

D²EPC User Training Workshops



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Executive Summary

This report summarizes the main information regarding the various workshops performed in the framework of task 5.1 - D²EPC guidance for auditing and implementation. These sessions, mainly addressed to EPC Assessors, were intended with a double purpose: on the one hand, to disseminate the methodology and showcase the D²EPC Web Platform and, on the other hand, to gather relevant feedback in order to improve both of them.

The document provides information about the content of the workshops (structure of the workshop, attendance, tools used to gather information, etc.) and the feedback gained.

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1 Introduction

1.1 Scope and Objectives of the Deliverable

This deliverable is part of **Task 5.1 - D²EPC guidance for auditing and implementation activities**, aiming to provide relevant information about the sessions (workshops) developed in the context of this task.

The objective of the deliverable is to summarize and communicate the activities performed in terms of presenting D²EPC methodology and platform to EPC Assessors and gathering relevant feedback from stakeholders. This feedback was used to evaluate the results, identify gaps and improve or modify the proposed framework.

1.2 Structure of the Deliverable

The deliverable is structured in the following parts:

- **Chapter 2: Information of the sessions.** In this section the objectives, target audience and contents of the workshops are described.
- **Chapter 3: Performed activities.** In this section, the tasks developed prior the workshops and after them are described.
- **Chapter 4: Questionnaires delivered after the sessions.** The questions delivered to the assessors are presented in this section.
- **Chapter 5: Results.** The main results and insights obtained from the workshops are described in the section.

1.3 Relation to other Tasks and Deliverables

Task 5.1 is strongly related to the findings of WP2, WP3 and WP4, as the Manual for EPC assessors contains the whole methodology, theoretical background and calculation steps of the project. Consequently, the key points of the methodology for EPC assessment and additional indicators have been explained in the sessions as well as their calculation through the D²EPC digital platform.

In addition, the feedback of the sessions has been used as an input in Task 5.4 - Evaluation and Comparative assessment of NG EPC in order to establish the indicators for the evaluation report for D²EPC Pilots (D5.8_ D²EPC Pilots Demonstration v2).

2 Information about the sessions

2.1 Objectives and target audience

Two sessions have been carried out in the framework of **Task 5.1 - D^2EPC guidance for auditing and implementation activities**. The first one, which took place the 12th of July 2022, was a workshop that aimed to present the D^2EPC Methodology for asset rating and operational rating and the additional set of indicators (SRI Indicators, thermal comfort indicators, visual comfort indicators, indoor air quality indicators, energy indicators, LCA indicators and financial indicators) and the respective tools for their calculation that were developed or being developed at that time during the project. The role of the EPC Assessor in the process was also explained. The purpose of this workshop was to gather feedback from EPC Assessors in order to improve presented framework.

In addition, a second workshop was carried out the 29th of June 2023, as a follow up of the methodological framework presented in the first workshop. In this case, the session was aimed to present the D^2EPC platform and the services it provides. As in the previous workshop, the purpose was to gather feedback from EPC assessors about the platform, in order to improve its contents and layout.

The target audience was engineers, architects, building experts and mainly EPC Assessors. Nevertheless, other stakeholders such as building owners and other interested parties have joined as well.

2.2 Contents

The sessions have been carried out in two periods of the project with different degrees of development. For this reason, the feedback expectations from the team were different and the content of the sessions was adapted to the needs during the respective time.

Both sessions are available to watch on the Youtube Channel¹ and on the website² of the project.

2.2.1 Content of the Workshop held on the 12th of July 2022

2.2.1.1 Session 1: Introduction to D^2EPC Scheme

Oscar Molins from SGS welcomed the workshop attendees and presented the session agenda. Additionally, he presented the first session of the event, in which he introduced the project's partners, presented the demonstration cases that are part of the project, explained the vision and objectives of D^2EPC and, finally, described the objectives of the workshop.

2.2.1.2 Session 2: EPC assessor's role in the methodologies

The objective of this session was to explain the asset rating and operational rating methodologies developed in the project, as well as the role of EPC advisors in them.

¹ <https://www.youtube.com/@d2epc659>

² <https://www.d2epc.eu/en>

Firstly, Stavros Koltsios from CERTH presented the asset rating methodology. He explained the definition of asset rating, the proposed novelties that D^2EPC project has brought to asset rating, an overview of the calculation methodology and the respective energy calculations flows, the concept of reference building and finally, the end results derived from the previous steps. He also presented the NZEB Smart Home (Thessaloniki, Greece) case study, by describing the building and explained the obtained results from the calculations. In addition, Stavros described how D^2EPC approach aims to deliver a holistic asset certification scheme, thanks to the addition of new KPIs, the inclusion of digital logbooks and the alignment with the building renovation passports. He then explained the role of the EPC Assessor during this process, highlighting the main tasks that assessors must carry out in order to ensure the quality and reliability of the results. Finally, as a conclusion to the presentation, Stavros introduced some questions to trigger a discussion with the attendants.

Then, Phoebe Georgali from FRC presented the operational rating methodology. She begun with the definition of operational rating and mentioned the main difference with respect to the asset rating. Besides, she defined the proposal of indicators linked to the operational rating (indicators per occupancy, occupancy-hours, area and volume). She also presented the Frederick Research Center building (Cyprus) case study, providing a description of the building and explaining the obtained results from the calculations.

2.2.1.3 Session 3: D^2EPC Indicators

In this session, the various indicators proposed in D^2EPC methodologies were explained.

Detlef Olschewski from CLEOPA started presenting the Smart Readiness Indicators (SRI) analysis for EPCs, making emphasis on which features can be defined within IFC files for the purpose of the SRI screening questions and what are the minimum modelling requirements to do so.

Thanos Kalamaris from HYPERTECH explained the human comfort and wellbeing indicators proposed in D^2EPC, that are related to indoor air quality, thermal comfort and visual comfort.

Phoebe Georgali from FRC explained the D^2EPC approach on integrating sustainability and Life Cycle Assessment (LCA) indicators into EPCs.

Mija Susnik from DMO presented the D^2EPC financial indicators proposal and the calculation methodology to obtain them.

2.2.1.4 Session 4: External tools

Stavros Koltsios from CERTH started this session explaining the D^2EPC Platform. He provided an overview of the system's architecture, explaining the interconnection between the different layers and components.

In addition, Stavros described the different services linked to the functioning of the platform, as they are the BIM-based digital twin, the calculation engine, the roadmapping tool for performance upgrade, the AI-Driven performance forecasts tool, the alerts and notifications tool and the energy performance benchmarking tool. He also explained the different user interfaces available, as they are the WebGIS tool, the mobile application. He made a short demo of the D^2EPC Platform to show the different modules in real time.

Christos Kontopoulos from GSH described the WebGIS tool and how it is integrated into D^2EPC. He also made a short demo of the tool.

2.2.2 Content of the Training Session held on the 29th of June 2023

2.2.2.1 Session 1: Brief methodology description

Stavros Koltsios from CERTH started the event with a brief description of the project. He presented the consortium partners and explained the different modules and services that make up the project. He started describing the asset and operational rating methodologies, pointing out the differences between them. He also described the enhanced set of indicators proposed in D²EPC project. Besides, he described the added value services suite, that is composed by different tools, i.e., the roadmapping tool, the energy performance forecasts tool, the alert and notifications tool, etc. Lastly, he provided an overview of the D²EPC web platform and webGIS tool.

2.2.2.2 Session 2: Policy implications

Paris Fokaides from FRC raised the issue of policy implications related to D²EPC project. For that purpose, Paris explained the six main objectives of the project, that correspond to the introduction of dynamic EPC into the market, the analysis of current EPC schemes in the EU in order to update them, the enhancement of EPCs through comprehensive indicators, the integration of operational data into EPCs using advanced technologies, the integration of smart readiness rationale into energy performance assessment and the development of an intelligent operational digital platform for dynamic EPCs.

For each objective, Paris highlighted some important challenges and gaps to overcome in order to make EPCs become a more interactive and holistic instruments across the EU.

2.2.2.3 Session 3: Presentation of D²EPC Platform: Smart Home (CERTH Thessaloniki) case study 1 and Session 4: Presentation of D²EPC Platform: Frederick University (Cyprus) case study 4

Both sessions were presented by Stavros Koltsios from CERTH. Stavros presented the platform's operation for two case studies. First, he described the buildings in regards to their geometry, installations, and usage patterns. Then, Stavros a walkthrough on the platform. First of all, he explained how to upload the BIM file and how to manage (register, rename, etc.) the different meters and sensors in the building. He calculated the asset and the operational rating, explaining the different results that the platform provides. Last, he showed the BIM Digital Twin and the previously explained indicator set.

After finishing session 4, a real time online questionnaire was delivered to the attendants. They were provided with some time to reply to the questions and a brief discussion about the results followed. The questionnaire can be found in section 4.2.1-Real time questionnaire during the session and the results are consolidated in section 5-Feedback from questionnaires.

3 Performed activities

For both sessions, a series of tasks were performed prior to the workshops to ensure the correct development of the sessions.

An invitation was drafted by SGS with the support of DMO in order to be used for disseminating the event and engaging audience. The invitations can be found in ANNEX A: Invitation templates.

An invitation mail letter was prepared by SGS and sent to the partner's network and project's newsletter list.

A number of meetings were arranged with the partners in order to discuss the contents of the workshops (agenda). Once the contents are agreed, SGS allocated the presentations to the corresponding partners.

Each partner sent the invitations to their relevant stakeholders.

SGS drafted a questionnaire to send to attendees after the workshops and gather feedback.

In addition, for the Training Session a real time questionnaire was developed in order to have feedback from the assessors during the event. That questionnaire was a short set of questions about the Platform, aimed to have the immediate opinion of the assessors about some features of the platform. An external app, MENTI, was used for this purpose, as next figure shows:



Figure 1. Feedback request during the event

The questionnaires were sent to the attendants a few days after the events. Each partner was in charge of sending and gathering those of the attendants from their country.

SGS prepared an attendance report with the number of attendees per country.

Finally, the results of the questionnaires were shared and summarized in a report.

4 Questionnaires delivered after the sessions

4.1 Questionnaire delivered after 1st workshop (12/07/2023)

The following questions were asked:

Assessor Info

- Name:
- Country:
- Experience Years:

EPC Methodology questions

1. **Which EPC rating scheme is used in your country?**
 - Asset Rating
 - Operational Rating
 - Both
 - None of the above
2. **Which is the best EPC methodology, in your opinion?**
 - Asset Rating
 - Operational Rating
 - Tailored Rating
 - Methodologies A and B are equally useful
 - Neither of the first three methodologies is fully capable to assess the energy performance of a building
3. **In the Asset Rating scheme, what degree of freedom should an EPC assessor have at the declaration of the boundary conditions/ operational profiles in the definition of a thermal zone?**
 - The assessor should have a high level of flexibility, so the calculated energy performance can be closer to the actual performance
 - The assessor should have a minimum level of flexibility, so they cannot affect the final EPC rating according to their will
 - The assessor should have a high level of flexibility only in certain fields (name some of them)
 - I am not familiar with the Asset Rating scheme
4. **In the Asset Rating scheme, which of the above two classification Methods are used in your country?**
 - Reference Energy Values (per m²)
 - Reference Building
 - Neither, the Asset Rating Scheme is not used in my country
5. **Do you find it important to include LCA KPIs in an EPC?**

- Very important
- Important
- Nice to have, but not necessary
- Insignificant

6. Do you find it important to include Human comfort KPIs in an EPC?

- Very important
- Important
- Nice to have, but not necessary
- Insignificant

BIM-IFC Questions

7. Do you believe that ifc files will actually help the EPC issuance process?

- Certainly Yes, they will minimize assessor's effort and issuance time
- Yes, but in the near future
- No, BIM format compatibilities will create more problems and inconsistencies
- Certainly No, BIM technology is not quite established yet, only a very limited number of buildings has a BIM file
- Other

8. The addition of extra information should be made:

- At the D²EPC Web platform, during the EPC issuance.
- Prior to the EPC issuance in the BIM file.

9. During the addition of extra information in the building model, how would you like to see the missing fields in the validation page?

- In tabulated form along with the rest of the values
- In question forms one by one
- Other

10. Would you consider the storage and ability for later access of the .ifc file in the platform?

- Useful and absolutely needed
- Useful but not needed
- Not useful

11. Is it helpful to have a 3D visual demonstration of the building during the certification procedure?

- Very Helpful
- Helpful
- Nice to have, but not necessary
- Ineffective

Look & Feel Questions

12. Do you believe that the calculated values of energy performance should be included in the final EPC Report?

- Certainly Yes
- Yes
- No
- Definitely No

13. To what extent should the assessor have access to the calculation results?

- They should have a detailed view of every calculation step
- An analytical view of the main result domains
- A high-level analysis of the calculated KPIs

14. Which is the best way to demonstrate the calculation results?

- per service (e.g., heating, cooling)
- per month
- per service and per month

15. Which is the best way to demonstrate the calculation results values?

- absolute energy values [kWh]
- relative energy values per m2 [kWh/m2]
- both

16. What is the most convenient way for the visualization of the EPC results?

- Bar - Chart
- Pie - Chart
- All of the above
- No visualization

17. How long do you think the final EPC Report should be?

- 1 page
- 2 pages
- 3 or more pages
- Other

Manual related questions

18. Do you believe that the manual is too technical?

- Yes (Tell us why in question 22)
- No

19. Would you like to see a more in-depth explanation of the EPC process?

- Yes
- No

20. Would you like to see a complete certification process for one of our pilot cases?

- Yes
- No

21. Do you think that the role of the EPC assessor in the process is clear?

- Yes
- No (If not tell us why in question 22)

22. What would you improve / What you would like to see implemented in the manual? (Free response)

4.2 Questionnaires delivered for 2nd Training Session (29/06/2023)

4.2.1 Real time questionnaire during the session

The following questions were chosen to be asked during the session:

Assessor Info

- Name:
- Country:
- Experience Years:

Q6: The energy performance information provided by the improved EPC format is concise and clearly understandable.

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q12: Assess whether you consider that the D²EPC tool provides a clear and comprehensive dynamic EPC calculation process for operational features?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q16: Do you think that incorporating environmental, financial, and human comfort indicators into EPCs will increase their attractiveness for the users?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q19: Assess whether you consider that the use of the D²EPC tool will facilitate the integration of BIM into EPC procedures.

1. Very unlikely

2. Unlikely
3. Neutral
4. Likely
5. Very likely

Q23: Do you agree that integrating smart readiness indicators into building energy performance evaluation procedures will improve EPC accuracy?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q24: How much do you agree: "D²EPC extensions (web-GIS tool, enhanced decision making, roadmapping tool) will have an added-value and increase user acceptance rate of EPCs"

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q26: How do you rate the interactive features of the D²EPC solution (recommendations for improving energy efficiency, alerting engine, real time monitoring)?

1. Very negative
2. Negative
3. Neutral
4. Positive
5. Very positive

Q30: In your opinion, how effective recommendations provided in the new generation EPCs would motivate building owners to undertake energy retrofitting measures?

1. Very unlikely
2. Unlikely
3. Neutral
4. Likely
5. Very likely

Do you think that the role of the EPC Assessor in the process of issuing an EPC through the platform is clearly defined?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

In your opinion to what extent the implementation of the D^2EPC solution will influence policy makers to adapt renovation policies.

1. Very low
2. Low
3. Neutral
4. High
5. Very high

4.2.2 Questionnaire delivered after the session

The following questions were asked:

Q1: Please provide your country.

Q2: What is your age?

- a) 18 – 25
- b) 26 – 35
- c) 36 – 45
- d) 46 – 55
- e) 56 and above
- f) Prefer not to say

Q3: What is your gender?

- a) Male
- b) Female
- c) Prefer not to say

Q4: What is your experience as an EPC assessor?

- a) Less than 1 year
- b) 1-5 years
- c) 6-10 years
- d) 11-20 years
- e) 21 and above

Q5: How often do you issue Energy Performance Certificates?

- a) Multiple times per day
- b) Daily
- c) Weekly
- d) Monthly
- e) Once a year or less

MAIN SECTION

The evaluative questions are presented on a scale of 1 to 5, so that the respondent can indicate the extent to which he/she agrees or disagrees with the statements or questions in the questionnaire. An explanation of the scale is given below:

1 = **Very Low – fully disagree**: This option indicates that the respondent strongly disagrees with the statement or question being asked. It represents a complete lack of agreement.

2 = **Low – partially disagree**: This option suggests that the respondent has some disagreement with the statement or question, but not to the same extent as the first option. It represents a partial disagreement.

3 = **Medium – neutral**: This option reflects a neutral or middle-ground stance where the respondent neither agrees nor disagrees with the statement or question. It represents a state of being impartial or having no strong opinion.

4 = **High – partially agree**: This option suggests that the respondent has some level of agreement with the statement or question, but not to the same extent as the next option. It represents a partial agreement.

5 = **Very High – fully agree**: This option indicates that the respondent strongly agrees with the statement or question being asked. It represents complete agreement and a high level of conviction.

Q6: The energy performance information provided by the improved EPC format is concise and clearly understandable.

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q7: The interface of the D²EPC tool is intuitive and the arrangement of functions and features are logical.

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q8: The layout of the D²EPC tool, the colour scheme and the use of graphical elements look attractive and reasonable.

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q9: Were you aware of the operational rating before the D²EPC project?

1. Not aware
2. Partially aware
3. Neutral
4. Highly aware
5. Fully aware

Q10: Have you ever issued an EPC based on the operational data?

1. Never
2. Rarely
3. Sometimes
4. Very often
5. Always

Q11: Do you consider the operational rating methodology more accurate than the asset-based rating?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q12: Assess whether you consider that the D²EPC tool provides a clear and comprehensive dynamic EPC calculation process for operational features?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q13: Have you ever noticed or identified any shortcomings or inconsistencies in the standardisation of energy performance of buildings?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q14: Please describe the main drawbacks or discrepancies you have encountered in the current EPC scheme.

Q15: Please provide potential solutions or recommendations for the improvement of the EPC scheme, if any.

Q16: Do you think that incorporating environmental, financial, and human comfort indicators into EPCs will increase their attractiveness for the users?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q17: Do you think that newly introduced indicators will serve as a valuable tool for decision making, such as evaluating the effectiveness of policies, strategies, and interventions in regards to indoor conditions and building operation?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q18: How often are you issuing EPC based on the BIM data?

1. Never
2. Rarely
3. Sometimes
4. Occasionally
5. Always

Q19: Assess whether you consider that the use of the D²EPC tool will facilitate the integration of BIM into EPC procedures.

1. Very unlikely
2. Unlikely
3. Neutral
4. Likely
5. Very likely

Q20: Provide your opinion on how the integration of BIM will improve the accuracy and reliability of energy performance assessments?

1. Very unlikely
2. Unlikely
3. Neutral
4. Likely
5. Very likely

Q21: Were you aware of the smart readiness concept before the D^2EPC project?

1. Not aware
2. Somewhat aware
3. Neutral/Vaguely aware
4. Highly aware
5. Fully aware

Q22: How often were you integrating smart technologies in the building certification procedures?

6. Never
7. Rarely
8. Sometimes
9. Very often
10. Always

Q23: Do you agree that integrating smart readiness indicators into building energy performance evaluation procedures will improve EPC accuracy?

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q24: How much do you agree with the following sentence: "D^2EPC platform extensions (web-GIS tool, enhanced decision making, roadmapping tool) will have an added-value and increase user acceptance rate of EPCs"

1. Fully disagree
2. Partially disagree
3. Neutral
4. Partially agree
5. Fully agree

Q25: In your opinion, will the improved EPCs and the use of the D^2EPC platform stimulate different innovations in buildings?

1. Very unlikely
2. Unlikely
3. Neutral
4. Likely
5. Very likely

Q26: How do you rate the interactive features of the D^2EPC solution (recommendations for improving energy efficiency, alerting engine, real time monitoring)?

1. Very negative
2. Negative
3. Neutral
4. Positive
5. Very positive

Q27: How would you characterise the indoor environmental quality indicators in the context of understanding the overall indoor conditions within the building?

1. Irrelevant
2. Relevant but not helpful
3. Somewhat helpful
4. Helpful
5. Really helpful

Q28: To what extent do the indoor environmental quality indicators influence your perception of the building's environmental performance?

1. Very low
2. Low
3. Neutral
4. High
5. Very high

Q29: How effective do you find the indoor environmental quality indicators in identifying potential issues or areas for improvement within the building?

1. Very ineffective
2. Ineffective
3. Neutral
4. Effective
5. Very effective

Q30: In your opinion, how effective recommendations provided in the new generation EPCs would motivate building owners to undertake energy retrofitting measures?

1. Very unlikely
2. Unlikely
3. Neutral
4. Likely
5. Very likely

Q31: In your opinion to what extent the implementation of the D²EPC solution will influence policy makers to adapt renovation policies.

-
1. Very low
 2. Low
 3. Neutral
 4. High
 5. Very high

Q32: Please provide additional feedback, if any:

5 Results

5.1 Attendance

5.1.1 First Workshop (2022)

The attendance of the 2022 workshop per country is summarized in the following table:

| Country | Attendants |
|--------------|------------|
| Austria | 13 |
| Belgium | 1 |
| Cyprus | 5 |
| Egypt | 1 |
| Germany | 4 |
| Greece | 17 |
| Ireland | 2 |
| Lithuania | 28 |
| Nederland | 1 |
| Portugal | 1 |
| Spain | 13 |
| Albania | 1 |
| Italy | 1 |
| Total | 88 |

Table 1. 2022 Workshop attendance per country

5.1.2 Second Training session (2023)

The attendance of the Training session per country is summarized in the following table:

| Country | Attendants inscribed |
|--------------|----------------------|
| Austria | 21 |
| Belgium | 1 |
| Cyprus | 8 |
| Germany | 9 |
| Greece | 24 |
| Lithuania | 15 |
| Pakistan | 1 |
| Poland | 2 |
| România | 1 |
| Slovakia | 1 |
| Slovenia | 1 |
| Spain | 20 |
| UK | 2 |
| Total | 106 |

Table 2. 2023 Training Session attendance per country

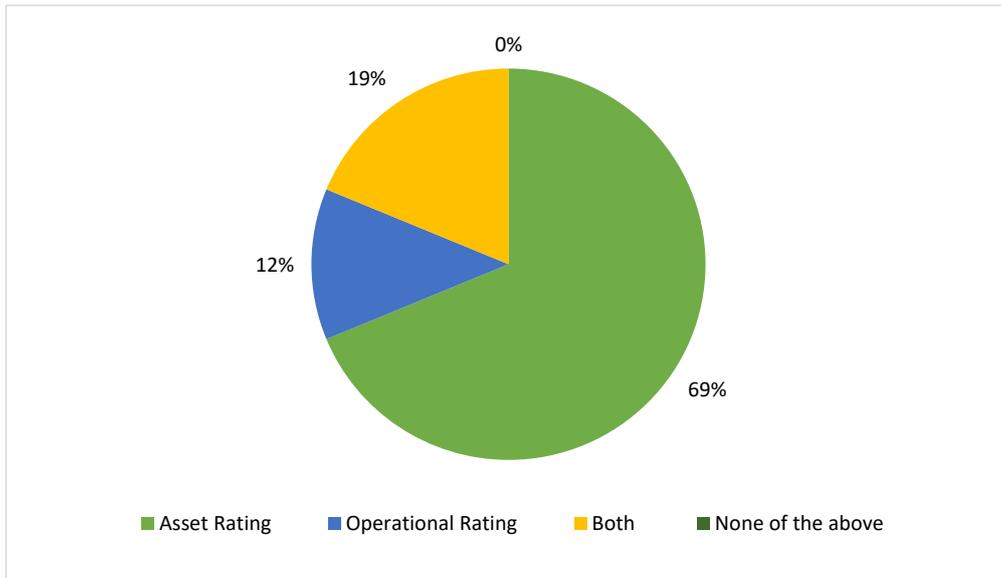
5.2 Feedback from questionnaires

5.2.1 First Workshop (2022)

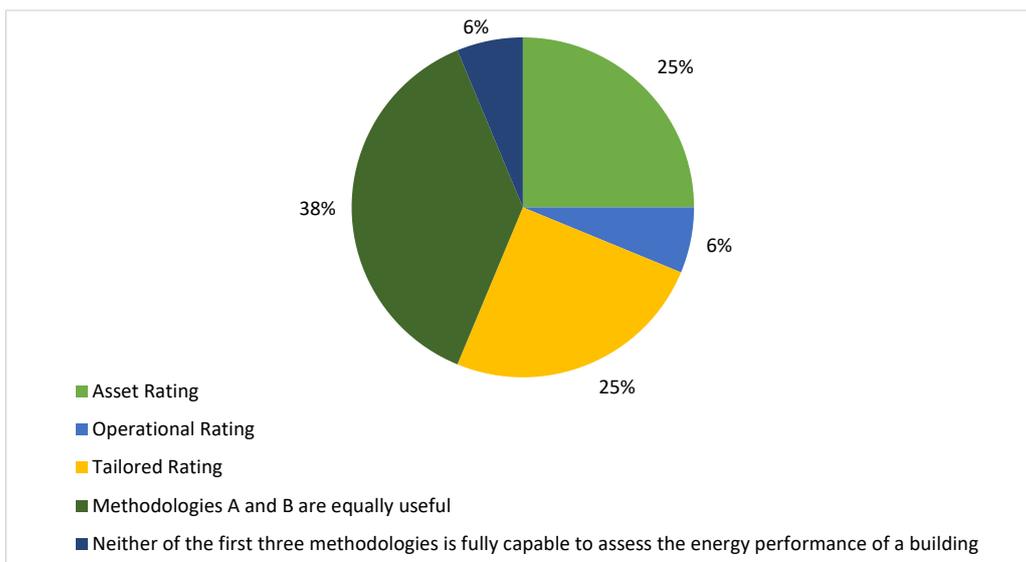
For each question, the most voted answer for each question as well as the free response part are shown:

EPC Methodology questions

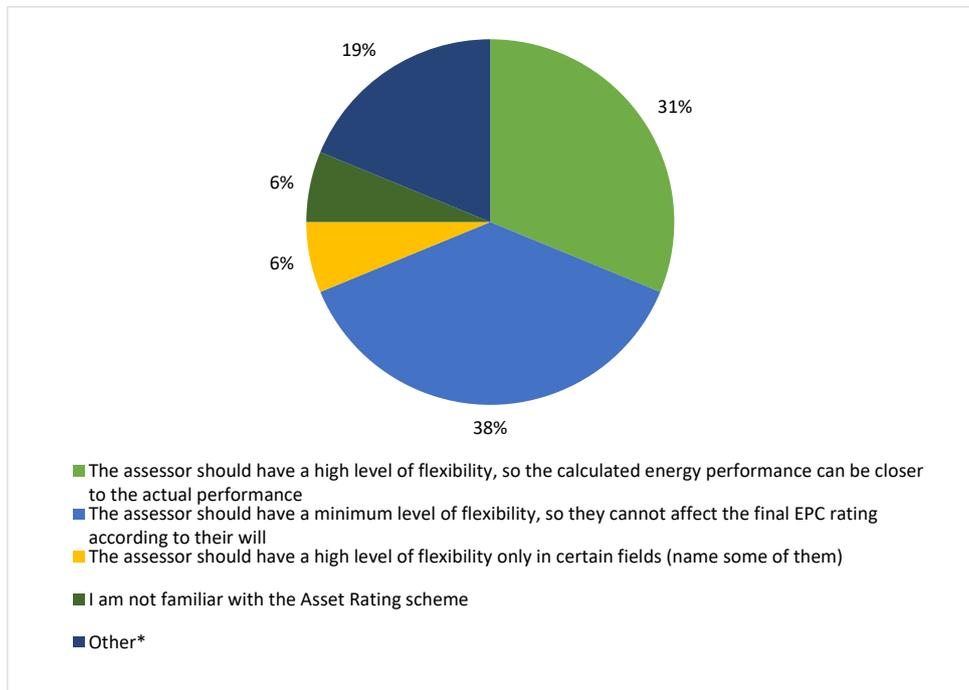
1. Which EPC rating scheme is used in your country?



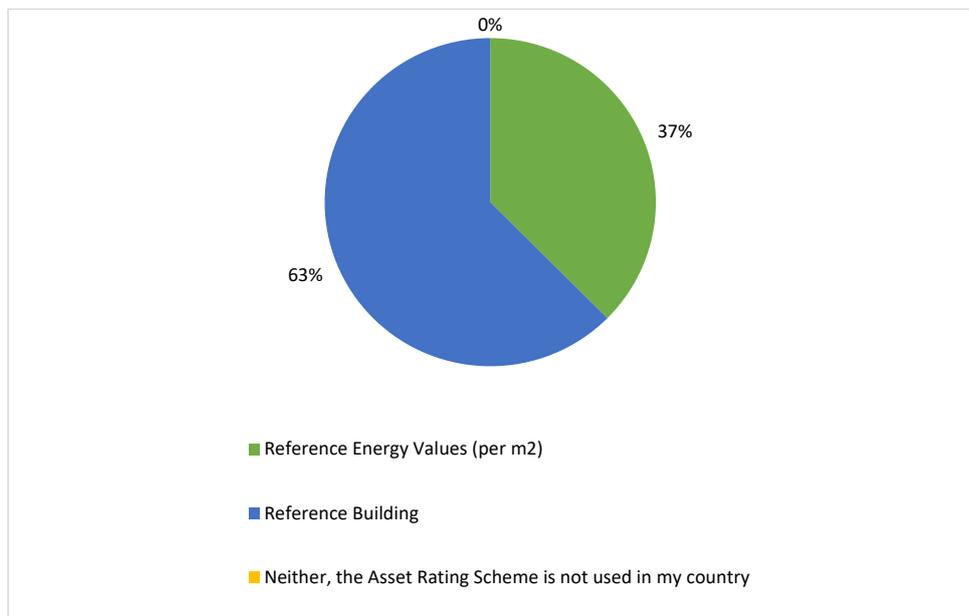
2. Which is the best EPC methodology, in your opinion?



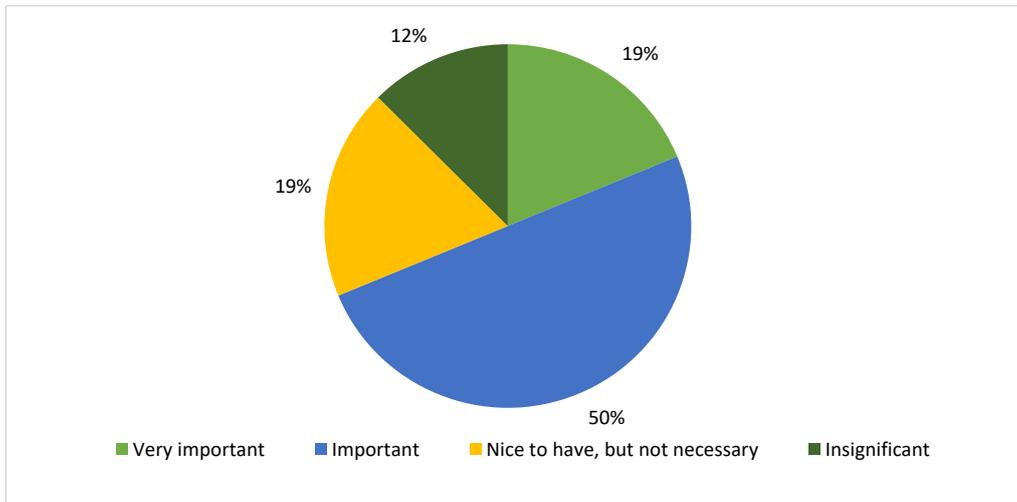
3. In the Asset Rating scheme, what degree of freedom should an EPC assessor have at the declaration of the boundary conditions/ operational profiles in the definition of a thermal zone?



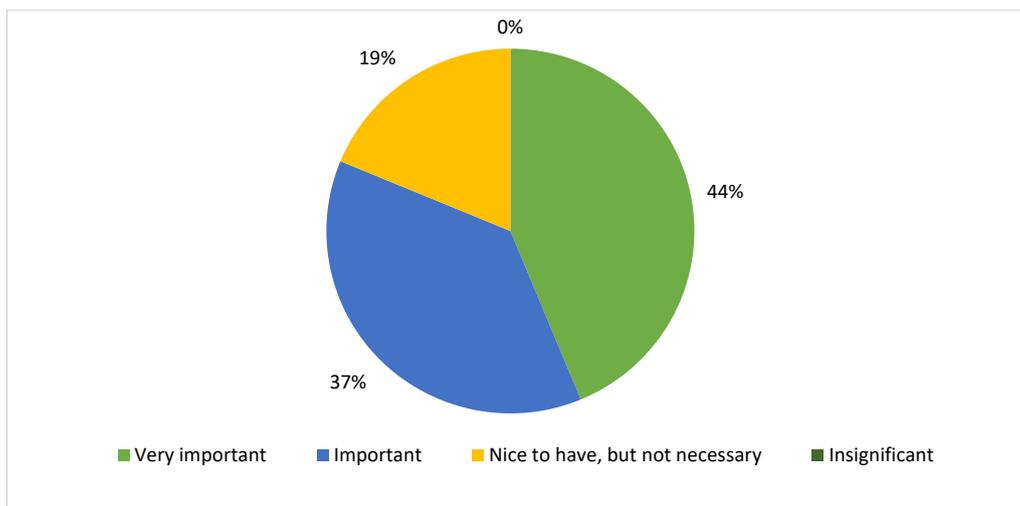
4. In the Asset Rating scheme, which of the above two classification Methods are used in your country?



5. Do you find it important to include LCA KPIs in an EPC?

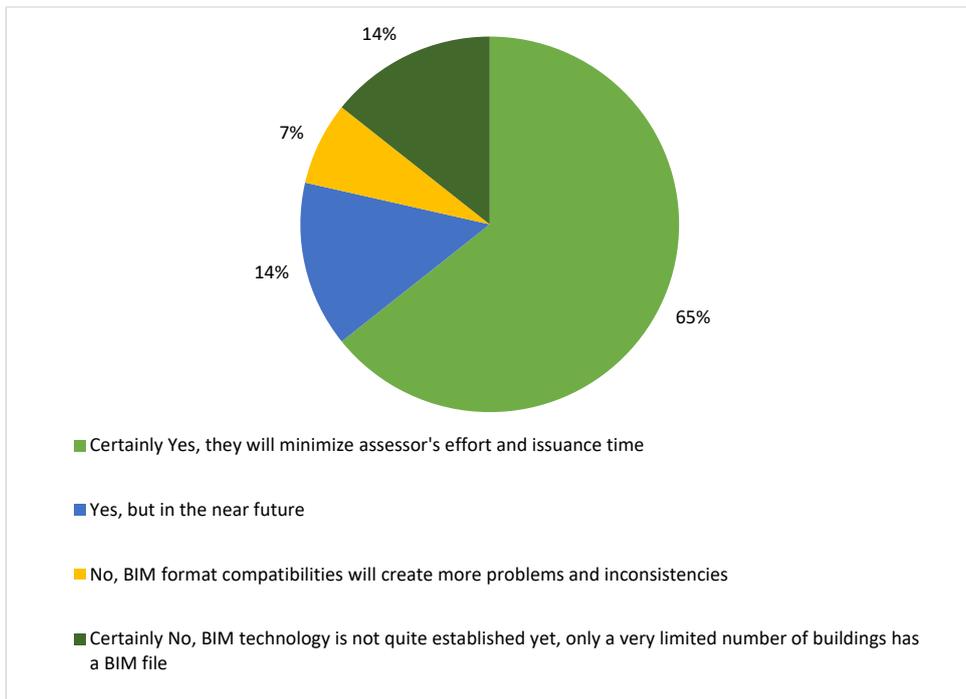


6. Do you find it important to include Human comfort KPIs in an EPC?

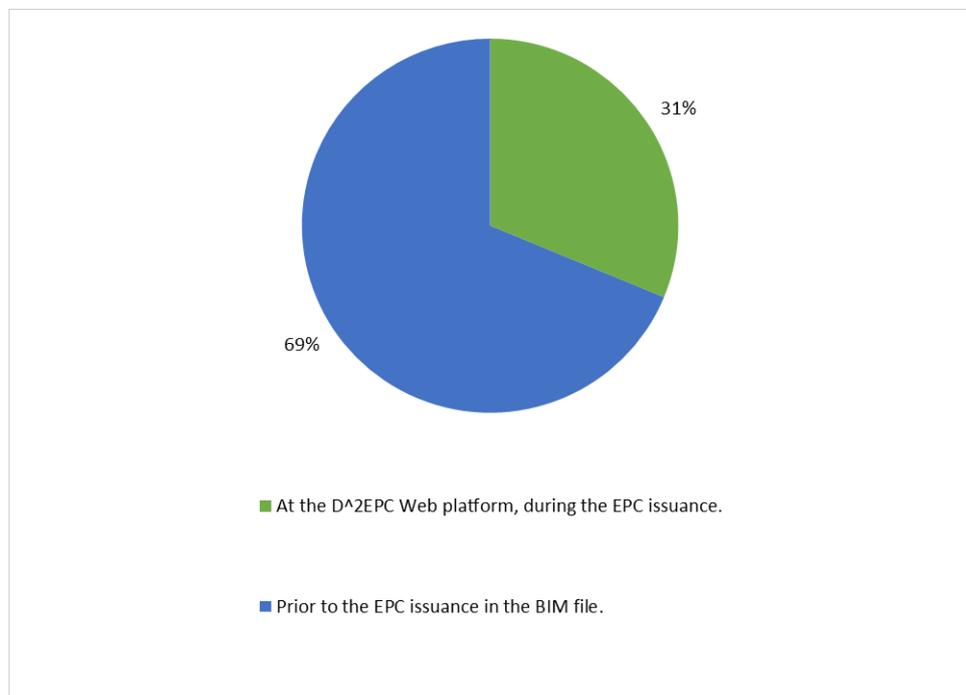


BIM-IFC Questions

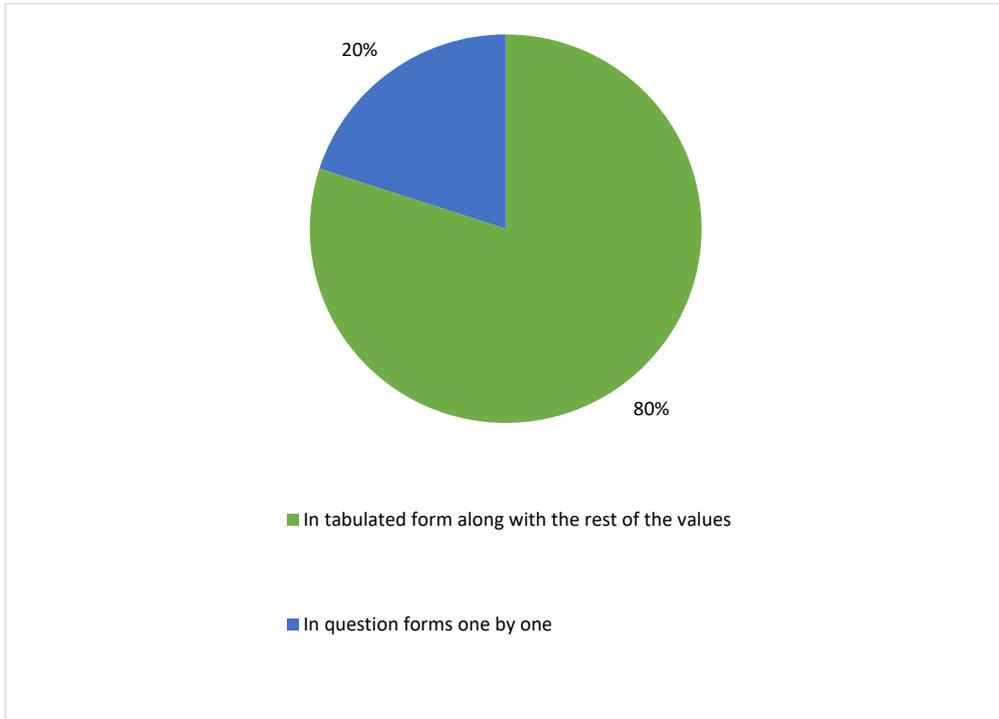
7. Do you believe that ifc files will actually help the EPC issuance process?



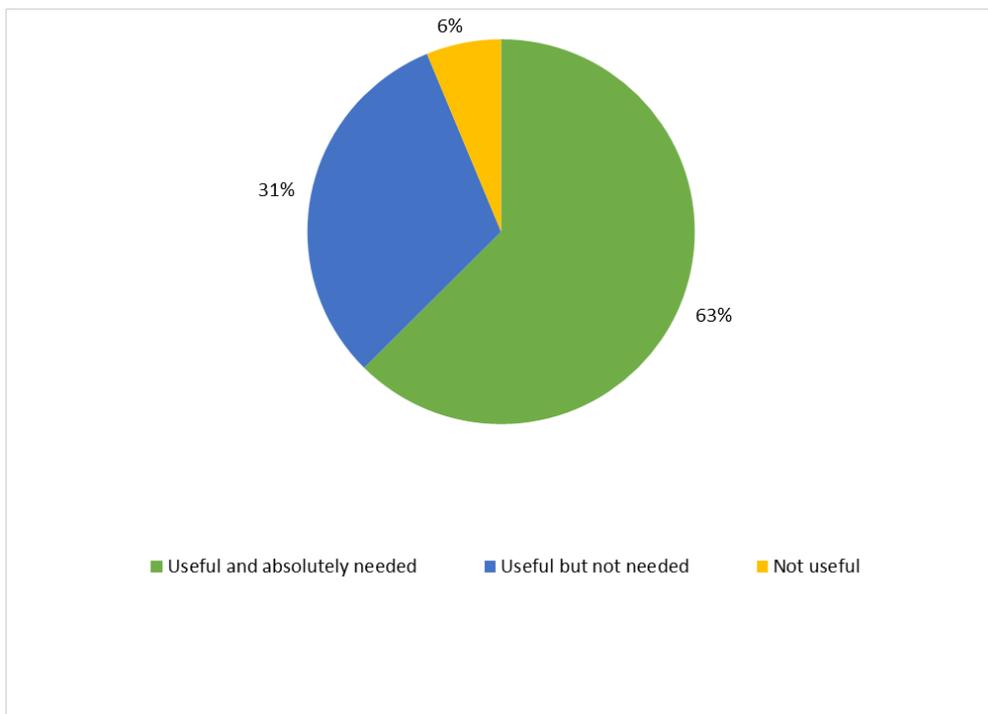
8. The addition of extra information should be made:



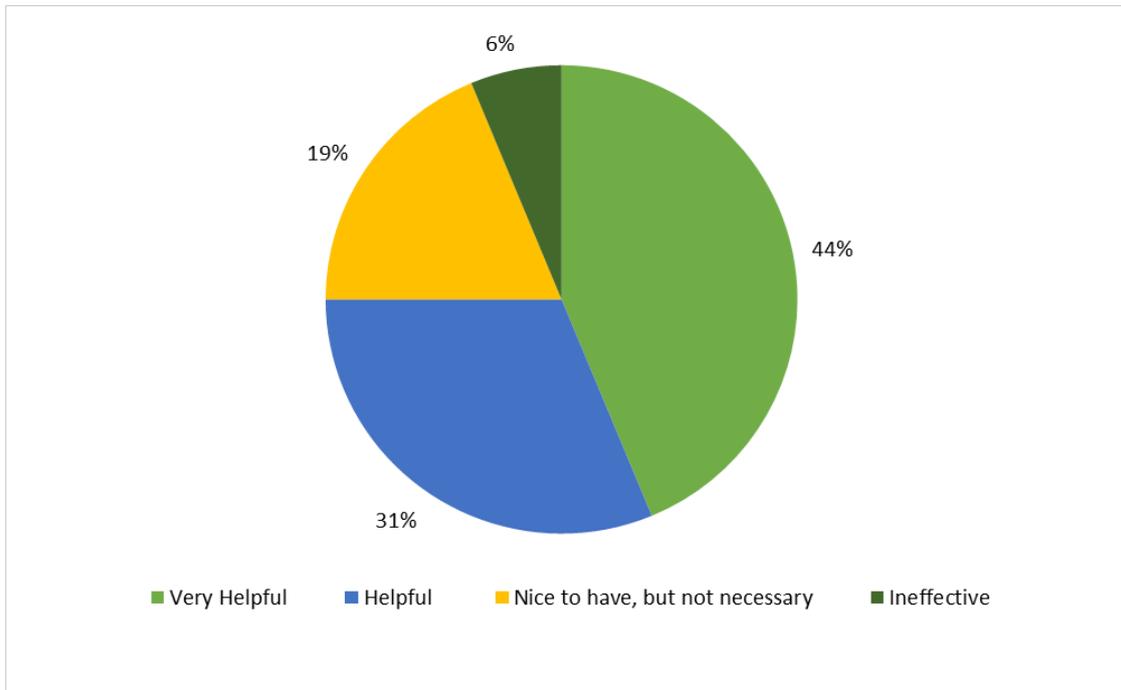
9. During the addition of extra information in the building model, how would you like to see the missing fields in the validation page?



10. Would you consider the storage and ability for later access of the .ifc file in the platform?

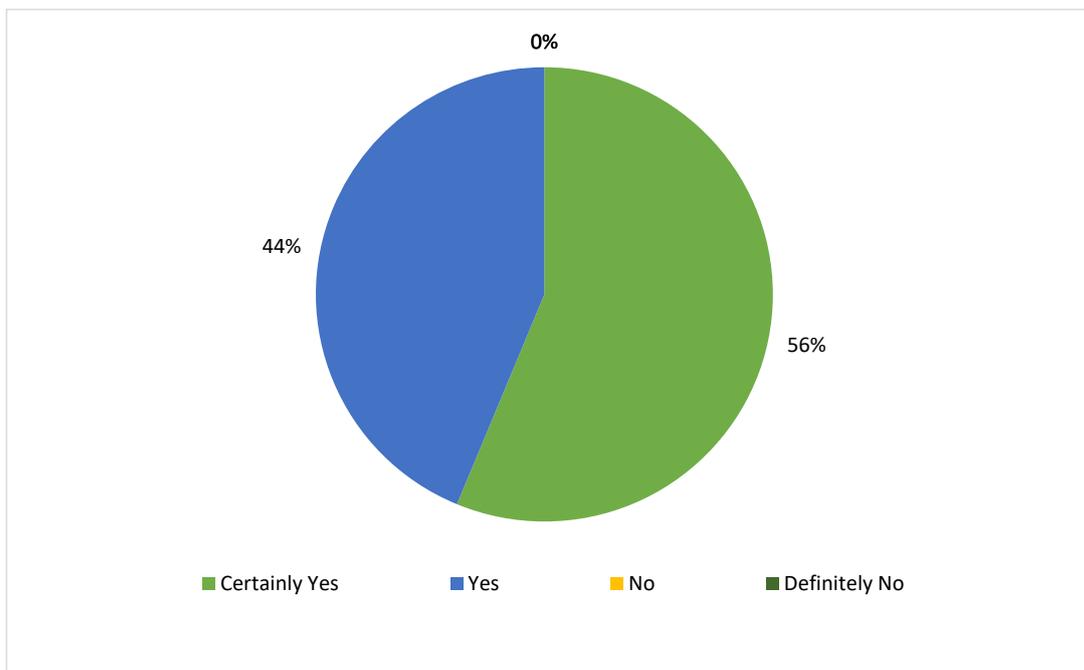


11. Is it helpful to have a 3D visual demonstration of the building during the certification procedure?

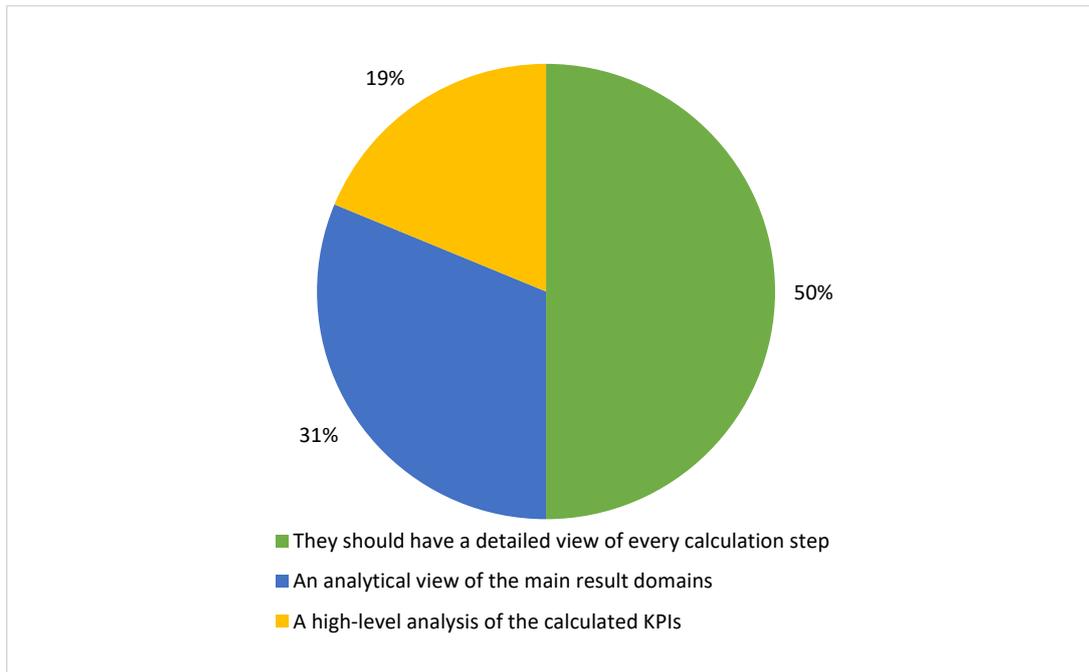


Look & Feel Questions

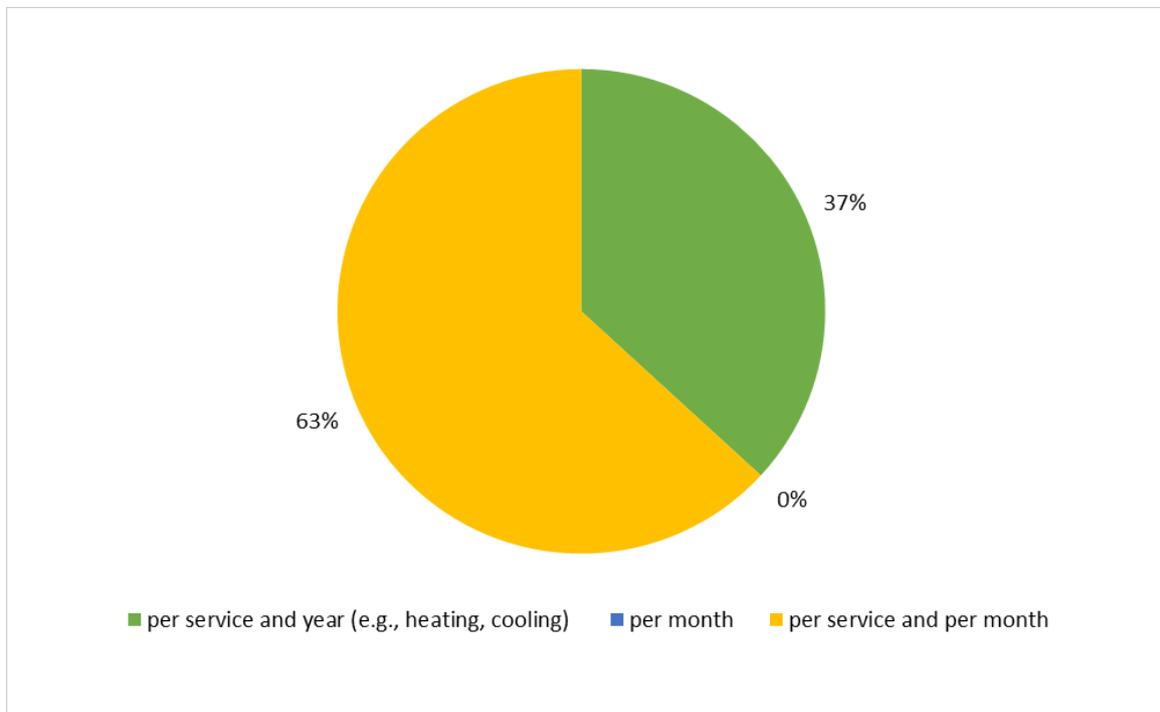
12. Do you believe that the calculated values of energy performance should be included in the final EPC Report?



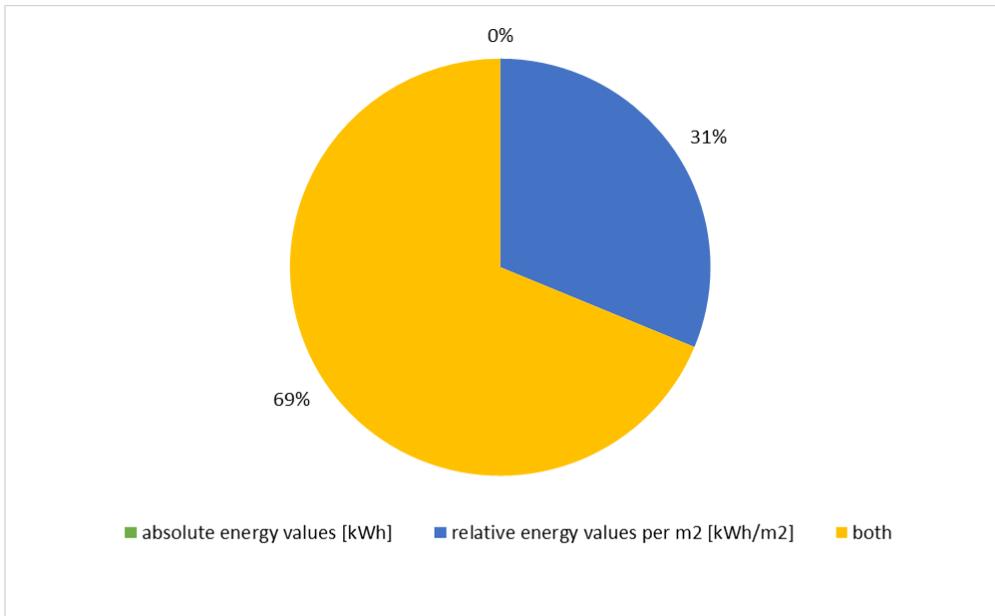
13. To what extent should the assessor have access to the calculation results?



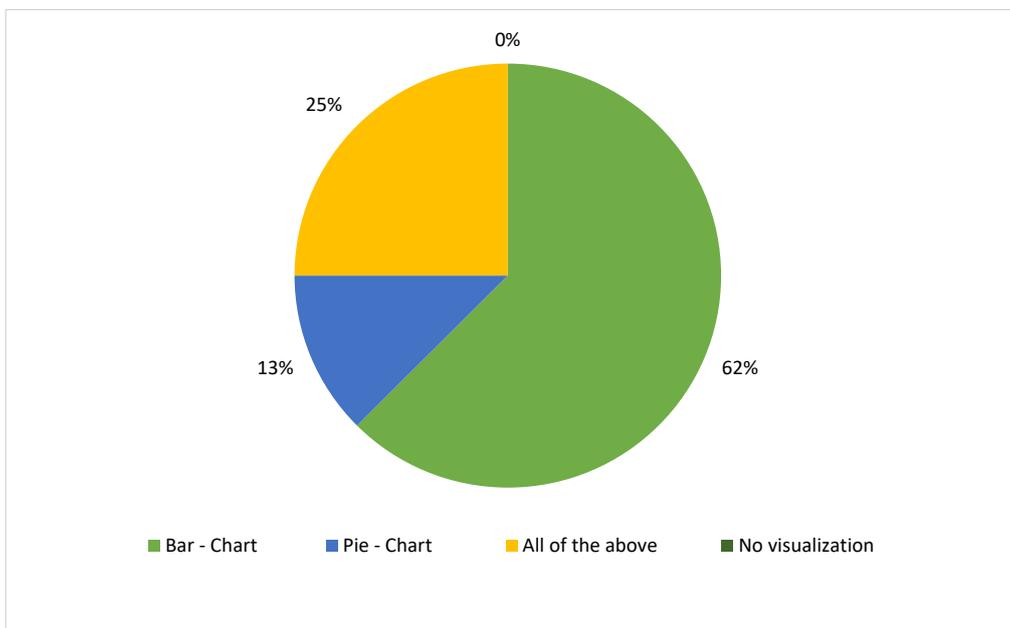
14. Which is the best way to demonstrate the calculation results?



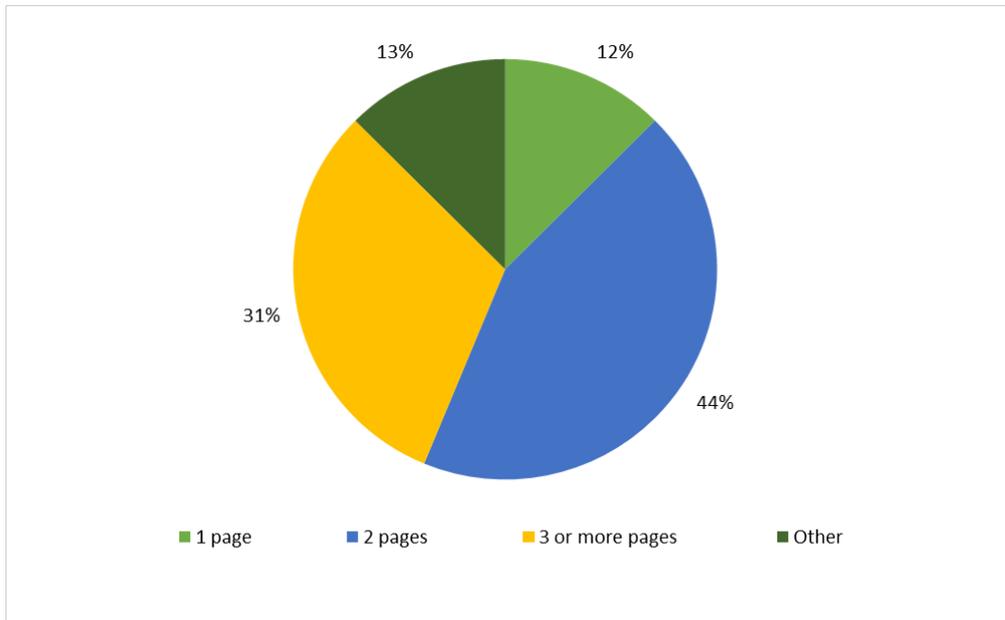
15. Which is the best way to demonstrate the calculation results values?



16. What is the most convenient way for the visualization of the EPC results?

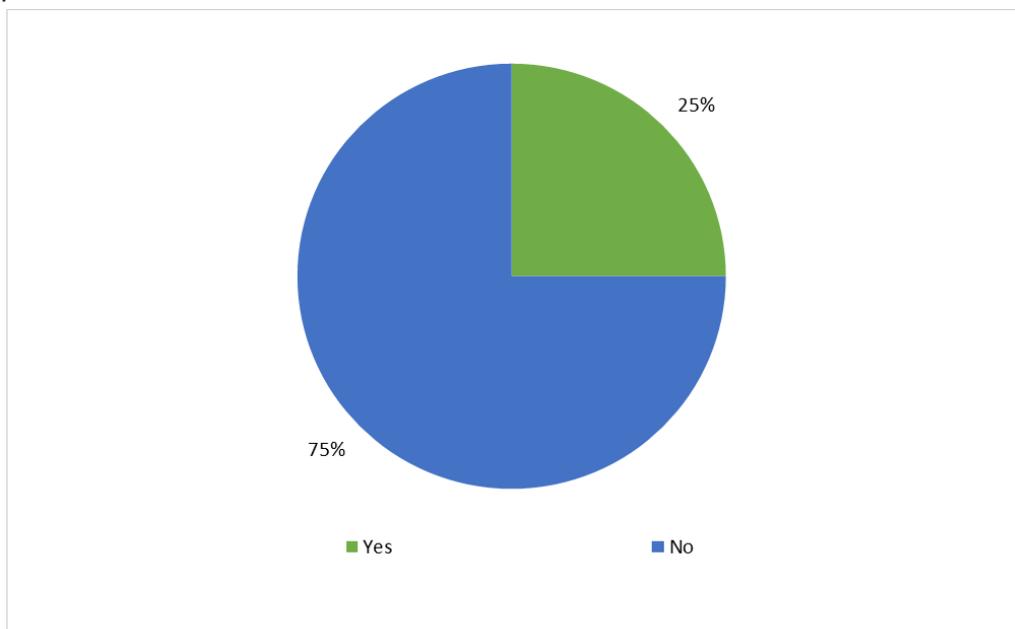


17. How long do you think the final EPC Report should be?

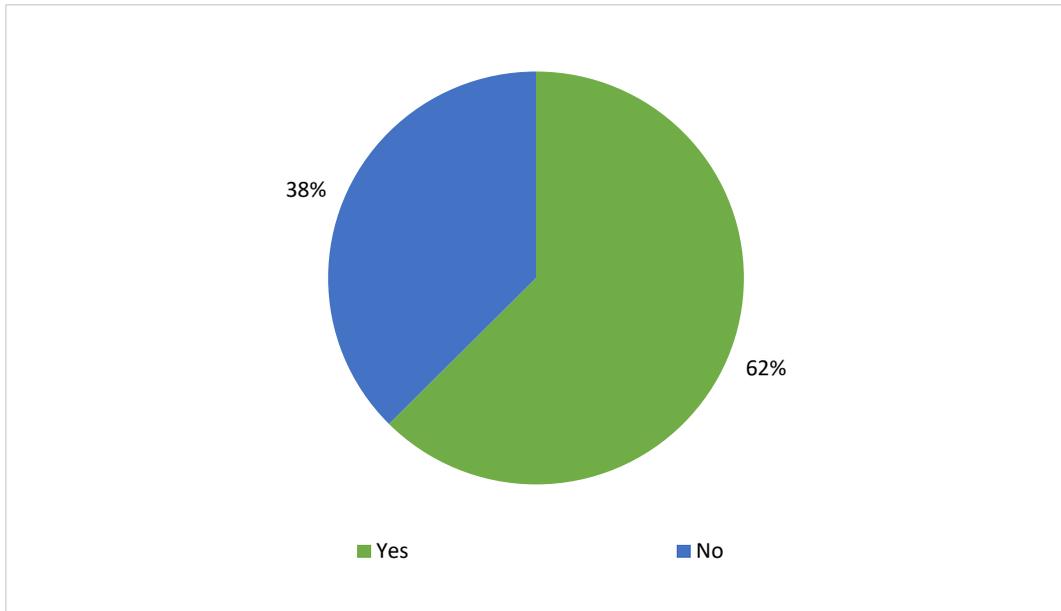


Manual related questions

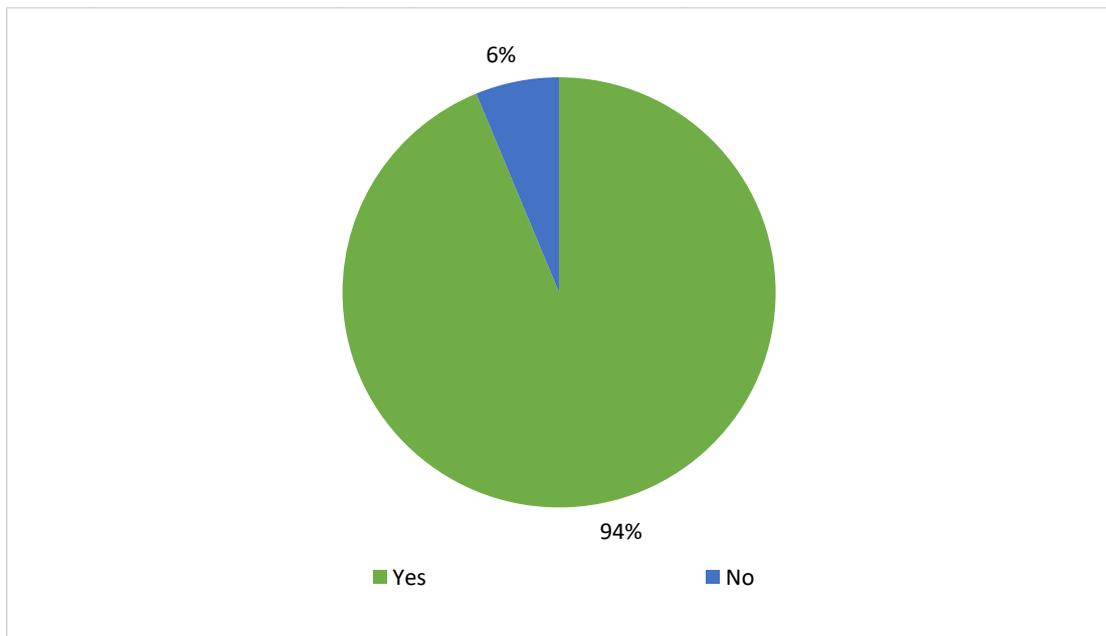
18. Do you believe that the manual is too technical?



19. Would you like to see a more in-depth explanation of the EPC process?



20. Would you like to see a complete process for one of our pilot cases?



21. Do you think that the role of the EPC assessor in the process is clear?

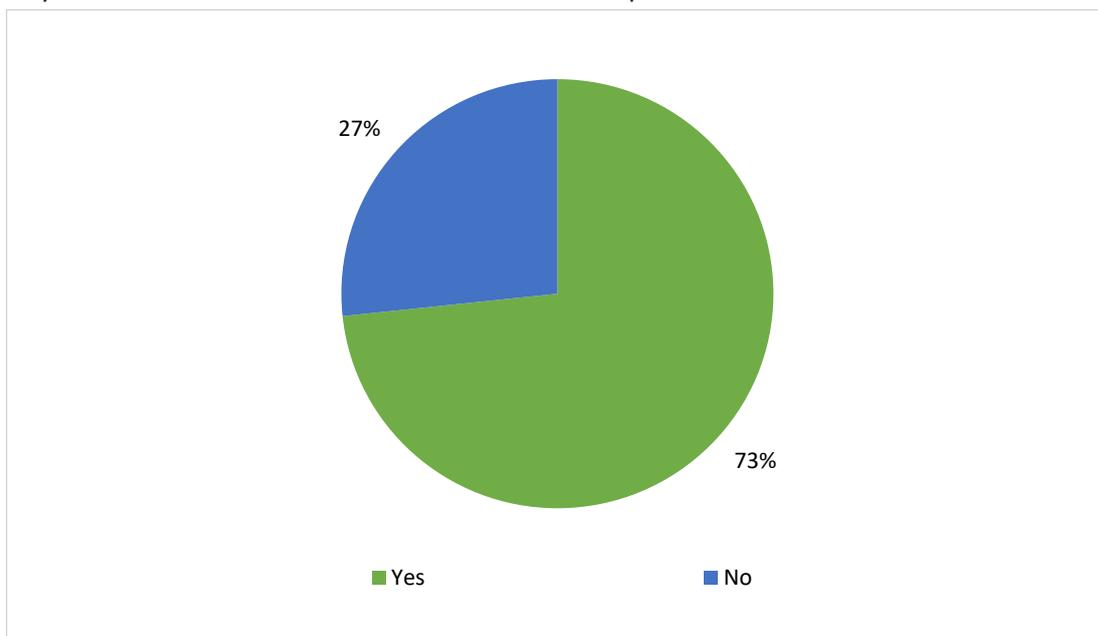


Figure 2. EPC assessors feedback graphs (1st Workshop – 2022)

22. What would you improve / What you would like to see implemented in the manual? (Free response)

| Country | |
|-----------|---|
| Austria | <ul style="list-style-type: none"> No comments |
| Cyprus | <ul style="list-style-type: none"> No comments |
| Greece | <ul style="list-style-type: none"> There must be a paragraph in the manual that explains how to use the tool with simple and clear steps and the user can go deeper where needed through the manual. How can it be applied in my country with the data of KENAK and TOTEE which is the basis for calculating the EPCs. For the real EPC cases editions, with the reality of Greece. Small private apartments offices. Some screenshots of the platform would be useful, so that the flow the user must follow is more clear. |
| Lithuania | <ul style="list-style-type: none"> We should try to do calculations before answering this question As it is still new information, there is a lot of non-clear points. There should be courses in Lithuanian to discuss all the details with the experts working in this field Detailed information about data sources where one or another parameter must be taken from for there wouldn't be maximum objectiveness in the evaluation of the building |

Table 3. EPC assessors feedback. Free response (1st workshop - 2022)

5.2.2 Second training session (2023)

The main conclusions are summarized in the following figures:

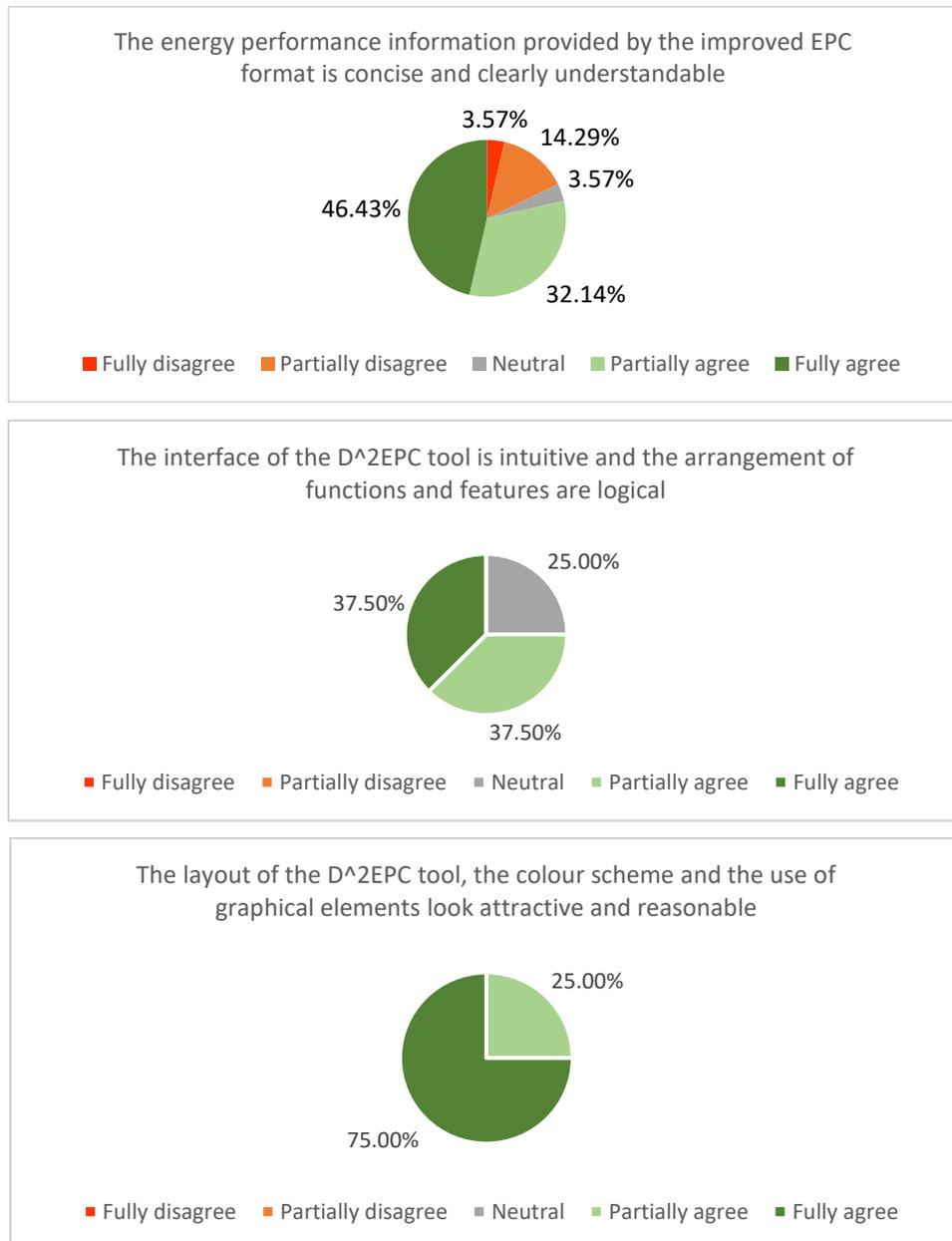
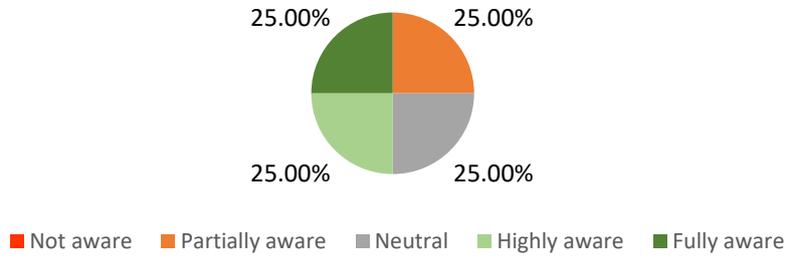


Figure 3. EPC Assessors' evaluation graphs

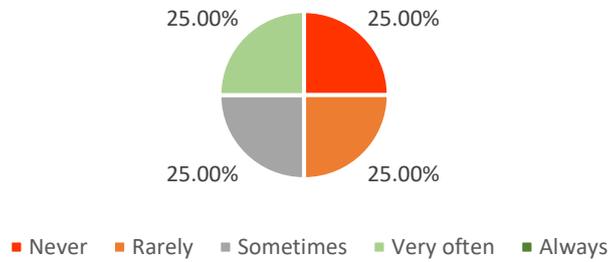
| Definition | Value |
|-------------------------------|---------------|
| Information clarity rate | 75.89% |
| Intuitiveness acceptance rate | 78.13% |
| Visual acceptance rate | 93.75% |
| Total acceptance rate | 82.59% |

Table 4. EPC assessors' acceptance rates

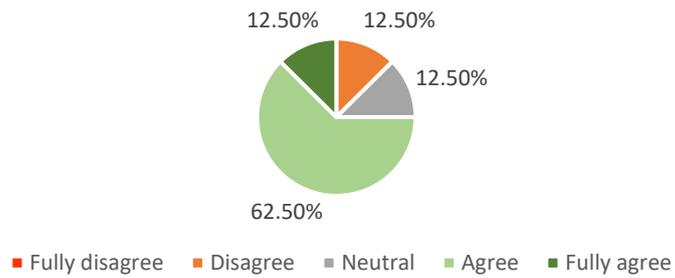
Were you aware of the operational rating before the training session?



Have you ever issued an EPC based on the operational data?



Do you consider the operational rating methodology more accurate than the asset-based rating?



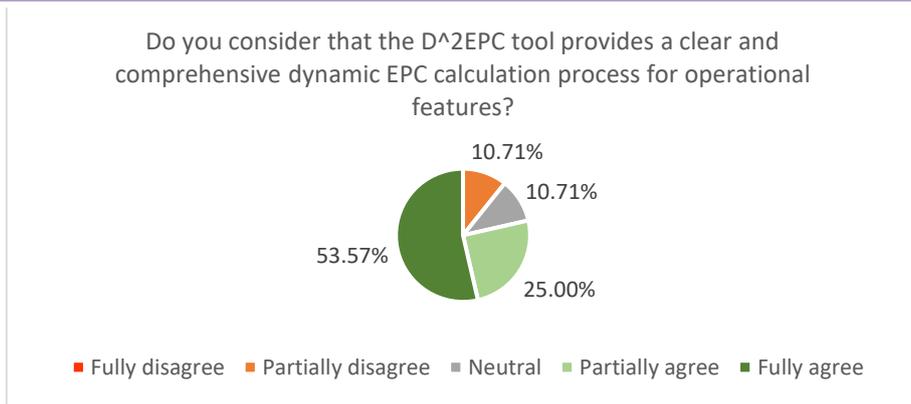


Figure 4. EPC Assessors' evaluation graphs

| Definition | Value |
|---|---------------|
| Awareness rate | 62.50% |
| Application rate | 37.50% |
| Total awareness rate | 50.00% |
| Operational rating acceptance rate | 68.75% |
| D ² EPC operational assessment acceptance rate | 80.36% |
| Total dEPC acceptance rate | 74.55% |

Table 5. EPC Assessors acceptance/understanding rates

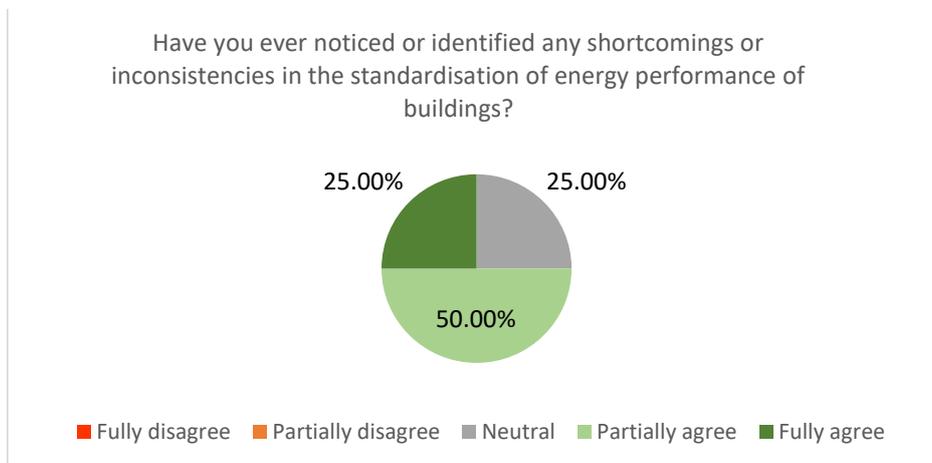
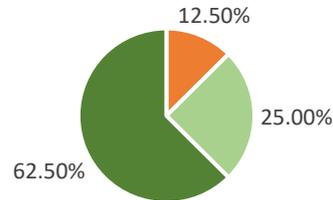


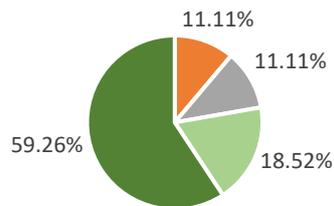
Figure 5. EPC assessors' feedback regarding drawback and discrepancies

Do you think that newly introduced indicators will serve as a valuable tool for decision making, such as evaluating the effectiveness of policies, strategies, and interventions in regards to indoor conditions and building operation?



Legend: Fully disagree (red), Partially disagree (orange), Neutral (grey), Partially agree (light green), Fully agree (dark green)

Do you think that incorporating environmental, financial, and human comfort indicators into EPCs will increase their attractiveness for the users?



Legend: Fully disagree (red), Partially disagree (orange), Neutral (grey), Partially agree (light green), Fully agree (dark green)

Figure 6. EPC assessors' evaluation graphs

| Definition | Value |
|---|---------------|
| Decision making acceptance rate | 84.38% |
| Increased EPC attractiveness by new indicators rate | 81.48% |
| Total acceptance rate | 82.93% |

Table 6. EPC assessors' acceptance rates

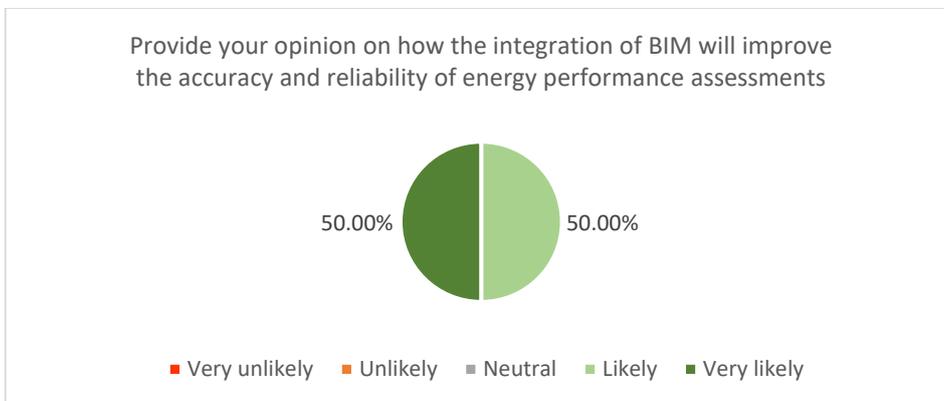
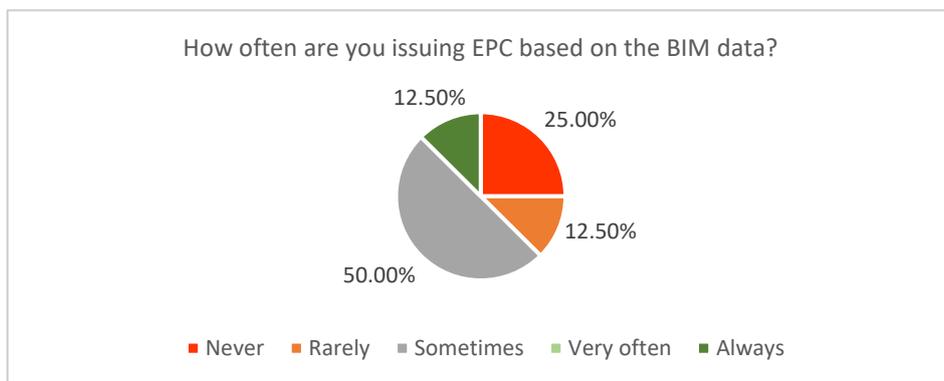
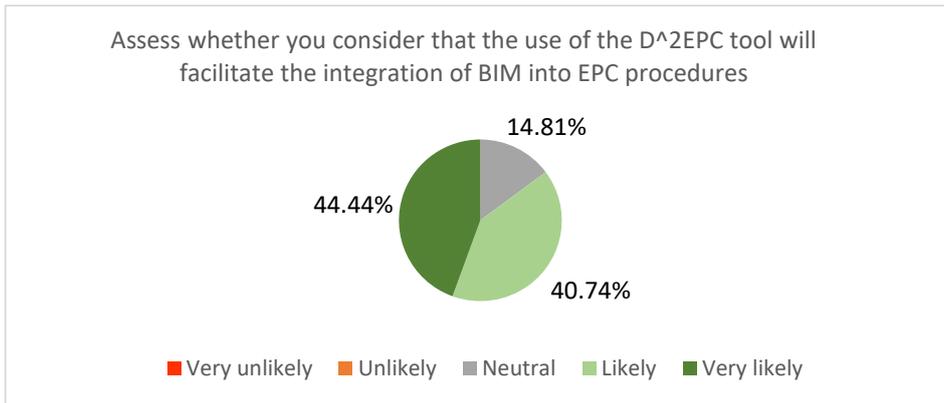


Figure 7. EPC assessors' assessment graphs

| Definition | Value |
|---|---------------|
| D^2EPC tool BIM integration facilitation rate | 82.41% |
| Accuracy improvement rate | 87.50% |
| Total solution acceptance rate | 84.95% |
| Total current BIM application rate | 40.63% |

Table 7. EPC assessors' acceptance rates

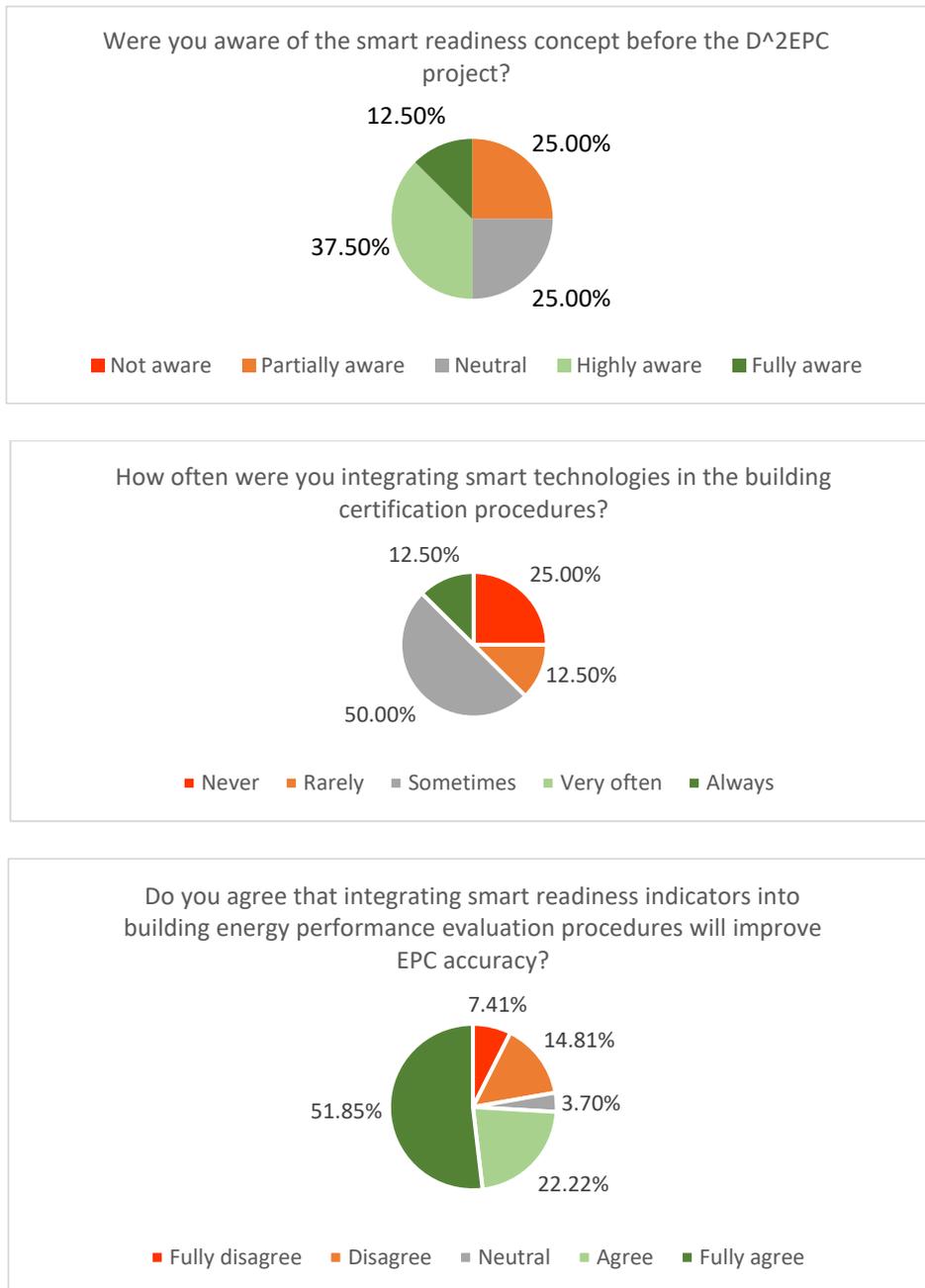


Figure 8. EPC assessors' evaluation graphs

| Definition | Value |
|------------------------------|---------------|
| SRI awareness rate | 59.38% |
| SRI application rate | 40.63% |
| Total awareness rate | 50.00% |
| Total acceptance rate | 74.07% |

Table 8. EPC assessors' SRI awareness and acceptance rates

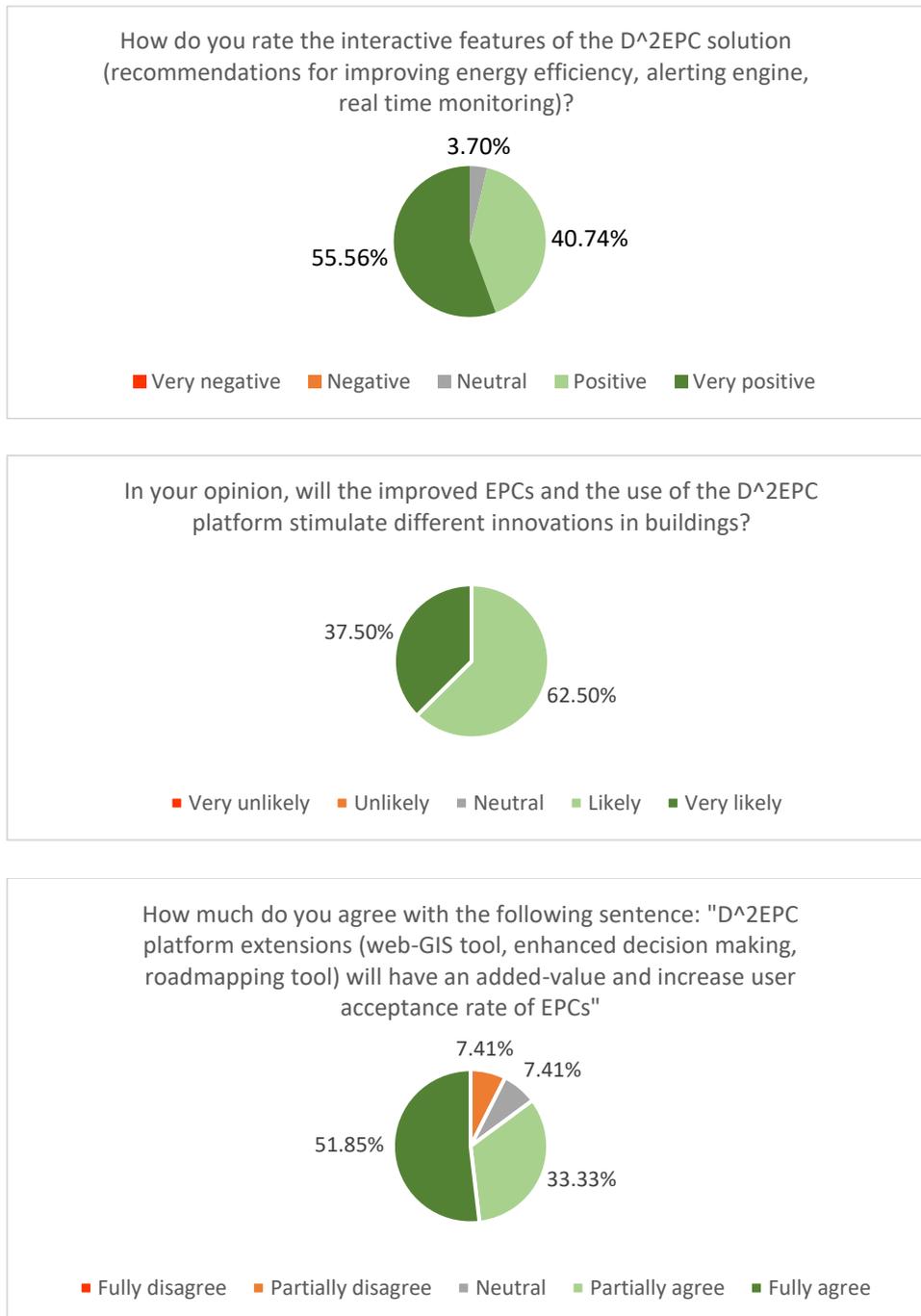


Figure 9. EPC assessors' evaluation graphs

| Definition | Value |
|--|---------------|
| D^2EPC tool interactivity rate | 87.96% |
| Innovation promotion rate | 84.38% |
| D^2EPC platform extensions acceptance rate | 82.41% |
| Total D^2EPC platform acceptance | 84.92% |

Table 9. EPC assessors' D^2EPC platform acceptance rates

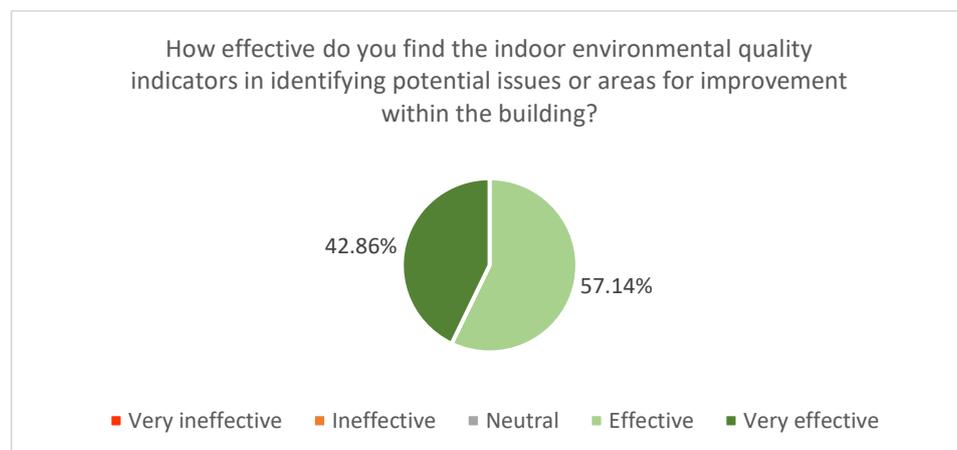
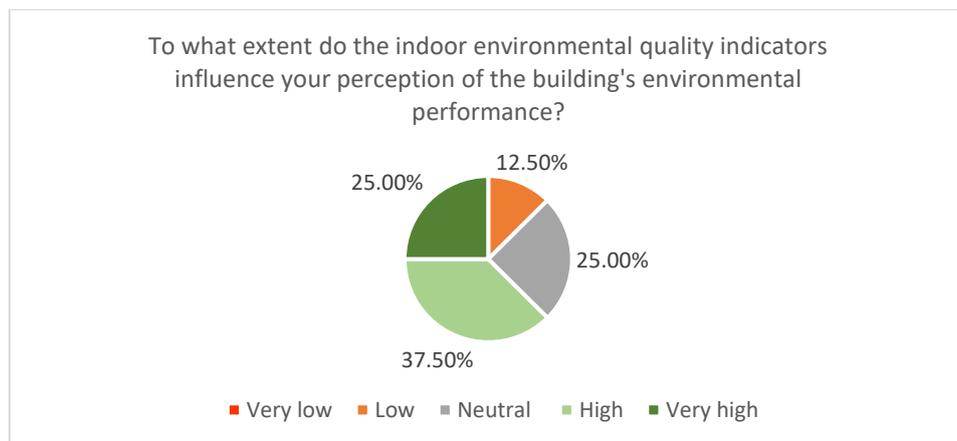
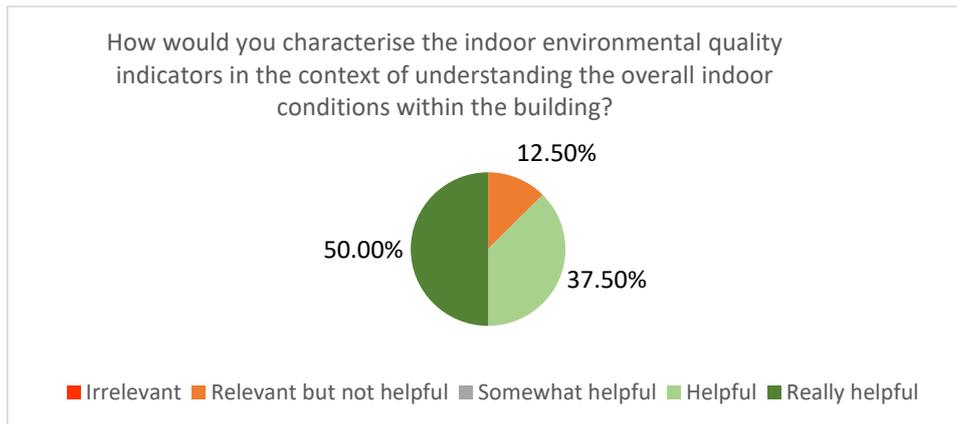


Figure 10. EPC assessors' evaluation graphs

| Definition | Value |
|---|---------------|
| IEQ in defining indoor conditions rate | 81.25% |
| IEQ indicators influence to indoor conditions perception rate | 68.75% |
| Indicators effectiveness rate | 85.71% |
| Total IEQ indicators acceptance rate | 78.57% |

Table 10. EPC assessors' IEQ indicators acceptance rate

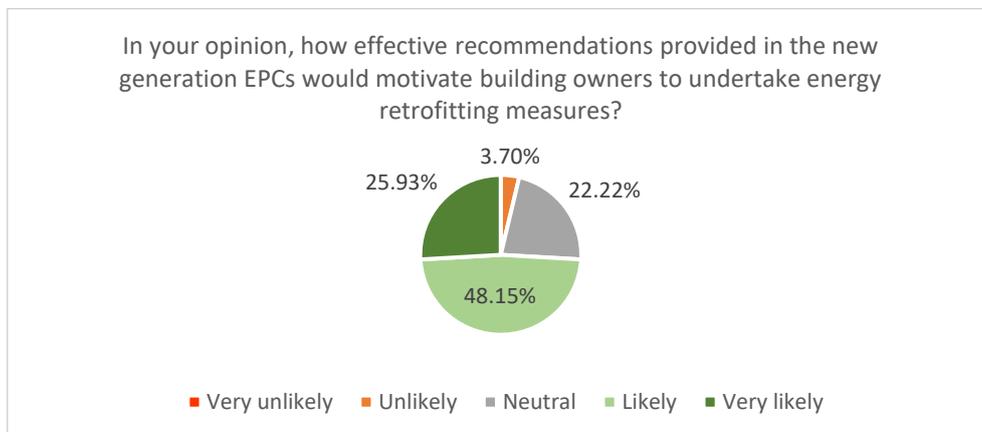
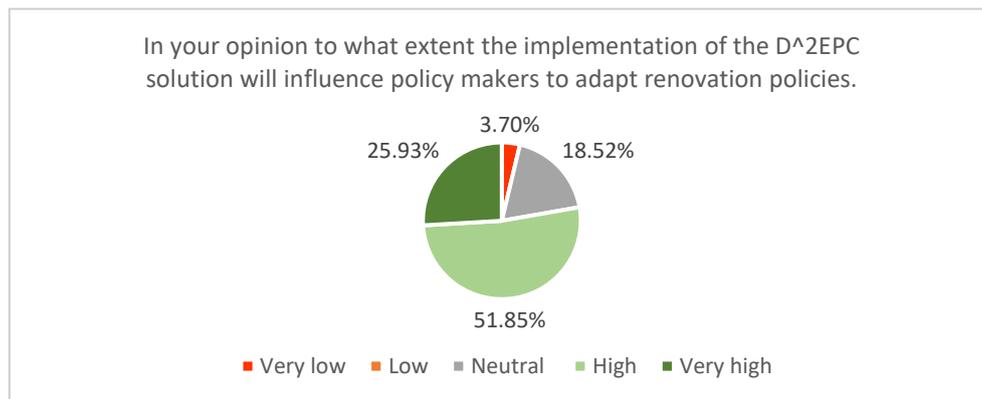


Figure 11. EPC assessors' evaluation graphs

| Definition | Value |
|--|---------------|
| D^2EPC influence to policy makers rate | 71.88% |
| D^2EPC renovation motivation rate | 74.07% |
| Total improving renovation rate | 72.97% |

Table 11. EPC assessors' renovation promotion perception

6 Conclusions

This deliverable aimed to describe the workshops developed in the framework of Task 5.1. Important information about the workshops has been provided, as they are the objectives, the target audience and the contents. The performed activities developed prior the workshops and after them have been also described. The questionnaires and their results have been included in the deliverable.

Concerning the presented results, both workshops had a good attendance (88 and 106 registered people respectively), with an important contribution of the countries represented in the consortium (Greece, Lithuania, Austria, Spain, etc.). Although the attendance was quite high, the number of responses to the questionnaires is lower than expected. Engaging the attendants to provide feedback after the workshops has been a difficult task. Nevertheless, asking the attendants to provide feedback through the real time online questionnaire has resulted in a much higher participation rate.

Regarding the responses themselves, D^2EPC methodologies and platform have had a very good impact. For example, after the first workshop, 75% of replies indicated that the contents of the manual were adequate and 73% indicated that the role of the assessor was clear. After the second workshop, about 78% of replies indicated that the information is concise and clearly understandable and a 75% considered positively the look and feel of the platform.

7 ANNEX A: Invitation templates



Figure 12. Invitation template for the 1st Workshop



Figure 13. Invitation template for the Training Session