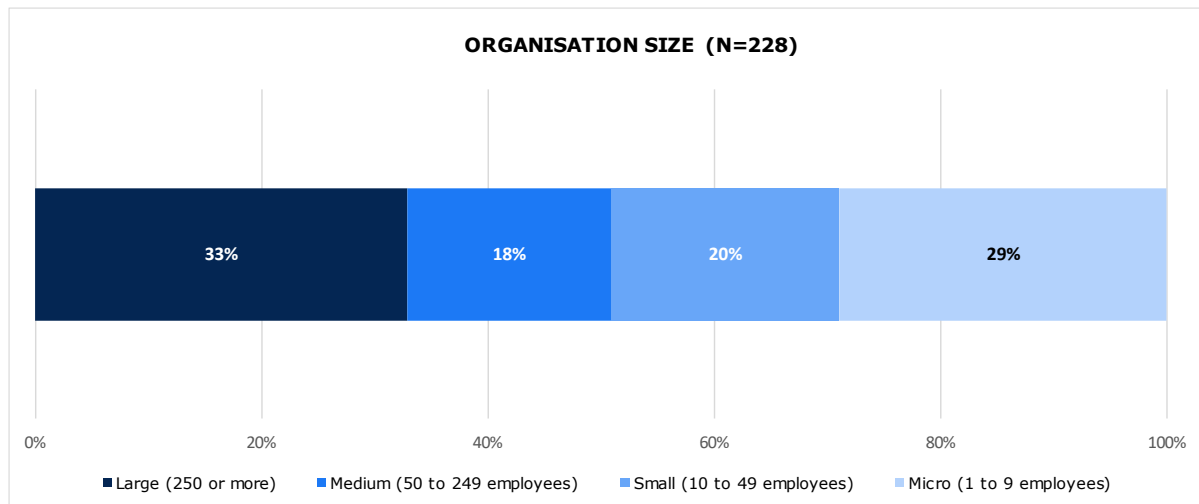
Figure 2. Distribution of stakeholder sector groups



Thirdly, all respondents except EU and non-EU citizens were asked about the **size of the organisation** they work for, and Figure 3 shows a rather even balance between the different organisation sizes. In fact, 33% of the respondents' organisations employ 250 or more employees, 29% have 1 to 9 employees, 20% employ 10 to 49 employees, and 18% have 50 to 249 employees.

¹ This sector group category was introduced when analysing the survey results, as a majority of respondents who had selected 'other' were identified as consulting and software providers.

Figure 3. Distribution of stakeholder organisation sizes



2.2 Country of origin

The **geographical distribution of the respondents** spreads across 21 of the 27 EU Member States (N=231), with additional input from seven non-EU countries (N=19). The largest share of responses comes from Belgium (N=54, 23%), followed by Germany (N=25, 11%) and Spain (N=22, 10%). The disproportionate representation from Belgium can be attributed to the presence of many NGOs and businesses organisations located in Brussels, strategically close to the EU institutions.

Major EU economies are well represented in the survey, but the number received from Eastern European Member States is low (Figure 4). No responses were submitted from Bulgaria, Cyprus, Estonia, Malta, Slovakia, and Slovenia.

Furthermore, the United Kingdom (N=6) and Switzerland (N=5) received the most significant number of responses from non-EU countries (Figure 5).

Figure 4. Distribution of stakeholder countries of origin (EU)

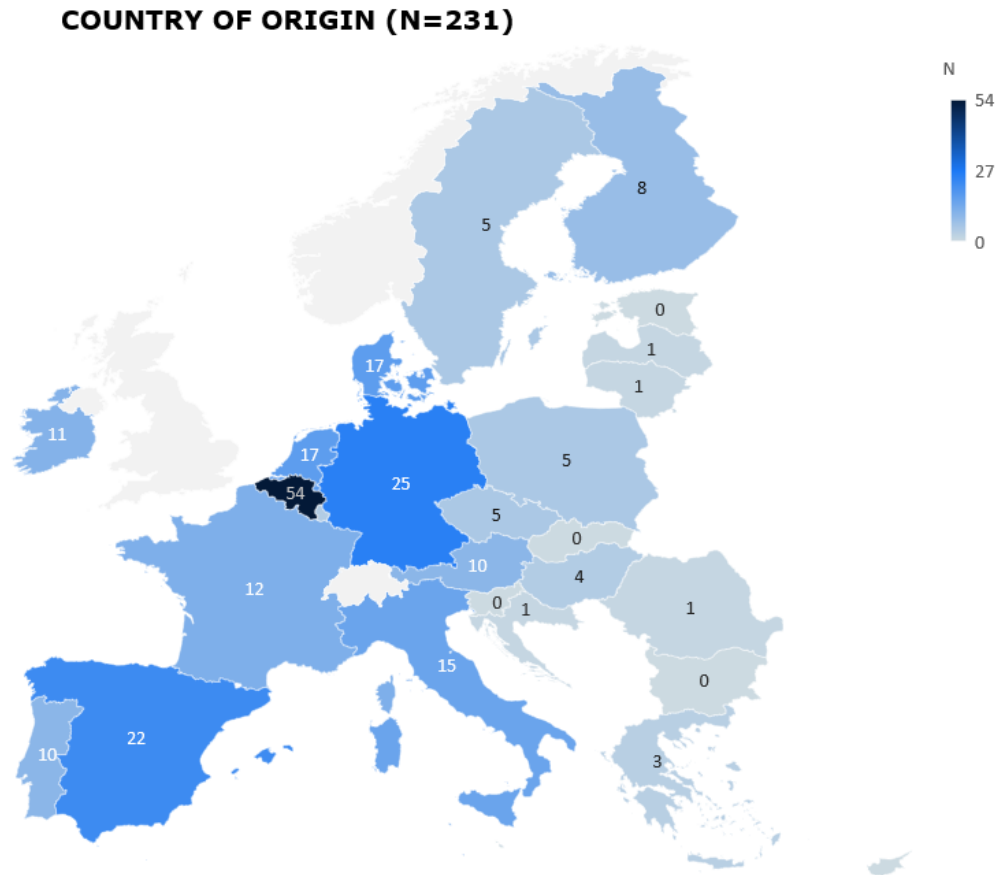
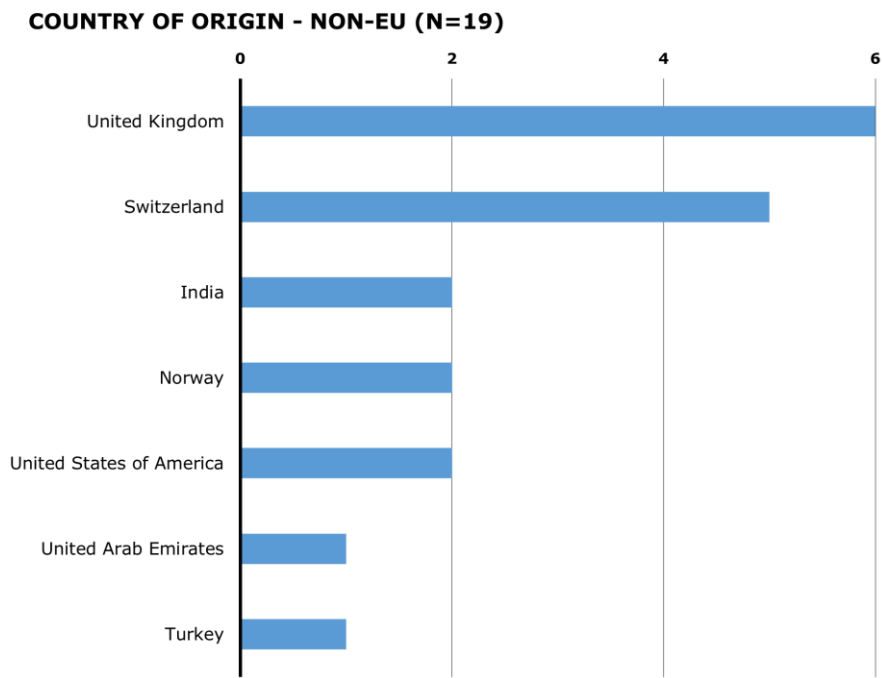


Figure 5. Distribution of stakeholder countries of origin (non-EU)



3. Results of survey responses

This chapter outlines the analysis of the responses organised into the following categories of questions in the questionnaire.

3.1 Respondents' current engagement in this topic

3.1.1 Q1 - How would you assess your own understanding of WLC of buildings?

The first question asked the respondents to assess their own understanding of WLC of buildings. They were given four options and could pick one as a self-assessment. Their answers are illustrated in Figure 6.

Most respondents rate their understanding of the matter as 'good' (89%). A further 10% indicate that they possess 'some understanding', while only two individuals out of the 250 surveyed claim to have 'limited or no understanding': one of them identifies as an Academic, and the other as a Company/Business organisation.

Therefore, the data underscores that most respondents of this public consultation are well-informed about WLC of buildings, and that the consultation primarily reached actors who are already aware and have at least some knowledge of the topic.

Figure 6. Overview of responses to Q1

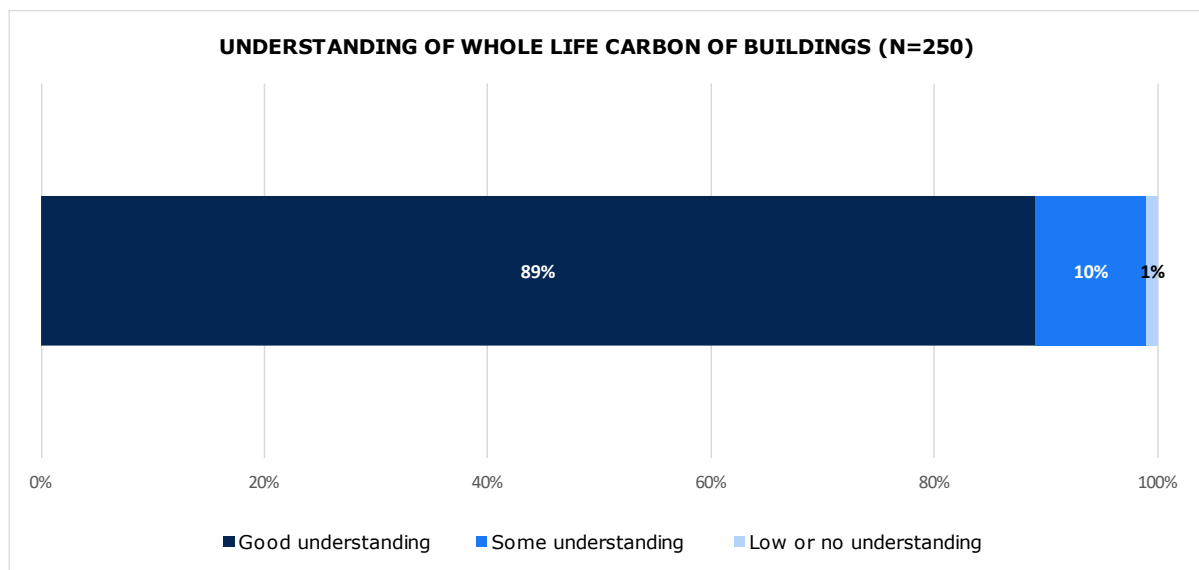


Figure 7 illustrates that all stakeholder categories are represented in both the 'good understanding' and 'some understanding' categories. Moreover, Figure 8 breaks down the responses from companies and business organisations by sector groups, which shows a very similar distribution. The respondent who identifies itself as Company/Business organisation category and answered 'low to no understanding of WLC of buildings' is more precisely a sub-contractor. The second response indicating a low level of understanding came from an academic participant and, as such, is not represented in the graphs that account for the sector groups.

Figure 7. Breakdown of responses to Q1 by stakeholder category

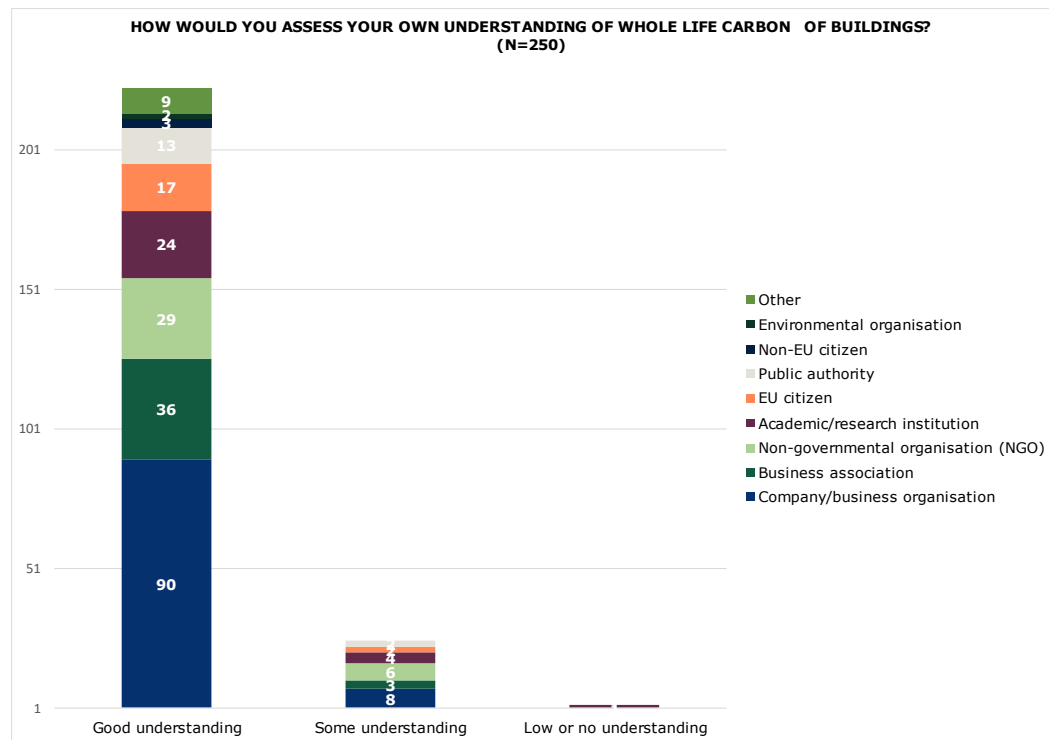
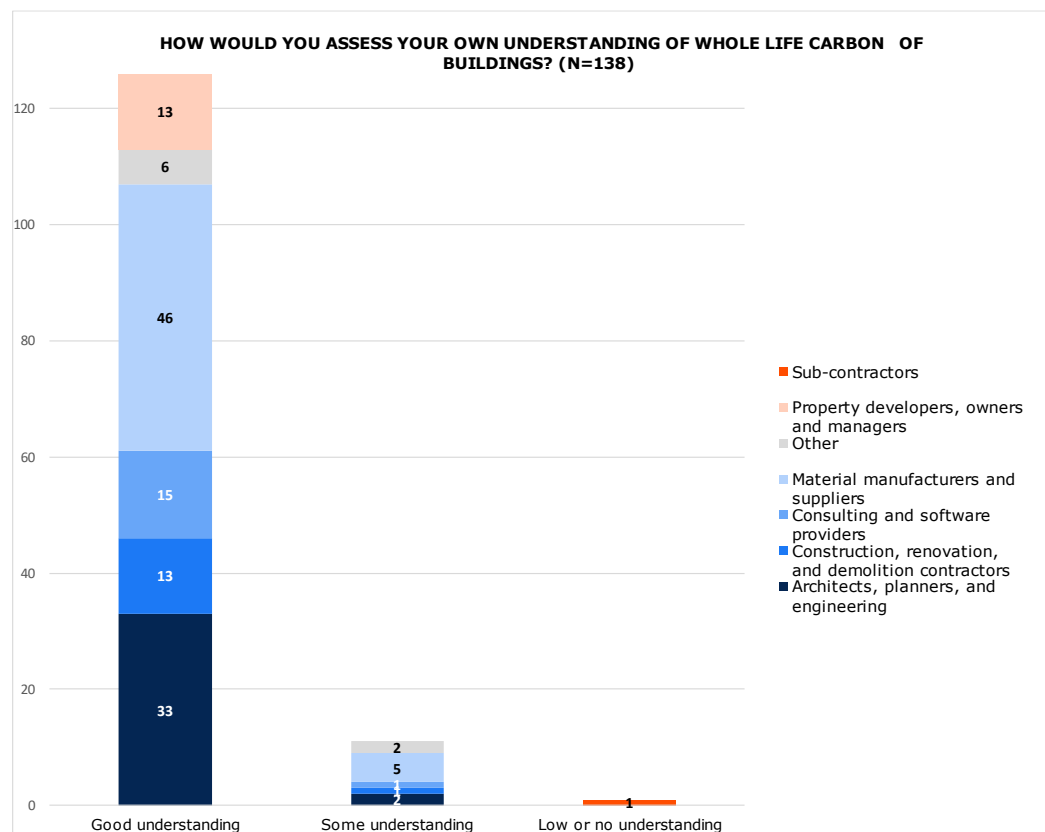


Figure 8. Breakdown of responses to Q1 by sector group

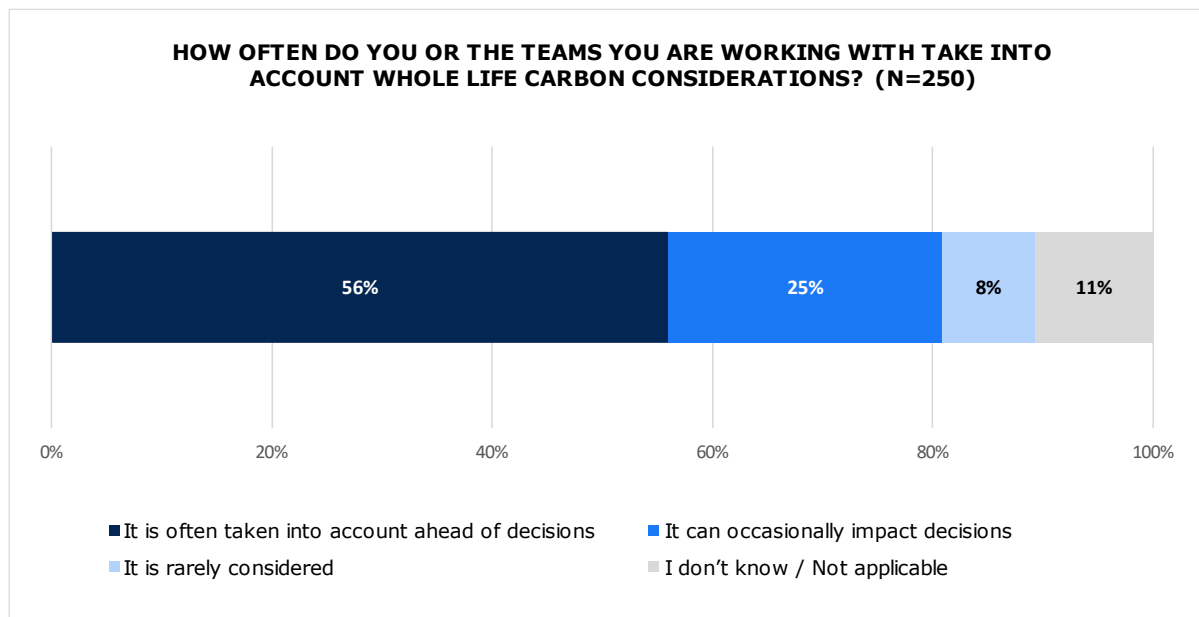


3.1.2 Q2 - How often do you or the teams you are working with take into account WLC?

This question aims to understand whether the respondents or the teams they worked with already consider whole life carbon impacts in their decisions.

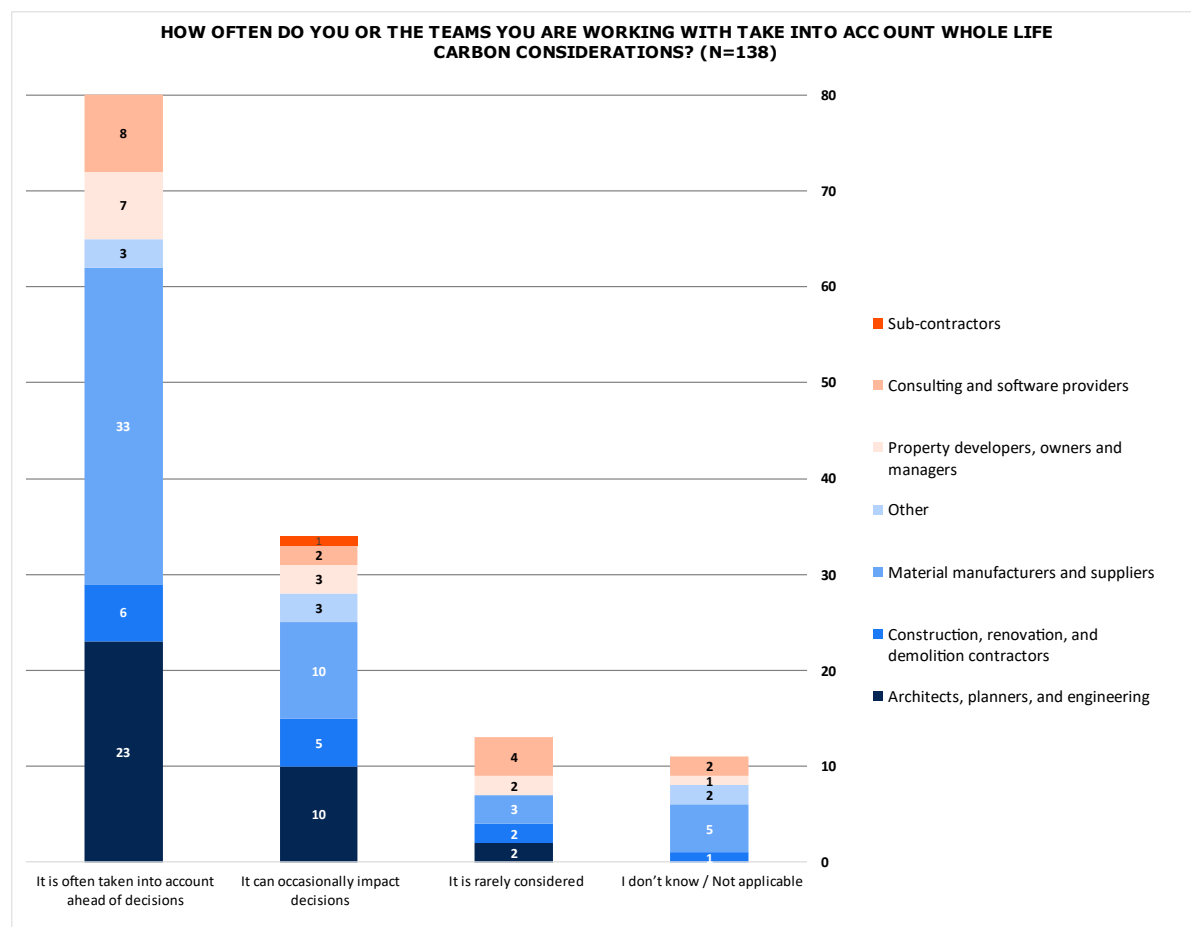
Figure 9 illustrates that more than half of the respondents (56%) often take WLC considerations into account in decision-making. 25% of respondents answer that they can occasionally impact decisions and 11% admit that they are rarely considered. Finally, 8% do not know or say the question does not apply to them.

Figure 9. Overview of responses to Q2



When compared to the respondent categories, Figure 10 illustrates a relatively even distribution of all sector groups of respondents across the four responses. This pattern remains consistent when analysing the general stakeholder categories (see Figure 1 for the categories), as all categories are represented in comparable proportions within the four response options.

Figure 10. Breakdown of responses to Q2 by sector groupsI



Importantly, these results show that those who are working on the reduction on WLC emissions as a way to contribute to climate neutrality responded to the survey. The results may not be representative of the wider construction and real estate sectors. Yet, the results capture the perspective and expertise of stakeholders, authorities and citizens, who encounter WLC aspects in their day-to-day business and professional practices.

3.2 EU policies addressing whole life carbon emissions of buildings

3.2.1 Q3 - Do you feel that current EU policies relevant to WLC of the building sector are sufficient to ensure that the building stock is aligned with a climate-neutral trajectory?

When asked if they feel that current EU policies relevant to WLC of the building sector are sufficient to ensure that the building stock is aligned with a climate-neutral trajectory, 51% of the respondents answer that the current EU policies are not enough, and that additional policy is needed to complement the existing framework. 39% state that a suitable EU framework is in place but needs strengthening. Only 8% of the respondents agree that a sufficient EU policy framework exists. 2% of the respondents do not have an opinion (Figure 11).

Figure 11. Overview of responses to Q3

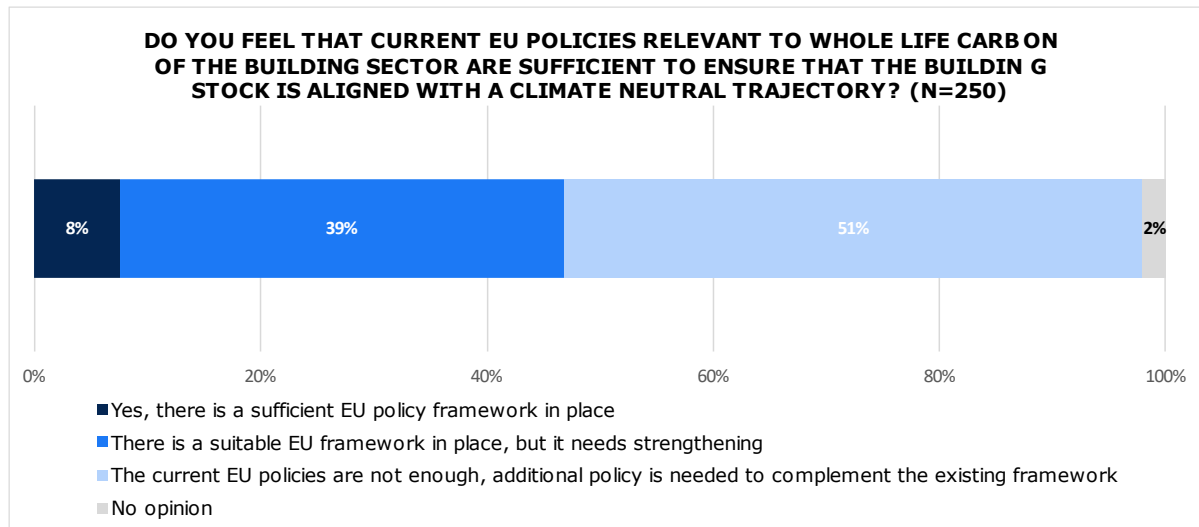


Figure 12 compares the previous results with the stakeholder categories to which the respondents belong. This graph shows that business associations are more strongly of the opinion that a sufficient EU-level policy framework is in place and only needs some strengthening. NGOs and public authorities on the other hand, in majority consider the current policies as not sufficient.

When looking at the sector groups of private sector respondents (Figure 13), it is further highlighted that material manufacturers and suppliers in majority select *'There is a suitable EU framework in place, but it needs strengthening'*, while architects, planners and engineers lean towards *'The current EU policies are not enough; additional policy is needed to complement the existing framework'*. Furthermore, most respondents who picked the *'Yes, there is a sufficient EU policy framework in place'* are material manufacturers and supplier.

Finally, a breakdown by organisation size in Figure 14 shows that, compared to other sized, a larger share of small organisations is of the opinion that additional policies are needed to complement the EU framework. This trend is also observed when only considering small companies/business organisations and business associations.

Figure 12. Breakdown of responses to Q3 by stakeholder category

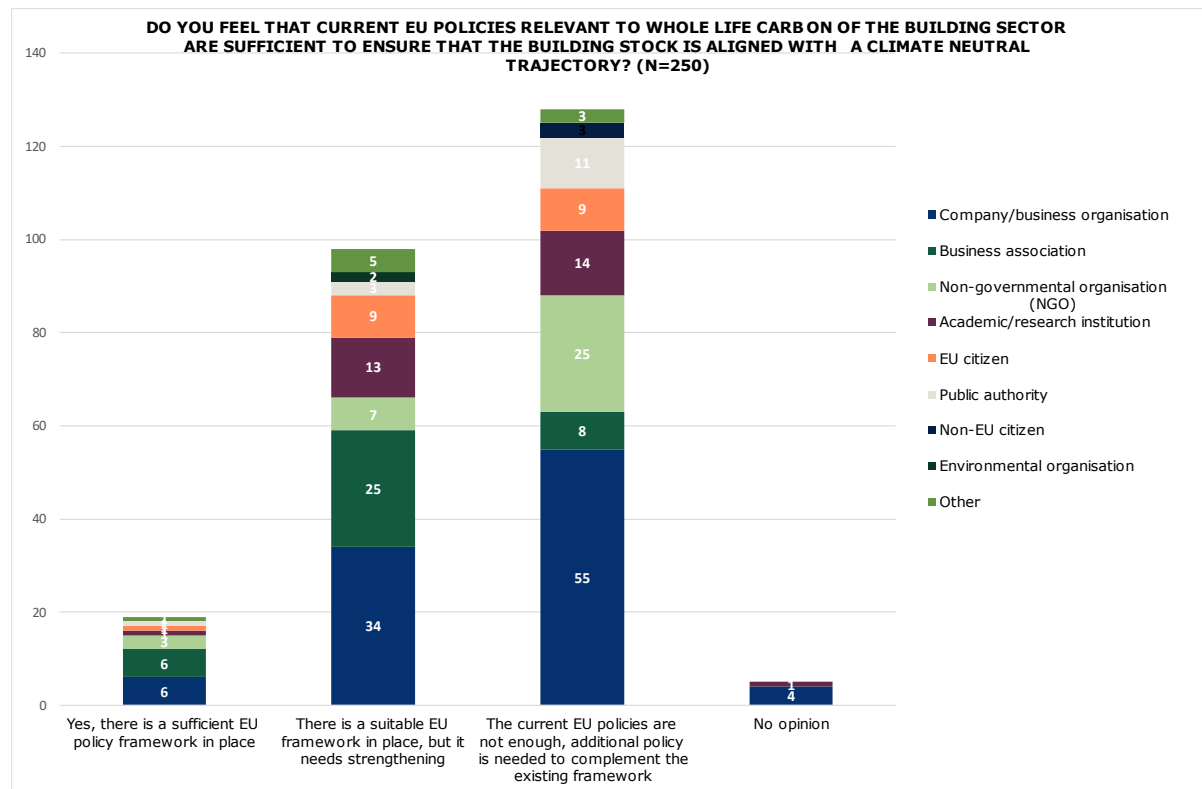


Figure 13. Breakdown of responses to Q3 by sector group

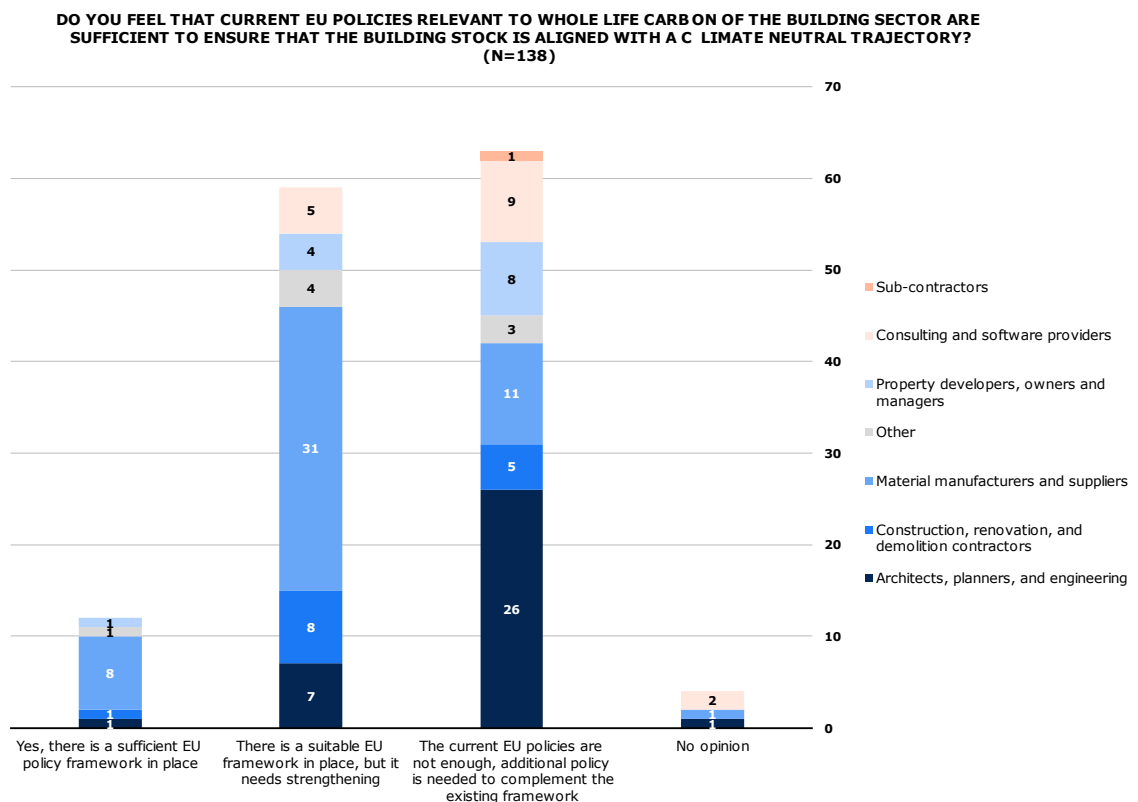
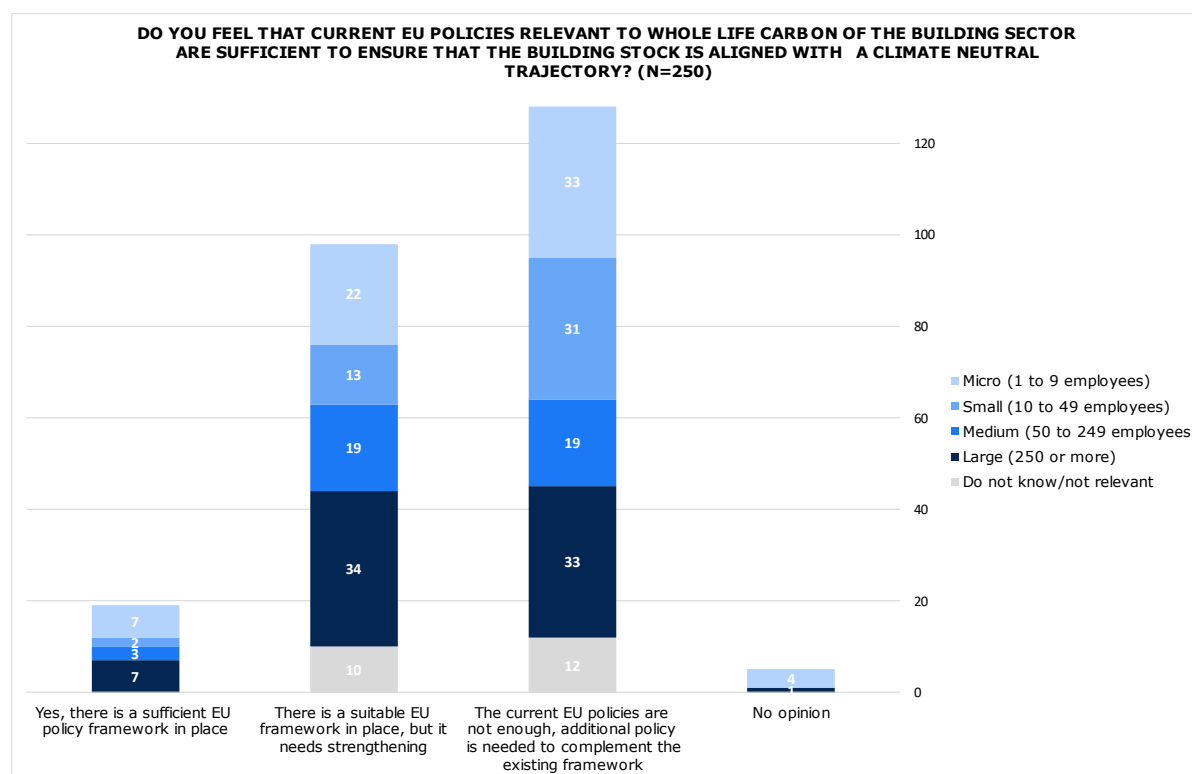


Figure 14. Breakdown of responses to Q3 by company size

Then, respondents were given the opportunity to give explanations for their views on why they consider the current policies insufficient or in need of strengthening. The prevailing theme mentioned is the urgency to act upon WLC as a significant source of emissions in the EU. This sentiment is echoed by stakeholder from all categories, even though NGOs are more often calling for higher ambition and faster pace compared to companies.

Across all stakeholders, there is a recognition of the need for incentives to increase the relevance of WLC emissions in discussions and decisions involving developers, architects and contractors. Consequently, several respondents call for mandatory reporting of WLC or WLC limits. Others emphasise the importance for supporting the transition through financial incentives and targeted awareness raising campaigns.

One contrasting theme was observed and primarily articulated by 7 stakeholders from companies and business associations which pertains to the complexity of the legal framework. This complexity is seen as posing challenges for smaller companies. In the eyes of these stakeholders, further policy developments should aim at aligning requirements and assessment methods.

3.2.2 **Q3a - What levels of governance do you think are the most appropriate to tackle WLC emissions?**

In this sub-question, stakeholders were asked to indicate the levels of governance they deemed most appropriate for addressing Whole Life Cycle (WLC) emissions. Respondents were allowed to select multiple responses.

As illustrated in Figure 15, a significant 88% of all respondents believe that European-level governance is the most appropriate to tackle WLC emissions. Additionally, 74% of respondents see a role for national or region-level governance, while 31% express a preference for a local approach. **Overall, the majority of respondents concur that incorporating European-level governance is the most effective approach for tackling WLC emissions.**

More specifically, Figure 16 shows that the largest segment of stakeholders (36%) advocate for both European and national or regional governance, followed closely by those who endorse a combination of all three levels, European, national or regional, and local governance (26%). The option with the next highest preference is solely European governance (25%). Conversely, a smaller proportion of respondents prefer solely national or regional governance (9%), national or regional governance in conjunction with local governance (3%), and finally, only local governance (1%). It is worth noting that the three most commonly selected options involve EU-level governance, while the three less frequently chosen options do not.

Figure 15. Overview of responses to Q3a

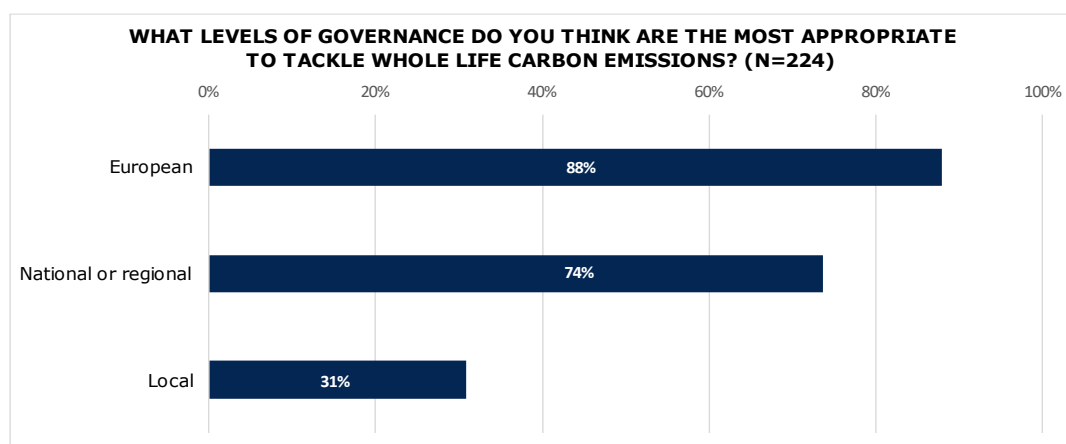
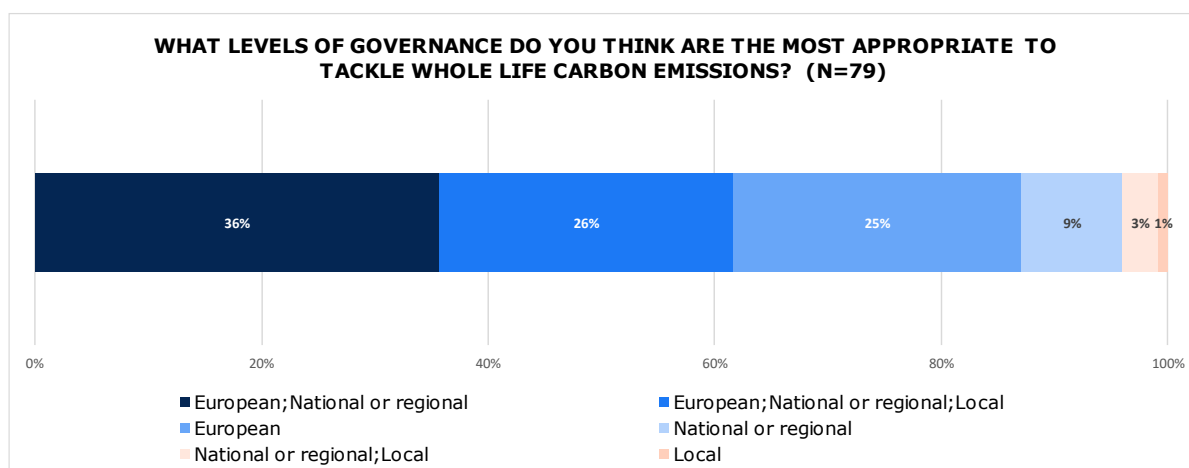


Figure 16. Detailed overview of responses to Q3a, showing the most often selected combinations of answers



3.3 Possible areas for actions to reduce WLC in buildings

3.3.1 ***Q4 - Please assess the following areas in terms of both their potential for reducing WLC emissions and the feasibility to act to achieve reduction of emissions.***

Respondents were presented with 18 examples of actions on WLC of buildings and were asked to rate their potential for reducing WLC emissions and their feasibility to act. This is illustrated in Figure 17. The graph is divided into two sections: the left side of the graph ranks the areas for action by their potential effectiveness, while the right side displays the feasibility responses in the same order.

It has to be highlighted that – as illustrated in Figure 17 – all answer options except reduce the emissions from the construction site are considered at least high in potential by more than half of the respondents. In fact, 11 of the actions reach 80% or more for at least high potential, while two more actions are well above 60%. Out of these 13 actions, 8 obtain at least high feasibility from 70% or more of the respondents, while two more are above 60% as well. This indicates a high degree of confidence in the potential of existing measures to reduce WLC from across the stakeholder landscape.

According to the respondents, the five options with the most potential for reducing WLC emissions are as follows:

1. Prioritising renovation, repair and maintenance over demolition and new construction
2. Reduce the greenhouse gas intensity of energy supply
3. Promote energy efficient renovation to reduce the energy use of existing buildings
4. Ensure that any new buildings are designed to be high energy performing and finally
5. Reduce the carbon footprint of materials and construction products in their manufacturing processes.

Response patterns of different stakeholder groups only differ marginally as shown in Table 1. It can be noted that the options considered most impactful are seen this way across all stakeholder categories. One exception is the prioritisation of renovation over demolition and new construction, which business associations rank lower than other stakeholder groups. NGOs tend to see a higher potential than other stakeholder groups, but the difference is small. Additionally, Table 3 illustrates the differences between sector groups. Material manufacturers indicate a high potential for reduction compared to architects and consulting providers, except for the highest ranked option.

When it comes to the feasibility of acting on those measures, the favoured options are:

1. Ensuring that any new buildings are designed to be high energy performing
2. Promoting energy efficient renovation to reduce the energy use of existing buildings
3. Reducing the greenhouse gas intensity of energy supply
4. Improving the management of energy use in existing buildings
5. Prioritising renovation, repair and maintenance over demolition and new construction.

Different stakeholder categories, again, share largely similar views in this respect. In contrast to the potential, however, business associations see a higher feasibility than companies and – in most cases – also NGOs (see Table 2). When looking into sector groups, the general trends are comparable across the different groups, with slight variations in relation to some specific option, as can be seen in Table 4.

Considering both reduction potential and feasibility, energy efficiency measures in both new and existing buildings are perceived as effective and feasible. Measures to address embodied carbon are seen as important levers to reduce WLC, but in comparison rank lower in the feasibility. Nevertheless, it should be noted that the measures ranked as most effective are considered feasible to act upon, with over 70% considering the feasibility of prioritising renovations and repairs over new construction at least as high.

Interestingly, there is an overlap between the three options with the lowest potential and lowest feasibility to act:

1. Ensuring that residential buildings do not remain under-occupied over the long term by facilitating the change of residence through various means
2. Minimising transport-related emissions of material and waste

3. Reducing emissions from the construction site.

The breakdown by sector groups shows that architects and contractors rate these options as particularly low, while consulting and software providers, as well as material producers see a slightly higher potential and feasibility, while still expressing only a lower relevance to these options.

All the provided options were grouped in five different areas aimed at achieving substantial reduction of WLC emissions in buildings areas (shown here in italic). In the case of *Demand for new built space*, respondents judge that all options have a higher potential for reducing WLC emissions rather than a high feasibility for implementation, with renovation being perceived more suitable than increasing space use intensity. Similarly, the responses for *Demand for materials*, *Supply of materials* and *Use of energy in buildings* indicate a high reduction potential, but slightly more challenges in their ability to be implemented. Only two options are ranked higher on their feasibility to act on rather than their potential for reducing WLC emissions. These are Ensure that any new buildings are designed to be high energy performing (from the *Use of energy in buildings* area) and Reduce emissions from the construction site (from *Other sources of emissions relating to whole life carbon*).

Figure 17. Overview of responses to Q4

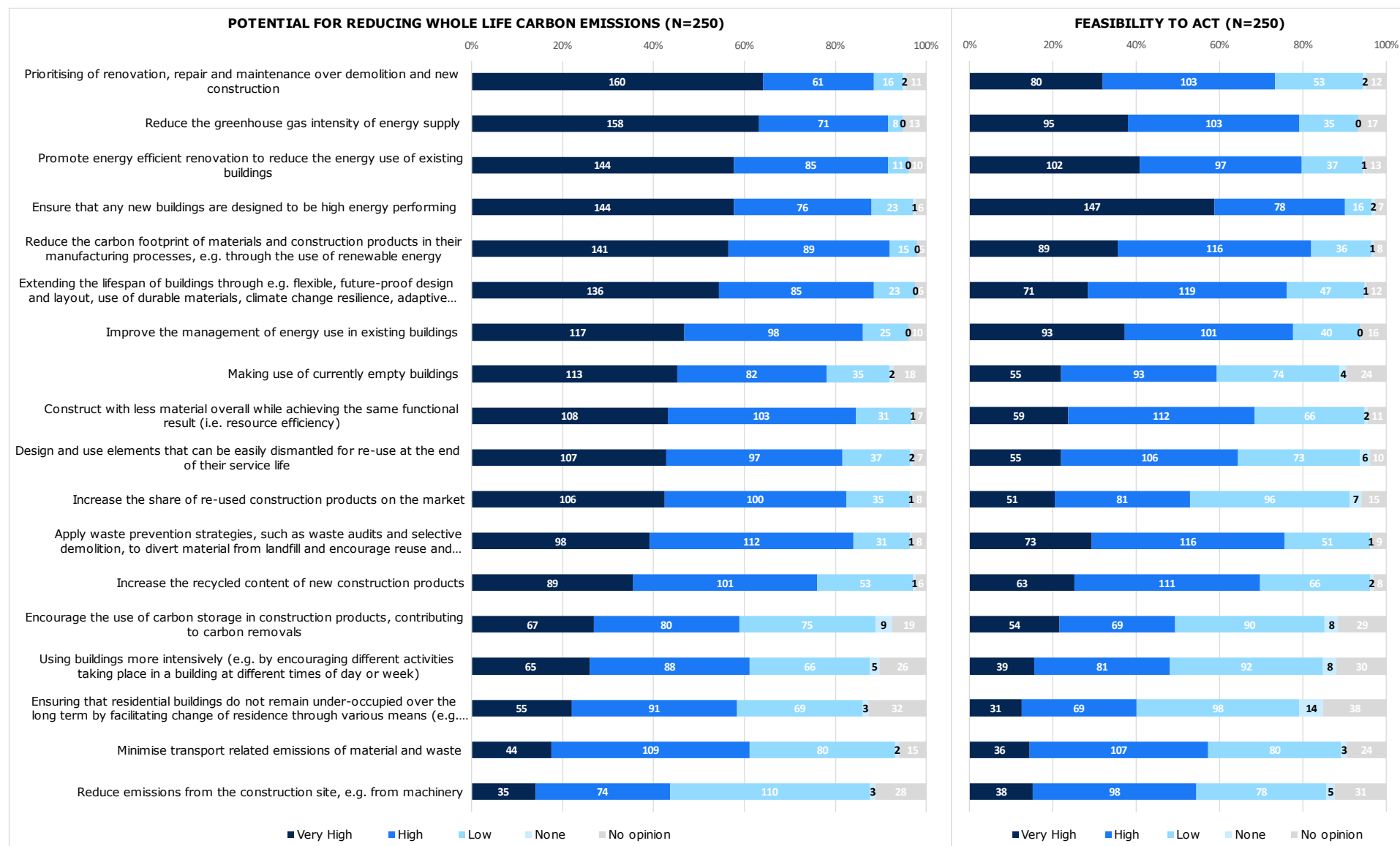


Table 1. Average score on the potential for reducing WLC of the actions listed in Q4 per stakeholder category

Potential for reducing whole life carbon emissions	N	Company/business organisation 99	Business association 39	Non-governmental organisation (NGO) 35	Academic/research institution 29	EU citizen 19	Public authority 15	Non-EU citizen 3	Environmental organisation 2	Other 9
Prioritising of renovation, repair and maintenance over demolition and new construction		2.611	2.314	2.706	2.571	2.737	2.533	3.000	3.000	2.500
Reduce the greenhouse gas intensity of energy supply		2.656	2.639	2.765	2.593	2.500	2.600	2.667	2.500	2.333
Promote energy efficient renovation to reduce the energy use of existing buildings		2.596	2.703	2.676	2.250	2.526	2.267	2.000	2.500	2.750
Ensure that any new buildings are designed to be high energy performing		2.505	2.711	2.382	2.429	2.389	2.267	2.667	2.500	2.444
Reduce the carbon footprint of materials and construction products in their manufacturing processes, e.g. through the use of renewable energy		2.526	2.676	2.657	2.214	2.316	2.600	2.333	2.500	2.444
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		2.443	2.694	2.429	2.536	2.211	2.533	2.000	2.000	2.333
Improve the management of energy use in existing buildings		2.469	2.278	2.424	2.214	2.316	2.400	2.667	2.500	2.250
Making use of currently empty buildings		2.330	1.970	2.588	2.250	2.316	2.533	2.667	2.000	2.286
Construct with less material overall while achieving the same functional result (i.e. resource efficiency)		2.323	2.297	2.441	2.357	2.158	2.133	3.000	2.000	2.000
Design and use elements that can be easily dismantled for re-use at the end of their service life		2.240	2.297	2.382	2.357	2.105	2.333	2.333	1.500	2.222
Increase the share of re-used construction products on the market		2.365	2.027	2.382	2.214	2.158	2.400	2.333	2.500	2.375
Apply waste prevention strategies, such as waste audits and selective demolition, to divert material from landfill and encourage reuse and recycling		2.278	2.250	2.182	2.321	2.316	2.200	3.000	2.500	2.111
Increase the recycled content of new construction products		2.198	2.054	2.118	1.759	2.316	2.333	2.667	2.000	2.333
Encourage the use of carbon storage in construction products, contributing to carbon removals		1.880	2.059	1.818	1.680	1.789	1.933	2.333	1.500	2.250
Using buildings more intensively (e.g. by encouraging different activities taking place in a building at different times of day or week)		1.944	1.867	2.097	1.926	2.056	1.867	3.000	1.500	1.500
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)		1.917	1.821	1.903	1.893	1.947	1.933	2.667	1.500	1.875
Minimise transport related emissions of material and waste		1.862	1.750	1.742	1.815	1.895	2.000	1.667	1.500	1.875
Reduce emissions from the construction site, e.g. from machinery		1.587	1.964	1.533	1.500	1.667	1.867	1.667	1.000	1.500

Note: The average score is obtained by assigning a value to the answer options, ranging from 3 for very high, 2 for high, 1 for low and 0 for none. Adding the scores per stakeholder category and dividing it by the number of respondents in that category yields the average score. The higher the score in the table, the stronger the reduction potential, as assessed by the survey respondents.

Table 2. Average score on the feasibility to act on the actions listed in Q4 per stakeholder category.

Feasibility to act	N	Company/ business organisation	Business association	Non-governmental organisation (NGO)	Academic/research institution	EU citizen	Public authority	Non-EU citizen	Environmental organisation	Other
Prioritising of renovation, repair and maintenance over demolition and new construction		2.202	2.000	2.200	2.111	1.895	1.867	2.667	2.000	1.500
Reduce the greenhouse gas intensity of energy supply		2.261	2.361	2.375	2.074	2.176	2.333	2.333	2.000	2.000
Promote energy efficient renovation to reduce the energy use of existing buildings		2.272	2.568	2.235	2.074	2.316	2.267	1.667	2.000	1.750
Ensure that any new buildings are designed to be high energy performing		2.490	2.737	2.588	2.286	2.500	2.667	2.667	2.500	2.222
Reduce the carbon footprint of materials and construction products in their manufacturing processes, e.g. through the use of renewable energy		2.271	2.243	2.265	1.926	2.211	2.200	2.333	2.000	2.111
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		2.085	2.400	2.000	1.923	2.053	2.067	2.000	2.000	2.000
Improve the management of energy use in existing buildings		2.217	2.257	2.303	2.259	2.158	2.333	2.333	2.000	1.750
Making use of currently empty buildings		1.881	1.676	2.206	1.964	1.789	1.467	3.000	1.500	1.714
Construct with less material overall while achieving the same functional result (i.e. resource efficiency)		1.957	1.919	2.242	1.786	1.947	1.867	2.000	1.500	1.778
Design and use elements that can be easily dismantled for re-use at the end of their service life		1.915	1.919	1.970	1.679	1.737	1.933	2.333	1.500	1.667
Increase the share of re-used construction products on the market		1.785	1.595	1.844	1.556	1.737	1.929	2.333	2.000	1.750
Apply waste prevention strategies, such as waste audits and selective demolition, to divert material from landfill and encourage reuse and recycling		2.116	2.111	2.059	1.893	2.000	2.200	2.667	2.000	2.111
Increase the recycled content of new construction products		1.989	1.784	2.061	1.828	2.000	2.200	2.667	2.000	2.000
Encourage the use of carbon storage in construction products, contributing to carbon removals		1.795	1.875	1.867	1.720	1.421	1.857	1.667	1.000	1.625
Using buildings more intensively (e.g. by encouraging different activities taking place in a building at different times of day or week)		1.644	1.516	1.867	1.923	1.842	1.357	2.667	0.500	1.500
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)		1.494	1.586	1.828	1.630	1.316	1.214	2.333	1.500	1.625
Minimise transport related emissions of material and waste		1.764	1.833	1.714	1.885	1.684	2.000	2.333	1.500	1.250
Reduce emissions from the construction site, e.g. from machinery		1.648	2.000	2.138	1.560	1.722	2.000	2.000	2.000	1.250

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per stakeholder category and dividing it by the number of respondents in that category yields the average score. The higher the score in the table, the more feasible to act upon the specific measure, as assessed by the survey respondents.

Table 3. Average score on the potential for reducing WLC of the actions listed in Q4 per sector group

Potential for reducing whole life carbon emissions	N	Material 51 manufacturers and suppliers	Architects, 35 planners, and engineering	Consulting and 16 software providers	Construction, 14 renovation, and demolition contractors	Property 13 developers, owners and managers	1 Sub-contractors	8 Other
Prioritising of renovation, repair and maintenance over demolition and new construction		2.444	2.714	2.625	2.429	2.385	3.000	2.333
Reduce the greenhouse gas intensity of energy supply		2.711	2.559	2.625	2.643	2.692	3.000	2.667
Promote energy efficient renovation to reduce the energy use of existing buildings		2.750	2.486	2.667	2.857	2.154	3.000	2.800
Ensure that any new buildings are designed to be high energy performing		2.760	2.371	2.438	2.786	2.231	3.000	2.500
Reduce the carbon footprint of materials and construction products in their manufacturing processes, e.g. through the use of renewable energy		2.640	2.571	2.500	2.500	2.462	2.000	2.571
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		2.688	2.371	2.563	2.357	2.154	3.000	2.833
Improve the management of energy use in existing buildings		2.447	2.429	2.563	2.286	2.231	3.000	2.333
Making use of currently empty buildings		2.150	2.514	2.125	1.786	2.231	2.000	2.600
Construct with less material overall while achieving the same functional result (i.e. resource efficiency)		2.375	2.400	2.250	2.071	2.000	3.000	2.667
Design and use elements that can be easily dismantled for re-use at the end of their service life		2.245	2.171	2.467	2.214	2.308	2.000	2.333
Increase the share of re-used construction products on the market		2.083	2.457	2.375	2.000	2.385	2.000	2.833
Apply waste prevention strategies, such as waste audits and selective demolition, to divert material from landfill and encourage reuse and recycling		2.306	2.343	2.125	2.286	2.000	2.000	2.500
Increase the recycled content of new construction products		2.082	2.229	2.133	2.071	2.231	2.000	2.500
Encourage the use of carbon storage in construction products, contributing to carbon removals		1.733	2.086	2.200	1.909	1.833	2.000	2.000
Using buildings more intensively (e.g. by encouraging different activities taking place in a building at different times of day or week)		1.703	2.294	1.938	1.786	1.750	2.000	1.833
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)		1.857	2.059	2.143	1.750	1.545	1.000	1.600
Minimise transport related emissions of material and waste		1.896	1.771	1.867	1.643	1.750	2.000	2.200
Reduce emissions from the construction site, e.g. from machinery		1.769	1.676	1.467	1.462	1.667	2.000	2.000

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per sector group and dividing it by the number of respondents in that group yields the average score. The higher the score in the table, the stronger the reduction potential, as assessed by the survey respondents.

Table 4. Average score on the feasibility to act on the actions listed in Q4 per sector group.

Feasibility to act	N	Material 51 manufacturers and suppliers	Architects, 35 planners, and engineering	Consulting and 16 software providers	Construction, 14 renovation, and demolition contractors	Property 13 developers, owners and managers	1 Sub-contractors	8 Other
Prioritising of renovation, repair and maintenance over demolition and new construction		2.133	2.171	2.188	2.143	2.077	2.000	2.200
Reduce the greenhouse gas intensity of energy supply		2.422	2.294	2.063	2.286	2.154	3.000	2.000
Promote energy efficient renovation to reduce the energy use of existing buildings		2.583	2.200	2.071	2.429	2.000	3.000	2.600
Ensure that any new buildings are designed to be high energy performing		2.800	2.371	2.563	2.643	2.077	3.000	2.400
Reduce the carbon footprint of materials and construction products in their manufacturing processes, e.g. through the use of renewable energy		2.184	2.257	2.500	2.357	2.308	2.000	2.143
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		2.298	2.030	2.375	2.286	1.769	1.000	2.200
Improve the management of energy use in existing buildings		2.273	2.171	2.438	2.071	2.083	3.000	2.200
Making use of currently empty buildings		1.730	1.971	1.867	1.714	1.667	1.000	2.200
Construct with less material overall while achieving the same functional result (i.e. resource efficiency)		1.936	2.029	2.000	2.000	1.615	1.000	2.200
Design and use elements that can be easily dismantled for re-use at the end of their service life		1.894	1.686	2.533	2.000	2.000	1.000	1.667
Increase the share of re-used construction products on the market		1.543	1.857	2.000	1.643	1.692	1.000	2.200
Apply waste prevention strategies, such as waste audits and selective demolition, to divert material from landfill and encourage reuse and recycling		2.104	2.257	2.000	2.214	1.833	1.000	2.200
Increase the recycled content of new construction products		1.860	1.971	2.267	1.857	1.750	1.000	2.200
Encourage the use of carbon storage in construction products, contributing to carbon removals		1.725	1.971	1.938	1.818	1.545	1.000	1.833
Using buildings more intensively (e.g. by encouraging different activities taking place in a building at different times of day or week)		1.541	1.824	1.938	1.538	1.000	2.000	1.200
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)		1.353	1.781	1.867	1.417	0.909	1.000	1.600
Minimise transport related emissions of material and waste		1.913	1.618	1.933	1.692	1.727	2.000	1.600
Reduce emissions from the construction site, e.g. from machinery		1.868	1.743	1.667	1.583	1.500	2.000	1.667

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per sector group and dividing it by the number of respondents in that group yields the average score. The higher the score in the table, the more feasible to act upon the specific measure, as assessed by the survey respondents.

3.3.2 ***Q5 - If you have examples of other areas for action to reduce the WLC emissions of buildings, please share them here.***

When asked about further areas for action, 118 respondents made use of the open text box. However, the analysis of these contributions reveals that most participants used this opportunity to emphasize specific action areas that had already been included in the questionnaire or to provide general input regarding the choice of actions.

Reiterating **already mentioned action areas** was most common, with the following items mentioned 13 times each:

- **Encouraging sufficiency** and making use of the existing built-up area (mentioned mostly by NGOs and academia (combined for 7 out of 13));
- **Increasing the use of bio-based materials** (mentioned by a mix of stakeholders, including public authorities, NGOs and companies);
- Optimising and **decarbonising use-phase energy** (mentioned primarily by companies and business associations, in majority from the material manufacturing industry (9 out of 13)).

Additionally, the circular use of materials was also often mentioned, with 11 mentions, primarily by companies and NGOs. Other noteworthy areas of action mentioned include building information modelling (BIM) for better understanding of upgrade and deconstruction measures (6 mentions), material efficiency (5 mentions), as well as prefabricated building elements (4 mentions).

Furthermore, respondents introduced **several new action areas** that were not previously addressed in the questionnaire. These pertain to the following categories:

- **District-level and urban planning:** benefits of such actions are described as providing better air quality and temperature regulation for lower in-use energy demand (2 mentions by one respondent from academia and one business association (architects, planners and engineering)). Additionally, these actions were seen as a means to reduce mobility emissions by shortening distances between relevant locations (cited twice, once by a business association representing property developers, owners, and managers, and once by a company specializing in architects, planners, and engineering).
- **User behaviour and knowledge about energy efficient building use** (4 mentions by one EU citizen, two academic, and one company (architects, planners and engineering)).
- **Vertical extensions to already existing buildings:** this action would create more space without requiring a new building. It entails adding lightweight structures to the top of an already existing building in areas with high demand for space (e.g. housing) (1 mention by an academic)
- Provide **certification and insurance for using novel technologies or recycled materials:** this would facilitate the uptake of the related actions in a wider part of the sector (1 mention by an EU citizen).
- **Specific materials or products:** including insulation material made from algae (EU citizen), composite facade insulation material (business association), and smart ventilation (company).

General inputs about the action areas include voices to differentiate the most relevant actions depending on the local context (5 mentions), as well as the need to align regulations with WLC reduction actions (4 mentions). Examples of the latter include removing barriers to recycling within waste regulation (EU citizen), simplifying overly prescriptive building codes (NGOs), and streamlining complex procedures for certifying innovative materials (academia).

3.4 Supportive policies for reducing whole life carbon

3.4.1 ***Q6 - Please assess the following factors in terms of both their potential effectiveness for driving reduction of WLC emissions and the feasibility for policy to be enacted.***

In this question, respondents were given 12 policy actions to address WLC of buildings and were asked to rate their potential effectiveness for reducing WLC emissions and the feasibility of those actions (policy initiatives or other) to be enacted. In both cases, all 250 respondents participated in the questions, picking up to three answers.

The left side of Figure 18 ranks the policy options by their potential effectiveness, and the right side shows the feasibility responses, in the same order as those on the left.

The findings indicate that most of the options are considered effective and feasible if combining those respondents which selected 'very high' or 'high'. For at least a high degree of effectiveness, 7 options reach 80%, for feasibility 8 options score 70% or higher. The top five policy options perceived as most effective for reducing WLC emissions are as follows:

1. Include consideration of WLC in national construction and new housing plans and targets
2. Mandatory carbon footprint declaration of construction products
3. Requirements to set national WLC roadmaps with quantified targets
4. Link public funding to whole life carbon performance
5. Include consideration of whole life carbon in national plans for renovation

These options are ranked highest by almost all stakeholder categories, as shown in Table 5. The table also highlights that companies, academia, and EU citizens see a higher effectiveness for most of the options compared with business associations and NGOs. In relation to sector groups, architects and planners as well as consulting and software providers expect a higher effectiveness than material producers contractors, but for some options such as mandatory carbon footprint declarations of products (contractors) or public sector leading by example (material producers) these sector groups rate them higher than the other groups. The full picture is provided in Table 7.

Conversely, when evaluating the feasibility of policy implementation, the respondents rated the options as follows:

1. Mandatory carbon footprint declaration of construction products
2. Public sector leading by example
3. Include consideration of WLC in national construction and new housing plans and targets
4. Link public funding to whole life carbon performance
5. Include consideration of whole life carbon in national plans for renovation

Table 6 shows that the views on feasibility vary more strongly than on potential effectiveness between the stakeholder categories. NGOs consider many options more feasible than private sector respondents, but the highest ranked options are considered feasible by all stakeholder categories with a larger sample size. Similar variation can be observed between the different sector groups shown in Table 8. Contractors select a few specific policy instruments as highly feasible, while architects and consulting providers consider a range of them as medium to high in terms of feasibility. Material producers are slightly more reserved, while still rating the feasibility as high or close to high on average.

Two of the options that respondents found highly effective also ranked as the most feasible to implement:

- Mandatory carbon footprint declaration of construction products

- Include consideration of WLC in national construction and new housing plans and targets

In both cases, the two least picked options to be effective and feasible to be enacted are:

- Capacity building, education and training for stakeholders not directly involved on-site.
- Use of sustainability scores such as the EU Taxonomy for Sustainable Activities to identify sustainable WLC.

These options were categorised into three areas: Market push, Market pull and Knowledge. The results suggest that respondents consider market push policies slightly more effective. In contrast, two options, one from Market pull (Public sector leading by example) and one from Knowledge (General awareness raising and media campaigns), garnered a larger share of responses regarding feasibility, indicating they are considered more achievable in practice.

Figure 18. Overview of responses to Q6

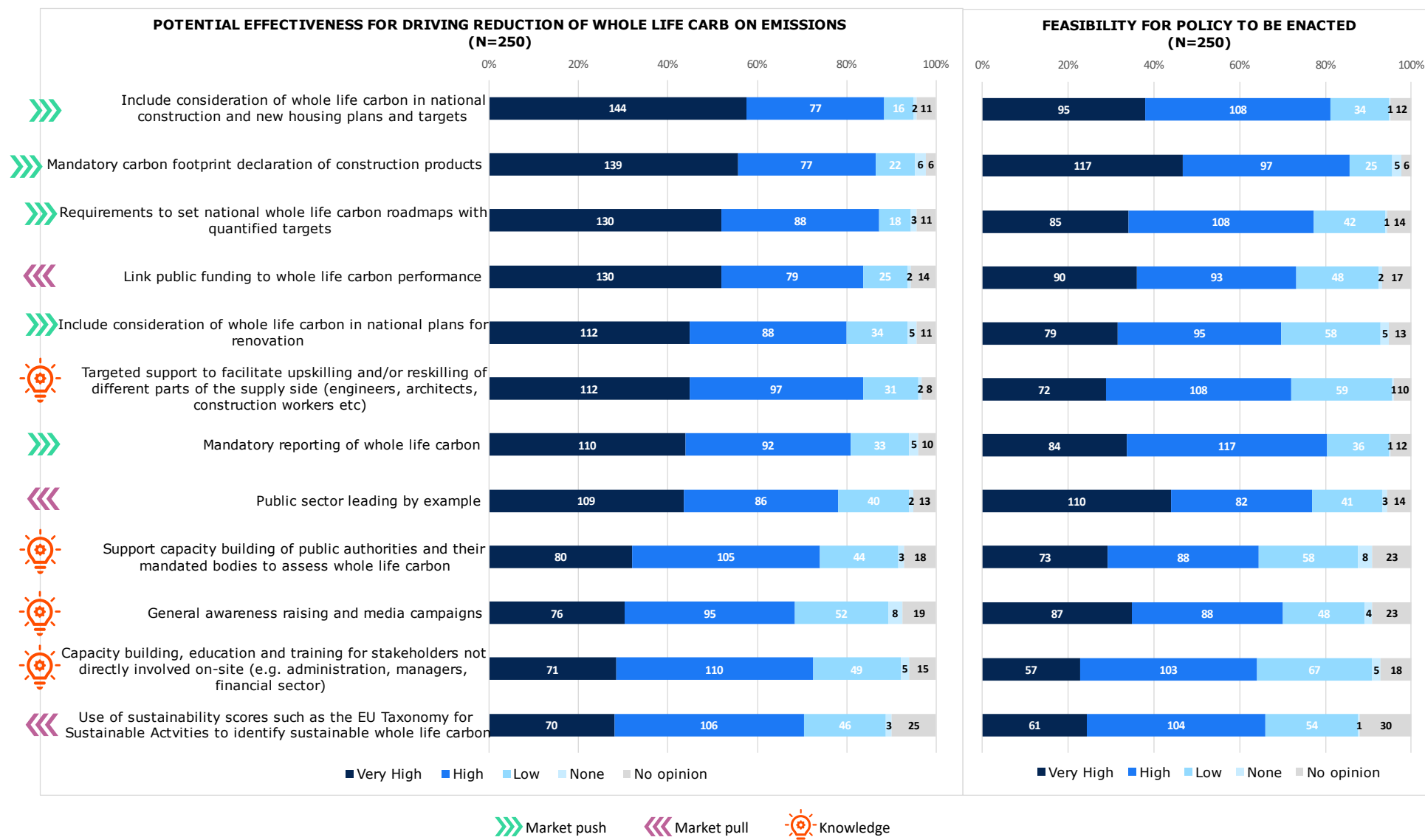


Table 5. Average score on the potential effectiveness for reducing WLC of the policy instruments listed in Q6 per stakeholder category.

Potential effectiveness for driving reduction of whole life carbon emission	N	Company/business organisation 99	Business association 39	Non-governmental organisation (NGO) 35	Academic/research institution 29	EU citizen 19	Public authority 15	Non-EU citizen 3	Environmental organisation 2	Other 9
Include consideration of whole life carbon in national construction and new housing plans and targets		2.632	2.343	2.485	2.655	2.579	2.143	2.333	2.500	2.222
Mandatory carbon footprint declaration of construction products		2.474	2.243	2.382	2.552	2.526	2.214	2.667	3.000	2.444
Requirements to set national whole life carbon roadmaps with quantified targets		2.617	2.081	2.485	2.464	2.368	2.357	2.000	2.500	2.333
Link public funding to whole life carbon performance		2.554	2.143	2.424	2.414	2.474	2.286	2.333	3.000	2.333
Include consideration of whole life carbon in national plans for renovation		2.421	2.057	2.364	2.172	2.421	2.143	1.667	2.500	1.889
Targeted support to facilitate upskilling and/or reskilling of different parts of the supply side (engineers, architects, construction workers etc)		2.284	2.351	2.382	2.379	2.368	2.071	3.000	2.500	2.111
Mandatory reporting of whole life carbon		2.396	2.143	2.212	2.310	2.263	2.071	1.667	2.500	2.222
Public sector leading by example		2.298	2.429	2.114	2.148	2.474	2.143	2.000	2.500	2.250
Support capacity building of public authorities and their mandated bodies to assess whole life carbon		2.087	2.114	2.121	2.296	2.111	2.000	2.667	2.500	2.125
General awareness raising and media campaigns		2.044	1.941	2.091	2.000	2.211	1.786	3.000	2.000	1.875
Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector)		2.043	2.088	2.029	2.103	2.211	1.846	2.333	2.000	1.750
Use of sustainability scores such as the EU Taxonomy for Sustainable Activities to identify sustainable whole life carbon		2.149	1.912	1.774	2.250	2.235	2.071	1.667	3.000	2.222

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per stakeholder category and dividing it by the number of respondents in that category yields the average score. The higher the score in the table, the higher the potential effectiveness, as assessed by the survey respondents.

Table 6. Average score on the feasibility for the policy instruments listed in Q6 to be enacted per stakeholder category.

Feasibility for policy to be enacted	N	Company/business organisation 99	Business association 39	Non-governmental organisation (NGO) 35	Academic/research institution 29	EU citizen 19	Public authority 15	Non-EU citizen 3	Environmental organisation 2	Other 9
Include consideration of whole life carbon in national construction and new housing plans and targets		2.340	2.057	2.212	2.241	2.368	2.071	2.667	2.000	2.111
Mandatory carbon footprint declaration of construction products		2.381	2.351	2.412	2.172	2.579	2.000	2.667	1.500	2.111
Requirements to set national whole life carbon roadmaps with quantified targets		2.237	1.946	2.469	2.111	2.211	1.929	1.667	1.500	2.222
Link public funding to whole life carbon performance		2.293	2.114	2.250	1.786	2.333	2.000	2.333	2.000	1.778
Include consideration of whole life carbon in national plans for renovation		2.128	1.771	2.094	2.069	2.526	1.929	1.333	1.500	1.556
Targeted support to facilitate upskilling and/or reskilling of different parts of the supply side (engineers, architects, construction workers etc)		2.043	2.027	1.912	2.069	2.263	2.231	2.667	1.500	1.778
Mandatory reporting of whole life carbon		2.221	2.114	2.281	2.172	2.421	2.071	2.000	1.500	1.889
Public sector leading by example		2.309	2.314	2.412	2.037	2.263	2.000	2.333	2.500	2.125
Support capacity building of public authorities and their mandated bodies to assess whole life carbon		1.870	2.000	2.219	2.040	2.000	2.286	2.000	2.000	1.875
General awareness raising and media campaigns		2.101	1.970	2.364	2.111	2.053	2.462	3.000	1.500	1.875
Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector)		1.901	1.758	1.971	1.966	2.105	2.077	2.000	2.000	1.500
Use of sustainability scores such as the EU Taxonomy for Sustainable Activities to identify sustainable whole life carbon		2.129	1.676	1.966	1.889	2.294	2.357	1.667	2.500	1.889

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per stakeholder category and dividing it by the number of respondents in that category yields the average score. The higher the score in the table, the more feasible to enact the specific policy instrument, as assessed by the survey respondents.

Table 7. Average score on the potential effectiveness for reducing WLC of the policy instruments listed in Q6 per sector group.

Potential effectiveness for driving reduction of whole life carbon emission	N	Material manufacturers and suppliers 51	Architects, planners, and engineers 35	Consulting and software providers 16	Construction, renovation, and demolition contractors 14	Property developers, owners and managers 13	Sub-contractors 1	Other 8
Include consideration of whole life carbon in national construction and new housing plans and targets		2.417	2.706	2.813	2.538	2.333	2.000	2.667
Mandatory carbon footprint declaration of construction products		2.224	2.412	2.563	2.714	2.462	2.000	2.714
Requirements to set national whole life carbon roadmaps with quantified targets		2.333	2.824	2.625	2.071	2.231	No opinion	2.500
Link public funding to whole life carbon performance		2.174	2.618	2.733	2.357	2.455	2.000	3.000
Include consideration of whole life carbon in national plans for renovation		2.106	2.529	2.563	2.308	2.077	2.000	2.833
Targeted support to facilitate upskilling and/or reskilling of different parts of the supply side (engineers, architects, construction workers etc)		2.229	2.485	2.188	2.643	1.923	2.000	2.286
Mandatory reporting of whole life carbon		2.239	2.588	2.500	2.308	2.077	2.000	1.875
Public sector leading by example		2.404	2.294	2.267	2.357	1.917	2.000	3.000
Support capacity building of public authorities and their mandated bodies to assess whole life carbon		2.021	2.281	2.000	2.333	1.923	1.000	2.000
General awareness raising and media campaigns		1.936	2.273	1.688	2.083	1.909	2.000	2.200
Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector)		2.021	2.212	1.875	2.182	2.000	1.000	2.000
Use of sustainability scores such as the EU Taxonomy for Sustainable Activities to identify sustainable whole life carbon		1.783	2.387	2.286	2.000	2.154	2.000	2.400

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per sector group and dividing it by the number of respondents in that group yields the average score. The higher the score in the table, the higher the potential effectiveness, as assessed by the survey respondents.

Table 8. Average score on the feasibility for the policy instruments listed in Q6 to be enacted per sector group.

Feasibility for policy to be enacted	N	Material manufacturers and suppliers 51	Architects, planners, and engineering 35	Consulting and software providers 16	Construction, renovation, and demolition contractors 14	Property developers, owners and managers 13	Sub-contractors 1	Other 8
Include consideration of whole life carbon in national construction and new housing plans and targets		2.167	2.382	2.563	2.308	2.000	1.000	2.200
Mandatory carbon footprint declaration of construction products		2.327	2.382	2.375	2.571	2.308	1.000	2.571
Requirements to set national whole life carbon roadmaps with quantified targets		2.042	2.424	2.375	1.929	1.846	No opinion	2.167
Link public funding to whole life carbon performance		1.957	2.324	2.533	2.571	2.273	2.000	2.500
Include consideration of whole life carbon in national plans for renovation		1.851	2.176	2.375	2.154	1.692	1.000	2.400
Targeted support to facilitate upskilling and/or reskilling of different parts of the supply side (engineers, architects, construction workers etc)		1.792	2.303	2.125	2.538	1.692	2.000	2.000
Mandatory reporting of whole life carbon		2.152	2.382	2.438	2.077	2.000	1.000	1.714
Public sector leading by example		2.213	2.294	2.267	2.571	2.333	1.000	2.833
Support capacity building of public authorities and their mandated bodies to assess whole life carbon		1.739	2.000	2.125	2.417	1.615	1.000	1.833
General awareness raising and media campaigns		1.978	2.212	1.867	2.083	2.091	2.000	2.500
Capacity building, education and training for stakeholders not directly involved on-site (e.g. administration, managers, financial sector)		1.717	2.030	2.000	2.100	1.692	1.000	1.800
Use of sustainability scores such as the EU Taxonomy for Sustainable Activities to identify sustainable whole life carbon		1.696	2.258	2.429	2.000	1.923	2.000	2.250

Note: The average score is obtained by assigning a value to the answer options, ranging from **3 for very high, 2 for high, 1 for low and 0 for none**. Adding the scores per sector group and dividing it by the number of respondents in that group yields the average score. The higher the score in the table, the more feasible to enact the specific policy instrument, as assessed by the survey respondents.

3.4.2 **Q7 - If you have examples of policies to reduce the WLC emissions of buildings at national, regional or local level WLC, please share them here.**

To gain a deeper understanding of successful and effective policies, respondents were invited to provide examples, resulting in input from 93 respondents. It is worth noting that the majority of these responses offered suggestions or made requests for policies rather than sharing specific examples.

23 respondents shared examples pointing to the following policies groups:

- **Most of these examples relate to assessment and reporting requirements for LCAs with maximum values that go beyond operational carbon in place in many of these policies:**
 - France's legislation RE2020 mandating an embodied carbon assessment in addition to operational energy use calculation and setting maximum values for different environmental indicators, including embodied emissions
 - Denmark's building regulation with reporting and maximum value requirements for WLC
 - Sweden's WLC reporting requirement and upcoming maximum values for embodied emissions
 - The Netherlands' legislation which requires an environmental cost calculation and sets maximum values for the environmental performance of new buildings
 - Germany's policies to require WLC calculation and define WLC limits for federal public works and WLC requirements for a federal grant programme
 - UK's Construction Playbook states that central government should carry out a LCA for all public works projects and programmes including building, civil engineering and construction
 - London's Spatial Development Strategy for Greater London from 2021 which introduces the requirement to undertake whole life carbon assessments
- **Specific requirements for public buildings as part of green public procurement rules:**
 - California's Buy Clean California Act, which sets public procurement requirements for four materials, including structural steel, concrete reinforcing steel, flat glass, and mineral wool board insulation
 - Japan's Act Concerning the Promotion of Long-Life Quality Housing
- **Instruments to improve the circularity of construction materials:**
 - Mandatory pre-demolition audits in Luxembourg, Stockholm, Vienna
 - As a voluntary initiative, Rotterdam's circular concrete covenant offers signatories the opportunity to pledge to make efforts to recycle building and demolition waste and specify how it can be accomplished
- **City-level policies that incentivise the implementation of low-carbon construction techniques:**
 - Brussels' bonus for using bio-based insulation materials, even though it is pointed out that this incentive is not based on a building-specific environmental impact assessment
 - Oslo's plan to have zero-emission construction sites by 2025
- **Data that can be used to inform the green transition across the EU:**
 - CLEVER scenario, which is not specific to the built environment, but develops a European pathway to bridge the climate neutrality, energy security and sustainability gap through energy sufficiency, efficiency and renewables

The recommendations for additional policies cover a broad spectrum of areas. These suggestions include requirements for reliable and accessible carbon footprint and energy efficiency data for building materials and products; wider inclusion in green public procurement requirements; a focus on material production and EU ETS sectors; strong incentives for renovations over new construction; and an enabling framework for circular use of materials. The full list of responses is included in Annex 1.

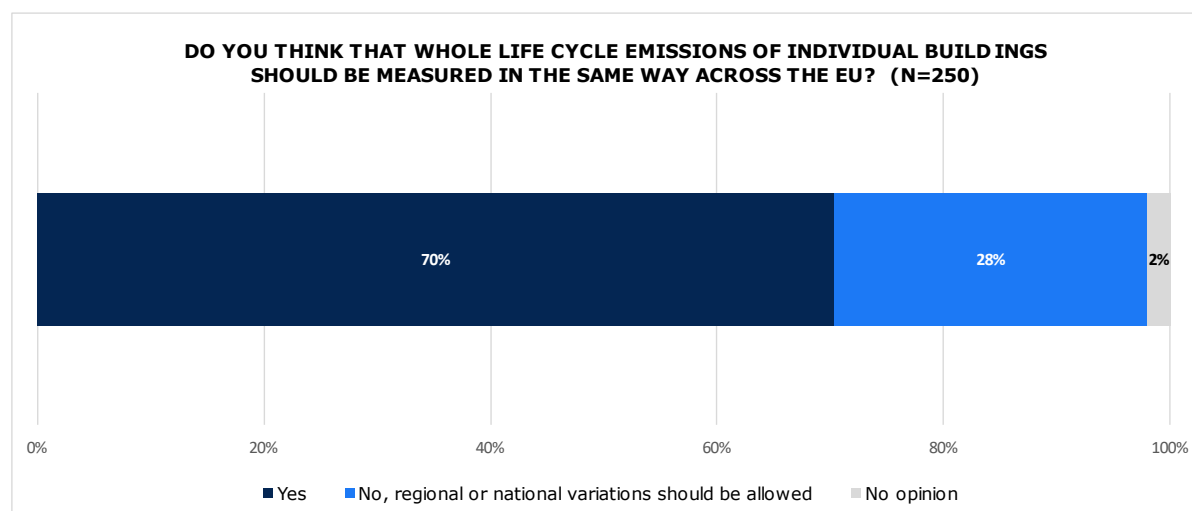
3.5 WLC values for individual buildings

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

Figure 19 shows that 70% of the respondents believe that WLC of individual buildings should be measured in the same way across the EU. 28% believe that regional variations should be allowed and 2% did not have an opinion.

When using pivot tables, the analysis shows that the stakeholder categories and sector groups are distributed homogeneously amongst all three possible answers. Still, most Architects, planners and engineers and Material manufacturers and suppliers answered 'Yes'. A further breakdown is shown in dedicated graphs (Figure 20 and Figure 21). The trends between answer options are very similar when investigating organisation size and also when comparing countries with existing WLC calculation methods² used in policy instruments to those which do not have a method in place yet.

Figure 19. Overview of responses to Q8



² Denmark, Finland, France, Germany, Netherlands, and Sweden

Figure 20. Breakdown of responses to Q8 by stakeholder category

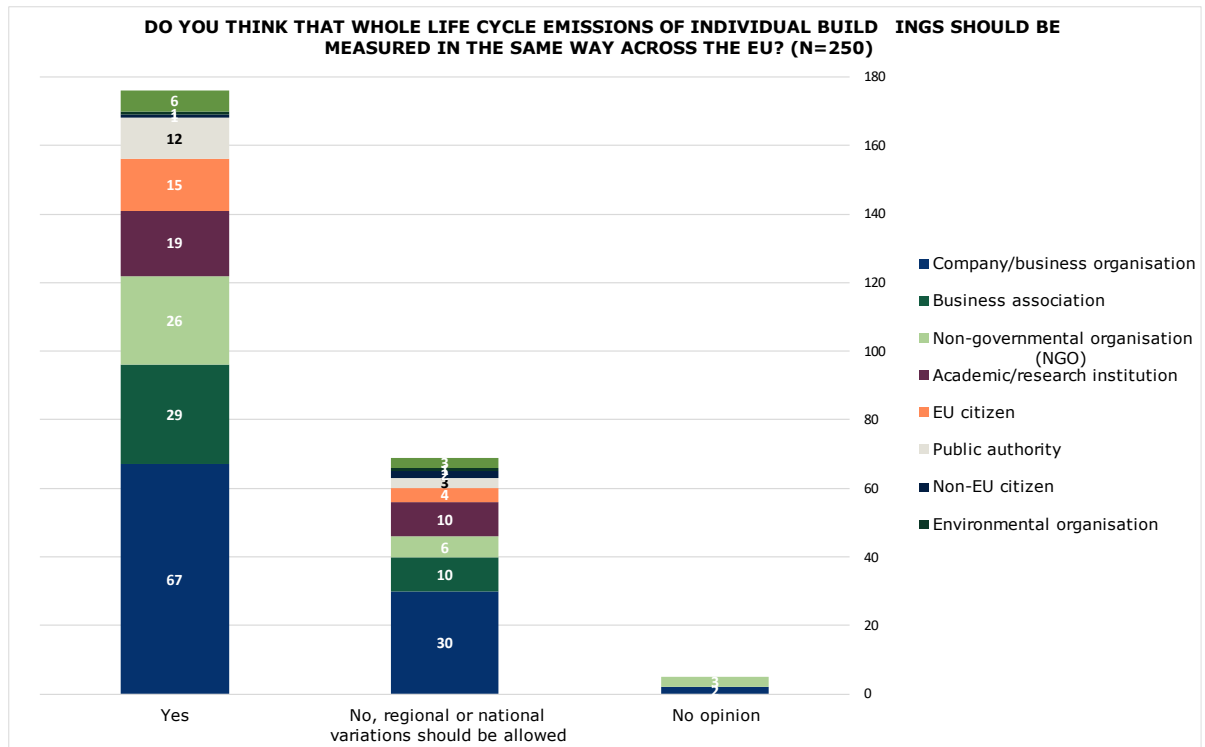
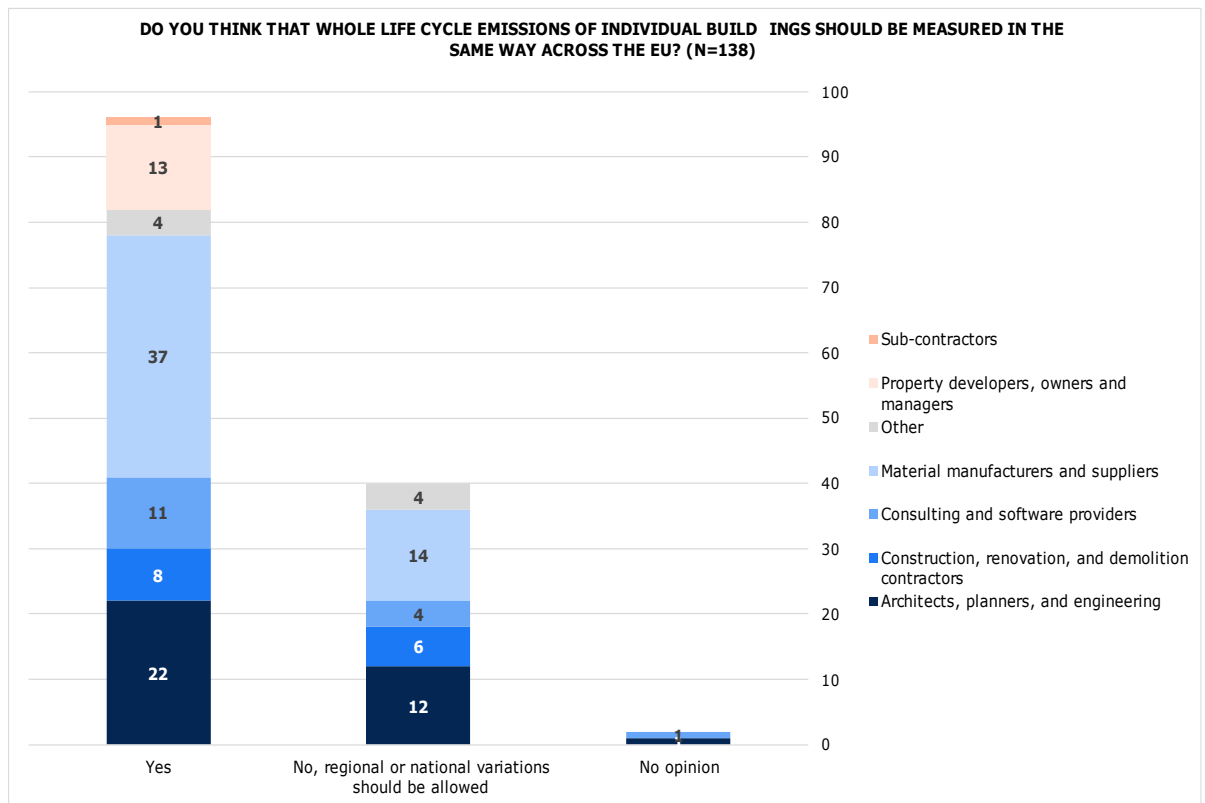


Figure 21. Breakdown of responses to Q8 by sector group



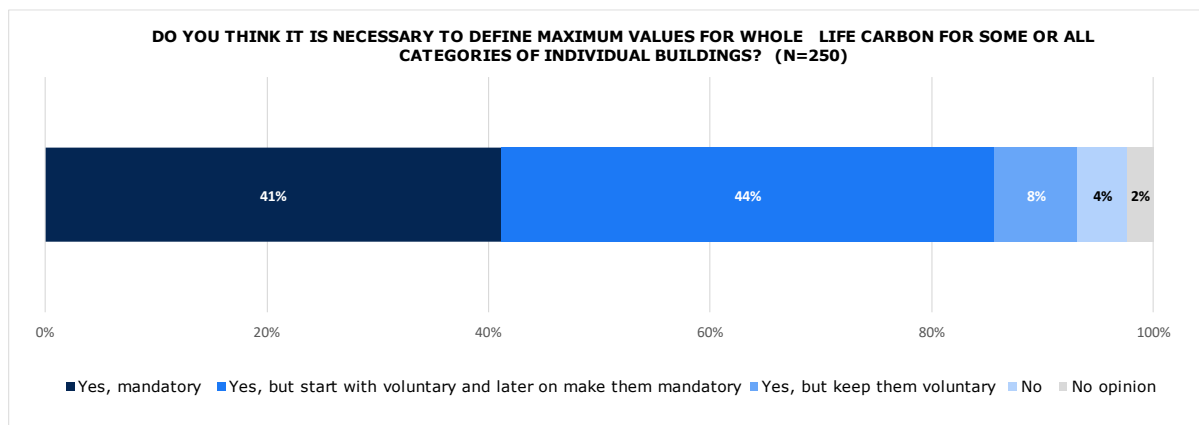
3.5.2 **Q9a - Do you think it is necessary to define maximum values for WLC for some or all categories of individual buildings?**

In response to the question of whether it is essential to establish maximum values for Whole Life Carbon (WLC) for some or all categories of individual buildings, an overwhelming majority of respondents (93%) believes that it is necessary.

Notably, 85% of respondents envisage a situation where these maximum values are mandatory. This includes 44% of the stakeholders who advocate for initiating this process on a voluntary basis, with a subsequent transition to mandatory limits, while 41% call for the immediate implementation of mandatory limits. Only 8% support a purely voluntary approach without the eventual shift to mandatory limits.

The remaining 6% hold different perspectives: 4% oppose the idea entirely, and 2% do not express a specific opinion on the matter (Figure 22).

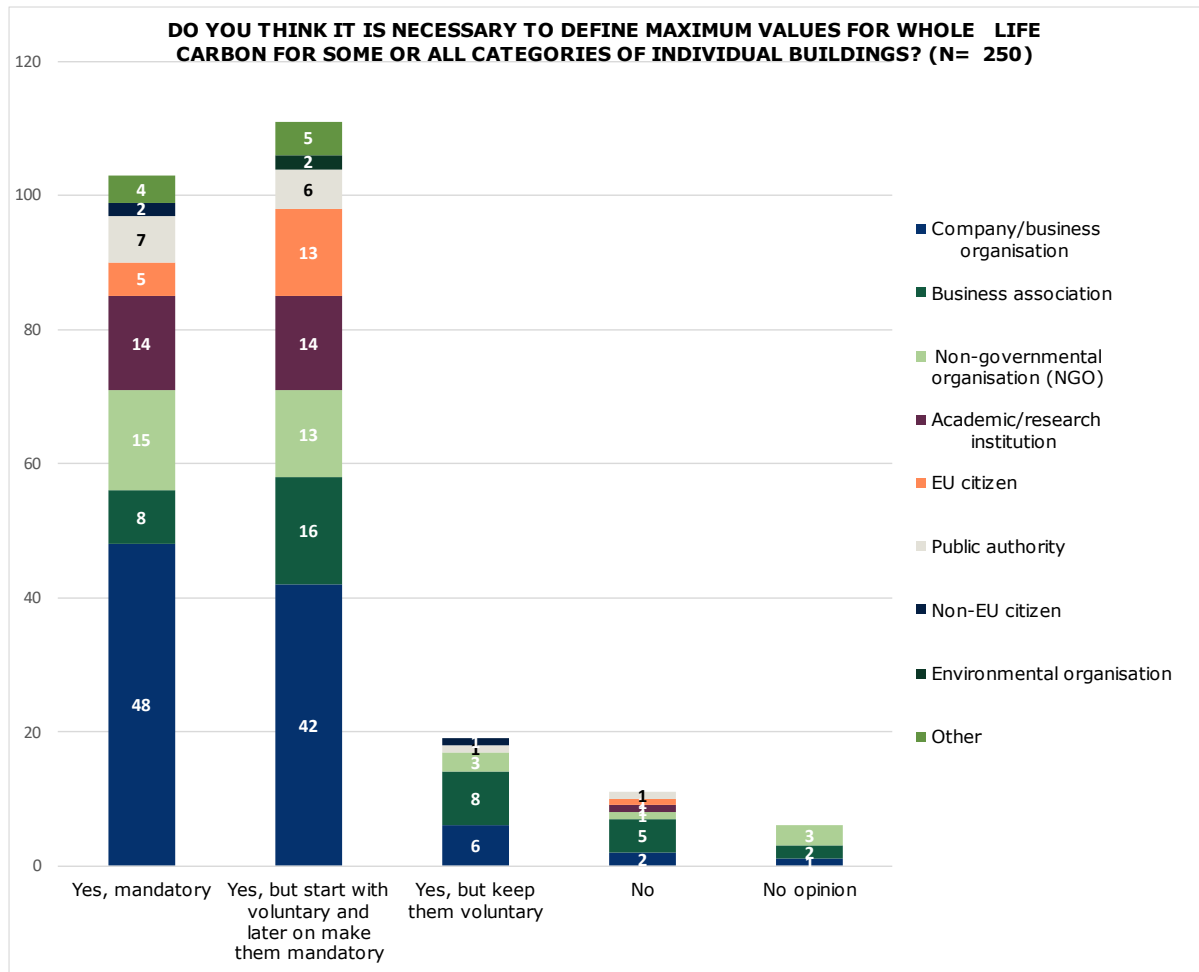
Figure 22. Overview of responses to Q9a



The breakdown of stakeholder categories (Figure 23) shows that the stakeholder categories are very evenly distributed among the immediately mandatory and the transition to mandatory options. EU citizens, however, prefer an incremental approach with voluntary targets first. For the rest of stakeholder categories, the values are very similar between the two options.

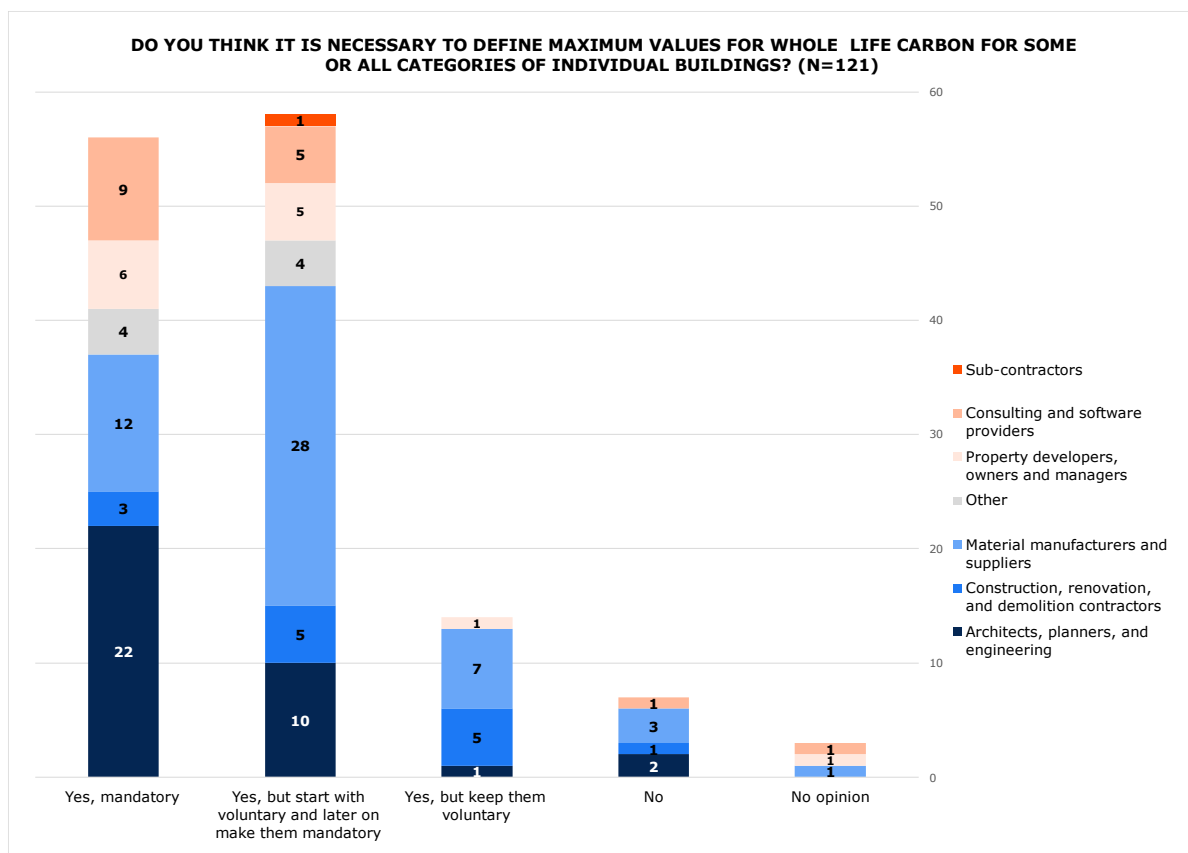
Organisation size did not determine any major differences between the selection of the options. The only noteworthy point is that for 'yes, but keep them voluntary' and 'no', most respondents represent micro-sized organisations (8 out of 19 for 'yes, but keep them voluntary'; 4 out of 6 for 'no').

Figure 23. Breakdown of responses to Q9a by stakeholder category



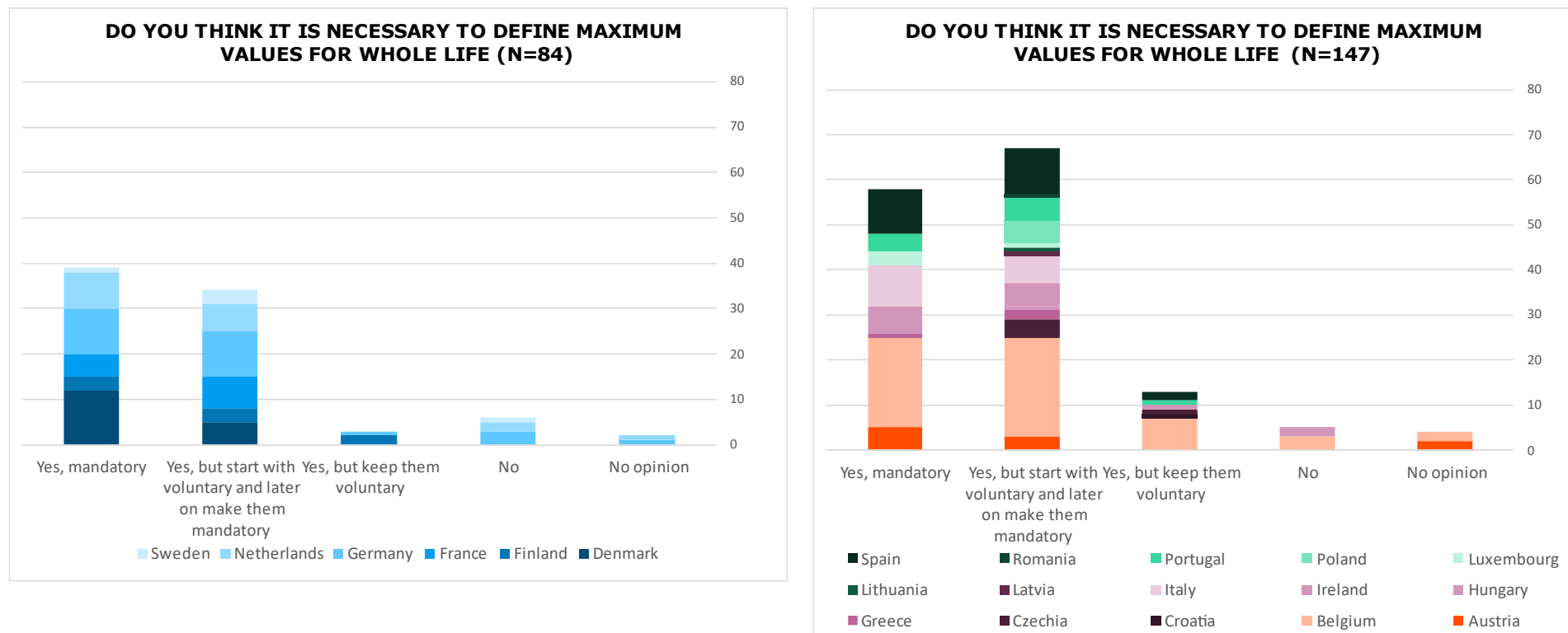
When broken down by stakeholder categories, the data reveals that architects, planners, and engineers are predominantly found in the *'yes, mandatory'* category, indicating strong support for immediate mandatory limits. Conversely, material manufacturers and suppliers are primarily situated in the *'yes, but start with voluntary and later on make them mandatory'* category, suggesting a preference for an initial voluntary approach with later transition to mandatory limits. The remaining responses are distributed relatively evenly across all categories, indicating no clear trend towards immediately mandatory or initially voluntary maximum values among the other sector groups (Figure 24).

Figure 24. Breakdown of responses to Q9a by sector groups



In Figure 25, a comparison between countries which already have WLC calculation methods used in policy instruments and countries that do not highlights, that those with existing methods support the introduction of mandatory maximum values more strongly than other countries. Additionally, respondents from the countries with WLC methods slightly prefer the immediate introduction of mandatory values over the phase-in approach with a voluntary stage, while from other countries, the trend is exactly the opposite.

Figure 25. Comparison for Q9a between EU Member States which have WLC calculation methods used in policy instruments (left) and other EU Member States (right)



Note that respondents from non-EU countries have been omitted in this comparison, which explains the lower total number of responses.

Respondents were given the opportunity to explain their answer. 161 respondents made use of this option.

The respondents which selected 'Yes, but start with voluntary and later on make them mandatory' explained their choice primarily by emphasizing the benefits of a phased approach, which they believe increases acceptance, feasibility, and accuracy of methods and values (33 mentions). Here are some illustrative examples that capture the essence of these responses:

- Academia respondent: *"A voluntary start enables the people in charge to evolve an opinion about the topic and prepare themselves for the mandatory compliance to max values in the future. This may support the acceptance of the max values."*
- Business association respondent (material manufacturer): *"As such policies are new to the entire industry, it is necessary to implement it incrementally in order to allow for stakeholders to educate on the methodologies, adjust production facilities and logistics and adapt business models to the new requirements."*
- NGO respondent: *"The performance and comparability of WLC calculations currently vary considerably between Member States. A consistent and harmonised approach to quantifying, reporting and setting thresholds is needed to enable a solid basis for enforcing and setting accurate WLC targets. The Commission must develop guidance on how the Level(s) framework will be used to develop relevant measures, including how to harmonise WLC calculation, reporting, benchmarking and limits under the relevant modules of EN 15978. Given different starting points, it makes sense for the framework to begin on a voluntary basis as knowledge and data improves. There should be staging posts and targets for measurement methodologies and maximum values to converge over time."*

Respondents who selected 'Yes, mandatory' provided justification primarily based on the urgency of reducing WLC emissions in line with the climate emergency. They emphasised that mandatory maximum values would ensure that a transition starts now and is enforceable (19 mentions). This perspective was particularly prevalent among architects/planners/ engineers, property developers as well as consultants/software providers (12 out of 19). The following show some examples that reflect the sentiments of this group:

- Company (property developer/owner/manager) respondent: *"We have learned by now that "voluntary" does not work in the real estate industry. For the simple reason that all parties involved (banks, owners, facility managers, asset managers, operators, etc) do not want to take the risk of losing revenue / yield etc. This is the reason why innovation in the real estate industry has been so slow."*
- Public authority respondent: *"If we ('the world') would have had another few decades to reduce carbon-emissions, I would have opted for option 2 'start with voluntary'. But since we are already (very) late 'mandatory' should be the way to go"*

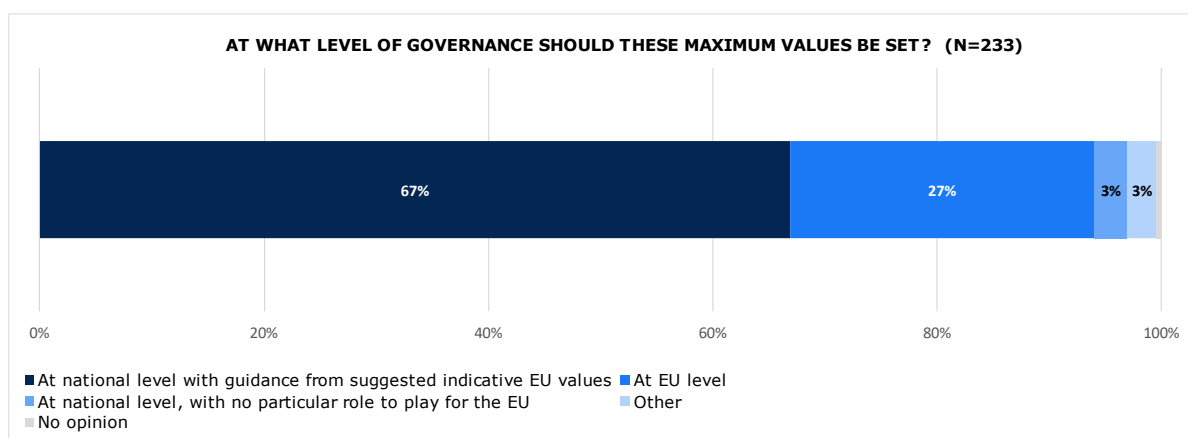
Respondents who advocated for keeping voluntary maximum values explained their choice by highlighting the need for flexibility to account for national or regional variations in building stock characteristics. This viewpoint was mainly shared by companies and business associations, constituting the majority of these respondents (8 out of 15). Additionally, some of these respondents expressed a desire for the harmonisation of the methods to calculate the maximum values and WLC performance (6 of the 15 respondents).

Conversely, respondents who selected 'No' expressed alternative preferences. Some suggested that carbon pricing, particularly through mechanisms like the EU Emissions Trading System (ETS), should be the primary approach (3 mentions). They argued that carbon pricing would effectively drive emissions reduction without imposing additional administrative burdens on construction and renovation activities (3 mentions).

3.5.3 Q9b – At what level of governance should these maximum values be set?

Around two third of respondents considered that maximum values for WLC of buildings should be governed at national level with guidance from suggested indicative EU values. Meanwhile, 27% of respondents advocated for governance at the EU level. A smaller portion of respondents expressed a preference for national-level regulation (3%), and a further 3% selected 'other' as their response.

Figure 26. Overview of responses to Q9b

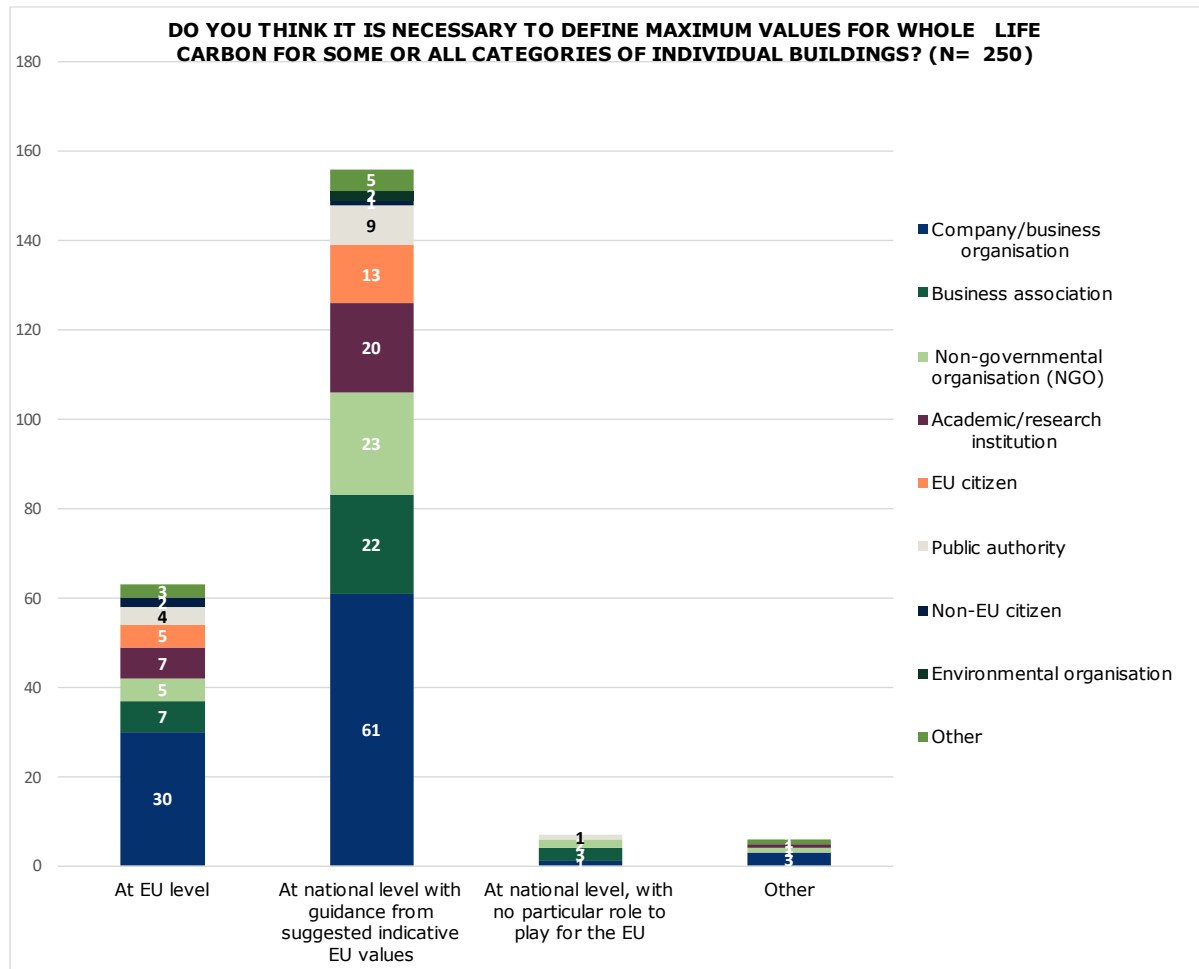


The preference for national maximum values with guidance from the EU level is a common trend across all stakeholder types and sector groups. The majority of respondents, regardless of their affiliation, opted for this approach. Notably, companies are the main stakeholder group advocating for EU-level maximum values, with 30 out of 63 selections of this answer originating from this group (Figure 27).

The comparison between different country clusters shows small but notable trends in the responses. When comparing Member States which have WLC calculation methods used in policy instruments to those who do not (Figure 28), the survey shows that a larger relative share of respondents from the former group see EU-level maximum values as the preferred solution (36% compared to 24%).

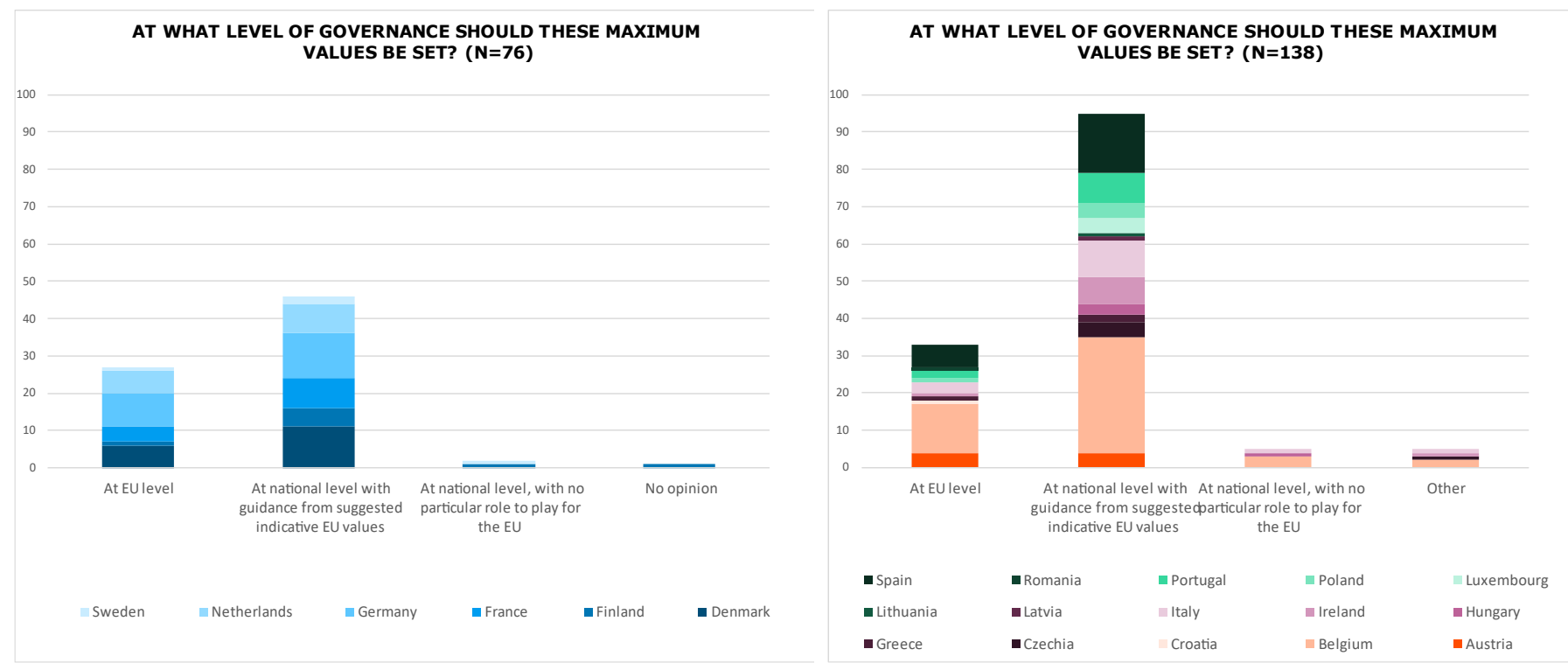
A breakdown of by organisation size does not reveal any relevant trends.

Figure 27. Breakdown of responses to Q9b by stakeholder category



Among the respondents who chose '*other*', three out of six respondents also called for a common methodology with values set at the national level. The remaining three respondents proposed regional-level maximum values, with one respondent specifically mentioning climatic zones as a relevant regional definition.

Figure 28. Comparison for Q9b between EU Member States which have WLC calculation methods used in policy instruments (left) and other EU Member States (right)



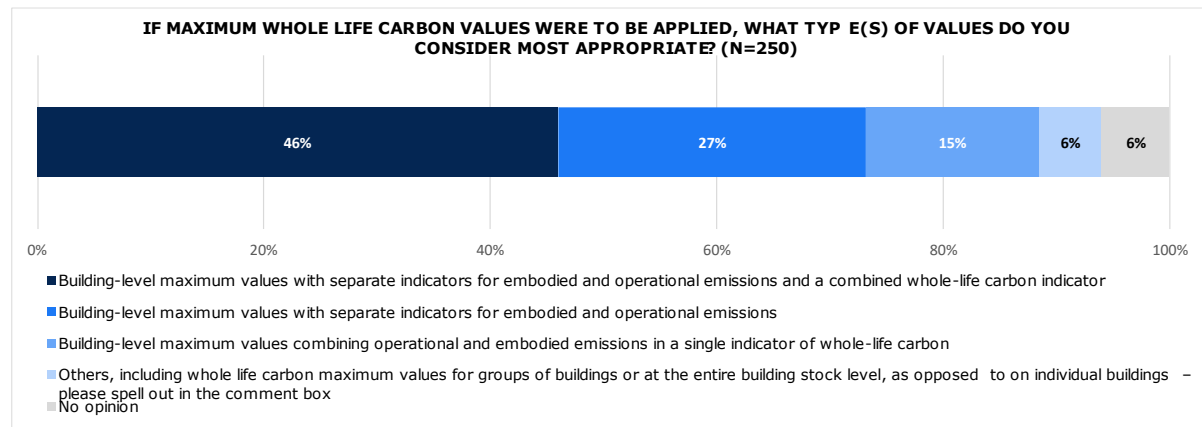
Note that respondents from non-EU countries have been omitted in this comparison, which explains the lower total number of responses.

3.5.4 Q10 - If maximum WLC values were to be applied, what type(s) of values do you consider most appropriate?

If maximum WLC values were to be applied, respondents ranked the following options as most appropriate (Figure 29):

1. Building-level maximum values combining operational and embodied emissions in a single indicator of WLC (46%)
2. Building-level maximum values with separate indicators for embodied and operational emissions (27%)
3. Building-level maximum values with separate indicators for embodied and operational emissions and a combined WLC indicator (15%).

Figure 29. Overview of responses to Q10



The 14 respondents who selected 'other' provided additional insights into their preferences for WLC values. Two themes stand out of their responses:

1. **Additional indicators** (6 mentions): Respondents called for the inclusion of further indicators, such as per capita emissions (mentioned twice), circularity (mentioned twice), limits based on enclosed area volume, specific thresholds for building components or material groups.
2. **Separate indicators for operational and embodied Carbon** (3 mentions): Respondents expressed support for having separate indicators for operational and embodied carbon to avoid favouring one over the other and prevent trade-offs between the two.

These responses highlight the diversity of the stakeholder landscape on how WLC values and indicators should be introduced to effectively address carbon emissions in buildings.

The answers of the respondents in relation to their stakeholder category are shown in Figure 30, which reveals a relatively equal distribution across the possible answers. Additionally, Figure 31 shows the answers of the respondents in relation to their sector groups.

Figure 30. Breakdown of responses to Q10 by stakeholder category

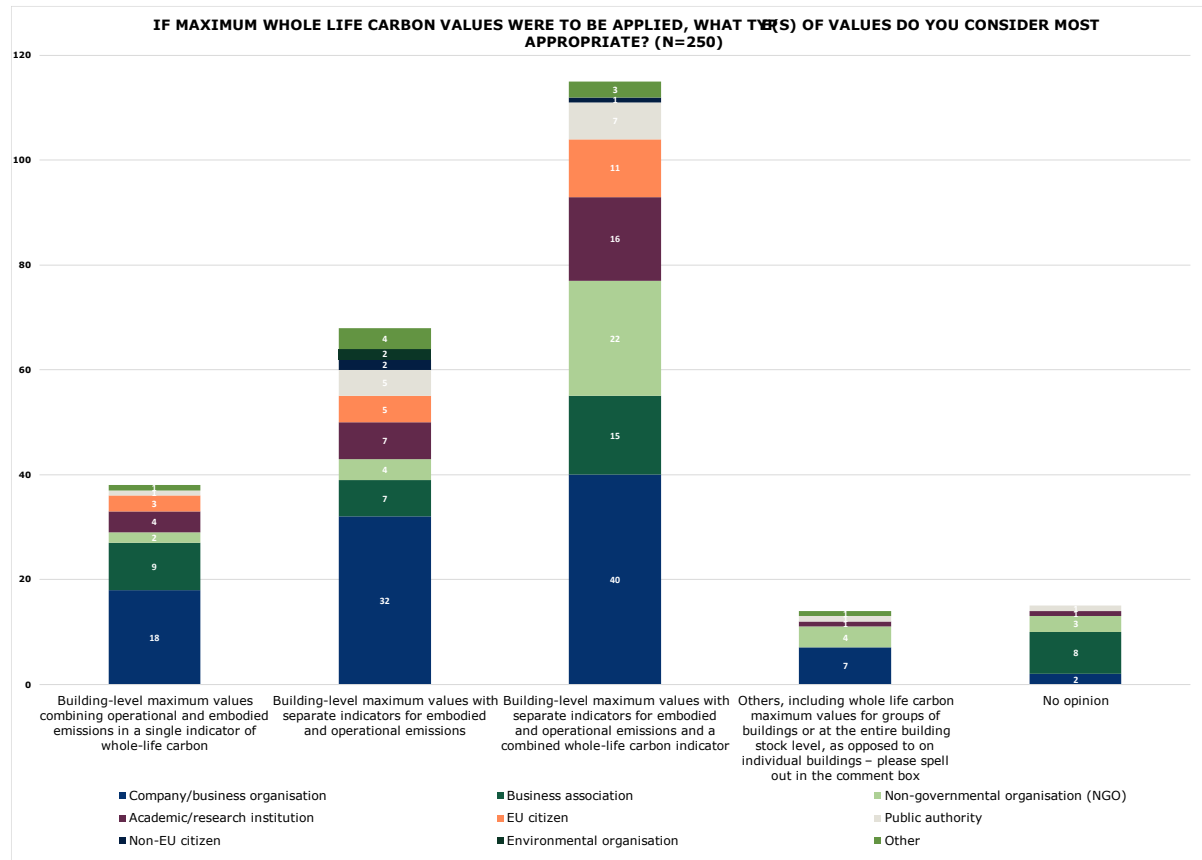
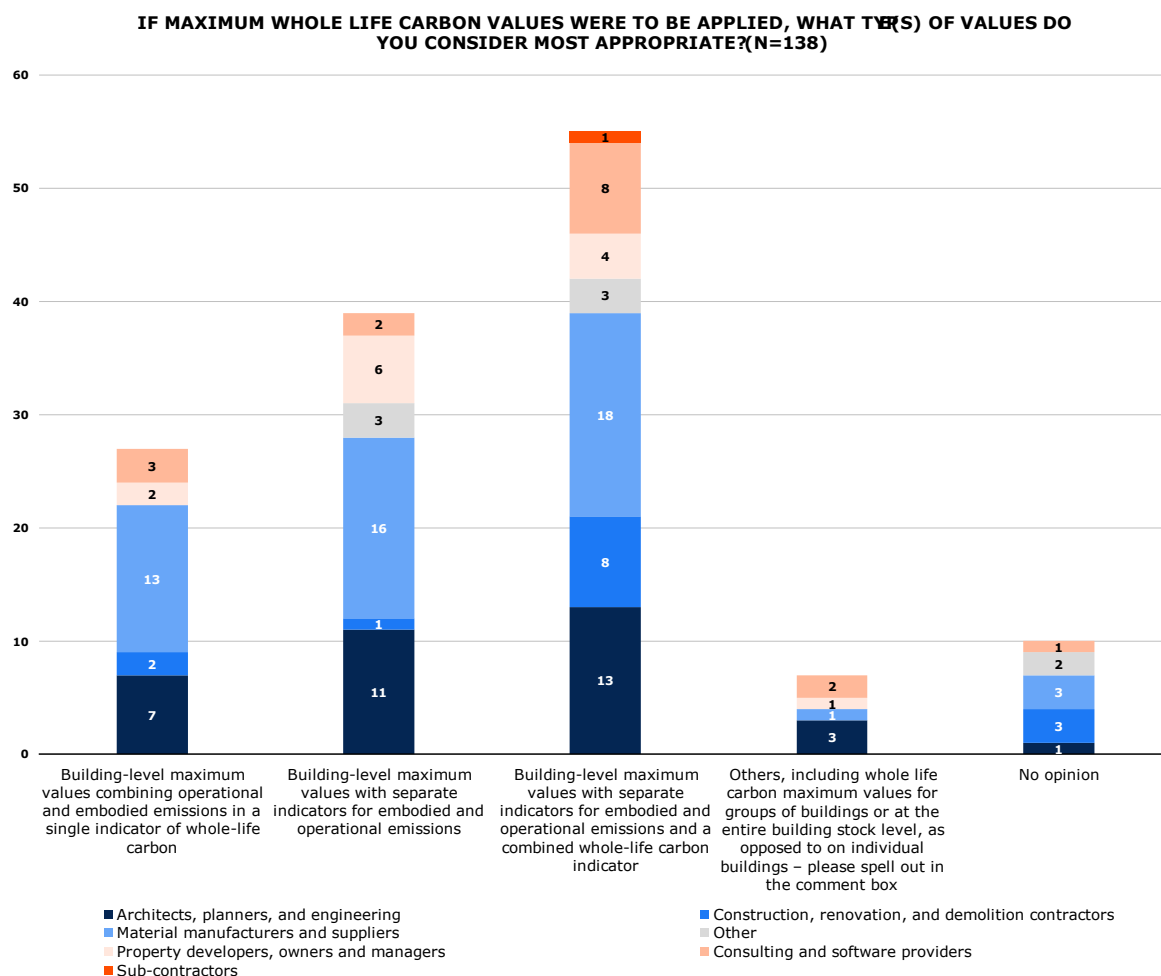


Figure 31. Breakdown of responses to Q10 by sector group

3.5.5 **Q11 - If maximum WLC values were to be applied, for which categories of buildings should they apply?**

In response to the question regarding the application of maximum WLC values in different building situations, there were four possible options for each situation: applying maximum values to all buildings, applying them to a subset of buildings, applying no maximum thresholds at all, or having no opinion.

As

Figure 32 shows, there is a large majority (80%) believing that new buildings, both residential and non-residential, should see maximum WLC values applied to them. Still a majority, however smaller, also believes this should be the case for major renovation projects, in the case of residential buildings 56% and for non-residential buildings 61%.

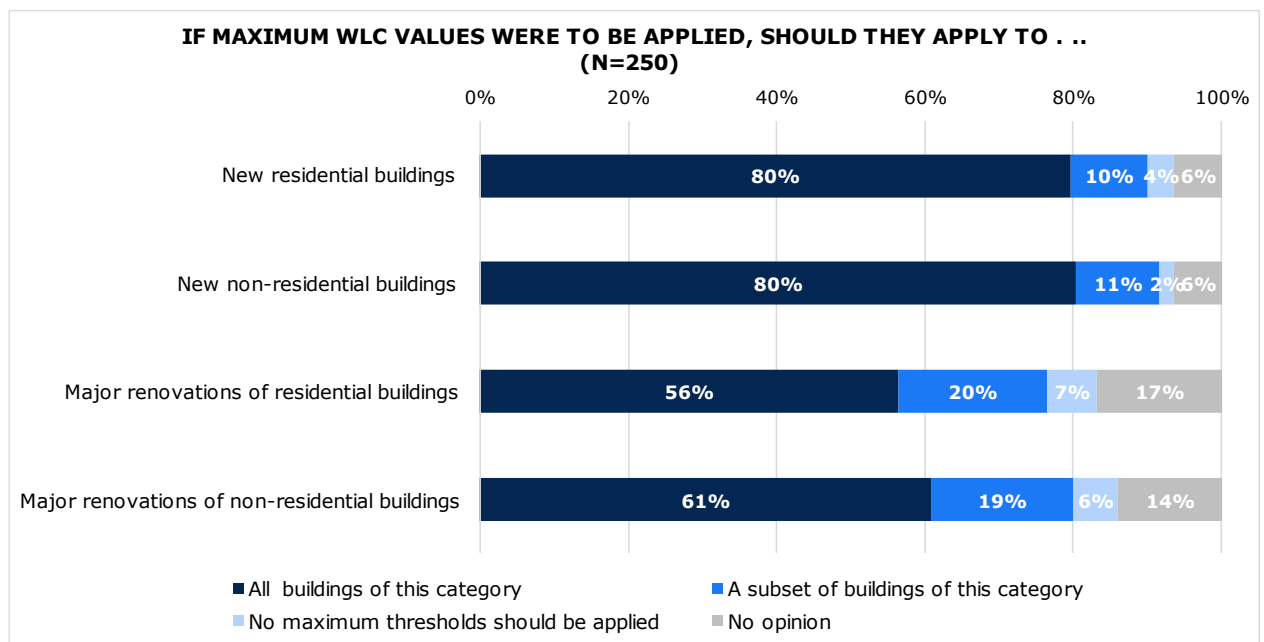
Respectively 2% and 4% of the respondents' state that no maximum thresholds should be applied to new and non-new residential buildings. However, the share rises to 17% and 14% for renovating residential and non-residential buildings.

The respondents thus strongly believe that maximum WLC values should apply to new constructions and – still in majority – also to renovation. In this latter case slightly more

respondents see a need for maximum values in renovations of non-residential buildings than residential ones.

Breakdowns and comparisons were performed to understand trends between stakeholder types, sector groups, organisation size, and country of origin. However, no trend could be identified in this process. The relative share of respondents is in comparable ranges across the building/project types and answer options. A breakdown of the four building/project types by stakeholder category and by sector group is included in Annex 2, for reference.

Figure 32. Overview of responses to Q11.



Those respondents who selected a subset of the main category to be the more relevant approach were asked for an explanation. The responses revealed several common trends and concerns:

1. New residential buildings:

- Many respondents argued for the exclusion of certain building types, such as single-family houses (17 out of 24) or holiday homes (1 respondent).
- Some respondents (3) called for a balance between climate impact and administrative burden.
- Others suggested waiting for agreed-upon calculation methods to be in place.

2. New non-residential buildings:

- Respondents (6 out of 25) emphasised a focus on large non-residential buildings with a substantial WLC impact.
- Many respondents (10) highlighted the substantial variation within non-residential buildings, including differences between offices, warehouses, and many special purpose buildings like hospitals, prisons, train stations etc.

3. Renovations of residential buildings:

- A significant number of respondents (15 out of 42) suggested focusing on larger residential renovations, but with varying threshold values being mentioned in individual answers, ranging from 150m² to 2000m².

- Some respondents (5) asked for clarification on the types of renovations to be considered, differentiating between home improvement projects, energy efficiency renovations, and deep retrofits.
- Concerns were raised about applying the same maximum values to historic buildings, with 7 respondents advocating for a separate treatment.
- A few respondents (4) expressed concerns that maximum values could discourage renovations aimed at increasing energy efficiency.

4. Renovations of non-residential buildings:

- Similar to residential renovations, respondents (12 out of 35) suggested a focus on larger non-residential renovations.
- Historic non-residential buildings were a concern for some respondents (6), and they called for specific considerations.
- As for non-residential new construction, the variation in non-residential buildings is also highlighted by 5 respondents.
- A couple of respondents argued for higher ambition in the non-residential sector, allocating more carbon budget to residential buildings in order to provide housing.

In addition, **all respondents had the opportunity to leave additional comments** on the building type coverage of potential maximum values.

- Several respondents reiterated the need to focus on larger buildings and specific building typologies with high WLC impacts.
- Prioritising public buildings was mentioned by 12 respondents, primarily from NGOs and companies.
- Some respondents (8) expressed concerns about discouraging renovations and suggested not setting maximum values for them. In contrast to these, the high number of existing residential buildings makes them a priority to 5 respondents.
- There were varying opinions on whether to prioritise residential or commercial/industrial buildings, with some emphasising the importance of specific exemptions based on public interest (e.g. museum, defence), climate adaptation needs, or a substantial contribution to the energy transition.

The additional comments point to the complexity of determining which building situations should be subject to maximum WLC values, with considerations ranging from building type and size to historic preservation and climate impact. However, in the overall picture the responses to this question highlight a strong support for maximum values and a preference of a comprehensive scope for such limits.

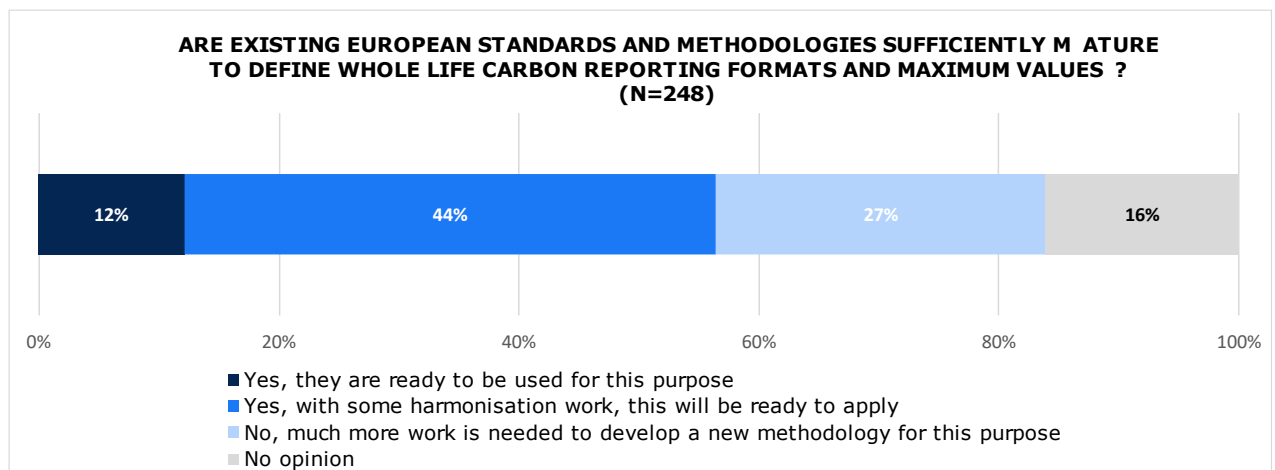
3.5.6 Q12 - Are existing European standards and methodologies sufficiently mature to define WLC reporting formats and maximum values?

This last close-ended question collected opinions on the maturity of the existing EU standards and methodologies to define WLC reporting formats and maximum values.

Figure 33 displays a divide in the respondents' opinions regarding the readiness of EU standards and methodologies for defining WLC reporting formats and maximum values: On the one hand, 56% of respondents consider the existing standards suitable. Out of these, 12% of the respondents believe that EU standards and methodologies are fully ready, while 44% of the respondents declare that some harmonisation work is needed to define WLC reporting formats and maximum values.

On the other hand, 27% of respondents indicate that existing standards are not mature enough and much more work is needed to develop them. A notable share of 16% have no opinion.

Figure 33. Overview of responses to Q12



When broken down by stakeholder category, the main observable trend is that public authorities consider that only some harmonisation is needed to bring the standards and methods to sufficient maturity (Figure 34).

Among those who affirm that '*no, much more work is needed*', business associations and company/business organisations are the most significant categories represented (Figure 35). Still, all sector groups are relatively evenly represented across all answers.

Further breakdowns and comparisons for organisation size and country of origin do not show any trends on the share of responses for this question.

Figure 34. Breakdown of responses to Q12 by stakeholder category

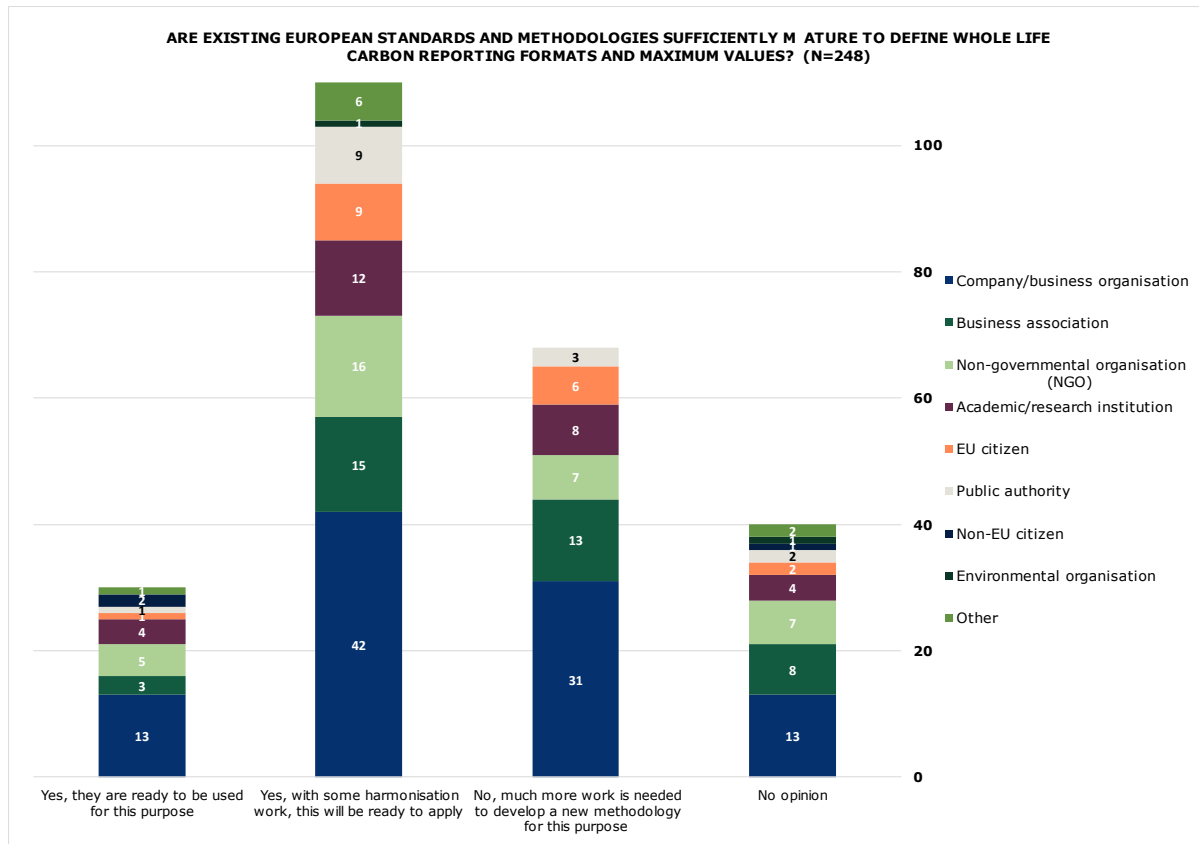
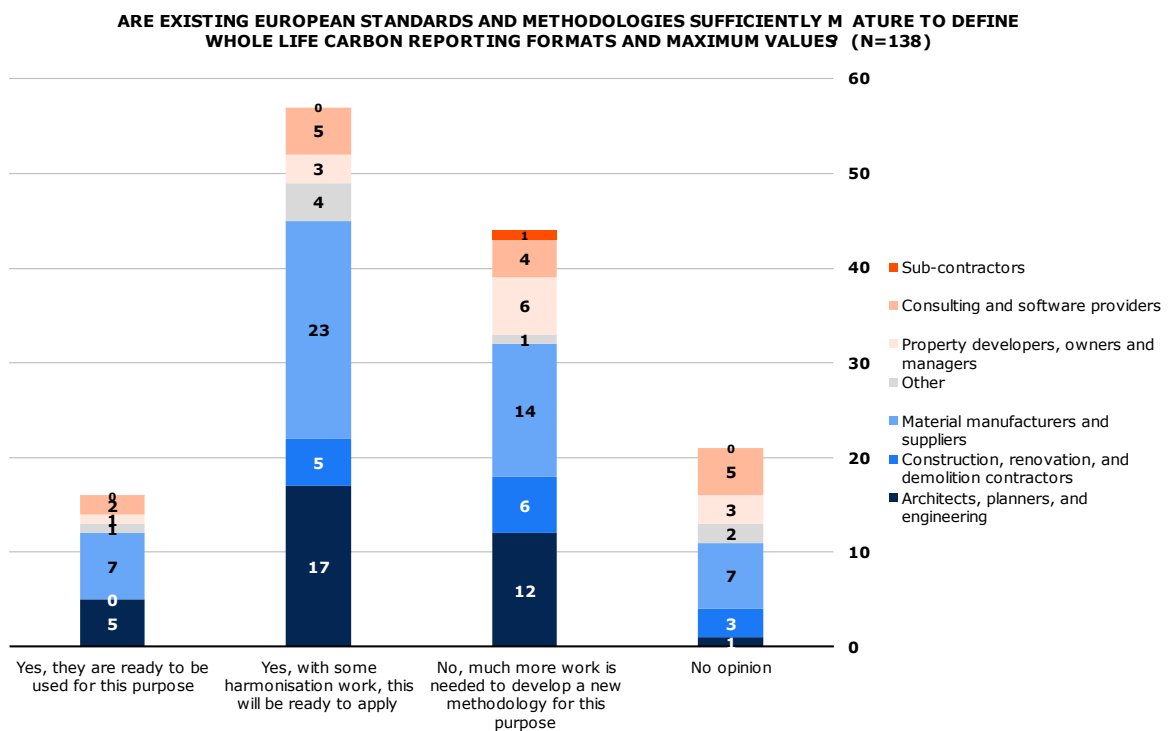


Figure 35. Breakdown of responses to Q12 by sector groups



Respondents who expressed the need for some more harmonisation (68 respondents) or much provided further insights into specific areas that require attention:

1. **Harmonisation and framework alignment:** As expected this point is raised by respondents who believe that some further harmonisation work is needed. They emphasize the challenges posed by the existence of multiple, potentially incompatible frameworks (mentioned by 35 respondents out of 68 respondents). They highlight the difficulty of combining or comparing frameworks such as EPDs, PEF, Level(s), and national legislation which all build on EN standards but differ in their details. The need for alignment in terms of target setting (8 mentions), databases of construction product data and LCA results (7 mentions), as well as LCA scenarios and calculation tools (6 mentions each) is a common theme. This alignment is crucial for creating a coherent and consistent approach to WLC assessment.

Those respondents who see a need for much more additional work on EU standards and methodologies to make them useable (44 respondents) point to the following needs for action:

1. **Specificity in calculation methods:** Respondents who argue that more work is required stress the need for greater specificity in calculation methods (mentioned by 22 respondents out of 44). This includes addressing issues related to lifecycle scenarios, Module D calculations, and decisions about the basis for calculations (e.g., early designs, BIM models, or as-built quantities). This is summarised by one remark saying *"if two different advisors calculate the GWP of a building, even if they use the same national data base, the result will be two different values."* (Company respondent, property developer/owner/manager). The aim is to reduce variability and improve the accuracy and consistency of WLC assessments.
2. **Data availability and trustworthiness:** Some respondents (10 out of 44) express concerns about the availability and trustworthiness of data required for WLC assessments. They point out discrepancies in product-level data between countries, gaps in data availability, and issues related to the reliability of data for reused materials and components. Ensuring a robust data foundation is essential for effective WLC assessments.
3. **Complexity and accessibility:** A subset of respondents (5 out of 44) perceives the current frameworks and methodologies as overly complex, potentially limiting their usability among a wide range of building professionals in the EU. Simplification and increased accessibility are seen as necessary to encourage broader adoption and compliance.

These insights indicate potential areas for improvement. However, as mentioned above, a majority of respondents agree that only smaller adjustments are necessary.

3.6 Concluding questions

3.6.1 **Q13 - Do you have any further comments on policy aspects relevant to WLC of buildings, which are not covered in your answers?**

Respondents had the opportunity to provide additional comments on policy aspects related to whole life carbon (WLC) of buildings, should they have any additional insights beyond what they had already shared. A total of 101 respondents made use of this option.

The methodology of defining maximum values and calculating WLC emissions is discussed by 44 out of 101 respondents. These respondents consistently emphasise the need for a harmonised methodology across the EU and the need for a consistent and reliable data foundation. Such foundation is essential in the adoption of materials and designs aimed at creating buildings with minimal environmental impact. In contrast, a much smaller subset of 3 respondents, stress the importance of avoiding high complexity and excessive relative costs. Additionally, 5 respondents advocate for building upon existing frameworks, standards, and tools to minimize

added complexity. The concept of digitalization is raised by 3 respondents as a means to achieve better integration and reduce costs. Similarly small numbers of respondents (3 each) highlight the need to define the right indicators such as adding embodied and operational carbon per capita, environmental impacts beyond the global warming potential (e.g., resource depletion, water consumption, etc.), or carbon credits.

Furthermore, 38 respondents emphasise specific measures to reduce embodied carbon.

Among these, 16 respondents stress the need to prioritise renovation, while 14 respondents acknowledge the need for prioritising reuse and recycled products. Additionally, 8 respondents mention bio-based or natural materials as an important lever.

19 stakeholders stress the need for clarification and support to encourage a wider uptake. This encompasses various aspects such as regulations, data availability and monitoring options. In essence, these voices highlight the significance of providing clear and comprehensible guidance and instructions. Stakeholders recommend increasing awareness to bridge the knowledge gap, recognising that *"one of the main challenges [...] is the lack of awareness on embodied carbon, and the ways how to address it."* To address this gap, they propose initiatives like training programmes or facilitating access to relevant data. One NGO notes the need to upskill the workforce: *"Upskilling of workers will be necessary, from promoters and architects to integrate low-carbon materials in their designs, to construction workers to be able to deploy innovative building techniques. The EU should take the necessary measures to bridge the skills gap"*. Another NGO confirms this point by stating that *"technical support is needed to build the capacity of the construction sector and local authorities through trainings, workshops, information campaigns"*.

This is also reflected by **11 respondents who highlight the importance of adopting a holistic or integrated approach.** This approach entails addressing the entire value chain, engaging all stakeholders, and ultimately working toward the overarching goal of reducing whole life-cycle carbon emissions within the buildings sector.

3.6.2 **Q14 - Do you have any other remarks?**

When given the opportunity, 68 respondents shared some final remarks. The comments made mainly explain the answers that had been given to the previous questions.

18 respondents share their support; *"This is a very good survey to conduct on this important topic", "Make it happen"* and highlight the urgency of the matter: *"Get moving", "Climate clock is ticking"*. Still, a small number of respondents (6) advocate for **caution towards the survey results**. For instance, a stakeholder noted that *"the survey is very ambiguous and can be taken many ways"*.

5 respondents also emphasise the **benefits of the buildings sector transition towards WLC reduction**. The socio-economic aspects, such as employment and local value creation are discussed here. An example of an answer is *"re-use of building components has a high job creation potential"*.

Additionally, 4 respondents raised the need for **sufficiency**, 4 for **more clarity in the policy framework**, 3 for **more environmental indicators beyond GWP**, and 4 for **clear calculation rules for removal or storage of carbon**.

Finally, 18 respondents provided references to documents, websites or expressed their availability to engage in further discussions (Annex 3).

ANNEX 1 – LIST OF POLICY EXAMPLES AND SUGGESTIONS IN RESPONSE TO 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)

The table is structured to present the most relevant examples of existing policies first (pink sub-heading). These are examples to existing policies. Subsequently, ideas for relevant policies are divided by the level of detail in which they are described. Under the green sub-heading, detailed policy suggestions and demands are collected, while under the blue sub-heading, all other responses are captured.

Stakeholder category	Sector group (if applicable)	Comment
Examples of policies at national, regional or local level		
Company/business organisation	Material manufacturers and suppliers	The Green Taxonomy, and the French RE2020 are good examples that need to be maximised (French rules should at some point also start applying to private development & developers). The Green Taxonomy and the percentages of reuse are valuable leverage tools to push for more reuse, but it's important that they focus on the interpretation of reuse instead of recycling (baked bricks being recycled to gravel for tennis courts, or steel from EU that is scrapped, transported to Turkey and then being melted into new steel to be returned to the EU.) Reuse should have strict interpretation along the lines of geo-based (unbaked), biobased & urban-based (2nd, 3rd, 4th, hand elements). The legal and insurance implications of reuse should also be addressed. The EC needs to start talking to large insurance companies who in a lot of cases don't insure anything but new building elements. There should be less 'awareness' campaigns but more positive pitches: the whole life carbon approach creates more jobs through using the leftover streams of Europe than dumping and/or burning lots of building materials with fossil fuel (which most countries of the EU don't produce and they consistently squander their money at). So, macro-economically and job-creation wise, there's a very strong case to go towards producing & reusing building materials instead of getting stuck in the linear production process of make, use, waste.
Academic/research institution		Germany uses requirements to limit WLC in federal public works. Germany has a grant program with requirements that limit WLC. Architectural associations in Germany launch continuing education initiative on LCA. Germany discusses including requirements to limit WLC in regulatory law.
Company/business organisation	Architects, planners, and engineering	Danish Building regulations LCA calculations are mandatory for all new buildings A limit of 12 kg/CO2/m2 is set for new building over 1000 m2 The limit is gradually strengthened. The limit is currently too high to have effect. A typical new building in Denmark is emitting approx 9,5 kg/CO2/m2, so the limit needs to be reduced to below 8,5 to have effect and below 6,5 for the Building Industry to stay within the Paris Accord this year.

Stakeholder category	Sector group (if applicable)	Comment
Business association	Architects, planners, and engineering	https://reductionroadmap.dk/
Company/business organisation	Material manufacturers and suppliers	<p>Denmark, Finland, France, the Netherlands, Norway and Sweden have already introduced policies requiring WLC reporting for new buildings. Additionally, Denmark, Finland, France, the Netherlands and Sweden either have or are planning to have WLC limit values.</p> <p>In our view, one of the best models is France's RE2020 building environmental regulation, which employs a dynamic LCA approach that incentivises the use of low-emission materials and that recognises the benefits from biogenic carbon storage. We also welcome the climate declaration in Finland's Building Act, which from 2025 will address buildings' potential climate benefits, including long-term biogenic carbon storage.</p> <p>More information on such policies can be found in Ramboll's 2022 report titled "Whole life carbon models for the EU27... Review of existing national legislation measures." Also, OneClick LCA's 2022 report titled "Construction carbon regulations in Europe: Review and best practices."</p>
Non-governmental organisation (NGO)		<p>As per the Ramboll study on EU Whole Life Carbon policy models, Denmark has introduced limit values for large buildings, quickly followed by limits for all new buildings in 2025, as will Finland. The WLC legal requirements are planned and forecast with certainty for the sector and citizens. For the EU this approach is crucial for the sector to prepare to implement solutions to reduce embodied and operational emissions for lifecycle decarbonisation of the building. Charting a sustainable course to achieve climate neutrality of the EU building stock requires oversight by dedicated WLC policies at EU, national, and regional levels, which as illustrated by a lack of specific examples is not currently the case. Elsewhere, despite the absence of WLC in name, numerous existing policies are fundamentally aimed at reducing WLC, as well as energy bills for citizens. Therefore, WLC policies are building on progress made on energy policies, strongly influenced by the climate crisis. MS Long-Term Renovation Strategies (LTRS), soon to become National Building Renovation Plans (NBRP) promote the retrofit and renovation of existing buildings to achieve higher level of energy-performance and to achieve nearly Zero Energy Building (nZEB) status, which brings down operational emissions and avoids embodied emissions from deconstructing, reprocessing materials, and from new construction of buildings (using steel, concrete, glass, other impactful metals and materials) to achieve the same goal of high energy performance. The climate benefits of adaptive reuse, retrofit, and renovation of existing buildings illustrates how sufficiency should frame all WLC policies moving forward. MS should look towards the CLEVER scenario which illustrates how a sufficiency, efficiency, and renewables approach (as per IPCC AR6) can deliver both energy security and climate-neutrality (see clever-energy-scenario.eu). Additionally, the California Buy Clean Act is an example of GPP targeting embodied carbon.</p>
Company/business organisation	Architects, planners, and engineering	Putting a cap and a price on carbon. A good example is the policy developed in London, whereby the GLA has set a WLC carbon limit to certain new projects and any carbon emissions above that need to be paid by the developer. Each borough has their own price on carbon in GBP/tCO ₂ that goes above the limit.
Non-governmental organisation (NGO)		<p>In 2019, Rotterdam signed with other municipalities and construction partners a circular concrete covenant, where the signatories pledged to make efforts to recycle building and demolition waste and specify how it can be accomplished. The Netherlands has material passport requirements for regulatory application, and Trondheim imposes requirements for material procurements. France and Belgium are implementing laws to certify sustainable products, and France has implemented a law in 2023 for all new public buildings to contain 50% of bio-based materials.</p> <p>Changing end-of-life practices also reduces GHG emissions. Cities in Luxembourg, Finland, Stockholm, and Denmark have already implemented pre-demolition audits, following Vienna's example. Lahti has applied life-cycle carbon and cost performance methodology to compare the feasibility of renovation instead of demolition and rebuild, for two schools of approx. 8,000m².</p>

Stakeholder category	Sector group (if applicable)	Comment
		Cities can also establish certain requirements to lower the amount of waste landfill diversion in municipal construction projects. Trondheim set as limit a maximum of 40 Kg of waste per square meter of new building. Another requirement set by cities like Trondheim, Oslo, Malmo, Gotenborg and Stockholm is the zero carbon construction sites.
Company/business organisation	Material manufacturers and suppliers	<p>Yes, in Czech Rep. there are some state subsidies motivating to reduction of emissions from housing:</p> <ul style="list-style-type: none"> - New Green to Energy Savings (for installations of renewable energy technologies and water retention, New Green to Energy Savings Light (for seniors), Renovate your Granny 's House (reduction of energy costs), subsidy for construction projects with more than 5 materials with EPD
Non-governmental organisation (NGO)		<p>Firstly, the EU roadmap for WLC of buildings will build on a number of national policies having been developed in the absence of EU directives. For example, the introduction of WLC policy measures in countries such as France, the Netherlands, Denmark, Finland and Sweden offers useful learnings and insights. To comprehensively address material and energy-related emissions, EU's policy framework for WLC needs to extend from initial raw materials to encompass construction products, building-level operations, and ultimately, end-of-life stages.</p> <p>Secondly, inspiration should be taken from the CLEVER scenario (Collaborative Low Energy Vision for the European Region), which illustrates how a sufficiency, efficiency, and renewables approach (the SER framework) can deliver both energy security and climate-neutrality. It aggregates national pathways, with a bottom-up approach, into a European vision and scenario, and increases equity between and within the countries covered. More specifically, for buildings, this scenario finds out that the large-scale rollout of deep renovation is the key to buildings sector decarbonisation and must also be complemented by sufficiency measures if it aims to reach the climate targets. This encompasses limiting the rising consumption levels and ensuring greater equity between countries in terms of dwelling size and consumption patterns within dwellings.</p>
Non-governmental organisation (NGO)		<p>A number of European countries have already introduced WLC requirements. E.g.,</p> <ul style="list-style-type: none"> - Denmark introduced regulation which, starting from January 2023 sets WLC limits for new buildings, to be progressively tightened over time. - In Sweden, WLC limit values are proposed to be introduced from 2025 at the earliest. Climate declarations covering the entire life cycle of buildings have also been proposed to be introduced from the beginning of January 2027, with declarations already required for modules A1-5 in new buildings. - Finland has adopted a building act which from 2025 will introduce mandatory provisions for calculating the carbon footprint of new buildings which will need to be within regulatory threshold values. - France since 2022 has enforced legislation addressing both operational and embodied emissions and plans to progressively tighten up carbon requirements in 2025, 2028 and 2031. It requires a dynamic Life Cycle Assessment (LCA) which weights current emissions more heavily than future emissions. - Netherlands requires all residential and office buildings exceeding 100m2 to account for their embodied impacts using LCA. - Norway requires apartment buildings and commercial buildings to prepare a greenhouse gas calculation. <p>Finally, London's City Plan requires developers to carry out a WLC assessment and issue a circular economy statement.</p>

Stakeholder category	Sector group (if applicable)	Comment
Business association	Architects, planners, and engineering	<p>New building subsidies in Germany already require proof of compliance with a limit value (24kg CO₂/m² and year) (Co₂ in the building (Incorporated Energy - embodied emission).</p> <p>Other examples include:</p> <p>Refurbishment Roadmap Baden-Württemberg,</p> <p>The Hamburg Climate Plan: The climate plan defines concrete savings targets for different sectors: these are the four sectors of industry, commerce, trade and services, private households and transport,</p> <p>municipal climate protection plans and municipal sustainable energy supply</p> <p>Departments in the administration must cooperate across the board. An example of this would be the area of heritage protection and climate.</p> <p>The development of the building resource passport is valuable in order to be able to read off the relevant information and to store important data and target refurbishments.</p>
Non-governmental organisation (NGO)		<p>There are a number of WLC policies in place which favour a performance-based approach:</p> <p>Denmark introduced regulation which, starting from January 2023 sets WLC limits for new buildings, to be progressively tightened over time.</p> <p>In Sweden, WLC limit values are proposed to be introduced from 2025 at the earliest. Climate declarations covering the entire life cycle of buildings have also been proposed to be introduced from the beginning of January 2027, with declarations already required for modules A1-5 in new buildings.</p> <p>Finland has adopted a building act which from 2025 will introduce mandatory provisions for calculating the carbon footprint of new buildings which will need to be within regulatory threshold values.</p> <p>France since 2022 has enforced legislation addressing both operational and embodied emissions and plans to progressively tighten up carbon requirements in 2025, 2028 and 2031. It requires a dynamic Life Cycle Assessment (LCA) which weights current emissions more heavily than future emissions.</p> <p>Netherlands requires all residential and office buildings exceeding 100m² to account for their embodied impacts using LCA.</p> <p>Norway requires apartment buildings and commercial buildings to prepare a greenhouse gas calculation.</p> <p>London's City Plan requires developers to carry out a WLC assessment and issue a circular economy statement.</p>
Non-governmental organisation (NGO)		<p>Aside from the national examples of Denmark, France, the Netherlands, Sweden and Finland, all LCA-based frameworks with different obligations, there are initiatives at local level worth mentioning.</p> <p>Zero-emissions construction sites (ZECS) enable a relatively small reduction of WLC; however, they are more notable because of the success case they represent in terms of green public procurement. By 2025 all of Oslo's public construction sites will operate zero emission machinery and zero emission transport of materials and workers to the site. This is achieved by awarding a share of 30% to environmental criteria in the tender. This approach could be extended to the procurement of low-carbon materials, by recognising the added value of projects with ambitious WLC.</p>
Business association	Material manufacturers and suppliers	National legislation, like in France.

Stakeholder category	Sector group (if applicable)	Comment
Non-governmental organisation (NGO)		<p>Some examples of policies to reduce Whole Life Carbon emissions include green public procurement rules, green building targets, embodied carbon limit values, Life Carbon Assessments for public procurement, circular economy requirements in demolition contracts.</p> <ul style="list-style-type: none"> - In 2023, Denmark introduced carbon limit values for all new buildings. - In France the RE2020 regulation also introduced carbon limit values for all new residential and non-residential buildings. - Sweden will introduce limit values for new buildings before 2027. - In Germany there is a mandatory Life Carbon Assessment for federal buildings. And mandatory lifecycle GHG emissions since 2021. - The Netherlands has introduced mandatory national life cycle carbon limits on all new residential and non-residential buildings - In the UK, the Construction Playbook states that central government should carry out a LCA for all public works projects and programmes including building, civil engineering and construction
Non-governmental organisation (NGO)		C40 Clean Construction policy explorer and the Building Energy Efficiency explorer share many policy examples taken from a number of different angles.
Academic/research institution		Existing examples of policies aiming at setting national limit values for the embodied carbon emissions of new buildings either developed or currently being developed in France, Denmark, Sweden and Finland.
Business association	Material manufacturers and suppliers	<p>The following policy options should be considered:</p> <ul style="list-style-type: none"> - A focus on overall building and complete life-cycle is needed. Relevant policy cases are that of France and Denmark (byggeriogklima.dk). In France, industry and national players have been encouraged to explore possibilities before introducing a regulation (E+C- pilot experiment that preceded RE2020). It is also necessary to use harmonized LCA methodologies across Europe (EN15978, EN15804, Level(s)) to ensure comparable results. Looking at one element only can have adverse effects from a whole life carbon emissions perspective. - Maximizing the energy efficiency of buildings during the use phase is a highly impactful element (this is linked to operational carbon). A relevant policy case to contribute to buildings' energy efficiency is that of Italy and the Ecobonus scheme. - Support recovery and recycling of construction materials more thoroughly can help drive down emissions. In the Netherlands, a glass recovery scheme (VRN - vlakglasrecycling.nl) provides glass waste (cullets) to produce lower-carbon glass. On this kind of policy, the EU framework is still poor. <p>Please also note some comments to clarify our answers to the questions above:</p> <p>Q6e: Flat glass' Environmental Product Declarations (EPD) are an effective first step to inform stakeholders about products with similar characteristics, using EN 15804. The indispensable second step is to consider the whole life carbon emissions of buildings and drive their reduction. To ensure fairer competition regarding EPDs, effective controls on the declared embodied carbon of imported products are also needed.</p> <p>Q6i to I: All elements addressed by these questions can all positively impact the whole life carbon emissions of buildings, but Glass for Europe cannot assess this from a policy perspective.</p>
Company/business organisation	Material manufacturers and suppliers	Public policies that address whole life carbon should be based on life cycle analysis that also evaluate the end of life. Also such policies should not discriminate against products but rather allow for paid and demonstrated performance. For instance, Brussels Region provides a bonus for using bio-based insulation in renovation efforts. However, this bonus is provided irrespective of the impact such products may have on the environment and without considering the end of life impact. A public policy designed in a such a way cannot

Stakeholder category	Sector group (if applicable)	Comment
		<p>drive whole life carbon emissions down sustainably over time.</p> <p>We believe that regulations in countries should follow the performance-based approach and not prescriptive based approach. The performance should be assessed through harmonized methodologies and not specific that would favor some categories of products.</p> <p>At product level this should be supported by the revision of the CPR. At building level, the EU framework Level(s) should be the base for such assessment. Although we are seeing, for example in France, that Level(s) is the base for the calculation, but not when it comes to account and interpret the results.</p>
Other		<p>At an international level, a particularly positive example of an effective policy in reducing the impact of construction materials on the whole life carbon emissions of buildings is the Buy Clean California Act.</p> <p>Under this legislation, public procurement requirements are set for four materials: structural steel, concrete reinforcing steel, flat glass, and mineral wool board insulation.</p> <p>Specifically, Global Warming Potential (GWP) limits are set for each of these products. These limits remain the same for all products within a product group, independently of the production method used. GWS reflects greenhouse gases produced during the manufacturing process and is expressed in terms of their CO2 equivalent (CO2 eq.)</p> <p>If these limits are surpassed the product is not eligible to be purchased in public tenders by California state agencies.</p>
Non-governmental organisation (NGO)		<ul style="list-style-type: none"> • London – London Plan: Spatial Development Strategy for Greater London (March 2021) - Policy SI 2 Minimising greenhouse gas emissions, Introduces the requirement to undertake whole life carbon assessments • France Reglementation environnementale 2020 (RE 2020) – introduced a total emissions cap for new buildings that will tighten over time. • Flemish Energy Agency - E100 approach • City of New York – Executive Order No.23 Clean Construction (September 22, 2023) • Toronto – Green Standard Update: Advancing Net Zero Emissions in New Development (May 2023) • Alternatively, in the Netherlands, many of these policies have been in place for years and have had no impact. Mandatory WLC reporting needs proper scientifically robust calculation methods. • Current EU Taxonomy does not move the needle, in its current form the Taxonomy incentivises building new rather than renovating existing buildings
Company/business organisation	Construction, renovation, and demolition contractors	<p>An important example from Denmark worth highlighting is the work of the Climate Partnerships, in which industry developed recommendations for the Danish Government regarding possible initiatives towards the 70 percent CO2 reduction goal in 2030. For construction the focus was on CO2 reductions across different areas:</p> <ol style="list-style-type: none"> 1. Energy efficiency in the existing building stock 2. Reduce CO2 emissions from building operations 3. Design to reduce embedded CO2 content of materials in buildings 4. Reduce CO2 emissions on construction site 5. Reduce CO2 emissions from larger construction work and infrastructure <p>More information here: https://climatepartnerships2030.com/the-climate-partnerships/construction/</p>

Stakeholder category	Sector group (if applicable)	Comment
Environmental organisation		London Plan Policy SI 2 sets out a requirement for development proposals to calculate and reduce WLC emissions as part of a WLC assessment. Local authorities should secure the post-construction stage WLC assessment through a planning condition or legal agreement with the applicant.
Business association	Property developers, owners and managers	<p>The EU-Taxonomy as a regulatory framework for sustainable investments does not currently support a resource-saving approach towards reducing lifecycle carbon emissions. The existing “mismatch” between the Taxonomy’s focus on the energy efficiency level A and the EPBD’s “worst-first”-principle needs to be resolved.</p> <p>The renovation of the EU’s most energy-inefficient buildings must be the priority as it represents a resource efficient approach and prolongs the lifecycle of these buildings. This means that the energy levels F and G must be tackled (worst-first), and investments must be directed towards these renovation activities.</p> <p>The Taxonomy, however, currently incentivises ownership and acquisition of level A-performing assets. Though, the Taxonomy offers the reduction of the primary energy demand by 30% as a Taxonomy-conforming economic activity, this only benefits already well-performing assets, e.g., energy-level B. This is because only these will – after a 30% energy-demand reduction – fall into the A-level category and hence making their ownership Taxonomy-compliant. This reduction is not a feasible option, however, for F or G-level buildings. This is because it would not result in them reaching energy-level A, even though, they offer the largest potential for energy-saving with comparatively low-investments, making them “low-hanging fruit”.</p> <p>A solution to this mismatch could be the addition of a technical criterion 7.7. (1b) to the Delegated Regulation 2021/2139. This criterion could offer the option for investors to reduce the primary energy demand by 60% within five years (demonstrated with EPCs before and after the implementation of the measures). Assets fulfilling this could then be granted taxonomy-conformity after fulfilling the criterion for 15 years up until at the most 2050. The latter provision would ensure an inducement for investors to act in the short term, while also being in line with the EU’s climate policy.</p>
Company/business organisation	Other	Zero-emissions construction sites (ZECS) might result in a relatively modest reduction in Whole Life Carbon (WLC). Nonetheless, their significance lies in their success stories within the realm of green public procurement. By the year 2025, all public construction sites in Oslo are set to operate using zero-emission machinery and employ zero-emission methods for transporting materials and workers to the site. This remarkable achievement is made possible by allocating a 30% share to environmental criteria during the tendering process. This innovative approach could be expanded to include the procurement of low-carbon materials by acknowledging the added value of projects committed to ambitious WLC targets.
Company/business organisation	Material manufacturers and suppliers	A number of EU countries have explored and enacted new policies for reducing WLC emissions : FR, NE, DK, FI, NL, for example. It is however often difficult to assess and compare the impact of these policies as their methodology differ.
Policy suggestions and demands - high level of detail		
Company/business organisation	Architects, planners, and engineering	Please make available on European scale useable data on the energy efficiency and carbon footprint of building materials and building products. All data should be fully available, open source, comparable and reliable. Then make it mandatory that buildings have to comply to a maximum footprint (nationally prescribed per building type and lowered in the following years to keep pressure on lower (but attainable) footprints. At the moment guidelines are too lenient and there is no trustworthy and complete data that can be used.
Public authority		<p>Measure like Q6b (setting/requiring targets for buildings or portfolios of buildings) have scored best in swiss national study on embedded carbon prevention (study available online, german language only -> link: https://www.bafu.admin.ch/dam/bafu/de/dokumente/wirtschaft-konsum/externe-studien-berichte/vobu-kreislaufwirtschaftsmassnahmen-im-bauwesen.pdf.download.pdf/VOBU_Kreislaufwirtschaft_Bauwesen.pdf)</p>
Company/business organisation	Consulting and software providers	<ol style="list-style-type: none"> 1. An SER decarbonisation policy to subdivide existing homes across the EU could offer the most impact to reduce floor area per capita to 30 sq.m per capita. 2. The housing policy of rightsizing-by-moving-home could be replaced by a policy of rightsizing-in-place.

Stakeholder category	Sector group (if applicable)	Comment
		<p>3. A public procurement policy to use connectable and subdividable plan templates instead of fixed-size plans could reduce twenty year demand by 15% on delivery of 100,000.</p> <p>4. A policy to size homes as studios and 1-beds in dwellings that can be connected could reduce the embodied carbon by between 20% and 50% in new homes.</p> <p>5. Enable leasees to have access to a specified roof area for fitting and upgrading of solar panels to enable a lifetime matching of supply can demand.</p>
Non-governmental organisation (NGO)		<ul style="list-style-type: none"> • 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.
Non-governmental organisation (NGO)		<p>An example of a successful policy reducing buildings whole life carbon emissions is French RE2020. It replaces the RT2012 with a different approach, taking into account not only the operational carbon footprint, but also embodied carbon. The policy applies to new buildings, aiming at reducing their carbon footprint over an estimated 50-year life cycle. LCBI believes this focus on new buildings should be retained in EU level policy.</p> <p>Crucially, RE2020 implementation has been made possible thanks to private sector investment and testing in France. The BBKA non-profit organisation has been developing whole life carbon accounting methods for buildings since 2015, offering an excellent example of efficient private/public partnership in the preparation of policy and regulation in the area.</p> <p>Other national policies and regulations can serve as examples too, such as the one in Denmark.</p> <p>Finally, the European non-profit Low Carbon Building Initiative (LCBI). In 2021, realising that there is no harmonised language to measure the whole life carbon footprint of their assets, a dozen European industrial from buildings sector have joined a technical team (composed of Elioth, Artelia, Drees&Summer, Bureau Veritas) to define this common language.</p>

Stakeholder category	Sector group (if applicable)	Comment
Business association	Material manufacturers and suppliers	<p>Mandatory declaration of carbon footprint at building and product level will help reduce emissions, but it will be more effective if combined with targets, hence the different score for effectiveness in questions 6a-6e.</p> <p>Support for upskilling should not oversimplify the solutions needed for decarbonising buildings as it requires much more consideration of design of buildings rather than simply using a 'green' material by default.</p>
Policy suggestions and demands - remaining responses		
Public authority		EU-ETS will make all the above not needed because the consumers will chose the cheapest application giving low carbon emissions natural.
Academic/research institution		<p>The construction industry "supply chain" requires support at different levels. Consumers occupy and inhabit buildings, campaigns to change consumer sentiment will impact the "product developers produce" and more ESD designs, with carbon accounting in the BIM (as part of LCA) will drive the carbon equation to 'reducing carbon in all practices'. All of the scenarios presented here need to be changed - that change requires a Modern Methods of Construction Mindset shift. With this, you get change.</p> <p>Rating systems for ESD and driving the commercial pricing for 'more sustainable building'. Consumer choices are centred around "doing he right thing" so this an important attribute to changing mindset.</p>
Company/business organisation	Architects, planners, and engineering	Ensure longevity and high quality of products and materials to avoid premature replacement leading to waste streams.
EU citizen		Ensure recycling facilities operate at the maximum rate of material waste diversion available and upgrade recycling technology as soon as feasible and demonstrably effective.
Company/business organisation	Material manufacturers and suppliers	. It would be better to use of a more "complete" declaration (an EPD), as carbon footprint is not the one and only indicator.
Non-governmental organisation (NGO)		whole LIFE carbon is not the point. Emissions caused in production and carbon captured in building-materials is effective regarding our current situation.
Academic/research institution		<p>Define financial and technical mechanisms to apply trade emission market up to the final users, that can verified (through standardised method) amount of saved emissions.</p> <p>Facilitate aggregation of renovation actions.</p> <p>Facilitate renewable energy communities.</p>
Company/business organisation	Consulting and software providers	First policy, and control body installed. Then we can start focussing on bringing it to the wider people through the best channels. It needs to become tangible and this will only be through control, unfortunately. This, until it becomes common practice. The new policies need to become very clear to understand by anyone, with the right stakeholders and advisors appointed.
Academic/research institution		What hinders the feasibility of the very sensible LCA information is the complexity of the requirement, especially for the building stock. Identifying all the materials used in millions of buildings and evaluating them in terms of their life cycle assessment seems almost impossible at the moment.
Academic/research institution		Modify the green public procurement at national level
Non-governmental organisation (NGO)		High taxation of excessive floor space per person (e.g. single-family dwellings of more than 100m2 per person...) and secondary residences.

Stakeholder category	Sector group (if applicable)	Comment
Public authority		Link private funding to whole life carbon performance
Company/business organisation	Consulting and software providers	<p>Clear account good friends. The cleverest person is only as clever as the simplest person understands him. Bring it down to the common understanding:</p> <p>Would you like to build/renovate your living rooms with hazardous waste, toxic ingredients and primary resources depleting soils? Are you okay, that the way it's build accounts only for 50-80 years of use (Do you have children, grandchildren?)? Would you be ready to pay the real price for your "wants"/claims/demands? If you are not able to renovate, repurpose your building on your own - support is guaranteed. Whereas, the undertaking must do it's utmost to realize optimal results. If you fear the liabilities, contract-wise or financially, there are instruments and funds to remunerate you.</p> <p>And even more important:</p> <p>Reduce potential to gain and earn from destructive practices. Limit influence of those "stake"holders on policy makers (i.e. lobbying for fossil and CO2-intense industries, not paying for the damage they cause - conciously). This could be done - as many times suggested - to have legally binding metrics assessed and binding accountability for Boards, CEO, Shareholders. If they decide to gamble and gain from the dilemma (i.e. prisoner dilemma, game theory), they will be held accountable with their private person and wealth.</p> <p>Only if (1) the "trust gap" is adressed seriously, (2) the "accountabiltiy gap" is surveyed thoroughly, and (3) transparent and automated methods/processes - that are based on the best and most recent knowledge - are implemented, will we see markets transforming in scale and velocity expected. Aside of changing majorities and power-dynamics within nations, the EU and geopolitically.</p>
Public authority		<p>LCA are not always correct, better supervision is desirable here. We hope that the revision of CPR and CPR Acquis proces (elaboration of current BWR7) will change this.</p> <p>Periodic monitoring of the functioning of installations and their energy consumption (and associated CO2 emissions).</p>
Company/business organisation	Material manufacturers and suppliers	Real evaluation of products based on LCA and EPD and provision of additional support to builders based on product selection.
Business association	Construction, renovation, and demolition contractors	- A key target should be the inclusion of WLC as an award criteria in (public) procurement of construction projects
Company/business organisation	Property developers, owners and managers	I think good examples will be followed if it is made easier to follow, by making national laws more flexibel. A european standard is neccessary for producers to make an interesting product for both investor/developer and producers: good production skale and international exchange of knowledge, examples and products and partners.
Company/business organisation	Property developers, owners and managers	<p>There is a easy cost effective policy to reduce whole life carbon. Build less, and reuse what we have for longer.</p> <p>The questionnaire again is mixing (Q6d) renovation with new construction. True a renovation work will be emitting carbon, however it should be compared with the equivalent new construction (and not in isolation).</p> <p>New construction and refurbishment are also competing for ressources (natural, human and financial), and therefore any ressource used in new construction is a limitation to the capacity of the economy to upgrade the existing stock which should be the uptmost priority of any climate polica applied to real estate</p>
Company/business organisation	Other	Promote clean energy solutions, not only electricity, and economic support to increase the energy efficiency on existing buildings, specially on lower income countries.

Stakeholder category	Sector group (if applicable)	Comment
EU citizen		It's just a note to the question "Q6g: Link public funding to whole life carbon performance". It would be very feasible to enact in Poland in case of EU financial support. In case of a need for independent national public funds use - the regulation will never be agreed by the government.
Company/business organisation	Architects, planners, and engineering	As an architect I constantly undertake cpd and read up about better methods of construction or more sustainable materials to specify, however time and time again those working on site are not being thought the same methods so are reluctant to retrain (often unpaid) about certain material installations etc. Irelands builders providers are extremely lacking in sustainable materials available, there is a big push for concrete blocks and petrochemical insulations. The main builders providers do not stock wood fibre insulation for example. It should be mandatory that these materials available and should have a reduced VAT rate to encourage use. There needs to be an incentive for developers to retain existing buildings, sadly reducing VAT is the only way I can see this happening. It all comes down to profit.
Company/business organisation	Architects, planners, and engineering	Buildings must achieve sustainability requirements in order to be seled or rented.
Company/business organisation	Material manufacturers and suppliers	<p>In the field of building services engineering, the following steps would significantly contribute to the rapid spread of circular economy principles in the market of glycol-based heat transfer fluids:</p> <ol style="list-style-type: none"> 1. Consideration of the type of heat transfer fluids during the issuance of green certificates for buildings/facilities, taking into account that in many cases, we are talking about quantities of several hundred tons. 2. Extension of green-themed EU/state support to smaller companies (e.g., Green National Champions - removal of the minimum requirement of 3 employees in Hungary). 3. Encouragement of purchases through tax incentives (e.g., sales with a reduced VAT rate - as the currently higher prices do not make natural or regenerated materials attractive). 4. Application of incentives in state and EU projects for the procurement of materials that comply with the above-mentioned principles. 5. National or European Union 'label' for raw materials produced according to the principles of the circular economy (any distinguishing mark that helps users navigate). 6. Campaign on the importance of awareness and safe disposal of hazardous waste/disused materials (clarifying legal requirements and consequences on the installation and facility operation side as well). <p>The above ideas would contribute to our long-term plan of using sustainably sourced and predominantly regenerated glycol on the Hungarian and European markets, thereby:</p> <ul style="list-style-type: none"> • Enhancing national raw material supply security through the establishment of domestic regeneration capacity. • Reducing CO2 emissions related to transportation and logistics thanks to domestic regeneration.
Company/business organisation	Consulting and software providers	Daag de financiële markten uit om afschrijving op restwaarde van bouwmaterialen te bepalen en voeg carbon credits toe

Stakeholder category	Sector group (if applicable)	Comment
Non-governmental organisation (NGO)		Policies that focus on product flows have shown higher potentials than only focussing on the building level. The emphasis should be on reducing the impact of materials and products before they are applied in the building. Focus on GWP module A, rather than whole life carbon
Business association	Architects, planners, and engineering	the communication of new narratives is key. we need to get away from single family houses. we need to get away from glass facades and glass designs. include media outlets. raise awareness on all levels.
Public authority		Mandatory reporting of whole life carbon MUST NOT be in accordance with EN 15987. This is because this only accounts for one lifecycle. We need mandatory WLC accounting based on the PRODUCT LEVEL reported separately for each use life, with certified product EPDs (mandated by CPR & ESPR). Circular economy at the building level, to the extent that this makes sense, should be reported as the sum of the building's component parts based on their immediately preceding use life. This makes each specification decision an opportunity to advance circularity at the product level. This will also allow for the calculation of WLC at the building level to be automated. Any assessment of WLC that is based on clairvoyance for end of life processes that may, or may not, happen, is doomed to failure because this just hands the commercial advantage to the greenwashers. This will undermine the delivery of circular economy in the construction sector.
Academic/research institution		Mandatory reporting with quantified targets, emission free construction sites, waste and reusability audits
Business association	Architects, planners, and engineering	<p>By 2030, Greece's National Energy and Climate Plan (NECP) targets a:</p> <ol style="list-style-type: none"> 1. 56% reduction in total GHG emissions (excluding LULUCF) from 2005 levels (equivalent to 42% from 1990 levels). 2. 36% reduction in non-EU ETS emissions compared to 2005 levels, exceeding EU requirements. 3. Increase the share of renewables in gross final energy consumption to a minimum of 35%. 4. Limit final energy consumption to 16.5 million tonnes of oil equivalent (Mtoe). <p>Notably, individual mitigation targets for non-EU ETS sectors are lacking.</p> <p>In alignment with the EU's 2050 carbon neutrality objective, Greece has created a Long-term Strategy to 2050, including decarbonization scenarios.</p> <p>In terms of local initiatives:</p> <ol style="list-style-type: none"> a. Over 100 out of 332 Greek municipalities have submitted climate action plans and GHG emission targets through the Covenant of Mayors initiative. b. Athens, a climate action leader, adopted a comprehensive climate action plan in 2017 with a 40% GHG reduction goal by 2030, focusing on energy-efficient buildings, renewable energy installations, and improved local transportation. <p>Furthermore, Greece 2.0 National Recovery and Resilience Plan features projects such as energy renovations for residential buildings and the renovation of the Olympic Athletic Centre of Athens, aiming to enhance energy efficiency and sustainability.</p>
Public authority		Start with mandatory declaration of climate impact from buildings to build up knowledge (lower reductions possible) and then introduce mandatory limit values to drive a bigger reduction of climate impact.
Company/business organisation	Architects, planners, and engineering	On the last question, I do not consider awareness raising and media campaigns to be the same thing. Awareness raising should be mainly local and at a minimum through media campaigns.
Other		What are national construction and new housing plans? Construction is mostly demand based without such plans. Public funding to whole life carbon performance is not realistic. This funding is needed for deep renovation.
Company/business organisation	Other	Regularly measure building energy consumption through ventilation (usually 40%), and take concrete measures to reduce it, e.g. by implementing Smart Demand Controlled Ventilation (SDCV), which can reduce those numbers immediately.

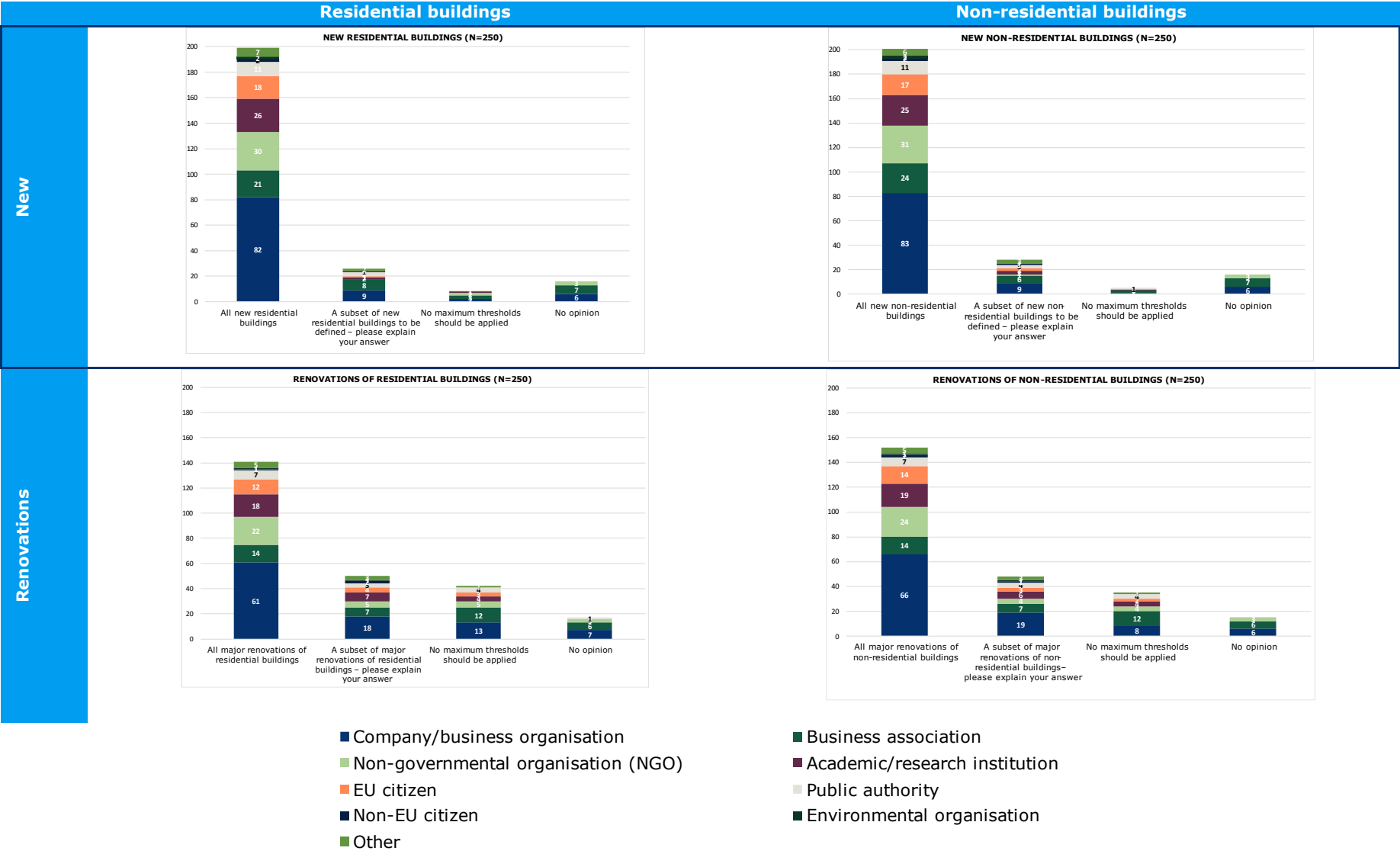
Stakeholder category	Sector group (if applicable)	Comment
Business association	Material manufacturers and suppliers	Support to development of EPDs and building LCA tools.
Company/business organisation	Material manufacturers and suppliers	We'd like to re-emphasise the importance of a roadmap with short term milestones. While incentives are important to reduce WLC emissions, taxonomy should not create a second layer to technical regulation for creating push to emission reductions.
Non-governmental organisation (NGO)		The emphasis should be on reducing the impact of materials and products before they are applied to the building.
Business association	Material manufacturers and suppliers	<p>At building level, the EPBD represents a crucial opportunity to set the necessary requirements for low-carbon construction and use for new buildings and renovation over the whole life cycle of the products used – including their post-use phase. In this sense, the EPBD should include provisions regarding harmonised reporting, targets and thresholds for WLC covering all the stages of the building's life cycle.</p> <p>At product level, the revision of the CPR should ensure the establishment of a material Neutral Level-Playing-Field. Particularly, in order to boost transparency, it is essential that distinctions between construction products are exclusively made on the basis of harmonized, sound science-based methodologies where data are analysed in a consensus-based whole LCA approach, consequently leading to well-balanced conclusions. Simultaneously, sustainability requirements and assessment of construction products in the CPR should go beyond the disclosing of Global Warming Potential (GWP) and be based on the existing standard EN 15804+A2 as reflected in the Environmental Product Declarations (EPD).</p> <p>Concerning the role of the public sector, there should be a much better use of public buildings as the leading example both for the construction of new buildings and renovation. In this sense, a more spread and harmonised implementation of Green Public Procurement could have great potential to boost the reduction of WLC emissions for the public sector.</p> <p>Finally, regarding the role of the EU Taxonomy, at the moment, its criteria do not have a significant value in reducing WLC emissions, and they appear less ambitious than the legislation already in place. On the contrary, Eurima believes that, by setting ambitious criteria at the building level, Taxonomy should set the direction of travel for sustainable finance and raise the bar compared to existing legislation.</p>
Non-governmental organisation (NGO)		<p>We aim to emphasize the effectiveness of "Sufficiency Policies" from question 4, "Demand for New Built Space," in reducing carbon emissions from buildings. These policies include utilizing vacant buildings, prolonging building life, intensifying building use, and discouraging long-term under-occupancy. We stress prioritizing renovation and maintenance over new construction, as they yield substantial emissions reductions without relying on technology.</p> <p>It's crucial to note that solely relying on technical solutions (TECH-Build) for emissions reduction won't align with the EU's 2050 net-zero target. To succeed, a combination of technical and sufficiency measures is needed.</p> <p>Key strategies include carbon footprint awareness, reduction tactics, carbon capture projects, fossil fuel-free electrification, 100% renewable energy adoption, biogenic materials, green facades, green roofs, mindful excavation practices, flexible local regulations, passive bioclimatic solutions (especially in warmer regions), circular economy standards for recycled materials, and promoting reused materials with eco-labels. These measures should underpin the EU's strategy for successful decarbonization in line with the Paris Agreement.</p>
Non-governmental organisation (NGO)		Introduction of limit values for whole life carbon and roadmap for implementation.
Non-governmental organisation (NGO)		Introducing minimum green asset ratios would be a helpful measure to move forward climate action in financial sector.

Stakeholder category	Sector group (if applicable)	Comment
Business association	Material manufacturers and suppliers	<p>Policies should be focused on the assessment at building level, not product level.</p> <p>For Q6h, reference should be made to the LEVEL(s) framework developed by the European Commission as part of a stakeholder process rather than the EU Taxonomy.</p>
Business association	Construction, renovation, and demolition contractors	The inclusion of WLC should become an award criteria in (public) procurement of construction projects as soon as assessing WLC is "reliable" and "credible" enough. Uncertainties must be resolved (see previous comments).
Company/business organisation	Architects, planners, and engineering	I think that there should be a policy imposed for empty and/or abandoned buildings (in Greece we have a lot of them), that after a short period of time of no use, there should be given to public authorities and/ or private funds in order to transform them in energy efficient, operational buildings with tenants or public use.
Non-governmental organisation (NGO)		<p>Public procurement of buildings including Whole Life Carbon criteria.</p> <p>Introducing minimum green asset ratios would be a helpful measure to move forward climate action in financial sector.</p>
Company/business organisation	Property developers, owners and managers	LDA for buildings according DIN EN 1578 should be changed in modul C in relation to the kind of used material. The use of natural and renewable material should be rewarded (see answer Q5)
Business association	Architects, planners, and engineering	<p>VALIDATION AND DISCLOSURE OF BUILDING PERFORMANCE IN USE</p> <p>It is urgent to strenghten Energy Performance Certificates (EPC) so they reflect as-built and actual operational performance, to ensure that the market is able to act on real data, as opposed to wishful thinking. Strenghtening EPCs in this way would ensure that they reflect the actual delivered quality of a project; how well a building is assembled; how resilient it is and allow owners and end-users to plan adequately for its maintenance and intended life span. Ultimately, this will prepare the ground for EPCs to be linked to actual performance improvements and consequently to value.</p> <p>Validating (through independent on-site inspection) the as-built buildings – MATERIALS, BUILDUPS through ON SITE INSPECTION of air tightness test and thermal imaging (thermal bridge test) and SYSTEMS is essential to address this gap and to make EPCs a reliable instrument. Eventually the as-built bill of materials should be validated through a combination of on-site inspection, focusing on large CO2 emission elements, and a desktop exercise based on receipts. Once such validation occurs, metered energy performance can be reconciled against the as- built building parameters.</p> <p>BILL OF MATERIALS</p> <p>Bill of Materials are the basis for reporting on the whole life performance of buildings and systems. It is also a powerful mechanism to support the verification of material build-ups and configurations that impede on thermal performance, indoor air quality and resilience. A harmonised and component-based way of reporting material quantities is necessary for both new build and retrofit projects.</p> <p>Example: WLC standards developed by RICS (https://tinyurl.com/4n4rrhct)</p> <p>FAVORRENOVATION OVER DEMOLITION</p> <p>Building conservation and retrofit should always be envisaged as a preferred option over demolition.</p> <p>CASE STUDIES</p> <p>These case studies illustrate how legislation can help to scale up solutions: https://tinyurl.com/4n4rrhct</p>
Company/business organisation	Material manufacturers and suppliers	<p>At an international level, a positive example is the Buy Clean California Act. This piece of legislation has proven to be of an effective policy in reducing the impact of construction materials on the whole life carbon emissions of buildings.</p> <p>Under this legislation, public procurement requirements are set for four materials: structural steel, concrete</p>

Stakeholder category	Sector group (if applicable)	Comment
		<p>reinforcing steel, flat glass, and mineral wool board insulation.</p> <p>Specifically, Global Warming Potential (GWP) limits are set for each of these products. These limits remain the same for all products within a product group, independently of the production method used. GWS reflects greenhouse gases produced during the manufacturing process and is expressed in terms of their CO2 equivalent (CO2 eq.) If these limits are exceeded the product is not eligible to be purchased in public tenders by California state agencies.</p>
EU citizen		<p>In order to properly report whole life carbon emissions, a universal, clear set of rules has to be created across the EU. Right now, every country has made its own set of rules, quickly and without order, which leads to confusion and no possibility for the countries to compare with each other. Moreover, these rules have to be updated at least every year, in order for the results to be truthful (energy CO2 intensity changes at least every year)</p> <p>A website for new lower carbon construction products and in which country (due to different set of construction regulations) these products can be applied.</p>
Public authority		<p>On all levels: Selective demolition, WLC including limit values (new buildings)</p> <p>Local; minimum criteria for reuse</p> <p>Q6d: Is answered with low, as it is not regulation but just considerations which are asked in for. We see that volunteer/considerations /awaeness campaigns etc. wont have a high result, but regulative (with limits) needs are necessary.</p> <p>Q6e: We cant put regulation about environmental sustainability on product level yet, due to CPR.</p> <p>Q6h: As taxonomy just has declaration and no limit value, do we not expect high reduction.</p> <p>Q6I: Potential is low, as just awareness/information won't be enough, if not regulation/limit value is in place. Soft skills like information are important and needed in the sector (DK has a knowledge center for LCA on building level for example), but this alone wont be enough.</p>
Business association	Material manufacturers and suppliers	<p>Whole life carbon policies need to support the uptake of lightweight construction and sustainable materials. Building renovation should be better promoted (over new built) as a way to reduce embodied carbon associated with building infrastructure. Building upon the existing, through vertical floor extension in dense urban areas, will also contribute to more flexibility in the use of space. Design for deconstruction will also be crucial in lowering emissions at the end of a building's lifetime and facilitate recycling processes, also reducing their carbon footprint.</p> <p>The EU taxonomy should pave the way for better considerations of low carbon, lightweight solutions, by going beyond the energy efficiency requirements.</p>
Other		<p>Ireland's Long Term Strategy on GHG reductions (2023) and under review following consultation June 23 https://www.gov.ie/en/publication/e4e81-long-term-strategy-on-greenhouse-gas-emissions-reductions/</p>

Stakeholder category	Sector group (if applicable)	Comment
		<p>Ireland's National Climate Policy https://www.gov.ie/en/policy-information/56654e-national-climate-policy/</p> <p>Ireland's Climate Action Plan 2023 https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/</p> <p>Irish Green Building Councils industry report on a recommended Zero Carbon Roadmap for Ireland https://www.igbc.ie/building-a-zero-carbon-ireland/</p>
Other		Policies that promote reutilization of materials and prioritize renovation of buildings over new construction. Policies that limit the percentage of soil covered by cement or other artificial material.
Business association	Material manufacturers and suppliers	Mandatory Whole Life Carbon reports for new buildings with threshold limits not to be exceeded. Green financing of renovation and refurbishment projects to reduce Whole Life Carbon in existing building stock. Acknowledging the use of bio-based renewable materials and incentivising carbon storage in buildings. Reference Service Life of buildings of around 50 years is a more realistic scenario when considering the unknown factors related to societal needs and trends' variations, technological advances that might make a policy obsolete 20 to 30 years from now, and unpredictable political and climate related fluctuations. Incentives and subsidies are needed for the development of technologies, business models, regulations and standards that will facilitate the implementation of circular economy in the building and construction sectors. The final Ramboll report "Supporting the development of a roadmap for the reduction of Whole Life Cycle of buildings" clearly shows in different scenarios, particularly in the one called TECH BUILD, that there are almost no more benefits in continuing to keep requesting a reduction of Operational Carbon after improvements over the first two to three decades. Not only the rate of reduction of Operational Carbon starts to decrease, but the Embodied Carbon of needed materials and construction work keeps increasing. Moreover, the emphasis on Embodied respectively Operational Carbon should be different for different countries. It is therefore better to develop highly differentiated geographical scenarios and time frames.
Business association	Material manufacturers and suppliers	The future Construction Products Regulation shall refer to EN 15804:2012+A2:2019 for holistically assessing the environmental performance of construction products over their service life instead requiring a single, simplified indicator (environmental or carbon footprint). Environmental Product Declarations according to EN 15804:2012+A2:2019 have been made broadly available by industry on a voluntary basis since years; they deliver all required inputs for different building certification schemes. Beyond the product design, the ETICS industry in parallel takes responsibility for constantly improving packaging, logistics and return of construction waste. Examples for already implemented measures are: collection of construction waste like cut-offs of insulation products which are brought back to production, biodegradable and recyclable foils or boxes or buckets made from recycled material.
Academic/research institution		Given the urgency of the situation, certification programs must evolve. They should incorporate stringent regulations about embodied carbon, set benchmarks for operational and construction-related lifecycle carbon emissions, dynamically tighten these thresholds until 2050, and limit certification attainment to projects meeting these benchmarks. Establishing comprehensive system boundaries through a holistic LCA and offering incentives for utilising low-carbon, negative carbon, and carbon-sequestering materials are also pivotal strides in this revolution.

ANNEX 2 – BREAKDOWN OF Q10 BY DIFFERENT RESPONDENT CHARACTERISTICS



ANNEX 3 – FURTHER DOCUMENTATION, RECOMMENDED BY RESPONDENTS IN Q14

Danish Reduction Roadmap.

- <https://reductionroadmap.dk/>

CLEVER final report.

- https://clever-energy-scenario.eu/wp-content/uploads/2023/06/clever_final_report-exec_summary.pdf

EEB, Sufficiency and circularity: the two overlooked decarbonisation strategies in the 'Fit For 55' Package.

- <https://eeb.org/library/sufficiency-and-circularity-the-two-overlooked-decarbonisation-strategies-in-the-fit-for-55-package/>

International Institute for Sustainable Development (IISD), 2021. Advancing Green Public Procurement and Low-Carbon Procurement in Europe: Insights.

- <https://www.iisd.org/articles/deep-dive/advancing-green-public-procurement-and-low-carbon-procurement-europe-insights>

IPCC: Cabeza, L. F., Q. Bai, P. Bertoldi, J.M. Kihila, A.F.P. Lucena, É. Mata, S. Mirasgedis, A. Novikova, Y. Saheb, 2022: Buildings. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA.

- https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter09.pdf

Nordic Sustainable Production, 2023. Knowledge centre: lifecycle assessment.

- <https://nordicsustainableconstruction.com/knowledge-centre/life-cycle-assessments>

Ramboll, 2022. EU policy models for reducing whole-life carbon of buildings: Guiding the European building stock on a path to climate neutrality.

- <https://c.ramboll.com/reducing-whole-life-carbon>

CLEVER, establishment of energy consumption convergence corridors to 2050, residential sector.

- <https://clever-energy-scenario.eu/wp-content/uploads/2023/03/2210-Convergence-corridors-Residential.pdf>

Whole life carbon models for the EU27 to bring down embodied carbon emissions from new buildings: review of existing national legislative measures. Ramboll (2022).

- <https://7520151.fs1.hubspotusercontent-na1.net/hubfs/7520151/RMC/Content/Whole-life-carbon-models-Review-of-national-legislative-measures.pdf>

The Case for Updating EU Procurement Policy. Marika Andersen. Bellona Europa (2023).

- <https://network.bellona.org/content/uploads/sites/3/2023/07/Policy-Brief-The-Case-for-Updating-EU-Procurement-Policy-1.pdf>

Green Public Procurement: a key to decarbonizing construction and road transport in the EU. Astrid Nilsson Lewis, Kaidi Kaaret, Eileen Torres Morales, Evelin Piirsalu, and Katarina Axelsson. Stockholm Environment Institute (SEI), (2023).

- <https://www.sei.org/wp-content/uploads/2023/02/green-public-procurement-eu.pdf>

Is Carbon Capture and Storage (CCS) Really So Expensive? An Analysis of Cascading Costs and CO2 Emissions Reduction of Industrial CCS Implementation on the Construction of a Bridge. Sai Gokul Subraveti, Elda Rodríguez Angel, Andrea Ramírez, and Simon Roussanaly. Environmental Science & Technology (2023) 57 (6), 2595-2601.

- <https://pubs.acs.org/doi/epdf/10.1021/acs.est.2c05724>

Embodied carbon regulation in the European construction sector.

- https://shiftingparadigms.nl/wp-content/uploads/2023/01/ECF_Embodied_Carbon_v2_spreads_6Feb23.pdf

DGNB published its two-part Guide to Climate Positive Building Stock in April 2023 as part of the EU project #BuildingLife. It provides information on the status quo of building stock at policy level and identifies 50 of the most important measures for a common path towards climate-positive building stock.

- <https://issuu.com/dgnb1/docs/dgnb-guide-to-climate-positive-building-stock>

Decarbonisation and whole-life carbon policies: proposals from the concrete and cement sector.

- <https://www.concrete-europe.eu/newsroom/publications/267-decarbonisation-and-whole-life-carbon-policies-proposals-from-the-concrete-and-cement-sector>

Document gathering legislation impacting the glass sector, and specific topics related to whole life carbon emissions of buildings.

- <https://glassforeurope.com/positions/>

EAE position, ETICS on the way to a circular economy.

- https://www.ea-etics.com/wp-content/uploads/2023/09/TG-Circular-Economy_EAE-position_2023-09-02_final.pdf

Getting in touch with the EU

In person

All over the European Union there are hundreds of Europe Direct centres. You can find the address of the centre nearest you online (european-union.europa.eu/contact-eu/meet-us_en).

On the phone or in writing

Europe Direct is a service that answers your questions about the European Union. You can contact this service:

- by freephone: 00 800 6 7 8 9 10 11 (certain operators may charge for these calls),
- at the following standard number: +32 22999696,
- via the following form: european-union.europa.eu/contact-eu/write-us_en.

Finding information about the EU

Online

Information about the European Union in all the official languages of the EU is available on the Europa website (european-union.europa.eu).

EU publications

You can view or order EU publications at op.europa.eu/en/publications. Multiple copies of free publications can be obtained by contacting Europe Direct or your local documentation centre (european-union.europa.eu/contact-eu/meet-us_en).

EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

