D4.3 PILOT PROJECT APPLICATION REPORT UNITED KINGDOM

PILOT 1 – SOUTH CAMBRIDGESHIRE HALL

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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.

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Disclaimer

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1 INTRODUCTION

During the QualitEE project activities, draft European technical quality criteria for Energy Efficiency Services[1] have been applied in pilot projects to provide critical feedback to feed into the adaptation of the criteria for the UK context, and to evaluate the feasibility of current proposals for a UK quality assurance scheme for EPC.

The project subject to the pilot exercise in this case is an Energy Performance Contracting project between South Cambridgeshire District Council, the Client, and their selected Contractor, Bouygues Energies & Services procured using the RE:FIT framework. This document gives an overview of the project, as well as summarising the key outcomes and feedback from the process.

The author would like to extend thanks to all that participated in the pilot project and provided feedback. In particular; Phil Bird, Kevin Ledger, Lee Jones and Alexandra Snelling-Day at South Cambridgeshire District Council, Miles Messenger, Alex Wingate and Lee Hyde at Bouygues Energies & Services, and Rachel Toresen-Owour and Keith Routledge at Local Partnerships.

[1] https://qualitee.eu/publications/draft-guidelines-of-european-quality-criteria/

2 DESCRIPTION OF THE PILOT PROJECT

2.1 Pilot project factsheet

Project details:

- Municipal administration building
- Project stage – contract agreement.
- Renewable electricity from PV
- Renewable heat from ground source heat pump
- Efficiency measures and EV charging

Table 1 Energy Consumption Data

Energy Consumption BEFORE intervention (actual) kWh/a	Energy Consumption AFTER intervention (expected) kWh/a	Value of planned EE investment £
1,457,527	**630,196**	**£1.9m**

Business case description/economic parameters

- 16-year Energy Performance Contract (correct at time of business case approval).
- £1.9m CAPEX

Stakeholders/companies involved

- Client - South Cambridgeshire District Council
- ESCO – Bouygues Energies & Services
- Facilitator – RE:FIT / Local Partnerships

Overview:
PV car ports, EV charging, ground source heat pump & various efficiency measures for municipal offices in Cambridgeshire.

Annual carbon savings:
171 tCO2 emissions per year

Annual energy savings:
827,331 kWh/year (57% energy savings)

Renewable generation:
498,600 kWh (Heat)
111,204 kWh (Electricity)

Annual primary energy savings:
1,126,292kWh/year

2.2 Technical aspects

Building before renovation

Building	South Cambridgeshire Hall
Building Use	Council (Municipal) offices
Built	2003
Floor area	5,200m^2
Electricity use	690,423 kWh p.a.
Natural gas use	767,104 kWh p.a.

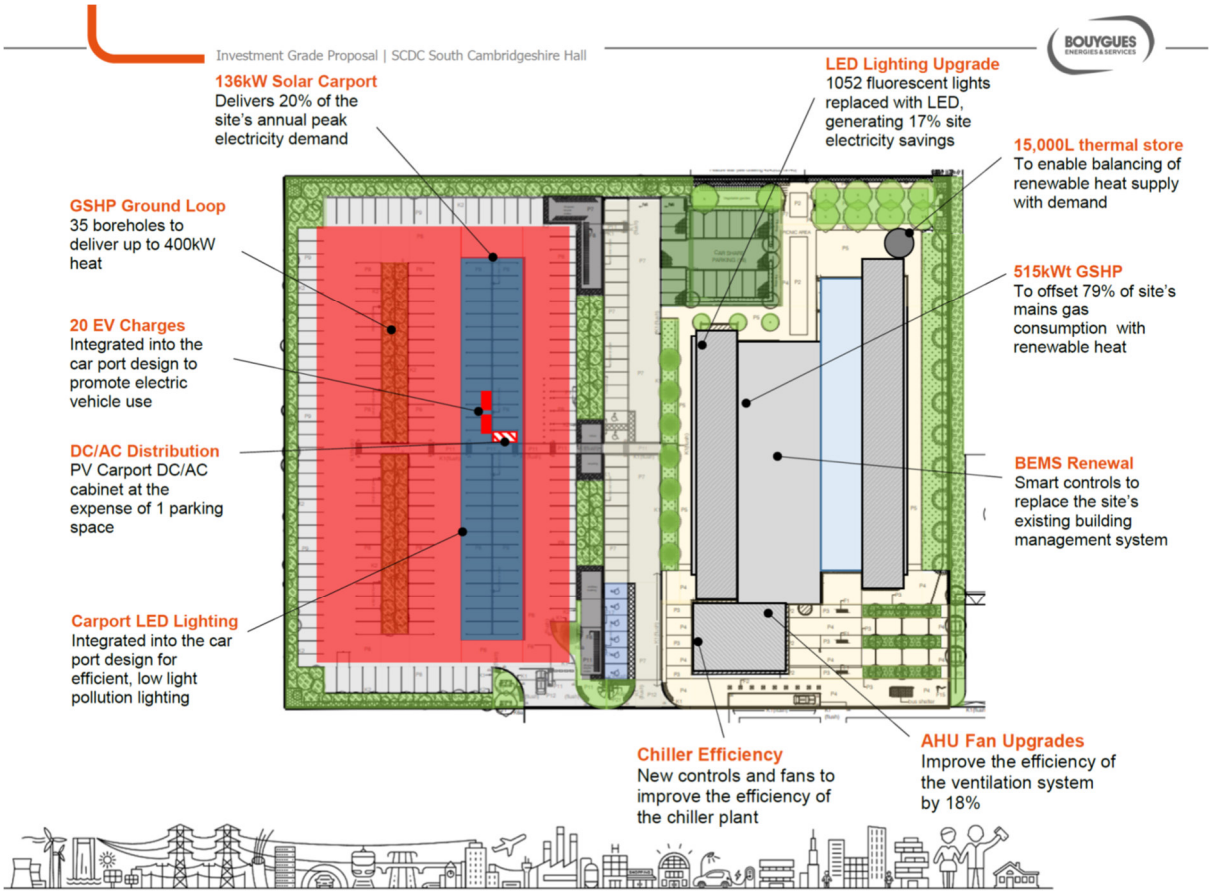
Project aims & scope

South Cambridgeshire District Council has declared a climate emergency and is therefore looking to play a leading role in the transition to net zero carbon by 2050. The ambition of this project is to go as far as possible to reducing the Council's flagship building's carbon footprint to zero within reasonable economic limits. Key items in the project such as the solar PV carports provides material amounts of renewable generation whilst the ground source heat pump makes a considerable impact in transitioning away from natural gas heating, which is critical to the decarbonisation of heat.

The scope of energy conservation and renewable generation measures is as follows:

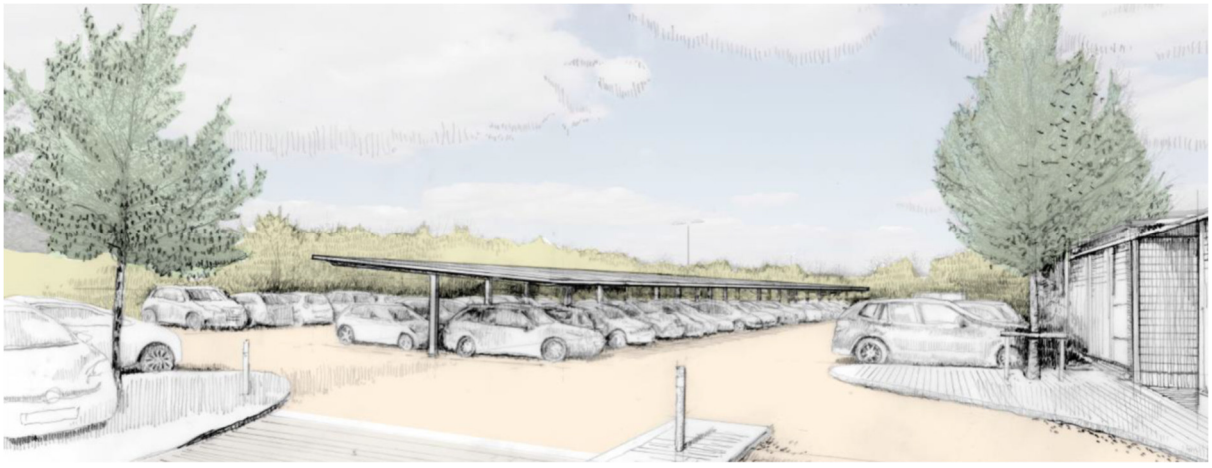
Energy Conservation Measure	Description
Solar Car Ports	A 136.5kW double-bay car port, equipped with 420 translucent bi-facial monocrystalline high-efficiency solar PV modules and SolarEdge power-optimised inverters to maximise solar yield.
Ground Source Heat Pump	A closed-loop ground source heat pump system, comprising 515kW high-temperature heat pump, 35 × 200m closed-loop boreholes, located in the car park around the car ports.
LED Lighting Upgrade	The replacement of existing fluorescent luminaires with high-efficiency LED luminaires. Also incorporates the innovative Light IP lighting controls system to give full, fitting by fitting dimmable control over the luminaires yielding significant operational and occupancy comfort benefits.
Building Energy Management System Renewal	Replacement of the existing obsolete TREND IQ2 building management system with a cutting edge Priva BlueID building energy management system. This will be programmed to minimise the energy expended to meet the required comfort conditions and maximise renewable energy use via a new demand-driven control strategy. The controls will integrate with the proposed GSHP and new chiller controls.

Energy Conservation Measure	Description
Chiller Efficiency Improvements	The modification of the existing chiller and chilled water system to improve its coefficient of performance and delivery efficiency. This will be achieved through the replacement of the existing condenser fans with high-efficiency EC plug fans, replacement of the chiller's controller and floating head pressure system.
Air Handling Unit Fan Replacements	The replacement of inefficient belt-driven supply and extract fans and motors with new ultra-high EC backward curve plug-fans with variable speed controls.
Electric Vehicle Chargers	The project includes installation of twenty 11kW smart EV chargers as part of this proposal integrated into the solar carports. Whilst this is not a building energy efficiency improvement per se, it will assist the Council in decarbonising transportation.



Project implementation and communication

- A detailed project implementation programme has been drawn up. It focusses on the completion of the project, in particular the ground source heat pump, before 31st March 2021 such that the Client can make benefit of the UK's renewable heat incentive scheme (the Renewable Heat Incentive) which is due to close on this date.
- In this project, the critical milestones for timely project implementation revolve around receiving planning consent. The main aspects of the project – the solar carport and ground source heat pump – include extensive civil engineering works that require planning consent. These aspects also need careful time planning and stakeholder engagement to minimise disruption to building users, particularly relating to the use of the car park.
- To ensure smooth and timely delivery the project board meets on a fortnightly basis. The project board includes.
    - Key Client project team including sponsor and manager
    - Client operational (facilities management) staff
    - ESCO technical and project management staff
    - Client communications officers to ensure the project activities are communicated internally and externally



Savings guarantee and performance verification (M&V)

- This project has been procured through the RE:FIT framework. Under this framework the savings guarantee is structured to run for the duration of the project's payback period, which in this case is 16 years. This means that the full value of the capital investment is protected under the guarantee.
- The guarantee monitoring and reconciliation process is organised annually. Where shortfalls arise in a contract year, these must be rectified in subsequent years or paid as a rebate to the Client directly after the end of the contract year. In the latter case, if the Contractor overperforms in subsequent years then the Client must repay all or part the rebate depending on the level of overperformance. A running balance of shortfalls and surpluses, and guarantee related payments is held in a 'notional account' and upon final reconciliation at the end of the Contract any remaining shortfall must be paid by the Contractor to the Client.
- The Contractor has developed an M&V Plan following the International Performance Measurement and Verification Protocol (IPMVP) and the RE:FIT specification. In this project the following headline approaches are being taken:
    - Whole facility measurement of gas savings to mainly capture gas savings from the ground source heat pump, but also the BEMS and AHU improvement measures. Baseline and reporting period are normalised to average external temperature conditions (degree days) through regression analysis.
    - Direct sub-metering of electricity use of the ground source heat pump, and heat output of the system for the calculation of renewable heat incentive income.
    - Direct sub-metering of Solar PV generation and export.
    - Retrofit isolation approaches for other ECMs focussed on spot testing of improvements in power demand extrapolated using agreed hours of operation.

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 the figure below.

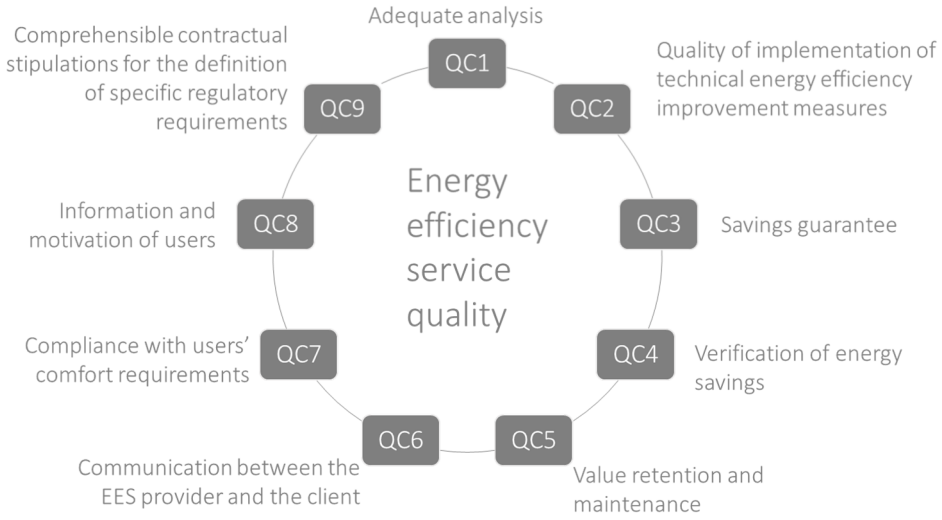


Figure Categories of quality criteria

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:

Client:

1. QC3 – Savings Guarantee
2. QC2 – Implementation
3. QC6 – Communication

ESCO:

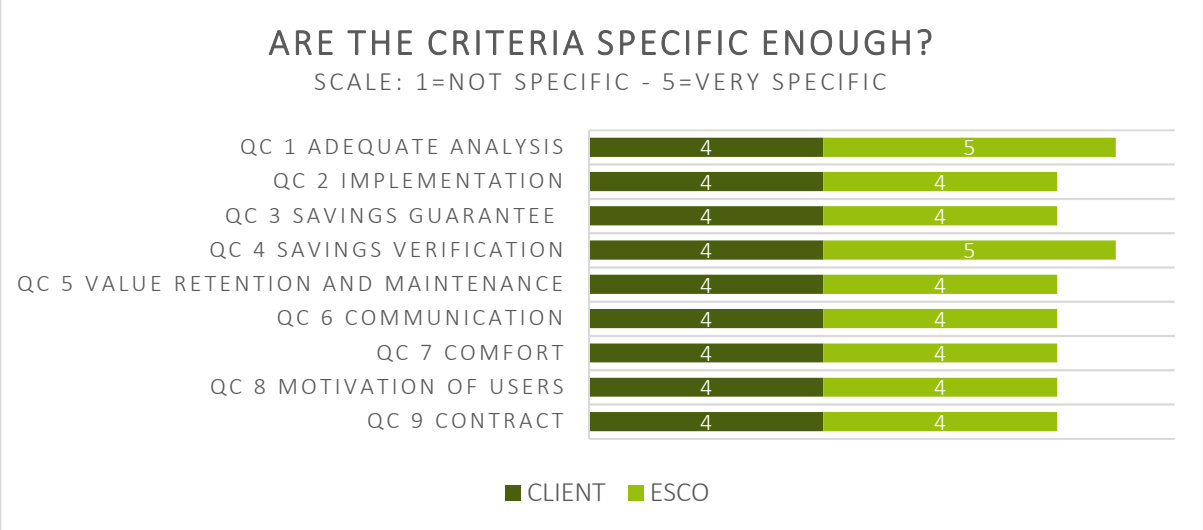
1. QC2 – Implementation
2. QC1 – Analysis / Energy Audit
3. QC3 – Savings Guarantee (although it was noted that QC4 should go alongside this as both criteria go hand in hand)

Facilitator

1. QC2 – Implementation
2. QC3 – Savings Guarantee
3. QC4 – Savings Verification (M&V)

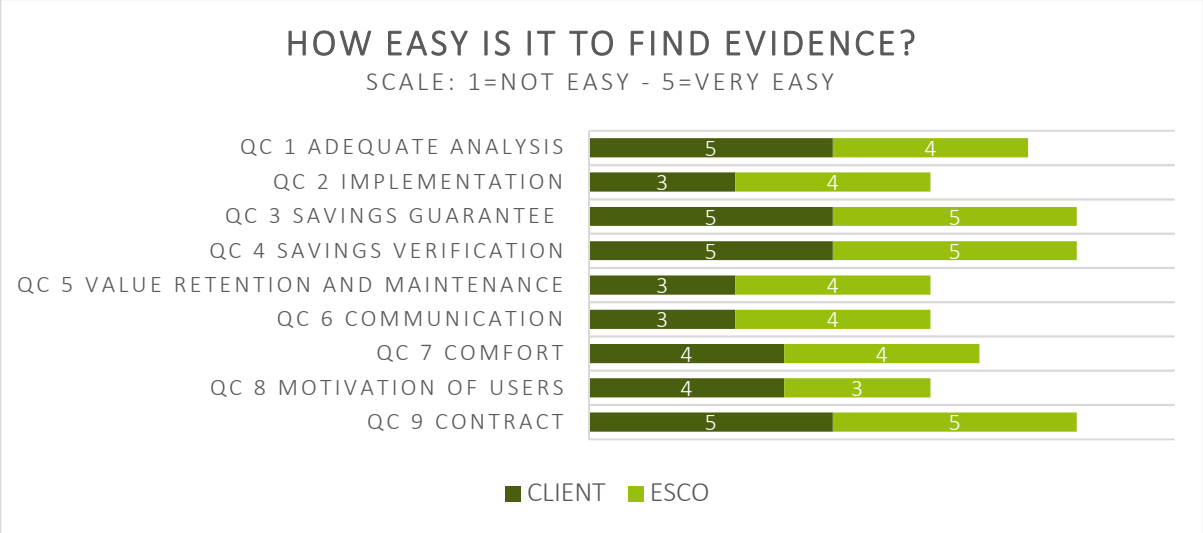
3.2 Are the criteria specific enough?

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.



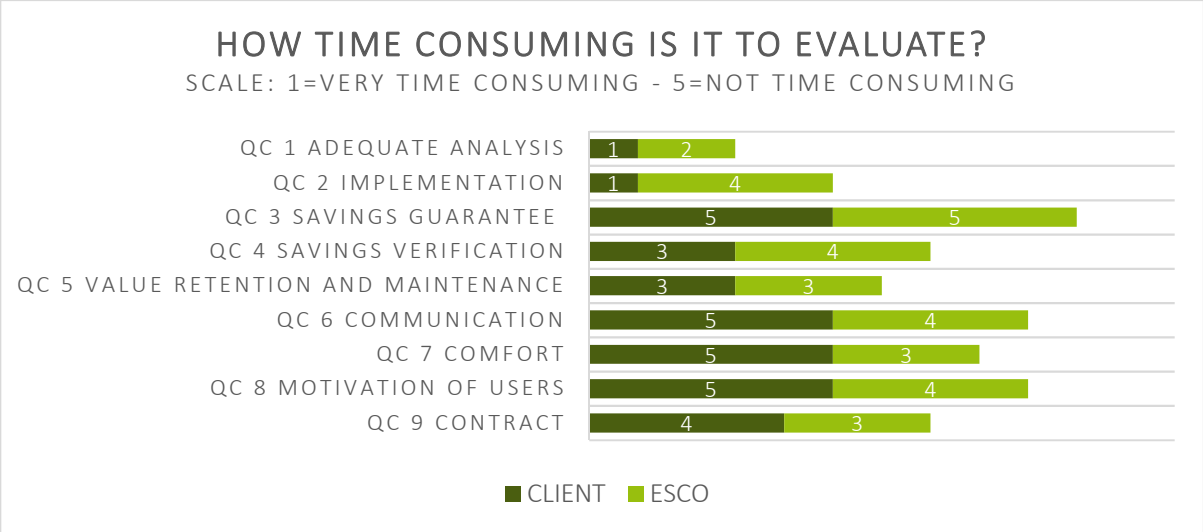
3.3 How easy is it to provide evidence?

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 summarised in the figure below.



3.4 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.



3.5 Barriers and success factors for the application of criteria

- How have the criteria been used in the pilot project?

  The criteria have been used during the project development, procurement, design and contracting phase as a discussion and review framework, mainly to support the Client in evaluating the proposals and documentation provided by the Contractor.

- What are the possible barriers in using them?

  One of the key barriers cited from a client perspective is the large number of criteria to evaluate, and that they are presented all together. It has been suggested that the criteria set should be streamlined and that it would be helpful to break down the criteria into the stages of the project process – in a timeline perhaps - so it is clear where the focus should be at each stage.

- Potential further applications for the criteria

  It was felt that the criteria can be helpful for the client when engaging those in their orgainsation that will be involved in the project but do not have experience in the field of energy or EPC. The criteria can be used as a tool to explain the process, what to look out for, and to build their confidence if they are required to engage with or manage the Contractor.

  South Cambridgeshire District Council is also using the project to demonstrate leadership in how organisations can work towards zero carbon. The criteria could offer a useful guide to SMEs and businesses in the area that follow the Council's lead and implement an EPC.

- Whose criteria are they?

  There was a point of discussion around which party is responsible for certain criteria. It was felt that there could be a separate set of Client (/Facilitator) criteria around project specification, data provision and communication. Often, access to good quality baseline data and building information is a challenge for the Contractor.

3.6 Lessons learned from consultations and pilot projects

3.6.1 Are all criteria relevant?

- Most of the criteria were relevant to the project except;
  - QC5 – was only partly relevant as O&M responsibility for the Energy Conservation Measures will be transferred to the Client as soon as the construction is complete. It was noted, however, that clear definition of responsibilities and detailed O&M manuals, training and handover activities are all still very important in this case.

- QC8 – information and motivation of users was not really relevant to this project as the project did not include this 'behavioural change' as part of the scope of energy conservation measures.

It was recommended that these criteria should become optional.

3.6.2 Potential additions and amendments.

Other feedback received focussed on criteria that were missing or could benefit from improvement. The feedback is summarised in the following table.

Criterion	Topic	Feedback
1-1	Project drivers	Further emphasis could be made on aligning the project development process to the client's needs; beyond energy and financial saving there a multitude of drivers of importance to clients such as delivery timescales, carbon saving / wider environmental impact, visible impact of project. For the latter it should be noted that in the pilot project the ground source heat pump equipment will be 'shown off' behind a glass panel in the main foyer of the building to visibly demonstrate the Council's commitment to the zero carbon transition. The solar carports and EV chargers have similar PR benefits.
2	Health & Safety (missing)	Health & Safety is a critical element of project construction works. The UK has well developed regulations – Construction Design & Management (CDM) – that regulate the design and planning of construction works to ensure health & safety is managed throughout the process.
1, 2, 4	Professional qualifications (missing)	It was highlighted that professional qualifications for staff working on certain aspects of the project are beneficial and are currently not covered in the criteria. For instance; QC1 – Qualified energy auditor (on the ESOS registers) and / or chartered engineering qualification QC2 – Project management qualifications such as PRINCE2 QC4 – Certified Measurement & Verification Professional
6-4	Resourcing (missing)	A key area of discussion was around resourcing requirements on both the Contractor and Client sides. Adequate resourcing is critical to high quality and timely delivery. The criteria could include a separate assessment of resourcing plans and execution in

		practice, or this may be included within evaluation of project implementation plans. AC 6-4 appears to have some reference to resourcing, but the wording is more focussed on exchange of information rather that having adequate personnel resources. It was noted the importance of resource planning on the client side. As part of Contractors' project delivery plans it is important to guide the Client to which personnel and skills they will need to ensure smooth project delivery.

4 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 South Cambridgeshire District Council, the client, and their selected Contractor – Bouygues Energies & Services. The purpose of the piloting exercise was to provide critical feedback to feed into the adaptation of the criteria for the UK context, and to use the criteria to provide a level of quality assurance of the project in progress.

Generally, it was found that the criteria were sufficiently specific and relatively easy to evidence. It was highlighted that criteria around analysis / energy auditing, implementation, savings verification (M&V) and operations & maintenance (O&M) are likely to be time consuming to evaluate. This is thought to be due to the number of different Energy Conservation Measures (ECMs) that need to be evaluated separately. To streamline this a process of sampling focussed on the most material ECMs – in terms of energy or cost saving – could be helpful.

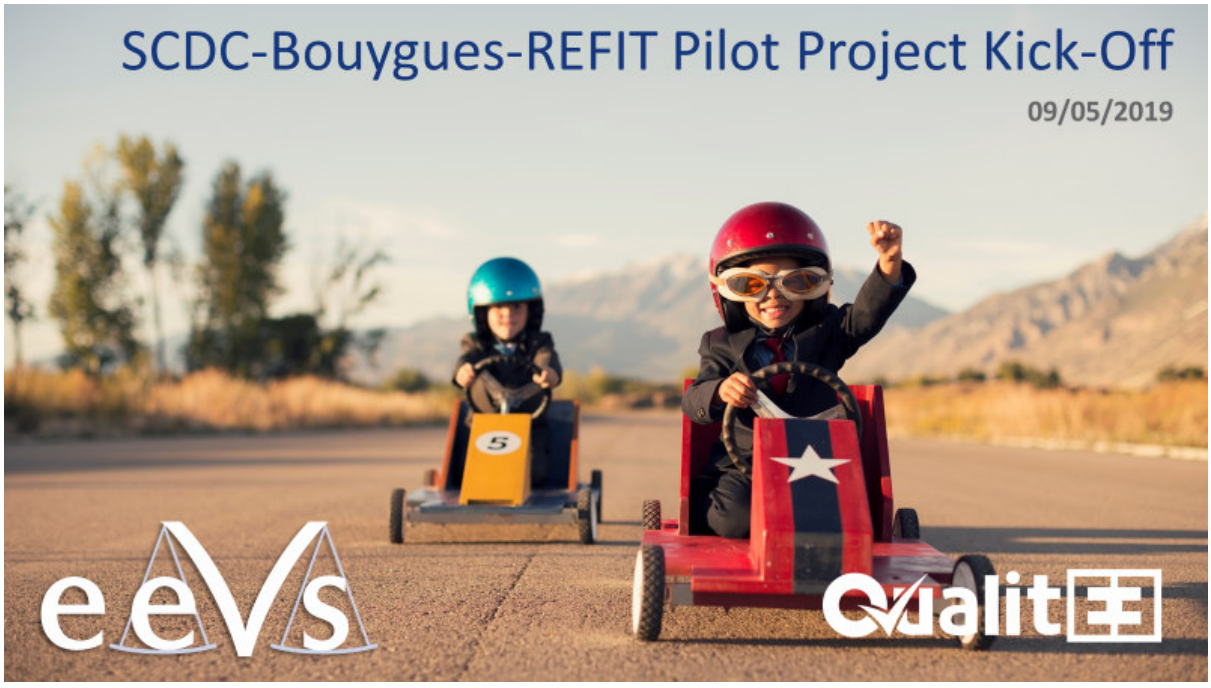
It was noted that QC5 (O&M) and QC8 (Motivation of users) were not entirely relevant to this project, and this is expected to be the case for many projects. Therefore, it was recommended that these criteria are made optional.

Feedback relating to missing topics or areas in need of improvement in the quality criteria focussed on resourcing, health & safety, adequate qualifications and project drivers.

5 ANNEX – MEETINGS

Meeting date	Summary
09/05/2019	Kick-off meeting to introduce quality criteria and pilot project process
26/06/2019	Initial assessment of quality criteria QC-1 & QC-6. Discussion of Non-Disclosure Agreement.
04/10/2019	Project catch up as Investment Grade Proposal (energy audit / project development) process nears completion.
10/12/2019	Catch up call with South Cambridgeshire District Council to set out framework for evaluation of quality criteria and feedback process. Initial feedback on Investment Grade Proposal documentation.
14/02/2020	Catch up call with South Cambridgeshire District Council to run through assessment of the project against the quality criteria and initial feedback.
20/02/2020	Meeting to collect feedback on quality criteria and discuss next steps in terms of pilot project communication.

Slides from kick-off meeting 09/05/2019



European Commission Disclaimer

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About the QualitEE project

Quality Assurance for **Energy Efficiency Services**

Trust | Standardisation | Simplification

Working in the U.K. with:

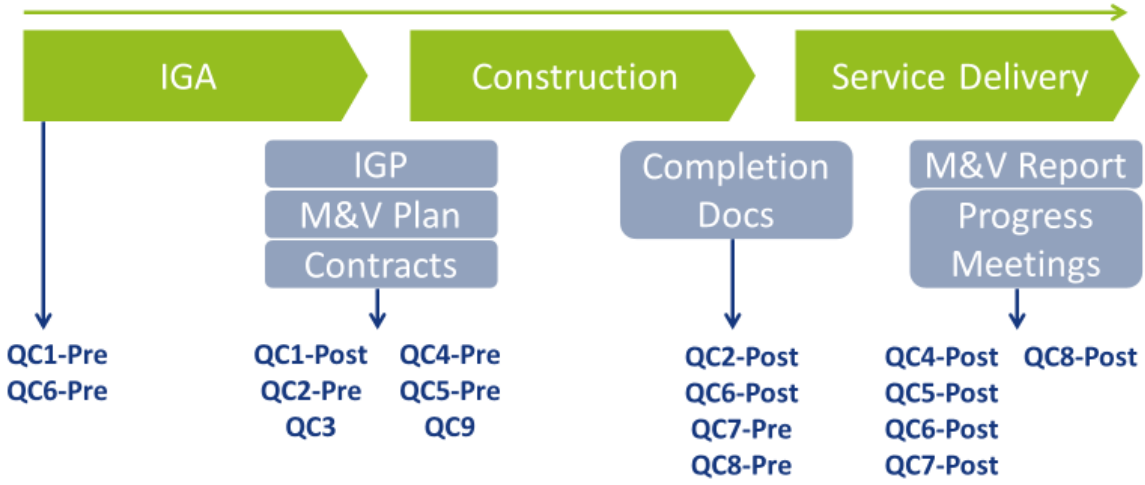
EPCg ESTA · SCOTTISH FUTURES TRUST · AMBER INFRASTRUCTURE GROUP · INVESTOR CONFIDENCE PROJECT

Draft QA Criteria for EPC Projects

QualitEE Pilot Projects

- **Objective** – test criteria in practice, gather feedback to refine them
- **Tasks**
  - Use criteria to review service planning & delivery - ESCo, Client & Facilitator
  - Complete feedback questionnaire incl. basic project details (Dec 2019)
- **Outputs** – Project Case Study, Application Report
- **Information requirements** – IGP, M&V, Contracts etc.
- **Benefits** – pioneer new standards, showcase work, receive independent & expert evaluation support

Rough timeline



Thank you

Links

QualitEE Project
www.qualitee.eu

QualitEE draft technical quality guidelines
https://qualitee.eu/publications/draft-guidelines-of-european-quality-criteria/

QualitEE UK Market Research Report
https://qualitee.eu/gb/publications/market-research-report/

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