# D4.3 PILOT PROJECT APPLICATION REPORT LATVIA

# PILOT PROJECT – EPC FOR APARMENT BUILDING IN BERZUPES STREET 23

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## QualitEE Project

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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.

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# Contents

# 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 Pilot project factsheet

**Project details:**

- The multi-apartment building is located in Riga, Ziepniekalns district, Berzupe street 23;
- It is 467 series residential building built in 1970's;
- for the M&V procedure existing energy meters are used. Additional measurement and monitoring systems were not installed for the building.
- Before the renovation building faced not only energy efficiency but also structural and technical problems. Damaged walls and sealing were found during the building's technical inspection. Roof and rainwater drains have been damaged. Residents of the building have carried out a non-harmonised replacement of heating radiators in some of the apartment, which makes it considerably more difficult to regulate the heating system and makes it impossible to ensure a good indoor temperature in all rooms. Despite the poor indoor conditions, the energy consumption in the building was high. The aim of the EPC was to ensure good and healthy indoor environment and improve energy efficiency of the building.
- Energy efficiency measures:
  - Thermal insulation of walls;
  - Thermal insulation of roof;
  - Replacement of all not replaced old windows;
  - Replacement of stairway doors;
  - Renovation of the ventilation system;
  - Replacement of the heating system, with new radiators and thermostats;
  - Replacement of the hot water system.

**Overview:**

Deep retrofit of 2911,1 $m^2$ apartment building with 60 flats in Riga

**Annual carbon savings:**

76,585 $tCO^2$ emissions per year

**Annual energy savings:**

246 300 kWh/year (47% energy savings)

## Table 1 Energy Consumption Data

| Energy Consumption BEFORE intervention (actual) kWh/a | Energy Consumption AFTER intervention (expected) kWh/a | Value of planned EE investment EUR |
|---|---|---|
| Total thermal energy consumption of the building: 509348 kWh = 174,97 kWh/m$^2$<br>Shared electricity: 6853,5 kWh= 2,35 kWh/m$^2$<br>Overall: 177,32 kWh/m$^2$ | Heating: 171558,1 kWh; 58,93 kWh/m$^2$<br>Hot water preparation: 115709,7 kWh; 39,74 kWh/m$^2$;<br>Other consumers: 6853,5 kWh; 2,35 kWh/m$^2$;<br>Overall: 294121,3 kWh/m$^2$; 101,02 kWh/m$^2$ | Project development and management costs: 15 915,34 EUR<br>Construction and installation costs: 530 511,47 EUR;<br>Project monitoring costs: 4 500 EUR<br>Overall costs for renewal works (without VAT): 550 926,81 EUR |

### Business case description/economic parameters

- Energy efficiency service contract between building apartment owners who have ownership of the building and ESCO company "InvEsco".

### Total investments:

| Expected investments | | |
|---|---|---|
| Project development and management costs | € | 15 915,34 |
| Construction and installation costs | € | 530 511,47 |
| Project monitoring costs | € | 4 500,00 |
| Overall costs for renewal works (without VAT) | € | 550 926,81 |
| VAT | € | 111 694,63 |
| Overall costs for renewal works (with VAT) | € | 666 621,44 |

### Stakeholders/companies involved

- Client - Berzupes street 23, Riga, LV-1058
- ESCO – INVESCO Ltd.
- Building management company – RENESCO PARVALDNIEKS Ltd.
- Source of funding:

| Symbol | Source of funding | | |
|---|---|---|---|
| A | State budget contribution — ALTUM | € | 289 106,18 |
| B | Contribution of the local government budget | € | - |
| C | Client Contribution | € | 10 000,00 |
| $I_C$ | Executor financial contribution | € | 377 515,26 |
| D | Other: | € | - |
| $I_T$ | Overall costs for renewal works (with VAT) | € | 666 621,44 |

## 2.2 Technical aspects

Before building renovation

- Foundations and the wall structure are exposed to increased humidity.
- The building's overbearing walls are composed of wall panels and reinforced-concrete wall panels in the staircases on which the enclosing panels are based. Wall and division panels are strengthened between themselves and welded in corners. The outer finish of the panels is composed of layered dolomite stones. The building has recently been restored and filled with stitches between the panels, where there are no seams and fragments of sutures. Between windows and in staircases, where there are no wall panels, there is a filling with wooden planks finished from outside, a 100 mm filling of mineral wool and painted plaster sheets on the inside.
- During the operation of the building, few apartment owners have filled the venting shafts with construction debris during their repair work.
- The roof structures are composed of hollow concrete panels above which are encased with expanded clay, netting layer of concrete and ruberoid roll material, which has been inserted several times. For places above the venting hatches, the tin cover on rooftops are damaged.
- Balconies are composed of reinforced concrete panels. The panels are exposed to atmospheric exposure, therefore in local areas reinforcement layer is crubled. Railings consisting of metal anchorages and metal leeches which have collated under the influence of precipitation on which the smooth dyed sheets of asbestos-cement are fortified
- Outside the entrances to the building are rooftops made of steel structures. The roof is formed in the form of “v” with the rain water collection part in the centre. The roof is composed of asbestos-cement sheet material on top and a tin covering under.
- The entrance porches for the building are made of concrete. The concrete is mossy and with local salt discharge. There is concrete corrosion on the sides of the porches.
- The 60-70% of the building windows are replaced with PVC frames. In the basement of the building there are wooden windows, the glazing is mostly broken and the aisles are covered with metal/wood sheets or wooden boards for that moment no light enters through them. In addition to the windows, hatches have been created in the outer enclosing structure of the basement, which are covered with metal bars.
- The front doors for the building are made from a steel block.
- The building has ventilation channels intended for natural ventilation with an outlet to the roof. The ventilation channels have not been cleaned. The outlets on the roof are made from the exposed clay bricks and are covered with tin rooftops.
- The walls and ceilings of sharing rooms are meshed and painted. As a result of exposure to humidity, the ceilings are slightly damaged due to defects in the roof covering. Defects have been caused by mechanical exposure to the wall veneer.
- The exterior walls of the building are composed of expanded clay-concrete panels. At the end of the building there are micro-cracks that are closed with putty. Balcony railings are the same for all balconies.

### Internal engineering networks and equipment

- The building is equipped with modern heating unit. The building has a two-pipe heating system with a lower distribution. Heating pipelines in the basement are partly covered with outdated thermal insulation.
- As heating elements, Soviet time radiators are installed in the building. Their thermal exchange is insufficient. In the stairwell, the heating radiators are on the first floor of the building.
- The building is connected to the city's electricity networks, but they have not been changed since the building was built and have deteriorated technically.

### Exiting energy consumption

The heating energy received from the district heating system of a building is used for the preparation and circulation of domestic hot water, as well for heating arc of the building for the provision of heat load during the heating period. Part of the thermal energy supplied to the building is heat losses in heating pipelines located in unconditioned basement rooms. The total thermal energy consumption of the building is 509 348 kWh.

## Main issues addressed during renovation

Damaged building plinth

Damaged facade and cap fittings

Entrance rooftops

Entrance monolithic concrete damaged

Sewer output from the building

Old wooden windows and wood-beaming frames

The lower surfaces of the boards of the balconies have been damaged, the colouring has been removed, the collared mesh has been damaged and the reinforcement has been exposed. The steel elements of the manila railings have fallen, the railing lining has worn off. The concrete layer of the surface of the balcony plates is relaxed and crumbled in places, finishing sheets worn out.

Ventilation shafts and canals. The ventilation channels have not been cleaned. The outlets on the roof are made from the exposed clay bricks and are covered with tin made rooftops. As a result of external rainfall, the housing of the venting channels has fallen and continues to deteriorate. The damaged areas need to be cleaned and sealed.

## Renovation process

1. Façade heat insulation:
    a. Cleaning and preparing the walls of the facade for fitting insulation material, transmission of engineering communications. Close micro-cracks with outdoor sealants.
    b. A ventilated facade for the building. Heat the outer walls of the facade with stone wool plates of 100 mm and 50 mm thick.
    c. Installation of a vertical wooden frame and applying an anti-wind film that was fortified with a wooden latching. Painted cement particle boards are used for wall finishing. They were strengthened by screws on the wooden frame.
    d. Restoration of the balcony, restoring its waterproofing, finish, and removal of old fills from the balcony railing, cleaning the railings from corrosion, treating with anti-corrosion products, painting. Reinstating welds if necessary.
2. Foundation insulation:
    a. An existing concrete border was dismantled along the perimeter of the building, and the front stoves at the entrance knots. The existing damaged plaster was repaired, and the surface was smoothed.
    b. For the surface part of the cap, and for the part of the base below the ground level ~ 1.0 m, the vertical waterproofing was incorporated into the depth of 2 layers and insulated with EPS plates at a thickness of 50 mm along the whole perimeter of the building. Front plates were attached to the finishing with glue.
    c. A concrete cobblestone protector border was constructed around the perimeter of the building. The porches were restored with replacement mortar composition.

3. Replacement of windows and doors:
    a. Old wooden windows were dismantled and changed to new PVC frames with triple glased package and selective coating.
    b. Old entrance door blocks were dismantled, new ones were installed.
    c. When assembling windows and doors around the perimeter, external and internal insulation tapes were incorporated.
    d. After changing the windows, the inner trim of the window aisles was perforated and the PVC sill for all windows were installed.
    e. After insulation of the facade, all windows were equipped with new external tin sills with PE coating.
4. Basement thermal insulation:
    a. In the basement outer plane new galvanised metal venting bars on the ceiling walls are installed, in the places of the existing ventilating openings, the PVC locking mechanism were incorporated into the inner plane of the venting.
    b. Light shafts were designed to be purified, aesthetically restored from the outside, to restore water drainage, to cover the edges with new moulds of galvanized metal.
    c. Insulation of the basement ceilings with stone wool lames, which are coated industrially with bottom paint coating and can be glued in a thickness of 100 mm. The surface had to be pre-purified and treated.
5. Insulation of buildings roof:
    a. The roof of the building was insulated. Thermal insulation on an existing ruberoid layer was provided for a = 160 mm and b = 40 mm rock wool surface thermal insulation.
    b. The ventilation shafts are in good technical condition. The chimneys were designed to install new tin coverings. Venting output were restored.
    c. The roof was designed to re-construct the parapet, as well as to install a new security barrier around the building.
    d. The rain water drainage system was restored, by making the water from the building be passed through ready-made concrete drains.
    e. The hatches from the stairway to the roof were changed to fireproof (EI60) hatches with external dimensions 700 x 800 mm. The existing ladder to the roof were repainted.
6. Reinstatement of entry roofs:
    a. The entrance rooftops that was in poor technical condition and their supporting columns were dismantled. Instead, lightweight metal roofs were installed, which were constructed from carrying profiles. Roof covering galvanised and dyed sheets of profiles.
7. Improvement on stairway quality:
    a. The walls and ceilings of the stairwell were cleaned and the microcracks were filled with sealant, the surface was prepared for painting. The stairway railings were cleaned, painted, also armrests were cleaned.
    b. New mail boxes were set up in the stairways.
8. Renovation of the heating system and recovery of pipeline insulation in the basement:
    a. Intended type of heating network - two-pipe.
    b. All risers were changed to new ones.
    c. The risers were equipped with balancing valves and partner valves that offset the pressure in the system.
    d. Existing risers for towel heaters were connected to the new heating circute.
    e. Where it was necessary the radiators in apartments were changed and fitted with a thermostat valve.
    f. Riser parts in the basement were sited with a fireproof stone-wool.
9. Renewal of the hot water supply system:
    a. Project includes renewal of the domestic hot water supply system.

b. Meters were fitted with closing ball veneer and one-way valve were placed above each door of the apartment.
c. Domestic hot water risers were moved to staircase technical shaft. The pipelines outside the shafts were covered with an anti-shock protective insulation layer.
d. Basement pipes were constructed at the ceiling without disturbing the arrival of the urban thermal unit pipelines located at the basement floor.
e. Hydraulic testing of pipelines after mounting of the heat pipeline were performed.

10. Improvement of the ventilation system:
    a. All windows were incorporate with an air supply system that provides regulatory air exchange in the room.
    b. Existing ventilation shafts were cleaned to ensure natural air leakage.
11. Fire protection measures:
    a. Fire safety requirements of the renewable installation were determined by Latvian construction standard LBN 201-15 “Construction fire safety”.
    b. According to LBN 201-15, the type of use and fire protection class U2b are identified for the residential house.
    c. Attic hatch with fire resistance level EI60 and outside dimensions of the hatch 700 x 800 mm were re-installed. All landing rooms were equipped with existing open windows, which were ensure that smoke is removed from the stairs.

### Process length

From the beginning of the development of the technical documentation to the completion of construction, 2 years and 2 months passed. The project was carried out together with RENESCO manager and RENESCO PARVALDNIEKS housing maintenance company.

### Quality assurance

1. Step: Development of technical documentation in accordance with RENESCO design tasks and quality testing;
2. Step: Conclusion of a contract with a knowledgeable building supervisor who has performed construction surveillance on several RENESCO buildings;
3. Step: Organisation of a building assembly every week at the construction site;
4. Step: Site survey every 2-3 days;
5. Step: Close communication with citizens on the progress of the process and rapid response to building failures.

### How long was the energy efficiency impanation process?

- The contract Construction period was 126 days. Additional work was carried out during the construction process, extending the period to 186 days.

## Total construction costs

| No. Code | Type of works or name of the constructive element | Cost | of which | | | Working capacity (c/h) |
|---|---|---|---|---|---|---|
| | | | salary | construction products | mechanisms | |
| 1 | Construction site preparations | 11 863,32 | 2 303,15 | 769,68 | 8 790,49 | 476,13 |
| 2 | Foundations and cap | 24 589,81 | 11 697,86 | 8 650,56 | 4 241,39 | 1 572,51 |
| 3 | Cellar division | 16 297,98 | 6 156,81 | 9 679,99 | 461,18 | 827,73 |
| 4 | Facade | 223 695,89 | 108 598,44 | 100 056,75 | 15 040,70 | 14 597,83 |
| 5 | Roof | 65 282,81 | 19 679,38 | 44 241,36 | 1 362,07 | 2 644,84 |
| 6 | Windows | 47 199,40 | 15 856,59 | 29 844,08 | 1 498,73 | 2 131,45 |
| 7 | Cosmetic repair of stairways | 25 953,15 | 17 344,09 | 6 953,59 | 1 655,47 | 2 330,71 |
| 8 | Hot water supply | 24 351,85 | 10 817,67 | 12 303,88 | 1 230,30 | 1 454,13 |
| 9 | Heating | 56 570,90 | 24 165,48 | 30 827,87 | 1 577,55 | 3 202,93 |
| | **Overall:** | **495 805,11** | 216 619,47 | 243 327,76 | 35 857,88 | 29 238,26 |
| | Overdose: 3% | 14 874,15 | | | | |
| | including job protection: 7% | 1 487,42 | | | | |
| | Profit: 4% | 19 832,20 | | | | |
| | Total: | **530 511,46** | | | | |

Services provided

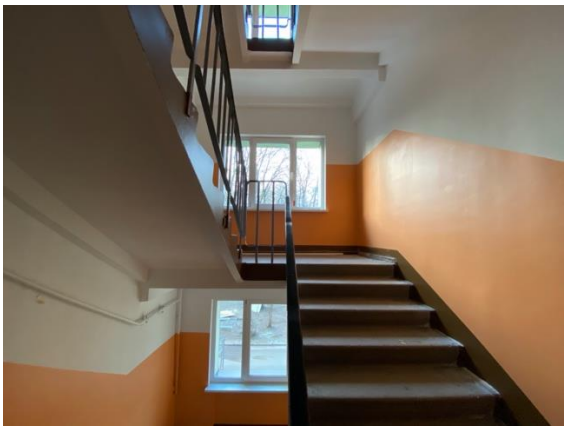
The performer undertakes to organise engineering services, procurement, supply, installation, launch, commissioning and financing, referred to as' Rehabilitation works', with a view to implementing Measures in the Building.

Measurements and quality checks of guaranteed energy savings:

- At the end of each settlement period, the Parties shall check whether the guaranteed energy savings provided for in this Agreement have been achieved. The Parties agree to verify the quality according to the following:
    - Climate adjustments are made to compare conditions during the provision of energy efficiency services with baseline conditions.
    - At the end of each billing period, the performer will provide an assessment of whether the services have been performed in such a way as to achieve the guaranteed energy savings, according to the contractual formulae.
    - Performance of the guaranteed energy savings: if there is not differnce, the performer has achieved the guaranteed energy savings during the applicable Settlement period. In such a case, the customer shall not be entitled to repayment from the performer.
    - Guaranteed energy savings failure: If the difference is negative (BHiet is a negative number), the performer has failed to achieve its guaranteed energy savings during the current period, and it covers the negative balance (difference) calculated according to the contractual formula.
    - The Parties shall pay the payment of the compensation (CG) as a lump sum payment paid by the performer to the customer or by deducting the compensation in similar parts of the payment payable to the contractor, dividing it over the next settlement period. The performer has the right to choose the preferred option, however, for the last settlement period after which the contract is terminated, the party's settlement shall be made in the form of a lump sum payment.
    - Excess: If the difference (balance) is positive (BHiet is a positive figure), the performer has exceeded his guaranteed energy savings and is entitled to keep any and all payments for such excess.

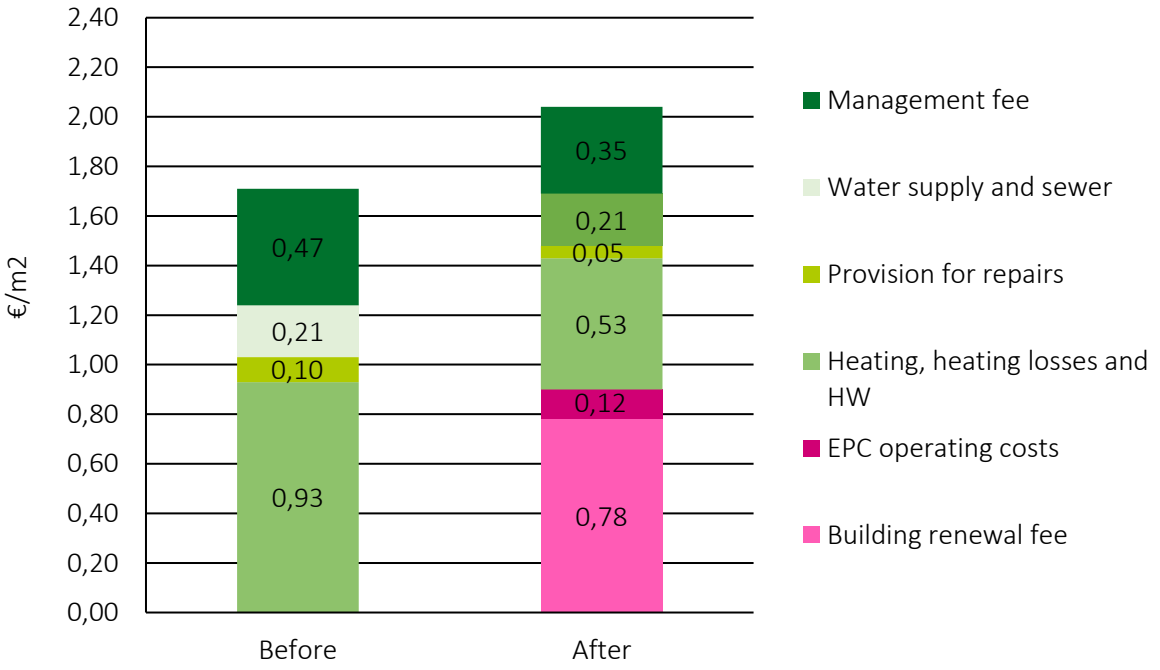
In order to determine the guaranteed energy savings and to assess the performance of the guaranteed energy savings, exit data shall be established in accordance with the general terms and conditions of the contract for measurements and quality checks.

After renovation and results achieved



Thermal energy consumption before – **191, 1 kWh/m² year.**

Thermal energy consumption after **101,0 kWh/m² year** (47% guaranteed savings)

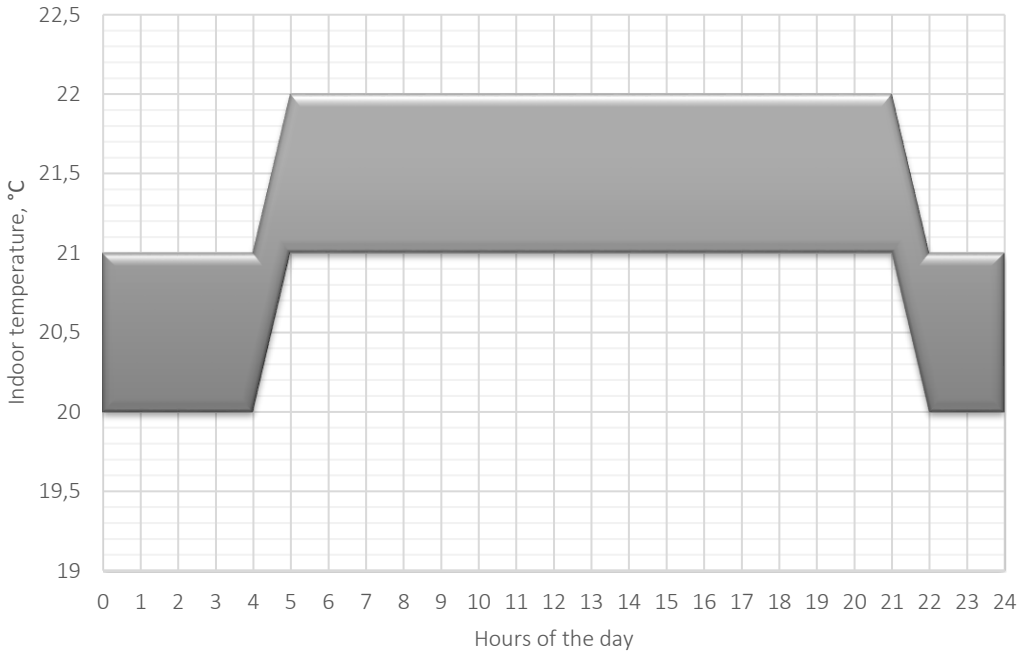


## The M & V process

The M & V process will use the existing thermal meter of the building, which will also serve as proof of quality control and guaranteed energy savings. Additional measurement equipment will not be provided for the building. The energy efficiency measures taken have already been tested and proven in other building renovation projects already in place.

– in addition, buildings indoor comfort as one of the guarantee is provided according to the below graph:

Diagram 1




– hot water temperature according to normative acts – 55 °C.
– quality of construction works.

# 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.

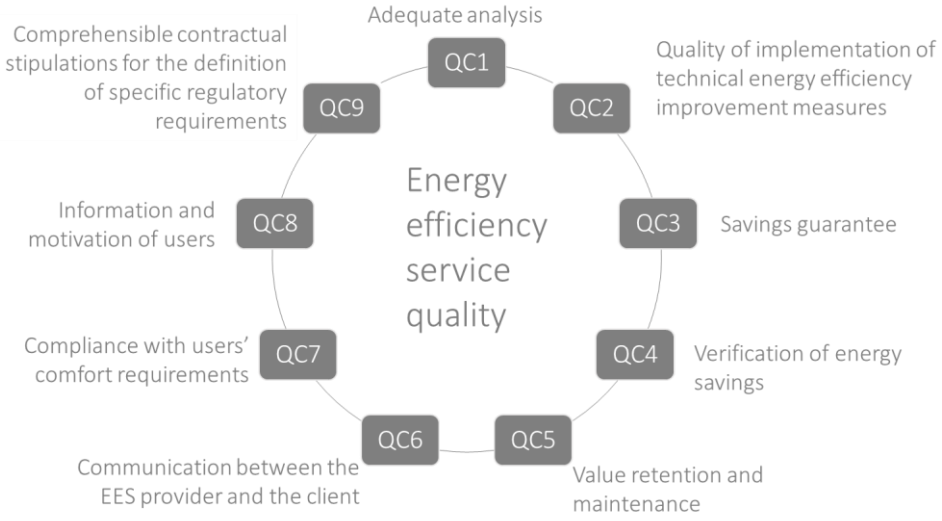



Figure 2. Categories of quality criteria

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.

## 3.1 Importance of the criterion

Respondents were asked to identify the three most important criteria. As most important criteria were identified:

From client side:

1. QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
2. QC 3 SAVINGS GUARANTEE
3. QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT

From ESCO side:

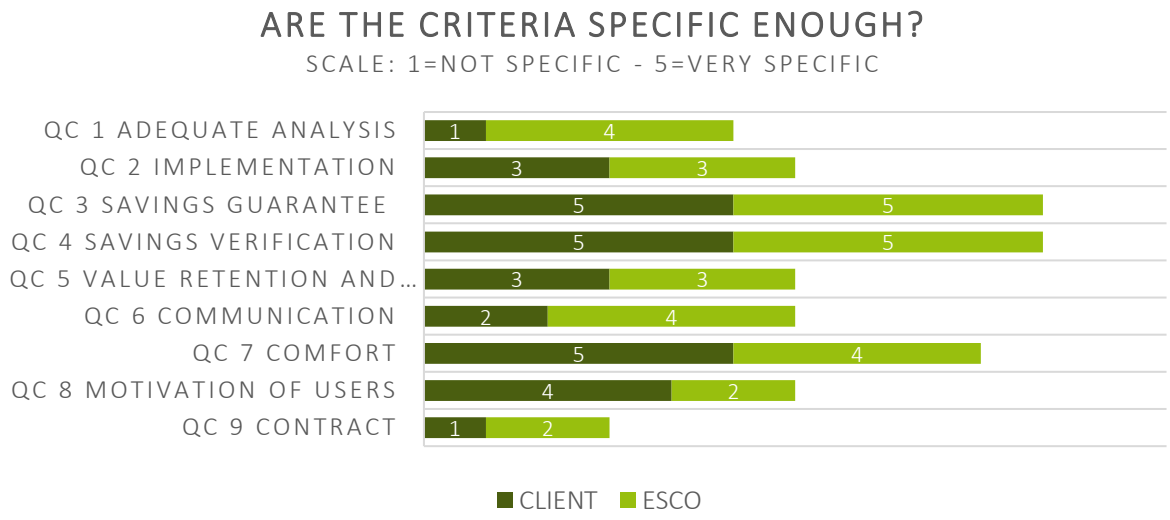
1. QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
2. QC 4 VERIFICATION OF ENERGY SAVINGS
3. QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT

From Facilitator sode:

1. QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
2. QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT
3. QC 8 INFORMATION AND MOTIVATION OF USERS

## 3.2 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**Error! Reference source not found.** below.

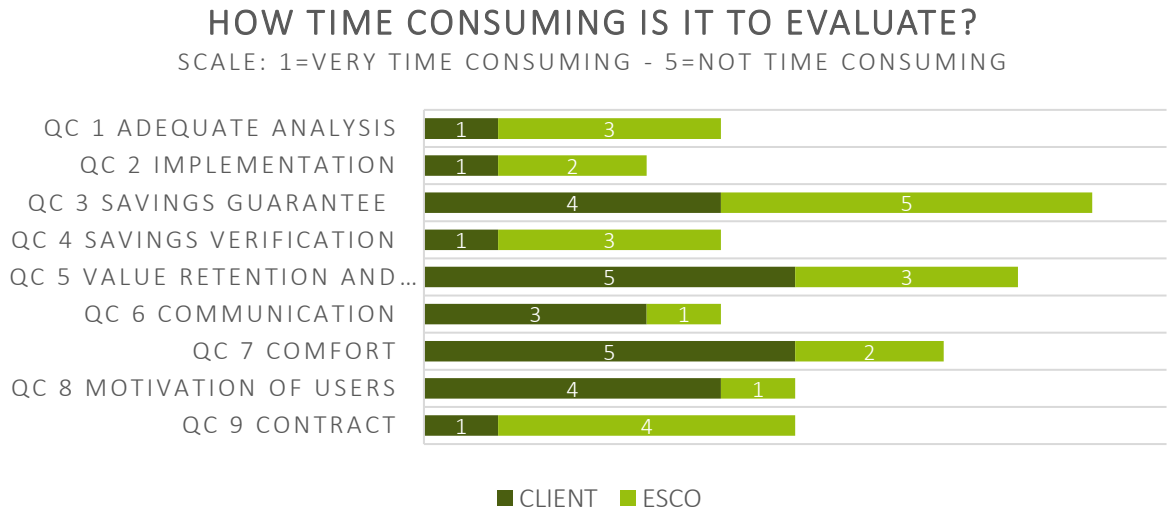


## 3.3 How easy is it to provide evidence?

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 below.


## 3.4 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 below.



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

| *Challenges/Problems* | *Solutions/Recommendations* |
|---|---|
| Delays in delivery of materials | Immediately after the announcement by the contractor regarding the delay in the supply of specified material, the commissioning party and the Construction Supervisor shall discuss the possibility of altering the material against the analogue. Following the agreement of all parties concerned on new material, the commissioning party must coordinate the change of this material with ALTUM. Only and only after a positive response from ALTUM contractor can order and use a new equivalent for the project. In Berzupe 23 case, facade plates were late during the final phase. |
| Lack of workers at the site | The shortage of workers at the site leads to a delay in the time period for completion of the works, which means that the commissioning party and the Construction Supervisor must follow the number of workers employed in the weekly building assembly. If the number of workers is insufficient or shrinks within a week, the commissioning party must verify the activities of the contractor to correct this problem. During the renovation of the Berzupe 23 building, workers were clearly lacking. |
| Non-professionalisation of workers and poor quality of work performed. | The Construction Supervisor must accept all covered works and inspect the materials used, according to the project. The financial amounts for completed works was not be paid until the defects specified by the Construction Supervisor were corrected.<br>The customer representative must follow the list of quality control previously by the developer.<br>It is important to mention that the best building supervisor in the process of renovating an apartment house is the resident of that house itself. Residents shall immediately report to the Customer regarding noted defects or violations of order and security at the site. |
| People not wanting to cooperate and to let into their apartments. | If one of the residents of the house refuses to let in their apartments in order to replace the joint-ownership engineering networks, and does not react to letters sent by the customer, the commissioning party should notify the other residents of the house of this situation.<br>Citizens, understanding that, for example, heating is not connected because of a single apartment, have a direct interest in helping to solve this problem. It is possible to convince people together. We have explained to citizens the progress of the process and the current uncertainties. |
| Population discontent with the quality of construction processes and works | During the construction period, the commissioning party should organise 2-3 information meetings for the residents of the house, where not only the representative of the commissioning party is present, but also the Construction Supervisor and the representative of the building contractor. Citizens have the |

| | |
|---|---|
| | opportunity to make their proposals, their claims and to ask questions. The commissioning party should record the meeting and should designate the responsible persons so that the problems are resolved. |
| Errors or shortcomings in the developed project | If the commissioning party has entered into an agreement with field supervisor, the supervisor should make any necessary changes to the project or develop additional nodes.<br>If the commissioning party has not entered into a contract with the field supervisor, the commissioning party must find the necessary solution and agree it with the author of the Project. |
| Need for additional financing to implement the project | Although the building recovery project has been developed in detail and quality terms, the construction process has led to the discovery of unexpected works requiring additional financing. The building contractor determines the costs of the additional estimate, which are agreed with the costumer and the Construction Supervisor, second, to re-evaluate each line of estimates of the Treaty. It is likely that the planned size of certain works is higher than that achieved, which means that the contractor can make savings during the implementation of the project. These savings are one of the main sources of additional work financing. |

## 3.6 Lessons learned from consultations and pilot projects

Which criteria been used in the pilot project?

Clients side

- QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
- QC 3 SAVINGS GUARANTEE
- QC 5 VALUE RETENTION AND MAINTENANCE
- QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT
- QC 7 COMPLIANCE WITH OF USERS' COMFORT REQUIREMENTS
- QC 8 INFORMATION AND MOTIVATION OF USERS

ESCO side

- QC 1 ADEQUATE ANALYSIS
- QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
- QC 3 SAVINGS GUARANTEE
- QC 4 VERIFICATION OF ENERGY SAVINGS
- QC 5 VALUE RETENTION AND MAINTENANCE
- QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT
- QC 7 COMPLIANCE WITH OF USERS' COMFORT REQUIREMENTS
- QC 8 INFORMATION AND MOTIVATION OF USERS

Facilitator

- QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES
- QC 3 SAVINGS GUARANTEE
- QC 4 VERIFICATION OF ENERGY SAVINGS
- QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT
- QC 7 COMPLIANCE WITH OF USERS' COMFORT REQUIREMENTS
- QC 8 INFORMATION AND MOTIVATION OF USERS

How have the criteria been used in the pilot project?

| | |
|---|---|
| QC 1 ADEQUATE ANALYSIS | The building was visited and its on-site survey and assessment was carried out, data on the state of the building, problems, initial energy consumption and population comfort level parameters were obtained. In the contract, the original state of the building will be described in detail, including all aspects related to energy consumption. The energy consumption of the building was analysed and major consumers were evaluated. Climate correction was taken into account in the negotiations. |
| QC 2 QUALITY OF IMPLEMENTATION OF TECHNICAL ENERGY EFFICIENCY IMPROVEMENT MEASURES | Certificate of the restoration of the facade of the residential building on Berzupe Street 23, Riga was developed on the basis of the design task submitted by the joint owners of the building, in accordance with the developed energy audit report of the building, the technical survey of the building, as well as in conformity with the construction standards and standards of the Republic of Latvia. Also, operation and maintenance manual has been established. |
| QC 3 SAVINGS GUARANTEE | The contract contains the guaranteed energy savings and describes its measurements and quality checks. |
| QC 5 VALUE RETENTION AND MAINTENANCE | The contract includes a service and maintenance manual that includes periodic maintenance activities, interim preventive maintenance operations and expected long-distance maintenance activities. |
| QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT | The contract specifies the contact details of the building's authorised persona and its contact details, the contact details of the independent expert, and the contact details of the performer. |
| QC 7 COMPLIANCE WITH OF USERS' COMFORT REQUIREMENTS | The contract established an indoor temperature that has to be provided during both the heating season and the service period, as well as the required hot water temperature. |
| QC 8 INFORMATION AND MOTIVATION OF USERS | There is nothing in the treaty about informing and involving the users of the building. |

Have we missed anything? List up to three (3) significant missing areas you have recognised when applying criteria?

Nothing is missing.

Are there any other criteria that should be added? List up to three (3) criteria.

Nothing needs to be added.

Are there any criteria that should be removed?

None of the criteria needs to be removed.

# 4 CONCLUSIONS

How should the criteria be used?

Client

- QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT should be used before and during the renovation about the process progress plus explaining the technological process with leaflets, additional meetings.
- QC 8 INFORMATION AND MOTIVATION OF USERS should be used regarding explanation before EPC is signed.

ESCO

- QC 1 ADEQUATE ANALYSIS should be used during energy audit, technical inspection, site visits.
- QC 4 VERIFICATION OF ENERGY SAVINGS should be used after the heating season has ended, report about savings should be issued.
- QC 7 COMPLIANCE WITH OF USERS' COMFORT REQUIREMENTS should be used when internal monitoring is applied.

Facilitator

- QC 6 COMMUNICATION BETWEEN THE EES PROVIDER AND THE CLIENT should be used regarding high demand and availability to communicate. It helps to minimize the doubt level. Acting on quality requests between constructor and client.

# 5 ANNEX

| Meeting date | Summary |
|---|---|
| 11/02/2018 | Kick-off meeting to introduce quality criteria, pilot project process and to discuss future action. |
| 26/03/2019 | Initial assessment of quality criteria from ESCO and client side |
| 14/04/2019 | Quality criteria used in ESCO procurement and included in the EPC agreement. Planned to sign the agreement in June. The criteria included (QC 1 Adequate analysis; QC 2 Quality of implementation of technical energy efficiency improvement measures; QC 3 Savings guarantee; QC 4 Verification of energy savings; QC 5 Value retention and maintenance and QC 6 Communication between the EES provider and the client; QC 7 Compliance with of users' comfort requirements) |
| 15/05/2019 | Assessment of project development phase – energy audit, technical design. |
| 07/02/2020 | Feedback about project development and procurement. |
| 13/02/2020 | Assessment of quality criteria is received from client side |
| 18/02/2020 | Assessment of quality criteria is received from ESCO and facilitators side. |
| 26/02/2020 | Meeting to collect feedback on quality criteria and discuss next steps. |
| 04/03/2020 | Assessments have been received and analysed. Results are aggregated in the report. Process is near completion. |