



D4.3 PILOT PROJECT APPLICATION REPORT BULGARIA



QualitEE Project

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1 INTRODUCTION

During the project activities, Technical quality criteria and sometimes Financial Guidelines have been applied in new pilot projects. Partners have provided support to and received feedback from clients or energy service providers from the procurement phase until the first measurement and verification phase (if possible). The report follows the pilot project implementation in quantitative and qualitative manner and extracts lessons learned.

This report describes the pilot projects and how and which technical and financial criteria were used. Feedback on the application was collected with the aim to refine and improve technical quality criteria and financial guidelines and to provide real-world insights and advice on the establishment of national certification frameworks.

2 DESCRIPTION OF THE PILOT PROJECT

2.1 Pilot project factsheet: EPC in a kindergarten in Katunitsa

Project details:

Kindergarten “Svoboda” in the Bulgarian village Katunitsa was renovated.

The EPC contract was signed in July 2018 and measures implemented in the following 90 days. At the time of contact with the EPC provider (beginning of 2019), the project was in an operational phase.

The project involved the following energy efficiency improvement measures:

- Thermal insulation of external walls 1294 m²;
- Replacement of 248 m² windows;
- Thermal insulation of 1316 m² roof.



Table 1 Energy Consumption Data

Energy Consumption BEFORE intervention (actual) kWh/a	Energy Consumption AFTER intervention (actual) kWh/a	Value of planned EE investment EUR
580 000	330 000	204 000

Business case description/economic parameters

- Energy Performance Contracting
- 7 years contract duration
- Support by the Energy Efficiency and Renewable Energy Fund (Bulgaria)

Stakeholders/companies involved

- Client: Sadovo Municipality, Sadovo
- ESCO: Almina Consult Ltd., Sofia

Energy retrofit of a 2561 m² kindergarten in Katunitsa
This project is expected to **save 72 tCO₂** emissions per year (estimated).

Annual final energy savings:
250 000 kWh/year (43% energy savings)
Annual primary energy savings:
360 000 kWh/year (estimated)

2.2 Pilot project factsheet: EPC in a school in Kostinbrod

Project details:

Utilization of the heat from the refrigerators

Primary School No.2 “Vasil Levski” in Kostinbrod was renovated. The contract was signed and measures implemented in 2018. At the time of the contacts with the EPC provider, the project was in an operational phase.



The project involved the following energy efficiency improvement measures, aiming to improve the energy efficiency class of the building from “G” to “C”:

- Insulation of external walls, aiming to reduce the heat transfer coefficient from $1,62\text{W/m}^2\text{K}$ to $0,27\text{W/m}^2\text{K}$;
- Replacement of 32 m^2 windows and the entrance door, resulting in reduction from $U = 2,42\text{W/m}^2\text{K}$ to $U = 1,47\text{ W/m}^2\text{K}$ and lower air infiltration.
- Thermal insulation of the roof, resulting in coefficient reduction from $1,10\text{ W/m}^2\text{K}$ to $0,26\text{ W/m}^2\text{K}$.
- Reconstruction of the heating system – gasification of the building (respectively reducing the previous consumption of electricity and wood biomass), aiming to use natural gas with efficiency of at least 92%, and internal heating network.

Table 2 Energy Consumption Data

Energy Consumption BEFORE intervention (actual) kWh/a	Energy Consumption AFTER intervention (actual) kWh/a	Value of planned EE investment EUR
190 000	64 000	118 862

Energy retrofit of a school in Kostinbrod

This project is expected to **save 34 tCO₂** emissions per year.

Annual final energy savings:
126 000 kWh/year (64% energy savings)

Annual primary energy savings:
154 000 kWh/year (estimated)

Business case description/economic parameters

- Energy Performance Contracting
- 5 years contract duration
- Investment payback 15.5 years
- Investment (project) lifetime 20 years
- Loan by the Energy Efficiency and Renewable Energy Fund covering 90% of the investment

Stakeholders/companies involved

- Client: Kostinbrod Municipality, Kostinbrod
- ESCO: Almina Consult Ltd., Sofia

2.3 Pilot project factsheet: Efficient refrigeration a distributional centre

Project details:

A family-run food distributor company based in Sofia had additional storage needs and this in turn increased their cooling needs. The project consists of installation of 3 new refrigeration units in the distributional centre of the company. The project results in the lowest possible energy consumption and generates electricity savings, due to the heat recovery system.



The units serve one medium temperature storage room and two low temperature rooms. All systems are fully automated through multifunctional micro-processing controllers and allow online monitoring. The units will lower the specific electricity consumption by 15%.

The contract was signed and measures implemented in 2018 and the project is in an operational phase.

The project was implemented through an EPC scheme, although it includes installation of additional units that increase the energy consumption. The baseline energy consumption, according to which the savings were calculated, was the energy consumption of traditional refrigeration technology.

Table 3 Energy Consumption Data

Energy Consumption BEFORE intervention (actual) kWh/a	Reduction of the electricity consumption compared to traditional technology %	Value of planned EE investment EUR
N/A	15%	53 300

Installation of 3 efficient refrigeration units in **350 m²** food distribution centre.

This project is expected to **save 69 tCO₂** emissions per year.

Annual final energy savings:
85 000 kWh/year (15% lower specific electricity consumption).

Annual primary energy savings:
212 000 kWh/year (estimated)

Business case description/economic parameters

- Energy Performance Contracting, where savings are calculated as the difference between the consumption of the installed efficient technology and traditional inefficient technology
- 20 years investment lifetime
- 4.5 years investment payback period
- Loan from Energy Efficiency and Renewable Energy Fund, amounting to 90% of the investment value

Stakeholders/companies involved

- Client: Ruvela, Sofia
- ESCO: Resalta Bulgaria, Sofia

3 FEEDBACK ON QUALITY CRITERIA

Feedback from pilot projects was collected in the form of a questionnaire. It contained identical questions for each quality categories and some open-ended questions to collect qualitative information. For closed questions a limited number of options were given, and respondents were asked to evaluate quality criterion category separately. All nine quality criteria impact categories have been analysed. The impact categories are given in Figure 1 below.

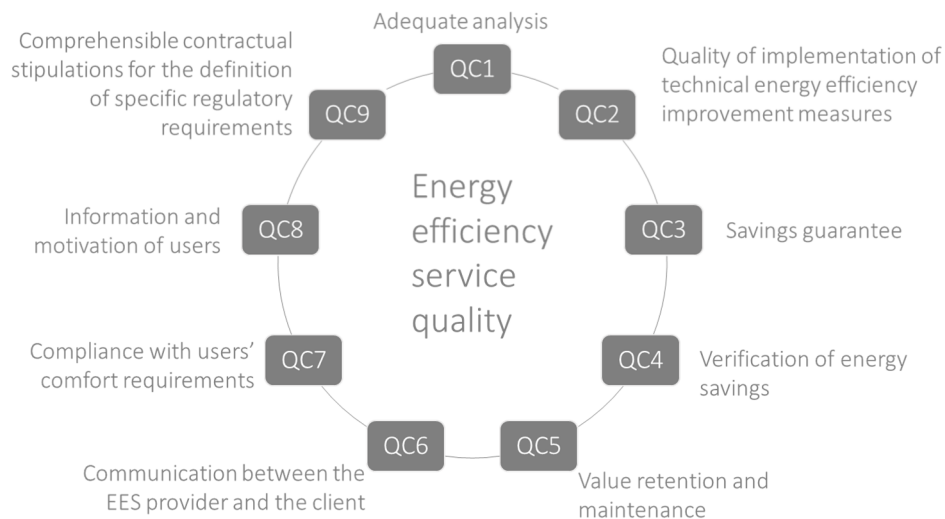


Figure 1. Categories of quality criteria

The main questions for each criterion are as follows:

1. How **important** is this criterion in assessing the quality of EES?
2. Is the criterion **specific** enough?
3. Is it possible to provide **evidence** (documents, references in contracts, measured data etc.) to assess the criterion?
4. How **time consuming** is the assessment of this criterion?
5. How many criteria have been used in the project?

The first question was asked to evaluate how important the particular criterion is.

3.1 Importance of the criteria

3.1.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

Given that the EES provider of the two renovation projects was identical and the projects were similar, an efficient approach to address the two projects at the same time was chosen.

Respondents have been asked to evaluate which are the most important criteria? As most important criteria according to the EPC provider have been considered:

- QC2: Quality of implementation
- QC3: Savings guarantee
- QC4: Verification of energy savings

3.1.2 Efficient refrigeration a distributional centre

As most important criteria according to the EPC provider have been considered:

- QC1: Adequate analysis
- QC2: Quality of implementation
- QC4: Verification of energy savings

3.2 Was the criterion specific enough?

3.2.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

Participants were asked to evaluate each impact category by rating them from not specific (1) to very specific (5). Answers have been summarized in Figure [Error! Reference source not found.2](#) below.

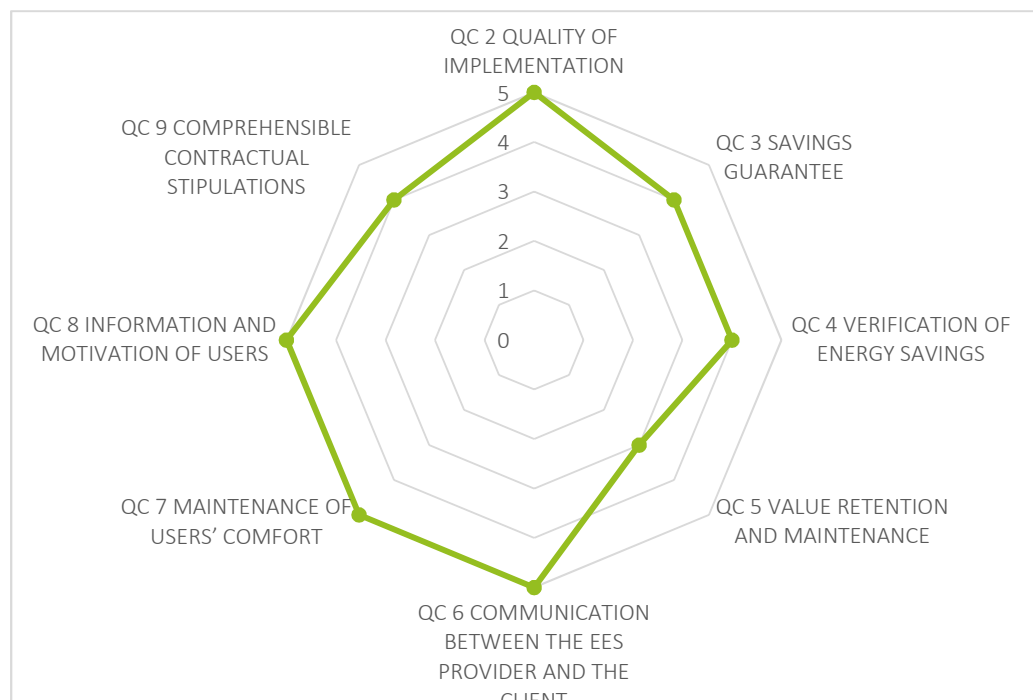


Figure 2. Specificity of criteria (pilots 1 and 2)

No questions about QC1 were answered. This criterion is not applicable for Bulgaria, because the legislation does not allow to the EES provider to get involved in the energy audit.

3.2.2 Efficient refrigeration a distributional centre

The respondents of this pilot provided responses to the same question shown on the below figure.

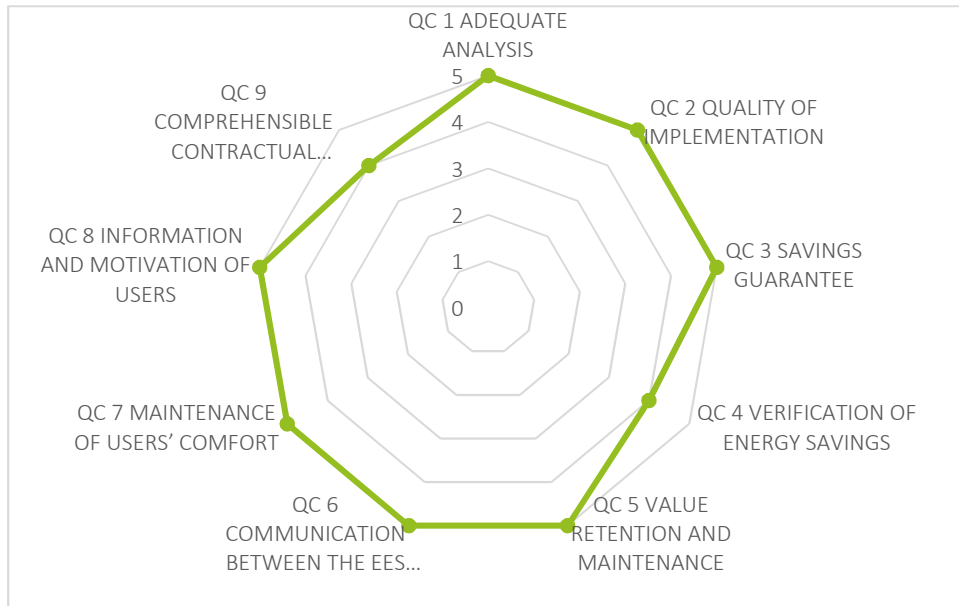


Figure 3. Specificity of criteria (pilot 3)

3.3 How easy is it to provide evidence?

3.3.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

Feedback was also collected with the aim to evaluate the ease of availability of evidence – documents, references in the contract, measured data etc. – to assess a specific criterion. Respondents were asked to evaluate each impact categories and the possibility to provide evidence by rating each criterion from not possible at all (1) to easily possible (5). The answers have been summarized in Figure 4.

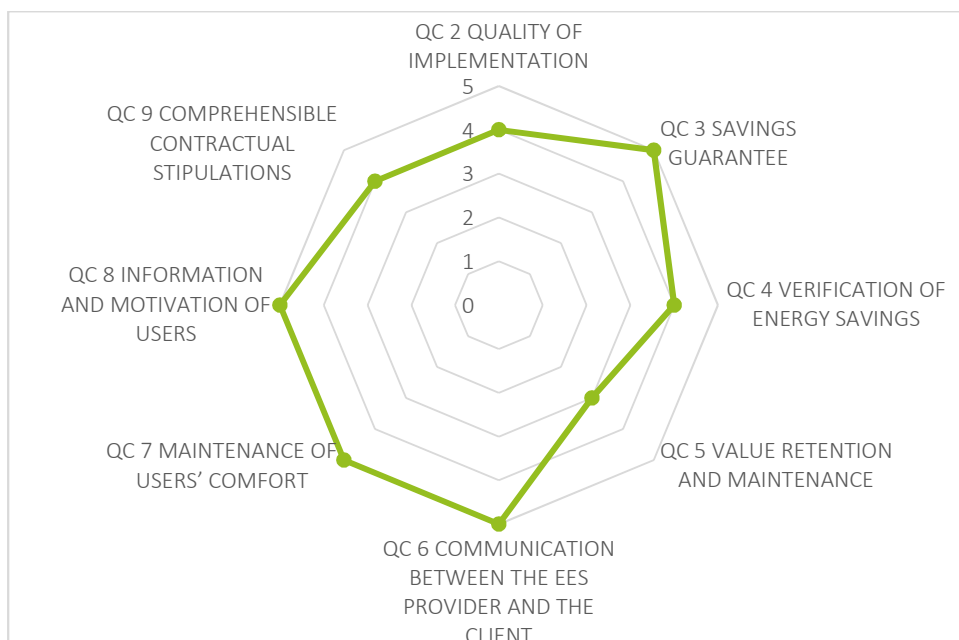


Figure 4. Availability of evidence in the two renovation projects (pilots 1 and 2)

3.3.2 Efficient refrigeration a distributional centre

The respondents of this pilot provided responses to the same question shown on the below figure.

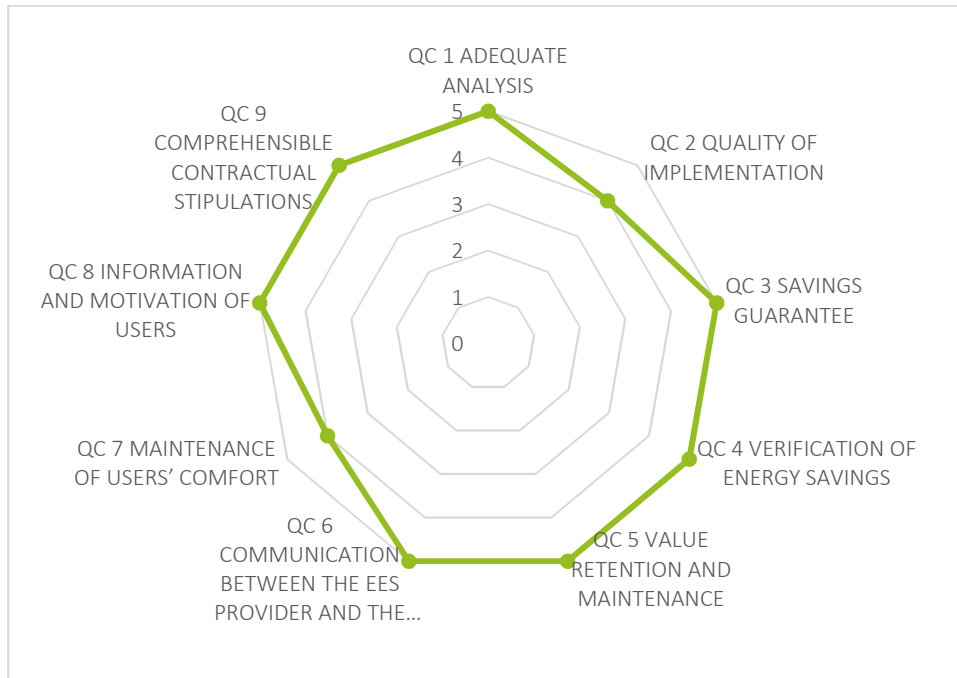


Figure 5. Availability of evidence in the two renovation projects (pilot 3)

3.4 How time consuming is the assessment of the criterion?

3.4.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

Respondents rated each impact categories from very time consuming (1) to not time-consuming (5). Answers have been summarized in Figure 6 below.

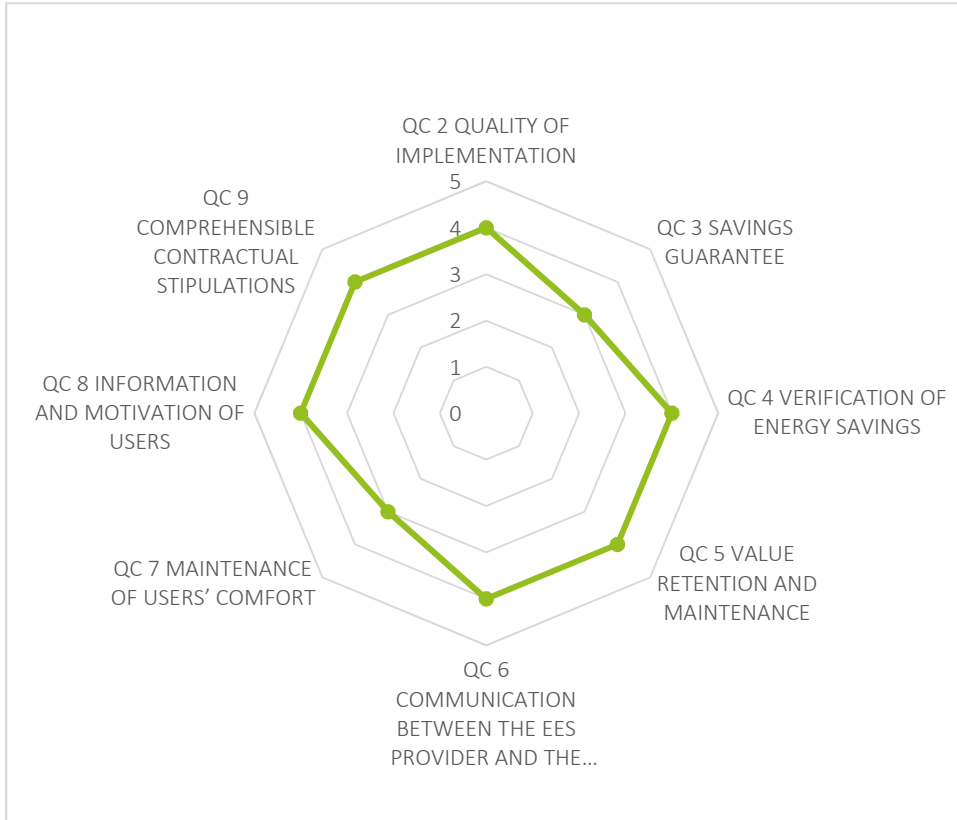


Figure 6. Time taken for evaluating criteria in the two renovation projects (pilots 1 and 2)

3.4.2 Efficient refrigeration a distributional centre

The respondents of this pilot provided responses to the same question shown on the below figure.

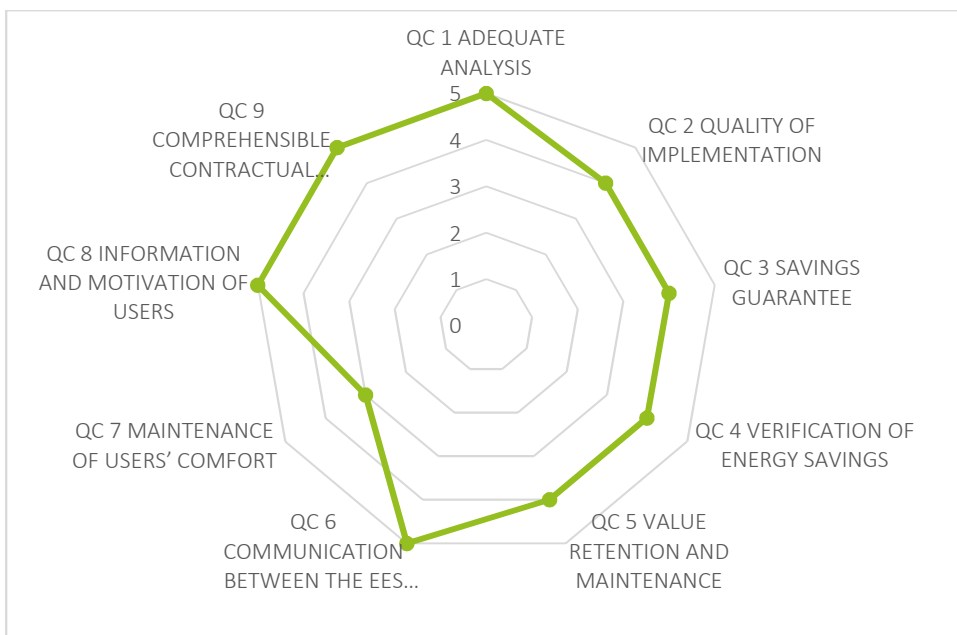


Figure 7. Time taken for evaluating criteria in the two renovation projects (pilots 1 and 2)

3.5 Barriers and success factors for the application of criteria

3.5.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

All EES quality criteria, although not all sub-criteria, have been considered in both projects - the school and kindergarten renovation, except for QC1. The reason for not considering QC1 was explained above.

Most QC are part of the Bulgarian legislation, concerning EPC, construction works, etc. The legislative requirements fully cover QC3 and QC4 and partly (some sub-criteria) – QC2, QC7, QC9. The QC covered by the legislation need to be fulfilled anyway, even if not part of the tender documentation and contract. It is important, however, to note that many of the legislative requirements about EPC concern only projects assigned by public clients (such as the 2 pilots) and are not applicable to private clients.

During the discussion, it was highlighted that the national legislation contains numerous quality-related requirements to projects. However, the practice in Bulgaria indicates that the actual compliance is sometimes poor, on paper only. Therefore, a priority is to ensure actual compliance with the legal requirements, rather than introducing additional requirements.

Additionally, during the discussion, several issues were highlighted:

- Criterion 4.3 is not applicable, because the baseline is defined in the audit report.
- It is unclear to which “system” criterion 5.1 refers to.
- The Bulgarian legislation defines the comfort requirements and who/how checks the compliance. Normally, except for specific cases, these are not project-specific and the sub-criteria are not applicable.
- It is unclear why Criterion 9.7 is needed, given that the client is not interested how the ESCO arranges the funding.

The QC considered in the project were part of the tender dossier – technical specification, model contract, etc.

3.5.2 Efficient refrigeration a distributional centre

All EES quality criteria relevant to the project were applied. QC7 is apparently not applicable, due to the specific use of the building. Similarly, QC8 has only negligible relation to the project. Additional sub-criteria not applicable to the project are: 5.1, 6.3, 6.4, 9.3, 9.6, 9.7, 9.8.

All criteria and sub-criteria are reasonable. In each specific project, however, many may be unnecessary, because each project is specific. It is therefore not justified to expect compliance with all criteria. Instead, they shall be used only as a checklist by the client and by the ESCO.

Private clients generally prefer short and simple contracts. A long list of contractual obligations would increase the transaction costs for both parties (e.g. to monitor and document compliance) and may make the service hard to sell. If there is trust, contracts are to a certain extent a formality.

3.6 Lessons learned from consultations and pilot projects

3.6.1 Renovation of the school in Kostinbrod and kindergarten in Katunitsa

The key lessons learned from the consultations are as follows:

- All EES quality criteria compatible with the Bulgarian legislation have been considered;
- No missing criteria have been identified;
- From a European point of view, no criteria to be removed have been identified, as all criteria may be relevant for a specific country context;
- From Bulgaria point of view the point of view, several criteria / sub-criteria are not needed. Their number is higher in the public sector projects, where EPC legislation covers these criteria.

3.6.2 Efficient refrigeration a distributional centre

The key lessons learned from the consultations are as follows:

- All EES quality criteria and sub-criteria relevant to the project were applied;
- Many criteria are not relevant to a specific project, or their formalization in the contract is unnecessary, so compliance with the criteria shall not be required; instead they shall be used only as a checklist;
- The following issue is missing in the list of criteria. In Bulgaria often the baseline energy consumption is very different from the actual one (e.g. due to underheating of buildings). As a result, the “theoretical” or calculated savings often exceed the actual ones. It is important, therefore, that the EES provider clearly explains to the client the difference between the two and the particular effect it would have on the payments, in order to avoid surprise for the client later. That discussion must take place as early as possible, e.g. during the first contact of the parties.
- No criteria need to be removed, as each may be relevant to a specific project.

4 CONCLUSIONS

Based on the consultations, the following conclusions can be made:

- The EES quality criteria were welcomed by the respondents and considered as a useful tool to improve EES quality.
- The criteria shall not be made obligatory, but used only as a checklist by the client and by the ESCO.
- All criteria are very specific or at least specific enough.
- For nearly all criteria, the proof of their application specified in the Guidance is very reliable;
- Most criteria require relatively low (but not very low) time to assess and this may be a barrier in small contracts or unnecessary in contracts where some trust is available.
- No criteria shall be removed from the European guidance, as all could be applicable to some projects or to specific country contexts. On the other hand, adaptation of the national guidance is needed, to make it compatible with the Bulgarian legislation.
- It is good to add a criterion, requiring that before the contract is signed, the EES provider explains to the client and quantifies the difference between the baseline and actual energy consumption. Such a criterion, however, would hardly fit, because none of the other criteria concerns actions before the contract signature.

5 ANNEX

Project Title	Meeting date	Feedback from meetings			Questionnaire used & sent to Ekodoma
EPC in a school in town of Kostinbrod	6/11/2018	Contract signed and measures implemented in 2nd half of 2018. In operation. Still no monitoring. A meeting with the EPC provider (Almina Consult) was carried out to fill-in the questionnaire.	<p>Criterion 4.3 not applicable in Bulgaria, because the baseline is defined in the audit report.</p> <p>Criterion 5.1 unclear. What is the "system"it refers to?</p> <p>Criterion 7 not applicable in Bulgaria, as the legislation defines all comfort requirements.</p> <p>Criterion 9.7 not needed, as the client is not interested how the ESCO arranges the funding.</p>		yes
EPC in a kindergarten in town of Katunitsa	6/11/2018	Contract signed and measures implemented in 2nd half of 2018. , but still no monitoring phase. A meeting with the EPC provider (Almina Consult) was carried out to fill-in the questionnaire.	<p>Criterion 4.3 not applicable in Bulgaria, because the baseline is defined in the audit report.</p> <p>Criterion 5.1 unclear. What is the "system"it refers to?</p> <p>Criterion 7 not applicable in Bulgaria, as the legislation defines all comfort requirements.</p> <p>Criterion 9.7 not needed, as the client is not interested how the ESCO arranges the funding.</p>		yes
EPC in the distributional centre of Ruvella Ltd.	03/06/2019 13/03/2020	The measures (efficient cooling) were installed in August 2018, still no monitoring. Meeting with EPC provider (Resalta Bulgaria) on 3 rd June 2019, with a follow up phone call on 13 th June 2019 and a follow-up meeting on 5 th July 2019.	<p>Not applicable to the particular project: 7 and 8, as well as sub-criteria 2.4, 5.1, 6.3, 6.4, 9.3, 9.6, 9.7, 9.8.</p> <p>All other criteria are relevant and actually considered.</p> <p>Most important criteria for the particular project: 1, 2, 4, 9.</p> <p>All criteria are specific enough. The criteria can be used just as a checklist by client and ESCO, but it is not justified to expect from a project to comply with 100% of them, because every project is specific.</p>	The following is currently missing: When EPC provider directly approaches a private client (no procurement), it need to clearly explain the difference between real and "normalized" (theoretically simulated, according to predefined conditions) energy consumption. The normalized one is specified in the energy audit report and is the baseline used for the EPC. Due to the difference, in many cases the client pays more during the EPC project than before the project.	yes