



## D4.3 PILOT PROJECT APPLICATION REPORT AUSTRIA



## QualitEE Project

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## Disclaimer

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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 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

### 2.1 Residential Building Horsching, Austria

#### 2.1.1 Pilot project factsheet

##### Project details:

- Existing residential building with 54 flats
- Project stage: Operation before M&V
- Change from new oil condensing boiler and badly regulated solar thermal system to gas condensing boiler with optimized controlled hydraulic and solar system

**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
440,000 kWh/a	317,000 kWh/a	€ 74,000

##### Business case description/economic parameters

- Contract duration and service provided: 20 years, delivery contracting
- expected investment, value of contract: € 74,000

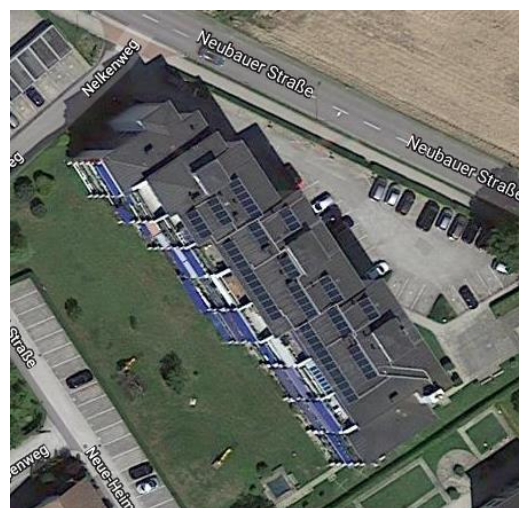
##### Stakeholders/companies involved

Client  
ESCO

#### 2.1.2 Technical aspects

##### Before building renovation (or before implementation of energy efficacy measures)

The residential housing block with 54 flats was heated by an oil condensing boiler and a later integrated solar system with a buffer store and complicated control system. As the expected energy savings weren't realised and the company, which were in charge of the building control went



**Figure 1:** Residential Building, Horsching  
© google maps

Change of energy carrier and optimization of building control of a **4,724.92 m<sup>2</sup>** apartment building with **54 flats** in Horsching

**This project saves:**  
53,9 tCO<sub>2</sub> emissions per year

**Predicted / Planned annual energy savings:**  
123,000 kWh/year  
(28 % energy savings)

bankrupt, the building was only operated manually and the heating system didn't work properly anymore.

Thus, the intention of the project was to simplify the heating system including the control system. The solar thermal system should be better integrated into the overall system. Further, a change from oil to gas should be done.

The energy consumption before intervention was 44,000 kWh.

#### **Renovation process** (or implementation of energy efficacy measures)

The period of implementation was from October 2017 until November 2017 and the costs for the implementation were 7,000. After the acceptance of the order, the ESCO started with the implementation. As the ESCO is in charge of the operation of the energy system and the specified comfort criteria, the quality securing is done by the building users themselves – if they are not satisfied with the comfort level (e.g. it's too cold or energy costs are too high compared to the predicted costs), they will complain and the ESCO has to deliver the comfort and reduced energy costs.

The single steps and measures of the integrated energy contracting were:

- Planning, construction and project management of the heating system
- Exchange the existing oil condensing boiler system with a highly efficient gas condensing boiler plant including a gas connection from the gas network
- Integration of the new heat generation plant into the existing heating system
- Construction of a moisture-insensitive, gas-tight and acid-resistant exhaust gas pipe and moving into an existing chimney
- Modification of the hydraulic integration of the existing solar thermal system to increase efficiency
- Installation high-efficiency pumps
- Installation of a control system with remote data monitoring for the heating system
- Exchange of all temperature sensors of the heating and solar control system
- Installing a sub-current meter for the central heating system and a calibrated main heat meter in the central heating system
- The ESCO is further in charge of the whole energy efficient operation and controlling of the system during the next 20 years of operation.

#### **After renovation and results achieved** (or after energy efficacy measures)

The predicted investment and energy costs were met so far and no complaints from the building users reached the ESCO. The control and integration of the solar thermal system functions as planned. The M&V will be done in co-operation by the ESCO and the building management as client. The annual energy savings are 123,000 kWh/year or 28 %.

## 2.2 Triumph international, Wiener Neustadt

### 2.2.1 Pilot project factsheet

#### Project details:

- Existing distributing and storage center and office building
- Project stage: Installation of measures
- Project duration: 5.1 years
- Change of:
  - o Heating boiler and optimizing heat distribution in the buildings
  - o Lighting equipment (without street lighting)
  - o Pumps
  - o HVAC (Space and Water) Heating, Ventilation and Air Conditioning
  - o Information and Communication Technologies (ICT)
  - o Metering, Monitoring and Energy Management



Figure 2: Triumph, Wr. Neustadt © ENGIE project leaflet

Change of heating boiler, lighting system and optimization of building control of a **36,876 m<sup>2</sup>** logistic and storage center in Wr. Neustadt, Austria

#### This project saves:

618 tCO<sub>2</sub> emissions per year

#### Predicted / Planned annual energy savings:

590,235 kWh/year  
 17.6 % Thermal energy savings  
 14.2 % savings in electricity

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
3,477,345 (total) 2,771,640 (heat) 705,705 (electricity)	Not measured so far	€ 2,345,660

#### Business case description/economic parameters

- Contract duration and service provided: EPC without building operation
- expected investment, value of contract: € 2,345,660

#### Stakeholders/companies involved

Client  
 ESCO



## 2.2.2 Technical aspects

### **Before building renovation** (or before implementation of energy efficacy measures)

Triumph Internationalist was founded in 1886 in Germany to manufacture corsets. In 1902 the company was renamed Triumph, which was later supplemented by "International". Currently, the headquarters of the internationally active company for the production of underwear is located in Bad Zurzach, Switzerland.

The branch in Wiener Neustadt was operated as a production site for almost 60 years, until mid-2017. After the conversion it became a logistics centre. The change to a logistics warehouse made further technical measures necessary.

### **Renovation process** (or implementation of energy efficacy measures)

The following measures were implemented:

- Replacement of the boiler and optimization of the heating operation and heat distribution
- Adaptation of the existing thermostatic valves
- Adaptation of the ventilation systems for halls 4 and 5
- Lighting conversion to LED technology
- Renewal of the building control system
- Electrical renewals and adaptation of the switch cabinet system
- Renewed fire protection measures such as fire alarm system, sprinklers and hydrants
- Gas supply contract through ENGIE Energie

The measures were implemented from September 2017 until April 2018 and the total investments were € 2,345,660. ENGIE as ESCO implemented the measures and guarantees the energy savings. However, the building operation stays at the client. Thus, some QUALITEE quality criteria couldn't be integrated into the contract as the client is in charge of these topics.

### **After renovation and results achieved**

All named measures were implemented. As the investment costs were part of the contract, the client could be sure that the investments were not higher as agreed. The M&V is done by the customer as he is in charge of the operation and has access to all energy data. As the client is in charge of the operation, the ESCO has no direct feedback about the comfort, but as the client didn't complain so far, it seems that the users are satisfied with the measures. The savings are not measured so far. The predicted savings were about 600 MWh/year or rather 17,6 % thermal energy savings and 14,2 % savings in electricity.

### 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 3 below.

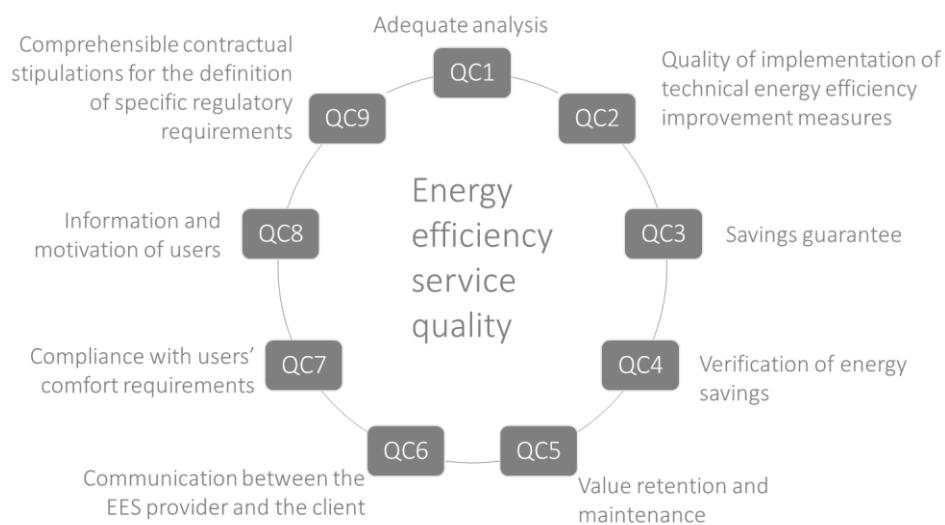


Figure 3. Categories of quality criteria

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 Residential Building Hösching, Austria

### 3.1.1 Importance of the criterion

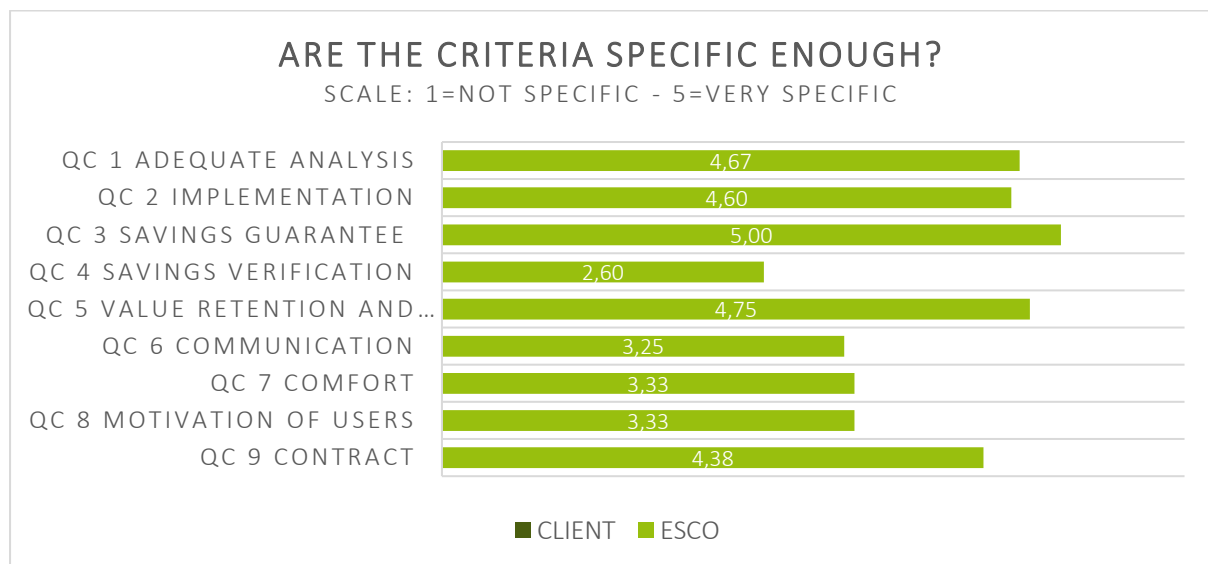
Respondents have been asked to evaluate which are the most important criteria. As most important criteria by ESCO side have been considered:

1. Value-retention and maintenance
2. Rendering of services in the implementation of technical measures
3. Comprehensible contractual stipulations on contracting-specific regulatory requirements

### 3.1.2 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 in Figure 4 below.

Figure 4. Specificity of criteria



### 3.1.3 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 5.

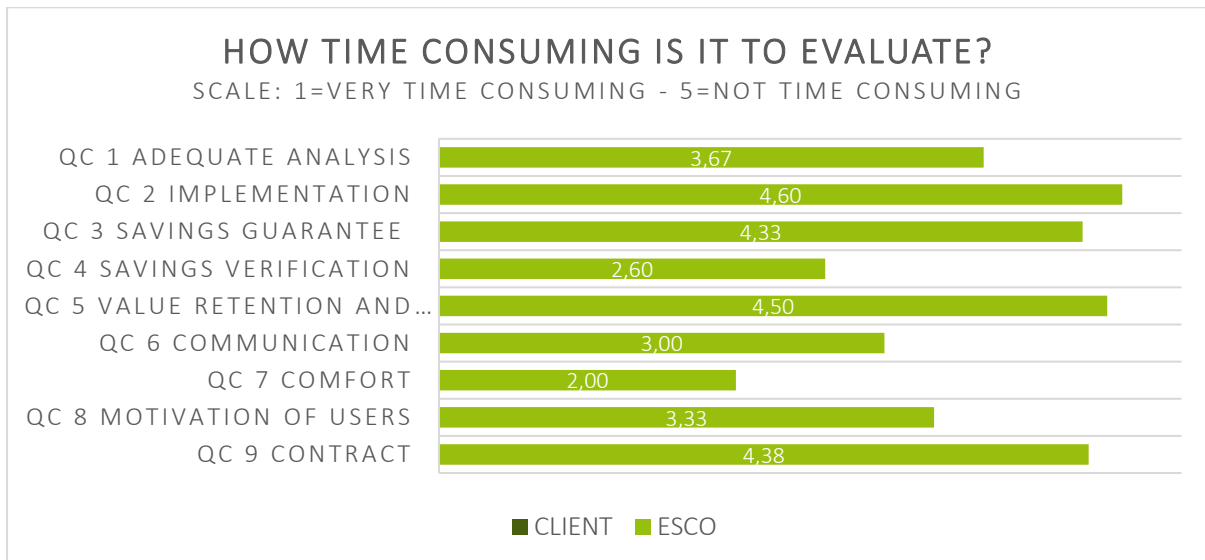
Figure 5. Availability of evidence



#### 3.1.4 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 below.

Figure 6. Time taken for evaluating criteria



### 3.1.5 Barriers and success factors for the application of criteria

All in all, the ESCO thinks, that most of the criteria are important and useful. Most of them are integrated in the internal contracts already. For Energy Supply Contracting on the one hand and for residential buildings on the other hand, several criteria are too complex and not necessary. They need to be simpler for these clients.

- Residential buildings are not so high equipped with housing technology as commercial or industrial buildings. Thus, the ratio between a pragmatic approach and exact guidelines must be reconsidered, otherwise there would be too high transaction costs for the contract and project elaboration.
- The most important thing for residential building occupants is the secure deliverable of heat and hot water combined with an acceptable price. If one of these conditions is not given, the client will complain and ENGIE will get lots of problems within the project. Thus, it is the major goal of ENGIE to satisfy its clients. Many of the named criteria are met, but not as transparent and specific written down.
- As ENGIE is a big enterprise, meeting the standards is self-evident as they cannot afford bad reputation due to not meeting the basic standards.
- ENGIE has strong internal guidelines for contracting projects. Not all meet exactly the criteria of the QualitEE criteria (e.g. name of special standards, communication guidelines, calculation methods)
- Within residential buildings, building occupiers also have to support energy efficiency due to energy efficient behavior. Otherwise, the ESCO cannot guarantee the savings. Thus, another share between not or over fulfilled savings is reasonable. In both cases, the ESCO and the occupier benefit from an over fulfilment or pay for a not fulfilment of the aimed energy savings.

### 3.1.6 Lessons learned from consultations and pilot project

The quality criteria are very comprehensive already. From the ESCO side, no relevant areas and questions are missing. It is already difficult to integrate all criteria in one contract. Sometimes it is better to do something simple and not to write in the contract also to make the transaction costs for the contract negotiations affordable. Following criteria are for residential buildings not so relevant:

AC 2-1: ENGIE as big company has to follow them anyway

AC 2-5: The contract duration is 20 years. After that duration the heating system is more or less to change anyway – also with the best maintenance. So, the quality of the systems after the contract period is not so important.

AC 3-1: In the case of residential building, a rough analysis does not make sense - there was no invitation to tender.

AC 4-1: ENGIE has standardized procedures within the group, whether according to standard is not known.

AC 4-2: Calculation of the ENGIE baseline was based on oil consumption (5 years). Especially for residential construction no different methods are discussed here.

AC 6-2: There are 54 apartments, but no specific contact person. An attempt was made to find a contact person among the residents, but within this project this was not possible. Customers are not interested in

viewing the data. For customers, the most important thing is that everything works and the billing is precisely regulated.

AC 6-3: Measures only concern the operator, and that is ENGIE itself.

AC 7-2: Users call the same way if something doesn't fit. If it often doesn't fit, data loggers are attached to check quality.

AC 7-3: Users call anyway if something doesn't fit.

AC 8-2: Does not make sense in residential construction.

AC 9-3: Customer must insure the installation himself, in the course of building insurance.

## 3.2 Triumph international, Wiener Neustadt, Austria

### 3.2.1 Importance of the criterion

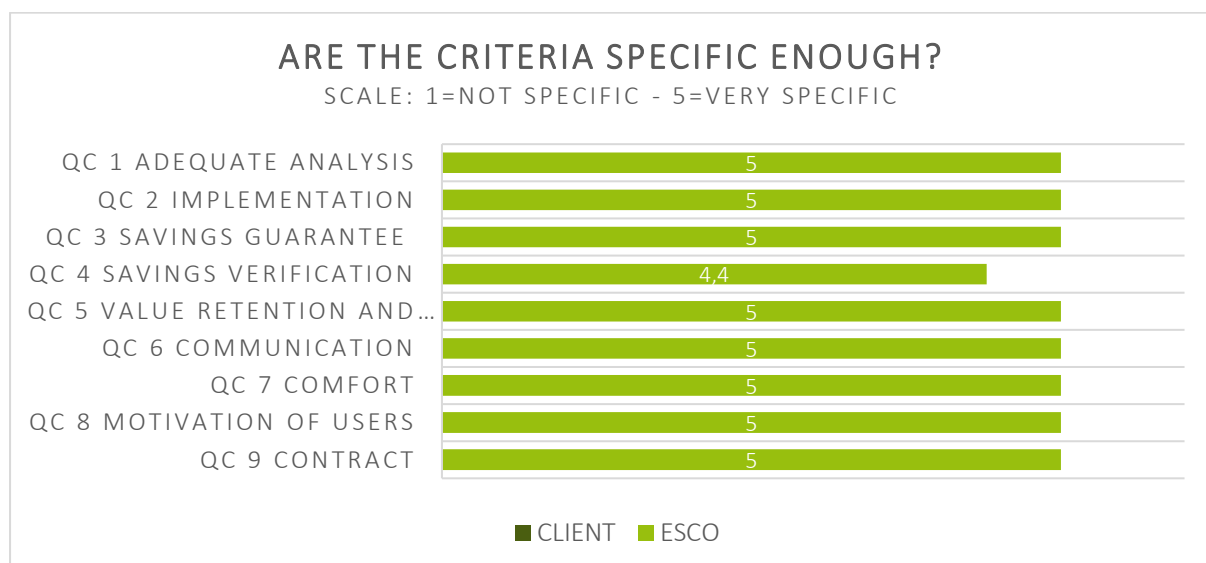
Respondents have been asked to evaluate which are the most important criteria. As most important criteria by ESCO side have been considered:

1. Adequate analysis
2. Rendering of services in the implementation of technical measures
3. Savings guarantee

### 3.2.2 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 in Figure 7 below.

Figure 7. Specificity of criteria



### 3.2.3 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 8.

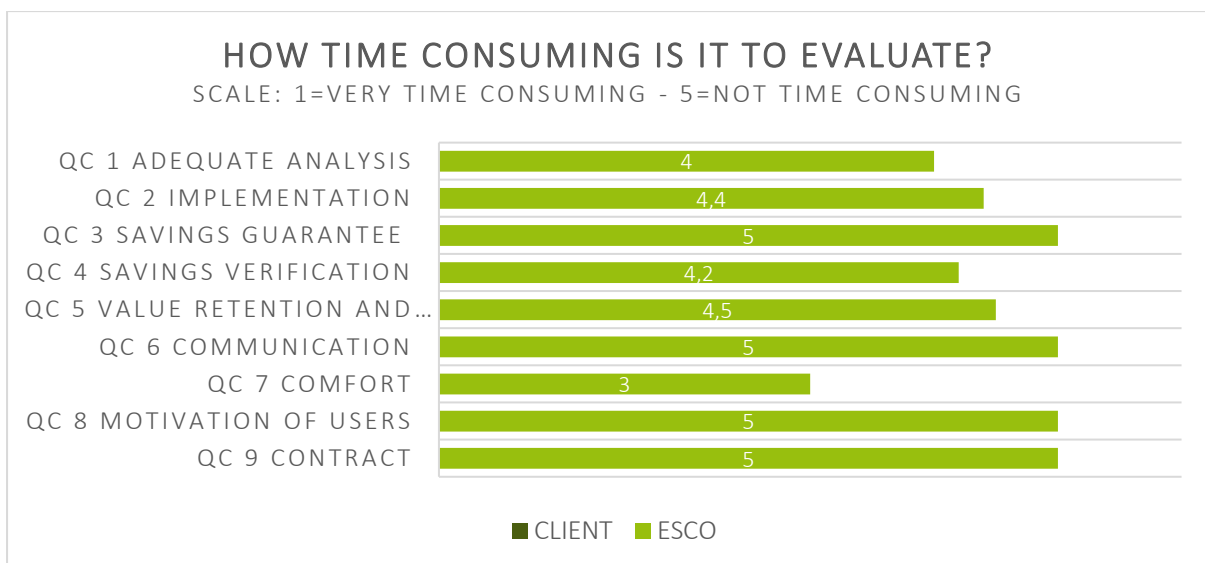
**Figure 8. Availability of evidence**



### 3.2.4 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 9 below.

**Figure 9. Time taken for evaluating criteria**



### 3.2.5 Barriers and success factors for the application of criteria

All in all, the ESCO thinks, that most of the criteria are important and useful. Most of them are integrated in the internal contracts already. Several criteria however, are only relevant if the building operation is part of the contract. Within the majority of the projects of the ESCO this building operation is not part of the contract. ENGIE would suggest to ask in advance, if building operation is included. If not, skip these criteria.

Some criteria seem to be too hard, contra productive or not relevant in certain projects:

- In general. In the beginning of the questionnaire should be queried, if the building operation is contracted within the project or not. Many criteria only fit, if the building operation is done by the ESCO. But in many projects this service is not contracted.
- AC 2-5: Too specific. No ESCO can afford to store spare parts and cannot guarantee software updates.
- AC 4-2: Client never asks for different calculations models. It's too difficult for client to decide that point. Recommendation has to be delivered from ESCO.
- AC 6-1: This criterion is not in the contract as it can change during project period. But it is important aspect for each project.
- AC 6-2: This exists in nearly each project, but it is not integrated into the contract, as such aspects might be contra productive for the service.
- AC 6-4: Is part of the project, but not fixed in the contract. As this might vary during the project, there are side agreements, but not in the contract.
- AC 8-2: User Motivation and communication with the employees are usually included in the project. In this project, the customer only wants direct communication with the contact person.
- AC 9-3: Unclear which insurances

### 3.2.6 Lessons learned from consultations and pilot project

The quality criteria are very comprehensive already. From the ESCO side, no relevant areas and questions are missing. It is already difficult to integrate all criteria in one contract. Sometimes it is better to do something simple and not to write in the contract. Sometimes it irritates clients to integrate into the contract (e.g. AC 6.2) or discuss it (e.g. AC 4-2).

The reason behind AC 6.2 is, that the criterion is good to clear in the project, but shouldn't be fixed in the contract as the client often want a direct and uncomplicated and not complete fixed communication scheme.

The reason behind AC 4-2 is, that no client ever asks for the calculation method. It irritates the client, if the ESCO starts to discuss the calculation method with the client.



## 4 CONCLUSIONS

Experience from the project suggests that hardly all criteria fit into a contract. Most criteria are considered very important and useful. Many of them are already implemented in existing contracts, but not in every project all criteria are applicable (e.g. for residential buildings). It very often depends on the initial situation.

Those criteria that are not implemented in the existing contracts are often done anyway, even if not stipulated in the contract.

The quality criteria are extremely useful as a checklist. In particular, they are very good during contract negotiations to show the client that certain issues are being dealt with in the project - even if not always contractually fixed. In this phase of project acquisition, the criteria catalogue is also useful in order not to forget important topics.

## 5 ANNEX

Quality management meeting date	Feedback from meetings			Questionnaire used and send to Ekodoma yes/no
	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?	
17 July 2018	In general, very useful criteria, many of them are integrated in the contracts already; Project is already in the implementation phase and criteria are used for further quality assurance during the project (--> Application of DECA quality seal).	AC 2-5 too specific AC4-2 client never asks for different calculation models (too difficult for client) - recommendations from ESCO necessary AC6-1 not in contract, as it can change during project period AC6-2 such aspects might be contra productive for the service AC6-4 As this might change during the project, there are side agreements but not in the contract AC8-2 User motivation and communication with the employees are usually included in projects, but not in this one AC9-3 Unclear with regard to insurances	It should be checked, if building operation is part of the service or not. Many criteria only fit, if the building operation is done by the ESCO. In many projects this is not the case.	yes
03. April 2019	All in all, very useful criteria. Most of them are integrated in the internal contracts already. Several criteria however, are only relevant for commercial or industrial buildings. For residential buildings some criteria must be simpler.	AC 1-1 very time consuming AC 4-1 and 4-2 were considered not important in this particular case AC 6-2, 6-3 and 6-4 not very important and especially 6-3 not specific enough to easily provide evidence QC 7 is rather time consuming and not considered very important AC 8-3 not for residential buildings	For residential buildings criteria AC 3-1, AC7-3, AC 8-1, and AC 8-3 not relevant or useful in residential buildings	yes