



D4.3 PILOT PROJECT APPLICATION REPORT

SLOVAKIA – PILOT PROJECTS 1&2



QualitEE Project

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Authors

Monika Rothová

e-mail: rothova@ecb.sk

Marcel Lauko

e-mail: lauko@ecb.sk

Energy Centre Bratislava

Slovakia

www.ecb.sk

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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 extracts lessons learned.

During this report pilot project 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 1 – BUILDING OF DORMITORY ŠD5 IN BRATISLAVA

2.1 Pilot project factsheet

Project details:

- Initial idea was the refurbishment of 7 dormitory buildings of University of Economics with utilisation of EPC. Technical analyses identified only 1 building as feasible for EPC.
- Project was initiated in July 2018 and contract was signed in March 2020.
- Main EE measures: thermal insulation of building, reconstruction of heating system, replacement of windows and doors, modernisation of lighting, water saving measures.



Deep retrofit of **3 805 m²** dormitory building of University of Economics in Bratislava.

This project saves:
86,0 t CO2 emissions per year

Annual energy savings:
425 160 kWh/year

Annual primary energy savings:
578 217 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
768 300	343 140	476 200

Business case description/economic parameters

- Business Model: Energy Performance Contracting
- Contract duration: 16,5 years (198 months)
- Value of contract: 560 625 € (without VAT)
- Investment financed by ESCO without subsidy
- Guaranteed savings: 37 375 €/year

Stakeholders/companies involved

Client – University of Economics in Bratislava

Facilitators: Energy Centre Bratislava (technical analyses), Tatra Tender (public procurement)

ESCO: Veolia Energia Slovakia, a.s.

2.2 Technical aspects

The University of Economics (EUBA) currently represents the biggest university in Slovakia which provides complex and integral education in economic and management study programmes at all levels of study. EUBA provides an accommodation for its students in 8 dormitories and 7 of them have been assessed in initial technical analyses focusing on EPC model feasibility. The buildings of all dormitories were built as part of a large-scale construction during the communist regime between years 1957 – 1986. All buildings are in the original unreconstructed condition maintained only by repairs within the limits of maintenance and do not meet current standards. The intention of the university was a comprehensive renovation of these buildings. But technical analysis proofed only 1 dormitory can be refurbished with EPC model - building of student dormitory ŠD5 - Starohájka 2900/8 in Bratislava.

The building of ŠD5 was built in 1981. The construction consists of a panel system T06B/BB with a transverse supporting system. The building has 9 floors, of which 8 are residential and is in original condition. The heat is supplied from the district heating. The following table shows a summary of the basic data on energy and water inputs.

Table 2 Average annual energy and water consumption in years 2015-2017

	Amount	Annual costs [€]
Electricity	66,4 MWh	8 608
Heat	731,9 MWh	62 856
Water	4 200 m ³	7 794

Picture 1 ŠD5 before renovation



Preliminary technical analysis and discussions with University led to identification of energy efficiency measures economically feasible and required by the client: thermal insulation of building, reconstruction of heating system, replacement of windows and doors, modernisation of lighting, water saving measures.

Preliminary technical analysis part was finalised in December 2018 and the project proceeded into preparation of public procurement. There were two separate facilitators. One responsible for technical part – Energy Centre Bratislava, executed technical preliminary analyses, set baseline, expected guaranteed savings, methodology for measurement & verification. Second facilitator (Tatra Tender) was responsible for legal aspects of the procurement process, procurement documentation and contract template adaptation. Extensive tender dossier was prepared between January 2019 and September 2019 when the tender was published. For tendering the ESCO, open public tender procedure was used in accordance with the Public Procurement Act 343/2015 Coll.

All information about the tender can be found here:

<https://josephine.proebiz.com/en/tender/5050/summary>

QualitEE Guidelines of European Technical Quality Criteria for EES were applied and tested on project stages from the technical analysis until the contract signature.

The contract between EUBA and winning ESCo was signed in March 2020. The contract was based on the official model contract for public sector which meets the conditions of the new Eurostat regulation for EPC. Energy efficiency measures were specified more in detail by winning ESCo and are as follows:

- ✔ thermal insulation of external walls with 1 770 m²,
- ✔ thermal insulation of the flat roof with 421 m² (a building of new attic if needed),
- ✔ reconstruction of existing heat transfer station (exchange of old station with new compact heat transfer station with plate heat exchangers),
- ✔ replenishment of the hot water tank and installation of a new heat pump (air-water),
- ✔ hydraulic balancing and installation of thermoregulation valves,
- ✔ new windows and doors,
- ✔ modernisation of lighting system – replacement of existing old luminaries with LED lights,
- ✔ water saving measures – installation of water saving fittings,
- ✔ new control system with remote control - daily heat and hot water consumption as well as cold water consumption will be measured, the system will provide continuous temperature measurement in 10 reference rooms of the building.

The winning ESCo guarantees to EUBA minimal level of energy costs savings 37 375 € per year. Savings in energy units are usually not guaranteed by the contract in Slovakia. According the timetable in the contract, the preparation and modernisation phase should last 18 months. The implementation of the project should be then completed in August 2021 and from September 2021 the last phase of guaranteed savings will begin.

3 DESCRIPTION OF THE PILOT PROJECT 2 – SERVICE CENTRE IN NOVÁKY

3.1 Pilot project factsheet

Project details:

- Deep retrofit of municipal building in town Nováky
- Majority of spaces are rented, but the tenants were cancelling the contracts because of insufficient indoor thermal comfort.
- Main EE measures: renewal of heating and ventilation system, thermal insulation of building envelope, new windows, PV plant (10 kWp).



Table 3 Energy Consumption Data

Energy Consumption BEFORE intervention (actual) kWh/a	Energy Consumption AFTER intervention (actual) kWh/a	Value of planned EE investment EUR
247 464	158 954	374 500

Business case description/economic parameters

- Business Model: Energy Performance Contracting
- Contract duration: 15,5 years
- Value of contract: 560 615 € (without VAT)
- Investment financed by ESCO without subsidy
- Guaranteed energy savings: 19 077 €/year
- Additional savings: 3 741 €/year

Stakeholders/companies involved

Client – Town Nováky

Facilitators: BMS Energy

ESCO: Východoslovenská energetika, a.s.

Deep retrofit of **829,2 m²** municipal building in town Nováky.

This project saves:
24,49 t CO₂ emissions per year

Annual energy savings:
88 510 kWh/year (78% energy savings)

Annual primary energy savings:
118 250 kWh/year

Renewable generation:
11 300 kWh per year

3.2 Technical aspects

The service centre in Nováky is a two-storey L-shaped building with a basement. The building is owned by the municipality and is situated in the town centre. The building is used for retail services and premises are rented for shops and sheltered workshops. The building is uninsulated, it has original windows with a steel window frame. The object is heated by two gas boilers. The heat source does not solve the heating of drinking water. Drinking water is heated by individual units locally with electricity. There is insufficient thermal comfort due to the poor condition of the building and the building cannot be heated. For this reason, tenants were terminating the lease.

Picture 2 Service centre before renovation



Open tender procedure was used for tendering the ESCO and the tender was published in November 2017. EPC contract was signed in June 2018. All tender documentation can be found online: <https://www.uvo.gov.sk/vyhľadavanie-zakaziek/detail/dokumenty/411620?page=1&limit=20&sort=datumZverejnenia&sort-dir=DESC&ext=0&nazovSablony=&nazov=&datumZverejnenia=&text=&zakazkald=411620>

The contract was based on the contract template prepared by Slovak Association of ES providers (APES). Value of the contract is 560 615 € without VAT. Energy savings are guaranteed in Euros at the level of 19 077 € per year. Additionally, there are guaranteed additional costs savings achieved on purchases of less electricity from grid due to the PV panels installation and on repair and maintenance costs savings.

Energy efficiency measures were specified more in detail by winning ESCo and are as follows:

- ✔ thermal insulation of external walls,
- ✔ thermal insulation of the flat roof,
- ✔ replacement of windows and doors,
- ✔ construction of air conditioning equipment (HVAC recuperation unit, HVAC distribution and control elements)- meeting the minimum hygienic requirements for air quality and thermal comfort in the building,
- ✔ new heat source - a pair of suspended gas condensing boilers 2x 35kW,
- ✔ new heating distribution in the current distribution routes,
- ✔ new radiators, thermostatic valves and control fittings,

- ✔ construction of a photovoltaic power plant (PV) with a peak electrical output of 10.00 kWp on the roof of the building (the total annual amount of electricity produced will be used primarily for the own consumption of the town of Nováky),
- ✔ new control system with remote control and energy consumption monitoring – measuring the temperature in all heated and ventilated rooms.

The implementation of the project was completed in March 2019.

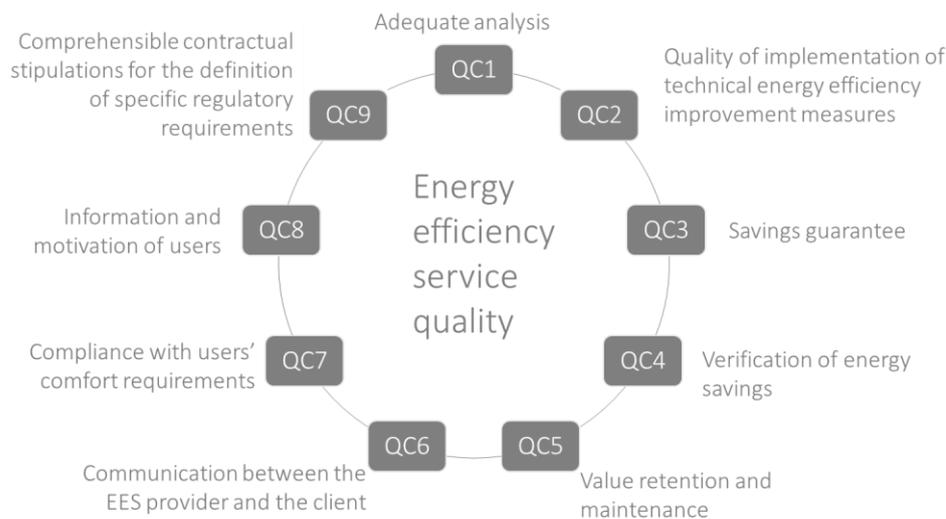
Picture 3 Service centre after renovation



4 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.

4.1 Importance of the criterion

Respondents have been asked to evaluate which are the most important criteria? As most important criteria by client side have been considered:

Pilot project no.1	
1.	QC 3 Savings guarantee
2.	QC 4 Verification of energy savings
3.	QC 5 Value retention and maintenance

and from Facilitator side:

Pilot project no.1		Pilot project no.2
1.	QC 3 Savings guarantee	QC 2 Quality of implementation of technical energy efficiency improvement measures
2.	QC 2 Quality of implementation of technical energy efficiency improvement measures	QC 5 Value retention and maintenance
3.	QC 7 Compliance with users' comfort requirements	QC 9 Comprehensible contractual stipulations for the contracting of specific regulatory requirements

4.2 Was the criterion specific enough?

Participants were asked to evaluate each impact category by rating them from not specific (1) to very specific (5). Answers have been summarized for each project separately in Figures below.

Figure 2. Specificity of criteria – Pilot project 1: Building of Dormitory ŠD5 in Bratislava

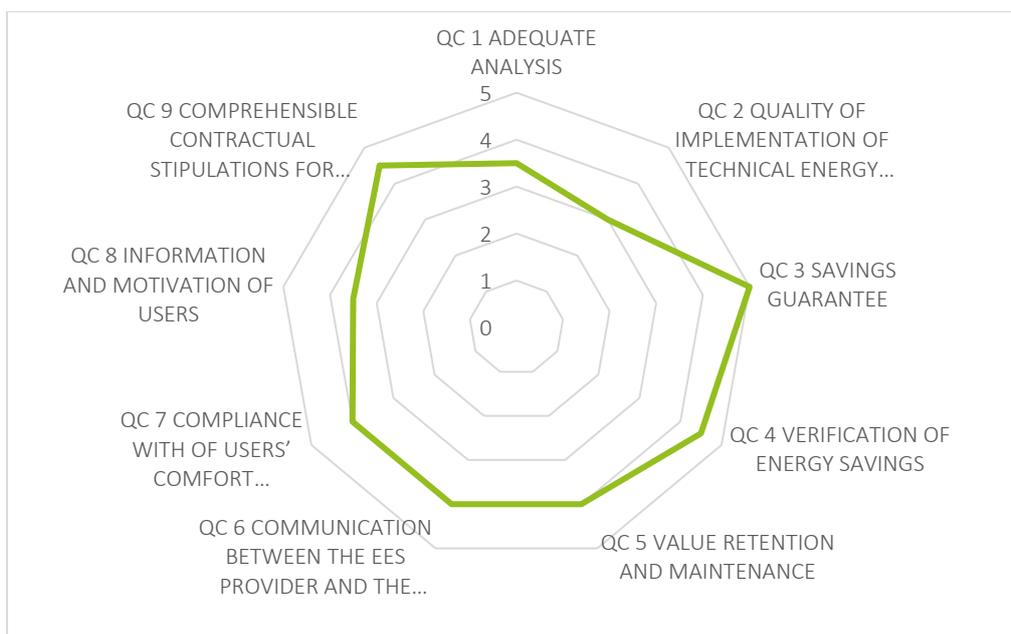
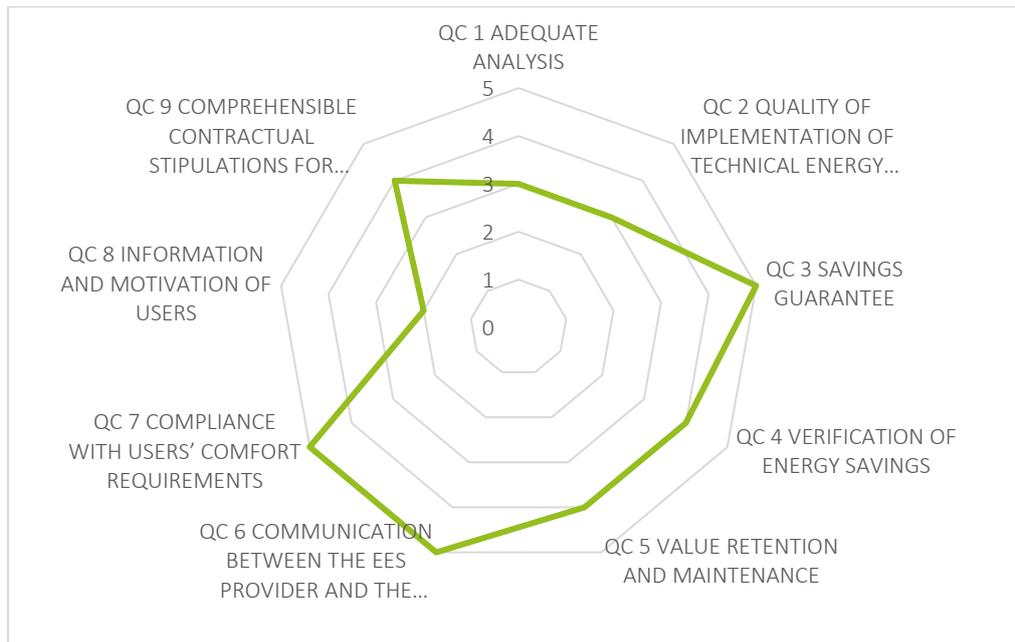


Figure 3. Specificity of criteria – Pilot project 2: Service Centre in Nováky



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 summarized in Figure 4 and 5.

Figure 4. Availability of evidence – Pilot project 1: Building of Dormitory ŠD5 in Bratislava

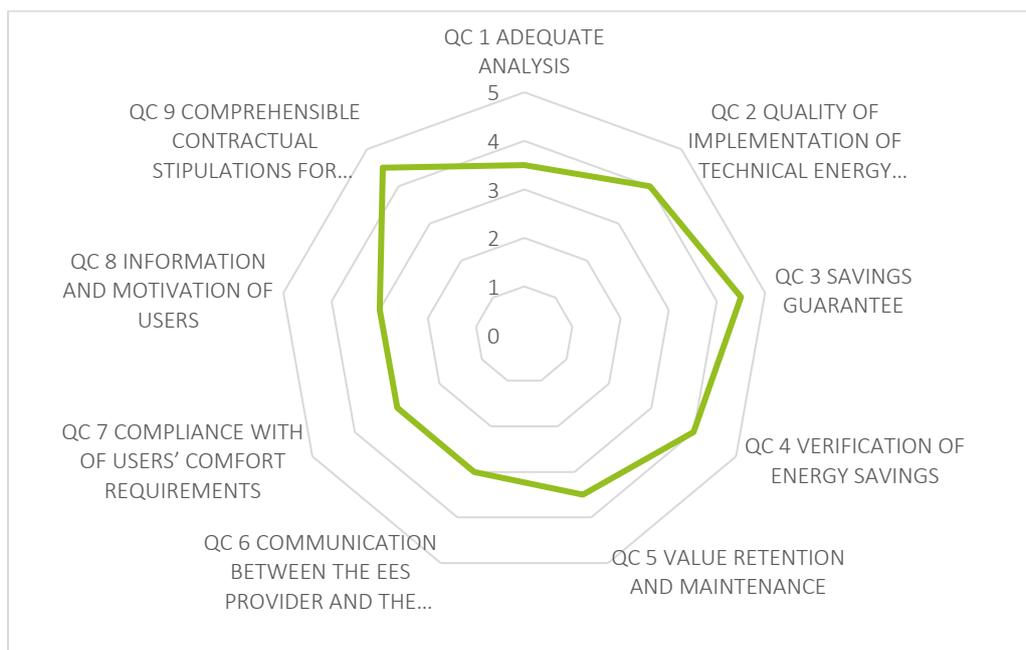
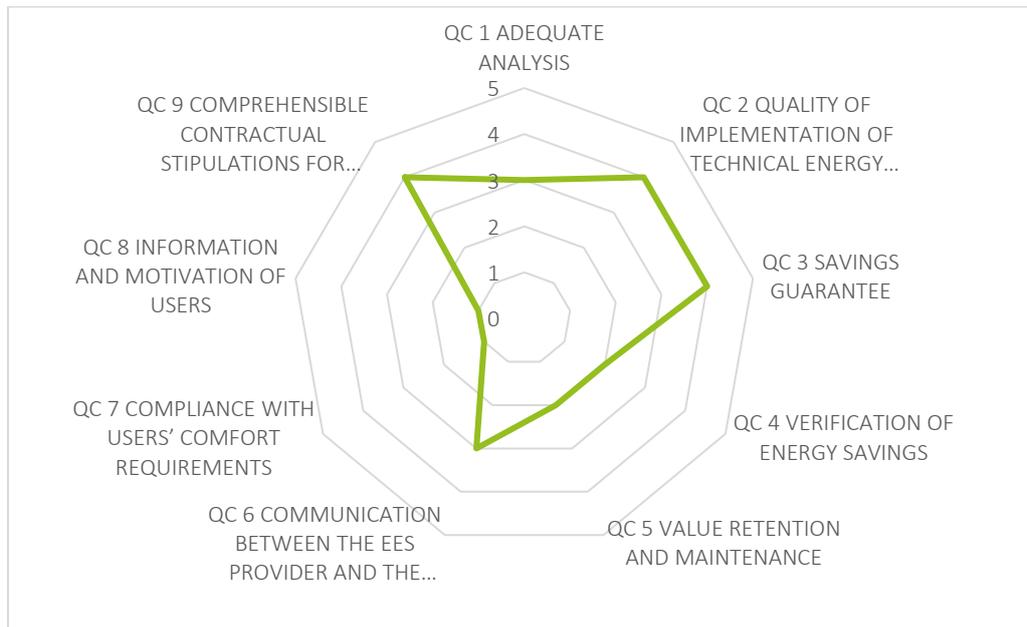


Figure 5. Availability of evidence – Pilot project 2: Service Centre in Nováky



4.4 How time consuming is the assessment of the criterion?

Respondents rated each impact categories from very time consuming (1) to not time-consuming (5). Answers have been summarized in Figure 6 and 7 below.

Figure 6. Time taken for evaluating criteria – Pilot project 1: Building of Dormitory ŠD5 in Bratislava

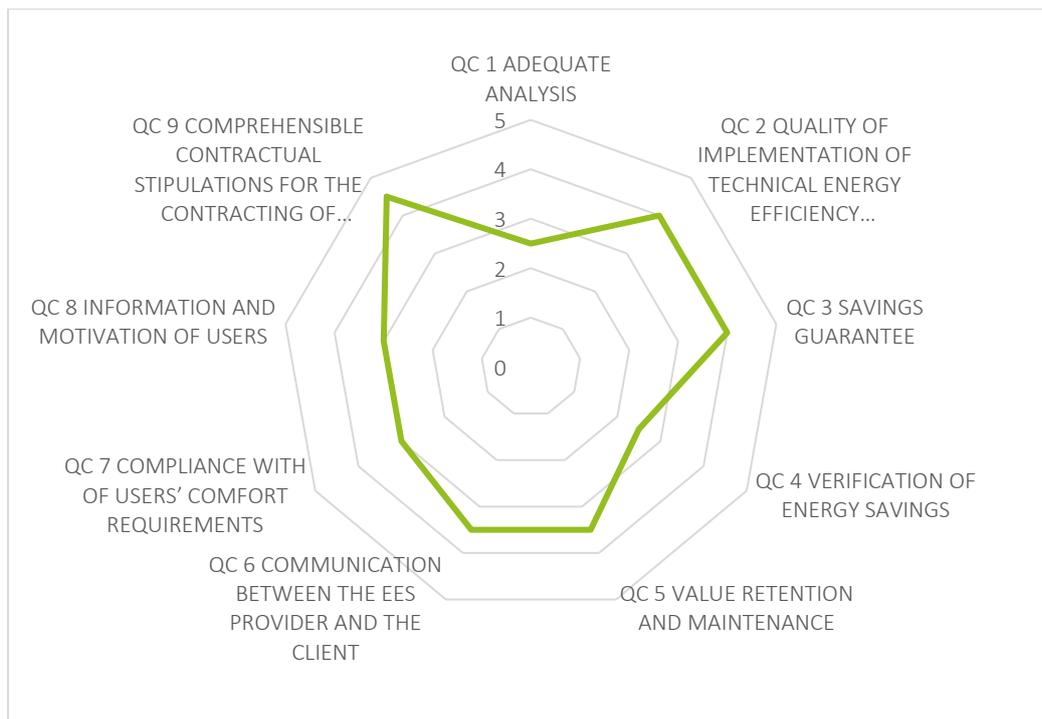
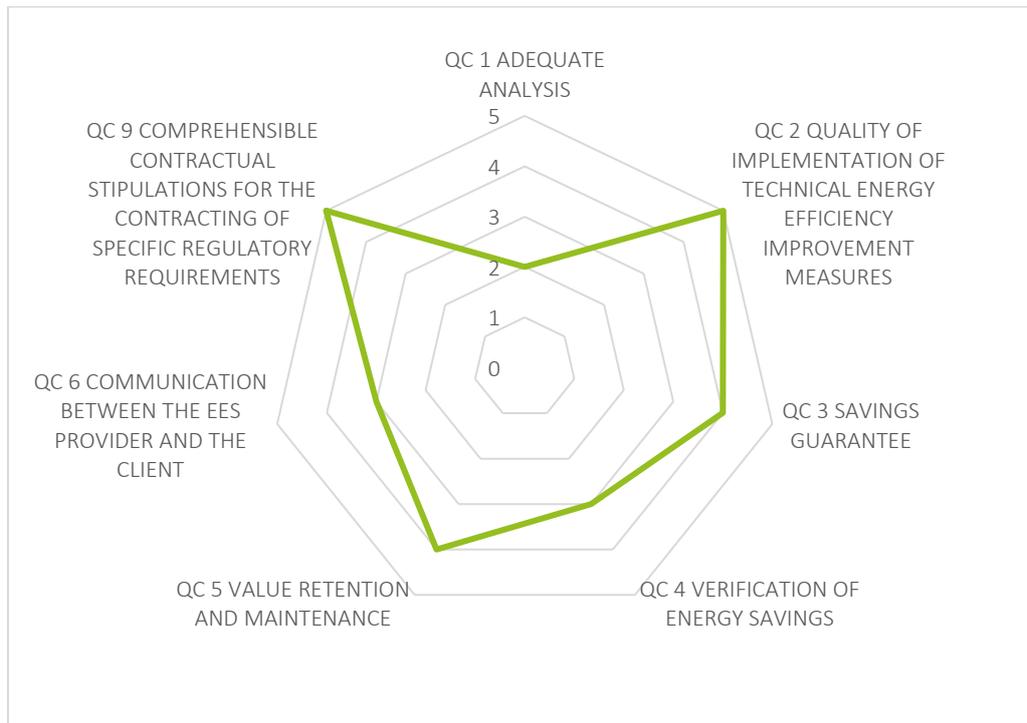


Figure 7. Time taken for evaluating criteria - Pilot project 2: Service Centre in Nováky



Quality criteria QC7 and QC8 were not used in pilot project and therefore it is not possible to assess time needed for the evaluation.

4.5 Barriers and success factors for the application of criteria

In the pilot project 1, the quality criteria were applied and tested from the initiation of the project by the client until the contract stage. Application of criteria in the 2nd project started in the procurement phase and continued until the implementation of the measures. For assessment of criteria fulfilment “ex-ante” method was used except from QC1 Adequate analysis verified “ex-post”.

The main barriers identified for both projects came from the focus of the clients on renovation process and not on achieving the savings. The clients in both cases were public authorities trying to find financial sources for deep renovation of the buildings in their ownership. Energy efficient services are usually new topic for clients and the personnel has not the motivation to spend excessive time on studying the concept and criteria. The complexity of the criteria and the time required to evaluate their conformity is also a considerable barrier.

Criteria were found the most useful in understanding what should be expected from a good quality EES projects and can be used as a checklist during the preparations and implementation of EES projects. The set of quality criteria supports the client and the facilitator to ask the key questions related to quality of projects. The criteria can be used in the procurement documentation for the definition of quality requirements and in service/construction contracts.

4.6 Lessons learned from consultations and pilot projects

Most of the quality criteria were relevant to the pilot projects and tested. The criteria listed below were not used or were used but not possible to document:

- ✔ QC3-2 Guaranteed savings achieved: was not possible to assess at contract signature stage.
- ✔ QC4-2 Selection of the most appropriate approach to the verification of energy savings: Selection was done by the facilitator by preparation of technical analysis and M&V Plan, but the proof for „justification“ is not exact/documented. As the client had not sufficient knowledge and experiences to decide, selection was made by facilitator and presented to client. Proof “Agreement between provider and client” is not relevant. (Both pilot projects.)
- ✔ QC5-1 Compliance with the required system availability and QC5-2 Rapid troubleshooting in case of malfunctions of technical systems: These QCs are not very relevant for projects focused on buildings. But is very important in industrial operation what was not the case of the pilot project. Additionally, responsible for maintenance is usually the client and ESCO has only the position of “supervisor”. (Both pilot projects.)
- ✔ QC5-3 Functionality of facility at the end of the Contract: Only partially fulfilled in both projects. Not all proofs were part of the contract. This QC seems to be the same as QC2-5.
- ✔ QC6-4 Organisational measures for committing internal operating personnel: For pilot project 1 this QC was not relevant yet and for the second project evidence does not exist.
- ✔ QC7 – all the criteria: These criteria were not used. Comfort requirements in EPC projects are derived from existing standards and legal prescriptions. As these standards have not been met in the current situation, this is also an improvement valid by the client. (Both pilot projects.)
- ✔ QC8 - all the criteria: QC was not used. Client was not interested in project 1. No evidence in project 2.
- ✔ QC9-2: Handling of energy price risk: Price risk is solved with fixed prices of energy sources set for reference year in M&V Plan (annex to a contract).
- ✔ QC9-7 Permissibility of different types of financing: This QC is not relevant. Both projects fully financed by ESCO without subsidies. (There are no subsidies available now for combination with ECP.)

The clients and facilitators in pilot projects found criteria comprehensive, no other missing areas were identified during the testing. Only a few ideas were provided for additional criteria:

- ✔ Specify the required quality according to different certifications (TÜV, Eurovent,..)
- ✔ Quality of maintenance (frequent failures of some part)

When questioning on criteria that should be removed, one response was QC7 and QC8. But discussions within pilot projects showed that better than remove the criteria could be differentiate the criteria as required and optional. Even there was a suggestion to give a “weight” to the criteria as it can better reflect the relevance of the particular criterion.

The clients and even the facilitators of the projects thought that studying quality criteria was quite time consuming to get sufficient knowledge to be competent to assess the project with the criteria. They prefer assessment by independent body.

5 CONCLUSIONS

The draft European technical quality criteria for Energy efficient Services were applied in new pilot projects to obtain feedback on criteria and real-world insights. This report summarizes the outputs of two Slovak pilot projects, one is the dormitory building of University of Economics in Bratislava and the second is municipal building for retail and services Service Centre in Nováky.

The involved parties in the projects welcomed the idea of EES assessment and creation of quality criteria as a useful tool to improve EES quality. But the enthusiasm was partially weakened by the time required to study the criteria and evaluate them.

The respondents ranked almost all the criteria as specific enough or very specific except from QC1 Adequate analysis, QC2 Quality of implementation and QC8 Information and motivation for users. These need more specification.

The best provision of evidence is possible for QC2, QC3, QC9. Very difficult to find evidence was for QC7 Comfort and QC8 Motivation of users.

The criteria QC 2, QC3 and QC9 were found less time consuming and on the other hand the most time consuming are QC1 and QC4.

From the discussions during testing additional conclusions were made:

- ✔ Respondents expressed the opinion that not all criteria are suitable for all involved parties and all projects. The endeavor to cover the wide range of EES and wide range of projects provided on one hand possibility to choose from a wide range of criteria those applicable, but on the other hand the scope of the criteria is too broad, they would be more useful if they were specified for different energy services separately.
- ✔ Not all the criteria should be mandatory. Criteria such as QC7 and QC8 would be “nice to have” but it seems that market situation and motivation within the projects is not yet matured enough to adopt such criteria. Different criteria can be even of different “weight” in the project. For example, QC3-1 Dependency of remuneration should have more “weight” than QC6-2 agreement on accessibility of data.
- ✔ During the assessment it is not clear if all the proofs defined for specific criterion need to be met.
- ✔ 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 conditions on national market and national legislation.