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Results of a public consultation on the first proposals for a 'common EU framework of core indicators for the environmental performance of buildings'

Draft report

Nicholas Dodd, Shane Donatello
(JRC, Unit B5)

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Contact information

Nicholas Dodd

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)

E-mail: jrc-ipts-efficient-buildings@ec.europa.eu

Tel.: +34 954 488 728

Fax: +34 954 488 300

https://ec.europa.eu/jrc

http://ipts.jrc.ec.europa.eu

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1. Background to the consultation

The European Commission's 2014 Communication on Resource Efficiency Opportunities in the Building Sector identified the need for a common EU approach to the assessment of the environmental performance of buildings. The starting point would be 'common framework of core indicators'. The framework would be rigorous enough to drive improvement in performance and allow for comparison between buildings.

A study was initiated by the European Commission in 2015 to develop an initial framework of core indicators, with the idea that they would be flexible in their use, so that they could potentially be incorporated into new and existing assessment schemes or be used on their own by a diverse range of stakeholders, including public authorities, design teams and property investors. It is important to emphasise that the intention is not to create a new standalone building certification scheme, or to establish performance benchmarks, but rather that it should provide a voluntary reporting framework that has a broad potential for use by building sector professionals across the EU.

Recognising the importance of engaging widely with building sector professionals, a number of formal stakeholder groups have been established to support progress of the study:

- A project steering group (SG1)
- Expert sub-groups on macro-objectives (SG2) and indicators (SG3)
- A main project stakeholder group (SG4)

Further details of the stakeholder engagement strategy and the members of each sub group can be found on the project website here:

http://susproc.jrc.ec.europa.eu/Efficient_Buildings/subgroups.html

As part of the ongoing study programme, work was initiated in 2016 to identify options for the indicators themselves, with the intention that the first proposals for indicators be consulted on with the formal stakeholders groups described above, as well as more widely with stakeholders in the public and private sector.

In order to gather the opinions of built environment professionals and stakeholders on the first proposal for a framework of core EU indicators for the environmental performance of buildings, the European Commission ran a consultation from the 6th July until the 7th October 2016.

During this period, stakeholders were invited to provide their views on the *'summary findings and indicator proposals*' consultation document and the background document *'Working Paper 2'*, which can be downloaded here:

http://susproc.jrc.ec.europa.eu/Efficient_Buildings/documents.html

In order to provide their views stakeholders were invited to complete an on-line consultation questionnaire using the EU Survey tool. The questionnaire was estimated to take approximately 45 minutes to complete and asked for feedback on:

- How the framework of indicators could work
- The specific initial proposals for indicators
- For which actors they would be most relevant

The majority of the questions were based on rankings of opinions or the selection of options, complemented by a small number of open questions. Responses that were not found to directly relate to a question were still used to the largest extent possible to generally inform the framework development.

2. Questionnaire response and profile of respondents

A total of 118 responses were submitted using the EU Survey tool. Indicatively this represents a 24% response rate, based on those stakeholders who were directly notified.

A total of 490 stakeholders, 249 of whom are formally registered to receive information about the study, were notified of the consultation. The 490 comprised:

- SG1 steering group (14)
- SG2 technical sub-group (7)
- SG3 technical sub-group (13)
- SG4 main stakeholder group (36)
- Registered mailing list of wider stakeholders (179)
- Stakeholder lists compiled from working group participation and previous consultations of DG ENV and DG GROW (213)
- EU Green Public Procurement Advisory Group (28)

Stakeholders were furthermore invited to act as multipliers to disseminate the questionnaire to other interested parties. This included, for example, the World Green Building Council (WGBC) who notified their European Regional Network which comprises 22 national Green Building Partners.

Part 1: Background of the respondents

Questions were asked in order to obtain a profile of the respondents to the consultation questionnaire – the organisation they represent, their professional background, their professional experience and the nature of their interest in the framework.

Below the responses for questions 1.4 – 1.7 are briefly presented and analysed.

Q1.4 What best describes your current role or professional background in the building sector

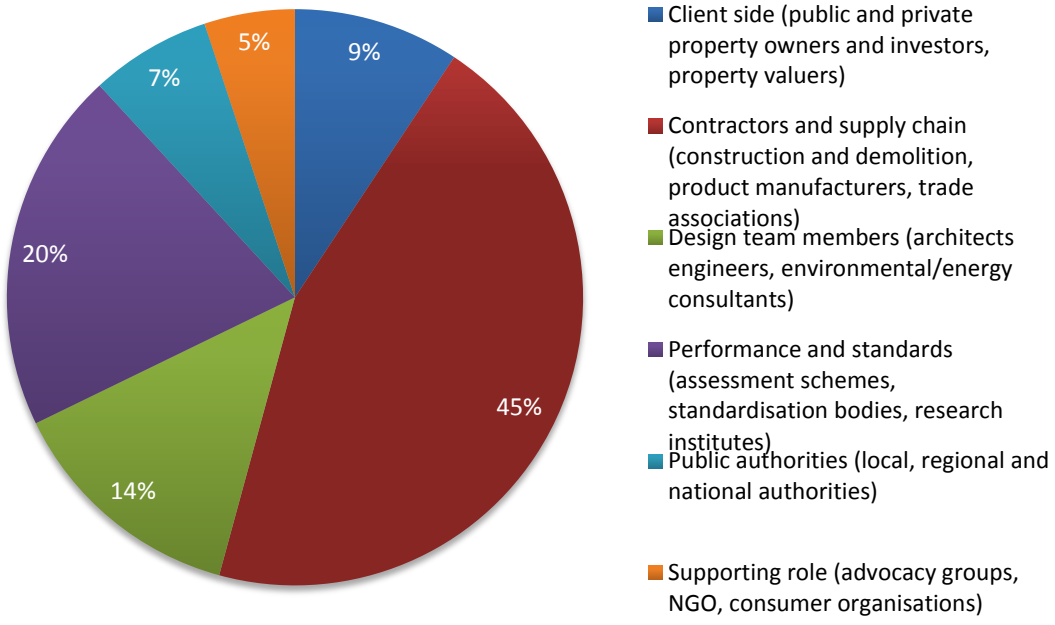

Figure 1.1 Simplified breakdown of the professional role of respondents

Figure 1.1 provides a breakdown of the respondents, grouped into six broad categories. It can be seen that representation is dominated by the categories *'contractors and their supply chain'*,*'performance and standards'* and *'design team members*'. This broadly accords with the background of the stakeholders that have shown the most interest in the study to date.

The *'contractors and supply chain'* category consisted mainly of construction product manufacturers or their trade associations. Around a third of respondents categorised as *'performance and standards'* represented building assessment schemes, with the rest consisting of research institutes and standardisation bodies.

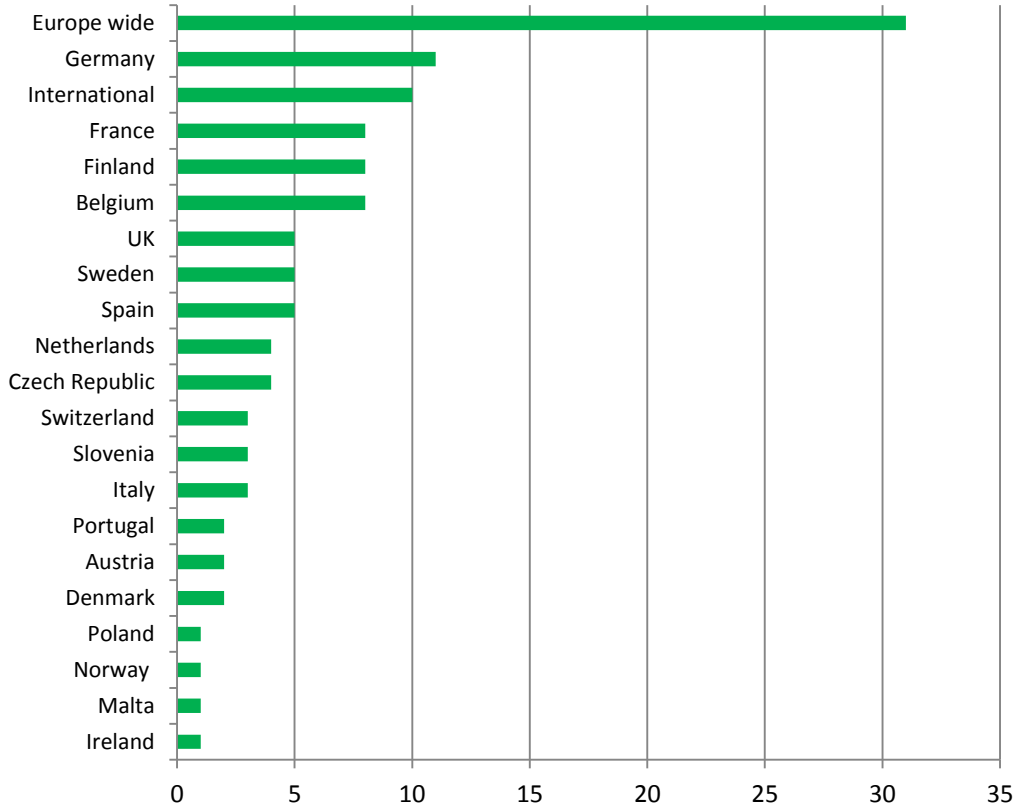

Figure 1.2 Breakdown of respondents by nationality

Figure 1.2 provides a full breakdown of the respondents by their nationality. A significant proportion of the respondents were from organisations working at European or International (non-EU) level (35%).

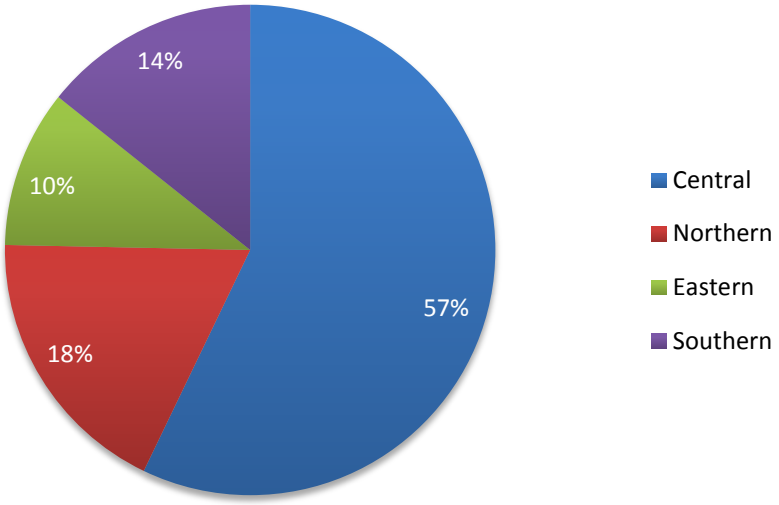

Figure 1.3 Split of Member State representation by broad area of Europe

19 Member States were represented and their geographical location in Europe is presented in Figure 1.3 [1]. The Member States with the most respondents were Germany, Belgium, Finland and France. These Member States in total accounted for 30% of the respondents. Despite their large building stock, Eastern and Southern Europe in particular were under-represented.

In terms of the relationship between geography and professional category, figure 1.4 provides an overview. Some clear relationships can be observed. For example, those respondents representing *'contractors and supply chain'* mainly originate from Central EU or are organisations that work at a European level, with the latter taking the form of large companies or trade associations. *'Performance and standards'* are almost exclusively from Southern and Central EU. Southern and Eastern EU have no *'client side'* representation, and Southern EU no *'contractors and supply chain'* representation.

[1] *Central EU:* France, Germany, Austria, Netherlands, Belgium, Luxembourg, UK, Ireland,; *Northern EU:* Denmark, Sweden, Finland, Latvia, Estonia Lithuania; *Eastern EU:* Poland, Czech Republic, Hungary, Slovakia, Slovenia, Bulgaria, Romania; *Southern EU:*Spain, Portugal, Italy, Greece, Cyprus, Malta

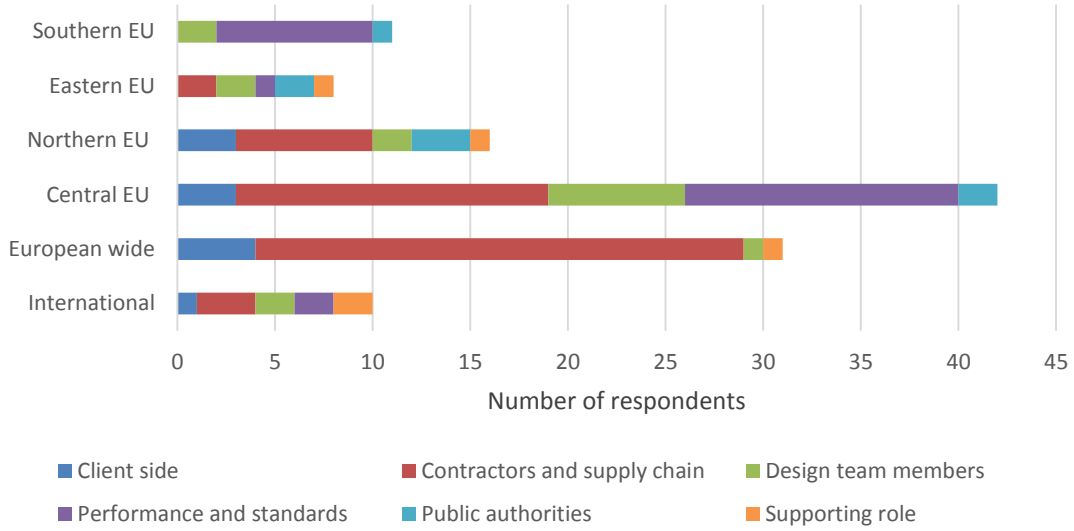

Figure 1.4 Breakdown of professional categories by geographical area

Q1.5 How many years have you worked in the building sector?

The majority of respondents (56%) have more than 15 years' experience in the building sector. 41% had between 5 and 15 years and 9% less than 5 years. This suggests the potential for experienced judgement of the proposals, but this would not account for any professional bias towards certain solutions or materials.

Q1.6 Which of the following building types have you worked with?

Of those respondents that claimed experience with office building projects, 71% had experience with new-build projects and 60% with renovation projects.

Of those respondents that claimed experience with residential building projects, 74% had experience with new-build projects and 69% with renovation projects.

Overall 77% of respondents claimed experience with both office and residential building projects. 16% did not claim any experience. This suggests that in general respondents had a balance of experience with both office and residential buildings.

Q1.7 During the last five years, what experience have you had in your professional life?

102 respondents completed this question, representing the full range of different professional roles from Q1.4.

Amongst the respondents, it can be seen in figure 1.5 that there is significant experience in the research, analysis and auditing of buildings, while a limited number of respondents have direct experience as a client, contractor, design team member or property manager.

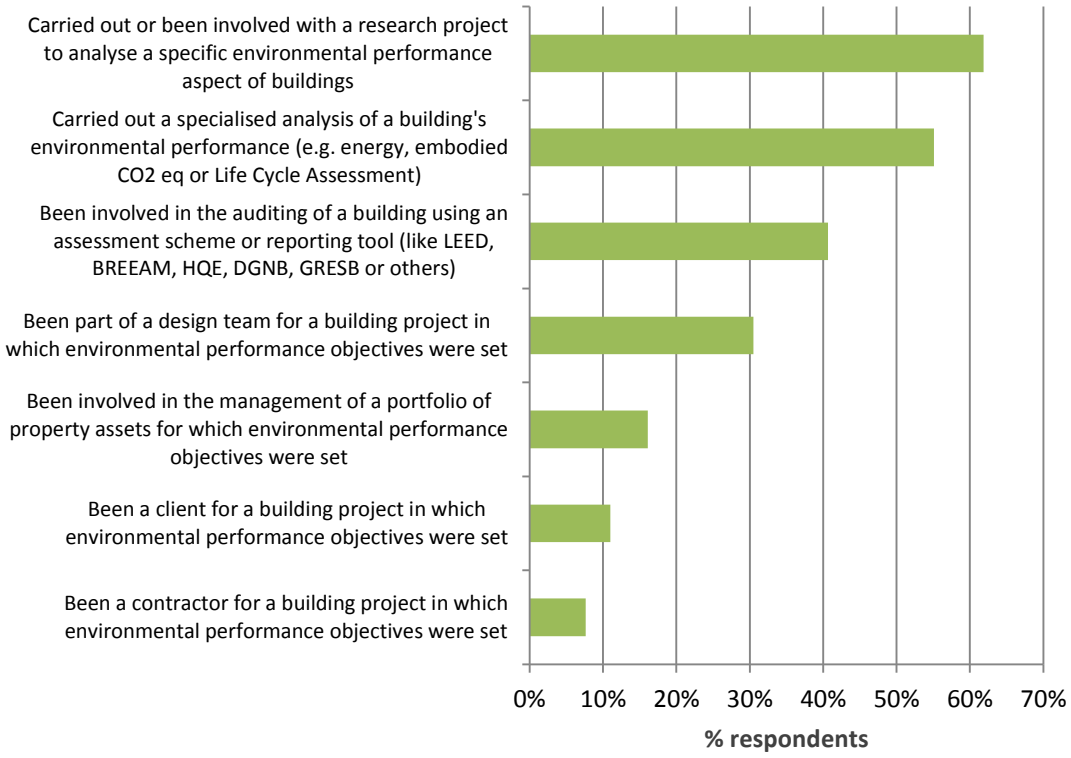

Figure 1.5 Professional experience of respondents in the last five years

Part 2 'How the framework of indicators could work'

In this part of the questionnaire, stakeholders were asked for their views on how the framework of indicators as a whole could work.

Questions were posed in relation to the structure of the indicator framework and themes that had emerged from the background study.

2.1 The structure of the indicator framework

Q2.1 Which options best reflect your opinion about the following different indicator frameworks?

Four options were presented describing how the framework could work, with respondents invited to rank their opinion of each option from 'strongly agree' through to 'strongly disagree'. Each option was distinctly different in order to explore respondents' views. A box inviting open comments was also provided.

The options ranged from a framework of 'basic' core indicators with the same ambition level, to a framework that also includes 'advanced' indicators and optional additional indicators for use by more experienced professionals.

The results are presented in figure 2.1 and a detailed breakdown of the results by professional category is provided in Annex 1.

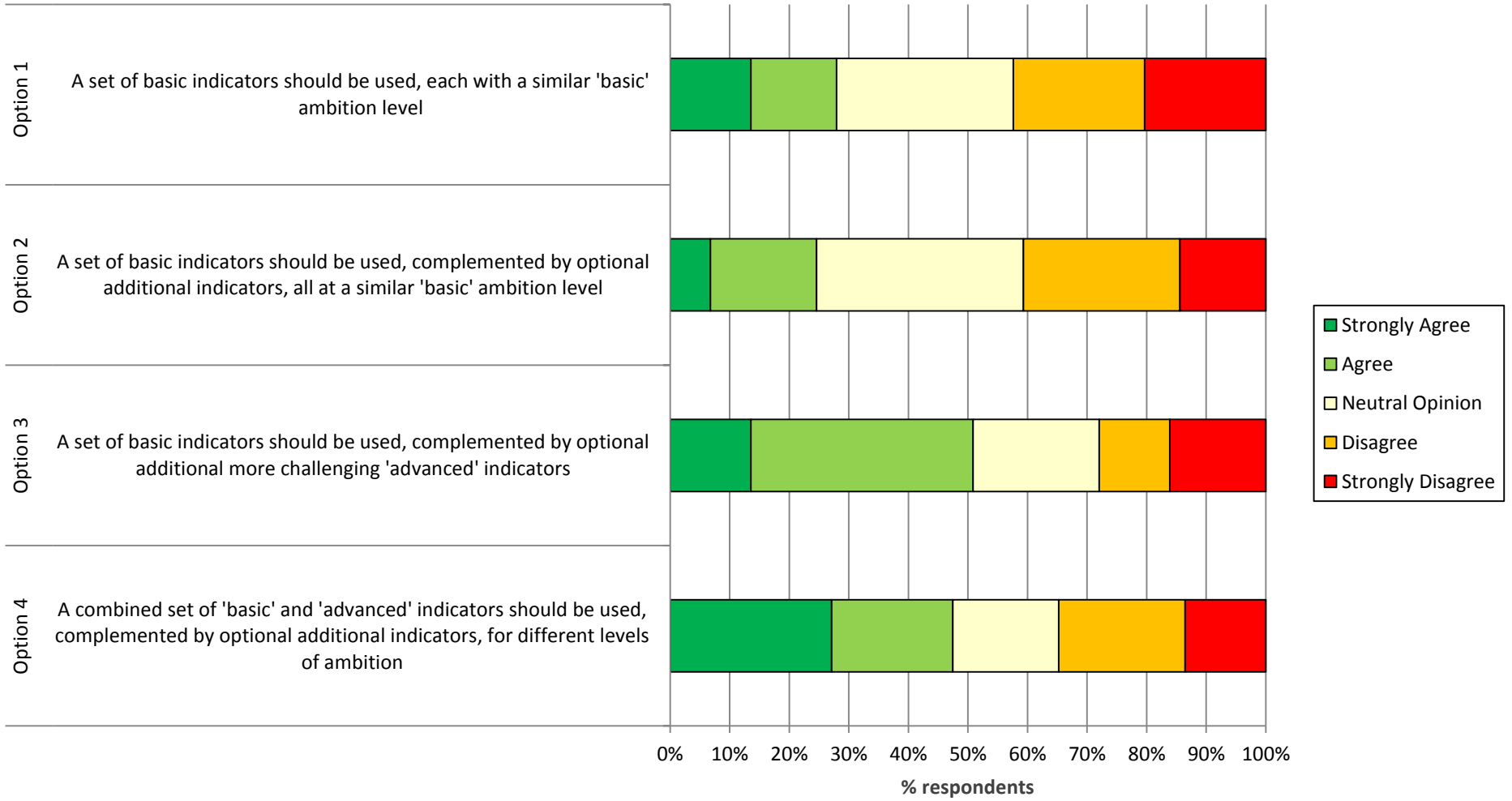

Figure 2.1 Ranked opinions on the Q2.1 indicator framework options

Analysis of the ranked response:

On balance, the general concept of combining '*basic*' and '*advanced*' indicators in some form or other was supported.

Option 3 received the greatest absolute approval rating (51%). This option was supported by the '*performance and standards'* and '*public authorities'* respondent groups while others showed a split opinion.

Within the response to the fourth option, '*client side*' respondents were strongly against while the '*design team'* and '*performance and standards'* groups were in favour. Such a split is perhaps understandable since clients want clarity and consistency in this area whereas design teams and performance and standards respondents may be more interested in possible new approaches and allowing these to be potentially incorporated into the indicator framework when ready.

Analysis of the open response:

48 open responses were provided. 23 of these respondents provided responses that were directly relevant to the question, and of these the majority (15 out of 23) were from the category *'contractors and supply chain'*. A ranking of the main aspects cited by the 23 respondents is provided in Tables 2.1 and 2.2

16 respondents referred to an indicator framework based on Life Cycle Assessment (LCA) and 7 to an indicator framework based on LCA and Life Cycle Costing (LCC) combined. 4 elaborated further on how LCA and/or LCC could form the basis for such a framework (*see Table 2.2)*. The majority of those putting forward an LCA or LCA/LCC-based approach were from the *'contractors and supply chain*' category.

The remaining responses covered a range of aspects relating to ambition level, scope and accessibility. These aspects were put forward by fewer respondents, so would somehow need to be addressed within a broader LCA or LCA/LCC approach.

Table 2.1 Open responses to the Q2.1 indicator framework options

Cited aspects	**Number of respondents**
1.1 Call for an LCA-based 'core' approach	9
1.2 Call for an LCA and LCC-based 'core' approach	7
2.1 A core framework based on the three pillars of sustainability	2
2.2 Start with the most important 'core' indicators relating to energy, environment and indoor climate	1
3.1 A limited number of indicators that are all 'fit for purpose' and create incentives for the market to provide the necessary information, supplemented by 'focus areas for attention'	1
3.2 Start with 2-3 basic indicators, with advanced indicators only introduced if they create real added value	1
3.3 Options should be given for each indicator that provide different ambition levels	1
3.4 Advanced indicators should be comprehensive but remain optional	1
3.5 Definitions are needed for 'basic' and 'advanced' indicators	1
4.1 Core indicators shall meet minimum requirements for their suitability	1
4.2 Indicators should not require data from industry that is not available today	1
5.1 There should be a focus on the use phase of a building	1

The LCA/LCC related responses in table 2.2 introduce the idea of distinguishing between more or less complex impact category indicators or indicators that measure 'direct' performance – with reference, for example, to indicators that measure the 'direct' performance of a building. The latter could be one way of making the link between the call from some respondents for more basic indicators and from others for the use of more advanced methodologies such as LCA.

Table 2.2 Further more specific open responses relating to LCA and LCC

Cited aspects	**Number of respondents**
An LCA-based 'core' approach with simplified reporting	1
An LCA-based 'core' approach that recognises there are basic and advance impact category indicators	1
An LCA-based approach would be more complex to begin with but would simplify the framework	1
An LCA and LCC-based 'core' approach with other indicators used to measure the 'direct' performance of building for owners and occupants	1

Q2.2 How many indicators do you think there should be in total?

Five options were presented for the number of indicators that could be in the framework, with respondents invited to make a choice ranging from *'6 or less'* to *'as many as required'*.

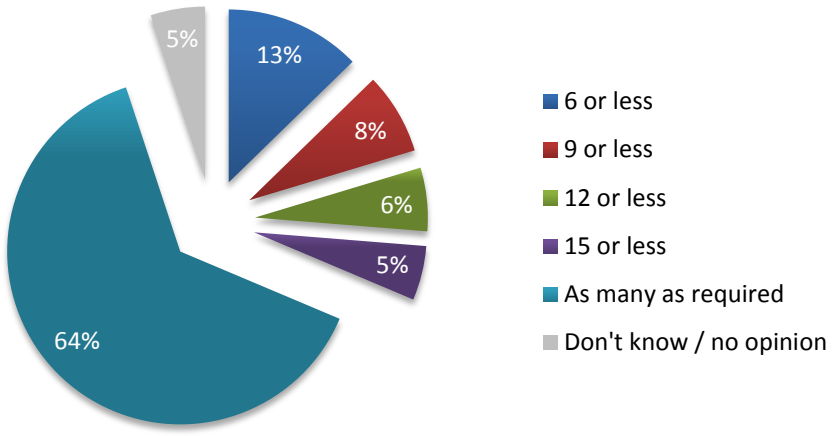

Figure 2.2 Opinions on how many indicators the framework should have

Analysis of the response:

The majority (64%) of respondents chose *'as many as required'* as their preference. Of these respondents, 47% were from *'contractors and supply chain'* and 23% from 'performance and standards'.

2.2 Themes emerging from the background study

2.2.1 Theme 1: Encouraging professional development and life cycle thinking

Q2.3 To what extent should the indicators require differing levels of expertise?

Three options were presented for how the framework could reflect different levels of professional expertise, with respondents invited to choose the option most closely reflecting their opinion. The results are presented in figure 2.3 and 2.4.

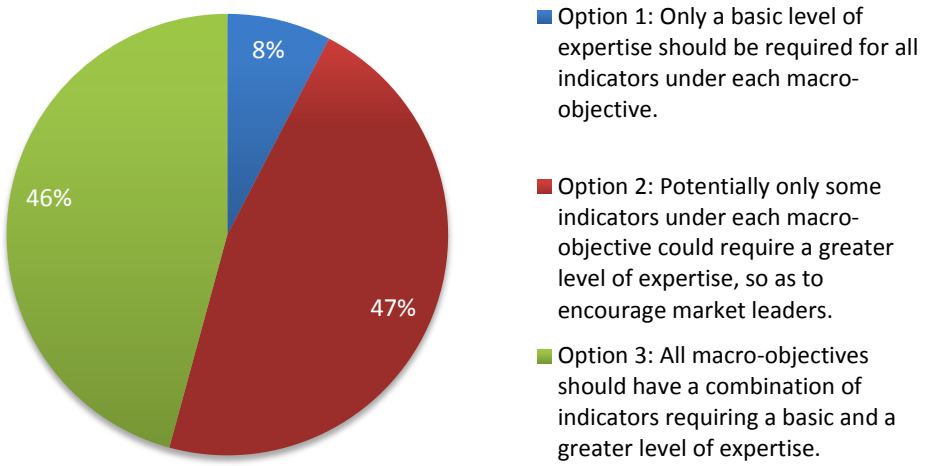

Figure 2.3 Opinions on to what extent the framework should require differing levels of expertise

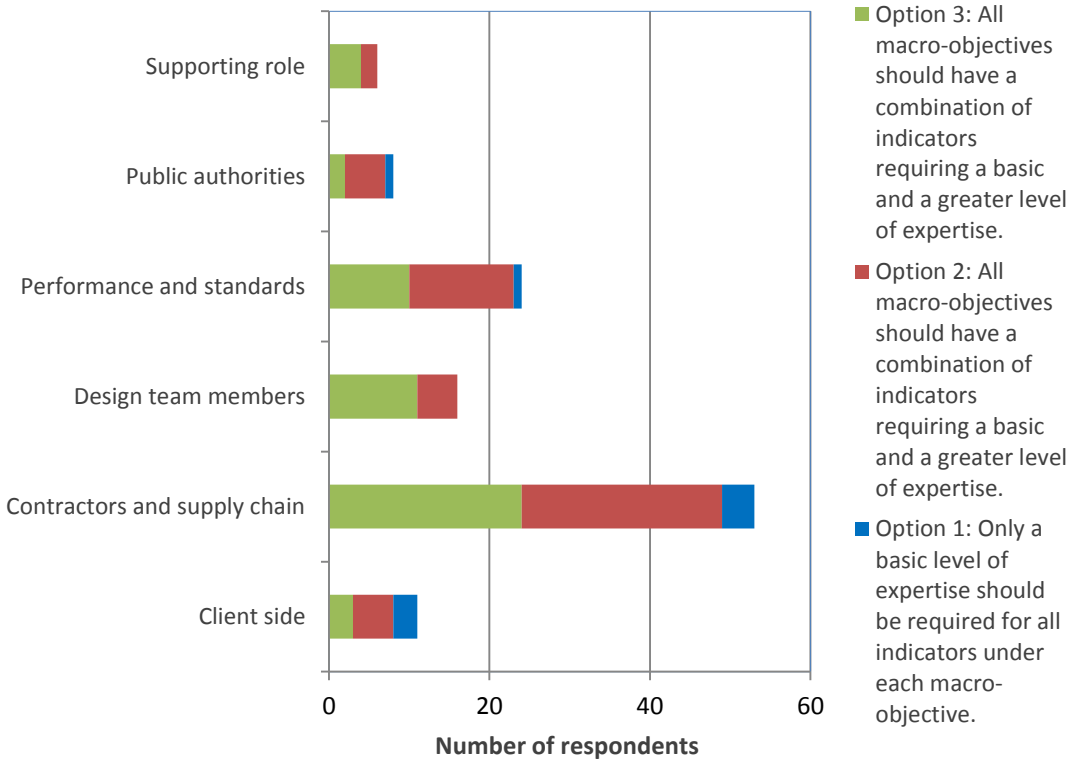

Figure 2.4 Breakdown of the options as selected by each professional category

Analysis of the response:

The majority of respondents supported the concept of indicators with both 'basic' and 'greater' levels of expertise. It is to be explored how this could be implemented in a way that doesn't overtly imply a two tier framework, and which encourages as opposed to puts off professional development.

2.2.2 Theme 2: Indicators to measure intensity of resource use

Q2.4 Would there be value in offering additional, more targeted indicators to measure intensity of resource use?

Three options were presented for how the framework could offer more targeted indicators, with respondents invited to choose the option which most closely reflected their opinion. The results are presented in figure 2.5 and 2.6.

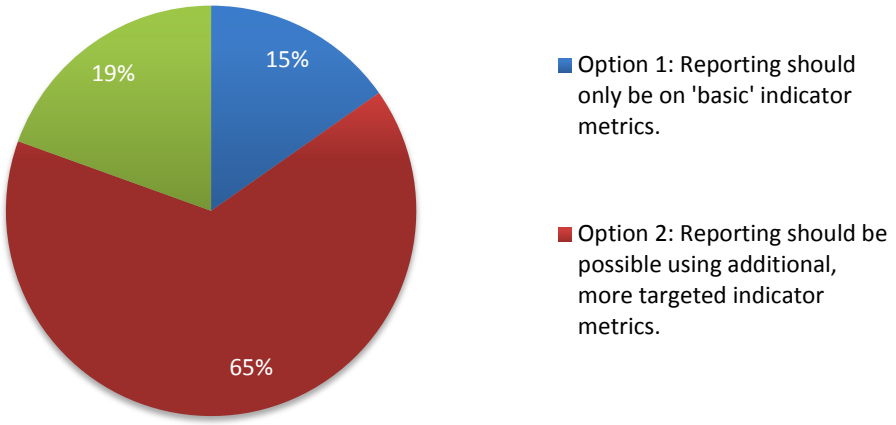

Figure 2.5 Opinions on to what extent the framework should offer more targeted indicators to measure intensity of resource use

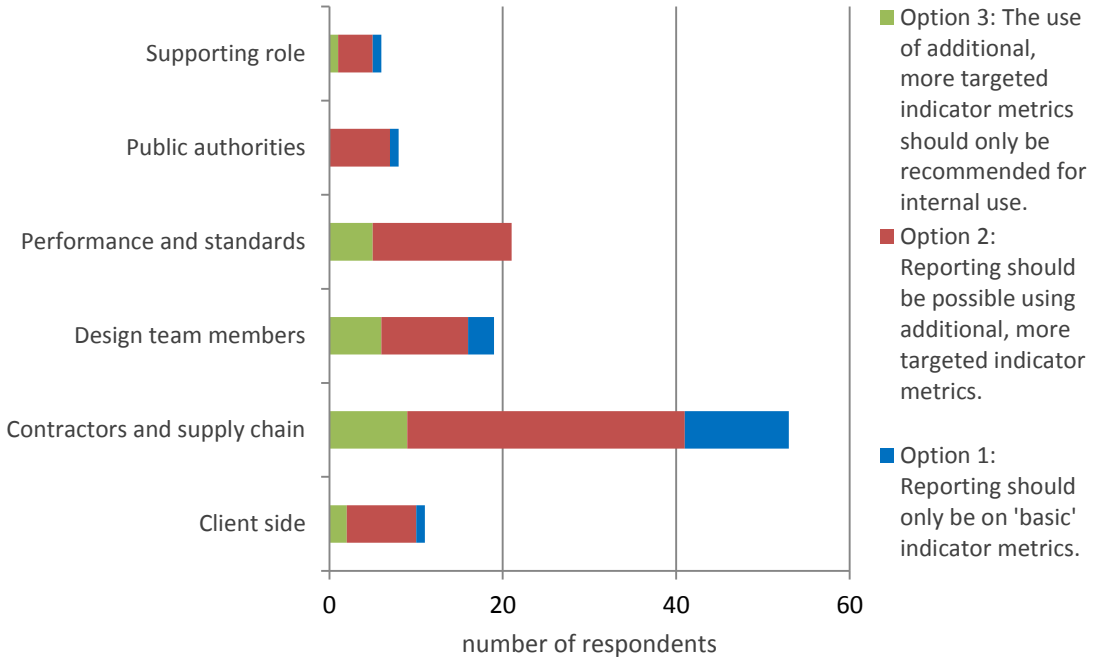

Figure 2.6 Breakdown of the options as selected by each professional category

Analysis of the response:

The majority of respondents supported the concept of additional, more targeted indicator metrics. These could be presented alongside the core indicator, but it is to be explored whether both the core indicator and additional indicators would then need to be reported.

Option 2 was particularly popular with *'performance and standards'* and *'client side'*, potentially reflecting the experience with the use/development of more targeted metrics. Option 1 was mainly favoured by *'contractors and supply chain'* and *'design team members'*, possible reflecting a preference for simplification.

2.2.3 Theme 3: Existing standards and methodologies

Q2.5 To what extent could narrower life cycle stage boundaries be defined in order to encourage greater reporting on life cycle GWP, LCA and LCC?

Three options were presented for how life cycle stage boundaries could be addressed, with respondents invited to choose the option which most closely reflected their opinion. The results are presented in figure 2.7 and 2.8.

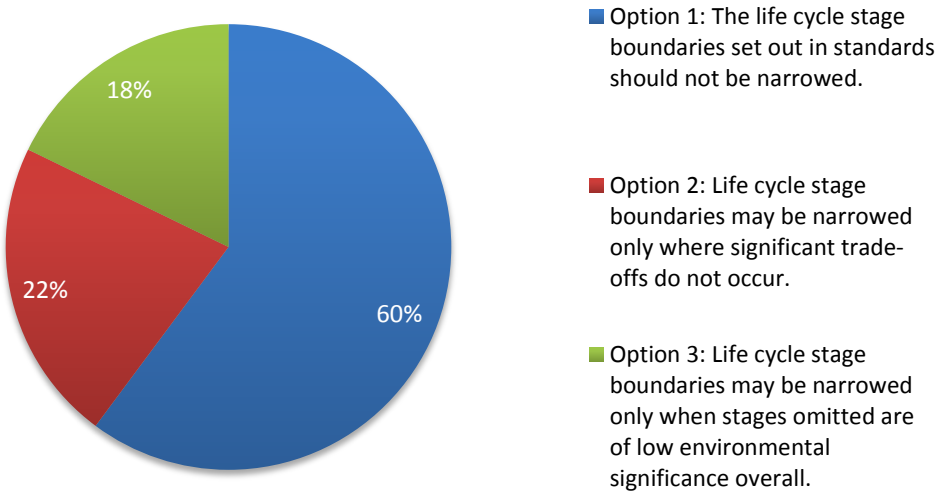

Figure 2.7 Opinions on to what extent the framework could use narrower life cycle boundaries

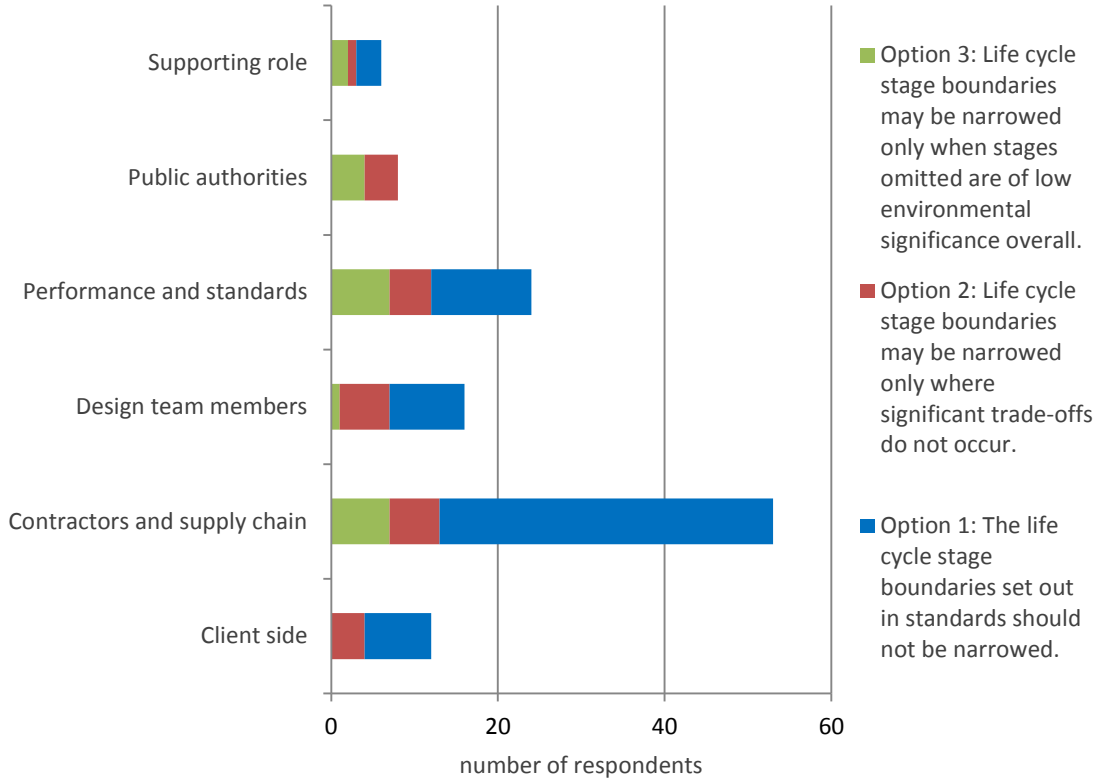

Figure 2.8 Breakdown of the options as selected by each professional category

Analysis of the response:

The majority of respondents considered that the life cycle boundaries set out in standards should not be narrowed. This would imply, for example, that all life cycle stage modules of EN 15978 – as presented in the indicator 1.2 (operational and embodied GWP) *'option 2'* proposal and the indicator 2.1 (cradle to grave LCA) proposal – should be reported on.

The majority of those choosing Option 1 were from the professional category *'contractors and supply chain'.* All other categories apart from *'public authorities'* also selected Option 1. This majority may reflect a general awareness of the potential effect of trade-offs between life cycle stages. Option 2 was chosen by all professional categories, supporting the previous statement, albeit less so by those in a *'supporting role'*.

Q2.6 To what extent could a narrower building component scope be defined in order to encourage greater reporting on life cycle GWP, LCA and LCC?

Three options were presented for how a building component scope could be addressed, with respondents invited to choose the option which most closely reflected their opinion. The results are presented in figure 2.9 and 2.10.

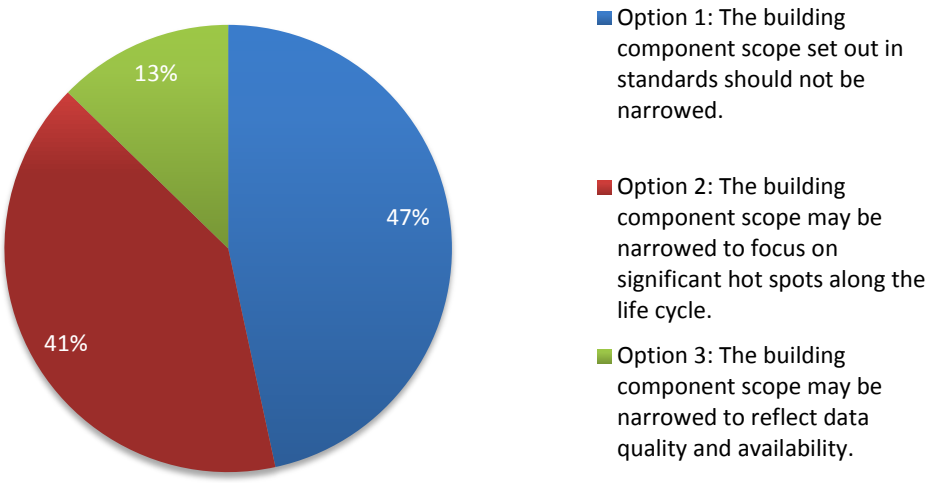

Figure 2.9 Opinions on to what extent the framework could use a narrower building scope

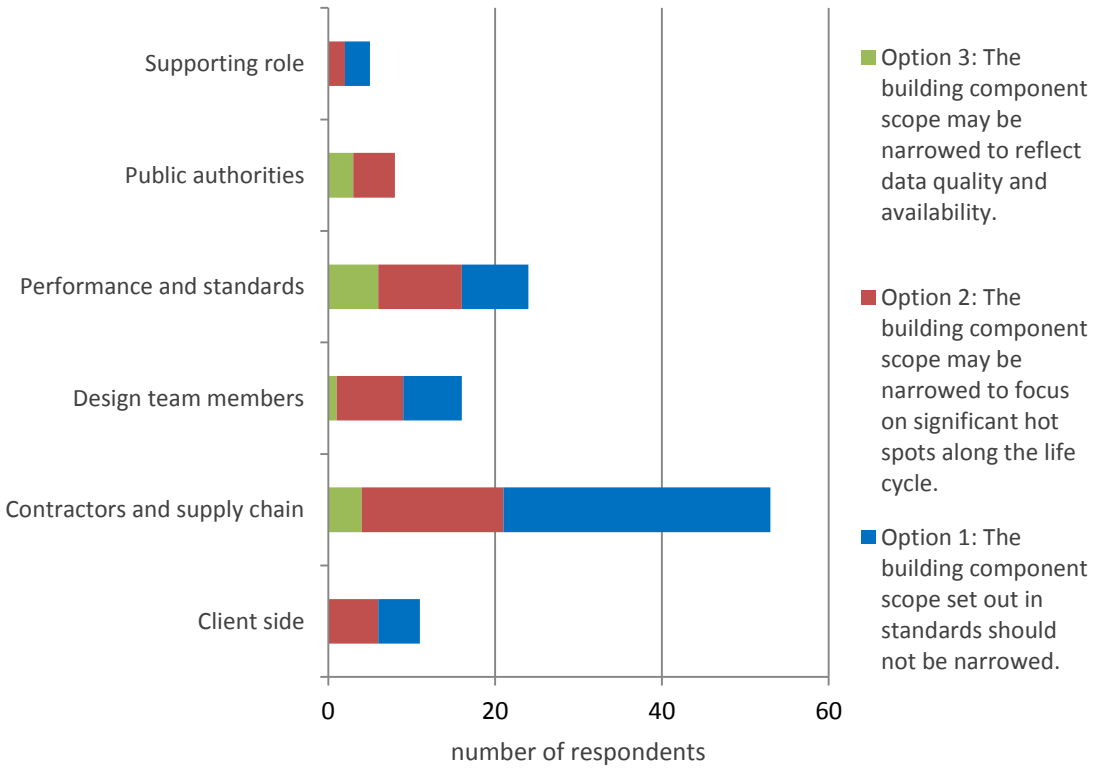

Figure 2.10 Breakdown of the options as selected by each professional category

Analysis of the response:

The majority of respondents (52%) supported the concept that the building component scope may be narrowed, but for differing reasons. The majority of those choosing Option 1 were from the professional category *'contractors and supply chain'* and, notably, there was no *'public authorities'* support for this option. Option 2 was the most popular choice of respondents from the *'client side'*, *'design teams'*, 'performance and standards' and *'public authorities'* categories.

The potential to narrow the scope was presented as a practical option to make the indicator proposals 1.2 (operational and embodied GWP) proposal and the indicator 2.1 (cradle to grave LCA) more accessible. It is to be explored how the combination of evidence for hot spots and data availability can be used to finalise a scope definition.

2.2.4 Theme 4: Data availability, quality and transparency

Q2.7 What should the approach be, given that data may be limited in quality/availability in some member states?

Four options were presented for how the issue of data quality could be handled, with respondents invited to choose the options which most closely reflected their opinion. The results are presented in figure 2.11 and 2.12

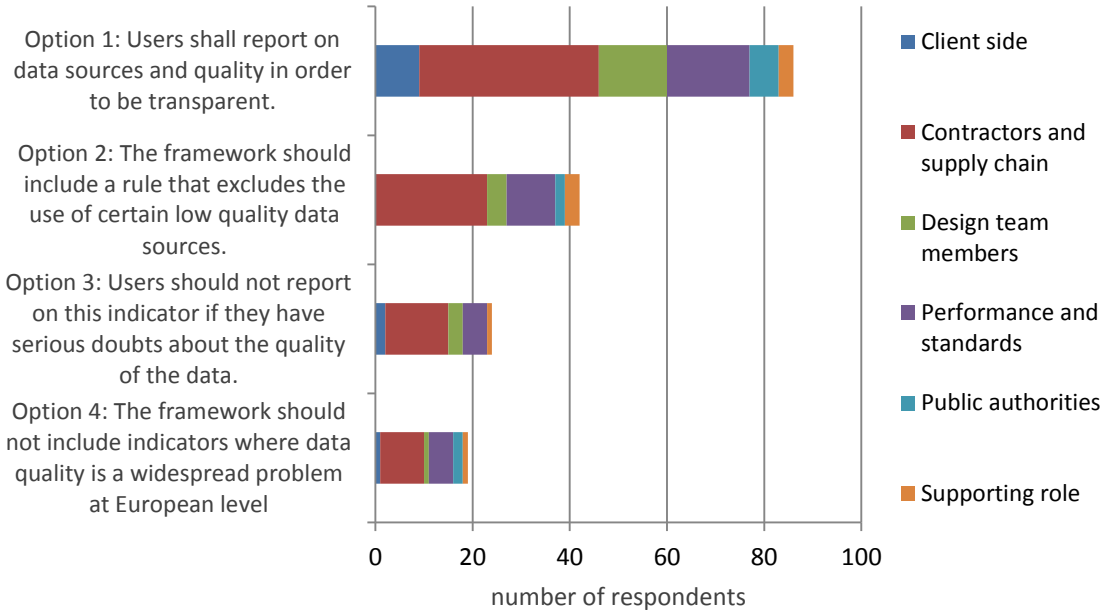

Figure 2.11 Number and breakdown of respondents selecting each option

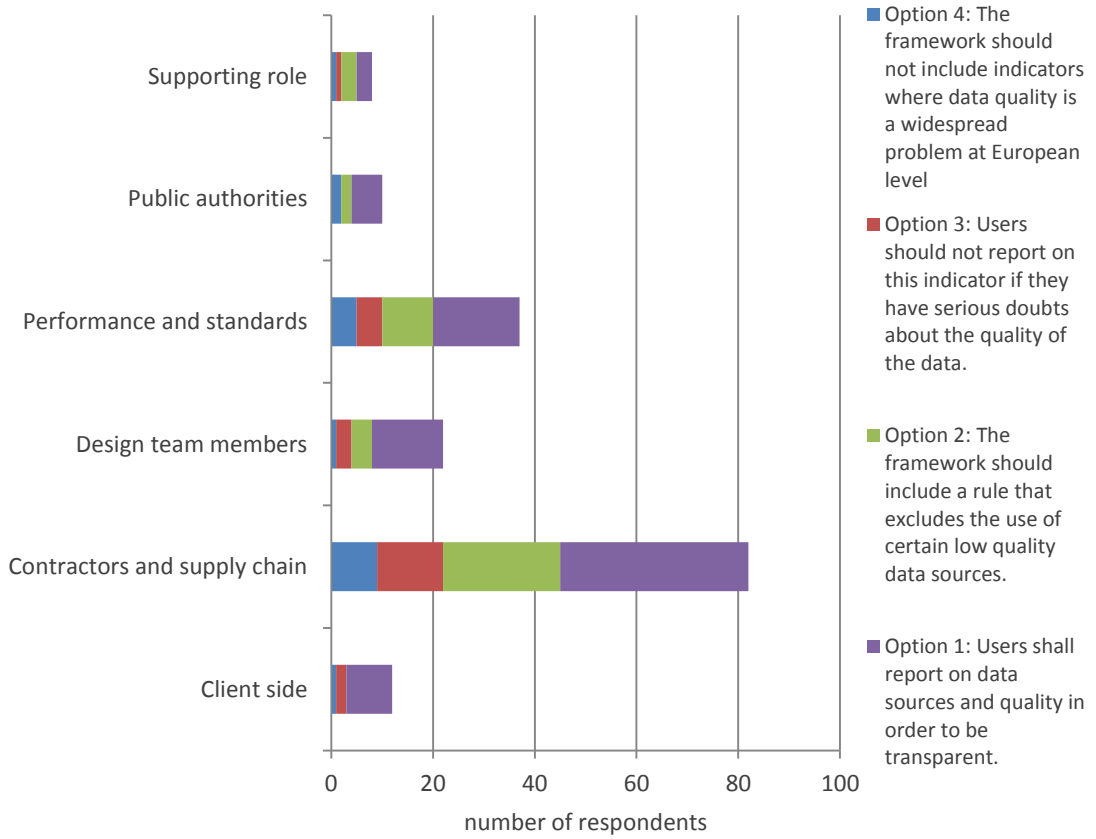

Figure 2.12 Breakdown of the options as selected by each professional category

Analysis of the response:

The majority of respondents (75%) supported the concept that data quality should be handled by reporting rules. Of those who selected option 1, 30% also selected option 2 and 15% option 3.

The profile of the respondents supporting option 1 was balanced, reflecting the overall mix of professional categories. However, of those selecting option 2, a much higher proportion were *'contractors and supply chain'*, a lower proportion *'design team members'* and none from the *'client side'*. This could suggest a preference on the supply chain side to encourage good quality data and on the project delivery side for still allowing the use of low quality data sources.

2.2.5 Theme 5: Comparability

Q2.8 At what level do you think it is most appropriate that the indicators support performance comparisons?

Five options were presented representing different spatial levels at which indicators could be comparable, with respondents invited to choose the options which most closely reflected their opinion. The results are presented in figure

2.13 and 2.14.

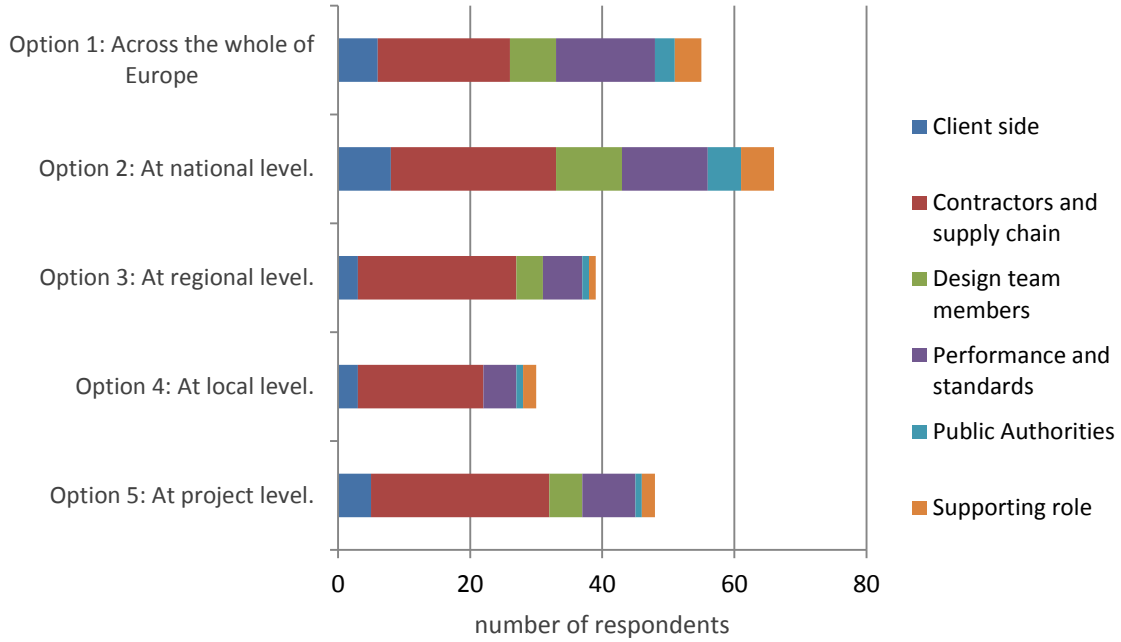

Figure 2.13 Number and breakdown of respondents selecting each option

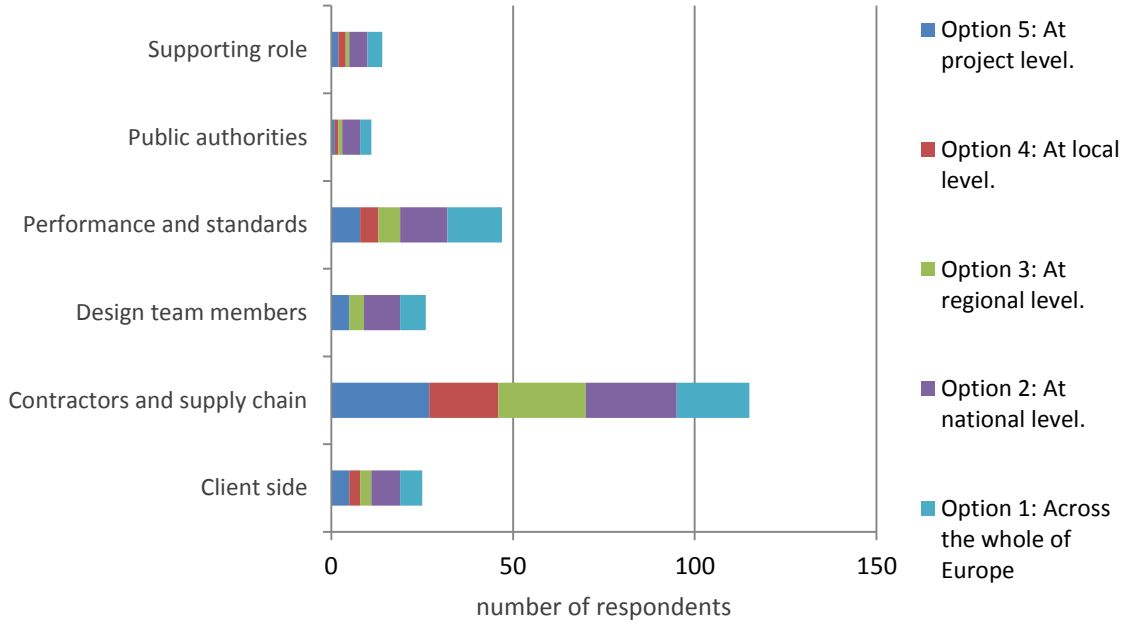

Figure 2.14 Breakdown of the options as selected by each professional category

Analysis of the response:

Based on the response, comparability will need to work at two levels – 1) at EU and Member State level and 2) project level. This is re-enforced by the fact that of those that chose *'at national level',* 47% also chose *'at project level'* and of those that chose *'across the whole of Europe',* 44% also chose *'at national level'*.

The profile of the respondents supporting option 2 was balanced, reflecting the overall mix of professional categories. *'Contractors and supply chain'* in particular made selections across all categories. Although this suggests a desire for

alignment of core indicators, it would appear to contradict a preference on the part of assessment schemes for the adaptation of criteria to national conditions.

2.2.6 Theme 6: Tracking performance along a projects life cycle

Q2.9 To what extent should the indicators allow for the tracking of quantifiable aspects of building performance from design through to post-occupation?

Three options were presented representing different project stages, with respondents invited to choose the options which most closely reflected their opinion. The results are presented in figure 2.15.

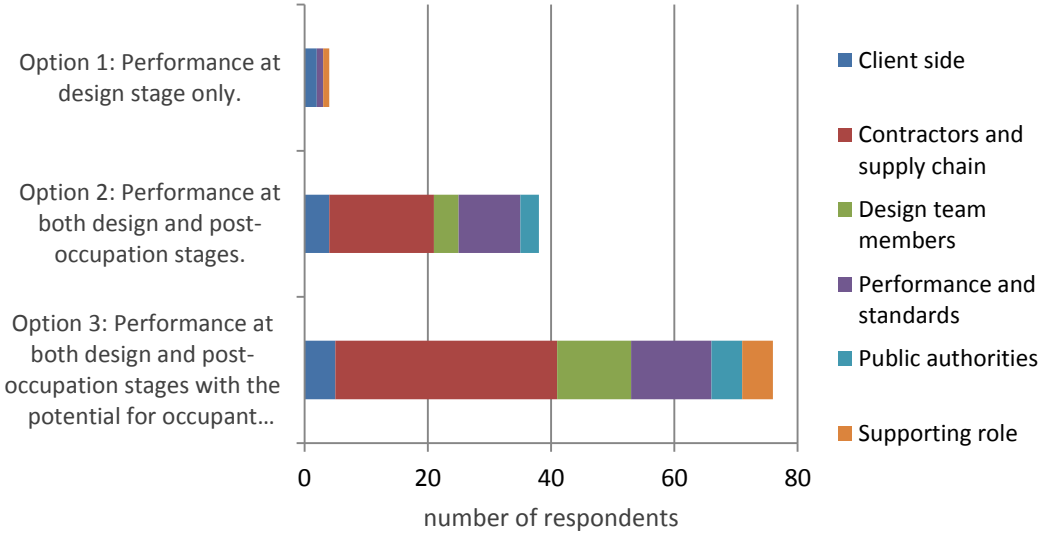

Figure 2.15 Number and breakdown of respondents selecting each option

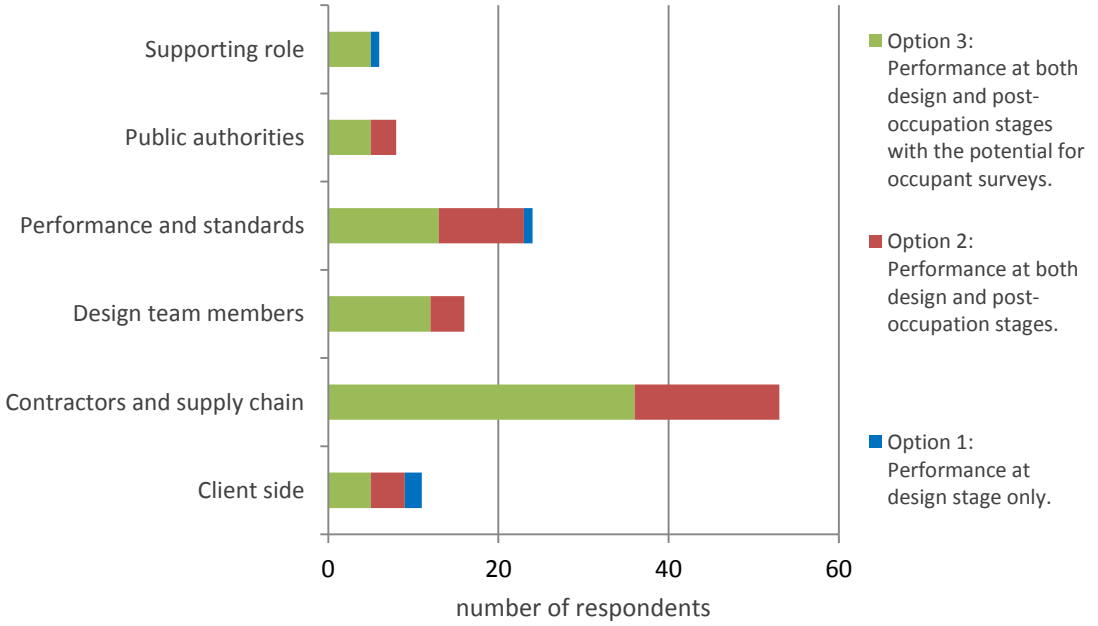

Figure 2.16 Breakdown of the options as selected by each professional category

Analysis of the response:

Based on the response, the framework should support the tracking performance from the design stage through to occupancy, with the option for qualitative performance measurement in the form of occupant surveys. This accords with a wider trend that can be observed towards a focus on the 'real' performance of buildings once they are occupied.

The profile of the respondents supporting option 1 reflected the overall mix of professional categories but there was a higher proportion of *'design team members'* and *'supporting role'* respondents. There was a lower proportion of *'performance and standards'* and *'client side'* respondents. This could suggest a focus by architects and consumer organisations on the performance of buildings upon occupation. On the other hand, respondents from assessment schemes may have tended towards a focus on design and as-built performance.

Part 3 'Questions relating to the initially proposed indicators

In this part of the questionnaire, stakeholders were asked for their views on suitability of the initial proposals for indicators.

Questions were divided into two broad types – those inviting a ranking of the overall suitability of each indicator proposal (3.1) and those inviting views on more detailed technical aspects of each indicator proposal (3.2).

3.1 General questions about all proposed indicators across all 6 macro-objectives

Q3.1 Please tick the options which best reflect your opinions about the suitability of each indicator to measure performance?

Respondents were invited to rank their opinion on the overall suitability of each individual indicator proposal. Four options were given – one negative, one neutral and two different grades of positive. The results for each indicator are presented in Figure 3.1 and a detailed breakdown of the results by professional category is provided in Annex 2

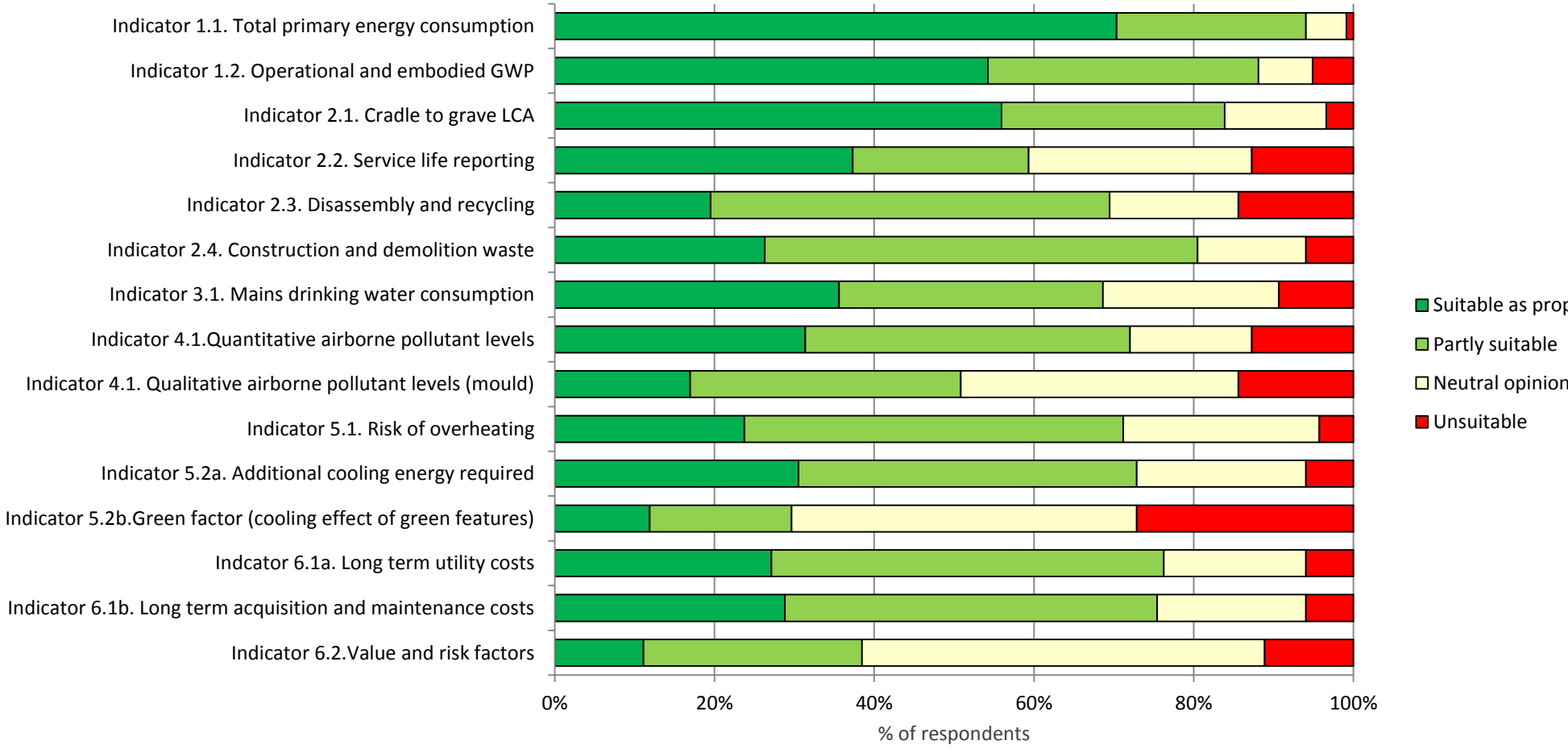

Figure 3.1 Ranking of the overall suitability of each individual indicator proposal

Analysis of the response:

It can be seen that all of the indicators proposed received a positive ranking (*'suitable as proposed'* or *'partly suitable'*) by the majority of respondents, apart from 5.2b and 6.2. Indicator proposals 1.1, 1.2 and 2.1 were considered the most suitable, whereas 5.2b was considered the most unsuitable, followed to a lesser extent by 2.2, 2.3 and 4.1.

5.2b and 6.2 generated a high neutral response, suggesting it was difficult for respondents to judge their suitability. This suggests that respondents either did not feel qualified to judge their suitability, or that not enough detail was provided upon which a judgement could be made (as suggested by the open responses received in relation to 6.2).

When comparing the responses of different categories of respondents for each indicator, one overall trend is that the responses from client side stakeholders were generally less positive than those of other groups. The exceptions were those relating to operational energy performance (1.1), service life reporting (2.2) and construction and demolition waste (2.4). Upon further examination of this category of respondents, which has a relatively small number (11), it can be seen that the distinction was caused by negative responses to this question from 3 or 4 respondents for the majority of the indicator proposals.

The proposed indicator 2.2 for design service life was strongly supported by design teams but perhaps not so well understood by stakeholders from the public authority and performance and standards categories, as reflected by a high number of neutral opinions. Neutral opinions from the performance and standards stakeholder group were dominated by individuals with a background in public research.

All stakeholder groups expressed high degrees of neutral opinions for the proposed indicator for qualitative reporting on the presence of mould, perhaps due to a general lack of experience in this specialised area. A similar trend was noted for the proposed indicator relating to the microclimate cooling effect of "green" features (5.2b) and for the proposed indicator relating to building value (6.2). However, there was also a much more significant degree of negative opinion relating to indicator (5.2b) than for the proposed indicators for mould (4.1) or for value (6.2).

Q3.2 Please enter a value of 1-5 which best reflects your opinions about the following statements for each indicator?

Respondents were invited to rank their opinion on aspects of the suitability of each individual indicator proposal. The four aspects considered were:

- 'is simple, accessible and easy to understand'
- 'is based on readily accessible and accepted methodology, tools and units'
- 'Supports comparison of building performance at project and local level'
- 'easy and cost effective to verify'

Five options were given – two grades of negative, one neutral and two grades of positive. The results for each indicator are presented in Figures 3.2.1-3.2.4.

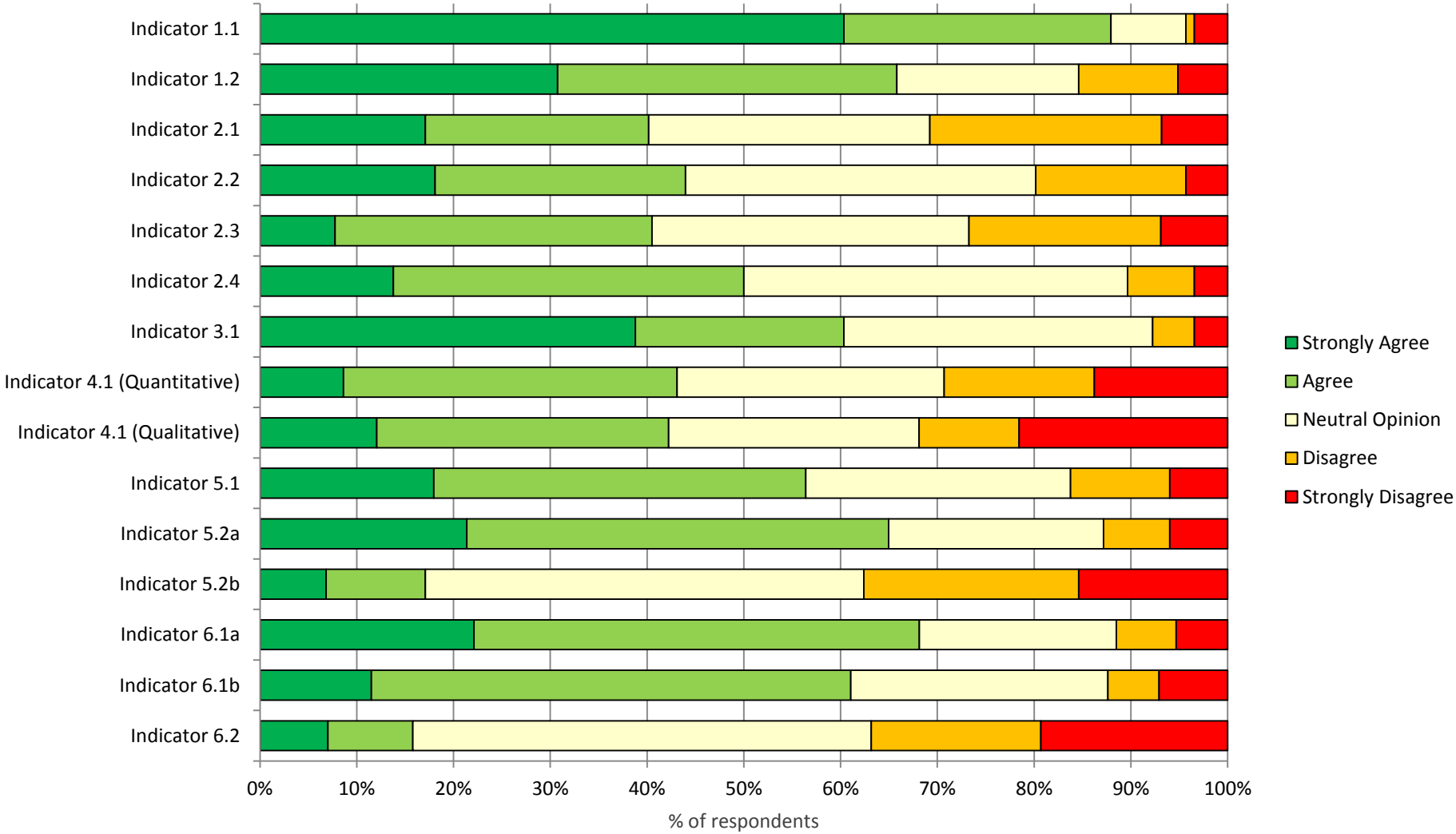

Figure 3.2.1 Ranking of '<u>is simple, accessible and easy to understand</u>' for each individual indicator proposal

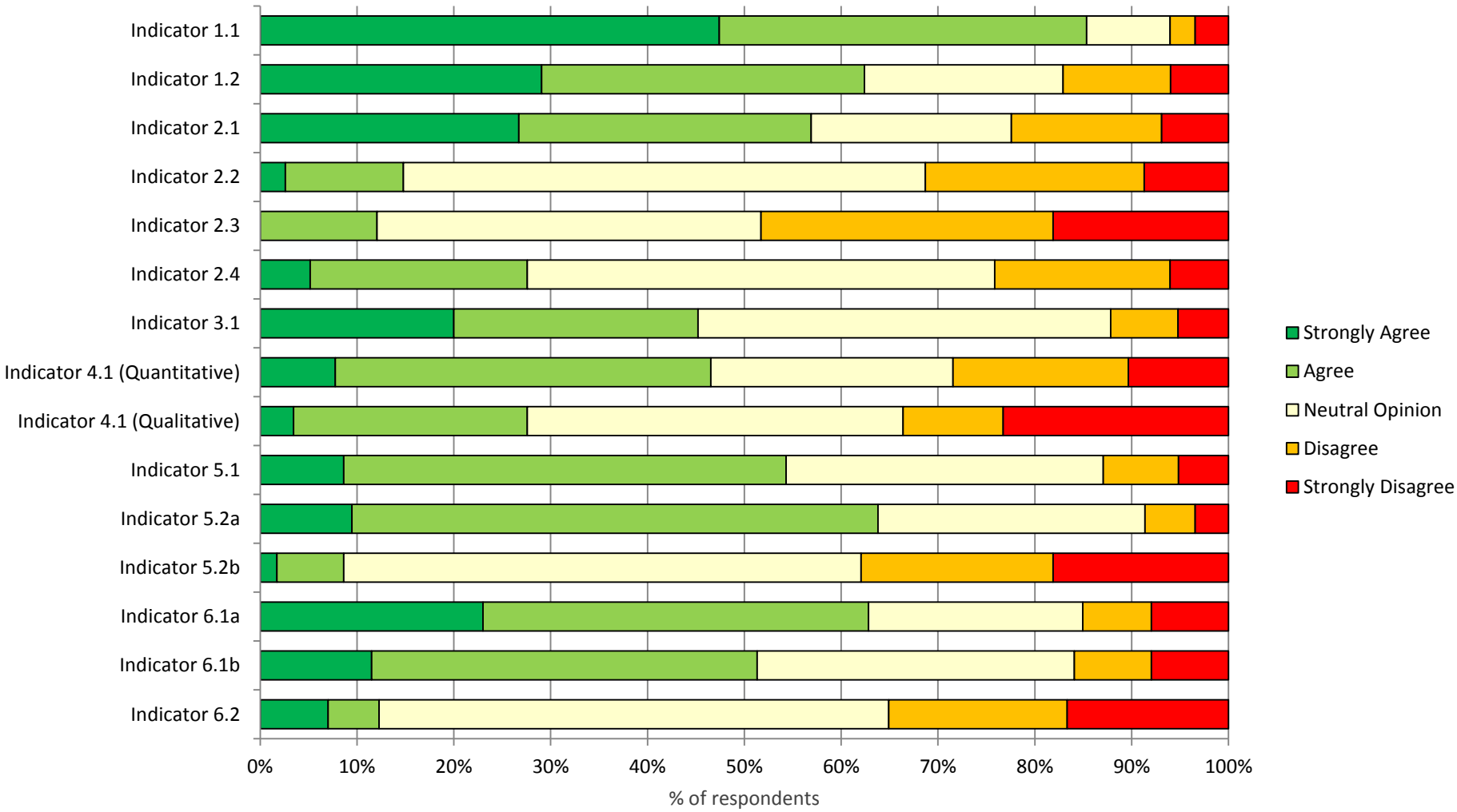

Figure 3.2.2 Ranking of '<u>is based on readily accessible and accepted methodology, tools and units'</u> each individual indicator proposal

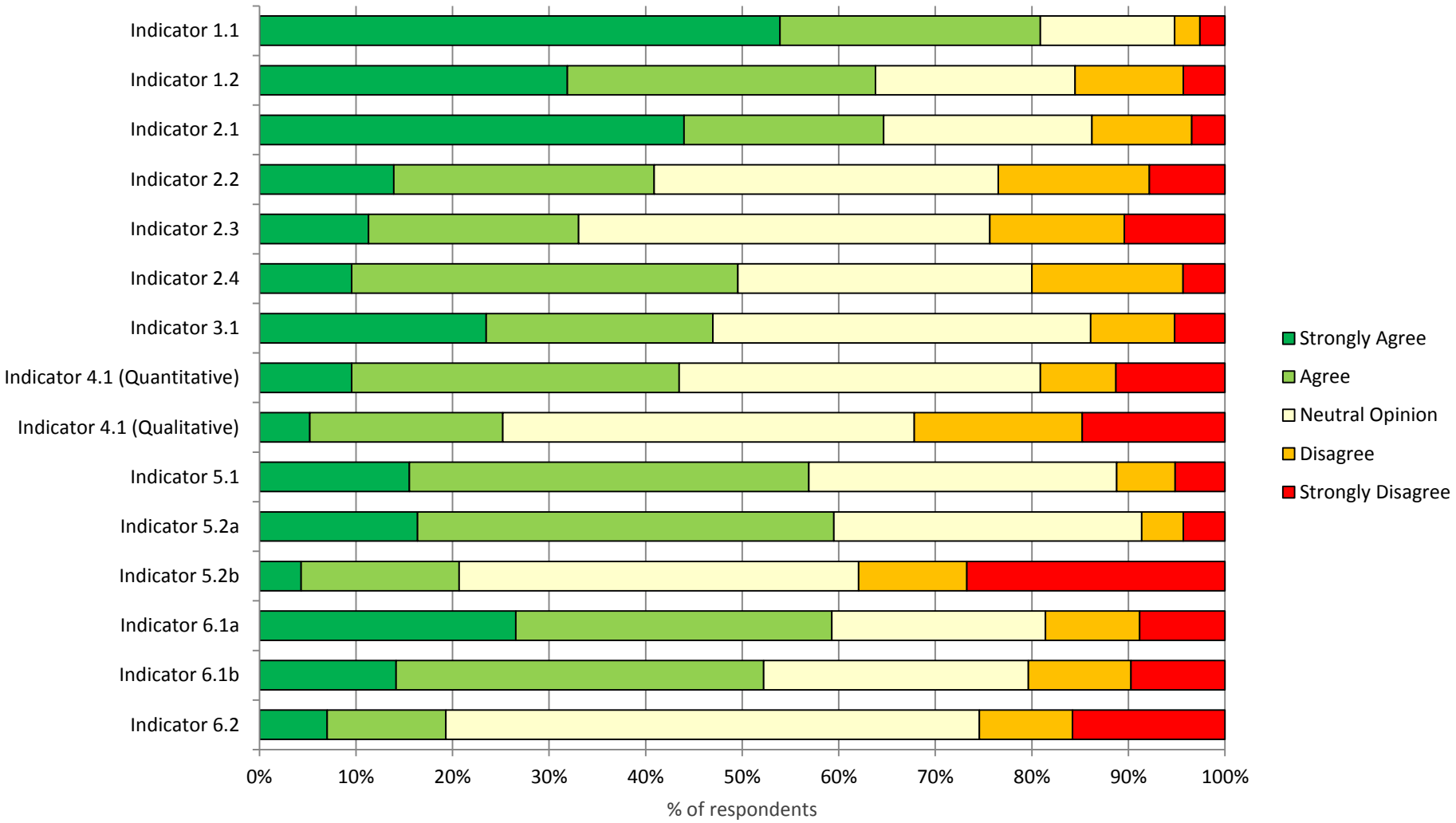

Figure 3.2.3 Ranking of 'supports comparison of building performance at project and local level' for each individual indicator proposal

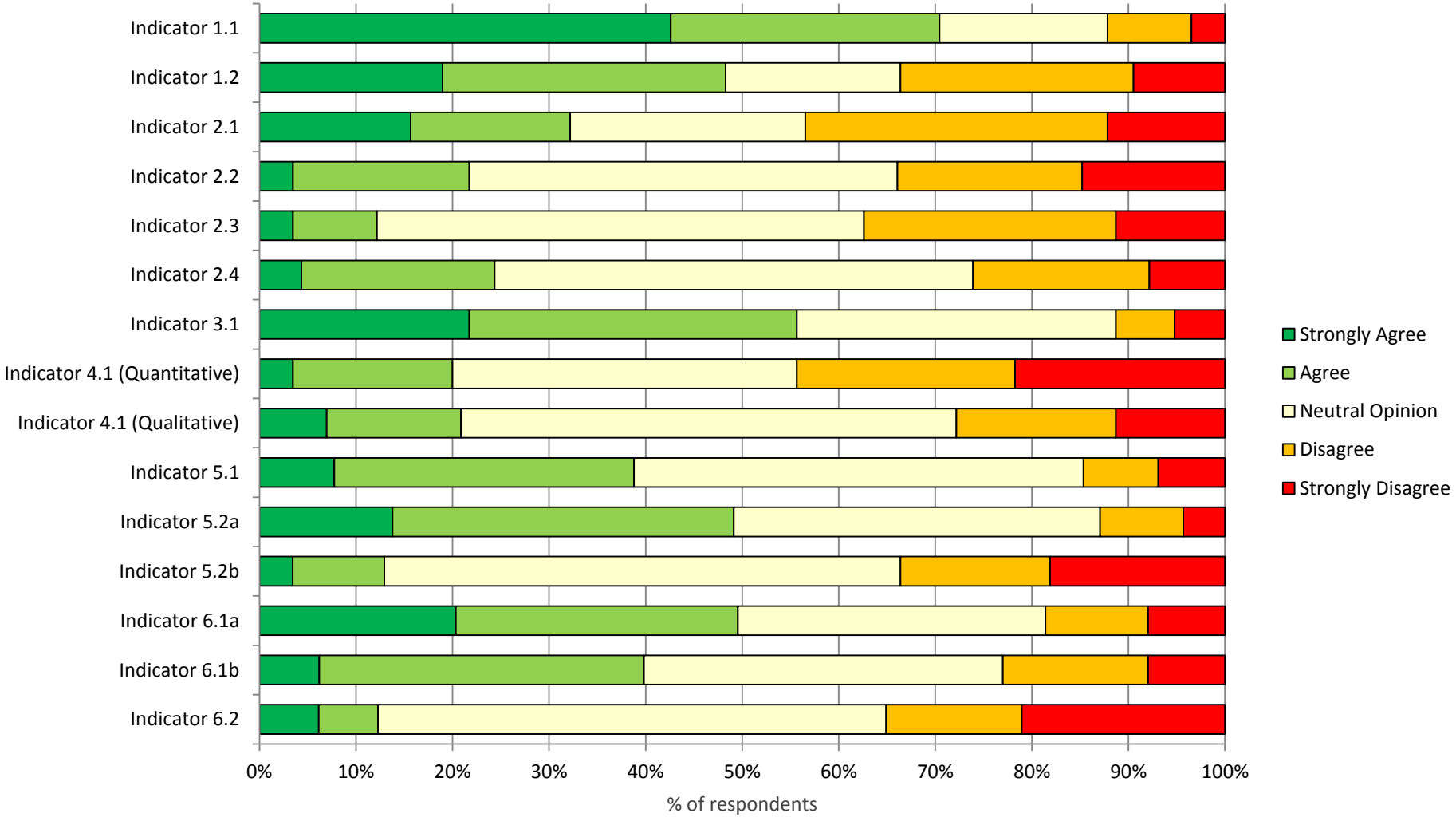

Figure 3.2.4 Ranking of '<u>easy and cost effective to verify'</u> for each individual indicator proposal

Overall, it can be seen that neutral responses across all aspects and indicators were relatively high, which may reflect the varying knowledge of the different respondents. The balance of views for each macro-objective are summarised below:

Macro-objective 1 indicators:

- The indicator of primary energy consumption (1.1) received a positive ranking ('agree' or 'strongly agree') by the majority of respondents across all four aspects.
- The indicator of operational and embodied GWP (1.2) was positively supported by the majority for three aspects but was not considered *'easy and cost effective to verify*'.
- A relatively high number of neutral opinions (19%) were expressed for 1.2 on the aspect of *'easy and cost effective to verify'* as well.

Macro-objective 2 indicators:

- None of the indicators received majority support across all four aspects.
- The best performing indicator was cradle to grave LCA (2.1), which received a positive ranking ('agree' or 'strongly agree') by the majority of respondents for two aspects – '*is based on readily accessible and accepted methodology, tools and units'* and '*supports comparison of building performance at project and local level'*.
- The indicator for construction and demolition waste (2.4) received majority support as being *'…simple, accessible and easy to understand'*
- The indicator for disassembly and recycling (2.3) received a relatively strong negative ranking (48%) for *'is based on readily accessible and accepted methodology, tools and units*'
- The indicator for service life reporting (2.2) received a high neutral rating for *'is simple, accessible and easy to understand'* (36%) and *'is based on readily accessible and accepted methodology, tools and units'* (54%)
- The indicator for construction and demolition waste (2.4) received a high neutral rating for *'is based on readily accessible and accepted methodology, tools and units'* (48%)

Macro-objective 3 indicators:

- The indicator of mains drinking water consumption (3.1) received a positive ranking ('agree' or 'strongly agree') by the majority of respondents across all aspects, with the exception of *'supports comparison of building performance at project and local level'*

Macro-objective 4 indicators:

- Neither the quantitative nor the qualitative airborne pollutant level indicators proposed received a positive ranking by the majority of respondents.
- Both parts of the indicator proposal received a high negative ranking for 'simple, accessible and easy to understand' (29%/32%)
- The qualitative indicator, which focusses on mould assessment, was not well received, with high negative rankings for
  - *'is based on readily accessible and accepted methodology, tools and units*' (34%),
  - *'supports comparison of building performance at project and local level'* (32%), and
  - *'easy and cost effective to verify'* (32%)

- The qualitative indicator also received a high neutral ranking for *'supports comparison of building performance at project and local level'*

Macro-objective 5 indicators:

- The risk of overheating (5.1) and additional cooling energy required (5.2a) indicators received a positive ranking ('agree' or 'strongly agree') by the majority of respondents across three aspects,
- The exception was *'easy and cost effective to verify'* for which both received a high neutral ranking.
- The green factor indicator (5.2b) did badly, receiving high negative and neutral rankings for:
  - *'is simple, accessible and easy to understand'* (38%/45%),
  - *'is based on readily accessible and accepted methodology, tools and units*' (38%/53%),
  - *'supports comparison of building performance at project and local level'* (38%/41%), and
  - *'easy and cost effective to verify'* (38% negative)

Macro-objective 6 indicators:

- The long term utility costs indicator (6.1a) and long term acquisition and maintenance costs indicator (6.1.b) indicators received a positive ranking ('agree' or 'strongly agree') by the majority of respondents across three aspects,
- The exception was *'easy and cost effective to verify'* for which support for 6.1b in particular was lower and for which both received a higher neutral ranking.
- The value and risk factors indicator (6.2) did badly, receiving high negative and neutral rankings for:
  - *'is simple, accessible and easy to understand'* (37%/47%),
  - *'is based on readily accessible and accepted methodology, tools and units*' (35%/53%),
  - *'supports comparison of building performance at project and local level'* (25%/55%), and
  - *'easy and cost effective to verify'* (25%/53%)

3.2 Specific questions about all proposed indicators across all 6 macro-objectives

3.2.1 Specific questions for proposed indicators that relate to macro-objective 1 (greenhouse gas emissions from building life cycle energy use)

Q3.3 For office buildings, which aspects of indicator 1.1 should be aligned with the proposed EU Voluntary Certificate Scheme (VCS)?

Five options were presented representing different aspects of the EU VCS proposals, with respondents invited to choose the options which most closely reflected their opinion. An open option was also provided, allowing for other additional aspects to be given.

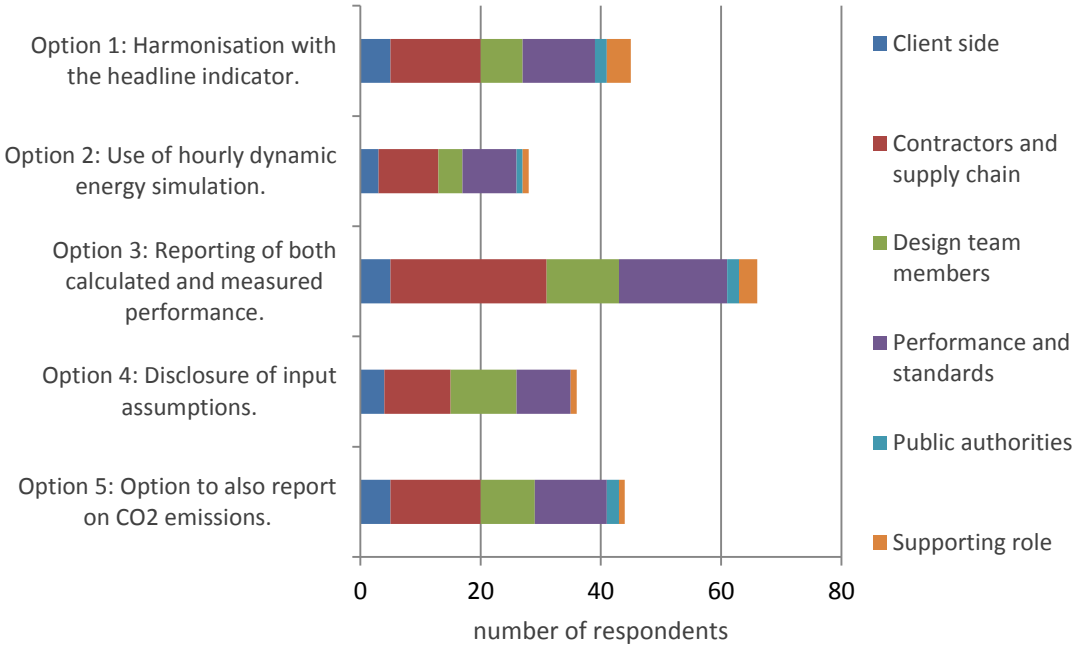

Figure 3.3 Number and breakdown of respondents selecting each option

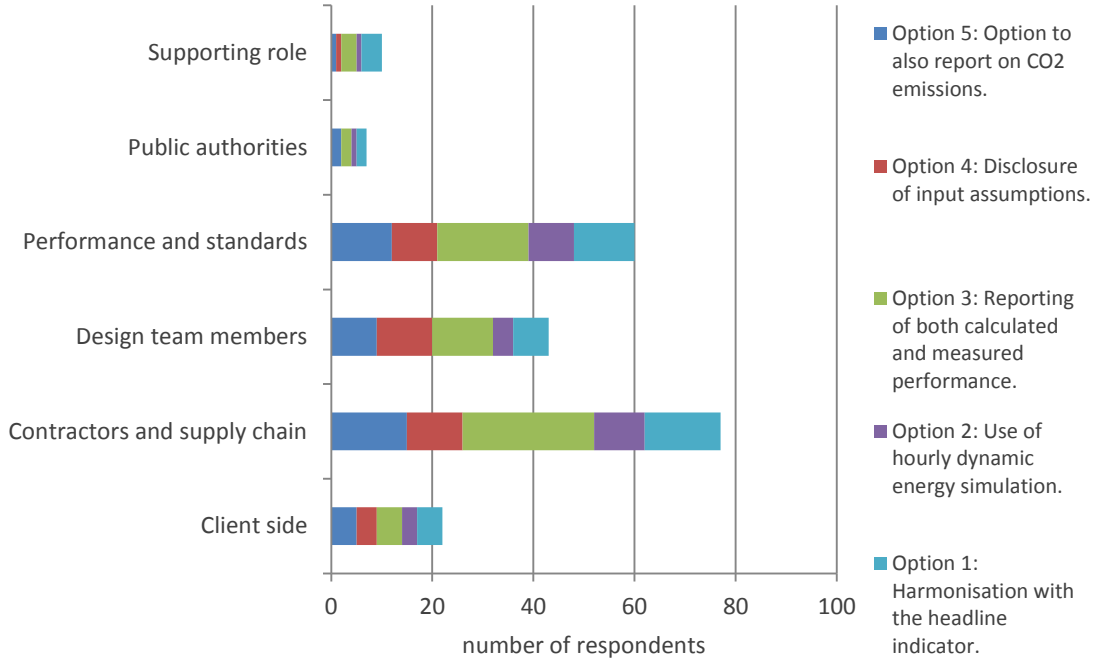

Figure 3.4 Breakdown of the options as selected by each professional category

Analysis of the ranked response:

The margin between the different options was relatively narrow so, as a result, it could be considered to include several of them as options within the reporting framework for indicator 1.1.

The option for *'reporting on both calculated and measured performance'* was chosen by the majority (63%) of respondents, so this would make sense to have this as a key aspect of reporting. The option *'use of hourly dynamic energy simulation'* received the least support. This option goes further than EPBD related requirements in many member states, and may have, as a result, been considered to be too challenging by some respondents.

Analysis of the open response:

28 respondents to Q3.3 (27% of total respondents) provided additional options, which are summarised in table 3.1.

Of the 24 respondents, 8 referred to the possibility to address total life cycle primary energy consumption and 4 the need to look further at the title and definition of the indicator, with reference to operational primary energy use and its components as described by the Near Zero Energy Building (EPBD and the forthcoming EN 52000 series) and EU VCS methodologies.

Table 3.1 Additional aspects for alignment with the proposed EU VCS

Cited aspects	**Number of respondents**
Life cycle primary energy consumption should be considered	8
The indicator title and definition requires clarification, with reference to NZEB and EU VCS	4
Further explanation of a preference for dynamic energy simulation	4
Measured energy use should be the focus	3

The EU VCS proposal is not supported in some Member States	2
Preference for harmonisation with EPBD instead of EU VCS	1
Reference patterns of building occupation should be defined	1
Metering should be encouraged to support HVAC commissioning	1

Q3.4 Does indicator 1.1 provide a strong enough incentive to design more resource efficient buildings?

Three options were presented representing different aspects of calculating the indicator, with respondents invited to choose the options which most closely reflected their opinion.

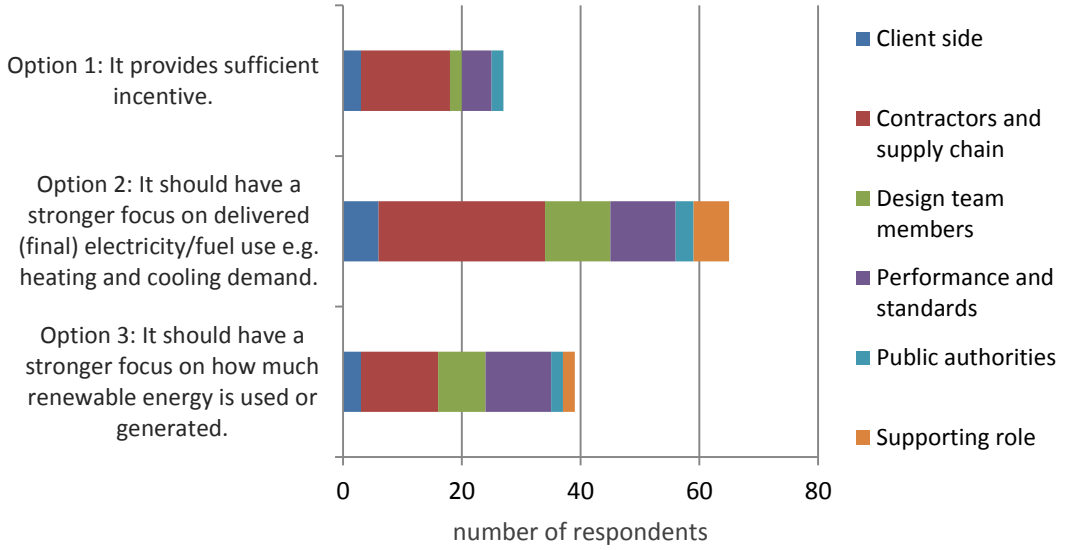

Figure 3.5 Number and breakdown of respondents selecting each option

Analysis of the ranked response:

The majority (61%) of respondents considered that there should be '*a stronger focus on delivered (final) electricity/fuel use'*, followed by *'a stronger focus on how much renewable energy is used or generated'* (36%). 16% of respondents selected both options 1 and 2.

The profile of the respondents supporting option 2 was balanced, reflecting the overall mix of professional categories. An analysis of *'contractors and supply chain'* respondents choosing option 2 indicates a large proportion of manufacturers of products relating to building fabric performance *e.g. insulation and windows.* A slightly higher proportions of *'client side' (9%)* and *'supporting role' (9%)* respondents compared to the overall mix of respondents and a lower approval for option 1 and 3 could suggest a greater focus by these categories on direct performance aspects of buildings.

Compared to the overall mix of respondents, those supporting option 3 included a higher proportion of *'performance and standards'* (28%) and *'design team members' (21%)* but a lower proportion of *'contractors and supply chain'* (33%). This could indicate a greater focus by the above mentioned respondents on meeting NZEB definitions.

3.2.2 Specific questions for proposed indicators that relate to macro-objective 2 (resource efficient material life cycles)

Q3.5 What form should reporting on a full LCA take?

Three options were presented representing different levels of complexity in the reporting, with respondents invited to choose the option which most closely reflected their opinion.

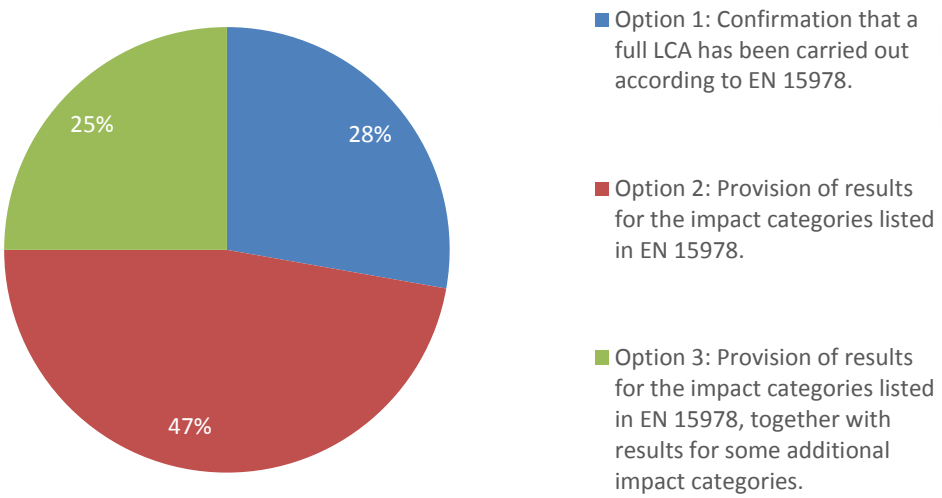

Figure 3.6 Percentage of respondents choosing each option for reporting on a full LCA (cradle to grave)

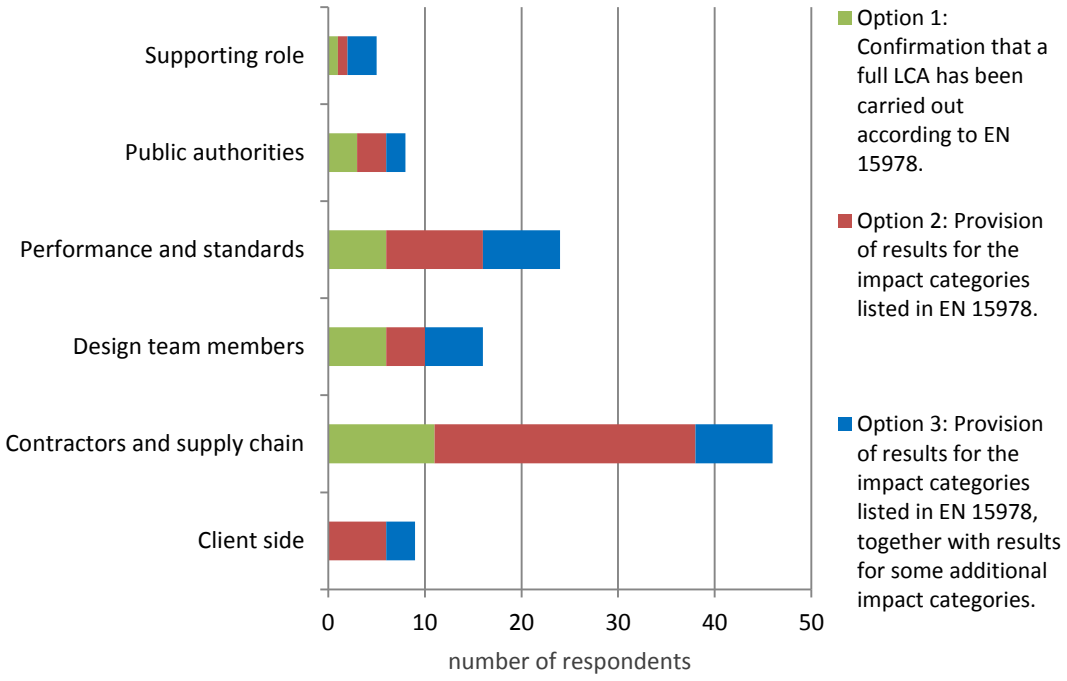

Figure 3.7 Breakdown of the options as selected by each professional category

Analysis of the response:

Nearly the majority (47%) of respondents considered that reporting should be according to '*…the impact categories listed in EN 15978'*. This option was supported by a higher proportion of respondents from *'contractors and supply chain*' and the *'client side'* , but by a lower proportion of *'design team members*' and organisations in a *'supporting role'*. This may reflect the experience of manufacturers with the creation of EPDs for building products.

Q3.6 Opinions about certain aspects of indicator proposals 2.1 to 2.4

Respondents were invited to rank their opinion on six statements relating to aspects of the Macro-objective 2 indicator proposals. Five options were given – two grades of negative, one neutral and two grades of positive. The results for each indicator are presented in Figure 3.8 and a detailed breakdown of the results by professional category is provided in Annex 3

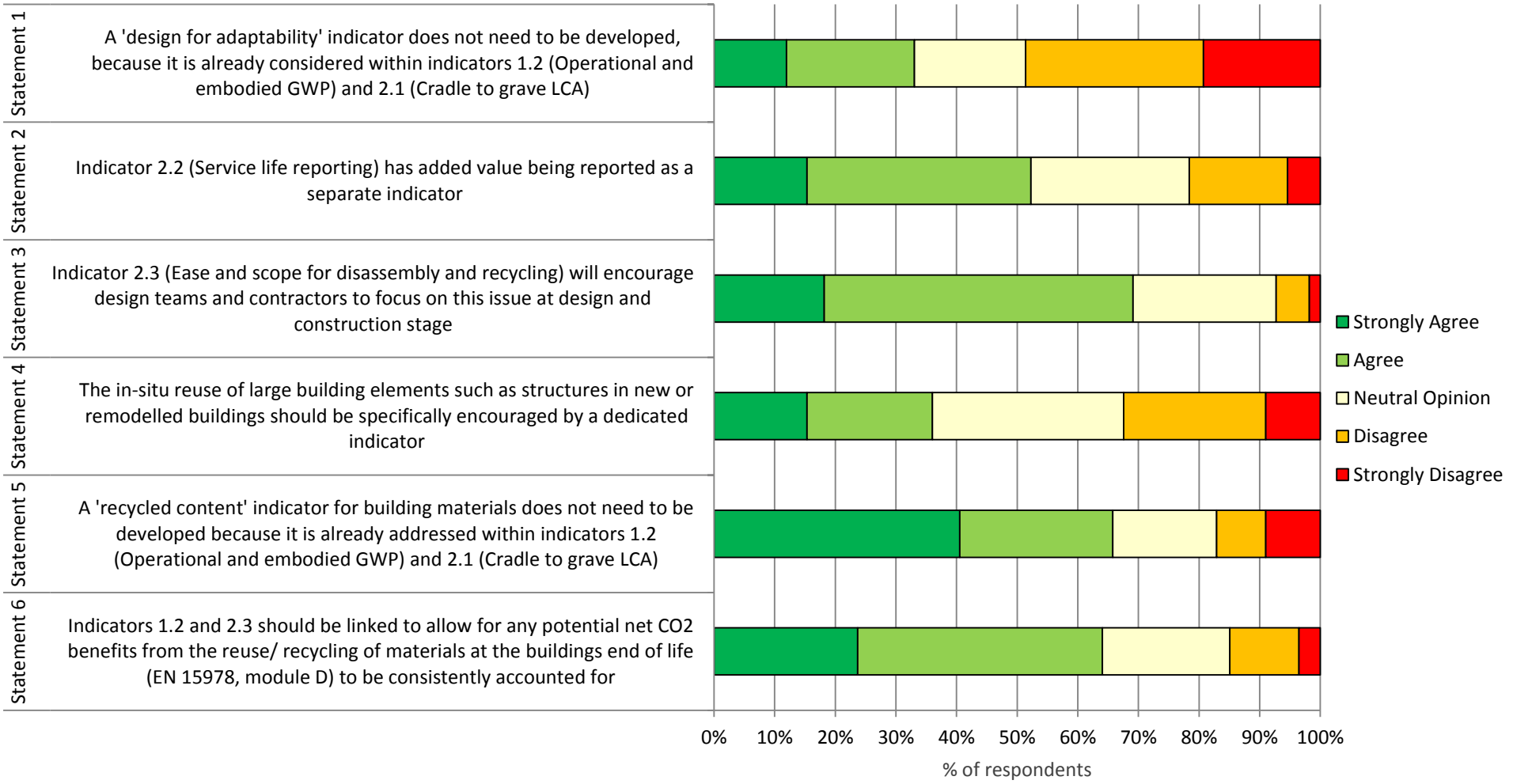

Figure 3.8 Opinions about certain aspects of the proposals for Macro-objective 2 indicators

Analysis of the ranked responses:

Statement 1: 'a design for adaptability indicator does not need to be developed, because it is already considered within indicators 1.2 and 2.1

Overall, respondents expressed, on balance, disagreement (48%) that a design for adaptability indicator is not needed. The strongest disagreement came from the *'design team'* and *'performance and standard'* respondent groups.

Statement 2: 'Indicator 2.2 has added value being reported as a separate indicator'

General support (52%) was expressed for a service life indicator (2.2), especially from the *'public authority'* and to a lesser extent the *'design team members'* respondent groups. The *'client side'* respondent group had a polarised opinion on this statement.

Statement 3: 'Indicator 2.3 will encourage design teams and contractors to focus on the issue at design and construction stage'

A strong ranking was given of the potential value of indicator (2.3) relating to the ease and scope for disassembly across all respondent groups (69%). The *'client side'* respondent group was the least supportive though (40% agreement and 30% disagreement).

Statement 4: 'The in-situ reuse of large building elements such as structures in new or remodelled buildings should be specifically encouraged by a dedicated indicator'

Opinions were split on this as yet unproposed indicator that would encourage the reuse of building elements in projects. Most support for this approach was expressed by the *'design team'* and *'supporting role'* respondent groups although the *'design team members'* group also had the highest proportion of neutral opinions. This suggests that where respondents with a design team background were knowledgeable in this area, they supported the proposal but that many may not be familiar with incorporating building element reuse into designs.

Statement 5: 'a recycled content indicator for building materials does not need to be developed because it is already addressed within indicators 1.2 and 2.1'

In general, respondents felt that there would be no need for an indicator related to the recycled content if indicators that report embodied GWP (1.2) and/or LCA impacts (2.1) were used (66%). This was most strongly expressed by the *'Contractor and supply side'* and *'performance and standards'* respondent groups.

Statement 6: 'Indicators 1.2 and 2.3 should be linked to allow for any potential net CO_2 benefits from the reuse and recycling of materials at the end of life of a building to be consistently accounted for'

All respondent groups expressed a strong overall support (64%) for the linking of proposed indicators for operation and embodied GWP (1.2) and for ease and scope for disassembly (2.3). Of all the respondents, those from the *'contractors and supply side'* showed the strongest support for such an approach.

3.2.3 Specific questions for proposed indicators that relate to macro-objective 3 (efficient use of water resources)

Q3.7 Is the proposed indicator 3.1 sufficient to measure intensity of water use?

Three options were presented representing different aspects of water use intensity, with respondents invited to choose the options which most closely reflected their opinion. The results are presented in figure 3.9 and 3.10.

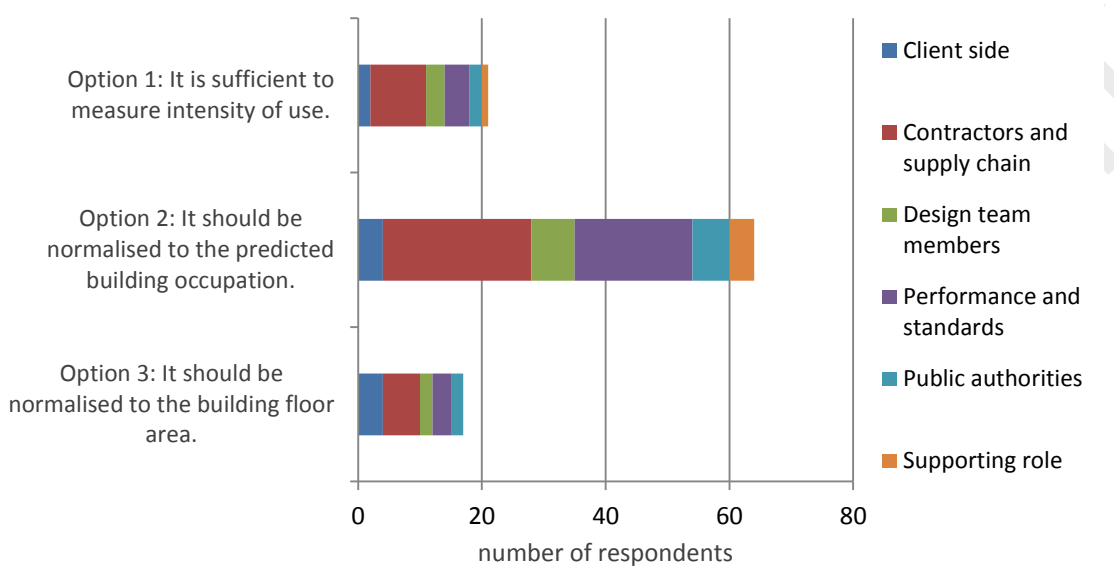

Figure 3.9 Number and breakdown of respondents selecting each option

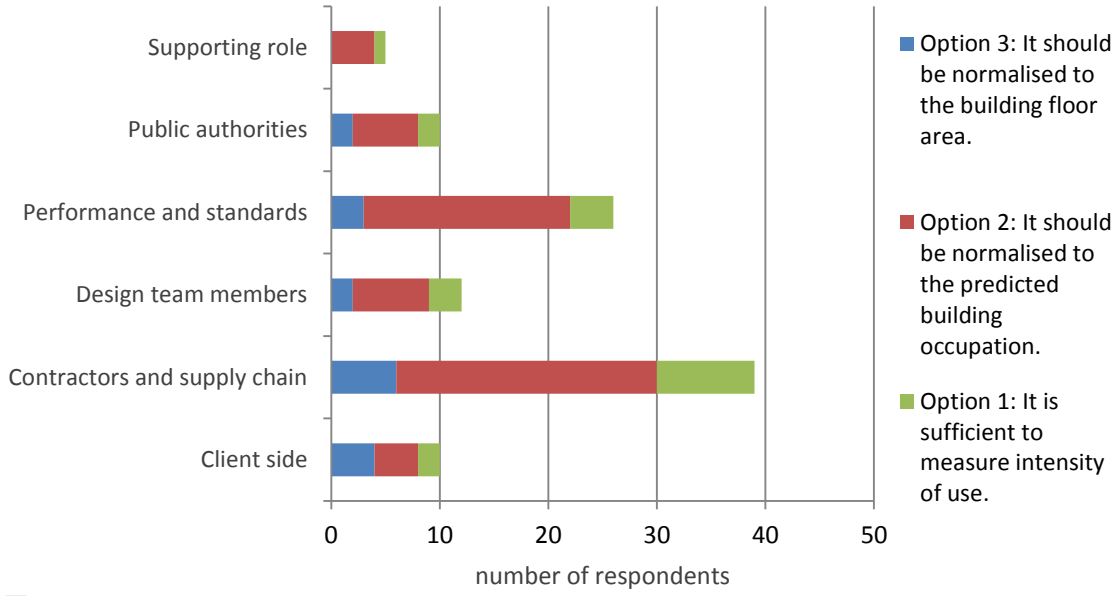

Figure 3.10 Breakdown of the options as selected by each professional category

Analysis of the response:

88 respondents (75%) selected from the three options. The option '*normalised to the predicted building occupation'* was chosen by the majority (73%) of respondents. The profile of the respondents supporting option 2 was balanced, reflecting the overall mix of professional categories. There were slightly higher proportions of responses from *'performance and standards' (30%)*.

Overall the response may reflect a general interest amongst stakeholders in measuring intensity of use, as reflected in the response to Q2.4.

Q3.8 What type of data do you consider appropriate to use for the water consumption of sanitary fittings?

Four options were presented representing different forms of verification, with respondents invited to choose the options which most closely reflected their opinion. The results are presented in figure 3.11. Respondents were also able to specify other data sources they considered acceptable.

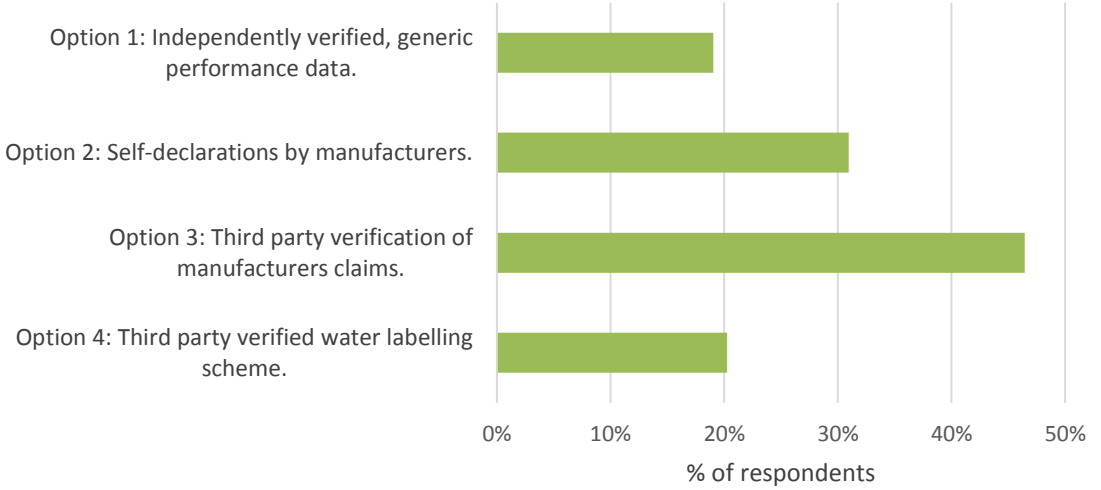

Figure 3.11 Percentage of respondents choosing each option

Analysis of the response:

84 respondents (71%) selected from the four options. The option '*third party verification of manufacturers claims*' was chosen by the highest proportion of respondents (46%).

The profile of the respondents supporting option 3 was balanced, albeit with a higher proportion of *'design team members'* and *'performance and standards'*. Option 2 was selected by a higher proportion of *'contractors and supply chain'*. Option 4 was chosen by a higher proportion of *'performance and standards'*. Option 1 was chosen by a higher proportion of *'design team members'* and *'public authorities'*. Overall the mix of respondent choices suggests that more than one option may need to be considered in support of the indicator, potentially with a focus on the assurance that option 2 could provide.

Analysis of the open response:

13 respondents to Q3.8 provided additional comments on acceptable data sources. Those of direct relevance to the question are presented in table 3.4.

9 respondents referred to potential data sources, including member state, EU, US and international schemes and labels referred to. Other comments suggested positive acceptance for manufacturer's declarations and highlighted the potential difficulty obtaining third party declarations.

Table 3.2 Other acceptable data sources cited by respondents

Cited aspects	Number of respondents
CEN/EN standard for energy efficiency	4
the European Water Label	2
The Swedish standard for energy efficiency	1
ISO standard for energy efficiency	1
US EPA 'watersense' labelling scheme	1
The consumption of fittings can be easily assessed by manufacturers and their declarations used	1
Self-declarations by manufacturers are sufficient where the data is reliable	1
Third party verifications could be difficult to obtain	1
There is the need for an EU scale (if possible) harmonised calculation method	1

Q3.9 Considering average residential water consumption with indicator 3.1

Statement: Calculated residential water use should be adjusted to reflect average consumption in that part of the EU.

Respondents were invited to rank their opinion on the above statement relating to the calculation method for indicator proposal 3.1. Five options were given – two grades of negative, one neutral and two grades of positive. The results are presented in Figure 3.12.

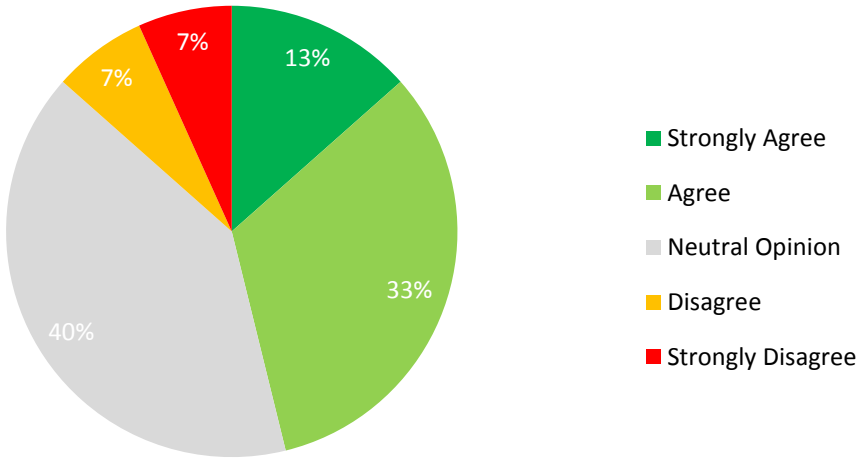

Figure 3.12 Opinions on whether calculated residential water consumption should be adjusted to reflect average consumption in that part of the EU

Analysis of the response:

The highest proportion of respondents (46%) agreed or strongly agreed with the statement. The profile of the respondents giving a positive ranking was balanced, albeit with greater proportion of support from the *'client side', 'public authorities'*

and 'supporting role' respondents. The neutral response was significant, and was dominated by 'contractors and supply chain' (57% of those expressing a neutral opinion).

3.2.4 Specific questions for proposed indicators that relate to macro-objective 4 (healthy and comfortable spaces)

Q3.10 The appropriateness of the pollutants covered in indicator 4.1 (reporting on specific pollutant levels or pollutant presence)?

Respondents were invited to rank their opinion on the scope of indoor pollutants proposed as being reported on. Five options were given – two grades of negative, one neutral and two grades of positive. The results are presented in Figure 3.13 and a detailed breakdown of the results by professional category is provided in Annex 4. An open option was also given for respondents to specify other pollutants.

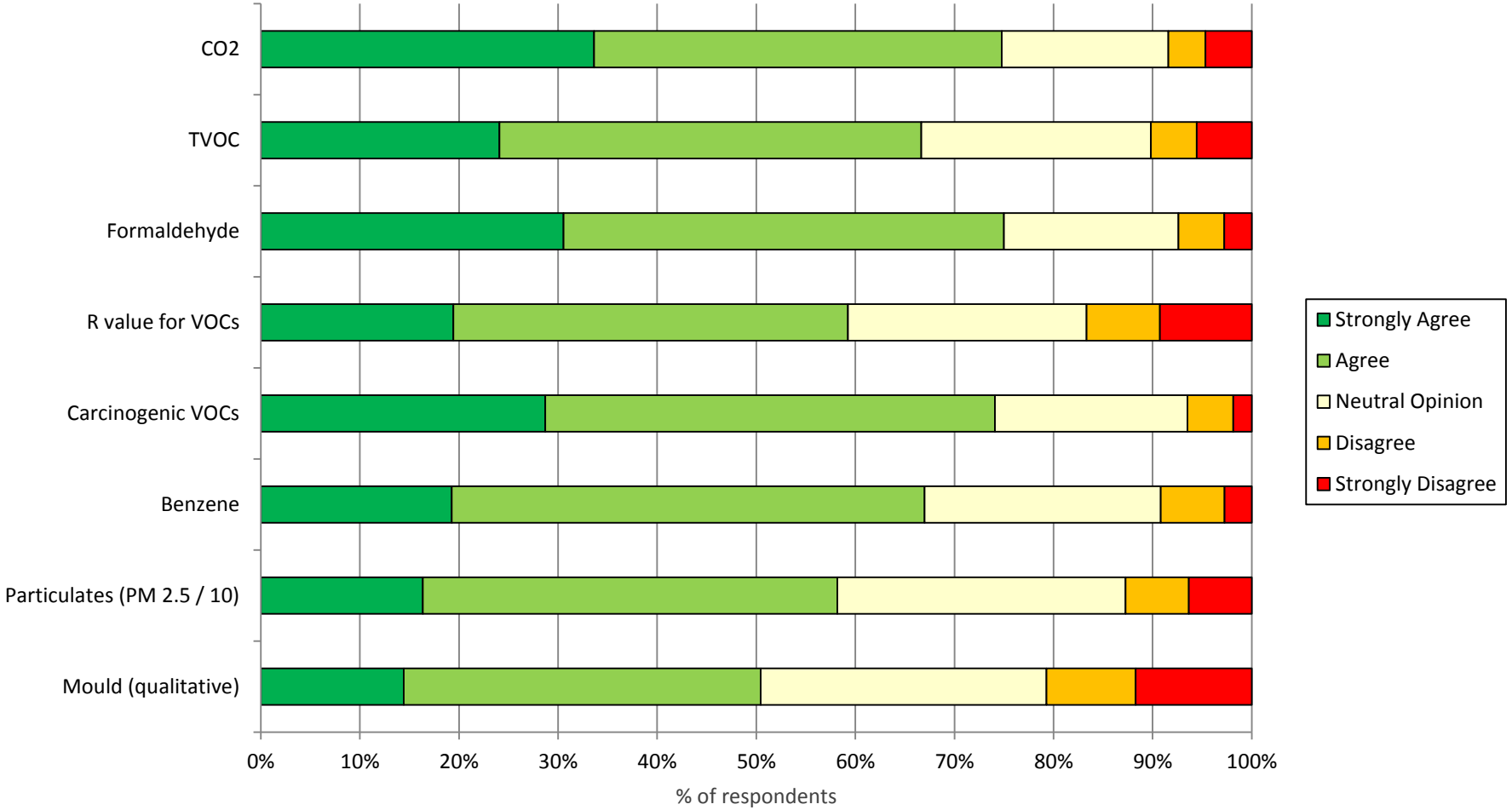

Figure 3.13 Opinions about the appropriateness of the pollutants proposed as the scope of indicator 4.1 (reporting on specific pollutant levels or pollutant presence)

Analysis of the ranked responses:

All the pollutants proposed were ranked positively ('agree' or 'strongly agree') by the majority of respondents. Nonetheless, the proposals for monitoring of R-value, Particulate Matter and mould received significantly higher levels of disagreement and neutral opinions than the other pollutants.

The *'client side'* and *'contractors and supply chain'* respondent groups expressed relatively high levels of neutral opinions for the monitoring of Particulate Matter and mould. This is perhaps linked to a perceived complexity or, in the case of mould, subjectivity of the measurement of these pollutants. No respondents from Germany or Austria disagreed with the R-value proposal, perhaps because this measurement is well established in those countries.

For CO_2 the strongest support came from the *'design team'* group while the few negative responses almost exclusively came from the *'contractors and supply chain'* respondent group.

For formaldehyde and for carcinogenic VOCs, support was registered from the *'public authority'* and *'supporting role'* categories, while a significant degree of neutral opinions were received from the *'client side'* respondent group, perhaps indicating a lack of awareness about health issues relating to these substances in indoor air. Any disagreement about proposed monitoring of benzene was predominantly from the "contractors and supply side" respondent group.

Analysis of the open response:

15 respondents cited additional pollutants that should be considered within the scope of the indicator. The cited pollutants are listed in Table 3.3. The most cited pollutant was radon gas, with respondents noting that it should be considered 'were relevant' and in line with the CEN/TC 351 scope. Total SVOC, carbon monoxide, odours and relative humidity were also cited more than once.

Table 3.3 Other pollutants cited by respondents that should be considered

Pollutant cited	**Number of respondents**
Radon	5
Total SVOC	3
Carbon monoxide	2
Odours	2
Relative humidity	2
VOCs that are mutagenic and toxic for reproduction	1
Acetaldehyde	1
Trichloroethylene	1
Dioxins	1
Pthalates	1
Halogenated organic compounds	1

POPS (including flame retardants)	1
NO_2	1
Pollen	1

27 respondents provided comments and opinions on aspects of the indicator proposal, the general approach, and its associated methodology and rules. These comments and opinions focussed on four main aspects – 1) defining good indoor air quality, 2) relating a product-based approach to in-situ measurement, 3) cost and feasibility of verification and 4) pollutant-specific aspects (CO_2, mould). The responses are grouped according to these five aspects in Table 3.4.

In-situ measurements were considered to be required to understand building performance by 7 respondents, with 8 other respondents addressing the relationship between product emissions testing and in-situ modelling and/or measurement. 5 respondents commented specifically on the '*presence of mould'* indicator.

Table 3.4 Other aspects of the indicator proposal cited by respondents

Aspect cited	**Number of respondents**
1.1 The proposed indicators should reflect/define *good* indoor air quality	1
1.2 The number of ventilation air changes should be defined	1
2.1.1 Hazards shall be identified in building materials	*1*
2.1.2 The proposed aspect is already addressed by harmonised product testing developed for the Construction Products Regulation	*1*
2.1.3 Modelling of product level information at building level is complex and not reliable	*1*
2.2.1 A risk-based approach is preferable to a hazard-based approach	*1*
2.2.2 In-situ measurement should only take place if problems arise	*1*
2.2.3 In-situ measurements are required to understand building performance	*7*
2.2.4 In-situ modelling could be related to product emissions testing as developed to support the Construction Products regulation	*1*
2.3 The measurement methods and in-situ procedures require more specification	2
3.1.1 The cost of verification may be too high	*1*
3.1.2 Verification cost and feasibility need to be considered further	*2*
3.2 Verification should be based on requirements linked to the Construction Product Regulation and obligations under REACH	1

4.1 All substances covered by the German AgBB scheme should be included	1
4.2 CO_2 should only be measured for office buildings	1
4.3.1 Mould is dependent on bad ventilation, humidity and maintenance by occupants	*1*
4.3.2 Mould is related to R Value so potential double counting	*1*
4.3.3 The procedure to measure mould must be widely accepted	*1*
4.3.4 If the presence of mould is included there should be guidance that further investigation may be required to identify the cause	*1*

Q3.11 How should the scope of building products for which emissions testing results should be obtained, be defined?

Three options were presented representing different descriptions of the possible scope, with respondents invited to choose the option which most closely reflected their opinion.

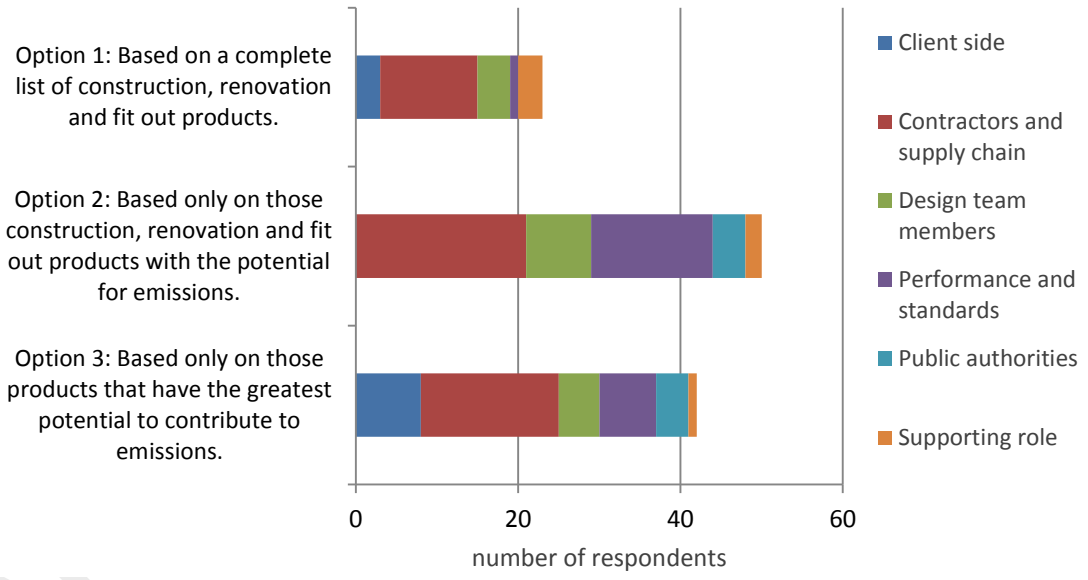

Figure 3.14 Number and breakdown of respondents selecting each option

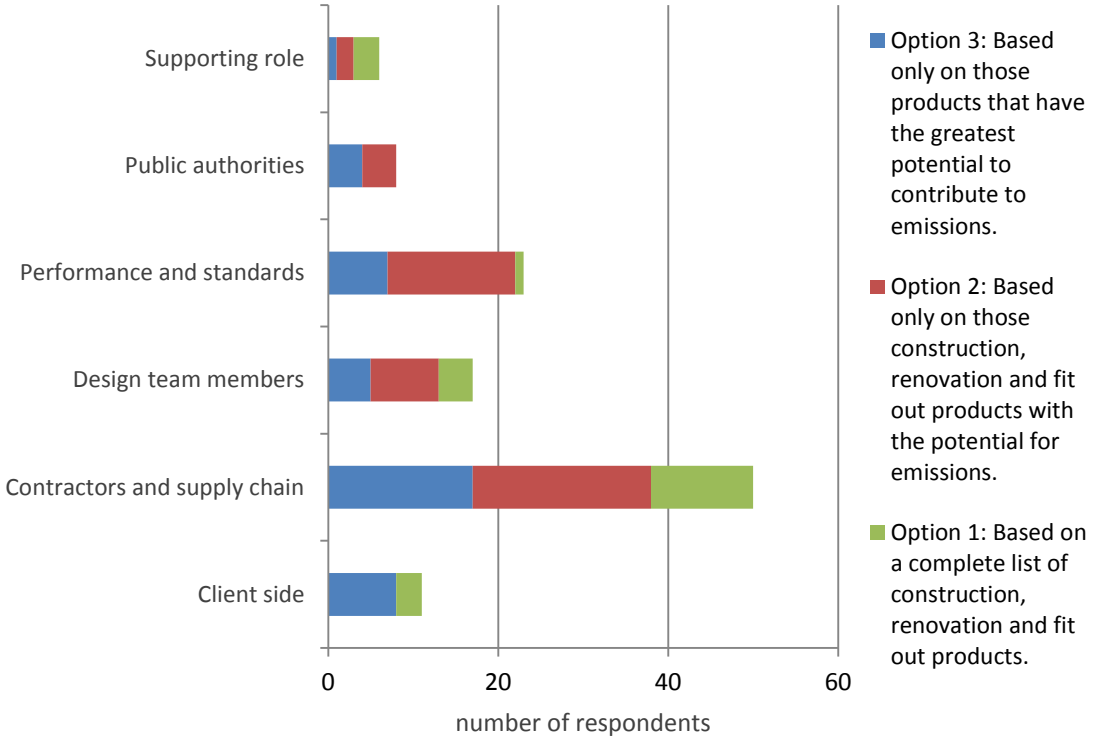

Figure 3.15 Breakdown of the options as selected by each professional category

Analysis of the response:

106 respondents (90%) selected from the three options. The option '*based on those construction, renovation and fit out products with the potential for emissions*' was chosen by the highest proportion of respondents (54%).

Option 2 was selected by a high proportion of *'contractors and supply chain'*, *'performance and standards' and 'design team members'* but notably none on the *'client side'*. Notably the 73% of 'client side' respondents chose option 3. This may reflect a preference for the management of the risk of occupant exposure.

3.2.5 Specific questions for proposed indicators that relate to macro-objective 5 (resilience to climate change)

Q3.12 Opinions about certain aspects of indicator proposals 5.1, 5.2a and 5.2b

Respondents were invited to rank their opinion on three statements relating to aspects of the Macro-objective 5 indicator proposals. Five options were given – two grades of negative, one neutral and two grades of positive. The results for each indicator are presented in Figure 3.16 and a detailed breakdown of the results by professional category is provided in Annex 5.

Analysis of the response:

Statement 1: 'Both overheating risk assessment and additional cooling primary energy consumption should be reported'

Strong support (48%) was received for the proposed joint reporting of an overheating risk assessment (5.1) and additional cooling energy demand (5.2a) when considering the resilience of a building to climate change. All respondent groups showed support for this proposal but *'public authority'* respondents were 100% in favour of this approach while only 46% of *'client side'* stakeholders supported the statement.

Statement 2: 'The two main indicators 5.1 and 5.2a should be covered by indicator 1.1 and macro-objective 4 respectively, negating the need for any macro-objective 5 section'

Opinions were somewhat split regarding whether an overheating risk assessment (5.1) and estimations of additional cooling primary energy consumption (5.2a) should be included within the scope of indicator 1.1 on total primary energy consumption.

Statement 3: 'A proxy measure for the microclimate cooling effect would be a useful alternative to building thermal simulation'

Respondents did not consider that the 'green factor' suggested in proposed indicator 5.2b would be useful as an alternative to building thermal simulations. The *'performance and standards'* and *'supporting role'* respondent groups were the most against this statement. The other respondent groups expressed very high levels of neutral opinions on this matter - implying a potential lack of knowledge in this specialised area.

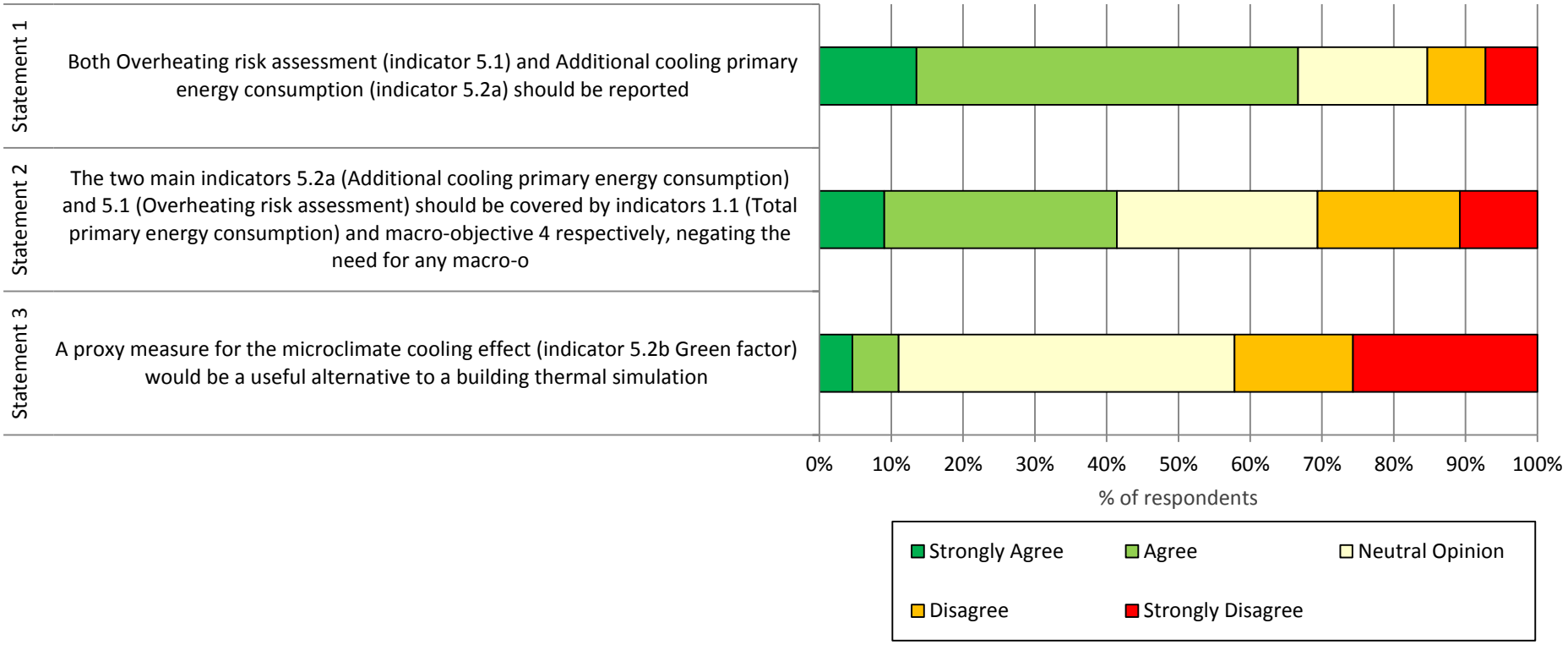

Figure 3.16 Opinions about certain aspects of the indicator proposals for 5.1, 5.2a and 5.2b

3.2.6 Specific questions for proposed indicators that relate to macro-objective 6 (life cycle cost and value)

Q3.13 Opinions about certain aspects of indicator proposals 6.1a, 6.1b and 6.2

Respondents were invited to rank their opinion on three statements relating to aspects of the Macro-objective 6 indicator proposals. Five options were given – two grades of negative, one neutral and two grades of positive. The results for each indicator are presented in Figure 3.17 and a detailed breakdown of the results by professional category is provided in Annex 6.

Analysis of the response:

Statement 1: 'The cost optimal EU methodology should be used as a simplified methodology for indicator 6.1a'

Overall opinion was split about the use of the cost optimal EU methodology to estimate long-term utility costs (proposed indicator 6.1a). The respondent groups were mainly dominated by neutral opinions although the *'client side'* group was generally against using the cost optimal methodology while the *'supporting role*' respondent group was generally in favour.

Statement 2: 'The Life Cycle Cost (LCC) focus on operational energy costs and long term acquisition and maintenance costs is appropriate'

Respondents generally found it appropriate to focus on operational costs and long term acquisition and maintenance costs when considering a life cycle cost (LCC) assessment of a building. The *'public authority'* respondent group had a high degree of neutral opinions on this matter while the *'supporting role'* and *'construction and supply chain'* respondent groups had high levels of agreement with this statement. The *'client side'* respondents had a clear split opinion on this matter.

Statement 3: 'A simple reliability rating based on a scoring of the input data and assumptions for each of the other indicators would be useful to valuers'

When considering the usefulness of a possible reliability rating of input data to value assessments (indicator 6.2), a split in respondent groups was noted even though the extent of neutral opinions was relatively high (53%). *'Client side'* respondents did not generally appreciate the usefulness of reliability ratings whereas all other groups were appreciative of such ratings.

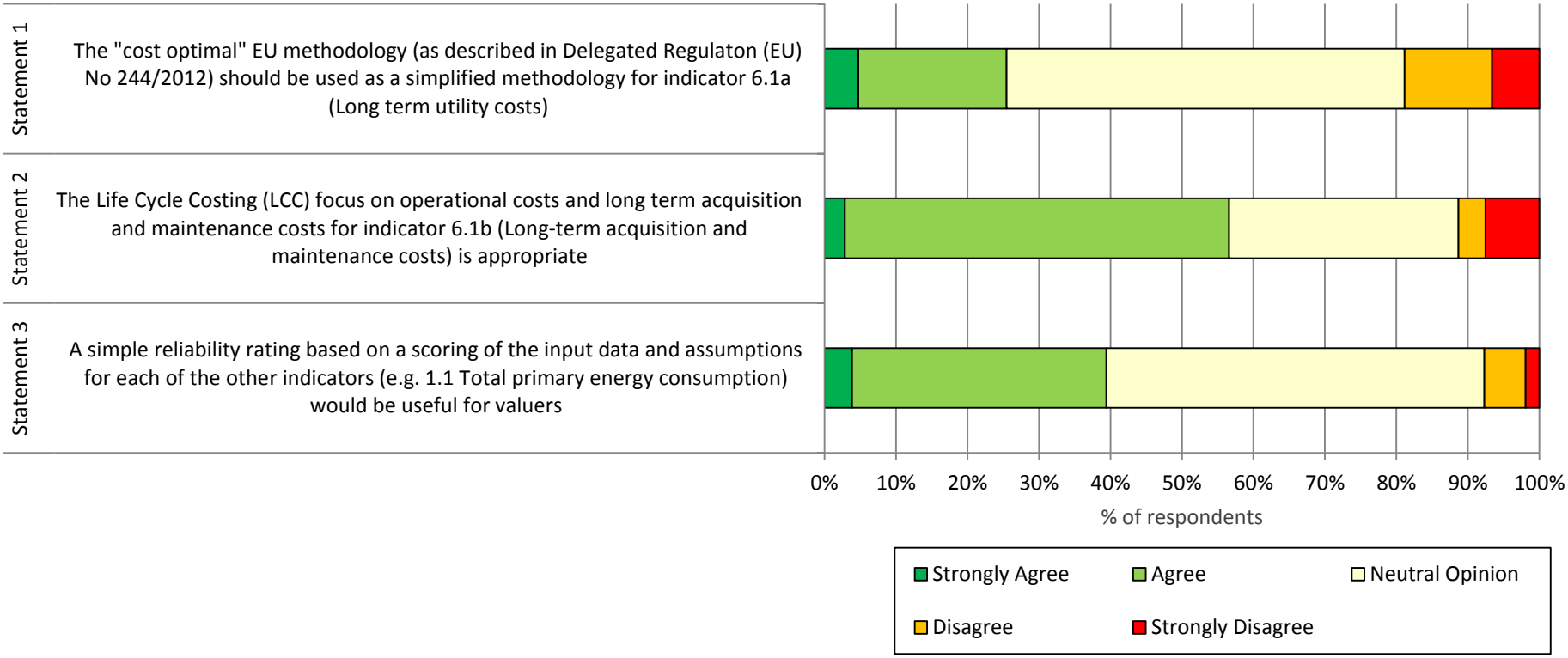

Figure 3.17 Opinions about certain aspects of indicator proposals 6.1a, 6.1b and 6.2

Q3.14 What do you think are the most appropriate life spans for maintenance plans for the following building types?

For three building types – office buildings, apartment blocks and individual houses – respondents were asked to select for each what they considered the most appropriate life span for preparation of a long term maintenance plan. The results for each of these building typologies are presented in Figure 3.18.

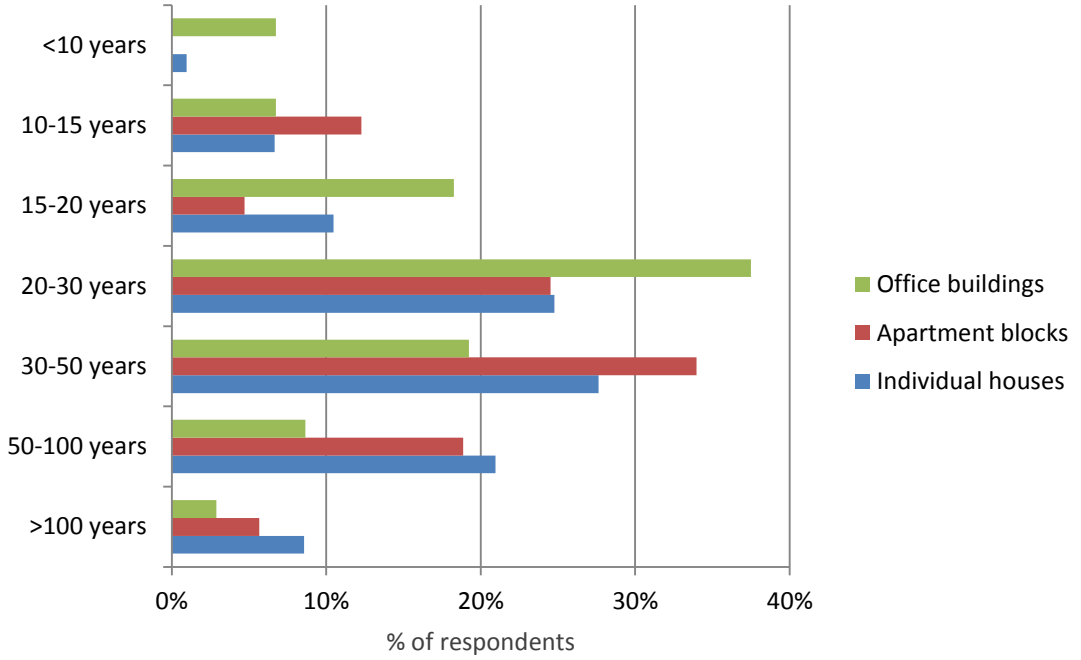

Figure 3.18 Opinions on the most appropriate life spans for maintenance plans for three different building typologies

Analysis of the response:

The response rate to this question was 89%, with a minor variation in the response depending on the types of building the respondents were most familiar with.

No life span option received support from the majority of respondents. The clearest result was 20-30 years (38%) for office buildings, which also mirrored comments that the proposed service life span for indicator 2.2 (50-60 years) was too long.

For apartment buildings, 30-50 years came out top (34%) but 20-30 years also received significant support, potentially reflecting typical mortgage terms of a residential property.

The more ambiguous results were for individual houses, which suggest that a median of 30 years – reflecting a typical mortgage term could be a pragmatic solution.

Part 4: Open questions

In this part of the questionnaire stakeholders were invited to submit open comments on any aspect of how the indicators could work and also the specific indicator proposals. This took the form of two questions and open fields with character limits.

Q4.1 How should the framework of indicators work and to which actors would it be most relevant?

79 open responses were submitted. These were subject to analysis in order to identify common aspects of how the framework could work and the actors most commonly identified as being relevant. The analysis is divided into the two sub-questions.

Sub-question 1: How should the framework of indicators work?

The first theme identified was the potential basis for the framework (see table 4.1). Here, an LCA approach, as referred to by some respondents in Q2.1, was also highlighted. This approach, together with references to CEN/TC 350 standards, can be understood to reflect a general focus on a life cycle approach, as well as a focus on social, environmental and economic aspects – the 'three pillars of sustainability'. Some respondents also saw the framework as a harmonisation tool for direct integration into existing building assessment schemes.

Table 4.1 Sub-theme: 'basis for the framework'

Aspect cited	Number of respondents
Based on/embedded in an LCA approach	8
Alignment with CEN/TC350 standards	6
Integration into the existing building assessment schemes	5
Based on the 'three pillars of sustainability'	2
Orientated to address the most significant impacts	1

The next theme identified related to how the framework should be orientated (see table 4.2). On one hand Member State and EU priorities, and the potential for use at national level to drive performance improvement were highlighted. Related to this was an important point about ensuring that the framework would be accessible for the building sector professionals in parts of Europe that were less advanced in the field.

On the other hand, some respondents looked for a framework that would support investors and property managers, and by extension to residential properties, even individual homeowners. The framework could support decision making and the communication of performance, as well allowing for some equivalence to be established with/between existing investor reporting tools.

Table 4.2 Sub-theme:'Orientation of the framework'

Aspect cited	Number of respondents
Use at national level by Member States	3
Towards investor and occupier and asset manager decision-making processes	3
Towards existing IT tools (e.g. BIM)	2
Not just the 'developed part of Europe'	1
To reflect EU and Member State policies	1
To support EU Green Public Procurement (GPP)	1

To support external communication of performance	1
Towards seeking equivalence between existing commonly used tools	1
Towards feasible, cost effective verification	1
Towards transparency and reliability	1
Towards home owners	1

The next theme identified related to the workings of the framework (see table 4.3). A range of practical aspects were identified. The concept of tracking performance along project stages was highlighted, and linked to these stages the use of common, easy to use calculation methods. The use of existing available data such as EPDs was also highlighted.

Table 4.3 Sub-theme: 'how it should work'

Aspect cited	**Number of respondents**
Comprehensible and easy to use for performance measurement by all actors	7
Based on common calculation methods and existing indicators	6
Can measure performance/drive improvement from design through to completion and occupation	5
Linked to building product performance declarations	3
Users should not be able to pick and choose between indicators because of trade-offs	2
Cost effective to report on	1
Targeted at key actors that are 'points of influence' from design through to occupation	1
Combines quantitative and qualitative indicators	1
Encourages reporting on a 'comply or explain' basis	1
Segmentation of reporting by country or asset type	1

The final theme identified related to the role of the framework as a professional tool for performance improvement (see table 4.4). Here the concept of comparability based on like-for-like building types or reference buildings was highlighted, a possibility that has also been raised in the SG3 sub-group. The management of complexity was also a concept, reflected in how LCA could be presented, a learning process to use different indicators and the eventual optimisation of designs.

Table 4.4 Sub-theme:'its role as a professional tool'

Aspect cited	**Number of respondents**
Supports like-for-like comparisons of building performance	2
Takes into consideration project size	2
Reference performance values provided to support comparability	2
Supports improvement of professional knowledge	1
Manages the complexity of LCA with user-friendly interfaces	1
Actors implement simplified indicators and processes first	1
Supports the optimisation of designs	1
Does not restrict clients	1
Should not distinguish between advanced and basic.	1
Will be launched with an initial pilot and follow-up dissemination	1

Sub-question 2: For which actors would it be most relevant?

Table 4.2 Actors identified by respondents in their open response to Q4.1

Actor	**Number of respondents**	**%**
Property investors and owners	24	22%
Existing assessment schemes	19	17%
Design teams	16	15%
Public authority regulation	13	12%
All actors	12	11%
Contractors	9	8%
Public authorities	7	6%
Occupiers and tenants	5	5%
Architects	2	2%
Public procurers	1	1%
Home owners	1	1%
Total respondents	*109*	*100%*

Q4.2 Any additional views on the specific indicator proposals?

73 open responses were submitted. These were subject to analysis in order to identify common aspects relating to each question and indicator proposal.

The results for this question will be circulated shortly

Annex

Annex 1: Opinions on the Q2.1 indicator framework options

	Client side		Contractors and supply chain		Design team		Performance and		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
A set of basic indicators should be used, each with a similar 'basic' ambition level												
Strongly Agree	2	18.2%	5	9.4%	3	18.8%	4	16.7%	2	25.0%	0	0.0%
Agree	3	27.3%	3	5.7%	3	18.8%	6	25.0%	1	12.5%	1	16.7%
Neutral Opinion	2	18.2%	16	30.2%	5	31.3%	6	25.0%	2	25.0%	4	66.7%
Disagree	3	27.3%	13	24.5%	1	6.3%	8	33.3%	0	0.0%	1	16.7%
Strongly Disagree	1	9.1%	16	30.2%	4	25.0%	0	0.0%	3	37.5%	0	0.0%
Sub total	**11**	**100.0%**	**53**	**100.0%**	**16**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
A set of basic indicators should be used, complemented by optional additional indicators, all at a similar 'basic' ambition level												
Strongly Agree	1	9.1%	3	5.7%	3	18.8%	1	4.2%	0	0.0%	0	0.0%
Agree	3	27.3%	4	7.5%	2	12.5%	8	33.3%	2	25.0%	2	33.3%
Neutral Opinion	2	18.2%	19	35.8%	6	37.5%	10	41.7%	1	12.5%	3	50.0%
Disagree	2	18.2%	17	32.1%	3	18.8%	5	20.8%	3	37.5%	1	16.7%
Strongly Disagree	3	27.3%	10	18.9%	2	12.5%	0	0.0%	2	25.0%	0	0.0%
Sub total	**11**	**100.0%**	**53**	**100.0%**	**16**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
A set of basic indicators should be used, complemented by optional additional more challenging 'advanced' indicators												
Strongly Agree	3	27.3%	2	3.8%	3	18.8%	5	20.8%	2	25.0%	1	16.7%
Agree	2	18.2%	20	37.7%	6	37.5%	10	41.7%	4	50.0%	2	33.3%
Neutral Opinion	3	27.3%	8	15.1%	6	37.5%	5	20.8%	1	12.5%	2	33.3%
Disagree	0	0.0%	10	18.9%	0	0.0%	3	12.5%	0	0.0%	1	16.7%
Strongly Disagree	3	27.3%	13	24.5%	1	6.3%	1	4.2%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**53**	**100.0%**	**16**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
A combined set of 'basic' and 'advanced' indicators should be used, complemented by optional additional indicators, for different levels of ambition												
Strongly Agree	1	9.1%	15	28.3%	6	37.5%	6	25.0%	3	37.5%	1	16.7%
Agree	1	9.1%	11	20.8%	3	18.8%	8	33.3%	0	0.0%	1	16.7%
Neutral Opinion	3	27.3%	5	9.4%	5	31.3%	6	25.0%	0	0.0%	2	33.3%
Disagree	0	0.0%	16	30.2%	1	6.3%	2	8.3%	4	50.0%	2	33.3%
Strongly Disagree	6	54.5%	6	11.3%	1	6.3%	2	8.3%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**53**	**100.0%**	**16**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**

Annex 2: Ranking of the overall suitability of each indicator proposal (Q3.1)

	Client side		Contractors and supply chain		Design team		Performance and standards		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
Indicator 1.1. Total primary energy consumption (kWh/m2/yr)												
Suitable as proposed	7	64%	36	68%	15	94%	14	58%	6	75%	5	83%
Partly suitable	3	27%	12	23%	0	0%	10	42%	2	25%	1	17%
Neutral opinion	0	0%	5	9%	1	6%	0	0%	0	0%	0	0%
Unsuitable	1	9%	0	0%	0	0%	0	0%	0	0%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 1.2. Operational and embodied Global Warming Potential (kg CO2 eq/m2/yr)												
Suitable as proposed	4	36%	32	60%	13	81%	10	42%	1	13%	4	67%
Partly suitable	4	36%	17	32%	0	0%	12	50%	6	75%	1	17%
Neutral opinion	1	9%	3	6%	3	19%	1	4%	0	0%	0	0%
Unsuitable	2	18%	1	2%	0	0%	1	4%	1	13%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 2.1. Cradle to grave Life Cycle Assessment (LCA) (Impact category results normalised to m2)												
Suitable as proposed	3	27%	39	74%	9	56%	10	42%	2	25%	3	50%
Partly suitable	3	27%	9	17%	5	31%	10	42%	5	63%	1	17%
Neutral opinion	3	27%	4	8%	2	13%	4	17%	1	13%	1	17%
Unsuitable	2	18%	1	2%	0	0%	0	0%	0	0%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 2.2. Service life reporting(design service life for building and specified elements/components)												
Suitable as proposed	5	45%	23	43%	5	31%	6	25%	3	38%	2	33%
Partly suitable	1	9%	8	15%	7	44%	6	25%	1	13%	3	50%
Neutral opinion	3	27%	13	25%	3	19%	10	42%	3	38%	1	17%
Unsuitable	2	18%	9	17%	1	6%	2	8%	1	13%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 2.3. Ease and scope for disassembly and recycling (Sum of category scores)												
Suitable as proposed	1	9%	12	23%	2	13%	2	8%	4	50%	2	33%
Partly suitable	4	36%	28	53%	9	56%	13	54%	3	38%	2	33%
Neutral opinion	3	27%	8	15%	1	6%	6	25%	0	0%	1	17%
Unsuitable	3	27%	5	9%	4	25%	3	13%	1	13%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 2.4. Construction and Demolition waste arisings (i. tonnes/100 m2 floor area; ii. % diversion from landfill to recycling and re-use excluding backfilling)												
Suitable as proposed	5	45%	12	23%	3	19%	4	17%	4	50%	3	50%
Partly suitable	6	55%	28	53%	8	50%	17	71%	2	25%	3	50%
Neutral opinion	0	0%	9	17%	4	25%	2	8%	1	13%	0	0%
Unsuitable	0	0%	4	8%	1	6%	1	4%	1	13%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 3.1. Total mains drinking water consumption (m3 per person per year)												
Suitable as proposed	2	18%	17	32%	7	44%	8	33%	4	50%	4	67%
Partly suitable	6	55%	16	30%	4	25%	11	46%	1	13%	1	17%
Neutral opinion	0	0%	17	32%	4	25%	2	8%	3	38%	0	0%
Unsuitable	3	27%	3	6%	1	6%	3	13%	0	0%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 4.1. Quantitative reporting on specific pollutant levels: CO2, total VOC, Carcinogenic VOCs, R-Value, formaldehyde, benzene and particulates (PM 2,5/10,0)												
Suitable as proposed	3	27%	16	30%	7	44%	5	21%	4	50%	2	33%
Partly suitable	3	27%	20	38%	7	44%	13	54%	2	25%	3	50%
Neutral opinion	2	18%	12	23%	1	6%	2	8%	1	13%	0	0%
Unsuitable	3	27%	5	9%	1	6%	4	17%	1	13%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 4.1. Qualitative reporting on the presence of mould												
Suitable as proposed	0	0%	13	25%	1	6%	3	13%	1	13%	2	33%
Partly suitable	3	27%	13	25%	9	56%	10	42%	3	38%	2	33%
Neutral opinion	6	55%	20	38%	5	31%	6	25%	3	38%	1	17%
Unsuitable	2	18%	7	13%	1	6%	5	21%	1	13%	1	17%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 5.1. Overheating risk assessment (adaptive degree hours)												
Suitable as proposed	2	18%	11	21%	2	13%	8	33%	3	38%	2	33%
Partly suitable	2	18%	28	53%	9	56%	10	42%	4	50%	3	50%
Neutral opinion	5	45%	13	25%	4	25%	6	25%	0	0%	1	17%
Unsuitable	2	18%	1	2%	1	6%	0	0%	1	13%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 5.2a. Additional cooling primary energy consumption (kWh/m2)												
Suitable as proposed	3	27%	17	32%	3	19%	7	29%	3	38%	3	50%
Partly suitable	4	36%	20	38%	9	56%	10	42%	4	50%	3	50%
Neutral opinion	1	9%	14	26%	4	25%	5	21%	1	13%	0	0%
Unsuitable	3	27%	2	4%	0	0%	2	8%	0	0%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 5.2b. Green factor (sum of weighted cooling effect for green features on/around the building)												
Suitable as proposed	0	0%	4	8%	2	13%	4	17%	2	25%	2	33%
Partly suitable	2	18%	11	21%	3	19%	2	8%	2	25%	1	17%
Neutral opinion	2	18%	28	53%	9	56%	9	38%	3	38%	0	0%
Unsuitable	7	64%	10	19%	2	13%	9	38%	1	13%	3	50%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 6.1a. Long term utility costs (€/m2.yr over 30 or 50 years)												
Suitable as proposed	3	27%	15	28%	2	13%	5	21%	4	50%	3	50%
Partly suitable	3	27%	27	51%	11	69%	14	58%	2	25%	1	17%
Neutral opinion	1	9%	10	19%	2	13%	4	17%	2	25%	2	33%
Unsuitable	4	36%	1	2%	1	6%	1	4%	0	0%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 6.1b. Long term acquisition and maintenance costs (€/m2.yr over 30 or 50 years)												
Suitable as proposed	3	27%	15	28%	6	38%	6	25%	2	25%	2	33%
Partly suitable	3	27%	26	49%	8	50%	12	50%	3	38%	3	50%
Neutral opinion	2	18%	11	21%	1	6%	5	21%	2	25%	1	17%
Unsuitable	3	27%	1	2%	1	6%	1	4%	1	13%	0	0%
Sub-total	**11**	**100%**	**53**	**100%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**
Indicator 6.2. Value and risk factors (Reliability rating for the input data and assumptions for each indicator)												
Suitable as proposed	2	18%	2	4%	5	31%	1	4%	1	13%	2	33%
Partly suitable	1	9%	18	34%	3	19%	7	29%	1	13%	2	33%
Neutral opinion	3	27%	28	53%	8	50%	14	58%	4	50%	2	33%
Unsuitable	5	45%	4	8%	0	0%	2	8%	2	25%	0	0%
Sub-total	**11**	**100%**	**52**	**98%**	**16**	**100%**	**24**	**100%**	**8**	**100%**	**6**	**100%**

Annex 3: Opinions about certain aspects of the proposals for Macro-objective 2 indicators (Q3.6)

	Client side		Contractors and supply chain		Design team		Performance and standards		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
A 'design for adaptability' indicator does not need to be developed, because it is already considered within indicators 1.2 (Operational and embodied GWP) and 2.1 (Cradle to grave LCA)												
Strongly Agree	1	9.1%	8	16.7%	1	6.7%	1	4.2%	2	25.0%	0	0.0%
Agree	4	36.4%	9	18.8%	1	6.7%	4	16.7%	2	25.0%	3	60.0%
Neutral Opinion	1	9.1%	12	25.0%	2	13.3%	5	20.8%	0	0.0%	1	20.0%
Disagree	2	18.2%	7	14.6%	9	60.0%	10	41.7%	3	37.5%	1	20.0%
Strongly Disagree	3	27.3%	11	22.9%	2	13.3%	4	16.7%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**47**	**97.9%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**
Indicator 2.2 (Service life reporting) has added value being reported as a separate indicator												
Strongly Agree	2	18.2%	8	16.7%	4	26.7%	0	0.0%	3	37.5%	0	0.0%
Agree	5	45.5%	14	29.2%	5	33.3%	11	45.8%	3	37.5%	3	60.0%
Neutral Opinion	0	0.0%	16	33.3%	4	26.7%	7	29.2%	2	25.0%	0	0.0%
Disagree	2	18.2%	8	16.7%	1	6.7%	5	20.8%	0	0.0%	2	40.0%
Strongly Disagree	2	18.2%	2	4.2%	1	6.7%	1	4.2%	0	0.0%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**
Indicator 2.3 (Ease and scope for disassembly and recycling) will encourage design teams and contractors to focus on this issue at design and construction stage												
Strongly Agree	0	0.0%	9	18.8%	3	20.0%	5	20.8%	2	25.0%	1	20.0%
Agree	4	40.0%	24	50.0%	7	46.7%	13	54.2%	5	62.5%	3	60.0%
Neutral Opinion	3	30.0%	13	27.1%	4	26.7%	5	20.8%	1	12.5%	0	0.0%
Disagree	1	10.0%	2	4.2%	1	6.7%	1	4.2%	0	0.0%	1	20.0%
Strongly Disagree	2	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sub total	**10**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**

The in-situ reuse of large building elements such as structures in new or remodelled buildings should be specifically encouraged by a dedicated indicator												
Strongly Agree	0	0.0%	9	18.8%	3	20.0%	2	8.3%	2	25.0%	1	20.0%
Agree	3	27.3%	7	14.6%	2	13.3%	8	33.3%	1	12.5%	2	40.0%
Neutral Opinion	4	36.4%	14	29.2%	9	60.0%	6	25.0%	1	12.5%	1	20.0%
Disagree	1	9.1%	13	27.1%	1	6.7%	7	29.2%	3	37.5%	1	20.0%
Strongly Disagree	3	27.3%	5	10.4%	0	0.0%	1	4.2%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**
A 'recycled content' indicator for building materials does not need to be developed because it is already addressed within indicators 1.2 (Operational and embodied GWP) and 2.1 (Cradle to grave LCA)												
Strongly Agree	2	18.2%	27	56.3%	1	6.7%	11	45.8%	3	37.5%	1	20.0%
Agree	2	18.2%	12	25.0%	6	40.0%	5	20.8%	0	0.0%	3	60.0%
Neutral Opinion	2	18.2%	6	12.5%	5	33.3%	4	16.7%	2	25.0%	0	0.0%
Disagree	3	27.3%	0	0.0%	1	6.7%	4	16.7%	0	0.0%	1	20.0%
Strongly Disagree	2	18.2%	3	6.3%	2	13.3%	0	0.0%	3	37.5%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**
Indicators 1.2 (Operational and embodied GWP) and 2.3 (Ease and scope for disassembly and recycling) should be linked to allow for any potential net CO2 benefits from the reuse and recycling of materials at the end of life of a building (EN 15978, Module D) to be consistently accounted for												
Strongly Agree	1	9.1%	15	31.3%	1	6.7%	4	16.7%	2	25.0%	1	20.0%
Agree	4	36.4%	21	43.8%	6	40.0%	11	45.8%	2	25.0%	2	40.0%
Neutral Opinion	3	27.3%	6	12.5%	5	33.3%	7	29.2%	2	25.0%	1	20.0%
Disagree	1	9.1%	5	10.4%	2	13.3%	2	8.3%	2	25.0%	1	20.0%
Strongly Disagree	2	18.2%	1	2.1%	1	6.7%	0	0.0%	0	0.0%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**8**	**100.0%**	**5**	**100.0%**

Annex 4: Opinions about the appropriateness of the pollutants proposed as the scope of indicator 4.1 (Q3.10: Reporting on specific pollutant levels or pollutant presence)

	Client side		Contractors and supply chain		Design team		Performance and standards		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
CO2 should be included in indicator 4.1												
Strongly Agree	4	36.4%	10	20.8%	8	72.7%	9	39.1%	2	25.0%	3	50.0%
Agree	4	36.4%	20	41.7%	3	27.3%	10	43.5%	5	62.5%	2	33.3%
Neutral Opinion	3	27.3%	12	25.0%	0	0.0%	3	13.0%	0	0.0%	0	0.0%
Disagree	0	0.0%	2	4.2%	0	0.0%	1	4.3%	1	12.5%	0	0.0%
Strongly Disagree	0	0.0%	4	8.3%	0	0.0%	0	0.0%	0	0.0%	1	16.7%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**11**	**100.0%**	**23**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
TVOC should be included in indicator 4.1												
Strongly Agree	1	10.0%	6	12.8%	6	40.0%	6	27.3%	3	37.5%	4	66.7%
Agree	5	50.0%	24	51.1%	3	20.0%	9	40.9%	3	37.5%	2	33.3%
Neutral Opinion	4	40.0%	11	23.4%	4	26.7%	5	22.7%	1	12.5%	0	0.0%
Disagree	0	0.0%	3	6.4%	1	6.7%	1	4.5%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	3	6.4%	1	6.7%	1	4.5%	1	12.5%	0	0.0%
Sub total	**10**	**100.0%**	**47**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
Formaldehyde should be included in indicator 4.1												
Strongly Agree	4	40.0%	11	23.4%	5	33.3%	7	31.8%	3	37.5%	3	50.0%
Agree	2	20.0%	23	48.9%	7	46.7%	9	40.9%	4	50.0%	3	50.0%
Neutral Opinion	4	40.0%	8	17.0%	2	13.3%	5	22.7%	0	0.0%	0	0.0%
Disagree	0	0.0%	4	8.5%	0	0.0%	1	4.5%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	1	2.1%	1	6.7%	0	0.0%	1	12.5%	0	0.0%
Sub total	**10**	**100.0%**	**47**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
The R-value should be included in indicator 4.1												
Strongly Agree	2	18.2%	6	13.0%	7	46.7%	2	9.1%	2	25.0%	2	33.3%
Agree	6	54.5%	17	37.0%	3	20.0%	10	45.5%	4	50.0%	3	50.0%
Neutral Opinion	3	27.3%	12	26.1%	4	26.7%	5	22.7%	1	12.5%	1	16.7%
Disagree	0	0.0%	6	13.0%	0	0.0%	2	9.1%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	5	10.9%	1	6.7%	3	13.6%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**46**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**

	Client side		Contractors and supply chain		Design team		Performance and standards		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
CO2 should be included in indicator 4.1												
Strongly Agree	4	36.4%	10	20.8%	8	72.7%	9	39.1%	2	25.0%	3	50.0%
Agree	4	36.4%	20	41.7%	3	27.3%	10	43.5%	5	62.5%	2	33.3%
Neutral Opinion	3	27.3%	12	25.0%	0	0.0%	3	13.0%	0	0.0%	0	0.0%
Disagree	0	0.0%	2	4.2%	0	0.0%	1	4.3%	1	12.5%	0	0.0%
Strongly Disagree	0	0.0%	4	8.3%	0	0.0%	0	0.0%	0	0.0%	1	16.7%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**11**	**100.0%**	**23**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
TVOC should be included in indicator 4.1												
Strongly Agree	1	10.0%	6	12.8%	6	40.0%	6	27.3%	3	37.5%	4	66.7%
Agree	5	50.0%	24	51.1%	3	20.0%	9	40.9%	3	37.5%	2	33.3%
Neutral Opinion	4	40.0%	11	23.4%	4	26.7%	5	22.7%	1	12.5%	0	0.0%
Disagree	0	0.0%	3	6.4%	1	6.7%	1	4.5%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	3	6.4%	1	6.7%	1	4.5%	1	12.5%	0	0.0%
Sub total	**10**	**100.0%**	**47**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
Formaldehyde should be included in indicator 4.1												
Strongly Agree	4	40.0%	11	23.4%	5	33.3%	7	31.8%	3	37.5%	3	50.0%
Agree	2	20.0%	23	48.9%	7	46.7%	9	40.9%	4	50.0%	3	50.0%
Neutral Opinion	4	40.0%	8	17.0%	2	13.3%	5	22.7%	0	0.0%	0	0.0%
Disagree	0	0.0%	4	8.5%	0	0.0%	1	4.5%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	1	2.1%	1	6.7%	0	0.0%	1	12.5%	0	0.0%
Sub total	**10**	**100.0%**	**47**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**
The R-value should be included in indicator 4.1												
Strongly Agree	2	18.2%	6	13.0%	7	46.7%	2	9.1%	2	25.0%	2	33.3%
Agree	6	54.5%	17	37.0%	3	20.0%	10	45.5%	4	50.0%	3	50.0%
Neutral Opinion	3	27.3%	12	26.1%	4	26.7%	5	22.7%	1	12.5%	1	16.7%
Disagree	0	0.0%	6	13.0%	0	0.0%	2	9.1%	0	0.0%	0	0.0%
Strongly Disagree	0	0.0%	5	10.9%	1	6.7%	3	13.6%	1	12.5%	0	0.0%
Sub total	**11**	**100.0%**	**46**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**100.0%**	**6**	**100.0%**

Annex 5. Opinions about certain aspects of the indicator proposals for 5.1, 5.2a and 5.2b (Q3.12)

	Client side		Contractors and supply chain		Design team		Performance and		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
Both Overheating risk assessment (indicator 5.1) and Additional cooling primary energy consumption (indicator 5.2a) should be reported												
Strongly Agree	0	0.0%	8	16.7%	1	6.7%	3	12.5%	1	14.3%	2	33.3%
Agree	5	45.5%	25	52.1%	8	53.3%	13	54.2%	6	85.7%	2	33.3%
Neutral Opinion	4	36.4%	7	14.6%	4	26.7%	4	16.7%	0	0.0%	1	16.7%
Disagree	0	0.0%	5	10.4%	1	6.7%	2	8.3%	0	0.0%	1	16.7%
Strongly Disagree	2	18.2%	3	6.3%	1	6.7%	2	8.3%	0	0.0%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**7**	**100.0%**	**6**	**100.0%**
The two main indicators 5.2a (Additional cooling primary energy consumption) and 5.1 (Overheating risk assessment) should be covered in indicators 1.1 (Total primary energy consumption) and 4.1 (Reporting on specific pollutant levels or pollutant presence) respectively, negating the need for any macro-objective 5 section												
Strongly Agree	0	0.0%	5	10.4%	2	13.3%	2	8.3%	0	0.0%	1	16.7%
Agree	1	9.1%	17	35.4%	8	53.3%	6	25.0%	2	28.6%	2	33.3%
Neutral Opinion	6	54.5%	13	27.1%	2	13.3%	6	25.0%	3	42.9%	1	16.7%
Disagree	1	9.1%	8	16.7%	2	13.3%	8	33.3%	1	14.3%	2	33.3%
Strongly Disagree	3	27.3%	5	10.4%	1	6.7%	2	8.3%	1	14.3%	0	0.0%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**15**	**100.0%**	**24**	**100.0%**	**7**	**100.0%**	**6**	**100.0%**
A proxy measure for the microclimate cooling effect (indicator 5.2b Green factor) would be a useful alternative to a building thermal simulation												
Strongly Agree	0	0.0%	3	6.3%	0	0.0%	1	4.2%	1	14.3%	0	0.0%
Agree	1	9.1%	4	8.3%	0	0.0%	2	8.3%	0	0.0%	0	0.0%
Neutral Opinion	7	63.6%	22	45.8%	10	71.4%	5	20.8%	5	71.4%	2	33.3%
Disagree	0	0.0%	3	6.3%	3	21.4%	10	41.7%	0	0.0%	2	33.3%
Strongly Disagree	3	27.3%	16	33.3%	1	7.1%	6	25.0%	1	14.3%	1	16.7%
Sub total	**11**	**100.0%**	**48**	**100.0%**	**14**	**100.0%**	**24**	**100.0%**	**7**	**100.0%**	**5**	**83.3%**

Annex 6: Opinions about certain aspects of indicator proposals 6.1a, 6.1b and 6.2 (Q3.13)

	Client side		Contractors and supply chain		Design team		Performance and		Public authorities		Supporting role	
	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)	Count (#)	Share (%)
The "cost optimal" EU methodology (as described in Delegated Regulaton (EU) No 244/2012) should be used as a simplified methodology for indicator 6.1a (Long term utility costs)												
Strongly Agree	0	0.0%	2	4.3%	0	0.0%	2	9.1%	1	14.3%	0	0.0%
Agree	2	20.0%	7	15.2%	1	6.7%	6	27.3%	2	28.6%	4	66.7%
Neutral Opinion	3	30.0%	31	67.4%	9	60.0%	12	54.5%	3	42.9%	1	16.7%
Disagree	3	30.0%	3	6.5%	4	26.7%	2	9.1%	0	0.0%	1	16.7%
Strongly Disagree	2	20.0%	3	6.5%	1	6.7%	0	0.0%	1	14.3%	0	0.0%
Sub total	**10**	**100.0%**	**46**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**7**	**100.0%**	**6**	**100.0%**
The Life Cycle Costing (LCC) focus on operational costs and long term acquisition and maintenance costs for indicator 6.1b (Long-term acquisition and maintenance costs) is appropriate												
Strongly Agree	0	0.0%	0	0.0%	2	13.3%	0	0.0%	1	12.5%	0	0.0%
Agree	6	60.0%	27	60.0%	6	40.0%	12	54.5%	2	25.0%	4	66.7%
Neutral Opinion	0	0.0%	15	33.3%	5	33.3%	8	36.4%	4	50.0%	2	33.3%
Disagree	1	10.0%	1	2.2%	0	0.0%	2	9.1%	0	0.0%	0	0.0%
Strongly Disagree	3	30.0%	2	4.4%	2	13.3%	0	0.0%	1	14.3%	0	0.0%
Sub total	**10**	**100.0%**	**45**	**100.0%**	**15**	**100.0%**	**22**	**100.0%**	**8**	**101.8%**	**6**	**100.0%**
A simple reliability rating based on a scoring of the input data and assumptions for each of the other indicators (e.g. 1.1 Total primary energy consumption) would be useful for valuers												
Strongly Agree	1	10.0%	1	2.2%	0	0.0%	1	4.5%	1	14.3%	0	0.0%
Agree	0	0.0%	14	31.1%	9	64.3%	7	31.8%	3	42.9%	4	66.7%
Neutral Opinion	5	50.0%	29	64.4%	4	28.6%	12	54.5%	3	42.9%	2	33.3%
Disagree	2	20.0%	1	2.2%	1	7.1%	2	9.1%	0	0.0%	0	0.0%
Strongly Disagree	2	20.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Sub total	**10**	**100.0%**	**45**	**100.0%**	**14**	**100.0%**	**22**	**100.0%**	**7**	**100.0%**	**6**	**100.0%**