D4.3 PILOT PROJECT APPLICATION REPORT CZECH REPUBLIC

PILOT 1 – ACADEMY OF FINE ARTS

This project receives funding from the European Union's Horizon 2020 Research and Innovation Programme

QualitEE Project

This document has been developed as part of the "QualitEE – Quality Certification Frameworks for Energy Efficiency Services" project supported by the EU's Horizon 2020 Programme.

The QualitEE consortium comprises 12 partner organisations covering 18 European countries, an expert advisory board, including the European standards body CEN/CENELEC, and 59 supporters from major financial institutions, government bodies, trade associations and certification bodies.

Date

March 2020

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The QualitEE project receives funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No. 754017. The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EASME nor the European Commission is responsible for any use that may be made of the information contained herein.

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1 INTRODUCTION

During the project activities, quality criteria have been applied for new projects. Technical quality criteria and Financial Guidelines have been applied in new pilot projects. Partners have provided support to clients or ESPs from the procurement phase until the first measurement and verification phase if possible. Report follows the pilot project implementation in quantitative and qualitative manner and extract lessons learned.

During this report pilot projects are described and description how and which technical and financial criteria had been used. Feedback on the application has been collected with the aim to refine and improve operationalised 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

Project details:

- EPC contract with Academy of Fine Arts in Prague was signed at the end of 2018; the installation of energy-saving measures began in May 2019 and it was finished in February 2020.
- Energy savings to be achieved by building modifications, repair or replacement of windows and roof insulation on two buildings and other technical measures

- Retrofit of 11 000 m^2 in 4 buildings of Academy of Fine Arts in Prague
- GHG savings: 610 tCO2/year
- Primary energy savings: 1,715,472 kWh/year

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
4,877,198	3,161,726	1,742,000

Business case description/economic parameters

- Contract duration: 10 years
- Business model: EPC
- Investment costs: EUR 1.74 mil.; out of which EUR 0.78 mil. Is expected to be covered by a subsidy from the State Environmental Fund

Stakeholders /companies involved

Client: Academy of Fine Arts;

ESCO: ENESA Ltd.

Facilitator: SEVEn – The Energy Efficiency Center, z.u.

2.2 Technical aspects

Savings measures are being implemented in four buildings of the Academy of Fine Arts (AVU) in Prague as part of the energy performance contracting project. A contract with a selected energy service provider ENESA Ltd. was signed at the end of 2018, while the installation of energy-saving measures began in May 2019.

From January 2020 measurement of savings is conducted according to the contract, though still some minor measures were applied in January. Exchange of 10 windows was left for the Summer 2020.

The AVU buildings selected for the implementation of energy-saving measures within the EPC project are protected buildings, and therefore the planned reconstruction of the building envelope had to be discussed with the National Heritage Institute. The client sought to reduce its energy consumption both by technological measures and possibly by replacing obsolete technologies with new ones. Based on the approval of the National Heritage Institute, building modifications, repair or replacement of windows and roof insulation on two buildings and other technical measures are being carried out:

- A new monitoring and control system common to all four buildings is being installed in the main building, while a measurement and regulation system (MaR) installed in each building separately.
- Most of the savings result from building modifications (especially insulation and draught proofing) and cost-effective lighting measures (replacement of selected sources with energy-saving LED sources).

A feature of this EPC project is the installation of an air-conditioning unit in the Modern Gallery of the AVU, which allows for precise temperature and humidity stabilisation in some rooms (heating, ventilation, and air-conditioning system – HVAC). Such stabilisation is necessary to preserve the paintings in the gallery.

The winning tender guarantees the client energy savings of 33% and cost savings of over CZK 3 million per year. In particular, the service provider will achieve this savings by reducing heat consumption by 656 MWh and electricity consumption by 1,049 MWh per year. It will further reduce water, natural gas and some other operating costs. Annual primary energy savings are expected to reach 1,715 MWh per year and annual CO_2 emissions savings 610 t CO_2 per year.

The cost of energy services will be gradually covered by annual cost savings over the 10-year EPC contract between 2020 and 2029. Over the 10 years of the contract The EPC provider guarantees the contractual annual amount of savings and must fully compensate any deficit. The overall investment costs are estimated to EUR 1.7 million. The guaranteed cost savings will reach more than EUR 0.12 million per year, which constitutes about 33% of the overall costs of energy, water and other related costs.

The client will use this amount to cover EUR 1.17 million in service costs. The total price of the service provided within the EPC project will exceed EUR 1.95 million, of which approximately EUR 0.78 million will be paid by the SEF subsidy. The total cost of the service includes regular energy management throughout the term of the contract.

Table 1 Consumption before and after the intervention

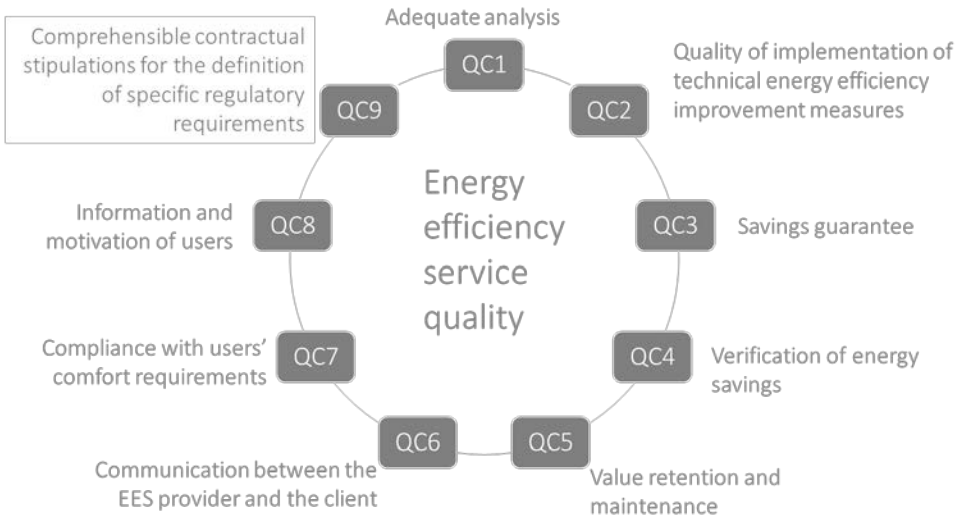
	Final consumption		Primary energy sources			
	Energy Consumption BEFORE intervention (actual) kWh/a	Predicted Energy Consumption AFTER intervention kWh/a	Energy Consumption BEFORE intervention (actual) kWh/a	Predicted Energy Consumption AFTER intervention kWh/a	Annual primary energy savings, kWh/year	Annual CO2 emissions savings CO2 t/year
heating kWh/a	1,904,444	1,307,778	2,094,889	1,438,556	656,333	234
electricity kWh/a	904,000	554,400	2,712,000	1,663,200	1,048,800	374
natural gas kWh/a	56,000	48,600	61,600	53,460	8,140	1.6
water m3/a	2,903	2,170	8,709	6,510	2,199	0.8
Total	**2,867,347**	**1,912,948**	**4,877,198**	**3,161,726**	**1,715,472**	**610**

Figure 1 Photos of installed measures

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 2 below.

Figure 2. 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.

4.1 Importance of the criterion

Respondents were asked to identify the three most important criteria:

Client:

- QC3.1
- QC3.3
- QC5.3

Provider:

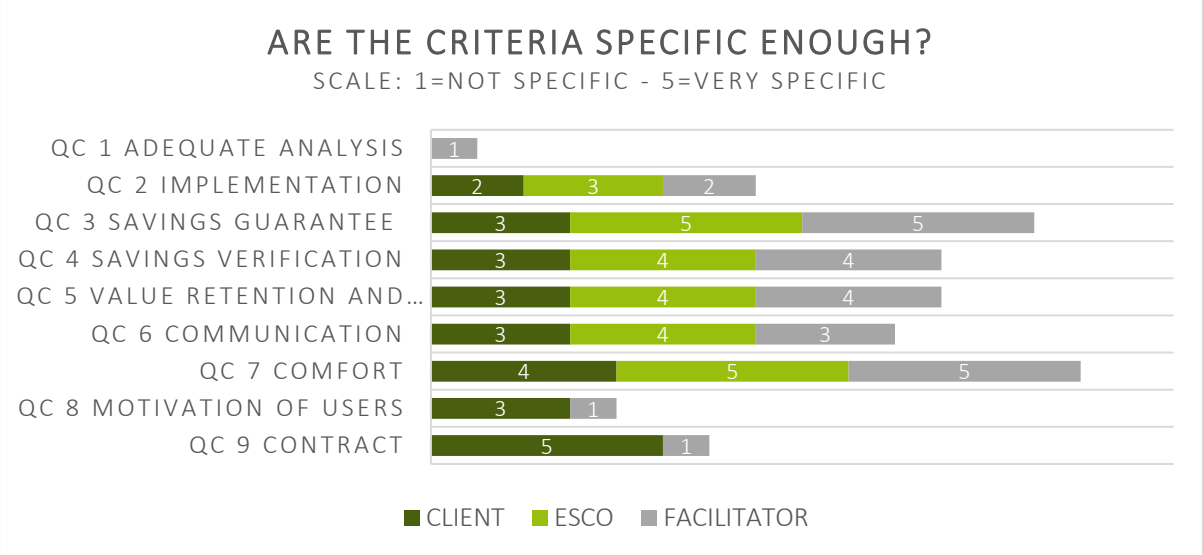
- QC3.1
- QC3.2
- QC3.3

Facilitator:

- QC3.1
- QC3.3
- QC4.1

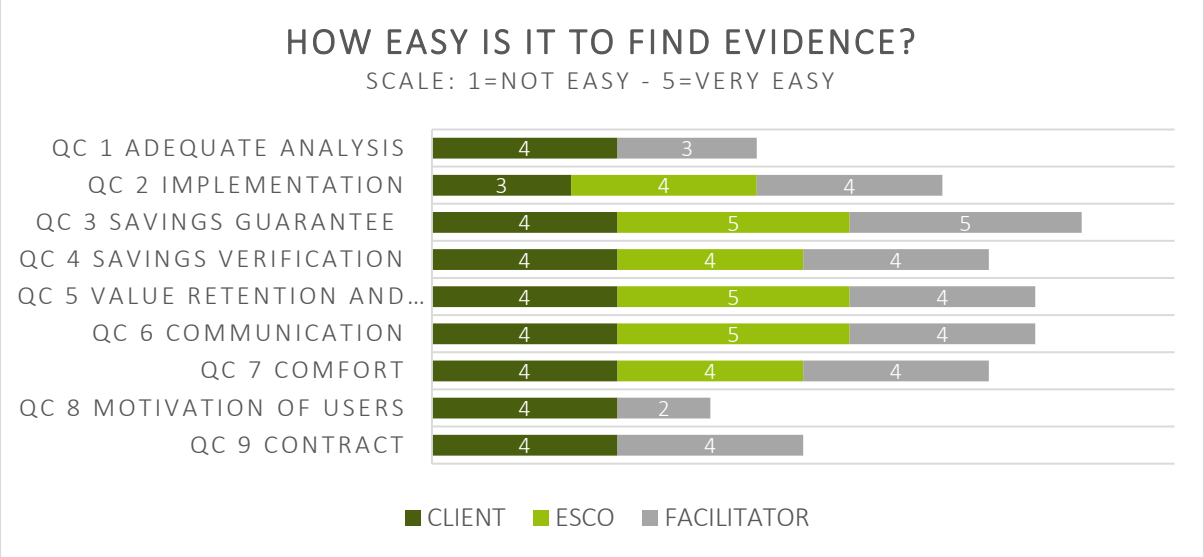
4.2 Are the criteria specific enough?

Participants were asked to evaluate each impact category by rating them from not specific (1) to very specific (5). Answers have been summarised in the figure below.



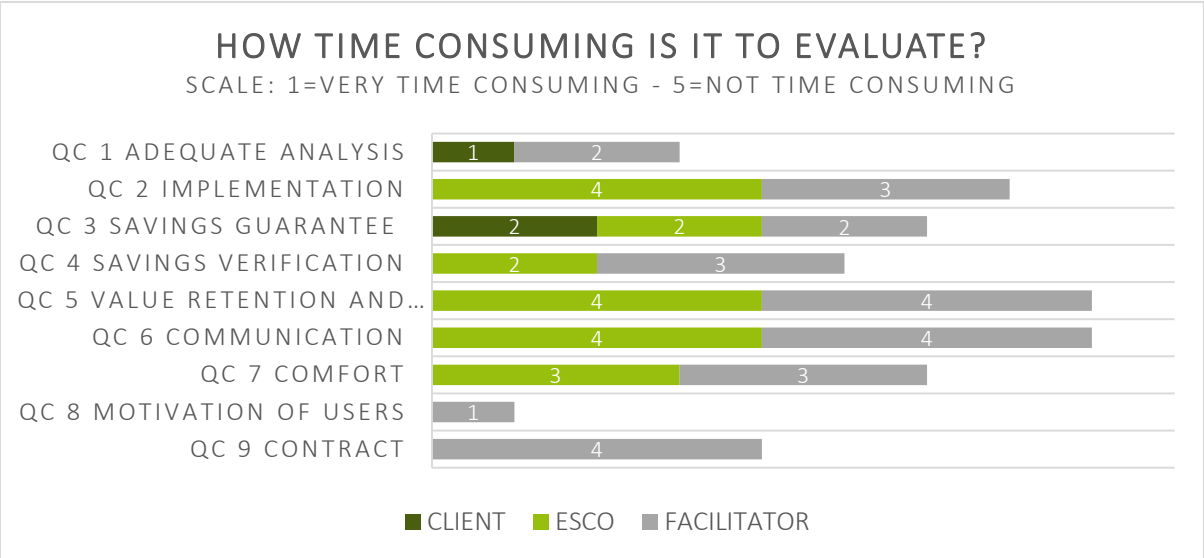
4.3 How easy is it to provide evidence?

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 summarised in the figure below.



4.4 How time consuming is the assessment of the criteria?

Respondents rated each impact categories from very time consuming (1) to not time-consuming (5). Answers have been summarised in the figure below.



4.5 Barriers and success factors for the application of criteria

The criteria have been used during the project development, procurement and contracting phase.

Criteria were found the most useful by the client in understanding what they should expect from a good quality EPC projects and what should be evaluated when selecting the best offer during the procurement process.

On the other hand, the barriers identified on the client side were complexity and large extent of the criteria. Also the formulations, which were done carefully to fit the case of all EES are less specific and harder to grasp for the client in comparison to the case where the criteria would be formulated only to fit EPC projects.

The use of QualitEE criteria is described in the table below.

4.6 Lessons learned from consultations and pilot projects

4.6.1 Importance of criteria

The set of quality criteria supports the client and the facilitator to ask the key questions related to quality of projects. The client was satisfied with evaluation of the tenders and believes application of criteria has led to selection of the best tender for the client.

Some QCs, which at first were not perceived as important, later showed to be of a key importance:

- QC 7-1 Definition of users' requirements (including regular review), which proved to be helpful for the client to discuss in detail the comfort requirements:
  - The client should have informed the facilitator and providers on the light quality required in the modern gallery: daylight or artificial light with daylight colour. The ESCO planned to install polycarbonate insulation on the windows, but that would change the light colour and/or reduced the light intensity at least by 10%, which was not acceptable by the client.
  - Further, the client had not asked about the time schedule of the reconstruction and noticed there is no cooling for 1 month for the server too late.
- QC 6-4 Organisation measures for committing internal operating personal helps the client to discuss in detail the organizational issues
  - The client shared that to write rules in Operational manual for art students is not a way to regulate temperature due to expected low compliance and it has to be automatic or regulated by a personnel.

4.6.2 Criteria to become optional or removed

Most of the criteria were relevant to the project except of the criteria listed in the table below. The table also summarises the feedback on these criteria and reasons for its removal.

Table 2 Criteria not applied in the EPC project

AC	Assessment Criterion	Justification for skipping the criterion in the EPC project	
		by the provider	by the facilitator
2-4	Induction of users or operating personnel	The client is responsible for induction of users.	Induction of users was not used as a special criterion because it is the usual part of the energy management. Induction of users was conducted in the project after installation of measures. Induction of operating personnel was included in criterion 6.4.
4-2	Selection of the most appropriate approach to the verification of energy savings	The evaluation of this criteria is very subjective.	There was not a need to justify the selection of the standardised method of the energy savings verification by the provider as this was a role of the facilitator.
7-3	Assessment of users' satisfaction	The evaluation of this criteria is very subjective.	It was not necessary to include in the contract stipulations as the achievement of energy savings is reviewed with the client during annual meetings between the client and provider. Annual meeting is required to be organised by the contract.
8-1	Development of a concept for the motivation of users		There was not a need to develop a concept as this is implicitly included in the contract in the list of duties for the client to achieve the savings.
8-2	Establishment of a suggestion scheme for clients to improve energy efficiency		Instead of suggestion scheme, achieved savings and energy efficiency improvement are discussed between the provider and the client during the regular annual meetings.

8-3	Provision of action-oriented information on the subject of energy efficiency		There was not a need that availability of information on specific energy saving actions that can be implemented by different target groups is guaranteed in the contract because it is inevitable part of energy management.

Based on the experience with testing the criteria in the pilot project and the feedback received the some changes have been proposed in the criteria: 2.5, 3.1, 3.2, 3.3 and 5.1. All of these proposed additions and amendments were reflected in the final version of the Guidelines of European technical criteria for EES.

Table 3 Criteria where additions and/or amendments were proposed

AC	Assessment criterion	Proof (new text added is underlined)
2-5	Ensuring the functionality of newly installed facilities at the end of the Contract	According to the contract, provider shall ensure that all the technology installed is in full operational status at the end of the contract. The following actions shall be taken by the end of the contract: • Disclosure of maintenance requirements and agreements between the EES provider and the client regarding the execution of maintenance • Provide information about the availability of spare parts and the required software Stipulation of warranty periods and contacts in warranty cases if any.
3-2	Amount of contracted guaranteed savings	When comparing more tenders: • Rank the tenders according to the amount of contracted guaranteed savings (from the highest to the lowest amount). When assessing only 1 tender or more detailed analysis is needed: • Break down the savings according to measures and compare with expert calculation done in preliminary analysis according to 1.3. criterion and /or

		provide detailed calculation of savings per each individual measure
3-3	Guaranteed savings achieved (only applicable to saving guarantee type 1)	Achieved savings are not lower than guaranteed savings. The following levels of deviations are applicable: ● Minor deviation: achieved savings are lower than 100% of guaranteed savings and higher or equal to 95% ● Moderate deviation: achieved savings are lower than 95% of guaranteed savings and higher or equal to 80% ● Serious deviation: achieved savings are lower than 80% of guaranteed savings and higher or equal to 80% Unacceptable deviation: achieved savings are lower than 80% of guaranteed savings
5-1	Compliance with the required system availability	Recording of operating times and downtimes Specification of system availability for highly sensitive areas according to the technology type and client needs.

In addition, one following criterion have been newly designed under criteria group 3 devoted to guaranteed savings and became part of the technical criteria to be used to evaluate EPC projects in the Czech Republic:

Table 4 Criteria where additions and/or amendments were proposed

Assessment criterion	Proof	Verification
Installation and functionality assurance of saving measures and equipment according to the contract	Saving measures and equipment have been installed as specified in the contract	Checking the actual installation of selected key saving measures and equipment and their functionality on site (including random checks of the remaining measures)

5 CONCLUSIONS

A piloting exercise was carried out to evaluate the draft European technical quality criteria for Energy Efficiency Services in a real-world Energy Performance Contracting project between Academy of Arts in Prague, the client, and their selected EPC provider – ENESA Ltd. The purpose of the piloting exercise was to provide critical feedback to feed into the adaptation of the criteria for the Czech context, and to use the criteria to provide a level of quality assurance of the project in progress.

For most of the criteria categories, it was found that the criteria were sufficiently specific with the following exceptions: QC 1 Adequate Analysis, QC 2 Implementation and QC 8 Motivation of Users and QC 9 Contract. Generally, it was found that the criteria were relatively easy to evidence with exception of QC 8 Motivation of Users. It was highlighted that many criteria are likely to be time consuming to evaluate: QC 1 Adequate Analysis, QC 3 Savings Guarantee, QC 4 Savings Verification , QC7 Comfort and QC 8 Motivation of Users.

Based on the experience with testing the criteria in the pilot project and the feedback received the some changes have been proposed in the criteria: 2.5, 3.1 , 3.2, 3.3 and 5.1. All of these proposed additions and amendments were reflected in the final version of the Guidelines of European technical criteria for EES.

Most of the criteria were relevant to the project except of the criteria2.4, 4.2 and 7.3, 8.1, 8.2 and 8.3, which were proposed to be removed.

EPC projects are always complex and the broad spectrum of criteria will help to prevent disappointments. It often happens that an EPC contract is signed and later technical design is prepared by provider. Implementation of energy savings is not as easy as expected, but provider usually find another way how to reach the savings and guaranteed savings need not to be decreased significantly. In AVU project the planned roof windows replacement had to be adjusted after detailed static analysis. Criteria provide a tool which helps to look at the complex process from different angles. ESCO often looks at the solutions from the point of view of standards (e.g. temperature), but it is equally important to consider the client expectations on the comfort.

6 ANNEX MEETINGS

Quality management meeting date	Feedback from meetings		
	Main feedback in few bullet points: - how criteria could be used in the pilot (procurement, evaluation of offers, contracts..) - please indicate main discussed points, decisions made, suggestions for usage of criteria. - what was the response form clients, ESCO's, FI or other stakeholders involved?	How important is this criterion in assessing quality of this project? Is the criterion specific enough?	Are there any other criteria that should be added? Are there any criteria that should be removed?
11/06/2018 15/08/2018 12/12/2018 16/01/2019 13/03/2019	The criteria have been used during the project development, procurement and contracting phase. Criteria were found the most useful by the client in understanding what they should expect from a good quality EPC projects and what should be evaluated when selecting the best offer during the procurement process. On the other hand the barriers identified on the client side were complexity and large extent of the criteria. Also the formulations, which were done carefully to fit the case of all EES are less specific and harder to grasp for the client in comparison to the case where the criteria would be formulated only to fit EPC projects.	The set of quality criteria supports the client and the facilitator to ask the key questions related to quality of projects. For most of the criteria categories, it was found that the criteria were sufficiently specific with the following exceptions: QC 1 Adequate Analysis, QC 2 Implementation and QC 8 Motivation of Users and QC 9 Contract.	Based on the experience with testing the criteria in the pilot project and the feedback received the some changes have been proposed in the criteria: 2.5, 3.1 , 3.2, 3.3 and 5.1. All of these proposed additions and amendments were reflected in the final version of the Guidelines of European technical criteria for EES. Most of the criteria were relevant to the project except of the criteria2.4, 4.2 and 7.3, 8.1, 8.2 and 8.3, which were proposed to be removed.