



REPORT ON EUROPEAN ENERGY EFFICIENCY SERVICES MARKETS AND QUALITY



QualitEE Project

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

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

Date

October 2018

Author

Jana Szomolányiová
qualitee@svn.cz
SEVEN-The Energy Efficiency Center, z.ú.
Americká 17, 120 00 Prague, Czech Republic
www.svn.cz

Co-author

Nick Keegan
nick.keegan@eevs.co.uk
EEVS – Energy Efficiency Verification Specialists
22 Long Acre, London, WC2E 9LY, UK
www.eevs.co.uk

Disclaimer

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

Contents

1	EXECUTIVE SUMMARY	10
2	INTRODUCTION	16
2.1	Objective of the report	16
2.2	Scope of the report and definitions	17
2.2.1	<i>Energy Efficiency Services (EES)</i>	17
2.2.2	<i>Energy Performance Contracting (EPC)</i>	19
2.2.3	<i>Energy Supply Contracting (ESC)</i>	19
2.2.4	<i>Other types of energy efficiency services</i>	20
2.2.5	<i>Market actors</i>	21
2.3	Sources of data and methodology	22
2.3.1	<i>Sources of data</i>	22
2.3.2	<i>Survey and interviews</i>	22
2.3.3	<i>Literature and other sources of data</i>	23
3	ENERGY PERFORMANCE CONTRACTING MARKET	24
3.1	EPC market developments	25
3.2	EPC business models	31
3.3	EPC market sectors	34
3.4	EPC measurement & verification	35
3.5	EPC market barriers	37
3.6	EPC market drivers	41
4	ENERGY SUPPLY CONTRACTING MARKET	44
4.1	ESC market developments	44
4.2	ESC business models	46

4.3	ESC market sectors	48
4.4	ESC market barriers	49
4.5	ESC market drivers	50
5	FINANCING	51
5.1	EPC financing	51
5.2	ESC financing	54
5.3	Minimum financial requirements	56
5.4	Financial tools	59
6	EU LEGISLATIVE AND REGULATIVE FRAMEWORK	63
6.1	Energy Efficiency Directive	63
6.1.1	<i>EED definitions</i>	63
6.1.2	<i>Article 18 of the EED to support energy services market</i>	64
6.1.3	<i>EED requirements to support energy efficiency</i>	64
6.2	Energy Performance of Buildings Directive	65
6.3	Procurement legislation	65
6.4	EU framework for certification of products and services	66
7	STANDARDS AND PROTOCOLS	68
7.1	European Standards	68
7.1.1	<i>European Standardisation Organisations</i>	68
7.1.2	<i>Energy Management Systems</i>	69
7.1.3	<i>Energy Audits</i>	71
7.1.4	<i>Energy Efficiency Services</i>	71
7.1.5	<i>Energy Efficiency and Savings Calculation</i>	72
7.1.6	<i>Environmental Management</i>	72
7.2	Model documents	72

7.3	National initiatives to provide guidance on the preparation and implementation of EPC projects	74
7.4	International initiatives to provide guidance on the preparation and implementation of EPC projects	74
7.4.1	<i>European Code of Conduct for EPC</i>	76
7.4.2	<i>Investor Confidence Project Europe</i>	77
8	QUALITY ASSURANCE OF ENERGY EFFICIENCY SERVICES	79
8.1	Quality assurance to face the market barriers	79
8.2	EPC quality determinants	89
8.3	ESC quality determinants	91
8.4	Desirable quality assurance system	94
8.5	Lessons learned from certification frameworks in the building sector	96
9	ACTIVITIES TO ESTABLISH NATIONAL QUALITY ASSURANCE OF ENERGY EFFICIENCY SERVICES	98
9.1	Austria	98
9.1.1	<i>“Umweltzeichen Energie-Contracting”</i>	98
9.1.2	<i>DECA Quality label for EES</i>	99
9.2	Belgium	100
9.3	Bulgaria	101
9.4	The Czech Republic	101
9.4.1	<i>Reasonable Energy Savings programme</i>	101
9.4.2	<i>Certification of EPC services and providers</i>	102
9.5	France	103
9.5.1	<i>RGE label</i>	103
9.5.2	<i>Qualibat, Qualit’EnR labels</i>	103
9.5.3	<i>The NF HQE™ Tertiary Buildings in operation Label</i>	103

9.6	Germany	104
9.6.1	<i>The Blue Angel</i>	104
9.6.2	<i>Energy-Saving Hospital Label</i>	104
9.6.3	<i>TÜV Nord's / SÜD's Energy Efficiency Verification services</i>	105
9.7	Greece	106
9.8	Italy	106
9.8.1	<i>Quality assurance for EES providers</i>	106
9.8.2	<i>Quality assurance for EES services</i>	108
9.9	Latvia	108
9.10	The Netherlands	109
9.11	Portugal	109
9.11.1	<i>ECO.AP Programme</i>	109
9.11.2	<i>Specifications for procedures of energy performance contracts under ECO.AP Program.</i>	110
9.11.3	<i>Qualification System for Energy Services Companies (SQESE)</i>	110
9.12	Slovakia	112
9.12.1	<i>Qualification system for EES providers</i>	112
9.13	Slovenia	113
9.13.1	<i>Scheme for the inspection of Air-conditioning Systems</i>	113
9.13.2	<i>Inspection of Heating Systems Scheme</i>	113
9.13.3	<i>Building Renovation Quality Management Scheme</i>	113
9.13.4	<i>Conditions, requirements and evaluation criteria for EPC projects co-financed as part of the framework of the Operational programme for the implementation of the EU Cohesion Policy 2014-2020</i>	113
9.14	Spain	116
9.14.1	<i>ESCO registration</i>	116
9.14.2	<i>Certification of EES providers</i>	116
9.14.3	<i>Certification of energy efficiency services</i>	118

9.15	UK	118
9.15.1	<i>Registered Energy Services Providers</i>	118
9.15.2	<i>Public Procurement Frameworks for EPC</i>	119
9.15.3	<i>Quality assurance schemes used to access energy related fiscal incentives</i>	119
9.15.4	<i>Heat Trust</i>	120
9.15.5	<i>EPC Code of Practice for the UK (draft)</i>	120
10	CONCLUSIONS	126
11	REFERENCES	130
11.1	QualitEE Country reports	130
11.2	Other literature	131

Definitions and glossary

Term	Definition
All Countries	means 15 EU countries covered by the QualitEE online survey and QualitEE country reports: Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK
Client	means any natural or legal person to whom an energy services provider delivers energy services
Energy Efficiency Directive (EED)	means Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency
energy efficiency improvement*	means increase in energy efficiency as a result of technological, behavioural and/or economic changes
energy efficiency*	means the ratio of output of performance, service, goods or energy, to input of energy
energy efficiency service (EES)**	means an agreed task or tasks designed to lead to an energy efficiency improvement and other agreed performance criteria
energy efficiency improvement*	means an increase in energy efficiency as a result of technological, behavioural and/or economic changes
energy management system* (EnMS)	means a set of interrelated or interacting elements of a plan which sets an energy efficiency objective and a strategy to achieve that objective
energy performance contracting* (EPC)	means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings
energy supply contracting*** (ESC)	means a contractual arrangement for the efficient supply of energy. ESC is contracted and measured in Megawatt hours (MWh) delivered
energy savings*	means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption
energy service*	the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings
energy service provider*	means a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises
energy*	means all forms of energy products, combustible fuels, heat, renewable energy, electricity, or any other form of energy, as defined

	in Article 2(d) of Regulation (EC) No 1099/2008 of the European Parliament and of the Council of 22 October 2008 on energy statistics
EPC provider	means an energy service provider who delivers energy services in the form of Energy Performance Contracting
ESC provider	means an energy service provider who delivers energy services in the form of Energy Supply Contracting
energy service project facilitator (facilitator)	means an advisory company working on behalf of the client to procure and/or implement an energy service project
Integrated Energy-Contracting (IEC)	means a combination of energy efficiency measures with energy supply contracting typically with short term 'operational verification' rather than ongoing Measurement & Verification
public bodies*	means 'contracting authorities' as defined in Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts
central government*	means all administrative departments whose competence extends over the whole territory of a Member State
Savings	means energy savings and/or related financial savings; the financial savings include the costs of energy provision and can also include other operational costs, such as the costs of maintenance and workforce
The International Performance Measurement and Verification Protocol (IPMVP)	is the widely referenced framework for "measuring" energy or water savings, which is available at www.evo-world.org

Notes:

*Definitions according to the Energy Efficiency Directive

**Definition according the European standard EN 15900:2010

***Definition is a simplified version of IEA DSM Task Force 16 definition

1 EXECUTIVE SUMMARY

Introduction

The objective of this report is to compile evidence to inform the development of European & national quality criteria and the implementation of quality assurance schemes for energy efficiency services (EES). This report 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 project aims to increase investment in EES and improve trust in service providers.

This report aims to improve the market knowledge of stakeholders so that they can make better informed decisions based on evidence. The barriers and success factors for energy efficiency services, their quality determinants and as well as the related legal, political and institutional framework have been mapped. Lessons learned from market developments and policy frameworks that have been analysed in this report will serve to establish strategies for the implementation of national quality assurance schemes.

QualitEE country reports

The report builds on QualitEE country reports by summarising the information obtained for each of 15 countries involved and by identifying recommendations to support the development of each national EES market. The countries include **Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK**. This European report is however, not a compilation of everything that was presented in the national reports. Instead, it presents a summary of the key information. For a more thorough view of all the information collected, it may be useful to refer to the QualitEE national country reports.

QualitEE market survey

The contents of this report are based on the results of a survey of the country's main actors within the EES market, a literature review and the market knowledge of the authors of the country reports. Information has been collected through a **market survey in the form of an online questionnaire for relevant EES providers and facilitators and personal interviews with financial institutions and clients**. In total, there were 188 respondents to the online survey across 15 EU countries surveyed (referred to henceforth in this report as 'All Countries'), operating in energy performance contracting and/or energy supply contracting markets. In addition, there were 79 personal interviews conducted with clients and financial institutions across 13 EU countries in the survey and six personal interviews with representatives of institutions on the EU level.

Market developments

The 15 EU countries involved in the QualitEE project are at different stages of development of their EPC and ESC market. Thus the needs, expectations and characteristics will differ

depending on the level of advancement of the markets, however there are common trends present in most of the countries and outlined below:

- ✔ The development in the 15 EU EPC markets provides a rather positive view. **More than half of all respondents (53%) reported that their national EPC market had seen growth over the last 12 months**, with 14% of respondents describing major growth (of 6% and higher) and 39% of respondents describing slight growth (of 1% to 5%). While 10% of respondents are witnessing a decline, 36% reported no change whatsoever. These results are just a bit less positive than those from a survey carried out in 2015 where 57% of respondents reported growth, out of which 16% reported major growth.
- ✔ The **typical number of EPC projects initiated within the last year is between one and five**, which was reported by 63% of respondents. Just 22% of the respondents had started six projects or more which is less than 28% reported previously by the 2015 survey.
- ✔ **The public sector drives EPC markets across All Countries.** The majority of EPC providers and facilitators (64%) report that their clients are most frequently municipalities.
- ✔ **The most common initial investment outlay for EPC projects** across All Countries reported by 67% respondents – EPC providers and facilitators - **is less than EUR 1 million**, while 29% of them selected the range from EUR 1 million to EUR 5 million. With only 4% of responses, investments exceeding EUR 5 million are rather rare.
- ✔ **Most common EPC contract length is five to ten years** as reported by 55% of the respondents. The categories of less than five years and eleven to fifteen years were reported as most common by about 20% of respondents for each category. With only 4% of responses, contracts exceeding 15 years are rather rare.
- ✔ When it comes to the **energy supply contracting (ESC) projects, market growth has been slower than in the case of EPC projects in 2017**. Both growth and stagnation were reported by about 45% of respondents each. When it comes to their own ESC orders stagnation was the most common response by ESC providers and facilitators.
- ✔ Most respondents – ESC providers and facilitators (46%) - became involved in one to five ESC projects in the last 12 months.
- ✔ ESC projects tend to have a lower value than EPC projects: The majority of respondents agreed the **most common overall value of the ESC projects** they are involved in is **below EUR 500,000**.
- ✔ Almost all respondents had **ESC clients from both the public and private sector**, so there is a higher share of ESC projects in the private sector than for EPC projects.

Market barriers

The most significant barriers to EPC business revealed in the survey are; complexity of the concept / lack of information identified by 59% of the respondents, followed by lack of trust in the ESCO industry (53%), low energy prices (45%) and administrative barriers in public sector (44%). As far as the main drivers of the EPC business are concerned, clearly the most substantial aspect is the energy savings guarantee (59%) followed by limited budgets in public sector and pressure to reduce the costs.

Similarly to EPC market, lack of trust into ESCO industry (49%) is the top barrier to the ESC market reported in the QualitEE survey. It is closely followed by lack of government support (45%). In contrast to the picture on the EPC market, complexity of the concept and administrative barriers were perceived as a barrier only by around 30% of respondents. While these barriers are similar to those on the EPC market, they are somehow less significant as the process of preparing and implementing ESC projects is usually less complex and does not include an energy saving guarantee. ESC projects are reported to be struggling less with complex administrative and accounting rules in the public sector.

Market drivers

As far as the main drivers of the EPC business are concerned, clearly the most substantial aspect is the 'energy savings guarantee' identified by 59% of respondents. Other key drivers that were identified are 'limited budgets in public sector' and 'pressure to reduce the costs'.

Respondents across All Countries in the survey agreed that increasing energy prices were a significant driver of ESC business. This implies energy supply contracts can benefit well from policies that bring external environmental costs into the price of energy.

Quality determinants

Preliminary analysis was identified as the key quality determinant for EPC projects, and it was reported that quality improvement is required for this aspect as well as all other areas of project preparation and implementation.. The 'preliminary technical-economical analysis (energy audit)' was reported as major quality determinant by 79% of respondents, followed by 'achieving expected level of savings' and 'measurement & verification of savings' identified by about 65% of respondents.

There was broad agreement amongst all surveyed groups – ESC providers and facilitators, clients and financial institutions that the areas of ESC projects which need the most attention when it comes to the quality are 'preliminary technical-economic analysis / energy audit' and 'implementation of technical measures'.

Quality assurance scheme to increase client trust

QualitEE country reports prepared for 15 EU countries provided recommended actions to overcome the identified market barriers. In all countries, it was recommended to develop and implement quality assurance systems to overcome existing lack of trust in service providers and low customer demand. Quality assurance for EES services and providers would provide a tool

for the clients to distinguish good quality projects from poor ones. Obtaining quality assurance is expected to provide providers with a competitive advantage on the market.

Implementation of quality assurance systems for EPC are supported also by the Article 18 of the Energy Efficiency Directive (EED) that requires Member States to encourage the development of quality labels and publishing a list of available energy service providers who are qualified and/or certified along with their qualifications and/or certifications.

Standardisation

One way to generate greater trust in the ESCO industry and hence increased customer demand is quality improvement by standardisation of the EES and the EES providers. Existing standards and protocols can also be used to inform the requirements of potential quality assurance systems:

- ✔ **European Standard EN ISO 50001:2011 Energy management systems - Requirements with guidance for use** was adopted to enable organisations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption. While there is a rapid growth in number of valid certificates for ISO 50001 (ISO 2018), **energy efficiency alone is not yet the key driver for the implementation of an EnMS, but instead national policy incentives** (ISO 2014).
- ✔ The European standard **EN 15900:2010 defines energy efficiency services** provides definitions and minimum requirements for an EES.
- ✔ **EN 16212 Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods** provides a general approach for energy efficiency and energy savings calculations with top-down and bottom-up methods.
- ✔ A series of **European Standards set out requirements and provide guidance on how to carry out energy audits**.

Desirable quality assurance

The QualitEE survey aimed to investigate what would be the attributes of a quality assurance system preferred by most of the market actors. While providers and facilitators and financial institutions clearly identified **governmental/public institutions as being the most respected bodies** to issue quality assurance certification for EES, the preference of clients is split between governmental/public institutions and associations of providers. The majority of EPC providers and facilitators agreed that the **cost for quality assurance should be met by the client** and **viable fee for quality assurance would be up to 1% of the value of a particular project**.

Review of voluntary building certification schemes used in Europe by Triple E Consulting (2014) showed reliability, cost and international acceptance are key factors influencing choice of the scheme.

The expectations of potential impacts from a quality assurance scheme differ among the market actors. While the providers and facilitators primarily expect an increase in customer trust, clients and financial institutions primarily expect an increase in quality. The majority of

providers and facilitators across All Countries in the QualitEE survey agreed that the main benefits of a quality assurance scheme would be an increase in customer trust and standardised quality criteria. The vast majority of clients interviewed across All Countries in the survey agreed that the added value of a quality assurance scheme would be an increase in project quality and that the projects would be better designed from a technical and process point of view. Financial institutions also expect increased project quality, less time needed to prepare the procurement procedure and higher availability and reliability of data for technical assessment. This indicates that establishing quality assurance schemes for EES should be one of the key actions to support EES market growth.

All surveyed market groups indicated a **strong preference to implementing projects subject to quality assurance**. However, while a vast majority of clients (88%) and financial institutions (89%) reported they would 'always' or 'in the majority of cases' prefer implementing a project with quality assurance, such preference was displayed by lower number of providers and facilitators (65%).

Quality criteria developed within quality assurance systems can be used in the procurement process to select the best quality projects. Survey respondents supported the idea that **well-defined procurement specifications increase the quality level of services**.

Minimum financial requirements

Financial institutions interviewed across All Countries in the survey unanimously agreed that **creditworthiness is a key condition to be met for the EPC/ESC project to obtain financing**. A large majority of financial institutions agreed that the provider must be **creditworthy** (76%), the project must be **legally robust** (i.e. it should abide by all legal requirements) (76%), the **contract needs to be well formulated, including step-in rights, penalties, receivables, bankruptcy, etc.** (76%), and the **project must be profitable** (74%). Sharing of risks and the integrity of the project are the least relevant factors, as only 50% and 44% of respondents respectively stipulated that these conditions need to be met, however, a significant share of respondents still think they should be considered. The idea of a **template of information needed by financial institutions to guide the client** received the overall support of all financial institutions.

Status quo and future of quality assurance

Currently, there are **several quality assurance schemes developed in the EU member states in the area of EES quality assurance** and additional schemes are under development. Most of these schemes are not very comprehensive and focus on a particular area of the EES, such as certification of buildings or professional qualifications. When it comes to the EPC and ESC services, which are the focus of this report, there are a few quality assurance schemes for the providers (Slovakia, Portugal) and very few dedicated to the quality assurance of the services (Austria). In many countries there have been no attempts - until now - to develop a quality assurance scheme for EES (Bulgaria, Belgium, Latvia, Netherlands). Some of the schemes may

look good on paper, but there is no proper enforcement of the requirements established and thus are not effective.

Overall, none of the implemented schemes are widely used and none have achieved a significant influence on client trust. It is noted however, that some have only been implemented recently and may realise their potential later on. One example of this is the DECA quality label, the most detailed scheme to date, which is tailored for EPC and ESC. It features a highly detailed specification of the quality criteria and has been used as the starting point for development of the European quality criteria for EES within the QualitEE project.

Existing schemes vary significantly among the countries and a few markets have more than one scheme, which have little in common with one another (Germany, Spain, Austria). Almost forty percent of the providers and facilitators expressed their concern in the QualitEE survey that too many quality assurance schemes could create a barrier to the development of EES markets. Under developments led by the QualitEE project, there is potential to achieve a level of harmonisation of quality assurance schemes across the EU member states, which may offer several benefits, especially in relation to the establishment of common quality criteria.

2 INTRODUCTION

2.1 Objective of the report

The objective of this report is to compile evidence to inform the development of European & national quality criteria and the implementation of quality assurance schemes for energy efficiency services (EES). This report 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 project aims to increase investment in EES and improve trust in service providers.

This report aims to improve the market knowledge of stakeholders so that they can make better informed decisions based on evidence. The barriers and success factors for energy efficiency services, their quality determinants as well as the related legal, political and institutional frameworks have been mapped. Lessons learned from existing certification frameworks will serve to establish strategies for the implementation of national quality assurance schemes.

The report builds on QualitEE country reports by summarising the information obtained for each of 15 countries involved and by identifying recommendations for the development of each national EES market. The countries include Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK. This European report is however, not a compilation of everything that was presented in the national reports. Instead, it presents a summary of the key information. As the report shows, several countries suffer from the same barriers to the development of their EES markets and would benefit from similar policies and solutions. In all countries, implementation of quality assurance schemes was recommended to increase the quality of EES and thus increase trust and demand on the client side. For a more thorough view of all the information collected, it may be useful to refer to the QualitEE national country reports.

Information has been collected through a market survey in the form of an online questionnaire and personal interviews. In addition, a literature review has been conducted from a range of existing local and national publications and documents. An analysis has been conducted and conclusions formed, which are presented in this report as well as in the form of an interactive online database on the QualitEE project website.

2.2 Scope of the report and definitions

2.2.1 Energy Efficiency Services (EES)

The European standard EN 15900:2010 defines an Energy Efficiency Service (EES) as an agreed task or tasks designed to lead to an energy efficiency improvement¹ and other agreed performance criteria. EES shall include an energy audit (identification and selection of actions, e.g. according to EN 16247) as well as the implementation of actions and the measurement and verification (M&V, e.g. according to IPMVP) of energy savings. A documented description of the proposed or agreed framework for the actions and the follow-up procedure shall also be provided – often referred to as an Investment Grade Proposal. The improvement of energy efficiency shall be measured and verified over a contractually defined period of time through contractually agreed methods (Amann and Leutgöb 2015).

This report focuses on the following key types of EES: Energy Performance Contracting (EPC) and Energy Supply Contracting (ESC). Energy Performance Contracting is provided in form of two main models; the guaranteed savings model and the shared savings model. Characteristics of these business models are summarised and compared in the table below. The table reflects only the variants of shared savings model that fall under definition of EPC used in this report and thus include guarantee of energy savings.

¹ According to the EED “energy efficiency improvement” means “an increase in energy efficiency as a result of technological, behavioural and/or economic changes”.

Table 1 Comparison of EPC and ESC models

	Energy Performance Contracting (EPC) / Guaranteed savings model	Energy Performance Contracting (EPC) / Shared Savings model	Energy Supply Contracting (ESC)
Key elements	implementation of energy saving measures (ESM) with ongoing monitoring & verification services to provide guaranteed energy savings	implementation of energy saving measures (ESM) with ongoing monitoring & verification services to quantify energy savings	efficient supply of useful energy such as heat, steam or electricity is contracted, measured and delivered in metered units of energy
Energy savings potential	high - comprehensive and detailed approach covering both supply and demand side; provider is motivated to include all technologies with energy savings and acceptable payback	medium to high - ESCO's primary focus is on technologies with high energy savings and acceptable payback; provider not motivated to include all possible technologies	in general lower than for EPC as limited to the supply side (boilers, chillers, etc.)
Guarantees by provider	provider guarantees the performance related to the <u>level of energy saved</u> throughout the contract life (often to energy cost savings at fixed energy prices)	provider guarantees a minimum performance related to <u>cost of energy saved</u> at prevailing energy prices throughout the contract life	final customer energy price is guaranteed
Payment	payment derived from the energy savings achieved (often based on fixed energy prices from the base year)	payment linked to the amount of savings in current energy prices	payment at a fixed rate/tariff per unit of energy
Provider's risk	assumes technical design, implementation and performance guarantee risks and customer creditworthiness (and risk of energy price change if applicable)	assumes a <u>proportionate part of</u> technical design, implementation and performance guarantee risks and customer creditworthiness (and risk of energy price change if applicable)	assumes technical design, implementation on the supply side and risk of client bankruptcy
Energy savings transparency	depends whether and what quality M&V is provided - in general the more independent the M&V, the more transparent the energy savings are		

2.2.2 Energy Performance Contracting (EPC)

According to the Energy Efficiency Directive (EED) energy performance contracting (EPC) means:

"a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings."

The energy efficiency measures as above may also be based on low or no up-front investment (by some literature referred to as 'Operational Contracting'). EPC may also include additional services related to efficient energy supply.

Within the report, the focus will be on EPC projects where the above mentioned "contractually agreed level of energy efficiency improvement" is **guaranteed** by the EPC provider. The **guarantee of energy efficiency improvement** is the commitment of the service provider to achieve a quantified energy efficiency improvement (EN 15900:2010).

This is in line with the EED, Annex XIII of which lists guaranteed savings among the minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications. Moreover, in Article 18 of the EED, Member States are required to promote the energy services market and access for SMEs to this market by, among other things, disseminating clear and easily accessible information on available energy service contracts and clauses that should be included in such contracts to **guarantee energy savings** as well as final customers' rights.

2.2.3 Energy Supply Contracting (ESC)

"ESC means a contractual arrangement for the efficient supply of energy. ESC is contracted and measured in Megawatt hours (MWh) delivered". This definition is a simplified version of the IEA DSM Task Force 16 definition.

2.2.4 Other types of energy efficiency services

The scope of this report is limited to EPC and ESC. Other energy efficiency services provided by ESCOs in at least some of the 15 countries covered by this report include:

- ✔ **Re-Commissioning (RECO)** is based on five key components: 1. Energy information systems; 2. Data analysis and selected measurement; 3. Optimisation of existing building technology; 4. Information and motivation of building occupants; and 5. Performance measurement and quality assurance. The Re-Co project², co-financed by the IEE Programme, aimed at developing, testing and promoting a systematic Re-Commissioning approach to improve the operation and maintenance of non-residential complex buildings with no- or low-cost measures. (e.g. in Austria and the Czech Republic)
- ✔ **Integrated Energy-Contracting (IEC)** means a combination of energy efficiency measures with energy supply typically provided by use of renewable energy. (Bleyl-Androschin, October 2009); (e.g. in Austria, Bulgaria and Greece)
- ✔ **Comprehensive Renovation** means coordinated implementation of renovations to the thermal envelope (including building envelope insulation and substitution of fixtures) and technology (including interventions in heating, cooling, domestic hot water and ventilation systems). The main advantage of this approach is that both types of measures can be inter-optimised within one renovation. This leads to optimal energy savings for a given level of investment. These results are impossible to achieve solely by partial renovation or by implementing the two types of measures without coordination.
- ✔ **CombinES Comprehensive Renovation** is a special case of comprehensive renovation where the thermal envelope part of the renovation is subsidised and the technology part of the renovation is implemented by applying the Energy Performance Contracting (EPC) model. The CombinES Comprehensive Renovation model was described and promoted by the Combines project³ co-financed by the Central Europe Programme. (in the Czech Republic, Germany, Italy, Slovakia and Slovenia)
- ✔ **Design-Implementation-Operation-Maintenance (DIOM in English or CREM in French)**, which is comprised in the broader category that is called “global contracts” covering works AND services. It will cover a building’s whole design, construction and first years, as the contract can be subject to a public tender after some years. The CREM is a compound of contracts defined here as EPC and ESC, its core goal is to keep building’s consumption as low as possible over its lifetime, with guaranteed savings, which can be periodically reviewed. (France)
- ✔ **Operational contracting (OC)** is EPC with no or low investment. It is covered by EPC definition and thus is included in this report.

² <https://ec.europa.eu/energy/intelligent/projects/en/projects/re-co>

³ http://www.central2013.eu/fileadmin/user_upload/Downloads/outputlib/CombinES_brochure_CombinES_EN-G-for-web.pdf

2.2.5 Market actors

The main actors operating on the EES markets are the EES providers, clients and project facilitators.

Within the QualitEE project, we use the EED's definition of energy service provider:

- ✔ "An '**energy service provider**' means a natural or legal person who delivers energy services⁴ or other energy efficiency improvement measures in a final customer's facility or premises."

We use the commonly used term "ESCO" as an equivalent of energy service provider.

We use the above-listed definitions to define the following terms:

- ✔ "An '**EPC provider**' means an energy service provider who delivers energy services in the form of EPC."
- ✔ "An '**ESC provider**' means an energy service provider who delivers energy services in the form of ESC."
- ✔ "A '**Client**' means any natural or legal person to whom an energy service provider delivers energy service."
- ✔ "An energy service project '**Facilitator**' means an advisory company working on behalf of the client to procure and/or implement an energy services." In the QualitEE project we use the shorter term "facilitator" to denote an energy service project facilitator.

⁴ According to the EED: "An 'energy service' means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings."

2.3 Sources of data and methodology

2.3.1 Sources of data

The contents of this report are based on two main sources:

- ✔ the results of a survey of the main actors within the EES market in 15 European countries; and
- ✔ a literature review (publications and studies, legislative documents, official statistics and databases) and the EES market knowledge of the authors.

2.3.2 Survey and interviews

To collect the data used in this document, the market actors have been approached in the following manner:

- ✔ an online questionnaire was distributed to the country's most relevant EES providers and facilitators;
- ✔ personal semi-structured interviews have been conducted with financial institutions and client organisations implementing EES projects.

The market and quality survey focused on energy efficiency services and gave the stakeholders an opportunity to provide their input and steer the development of quality assurance. The surveys and interviews contained questions about the EES market, barriers and success factors, EES quality determinants, minimum financial information requirements for financial institutions and certification frameworks, as well as EES-related legal, political and institutional frameworks. The responses have been analysed and the results are presented in this report in an aggregated form.

Throughout this study the results from the online survey across **All Countries** are summarised and compared. In total, there were 188 respondents to the online survey across **All Countries**:

- ✔ Respondents operate in 15 EU countries; Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK. (The label **All Countries** used throughout this report refers to the countries listed here)
- ✔ Respondents include 109 representatives of ESCOs, where 53 of them operate on the EPC market only, and 11 operate on the ESC market only and 45 on both the EPC and ESC markets.
- ✔ Respondents include 79 representatives of EES facilitators, where 37 of them operate on the EPC market only, and 17 operate on the ESC market only and 25 on both the EPC and ESC markets.

In addition, the results from the personal interviews across **All Countries with exception of France and the Netherlands** are compared with the results from the personal interviews taken at an EU level. Clients and financial institutions have been interviewed in the following 13 EU countries involved in the QualitEE project: Austria, Belgium, Bulgaria, Czech Republic, Germany, Spain, Greece, Italy, Latvia, Portugal, Slovenia, Slovakia and the United Kingdom. In total, there were 79 respondents to the personal interviews:

- ✔ In total 37 representatives of finance houses and governmental funding programs, which are sources of financing for the EPC projects;
- ✔ and 42 EES clients;

In addition, there were six personal interviews conducted at an **EU level** to provide perspective of the European institutions, which has covered:

- ✔ three representatives of finance houses;
- ✔ three EES clients.

2.3.3 Literature and other sources of data

Apart from the surveys, the reports build on research presented in national and international literature (reports of other European projects and institutions, legislative documents, publications and studies, official statistics and databases) and the market knowledge of the authors of the country reports.

The report also builds on the data and information gathered primarily by the Transparens project and other previous European projects (EESI2020, CombinES) and projects run in parallel (EPC+, GarantEE).

3 ENERGY PERFORMANCE CONTRACTING MARKET

The 15 EU countries involved in the QualitEE project are at different stages of development of their EPC market. Thus the needs, expectations and characteristics will differ depending on the level of advancement of its EPC industry, however there are common trends present in most of the countries and presented below. The trends have been mostly identified based on the results of the QualitEE surveys (2017), which included an online survey of EPC providers and facilitators, as well as personal interviews with clients and financial institutions. In some cases, comparisons are made with the previous surveys, especially Transparence 2013 and 2015 survey (Szomolányiová et al. 2015).

The situation and the development of the EPC markets across All Countries in the QualitEE survey (2017) can be summarised as follows:

- ✔ The development in the 15 EU EPC markets provides a rather positive view. More than half of all respondents (53%) reported that their national EPC market had seen growth over the last 12 months, with 14% of respondents describing major growth (of 6% and higher) and 39% of respondents describing slight growth (of 1% to 5%). While 10% of respondents are witnessing a decline, 36% reported no change whatsoever. These results are just a bit less positive than those from a survey carried out in 2015 where 57% of respondents reported growth, out of which 16% reported major growth.
- ✔ The typical number of EPC projects initiated within the last year is between one and five per organisation, which was reported by 63% of respondents. Just 22% of the respondents had started six projects or more which is less than 28% reported previously by the 2015 survey.
- ✔ The public sector drives EPC markets across All Countries. The majority of EPC providers and facilitators (64%) report that their clients are most frequently municipalities.
- ✔ The most common initial investment outlay for EPC projects across All Countries reported by 67% respondents – EPC providers and facilitators - is less than EUR 1 million, while 29% of them selected the range from EUR 1 million to EUR 5 million. With only 4% of responses, investments exceeding EUR 5 million are rather rare.
- ✔ Most common EPC contract length is five to ten years as reported by 55% of the respondents. The categories of less than five years and eleven to fifteen years were reported as most common by about 20% of respondents for each category. With only 4% of responses, contracts exceeding 15 years are rather rare.
- ✔ The most significant barriers to EPC business revealed in the survey are *complexity of the concept / lack of information* identified by 59% of the respondents followed by *lack of trust in the ESCO industry* identified by 53% of the respondents. *Administrative*

barriers in public sector and low energy prices are other important barriers reported by about 45% of respondents.

- ✔ As far as the main drivers of the EPC business are concerned, clearly the most substantial aspect is the ‘energy savings guarantee’ identified by 59% of respondents. Other key drivers that were identified are ‘limited budgets in public sector’ and ‘pressure to reduce the costs’.

Preliminary analysis was identified as the key quality determinant for EPC projects, and it was reported that quality improvement is required for this aspect as well as all other areas of project preparation and implementation. The ‘preliminary technical-economical analysis (energy audit)’ was reported as major quality determinant by 79% of respondents, followed by ‘achieving expected level of savings’ and ‘measurement & verification of savings’ identified by about 65% of respondents. Interestingly, in the Czech Republic the ‘communication between the provider and client’ was reported as the major quality determinant by 91% of respondents, which is more than 30 percent more than when considered across all respondents for all the countries surveyed. This may explain why acute lack of trust (in more than half of projects) is reported by 30% less Czech respondents, when compared to the overall results.

- ✔ The following sub-chapters provide full details and figures relating to the conclusions drawn above.

3.1 EPC market developments

Based on the opinion of EPC providers and facilitators, the market for EPC services is stagnating or experiencing growth across All Countries (Figure 1). The proportion of respondents estimating that the EPC market was experiencing slight growth (39%) over the last 12 months was slightly higher than the proportion of respondents estimating market stagnation (36%). Only 14% of respondents felt the market was experiencing major growth. About 10% of respondents reported decline, which made the overall picture slightly less positive than in 2015; 8% of respondents in the 2015 Transparence survey reported market decline (Figure 2).

Among All Countries in the survey, the largest growth was experienced by respondents in Slovenia, Italy and Netherlands as illustrated in Figure 3. In these countries, market development has been influenced by specific supportive activities as follows: In Slovenia, the current EPC market development in the public sector is underpinned by the OP ECP support scheme throughout the period 2016-2020 and public clients are assisted by the Public Buildings Energy Renovation Projects Implementation Unit operating within the Ministry of Infrastructure (Staničić 2018). In Italy, EPC market growth is mainly attributed to the three most important support schemes in the country; the white certificates system, which is considered the principal driver for the implementation of energy efficiency measures; tax reductions that represent the most successful form of incentive in the residential sector; and the “*Conto Termico*”, that incentivises interventions that increase efficiency and renewable production of heat (Espejo Luque and Real Ruiz 2018). The Netherlands Enterprise Agency

recently supported Dutch market development by offering guidelines, model contracts and financial information. Since 2013 a new ESCO association 'ESCONetwerk.nl' has also supported market development by implementing a project database and disseminating a Code of Conduct.

Figure 1 Over the last 12 months, has the EPC market in your country seen growth, little change or decline? (Percentage share of responses by providers and facilitators Sept 2017)

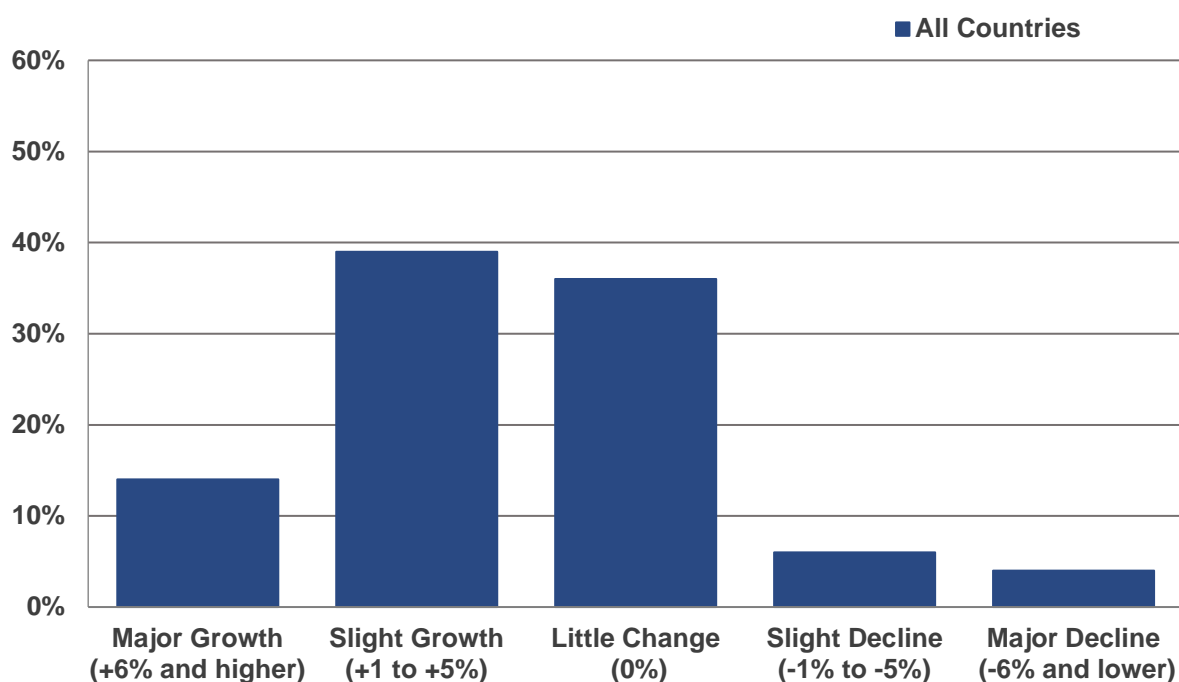


Figure 2 Timeseries (2015, 2017) – Over the last 12 months, the EPC market in your country has seen

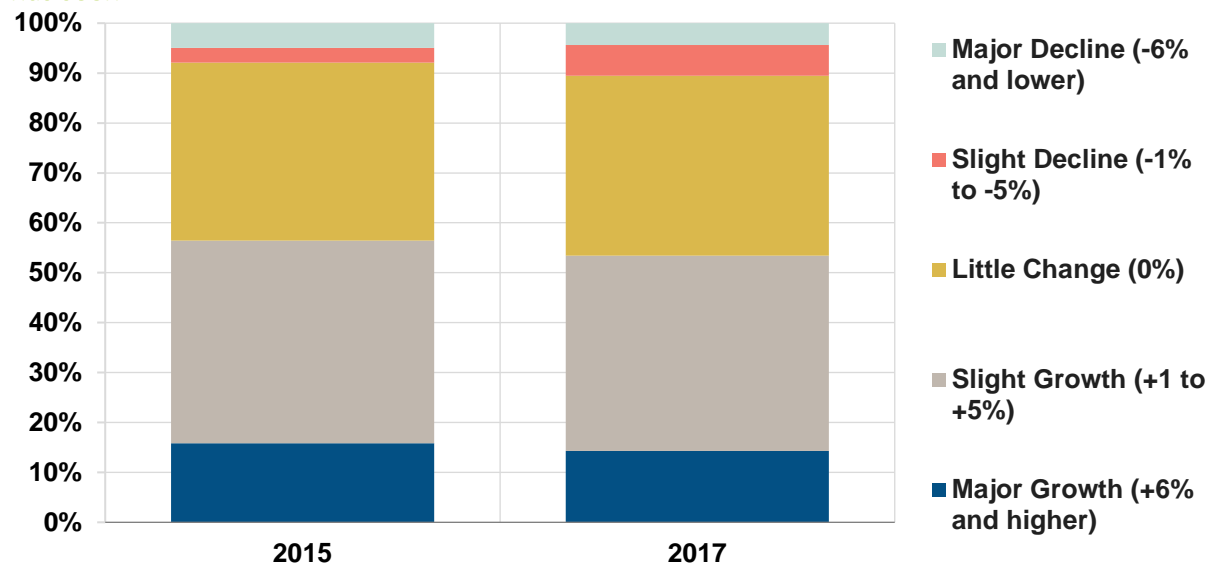
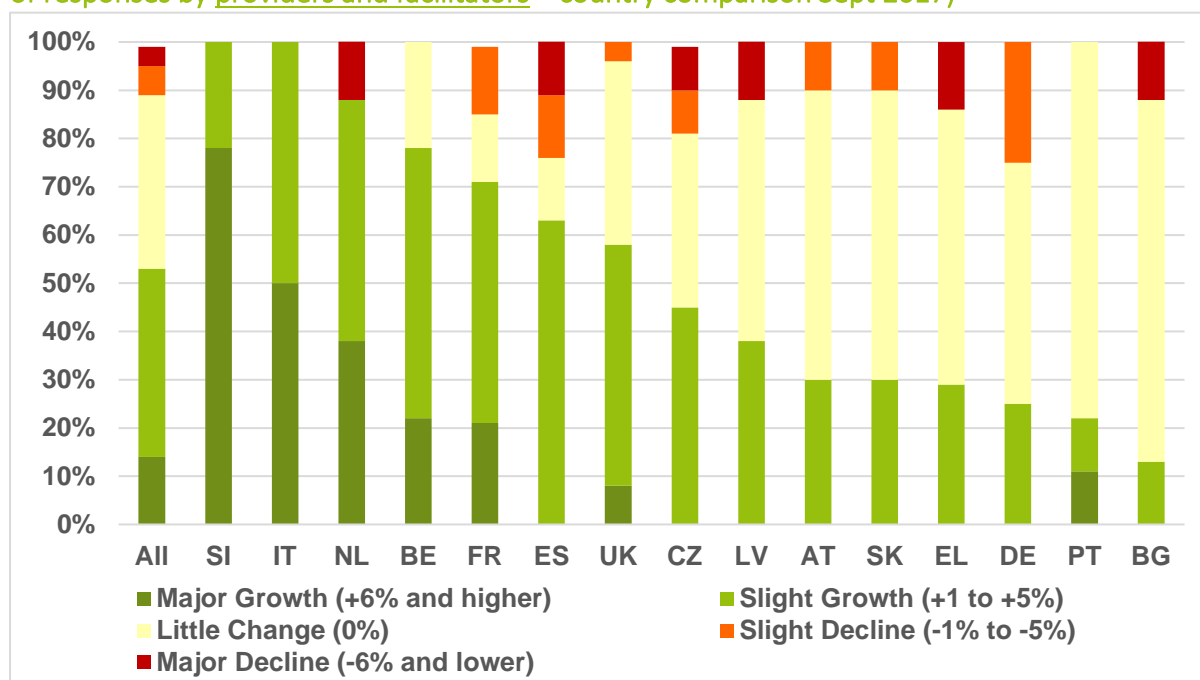


Figure 3 Over the last 12 months, the EPC market in your country has seen: (Percentage share of responses by providers and facilitators – country comparison Sept 2017)



EPC providers and facilitators reported a slightly less positive picture of EPC orders over the last 12 months than for the overall market growth across All Countries in the survey. Almost half of respondents reported growth in their own orders (49%). Stagnation was experienced by 37% of respondents and a decline in orders was witnessed by 14% of them.

When comparing results with the Transparence survey conducted in 2015, the only difference worth mentioning is increase in number of respondents reporting decline – from 9% to 14% in 2017. Between 2013 and 2015 there was more noticeable shift towards growth than between 2015 and 2017.

Figure 4 In the last 12 months your EPC orders have seen (Percentage share of responses by providers and facilitators Sept 2017)

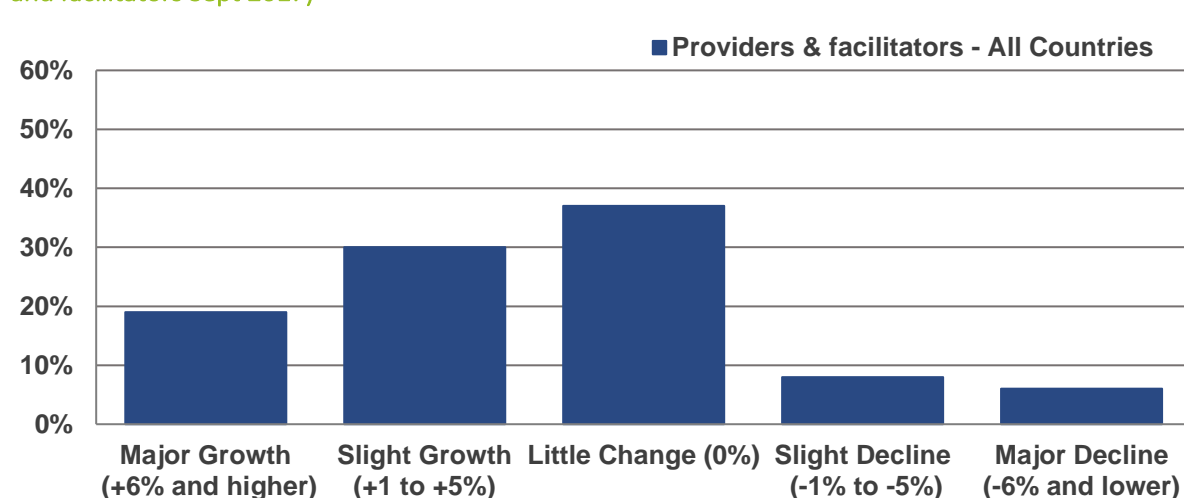
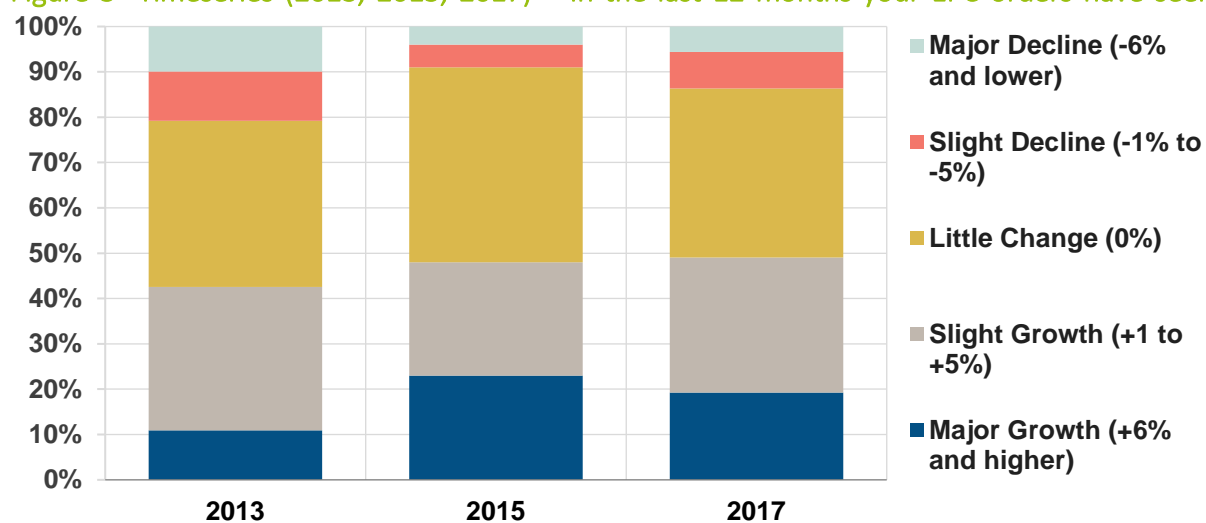


Figure 5 Timeseries (2013, 2015, 2017) – In the last 12 months your EPC orders have seen



The majority (63%) of respondents – EPC providers and facilitators across All Countries in the survey – became involved in between **one and five EPC projects** in the last 12 months. Another 15% of respondents participated in 6 – 10 projects, which was second most frequently selected category. Only 15% of respondents did not become involved in any new projects. When comparing results with the Transparens survey conducted in 2015 (Szomolányiová et al.), a slight increase in the percentage of respondents reporting that they became involved in more than 20 projects is observed (from 2% in 2015 to 4% in 2017) and a slight decrease in those reporting were involved in no projects (from 21% in 2015 to 15% in 2017). It should be noted however, such minor differences can be also caused by a different sample of respondents.

Figure 6 How many EPC projects (that have reached Contract Signature) has your organisation initiated / become involved with in the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)

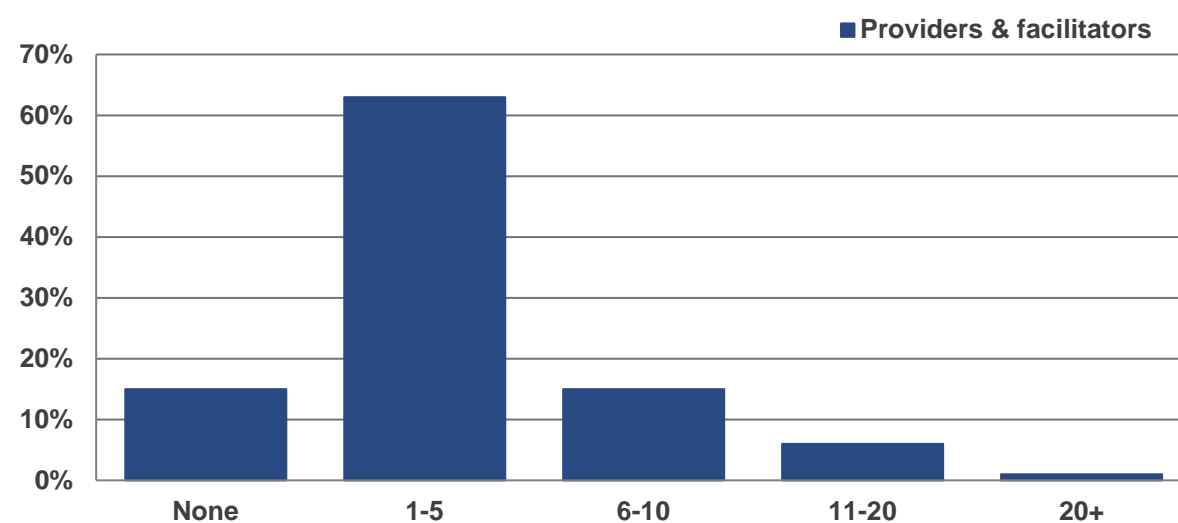
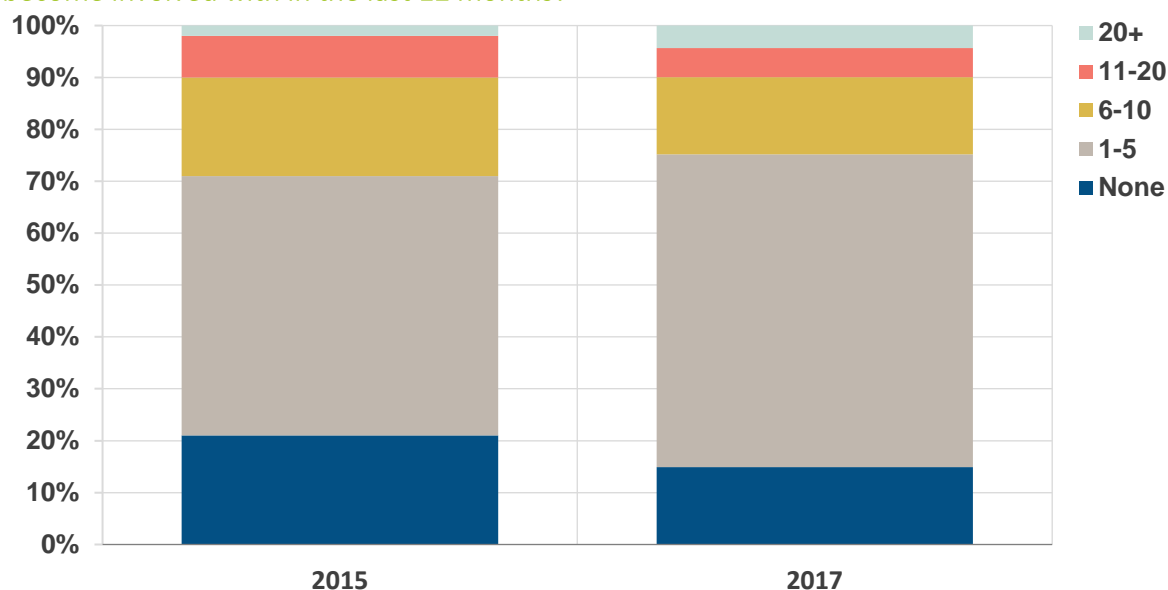
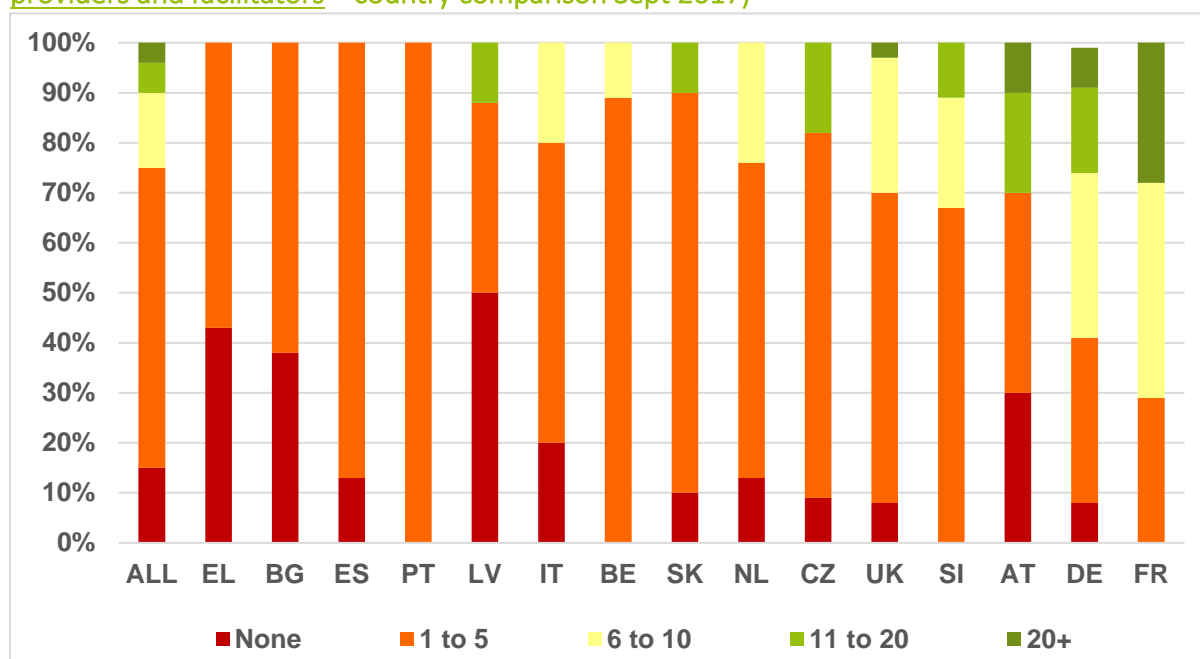


Figure 7 Timeseries (2015, 2017) How many EPC projects has your organisation initiated / become involved with in the last 12 months?



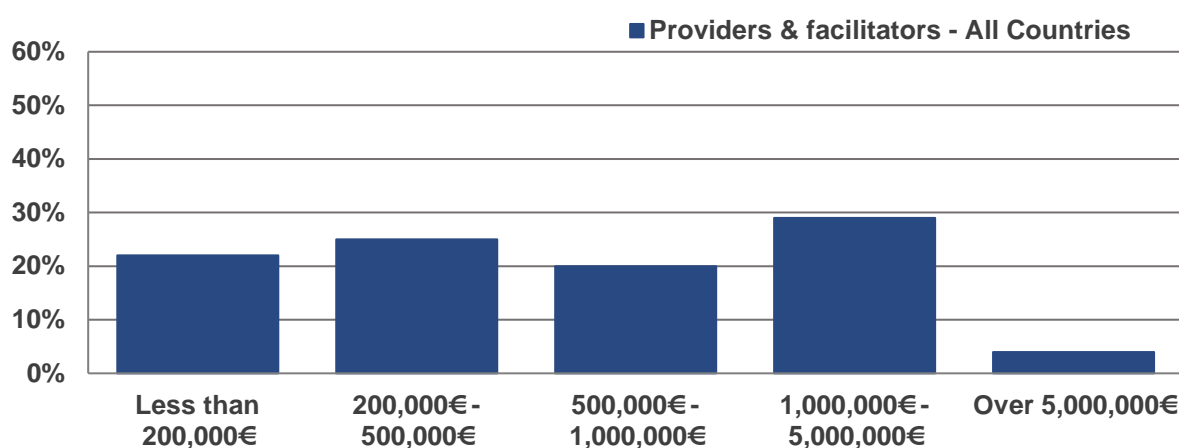
In Figure 8 below we can see that, the countries where most respondents did not implement any projects in the last 12 months are Latvia, Greece, Bulgaria. These are all 'beginner' markets struggling with lack of trust in providers and significant market barriers. On the other hand, providers and facilitators in France, Germany, Austria and Slovenia indicated the highest activity, which can be attributed to the long history of the market and ongoing policy support measures (especially in Slovenia).

Figure 8 How many EPC projects (that have reached Contract Signature) has your organisation initiated / become involved with in the last 12 months? (Percentage share of responses by providers and facilitators – country comparison Sept 2017)



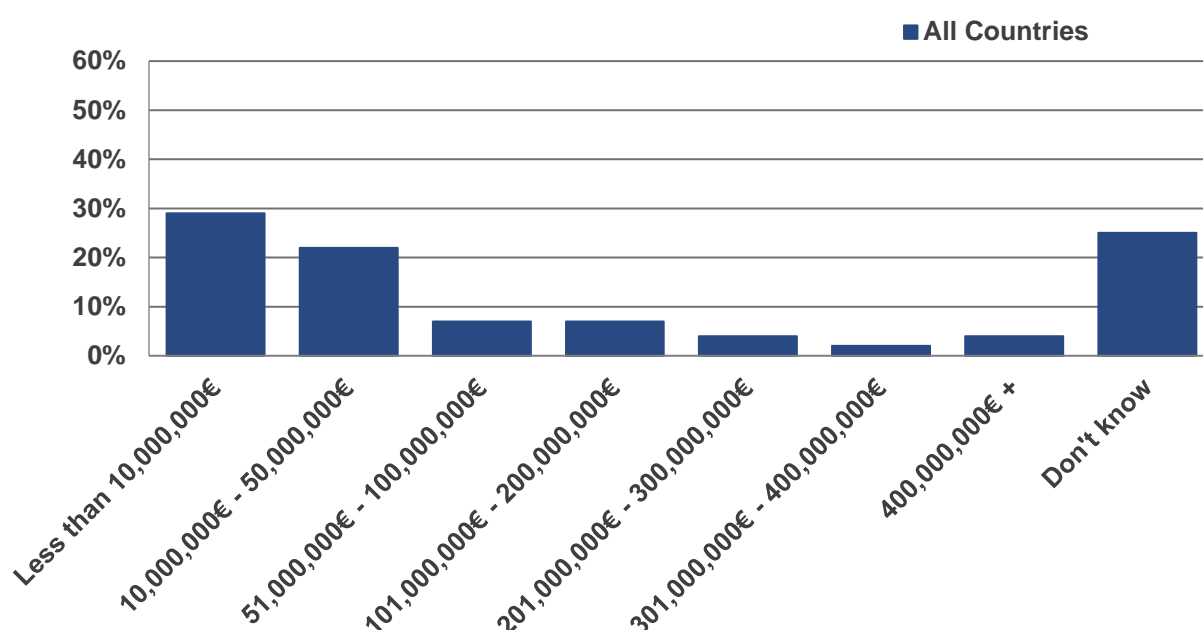
The most common initial investment outlay for EPC projects across All Countries reported by 67% respondents – EPC providers and facilitators – is less than EUR 1 million, while 29% of them selected the range from EUR 1 million to EUR 5 million. With only 4% of responses, investments exceeding EUR 5 million are rather rare.

Figure 9 What is the most common overall value (investment outlay) of the EPC projects you are involved in? (Percentage share of responses by providers and facilitators Sept 2017)



More than half of EPC providers and facilitators across All Countries (51%) agreed that the EPC market volume was below EUR 50,000,000 in their country, while one quarter of respondents were not willing to speculate. In most of the countries, the respondents answered based on expert estimates as no aggregated data on the total market volumes had been published.

Figure 10 How much revenue do you think the EPC market in your country generated in 2016? (Percentage share of responses by providers and facilitators Sept 2017)



3.2 EPC business models

The majority of respondents – including EPC providers and facilitators - across All Countries in the survey (55%) agreed that the most common duration of EPC projects they are involved in is between five and ten years (Figure 11). About one fifth of respondents mainly work on projects with contract duration of shorter than five years and another 22% projects with a length of between 11-15 years. Only 4% of providers and facilitators typically implement projects longer than 15 years.

Figure 12 compares typical project length among All Countries in the survey. This shows that Germany, Italy, Czech Republic and France have the highest share of providers and facilitators reporting projects longer than five years. An interesting situation was identified in Latvia and Slovenia, where projects typically last up to 5 years or – on the contrary - they are longer than 10 years. This split is attributed to the fact that typical EPCs are either implemented in the lighting sector with short paybacks, or focus on deep building renovations with long paybacks. In Latvia, deep renovations are mostly conducted in the residential sector (Kamenders et al. 2018), while – on the other hand - in Slovenia long term EPC contracts (78%) are typically in deep renovation of public buildings supported through Cohesion grant funding (Staničić 2018).

Figure 11 What is the most common duration of the Energy Performance Contracts you are involved in? (Percentage share of responses by providers and facilitators Sept 2017)

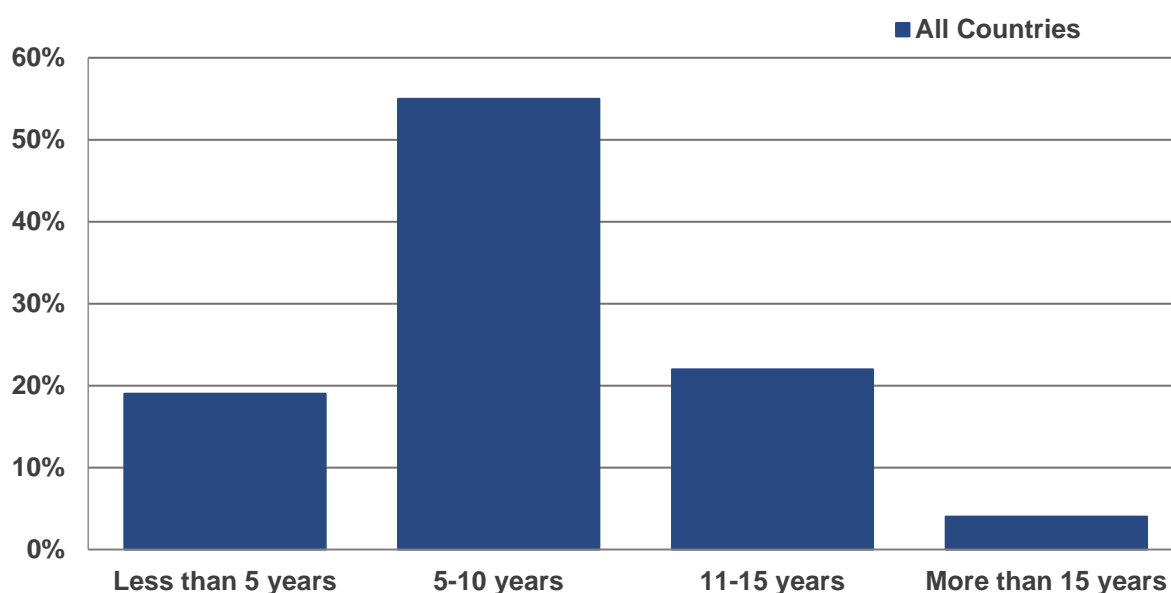
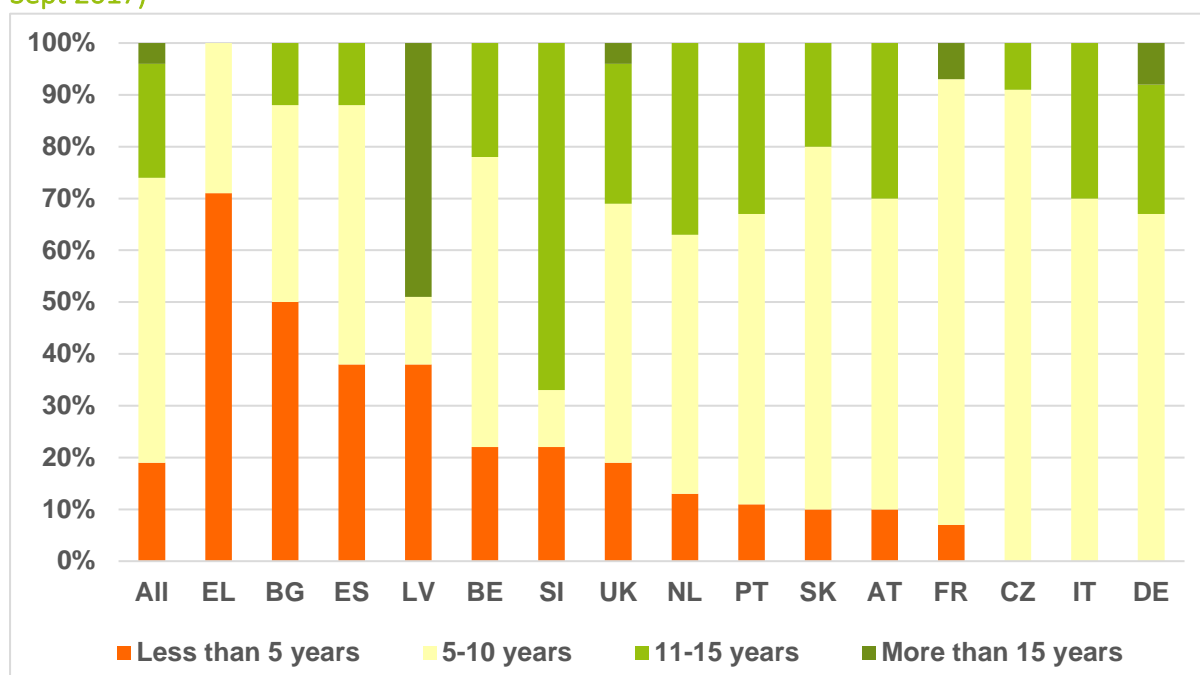


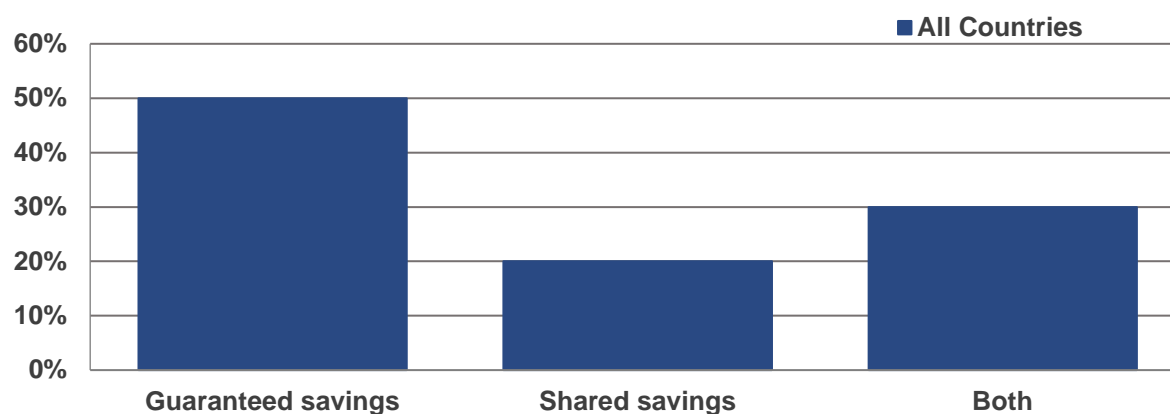
Figure 12 What is the most common duration of the Energy Performance Contracts you are involved in? (Percentage share of responses by providers and facilitators – country comparison Sept 2017)



The guaranteed savings model dominates EPC markets across All Countries in the survey. Half of providers and facilitators reported that they offer solely the guaranteed savings model in their EPC projects (Figure 13). On the other hand, one fifth of respondents use solely the shared savings model. The remaining respondents (30%) use both models in their projects.

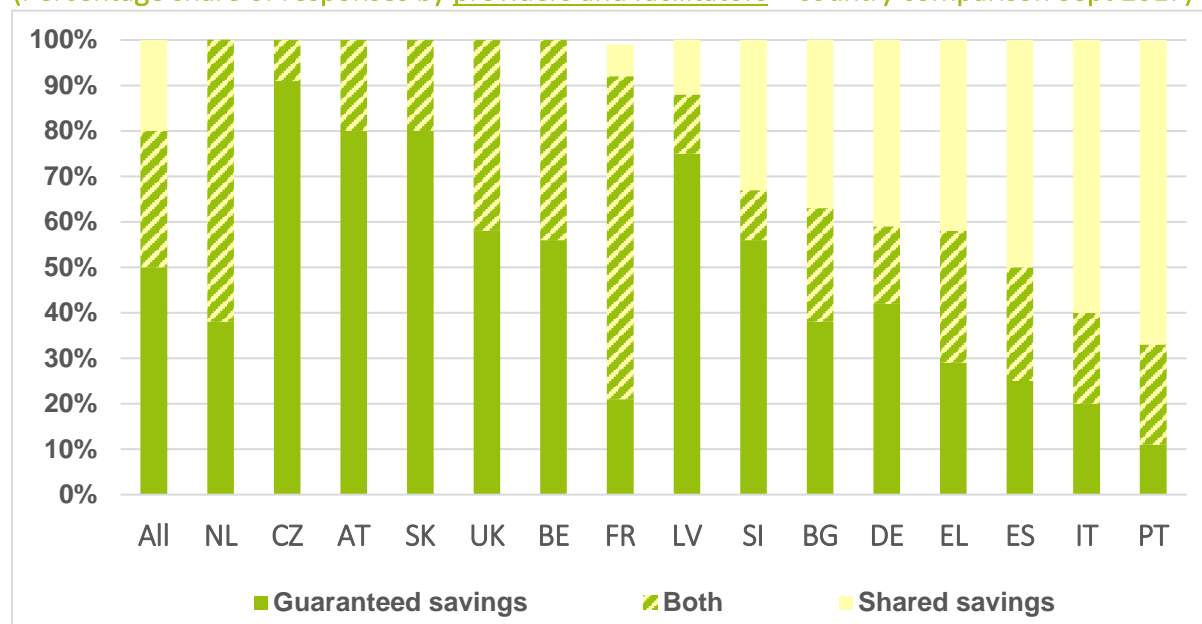
Usage of different models varies widely among the countries as can be seen on Figure 14. In the Netherlands, the Czech Republic, Austria, Slovakia, the UK and Belgium, the shared savings model was not typically in use for any respondents. In contrast, more than half of respondents report typical use of the shared savings model in Spain, Italy and Portugal.

Figure 13 What type of energy savings model is offered in the EPC projects you are involved in? (Percentage share of responses by providers and facilitators Sept 2017)



Note: In a shared savings model, the client pays the ESCO a pre-determined percentage of its achieved

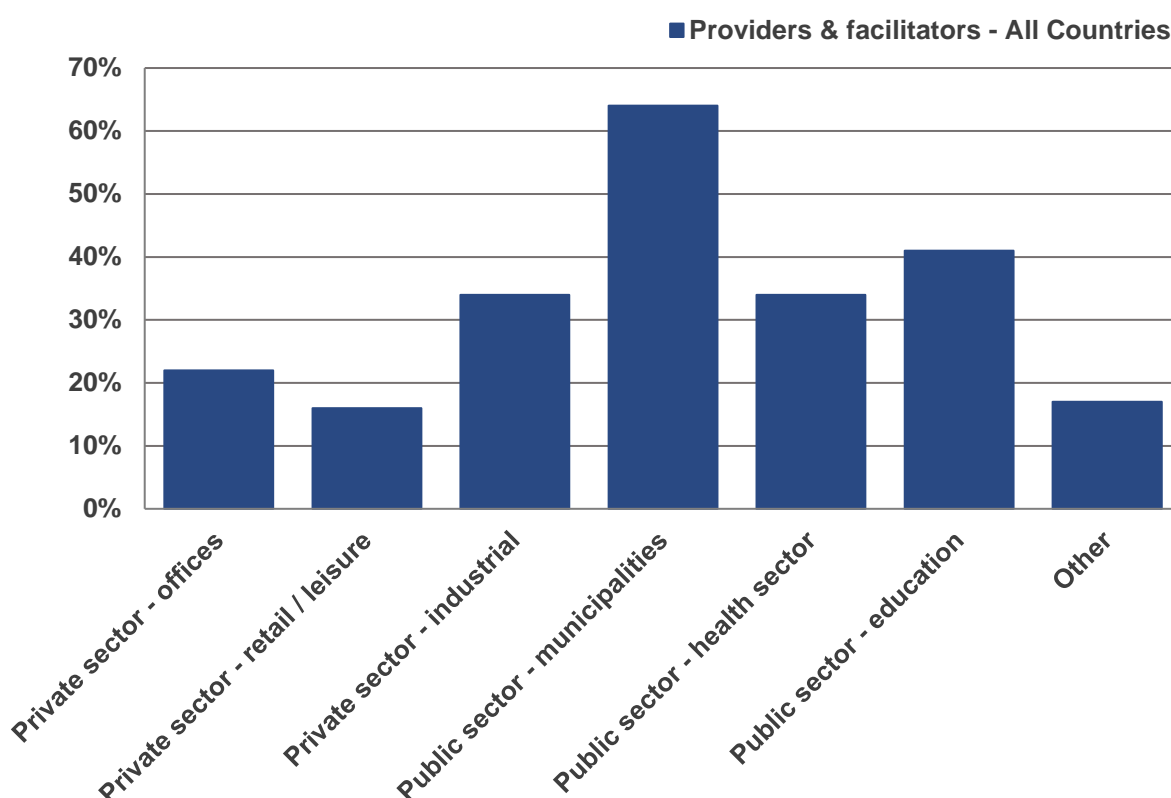
Figure 14 What type of energy savings model is offered in the EPC projects you are involved in? (Percentage share of responses by providers and facilitators – country comparison Sept 2017)



3.3 EPC market sectors

The survey confirms that the public sector drives EPC markets across All Countries. The majority of EPC providers and facilitators (64%) report that their clients are most frequently municipalities. In general, municipalities are followed by two other key areas of the public sector, i.e. education (41%) and healthcare (34%), which shares the third highest ranked position with industrial clients (34%).

Figure 15 Which sectors do your EPC clients generally come from? (Percentage share of responses by providers and facilitators Sept 2017)

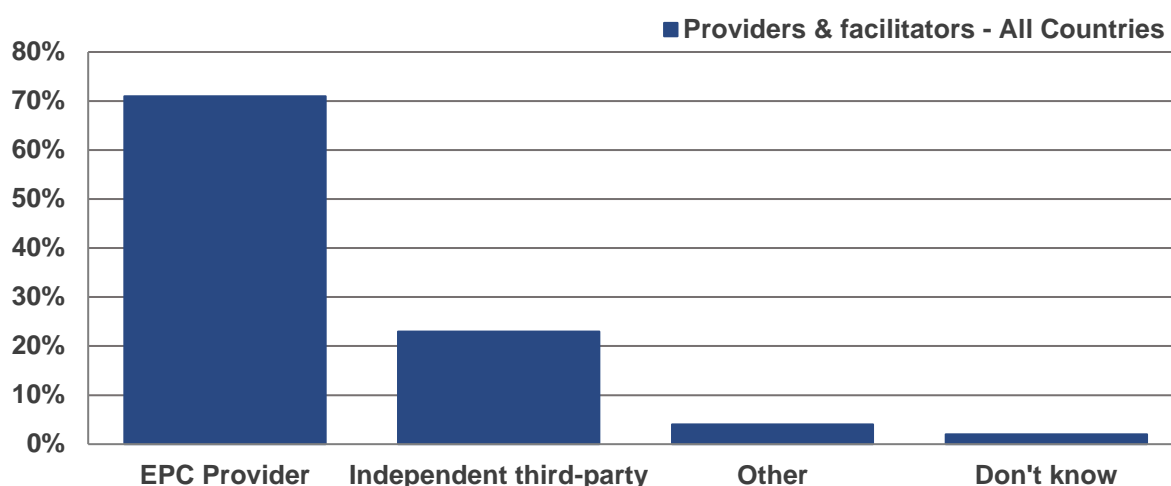


Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

3.4 EPC measurement & verification

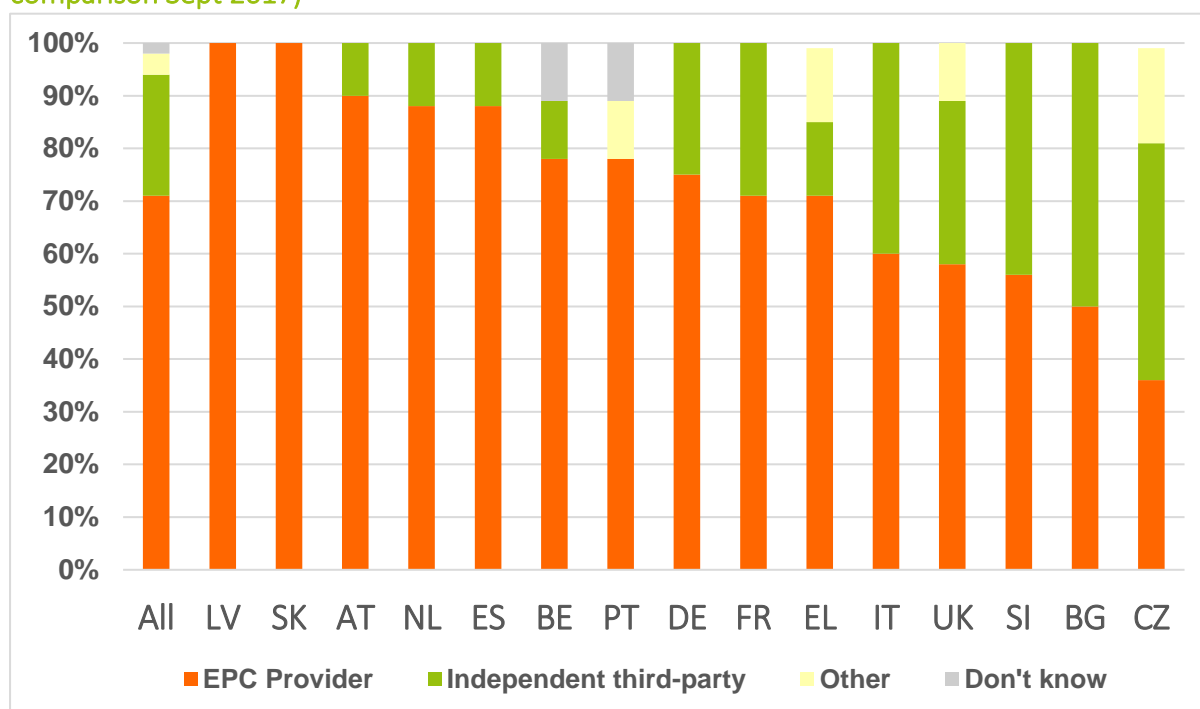
The majority of EPC providers and facilitators across All Countries in the survey (71%) highlighted that the EPC provider is typically responsible for energy savings performance analysis (often referred to as measurement & verification or M&V), while only 23% of respondents reported that a third party takes over responsibility for this task. In some cases clients choose to use an independent third party to carry out performance reporting or provide verification of the EPC provider's reporting. This can reduce the risk of the EPC provider's vested interests (i.e. their interest in ensuring the highest level of performance is reported such that they maximise their remuneration under the savings guarantee) affecting the reliability or fairness of the performance reporting.

Figure 16 Who typically delivers the energy savings performance analysis in the EPC projects you are involved with? (Percentage share of responses by providers and facilitators Sept 2017)



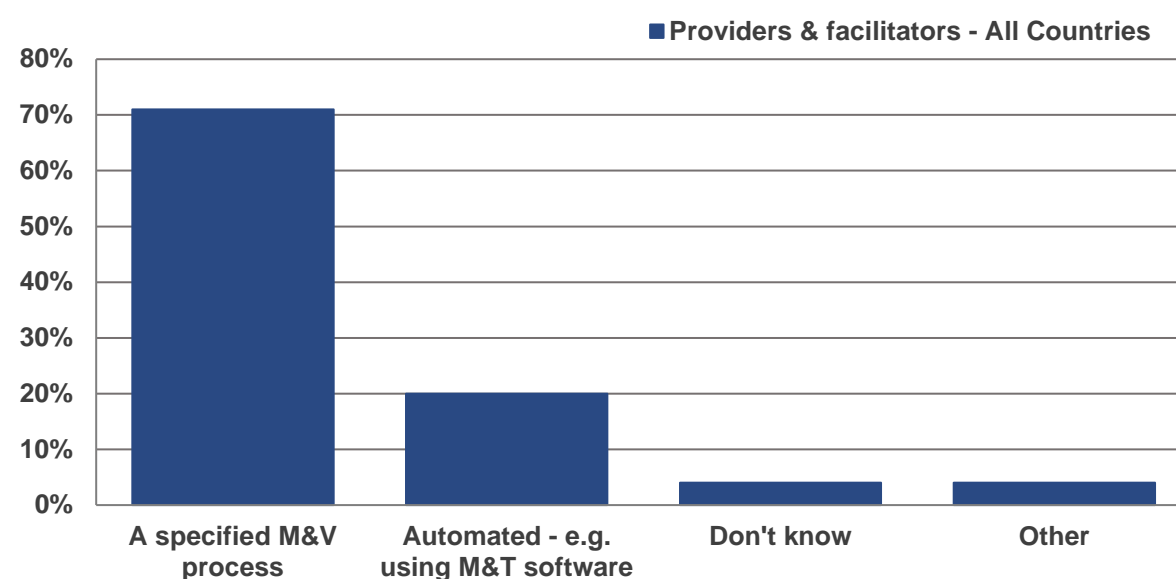
A greater emphasis on performance analysis being carried out by independent third parties was reported in Bulgaria (50%), Czech Republic (45%), Slovenia (44%) and Italy (40%). In the Czech Republic and Slovenia, it is usually the EPC facilitator that originally assisted with organisation of the procurement that provides energy savings performance verification for projects in the public sector. Such an EPC facilitator (or other consultant) verifies the results of energy savings performance reporting provided by the EPC provider. In Bulgaria, often an external energy auditing company verifies the achieved savings, at least for the first verification period, either due to the legal obligation for an energy audit to confirm the implementation and effect of the measures recommended in the original audit (before the energy refurbishment), or due to a requirement set by the international organisations that provide the funding. In Italy, it is thought that high use of independent third parties may be a result of the national transposition of the Energy Efficiency Directive. The new law has obliged large and high energy consuming companies to perform energy audits every 4 years, and these audits can only be conducted by certified ESCOs.

Figure 17 Who typically delivers the energy savings performance analysis in the EPC projects you are involved with? (Percentage share of responses by providers and facilitators – country comparison Sept 2017)



The energy savings performance of EPC projects is typically quantified by using a specified M&V process as reported by 71% of EPC providers and facilitators, while 20% of rely on reporting from 'Automated' software systems (Figure 18).

Figure 18 How is the energy savings performance of the EPC projects you are involved with typically measured and quantified? (Percentage share of responses by providers and facilitators Sept 2017)



3.5 EPC market barriers

EPC providers and facilitators that responded to the QualitEE online survey across All Countries agreed with EPC clients interviewed as both groups selected ‘complexity of the concept / lack of information’ (58%) and ‘lack of trust’ in the ESCO industry as the top barriers to the development of the EPC market.

EPC providers and facilitators across All Countries indicated **complexity of the concept / lack of information** (58%) and **lack of trust in the ESCO industry** (52%) were the top two barriers to EPC business (Figure 19). Interestingly, almost identical results were obtained in the Transparens survey (2015). Trust in ESCOs is the most significant barrier in Portugal, Slovenia, the Netherlands and Italy; in these countries at least 70% of respondents selected this issue (Table 2). France and Slovakia are the only countries where only a few respondents believe lack of trust is an issue.

In Southern Europe, the financial crisis particularly affected the economy of the countries of the area, including Portugal and Italy. Consequently, since then has been a lack of liquidity that has resulted in reduced interest from financial institutions in new and complex projects. Therefore, even where credit lines are available in a few of these financial institutions, their lack of information and trust, and especially their reluctance to increase their understanding of the ESCO industry are the main barriers for the EPC market.

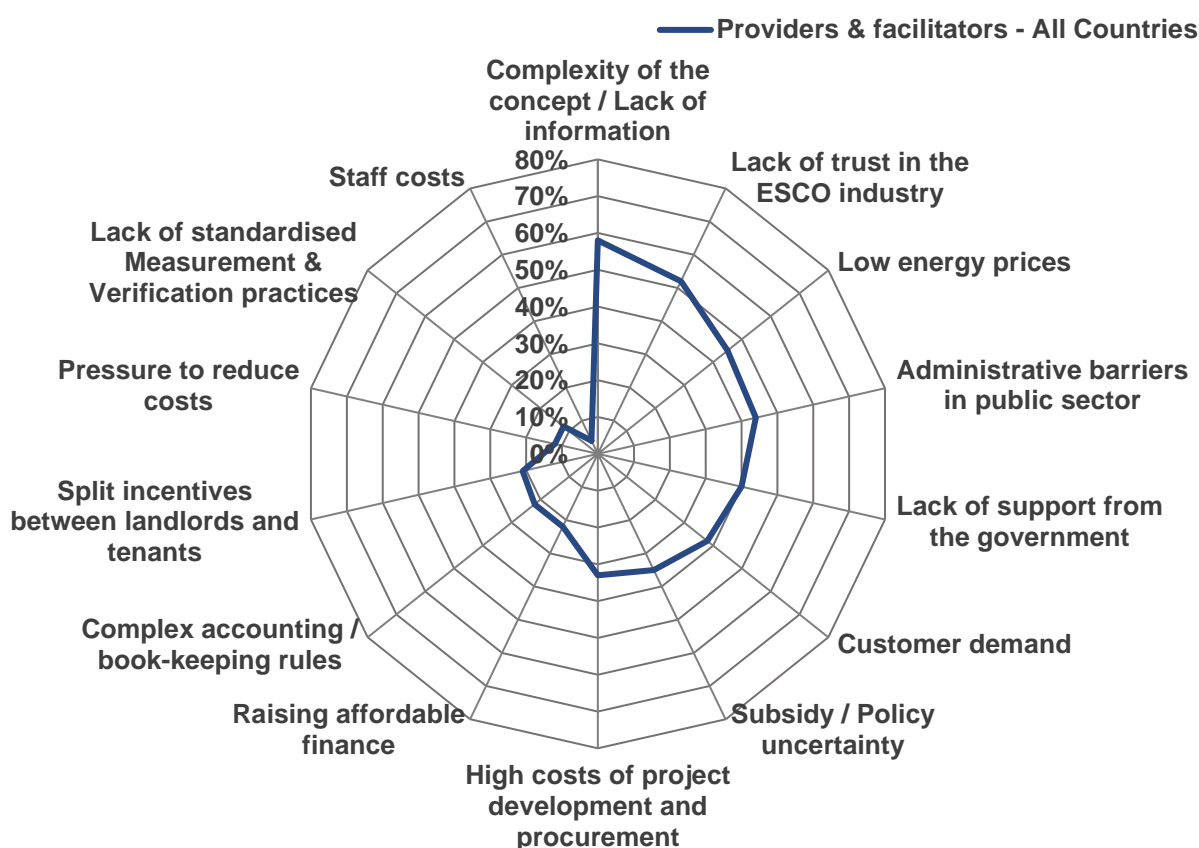
The following barriers are less important when looking at the overall picture across All Countries, however, in some of these countries these barriers play a major role:

- ✔ **Low energy prices** were reported as a main barrier to EPC by 45% respondents, however in France and Austria they seem to play a major role as 90% respondents agreed they belong among main barriers. (On the other hand, this is not perceived as a relevant barrier in Southern European countries such as Italy (10%), Portugal (11%), Spain (13%) or Greece (14%).)
- ✔ While overall **administrative barriers in the public sector** were selected only by 44% of respondents across All Countries, there were countries where they play key role: Belgium (89%), Czech Republic (73%) and in Bulgaria (63%).
- ✔ **Support from the government** is reported to be lacking in Latvia (75%), Slovakia (60%) and Austria (60%), which is expected to be related to **subsidy and policy uncertainty** reported in Latvia (88%) and Slovakia (70%).
- ✔ **Customer demand** is a major issue in Austria (70%) and Belgium (67%).
- ✔ **High costs of project development and procurement** is an important barrier to EPC market development in the Netherlands (75%), Germany (58%) and in the UK (50%). In Germany and in the UK this has been reported despite the availability of standardised

procurement routes in these countries. Moreover, in the UK, EPC facilitation is subsidised in the public sector. Whilst both issues address negative impact on the commercial investment case, the concern in the UK is that high transaction costs for EPC make the model less attractive than alternative approaches to implementing energy efficiency improvements.

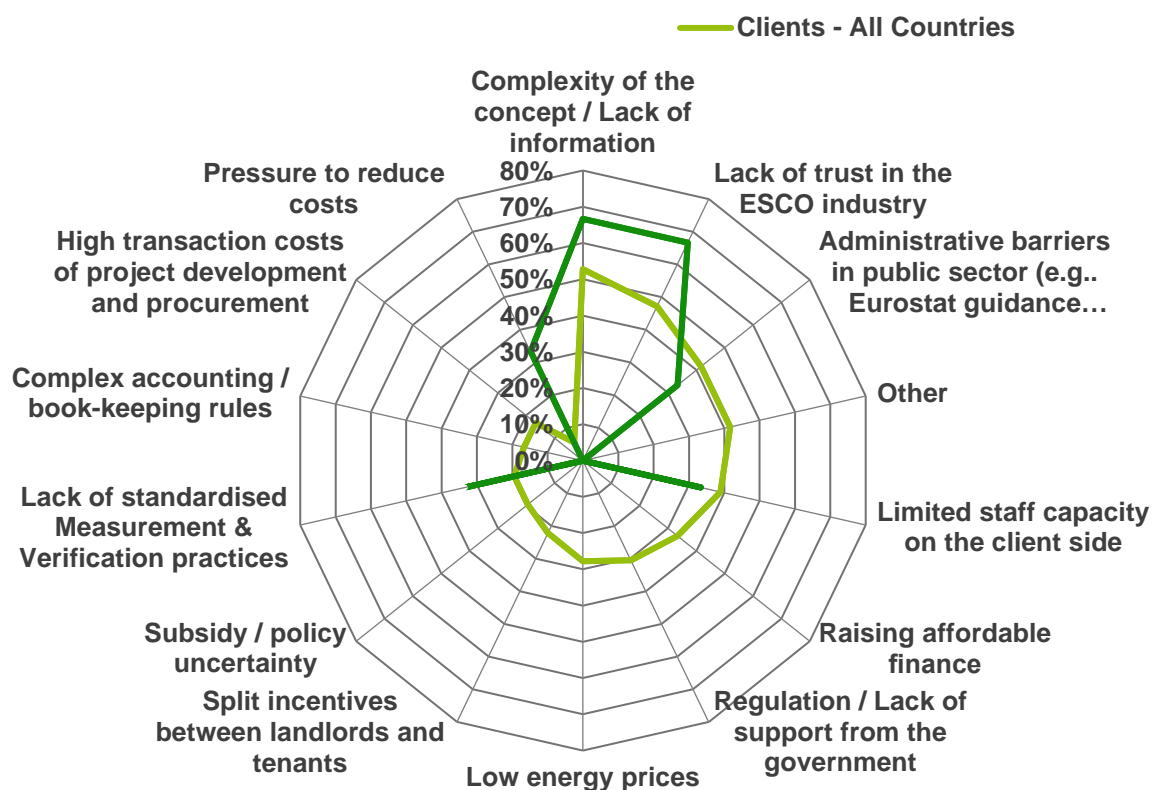
EPC clients interviewed selected "Complexity of the concept / Lack of information" (53%) and "Lack of trust in the ESCO industry" (47%) as the top two barriers to EPC business. EPC clients interviewed rated "Administrative barriers in public sector" (42%) and "Limited staff capacity on the clients' side" (39%) as the third and fourth ranking barriers. One third of clients across All Countries (33%) selected "Raising affordable finance". (Figure 20)

Figure 19 What are the main barriers to EPC business based on the activities of the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Figure 20 Based on the EPC projects you have been involved with: what do you think are the main BARRIERS to EPC business? (Percentage share of responses by clients Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%. Clients – EU level refer to personal interviews conducted with three clients operating on an EU wide level.

Table 2: What are the main barriers to EPC business based on the activities of the last 12 months? (Percentage share of responses by providers and facilitators in individual countries Sept 2017)

	AT	BE	BG	CZ	FR	DE	GR	IT	LV	NL	PT	SK	SI	ES	UK
Complexity of the concept/lack of information	70%	89%	38%	55%	64%	67%	71%	70%	38%	63%	78%	30%	44%	63%	50%
Lack of trust in the ESCO industry	50%	56%	63%	45%	14%	25%	57%	70%	50%	75%	100%	10%	78%	63%	58%
Low energy prices	90%	78%	38%	45%	93%	50%	14%	10%	63%	38%	11%	30%	44%	13%	31%
Administrative barriers in public sector	40%	89%	63%	73%	29%	25%	29%	50%	0%	25%	56%	60%	56%	50%	35%
Lack of support from the government	60%	33%	25%	45%	29%	33%	43%	30%	75%	38%	56%	60%	44%	38%	23%
Customer demand	70%	67%	50%	36%	29%	50%	14%	20%	13%	38%	22%	30%	11%	50%	42%
Subsidy / Policy uncertainty	20%	33%	50%	18%	29%	50%	14%	50%	88%	25%	33%	70%	11%	13%	31%
High costs of project dev. and procurement	30%	33%	25%	27%	21%	58%	14%	30%	38%	75%	44%	10%	0%	0%	50%
Raising affordable finance	20%	22%	50%	0%	21%	0%	57%	0%	50%	13%	0%	30%	22%	25%	35%
Complex accounting / book-keeping rules	30%	0%	0%	18%	21%	33%	43%	20%	0%	0%	33%	20%	56%	25%	19%
Split incentives btw. landlords and tenants	70%	56%	0%	18%	36%	25%	14%	10%	0%	25%	0%	0%	11%	0%	19%
Pressure to reduce costs	20%	11%	0%	9%	36%	17%	14%	20%	0%	13%	11%	0%	11%	13%	4%
Lack of standardised M&V practices	0%	0%	0%	0%	7%	17%	43%	20%	25%	13%	11%	0%	22%	50%	4%
Staff costs	0%	11%	0%	0%	0%	0%	0%	0%	25%	0%	0%	0%	0%	13%	12%

3.6 EPC market drivers

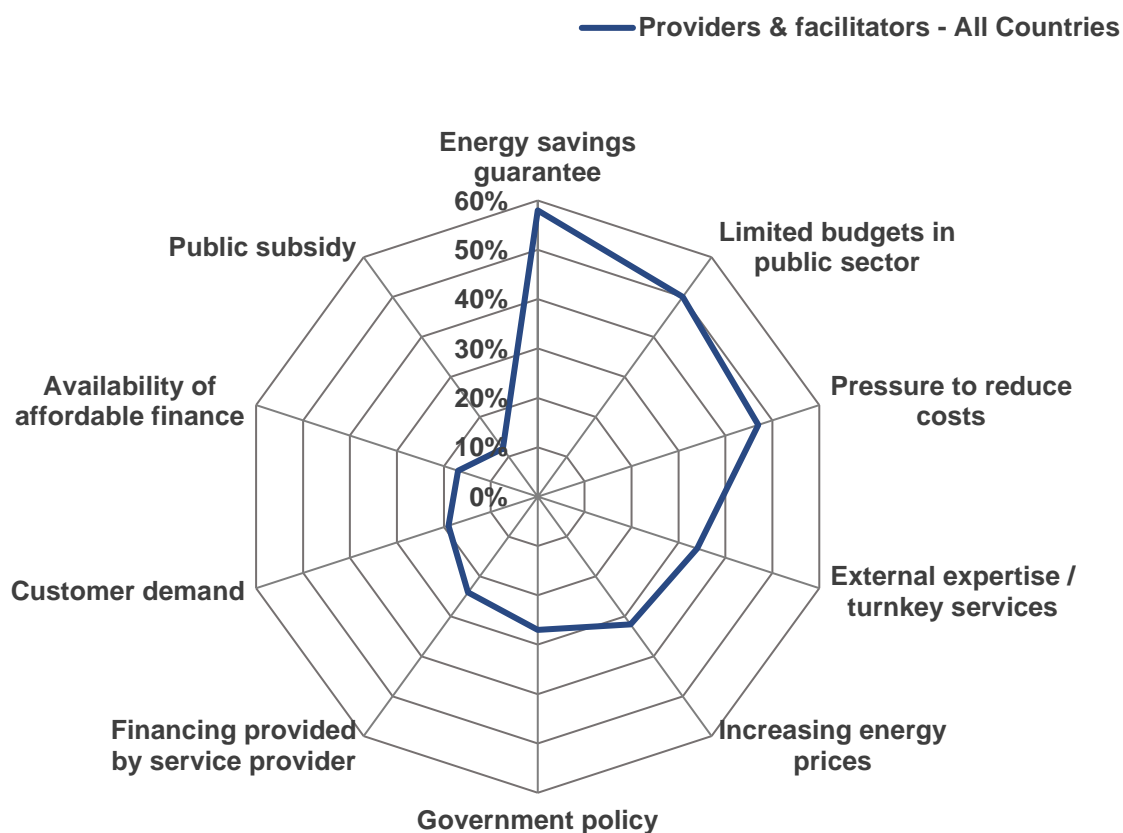
EPC providers and facilitators that participated in the QualitEE online survey across All Countries agreed with EPC clients interviewed in that the energy savings guarantee, limited budgets in public sector and pressure to reduce costs are the top drivers of the EPC markets. These survey results are also consistent with literature (Polzin et al 2016, Nolden, Sorrell 2016, Garnier 2013).

EPC providers and facilitators across All Countries in the QualitEE survey identified energy savings guarantee (58%) as the top driver of the EPC market. Half of these respondents also reported limited budgets in public sector (50%) and pressure to reduce costs (47%) to be key drivers. The offer of financing provided by the service provider (24%) and availability of affordable finance (17%) seem to play much less profound role.

Energy savings guarantees offer the opportunity to transfer exposure to technical, performance and financial risks to those that have more capacity to evaluate and manage them. It is therefore critical that guarantees have value and deliver on this promise of risk transfer. Lack of trust in the ESCO industry, which was strongly identified as a key barrier in the survey, indicates uncertainty from clients as to whether they would be truly receiving these benefits. It also indicates a scepticism that ESCOs are willing to take on these risks, and are therefore finding contractual means to reduce their exposure. Some clients shared that they could not tell whether the EPC delivered the savings as the M&V was poorly specified. Less than one quarter of providers and facilitators indicated an independent third party is involved in the M&V process for their project. Thus, it seems to be important to increase this share to provide clients with a reliable verification process. Polzin et al. (2016) and the European Commission (2017) highlight a lack of specific skills for procurement, contract risk evaluation and management of long term outsourcing contracts. So, whilst the benefit of outsourcing technical expertise can be achieved by EES, clients must have 'muscular' procurement and contract governance skills to ensure they truly achieve the desired risk transfer.

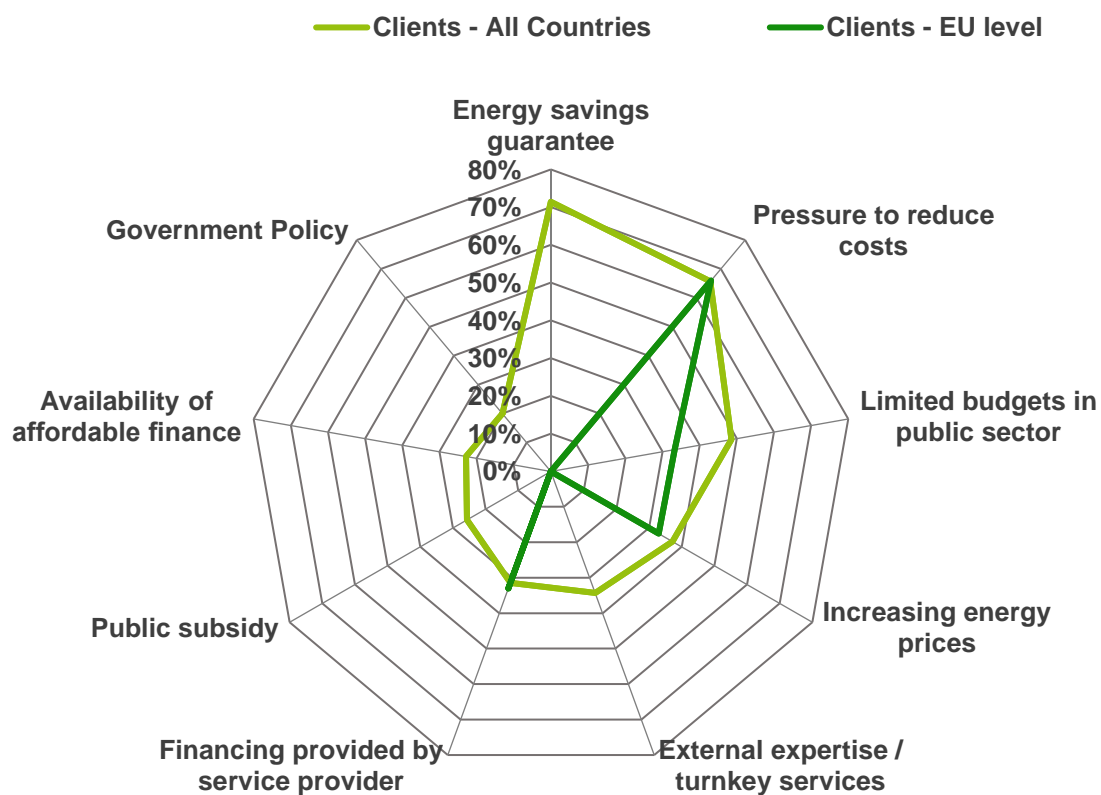
The majority of clients interviewed across All Countries agreed that the "energy saving guarantee" (71%) and "pressure to reduce costs" are the main drivers of EPC business (66%) (Figure 22). Almost half of them indicated "limited budgets in public sector" (49%) as a very significant driver. Increasing energy prices (37%) and financing provided by the energy service provider (31%) also play a role in driving the EPC market in the clients' view. EU-level clients agreed with the clients across All Countries about the high importance of the following three drivers: "pressure to reduce costs", "increasing energy prices" and "financing provided by service provider", whilst the other drivers did not seem to be so important to them.

Figure 21 What are the main drivers of the EPC business based on the activities of the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Figure 22 Based on the EPC projects you have been involved with: what do you think are the main DRIVERS of EPC business? (Percentage share of responses by clients Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%. Clients – EU level refer to personal interviews conducted with three clients operating on an EU wide level.

4 ENERGY SUPPLY CONTRACTING MARKET

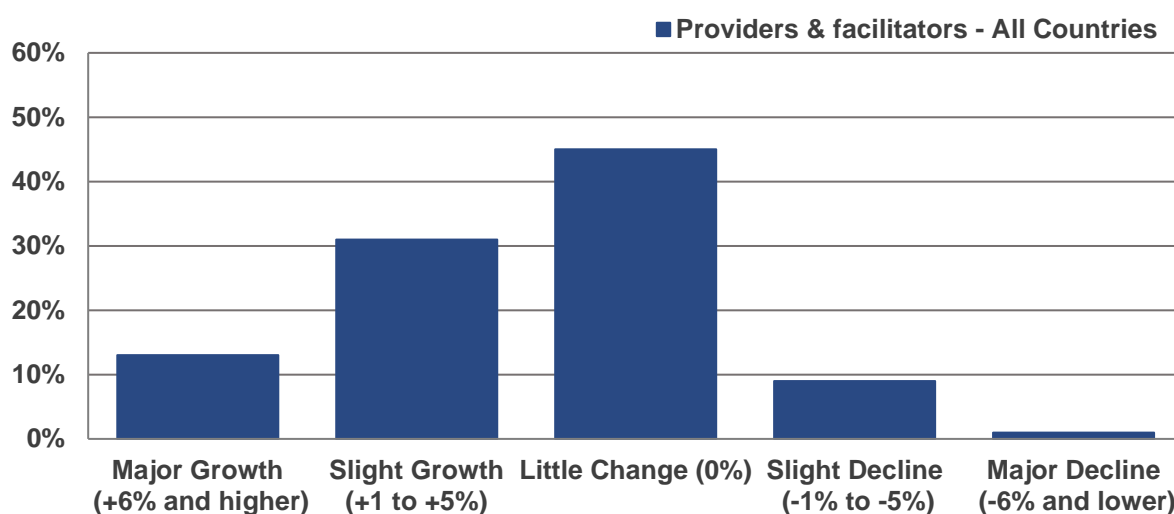
The trends in the energy supply contracting market have been identified using the results of the QualitEE surveys (2017) among the key market actors. This included an online survey of EPC providers and facilitators across All Countries and personal interviews with clients and financial institutions across All Countries (excl. France and the Netherlands):

- ✔ Market growth for energy supply contracting (ESC) projects has been reported to be slower than in the case of EPC in 2017. Both growth and stagnation were reported by about 45% respondents each. When it comes to their own ESC orders stagnation was the most reported status.
- ✔ The majority of ESC provider and facilitator respondents (46%) became involved in one to five ESC projects in the last 12 months.
- ✔ ESC projects tend to have a lower value than EPC projects. The majority of respondents agreed the most common overall value of the ESC projects they are involved in is below EUR 500,000.
- ✔ Almost all respondents had ESC clients from both the public and private sector, so there is a higher share of ESC projects in the private sector than for EPC projects.

4.1 ESC market developments

Based on the results of the QualitEE survey (2017) among ESC providers and facilitators across All Countries, the ESC market growth has been slower than in the case of EPC. Market growth in the last 12 months was reported by about 45% respondents, while another 45% identified little change in market size.

Figure 23 Over the last 12 months, the market for ESC in your country has seen: (Percentage share of responses by providers and facilitators Sept 2017)



"Little change" was the most selected option to describe the development of their ESC orders from respondents across the All Countries dataset. Growth was indicated by 39% of respondents and decline only by 13% of respondents.

The majority of ESC provider and facilitator respondents (46%) became involved in one to five ESC projects in the last 12 months (Figure 25). The second most selected category was 20 or more projects (14%). Twenty seven percent of respondents that claimed to operate on the ESC market did not become involved in any new projects in the last 12 months.

Figure 24 In the last 12 months your ESC orders have seen: (Percentage share of responses by providers and facilitators Sept 2017)

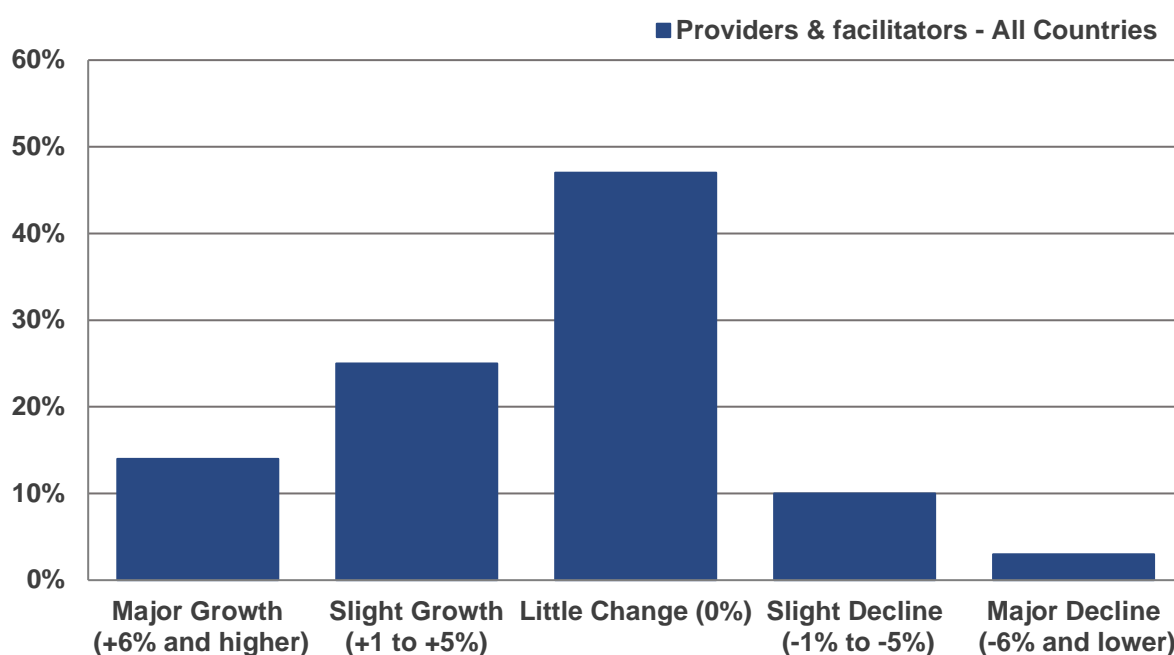
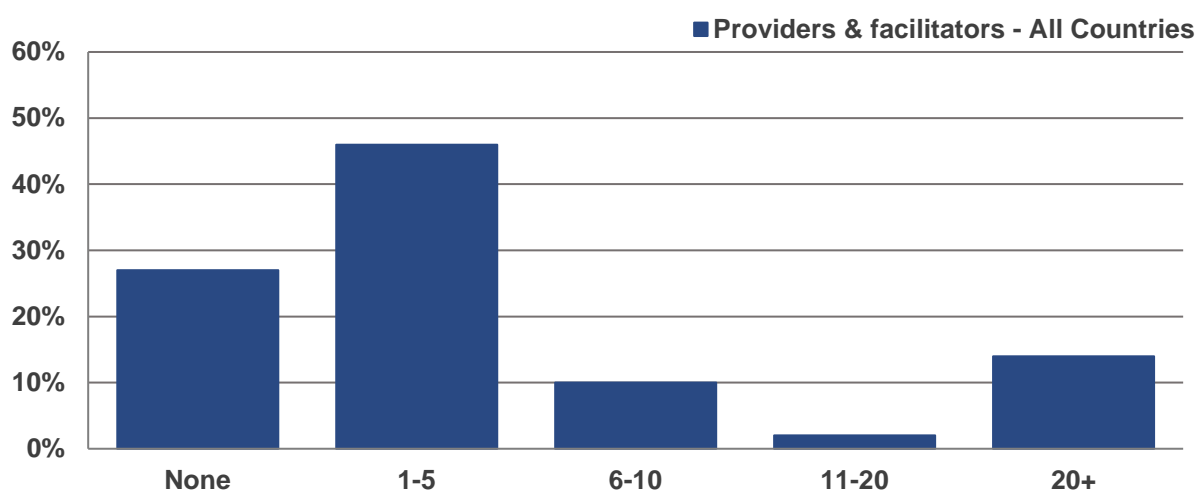
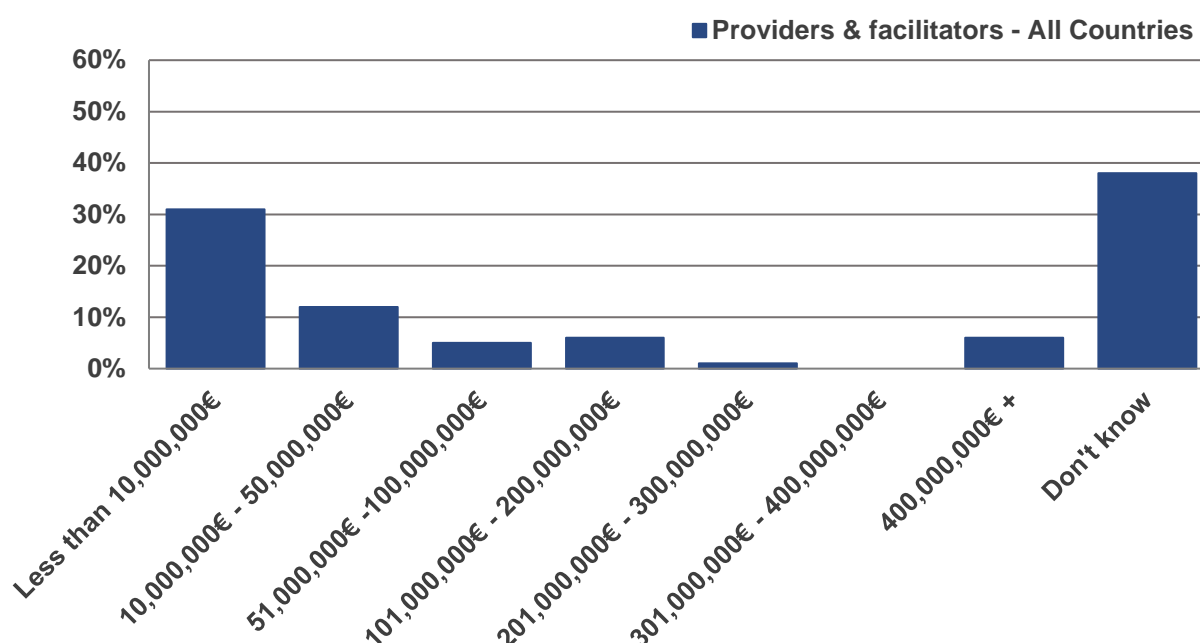


Figure 25 How many ESC projects (that have reached contract signature) has your organisation initiated / become involved with in the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)



A significant proportion (38%) of ESC providers and facilitators were not willing to speculate on the ESC market size, which is not surprising, as there are no definitive sources of data for this information for most countries in the survey. Half of respondents who provided estimates agreed that the ESC market size was below EUR 10,000,000 in their country.

Figure 26 How much revenue do you think the ESC market in your country generated in 2016? (Percentage share of responses by providers and facilitators Sept 2017)



4.2 ESC business models

In an Energy Supply Contract (ESC) the efficient supply of useful energy such as heat, steam or electricity is contracted, measured and delivered in physical units (such as MWh), and therefore resembles district heating or cogeneration supply contracts.

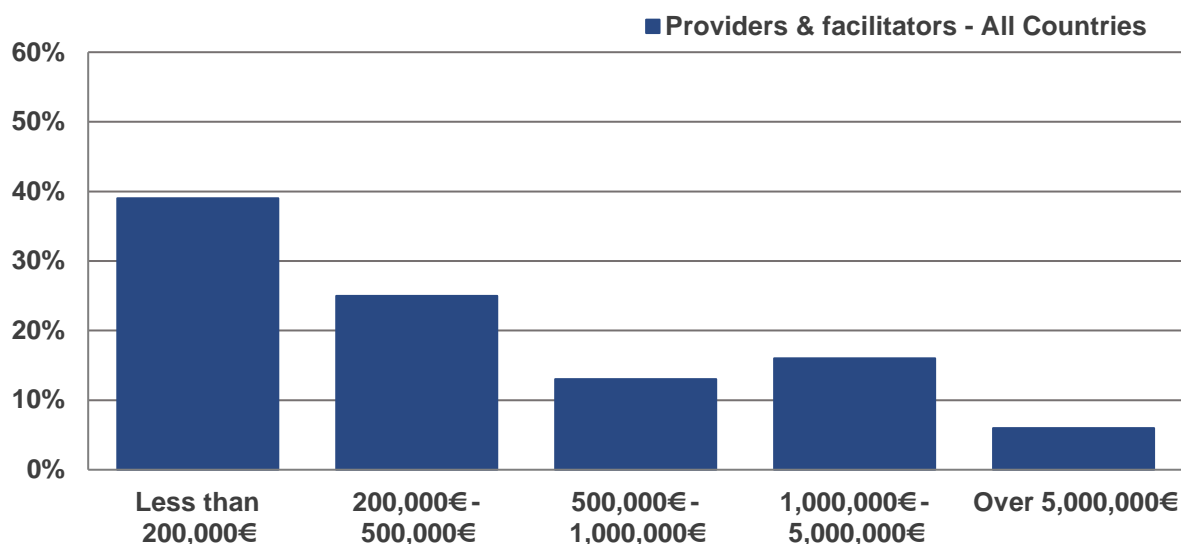
ESC providers usually apply energy saving measures only on the energy supply side (boiler efficiency, etc.). They are motivated to achieve efficiency on the supply side to maximise their profits, however they do not provide a guarantee of energy savings to the client.

There is a number of ways in which the client pays for ESC services. One typical method applied consists of the following two parts:

- ✓ The fixed part of the price covers the whole investment. Usually the contract stipulates a minimum threshold volume for the usage (of the supplied energy service). When the client's usage is below this threshold, it must pay a higher fixed unit fee.
- ✓ The variable part of the price covers operating costs, including fuel costs.

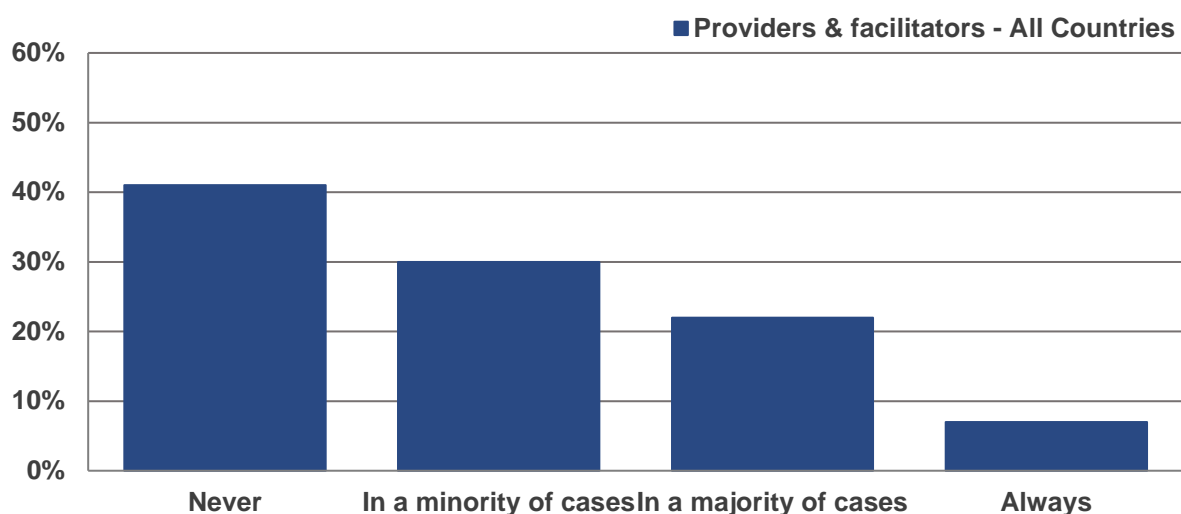
The view across All Countries in the survey is that ESC projects tend to have a lower value than EPC projects. The majority of respondents (64%) agreed the most common overall value of the ESC projects they are involved in is below EUR 500,000.

Figure 27 What is the most common overall value (investment outlay) of the ESC projects you are involved in? (Percentage share of responses by providers and facilitators Sept 2017)



The majority of respondents agreed that is not typical for payments for energy delivered from generation equipment to be combined with payments per unit of energy saved from energy efficiency under the bracket of ESC. Thirty percent of them had such a combination in the projects they are involved in a minority of cases, and 41% reported that they had no experience with such an arrangement.

Figure 28 In the ESC projects you are involved in, were payments per unit of energy delivered in combination with payments per unit of energy saved (from installed energy efficiency measures)? (Percentage share of responses by providers and facilitators Sept 2017)

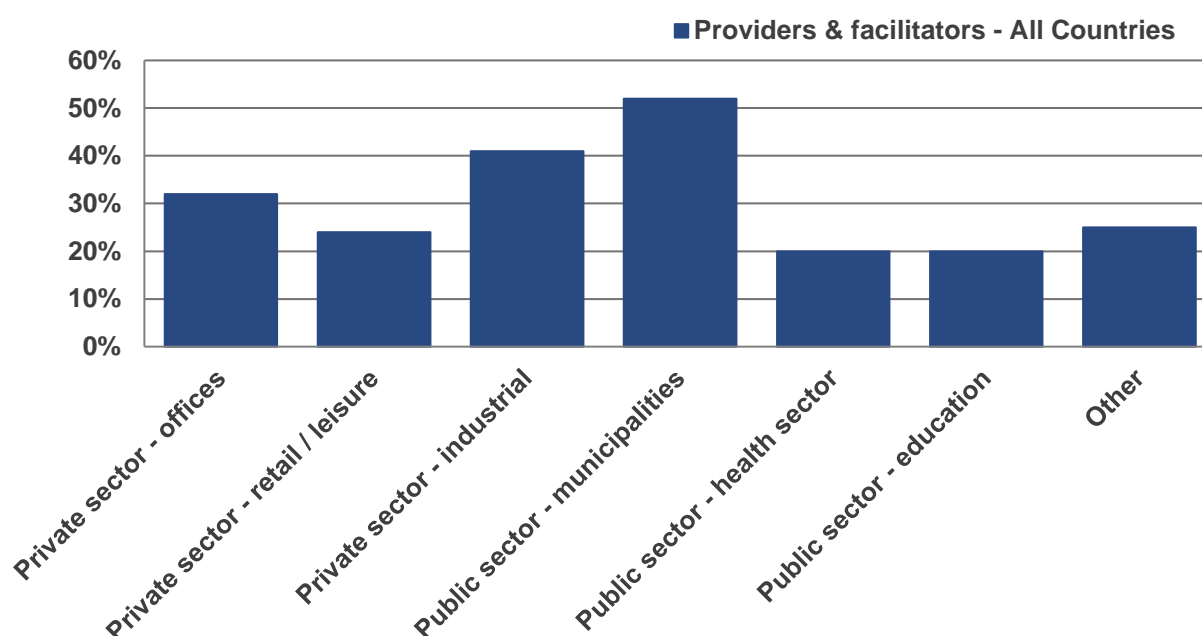


4.3 ESC market sectors

ESC clients can be found both in the public and private sector. Working with private sector clients was stated by 97% ESC providers and facilitators, while working with public sector clients by 92% of them. There is a higher share of ESC projects in the private sector (vs. public sector) than for EPC projects.

The majority of ESC projects implemented in public buildings are for municipalities (52%), followed by the health sector (20%) and the education sector (20%). When it comes to private clients, the highest share of respondents work with clients in the industrial sector (41%).

Figure 29 Which sectors do your ESC clients generally come from? (Percentage share of responses by providers and facilitators Sept 2017)



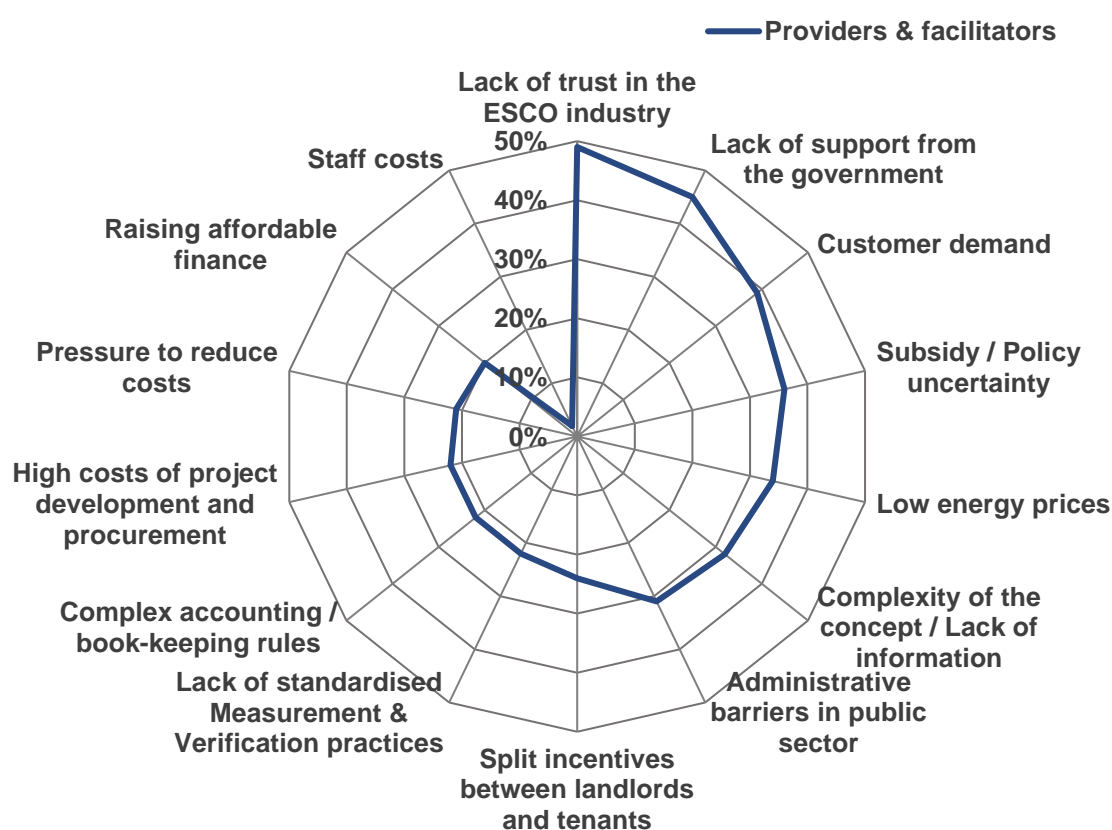
Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

4.4 ESC market barriers

ESC providers and facilitators identified lack of trust into ESCO industry (49%) and lack of government support (45%) as the top two barriers to the ESC market in the QualitEE survey.

In contrast to the picture on the EPC market, complexity of the concept and administrative barriers were perceived as a barrier only by about 30% of respondents. Existing regulatory, administrative and structural barriers in the ESC market are similar to those for the EPC market. However, the process of preparing and implementing ESC projects is usually less complex and does not include an energy saving guarantee, so these projects are struggling less with complex administrative and accounting rules in the public sector.

Figure 30 What are the main barriers to the ESC business based on the activities of the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)

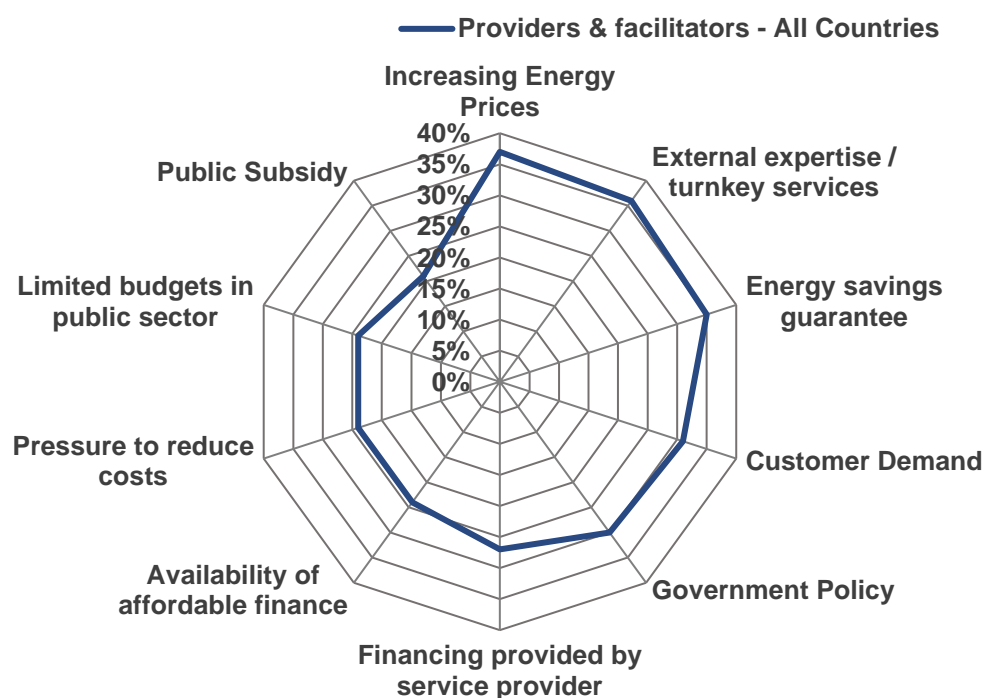


Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

4.5 ESC market drivers

Respondents across All Countries in the survey agreed that increasing energy prices were a significant driver of ESC business. This implies energy supply contracts can benefit well from policies that bring external environmental costs into the price of energy.

Figure 31 What are the main drivers of the ESC business based on the activities of the last 12 months? (Percentage share of responses by providers and facilitators Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

5 FINANCING

5.1 EPC financing

Whilst a full range of financing options for EPC appears to be in use across All Countries, the most cited financing options are EPC provider debt and client debt.

Providers and facilitators across All Countries indicated that for the EPC projects they are involved in, service provider debt (38%), client debt (34%) and service provider internal financing (33%) were most used types of financing (Figure 32). The providers could select more than one option as an answer to the question, thus if 28% stated grants and subsidies, these were mostly in combination with other sources of financing. A similar share of providers and facilitators selected project financing (24%) and sale of claims (23%), which is where EPC service payments are sold by the service provider to investors on financial markets.

It is not surprising financial institutions most often selected debt borrowed by service provider (35%) or by client (35%), which is similar to the results received from providers and facilitators. The results differ when it comes to sale of claims, which was cited by 35% of financial institutions across All Countries (excl. France and the Netherlands), i.e. noticeably more than by the providers and facilitators (Figure 32).

Across All countries, only 28% of EPC providers and facilitators indicated that the sale of claims is accepted as a main collateral (in all or in the majority of cases) in contrast to half of financial institutions that claimed acceptance of this form of financing (in all or in the majority of cases) (Figure 33). It may be useful to further investigate this discrepancy as it might be that many EPC providers do not know about all opportunities to finance their projects via sale of claims.

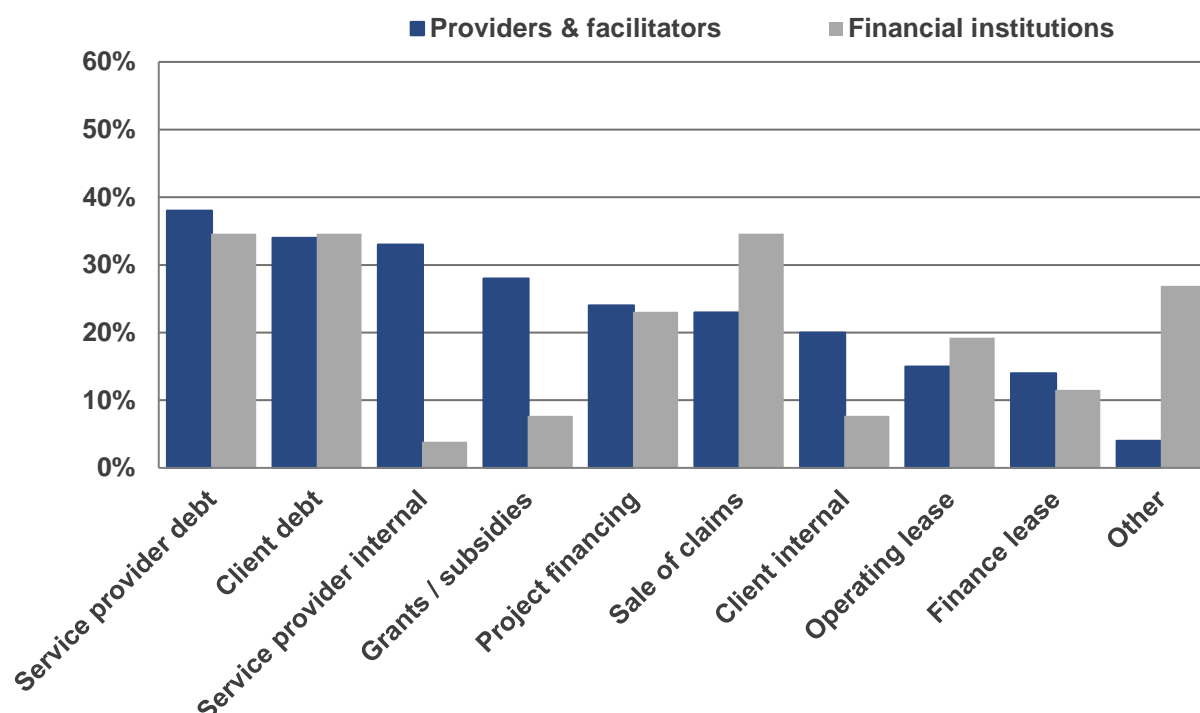
The general view of respondents – EPC providers and facilitators - across All Countries is that obtaining viable finance is "difficult" (54%) or "very difficult" (12%). Obtaining viable finance was seen as "easy" only by 29% of respondents (Figure 34).

In stark contrast to the picture across All Countries in the survey, in the Czech Republic obtaining viable finance was seen as "easy" by the vast majority of Czech EPC providers and facilitators (91% - Figure 35), which is consistent with the low number of respondents selecting "raising affordable finance" as a barrier to EPC business (Szomolanyiova 2018). This can be explained by the fact, that sale of claims is very well accepted as a main collateral in the Czech Republic (91% of respondents stated it is accepted in a majority of cases and the rest of 9% stated it is accepted in all cases) and it has become a financing method for majority of Czech EPC projects. Germany is another country where obtaining finance was seen as "easy" and acceptance of sale of claims is quite high.

There is a statistically significant strong correlation of 70% between the proportion of respondents in each country indicating that obtaining finance is "easy" and the proportion of

respondents in the country indicating that there is acceptance of sale of claims as a financing option. Availability of sale of claims makes financing of EPC projects easier. However, in the countries where obtaining financing is perceived as easy, there is higher development of the EPC market and a higher experience and trust in EPC providers. This supports trust of financial institutions in ESCOs and thus their willingness to accept of sale of claims as a financing option.

Figure 32 How are the EPC projects you are involved with financed? (Percentage share of responses by providers and facilitators; and clients Sept 2017 Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%. For Financial institutions the question was formulated as: "What type of financing has been provided to EPC projects financed/co-financed by your institution?"

Figure 33 From your experiences, is the sale of claims accepted as the main collateral for EPC projects? (Percentage share of responses by providers and facilitators vs. financial institutions Sept 2017)

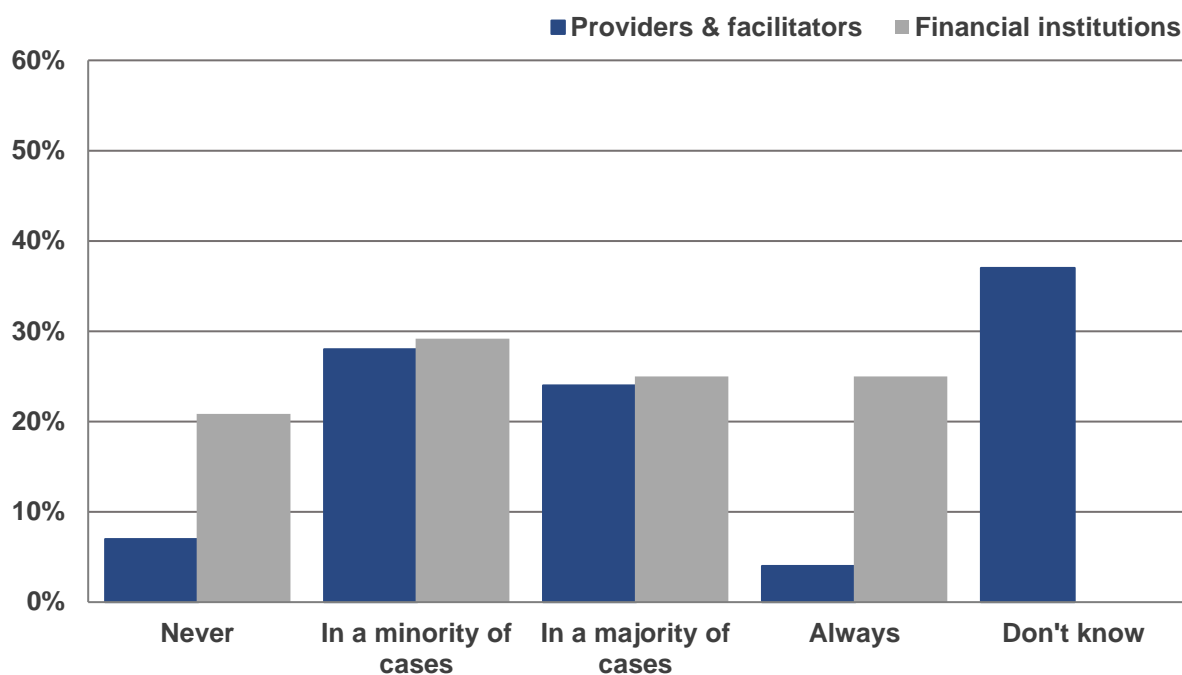


Figure 34 Obtaining viable finance for an EPC project is easy (Percentage share of responses by providers and facilitators Sept 2017)

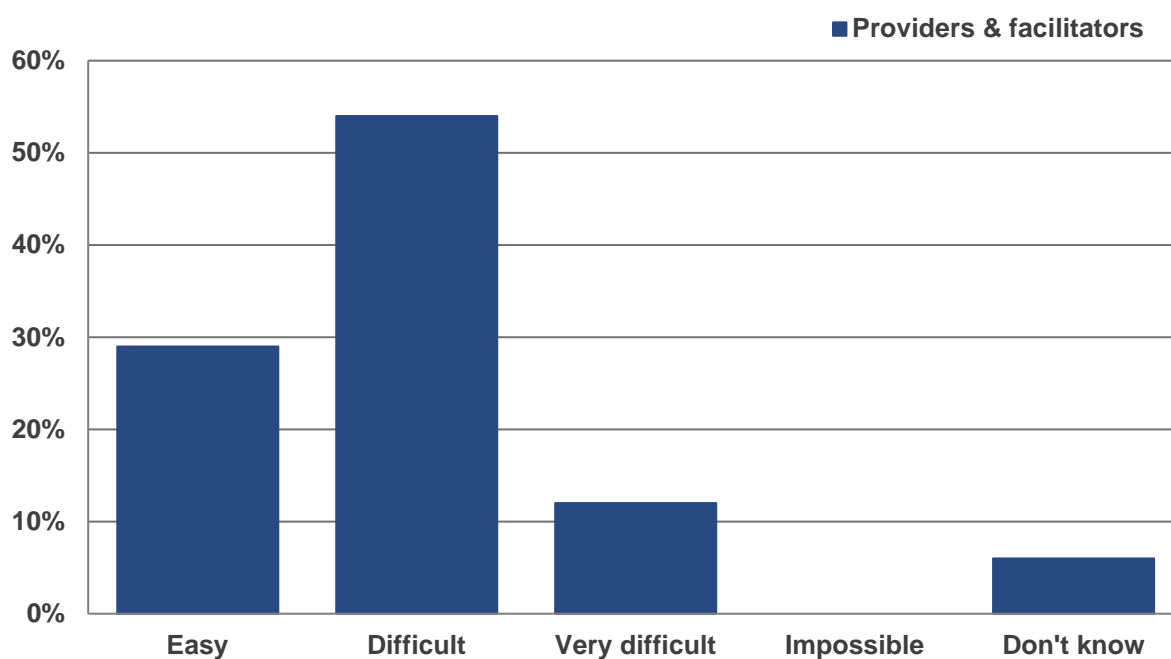
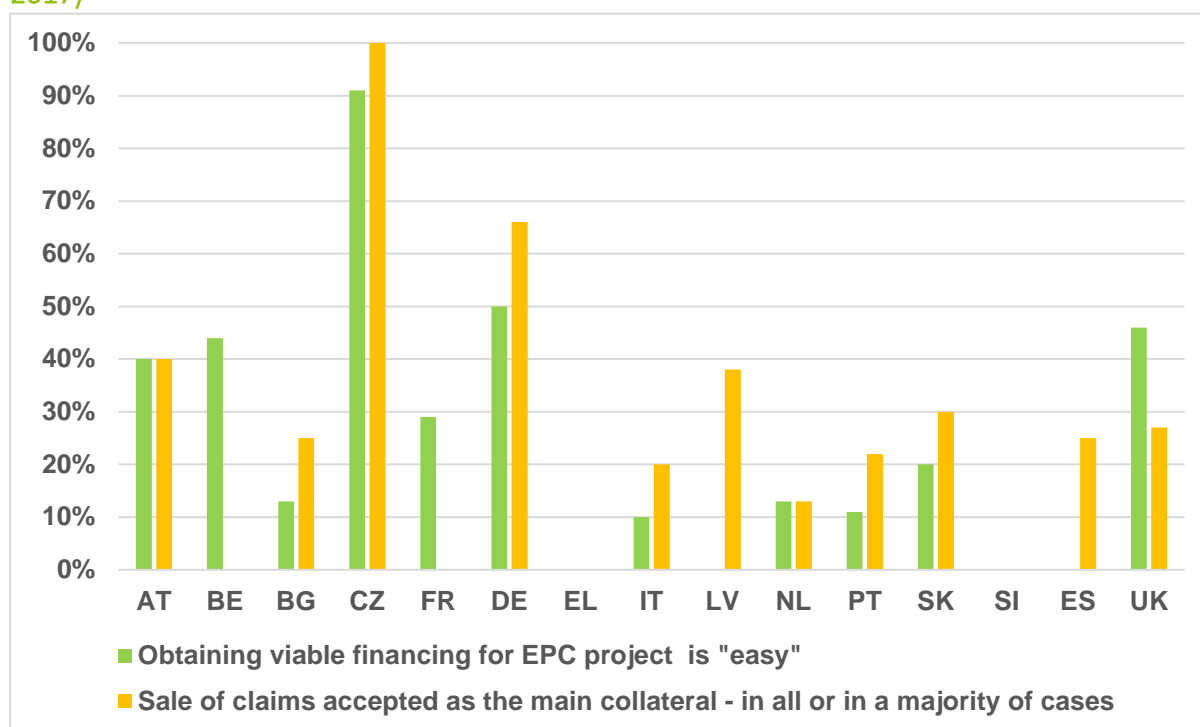


Figure 35 Obtaining viable finance for an EPC project is easy and acceptance of sale of claims in all or in the majority of cases (Percentage share of responses by providers and facilitators Sept 2017)

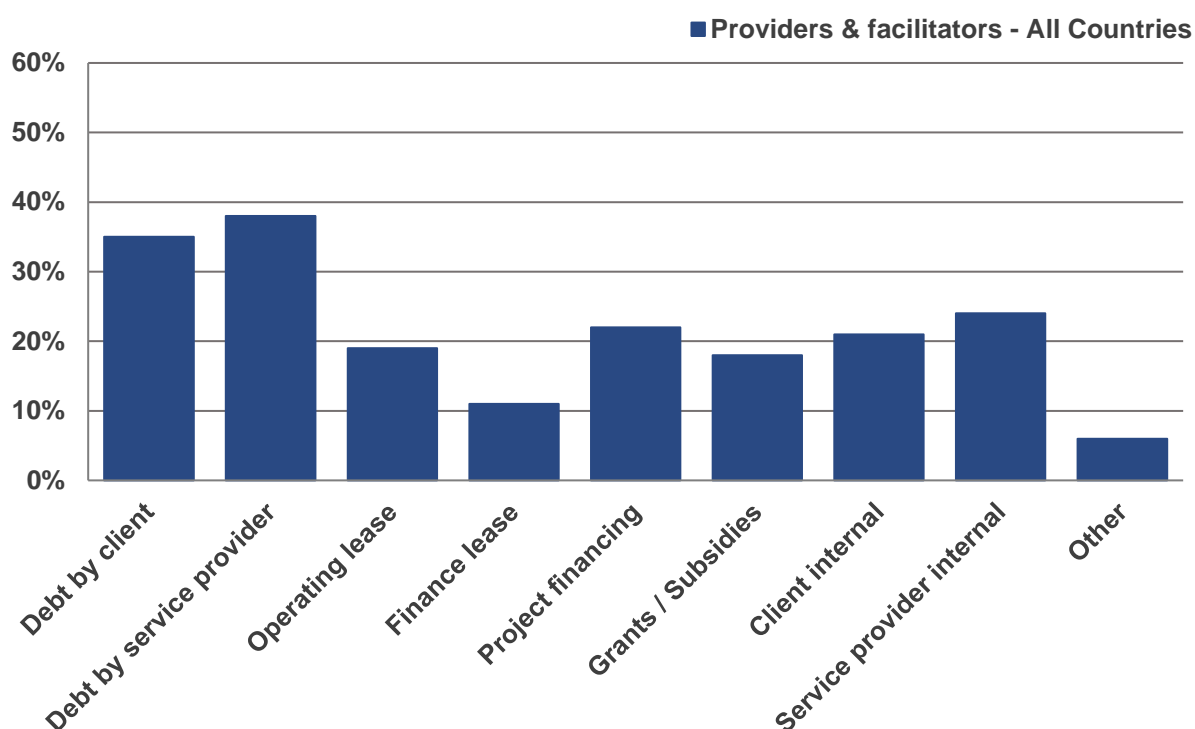


5.2 ESC financing

The survey results indicated that financing for ESC is mainly from debt borrowed by service provider or by client, so a similar balance of funding options is experienced for both ESC and EPC.

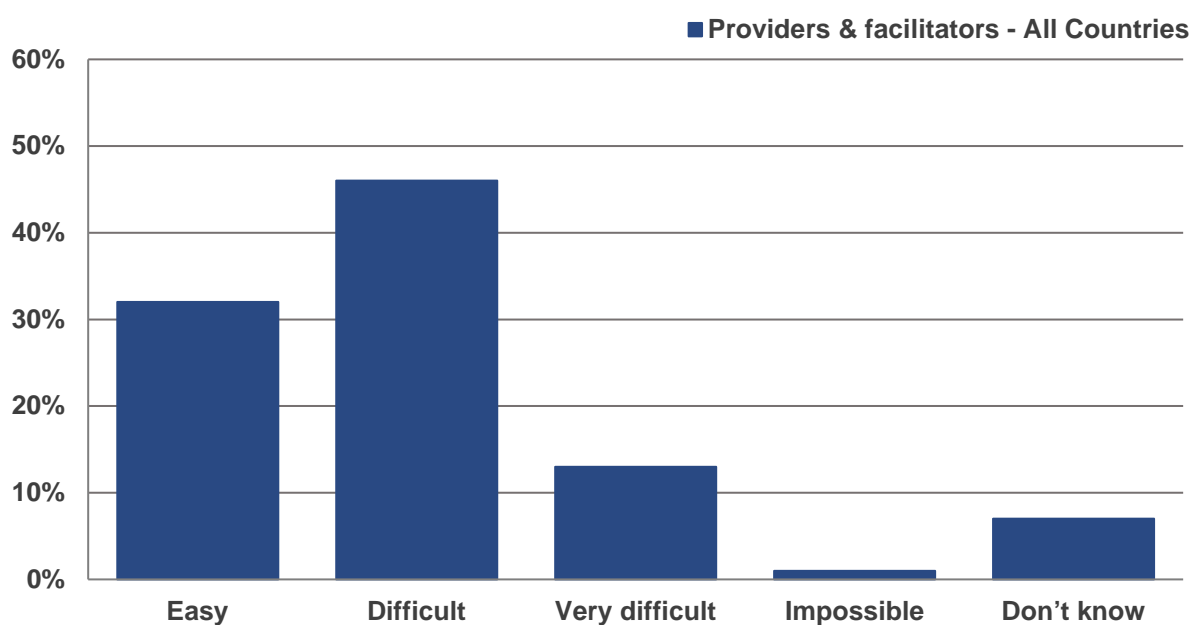
The majority of ESC provider and facilitator respondents indicated that obtaining financing for ESC projects is difficult (46%) or very difficult (13%) (Figure 37). Another 32% of respondents find it easy to obtain financing and the rest did not have an opinion on this matter, indicating limited experience with ESC projects. The results of the survey again signal that financing is an issue for ESC markets across All Countries in the survey.

Figure 36 How are the ESC projects you are involved with financed? (Percentage share of responses by providers and facilitators Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Figure 37 Do you consider that obtaining viable finance for an ESC project is easy? (Percentage share of responses by providers and facilitators Sept 2017)



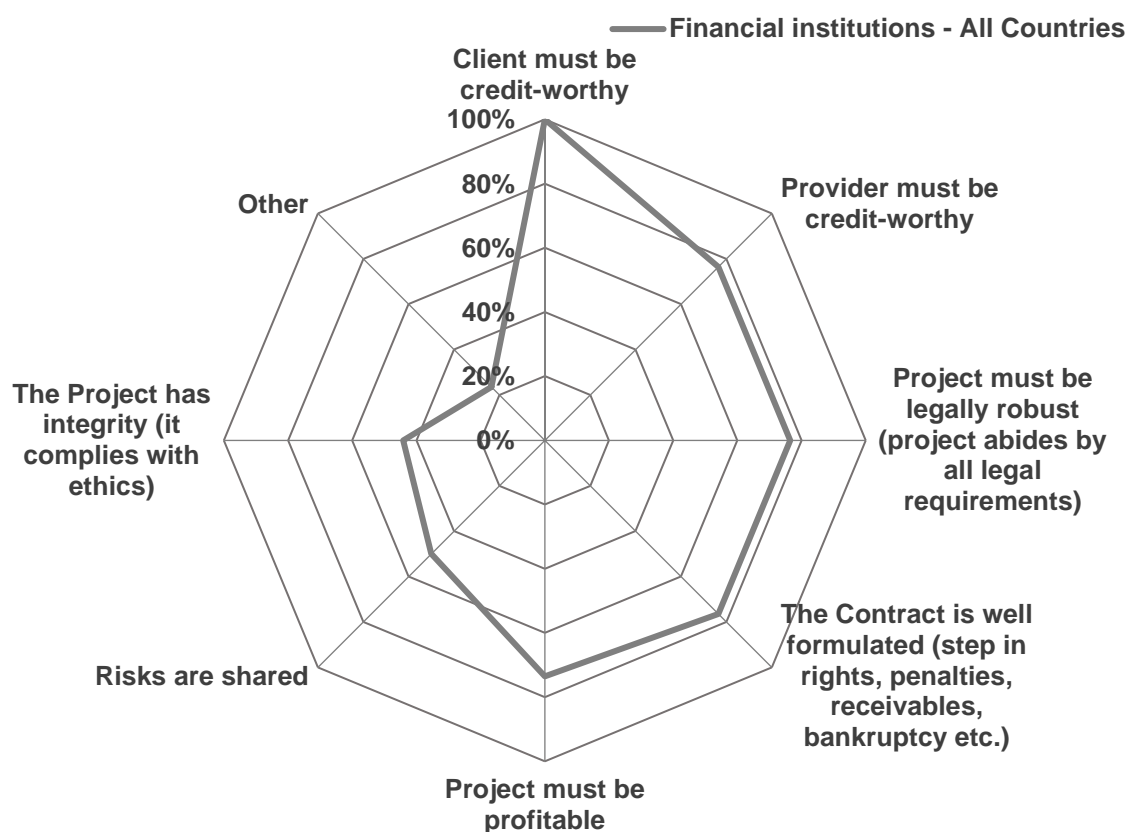
5.3 Minimum financial requirements

In the text below, the opinions of respondents representing financial institutions across All Countries in the survey and at the EU level are presented to provide a picture of financial institutions' minimum requirements when deciding to finance an EPC/ESC project.

Financial institutions interviewed across All Countries in the survey (excl. France and the Netherlands) unanimously agreed as 100% of them stated that **creditworthiness is a key condition to be met for the EPC/ESC project to obtain financing**. Respondents across All Countries in the survey agreed that increasing energy prices were a significant driver of ESC business. This implies energy supply contracts can benefit well from policies internalising external environmental costs into the price of energy (Figure 38). A large majority of financial institutions agreed that the provider must be **creditworthy** (76%), the project must be **legally robust** (abide by all legal requirements) (76%), the **contract needs to be well formulated, including step-in rights, penalties, receivables, bankruptcy, etc.** (76%), and the **project must be profitable** (74%). Sharing of risks and the integrity of the project are the least relevant factors, as only 50% and 44% of respondents respectively stipulated that these conditions need to be met, however, a significant share of respondents think they should be considered.

When interviewers asked whether there are any other important aspects of a good quality project which their institution does not assess before financing, respondents cited the overall information needed by the financial institution received the overall support of all financial institutions across All Countries and institutions at the EU level. Almost all financial institutions from individual countries agree that such an arrangement would improve cooperation between their institution and a client, while only 6% of them are not sure this would cause an improvement (Figure 39). In the case of EU-level institutions, one respondent is not sure and the other one supports such a solution. No response expressed a negative opinion about such a template. good financial health of the project (with an emphasis on cash-flow), well established subcontractors, ecological and social impacts.

Figure 38 When your organisation makes investment decisions, what conditions must be met for the EPC/ESC projects to obtain financing? (Percentage share of responses by representatives of financial institutions Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Figure 39 Do you think it would be useful if you as a financial institution provide a template/ guiding questions so the client is better prepared to provide information tailored to your needs? (Percentage share of responses by representatives of financial institutions Sept 2017)

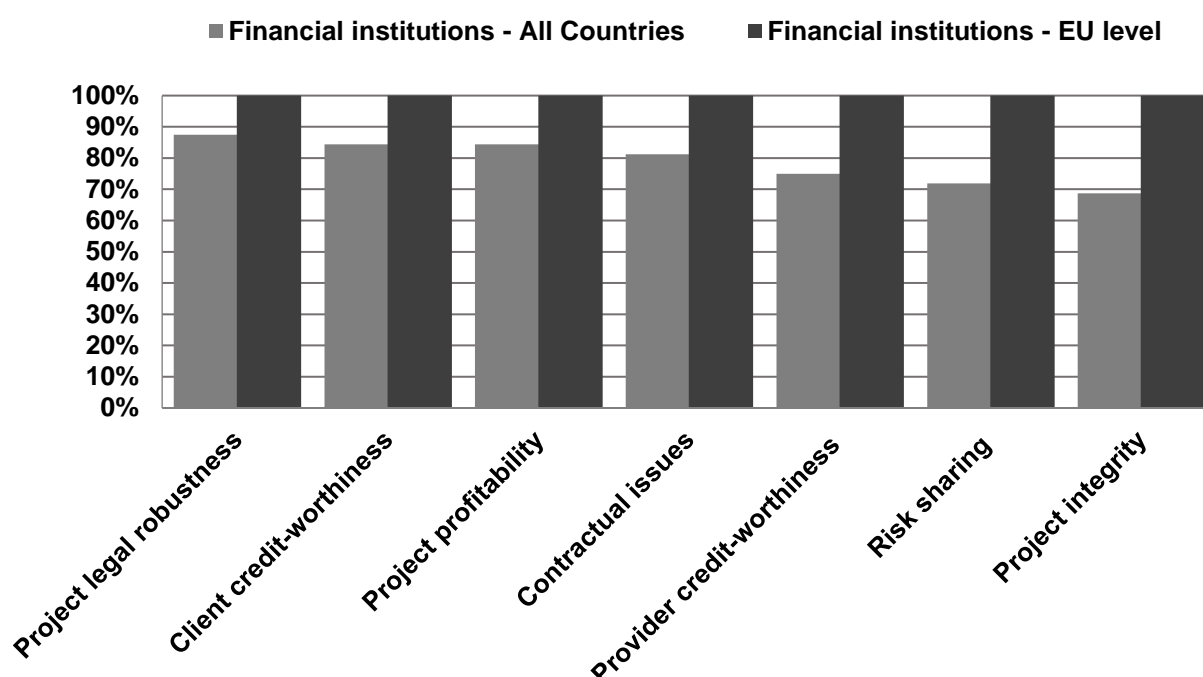


Within the QualitEE project, a **financing guide** will be prepared to establish a common understanding among clients, EES providers and financial institutions about which minimum financial information is relevant to support decisions to finance EES projects. Financial institutions across All Countries strongly supported the inclusion of all the content suggested to them in the QualitEE interview survey. There was especially strong agreement on the chapters concerning the legal robustness of a project (88% of respondents supported the inclusion of this chapter) followed by client creditworthiness and project profitability (both received the support of 84% of respondents from the group of country-based financial institutions). Project integrity attracted the least interest, but the inclusion of this topic was still supported by 69% of respondents. All three respondents representing EU-level financial institutions unanimously agreed that they would wish to see all suggested chapters included in the guide.

A few respondents expressed an opinion that while the credit-worthiness is something easy to evaluate for the financial institutions, the focus of the guide should be on the other issues listed. In addition, the representatives of the financial institutions suggested to include:

- ✔ how to structure an EPC-project and its procedures;
- ✔ compliance with building and environmental codes (permits) ;
- ✔ M&V, protocol for performance measurement and verification of performance (savings);
- ✔ technologies and measures;
- ✔ EPC benefits;
- ✔ good examples of profitable projects;
- ✔ insurance solutions.

Figure 40 Chapters to be included in the financing guide for clients and contractors
(Percentage share of responses by representatives of financial institutions Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

5.4 Financial tools

To make the preparation, implementation and evaluation of the EPC and ESC projects more efficient, several financial tools have been developed across the QualitEE countries. The tools serve a variety of purposes: There are software tools that aid the financial calculations of energy services (e.g. such were part of EPC+ technical toolbox), comprehensive tools for budgeting and building construction calculations, and also a tool for financial quality assurance of energy services.

There are a several financial tools developed within the EU financed projects, such as EPC+, TrustEPCSouth, FRONt project, ESoli project available for use in several QualitEE countries. In addition, there are national financial tools in use as listed in the overview table below.

Table 3: Overview of financial tools

Cou ntry	Name of system	Financial tool produced/ operated by	Scope	Tool applied to	Brief explanation	Status of implemen tation	Imple ment ed
EU	GREPCon service	Designed by Bureau Veritas Iberia (BVI) along with the Trust EPC South project consortium. Operated by BVI	EPC	service	The auditor of the project requests for the project to be registered. Once the project is registered, the auditor executes the GREPCon tool on the project. After that, the auditor requests for a quality control to one of the accredited quality control bodies in his or her country. If the project passes the control, then the quality control body notifies to Bureau Veritas that the project has fulfilled the quality criteria, so that Bureau Veritas certifies the use of the GREPCon. The auditor then issues a final report with the quality seal stamped on it.	Under developm ent	2018
EU	EPC+ technical toolbox	EPC+ project	EPC (in buildings)	service	For a number of technical measures in buildings (indoor lighting, HVAC, biomass boilers, etc.) technical tools have been developed. They include guidance and Excel spreadsheets for the technical and financial calculations and other aspects of the implementation of the measure through an EPC. Available in the following languages: EN, BG, CZ, DE, ES, GR, PT, SI	Implemen ted	2017
EU	RHC Cost Estimation Tool	FROnT project	Renewabl e Heating and Cooling	project	The overall objective of the tool is to assess the competitiveness of renewable energy technologies (biomass, solar thermal, air-source heat pump and ground-source heat pump) against traditional fossil fuels. Available in the following languages: EN, DE, PO, PT, ES, NL The tool is aimed, mainly, at residential consumers. The guidance and default values included in it are targeted to ease the completion of the forms by non-expert users.	Implemen ted	2016
BG	Guidance for Innovative Financial Schemes for Street Lighting	ESOLI project	EPC, ESC	service	The guidance provides a wide variety of financing schemes and sources, with an emphasis on EPC and ESC, and assists in the identification of the most appropriate one. It specifies the procedures and responsibilities in EPC and ESC projects, barriers, and possible solutions. It includes good practice examples.		2012
CZ	KROS calculation tool	ÚRS PRAHA	buildings	service	Comprehensive tool for budgeting, building construction calculations and building order tracking. As the only building software in the Czech Republic, it contains a complete form of the ÚRS Pricing System and is able to work with any other database of prices of construction work, products and materials. The program is designed for construction companies, investors, designers, budgets and other participants in building management	Implemen ted	1990s

Cou ntry	Name of system	Financial tool produced/ operated by	Scope	Tool applied to	Brief explanation	Status of implemen tation	Imple ment ed
IT	Private Finance for Energy Efficiency (PF4EE) instrument	Adelphi (EIB, European Commission, Adelphi, MACS)	Energy Efficiency services	Service	PF4EE offers preferential loans for private economic entities who want to invest in energy saving projects.	Implemen ted	2017
LV	ALTUM	ALTUM Governmental institution	EPC/Buildings	ES provider/ Clients (building owners)	Calculation of the cash flow for energy efficiency projects in buildings. Sets requirements of project overall profitability (IRR and NPV). Project grant and loan calculation tool. The ALTUM is a state-owned development finance institution, which offers state aid for various target groups with the help of financial tools.	Implemen ted	2016
LV	LABEEF	LABEEF - Private entity	EPC	EPC provider/ Clients (building owners)	This tool helps ESCO providers and building owners to predict the value of payments after deep renovation of a building. LABEEF purchases contracts from ESCO's once the building renovation have been completed and energy savings proven according to the LABEEF contracts and guidelines. The Latvian Baltic Energy Efficiency Facility (LABEEF) is a facility to repurchase the long-term investments necessary for multifamily building renovation these contracts are embedded in the guidelines for each type of EPC to further reduce risk and transaction costs.	Implemen ted / periodicall y updated	2016
SI	Guidance (no software) about the financial calculations	Ministry of Infrastructure (Ministry of Finance)	EPC/Public buildings	Project	Guidance for investors on deep energy renovation projects in buildings financed in the framework of the cohesion programme, including financial and economic evaluation in line with the Regulation on a uniform methodology for the preparation and treatment of investment documents in the field of public finance (Official Gazette of the RS, No. 60/06, 54/10 and 27/16), Regulation (EU) No 1303/2013, Commission Delegated Regulation (EU) No 480/2014, Commission Implementing Regulation (EU) 2015/207 and Guide to Cost-Benefit Analysis of Investment Projects – Economical appraisal tool for Cohesion Policy 2014-2020.	Implemen ted	2016
SK	CENKROS 4	KROS, a.s.	buildings	service	Comprehensive tool for budgeting, building construction calculations and building order tracking. The program is designed for construction companies, investors, designers, budgets and other participants in building management.	Implemen ted	1995

Cou ntry	Name of system	Financial tool produced/ operated by	Scope	Tool applied to	Brief explanation	Status of implemen tation	Imple ment ed
UK	Salix Energy Efficiency Loans Scheme	Salix Finance	EPC, ESC, ES, general EE	project	Salix Finance have been offering interest free matched finance for recycling energy efficiency funds (recycling means that financial savings go back into the fund for further projects) and individual project loans to public sector organisations since 2004. Salix is funded by the Department for Business, Energy and Industrial Strategy, the Department for Education, the Welsh Government and the Scottish Government. It assesses energy efficiency projects in terms of payback and cost / lifetime CO2 savings metrics. They hold a technology list of over 100 energy efficiency technology types (i.e. LED lighting, condensing boilers etc.) that have been assessed to deliver proven results. Each technology is also assessed for its savings persistence (i.e. how many years it will continue to be effective) to allow calculation of lifetime CO2 savings. Salix has committed £652million to energy efficiency projects at the time of writing which indicates that it has been well received.	Implemen ted	2004

6 EU LEGISLATIVE AND REGULATIVE FRAMEWORK

At an EU level, there are legislative acts and initiatives to increase demand for energy efficiency and EES. The main directives that influence EES markets are the **Directive on energy efficiency (EED)** and **Energy Performance of Buildings Directive (EPBD)**.

6.1 Energy Efficiency Directive

Directive 2012/27/EU on energy efficiency (EED) establishes a common framework of measures for the promotion of energy efficiency within the EU in order to ensure the achievement of the Union's 2020 20 % headline target on energy efficiency. It lays down rules designed to remove market barriers and overcome market failures that impede efficiency in the supply and use of energy. It provides for the establishment of indicative national energy efficiency targets for 2020. It requires application of mandatory energy-saving measures, including renovating public buildings, energy-saving schemes for utilities, and energy audits for all large firms.

6.1.1 EED definitions

The Energy Efficiency Directive (approved in 2012) provides definitions of energy services, energy performance contracting and energy service providers. It repeals the Energy Services Directive (2006/32/EC) and amends definitions this directive had provided.

Annex XIII of EED clearly requires guaranteed energy savings to be part of the compulsory items of the EPC model contract for public bodies (see more in part 2.2.2). Since the definition of EPC has been transformed in the legislative systems of the most of Member States (Kiss et al. 2017), it has contributed to common understanding of EPC among European experts.

However, not all member states have the older version of EPC definition from Energy Services Directive in their legal system. More importantly, still there are member states, where energy service providers present their projects as EPC, though it does not comply with the EED definition. For example, such projects include energy efficiency improvement measures that are not "verified and monitored during the whole term of term of contract" or investments in that measure are not "paid for in relation to a contractually agreed level of energy efficiency improvement".

Article 18 of the EED also requires EU Member States to encourage development of quality labels, which would provide an important step to providing clarity about what can be regarded as a good quality EPC project.

6.1.2 Article 18 of the EED to support energy services market

Apart from the above, the EED imposes obligations on Member States **to support the energy services market** in Article 18, according to which, Member States shall promote the energy services market and access for SMEs to this market via the following actions:

- ✔ disseminating information on available energy service contracts and clauses that should be included in such contracts to guarantee energy savings and final customers' rights and financial instruments, incentives, grants and loans to support energy efficiency service projects;
- ✔ encouraging the development of quality labels,
- ✔ making publicly available a list of available energy service providers which are qualified and/or certified, along with detail about their qualifications and/or certifications;
- ✔ providing public bodies with model contracts for energy performance contracting which include at least the items listed in Annex XIII of the EED;
- ✔ providing information on EPC best practices;
- ✔ providing a qualitative review (as part of the National Energy Efficiency Action Plan) regarding the current and future development of the energy services market.

In addition, Member States shall support the energy services market, where appropriate, by:

- ✔ publicising information contact points for final customers;
- ✔ taking measures to remove the regulatory and non-regulatory barriers that impede the uptake of EPC and other energy efficiency service models;
- ✔ enabling independent market intermediaries to play a role in stimulating market development.



Article 18 of the EED also outlines that Member States are required to ensure that energy distributors, distribution system operators and retail energy sales companies refrain from any activities impeding the demand for and delivery of energy services.

6.1.3 EED requirements to support energy efficiency

There are other articles of the EED, which can indirectly provide support to the development of EES markets. Bertoldi and Kiss (2016) summarise potential role of these articles as follows:

- ✔ Article 5, which calls for renovation of 3% of the national central government building stocks, can promote the use of energy services in the public sector.
- ✔ Article 7 enables additional actors such as energy service companies to contribute towards meeting the end-use target imposed on the energy companies.
- ✔ Article 8 imposes mandatory energy audits for large companies, which increases demand for energy consultancy, a key segment of the energy services market. Audits

may increase awareness about energy saving opportunities and thus increase a demand for energy services, while also reducing transaction costs.

-  Article 19 calls for member states to evaluate and, if necessary, take appropriate measures to remove regulatory and non-regulatory barriers to energy efficiency. This relates particularly EPC in the public sector in regard of public purchasing, annual budgeting and accounting.
-  Article 20 on the establishment of a National Energy Efficiency Fund, which may also include dedicated streams of financing to support the uptake of energy services projects.

6.2 Energy Performance of Buildings Directive

The **Energy Performance of Buildings Directive 2010/31/EU (EPBD)** is the key policy instrument promoting the improvement of the energy performance of buildings. The EPBD requires Member States to ensure compliance with several obligations including the energy performance certification of buildings; inspection of heating and air conditioning systems; energy performance requirements set for new buildings and existing buildings (or their components) that undergo a major renovation. As it is often efficient for the responsible parties to use the services of EES providers to comply with the above listed requirements, the EPBD is effectively supporting rising demand on the EES markets.

In July 2018, the revised provisions to the EPBD by Directive (2018/844/EU) have entered into force, which aim to accelerate the cost-effective renovation of existing buildings, with the vision of a decarbonised building stock by 2050 and the mobilisation of investments. New provisions to enhance smart technologies and technical building system (including automation) have been also introduced. Member States are required to transpose the new provisions into national law by March 2020.

6.3 Procurement legislation

For public organisations, the EES provider needs to be selected in accordance with the procurement requirements of the national legislation consistent with EU public procurement law. For EES projects two key directives are relevant: Directive 2014/25/EU on procurement by entities operating in the water, energy, transport and postal services sectors and Directive 2014/24/EU on public procurement.

Based on experience, it is recommended that the EES procurement is implemented using a procedure where negotiation between contracting authority and tenderers is allowed. To organise a procurement process for EPC or ESC only two procedures defined under Directive 2014/25/EU can be considered:

-  a negotiated procedure with prior call for competition (NPPC) and

 a competitive dialogue (CD).

EPC and ESC are typically characterised by the fact that various technical solutions can be proposed to meet the stipulated requirements (as permitted in an NPPC), or even different approaches to elements of the project which the contracting authority has not already defined at the time of the award (as permitted in a CD).

When preparing complex projects in the area of energy efficiency services (EES projects), in particular EPC projects, NPPC has proven to be effective. A NPPC permits the required degree of flexibility, while at the same time being less organisationally demanding than a CD. While a CD may be applied to EES projects, it is necessary to anticipate higher organisational demands and higher management costs on the part of both the client and the supplier compared to an NPPC. This pays off especially in larger projects, in particular for ESC. Another disadvantage of a CD is the lower standardisation of processes, especially when comparing bids, and therefore there is greater room for error in the results of the proceedings and greater chance of legal disputes.

The basic legislative framework for the procurement of energy services is set by Directive 2014/24/EU on public procurement. Member States were required to implement the directives into national law by 2016. Therefore, when preparing a specific project it is necessary to pay attention to the valid national public procurement rules.

6.4 EU framework for certification of products and services

In the area of product certification, an **accreditation body** accredits certification bodies who **certify the quality of a product**. The word “product” is used in its widest sense also including processes and services. The certification of such a product is a means of providing assurance that the product in question conforms to standards and/or other normative documents. Certification bodies providing product certification issue product certificates or licences to organisations.

In the EU, requirements for accreditation are set in **Regulation 765/2008** of the European Parliament and of the Council of 9 July 2008 laying down the **requirements for accreditation and supervision over the market concerning the marketing of products**. The regulation promotes a uniformly rigorous approach to accreditation across EU countries. EU Member States shall not maintain more than one national accreditation body (NAB) and shall ensure that it is organised in such a way as to safeguard the objectivity and impartiality of its activities.

The **national accreditation bodies in each country** develop an accreditation system, in compliance with international requirements and rules established by EC and European association European Cooperation for Accreditation (EA). The national accreditation systems – i.e. the set of processes, procedures and rules for obtaining accreditation from the relevant authoritative body – is mainly regulated by Regulation (EC) No. 765/2008 and by the national legislation.

The national accreditation body will grant accreditation after the subject demonstrates - by means of a conformity assessment under the conditions set by law - that **the accreditation requirements for the accreditation that it is applying for have been met**. The accreditation requirements must be met for the duration of the validity of the granted accreditation.

The document proving that accreditation was granted is the **accreditation certificate**, which is used to demonstrate the professional competence and impartiality of subjects providing conformity assessment services.

7 STANDARDS AND PROTOCOLS

One way to generate greater trust in the ESCO industry, and thereby increase client demand, is quality improvement by standardisation of EES and EES providers. Existing standards and protocols can be used to design requirements of the quality assurance systems.

A standard is a document that sets out requirements for a specific item, material, component, system or service, or describes in detail a particular method or procedure.

7.1 European Standards

7.1.1 European Standardisation Organisations

European Standards (ENs) are documents that have been ratified by one of the three European Standardisation Organisations (ESOs), out of which two - **The European Committee for Standardization (CEN)** and **European Committee for Electrotechnical Standardization (CENELEC)** - are relevant for energy efficiency. ESOs are officially recognised by the European Union (EU Regulation 1025/2012) as responsible for developing and defining standards at a European level.

The Members of CEN and CENELEC are, respectively, the National Standardisation Organisations and National Committees of 33 European countries including all of the EU member states.

CEN and CENELEC and their respective Members work with various stakeholders – including industry, SMEs, consumers and other societal stakeholders, public sector bodies, academics and researchers – to develop voluntary European Standards (ENs) and other standardisation deliverables.

CEN works in partnership with the International Organization for Standardization (ISO) and CENELEC collaborates with the International Electrotechnical Commission (IEC), in order to coordinate their respective standardisation activities and enable the alignment of European and international standards.

All European Standards that have been adopted by CEN and CENELEC are published and distributed by the National Members of CEN and the National Members of CENELEC. After the publication of a European Standard, each national standards body or committee is obliged to withdraw any national standard which conflicts with the new European Standard. Hence, one European Standard becomes the national standard in all the 34 member countries of CEN and/or CENELEC.

In the last decade, there has been an increase in legislative, standardisation and other initiatives in relation to energy efficiency and energy management.





CEN and CENELEC created an advisory and strategic body in 2006, the **CEN/CENELEC Sector Forum Energy Management (SFEM)**, in order to foster exchange of information between experts, investigate standardisation needs related to EU energy legislation, policy targets and market developments and to provide to regulators and market players with the necessary standards.

7.1.2 Energy Management Systems

European Standard EN ISO 50001:2011 **Energy management systems - Requirements with guidance for use** was adopted to enable organisations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption. It specifies energy management system (EnMS) requirements, upon which an organisation can develop and implement an energy policy, and establish objectives, targets, and action plans which take into account legal requirements and information related to significant energy use.

This standard is applicable to all types and sizes of organisations. Successful implementation depends on commitment from all levels and functions of the organisation, and especially from top management.

The standard uses the ubiquitous Plan, Do, Check, Act process of continual improvement, common to all modern management systems standards. In the context of energy management, the PDCA approach can be outlined as follows:

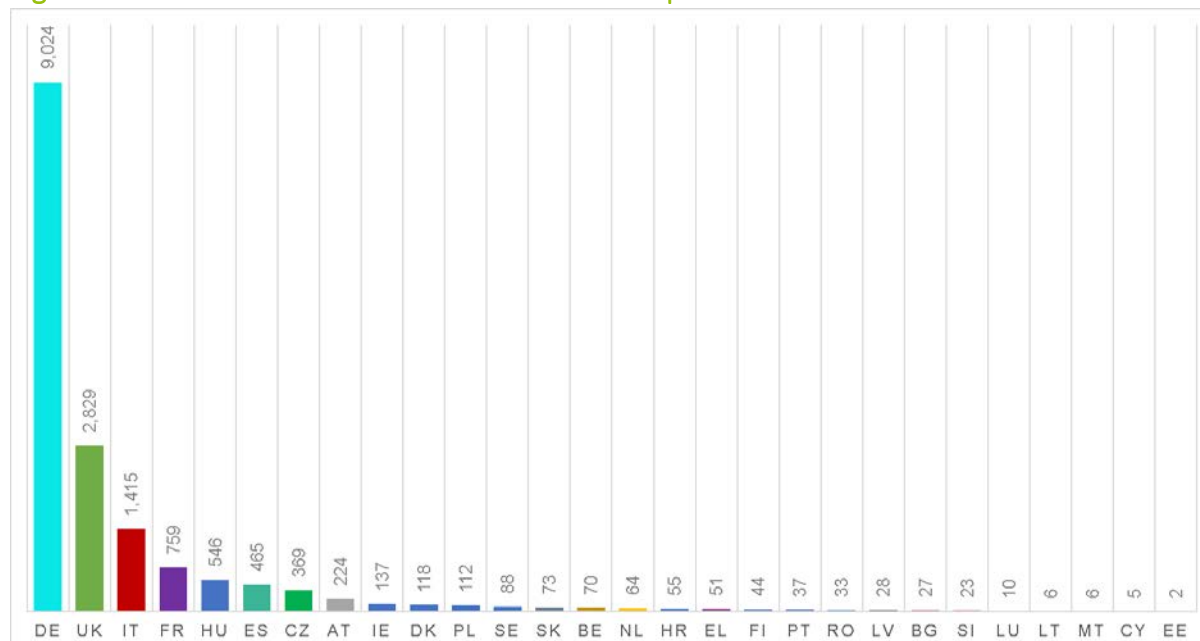
-  Plan: conduct an energy review and establish the baseline, energy performance indicators (EnPIs), objectives, targets and action plans necessary to deliver results that will improve energy performance in accordance with the organisation's energy policy;
-  Do: implement the energy management action plans;
-  Check: monitor and measure processes and the key characteristics of operations that determine energy performance against the energy policy and objectives, and report the results;
-  Act: take actions to continually improve energy performance and the EnMS.

The ISO Survey of Management System Standard Certifications (ISO 2018) showed a rapid growth in number of valid certificates for ISO 50001 for energy management from 364 in 2011 to 2016 to 17,102 across Europe. In 2016 the number grew by 59%. The strong growth seen for this standard is likely to be related to the fact that they are relatively new to the market (ISO 2018).

The final report on the activity of the SFEM Working Group relating to communication on EN ISO 50001 (2014) stated - based on a questionnaire survey - that **energy efficiency itself (alone) is not yet the driving force for the implementation of an EnMS as national policy incentives are the main drivers for companies to get EN ISO 50001 certified**. The incentives have different

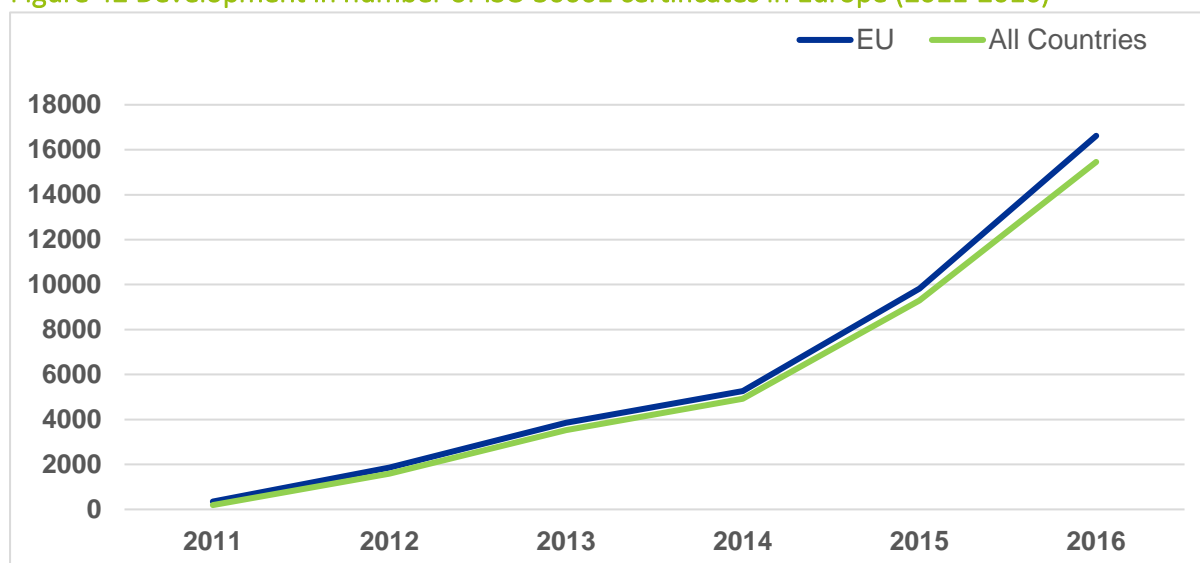
forms: in most cases a tax rebate (often fossil energy related taxes e.g. excise or CO₂ taxes) is adopted; another form is a “bonus” given to energy certificates when obtained through an EN ISO 50001 certificate or any EnMS. Incentives are granted especially to energy intensive industries to understand and manage their “energy use and consumption” and measure the energy performance improvement. The link between national regulations defining the incentives scheme and EnMS implementation is strong, while there is seldom an explicit request to apply EN ISO 50001.

Figure 41 Overview of ISO 50001 certificates in Europe



Source of data: ISO (2018)

Figure 42 Development in number of ISO 50001 certificates in Europe (2011-2016)



Source of data: ISO (2018)

7.1.3 Energy Audits

In 2015 CEN and CENELEC published a series of **European Standards that set out requirements and provide guidance on how to carry out energy audits**, intended to help companies throughout Europe compliant with the EED requirements. According to Article 8 of EED, each Member State should ensure that large companies undergo energy audits carried out by qualified and/or accredited experts or implemented and supervised by independent authorities. Every large company (with more than 250 employees) should have undergone an energy audit by 2015 and then should repeat it at least once every four years. Furthermore, Member States must develop programmes to encourage smaller companies (SMEs) to undergo energy audits and implement the recommendations from these audits.

The **European Standards of the EN 16247 series** were developed by a Joint Working Group of CEN and CENELEC in accordance with an official standardisation request (M/479) from the European Commission. The first standard from the series - **EN 16247-1 Energy audits**, specifying the general requirements, common methodology and deliverables for energy audits was adopted by CEN and CENELEC in 2012. Three further standards, addressing the specific requirements, methodology and deliverables of energy audits in relation to buildings (EN 16247-2), processes (EN 16247-3) and transport (EN 16247-4), were adopted in 2014. The fifth standard in the series (EN 16247-5), which relates to the competences of energy auditors and will support the development of national qualification schemes for energy auditors, was approved in 2015.

Another way that companies can reduce their energy consumption and comply with the EED requirements is by implementing an **Energy Management System** (in line with the European/International Standard EN ISO 50001:2011) or an **Environmental Management System** (in line with the European/International Standard EN ISO 14001:2004).

7.1.4 Energy Efficiency Services

The European standard **EN 15900:2010 defines energy efficiency services** as an agreed task or tasks designed to lead to an energy efficiency improvement and other agreed performance criteria. According to EN 15900:2010, EES shall include an energy audit (identification and selection of actions) as well as the implementation of actions and the measurement and verification of energy savings. A documented description of the proposed or agreed framework for the actions and the follow-up procedure shall also be provided. The improvement of energy efficiency shall be measured and verified over a contractually defined period of time through contractually agreed methods. (see also part 2.2.1).

7.1.5 Energy Efficiency and Savings Calculation

EN 16212 Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods provides a general approach for energy efficiency and energy savings calculations with top-down and bottom-up methods. It is applicable for energy savings in buildings, appliances, industrial processes, etc. It deals with savings on energy supplied to end-users and covers energy consumption in all end-use sectors. The standard is meant to be used for ex-post evaluations of realised savings as well as ex-ante evaluations of expected savings.

7.1.6 Environmental Management

The ISO 14000 family of standards provides practical tools for companies and organisations of all kinds looking to manage their environmental responsibilities. **EN ISO 14001:2015 Environmental management systems -- Requirements with guidance for use** defines criteria for an environmental management system. It does not state requirements for environmental performance but rather maps out a framework that a company or organisation can follow to set up an effective environmental management system. It can be used by any organisation that wants to improve resource efficiency, reduce waste, and reduce costs.

7.2 Model documents

Most of the All Countries have an **EPC model contract** published, as required by the EED (see the table below). Model contracts must reflect the obligatory minimum items of the EPC contract applied in the public sector listed in Annex XIII of the EED.

The model contracts have typically been created primarily for the purposes of public sector contracting authorities looking to procure EPCs. However, such contracts are also used for private clients. Model contracts have to be updated each couple of years to reflect development in the EU (EED and procurement directives) and national legislation.



In 2018, an EPC model contract is available in all QualitEE countries, with exception of Bulgaria. In developed markets (CZ, DE) the model contracts often reflect long experience and knowledge gained over years on the markets and is widely used. In some emerging countries, the model contract was developed by the government or by international organisation or project, and is not widely rooted in the market, thus may be used less frequently. One example is Latvia, where the model contract was developed by the EBRD, but the local providers have been using their own contracts. Recently however, EU funded projects (projects Accelerate SunShine and SunShine) in Latvia have established new model contracts tailored to the national market, which are expected to have better market penetration.

Table 4 Overview of EPC model contracts developed

Country	EPC model contract	Prepared/published by
AT	✓	OEGUT
BE	✓	Fedesco
BG	-	-
CZ	✓	Ministry of Industry and Trade in co-operation with the Association of energy service providers (APES)
DE	✓	dena; Vfw
FR	✓	Ministry of Ecology
ES	✓	Public bodies: IDAE in cooperation with the Spanish Federation of Municipalities and Provinces (FEMP)
EL	✓	The Ministry of the Environment and Climate Change
IT	✓	For public bodies: ENEA
LV	✓	Sunshine and Accelerated Sunshine projects; EBRD (not in use)
NL	✓	The Netherlands Enterprise Agency
PT	✓	Administrative Rule no. 60/2013 by Ministry of Finance and Economy and Employment
SI	✓	the Ministry of Infrastructure - PBER PIU
SK	✓	Association of energy service providers (APES-SK)
UK	✓	The former Government Department of Energy & Climate Change (based on the contract developed for the RE:FIT programme)




Source: QualitEE Country reports on the energy efficiency services market and quality (2018), Fourth National Energy Efficiency Action Plan for the Netherlands (2017)

With respect to **energy supply contracting**, very few countries have model contracts in use:

-  In Austria, on behalf of Ministry for Sustainability and Tourism (BMNT), the Austrian Society for Environment and Technology (OEGUT) has drawn up model contracts for ESC (as well as for EPC), which can be used by both public and private clients.
-  The Netherlands Enterprise Agency website distributes information to promote the market for energy services and access for small and medium-sized enterprises to this market. (Fourth National Energy Efficiency Action Plan for the Netherlands 2017) This information includes a template for an ESC contract as well as general EPC contract and a manual how to add performance related clauses to it.

7.3 National initiatives to provide guidance on the preparation and implementation of EPC projects

In almost all QualitEE partner countries some kind of guiding documents for EES have been developed, mostly within the international projects co-financed by the EU funds. However, some of the partner countries also have guiding documents for EES implementation prepared based on national initiatives:

-  In the Czech Republic a number of guiding documents have been published by the Ministry of Industry and Trade⁵, in particular an EPC guide for public contracting authorities that focusses on the process of preparing a public procurement procedure for EPC. In addition, the association of energy service providers (APES) has published a number of guides on EPC project implementation on its website⁶, e.g. on EPC accounting rules and financing in the public sector and methodology for EPC projects in public lighting (SEVEN 2018).
-  The Netherlands Enterprise Agency RVO has published a guidance document for procuring EPC contracts (Leidraad Aanbesteden, Energieprestatiecontracten) for public sector (Factor4 2018).
-  In Slovenia, the Ministry of Infrastructure (PBER PIU) has prepared a number of EPC/EES model documents and project implementation guidelines, such as instructions and technical guidelines for energy renovation of public buildings. (JSI 2018)

7.4 International initiatives to provide guidance on the preparation and implementation of EPC projects

As a result of several EU financed Intelligent Energy Europe and Horizon2020 projects a number of guiding documents and tools have been developed and published. The difference is usually that the documents are prepared by an experienced partner of the EU project and then the documents are adapted to the national markets, so they are not always taken up by the national market actors. Among others, the following tools have been developed:

-  The Transparence project⁷ (2013-2015) developed the European Code of Conduct for EPC in discussion with market actors in 20 EU countries.
-  The EESI 2020 project⁸ (2013-2015) updated essential EPC documents in all partner countries including model contracts and developed an EPC facilitator guideline.

⁵ <https://www.mpo.cz/cz/energetika/energeticka-ucinnost/energeticke-sluzby/energeticke-sluzby-se-zarukou---energy-performance-contracting-epc--105425/>

⁶ <http://www.apes.cz/stazeno.php>

⁷ <http://transparence.eu/>

⁸ <https://ec.europa.eu/energy/intelligent/projects/en/projects/eesi-2020>

- ✔ The EPC+ project⁹ (2015-2018) prepared model documents and organisational tools for EES implemented by SME Partnerships for Innovative Energy Services (an organised cluster of independent companies)
- ✔ The Trust EPC South project¹⁰ (2015-2018) has developed the GREPCon service, which includes a technical and financial assessment and provides a standardised and independently verified approach to the identification and quantification of energy saving measures in tertiary sector buildings. The correct use of the service will be certified by Bureau Veritas, which establishes if the project is viable.
- ✔ The EESI project¹¹ (2009-2012) developed guidelines for implementing EES projects, guidelines for deep renovation of buildings through energy-saving contracting, financing models for energy services, regulations for the proof of energy savings and regulations for the procurement process for contracting projects.
- ✔ The Permanent project¹² (2009-2011) translated and adapted the Efficiency Valuation Organization's (EVO) Protocols IPMVP (International Performance Measurement and Verification Protocol) and IEEFP (International Energy Efficiency Financing Protocol) to European and national circumstances in five European countries.
- ✔ The ChangeBest project¹³ (2009-2012) aimed to support energy companies, ESCOs and other interested market actors in developing and introducing new EES for private households and business clients. The support was based on thorough country analyses, experience exchange, general strategy concepts and bilateral dialogues with individual companies on their business plans and product developments.
- ✔ The Eurocontract project (2007)¹⁴ elaborated EPC model contracts and manual on quality assurance instruments for EPC.

Further tools are being developed within current projects financed by Horizon2020 programme:

- ✔ The GuarantEE¹⁵ EPC contract variants that provide enhanced flexibility are being developed with a special focus on private sector building owners.
- ✔ The Investor Confidence Project Europe¹⁶ (ICP Europe) offers a standard documentation process for energy efficiency projects that is independently quality assured and awarded "Investor Ready Energy Efficiency" certification.
- ✔ The Sunshine and Accelerate Sunshine¹⁷ projects have developed standardised EPC contract forms for residential and public buildings in Latvia. Currently, templates for

⁹ <http://epcplus.org/>

¹⁰ <http://www.trustepc.eu>

¹¹ <https://ec.europa.eu/energy/intelligent/projects/en/projects/eesi>

¹² <https://ec.europa.eu/energy/intelligent/projects/en/projects/permanent>

¹³ <http://www.changebest.eu>

¹⁴ <https://ec.europa.eu/energy/intelligent/projects/en/projects/eurocontract>

¹⁵ <https://guarantee-project.eu>

¹⁶ <http://europe.eepperformance.org/icpeu-deliverables.html>

¹⁷ <http://www.sharex.lv/lv>

tender documentations, M&V of energy savings are being developed and tested. Supporting documents like project implementation manuals for public sector buildings and for residential sector buildings will also be developed.

7.4.1 European Code of Conduct for EPC

The European Code of Conduct for EPC (2014) defines the basic values and principles that are considered fundamental for the successful preparation and implementation of EPC projects.

The European Code of Conduct for EPC defines that the EPC provider assumes the **contractually agreed performance risks of the project** throughout the duration of the EPC contract. These include the risks of not achieving contractually agreed savings as well as design risks, implementation risks and risks related to the operation of installed measures. If an EPC project fails to achieve performance specified in the contract, the EPC provider is contractually obliged to compensate savings shortfalls that occurred over the life of the contract. It also defines that any excess savings should be shared in a fair manner according to the methodology defined in the contract.

The Code of Conduct was developed within the Intelligent Energy Europe project Transparence in cooperation with EPC providers, clients and European associations of EES providers, among others. The two organisations representing EES providers at the European level – the European Association of Energy Service Companies (eu.esco) and the European Federation of Intelligent Energy Efficiency Services (EFIEES) – endorse the European Code of Conduct for EPC and support its use when implementing EPC projects and continue in administering and maintaining the Code of Conduct. By the end of June 2018, the Code of Conduct had 236 signatories across Europe. This includes 150 EPC providers, 13 national associations (with 160 members in total), two European associations and 70 facilitators and other signatories. The national administrators of the Code are the national associations of ESCOs, governmental institutions and agencies.

The list of Code signatories is available online and promoted within eu.esco and EFIEES activities (press releases, articles, national and international events). EPC providers who become signatories of the EPC Code undertake to conduct EPC projects in compliance with the Code. It is a voluntary commitment of the EPC providers and is not legally binding.

The European co-administrators of the Code – EFIEES and eu.ESCO - organise regular conference calls with national administrators to exchange information about regulatory developments, best practices and new projects and initiatives. Occasionally, also representatives of the EU Commission present the initiatives supporting EPCs currently available or planned at the EU level. During drafting process of the new Eurostat/EIB guide on EPCs, European co-administrators organised meeting of representatives from the EIB and EU Commission working on the document, where also national administrators had opportunity to make their voice heard. Moreover, the national administrators have been regularly informed about the developments relating to the accounting of EPCs in the public sector and related

changes over the past years. Code co-administration created opportunities for further co-operation of the EFIEES and eu.ESCO which resulted in joint support activities for EES market developments, such as organisation of events within the annual European Sustainable Energy Weeks.

After introducing common definition of EPC by the EED, the European Code of Conduct for EPC was a second step towards a harmonised European quality standard of EPC projects. It has helped to raise potential clients' confidence in the business model and thus led to higher demand for EPC projects. The Code has been used as a discussion guideline between client and EPC provider, guidance for the preparation of tender dossiers and contracts, and as a marketing tool. Within the QualitEE project, it is being used as a starting point for developing quality criteria for energy efficiency services. The Code has proven useful in explaining the benefits of the EPC to clients, bolstering their motivation to make savings on the operational costs of their facilities. Their feedback showed that they found the Code helpful for understanding the EPC process and what to expect from the EPC provider (Szomolányiová and Černý 2015a). The fact that EPC is a well established and internationally recognised method helped to gain clients' trust (Szomolányiová and Černý 2015b). Although the direct impact of signing the Code on the EPC providers behaviour has not been measured, behavioural economic research suggests that reminding EPC providers of their moral obligations (by signing the Code) would lead to an increase in adherence to these principles and their integrity (Ariely 2012).

7.4.2 Investor Confidence Project Europe

The Investor Ready Energy Efficiency Certification (developed as part of the Investor Confidence Project) was originally established by the Environmental Defense Fund in the US and brought to Europe by the Horizon 2020 funded Investor Confidence Project Europe. The Investor Confidence Project (ICP) provides standardised protocols for the documentation of building and single technology energy efficiency projects (with further protocols for industry, district heating and street lighting in development) based on a coordination of existing standards. The scheme 'credentials' (i.e. accredits) project developers and quality assurance providers through an internally managed application and training programme. Energy efficiency projects can apply for Investor Ready Energy Efficiency Certification where project documentation must first be developed by a credentialed project developer and then positively reviewed by a credentialed quality assurance provider. The scheme aims to encourage financial institutions to invest in energy efficiency at more favourable rates, but is also used to build client confidence. ICP Europe has been subject to two Horizon 2020 grants.

ICP Europe has partners in Austria, Bulgaria, Portugal, Germany and the UK, but also certify projects in other European countries, e.g. in Italy and Spain. Several pilot projects have been IREE certified or are in the process of implementation.

There are key differences between QualitEE and ICP Europe: QualitEE focusses on energy efficiency services that have specific aspects of quality beyond energy efficiency projects in general, such as energy saving guarantees. QualitEE also aims to take a national approach to quality assurance. However, the interface and market appearance between ICP Europe and QualitEE should be carefully managed in the countries where ICP Europe is active to avoid confusion or the perception of duplication. In the UK, a dialogue between the projects has already been established.

8 QUALITY ASSURANCE OF ENERGY EFFICIENCY SERVICES

8.1 Quality assurance to face the market barriers

QualitEE country reports prepared for 15 European countries provided an analysis of the EES market barriers and recommended actions to overcome them. In all countries, it was recommended to develop and implement a quality assurance scheme to overcome some of the main barriers on the markets and primarily to address the lack of trust in service providers and low customer demand. In some countries, the quality assurance was recommended also to improve availability of financing and improving skills and tools to negotiate and manage contracts.

Quality assurance for EES services and providers will provide a tool for the clients to distinguish good quality projects. Such a system will set quality benchmarks for a good quality project for both existing and new providers. Obtaining quality assurance is expected to give providers a competitive advantage on the market.

Implementation of quality assurance systems is supported also by the provisions of the EED directive. It is at the discretion of the Member states whether to introduce an accreditation and certification system or an equivalent qualification system for the provision of energy services.

Quality criteria developed within quality assurance could be used in the procurement process to select the highest quality projects. Survey respondents supported the idea that **well-defined procurement specifications increase the quality level of services**

The QualitEE online survey (2017) indicated **a significant lack of trust in EPC/ESC service providers** across All Countries based on the responses from providers and facilitators. However, this is in stark contrast to the relatively high trust expressed in the QualitEE client personal interviews conducted.

Almost half (44%) of EPC/ESC providers and facilitators across All Countries in the survey identified a lack of trust in all or in majority of cases and 34% of respondents experienced lack of trust in EPC/ESC service providers in about half of cases (Figure 43).

International comparison (Figure 44) shows that the providers are the least trusted in Portugal, Bulgaria and Greece. The results show that providers enjoy higher levels of trust in France, the Czech Republic, Slovakia, Netherlands, in the UK and Austria. Most of these countries have a long track record with EPCs. However, Slovakia is an exception to this rule which proves that trust can also be built in emerging markets. This can possibly be attributed to the support and tools provided by the Slovak association of energy service providers (e.g. model contract, best practice examples) as well as legislative requirements for ESCOs. Another factor is that EPC

projects in Slovakia are being implemented by large multi-national corporations with good reputations.

Surprisingly, 79% of the clients interviewed across All Countries (excl. France and the Netherlands) claim to trust providers, out of which 35% completely and another 44% in a majority of cases. Overall, this indicates prevailing trust in the providers; however, 15% of respondents trust providers in only about half of cases and another 6% in a minority of cases, which shows that the issue is not fully resolved. The difference between perception of the providers and facilitators can be explained, that 94% of the interviewed clients who responded to this question have been involved in at least 1 project, while the providers and facilitators may see distrust among potential clients who have not signed any contract yet. This issue should be investigated more in depth (Figure 45).

Figure 43 Lack of trust in EPC/ESC service providers (Percentage share of responses by providers and facilitators Sept 2017)

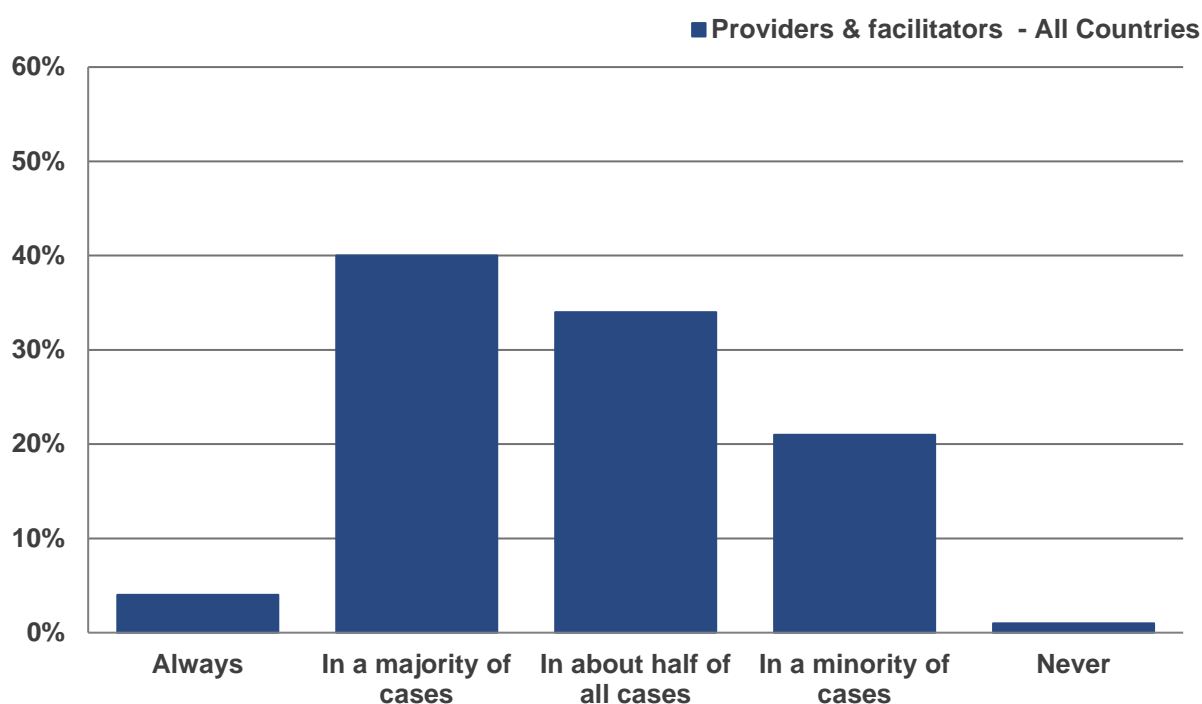


Figure 44 Lack of trust in EPC/ESC service providers (Percentage share of responses by providers and facilitators – country comparison Sept 2017)

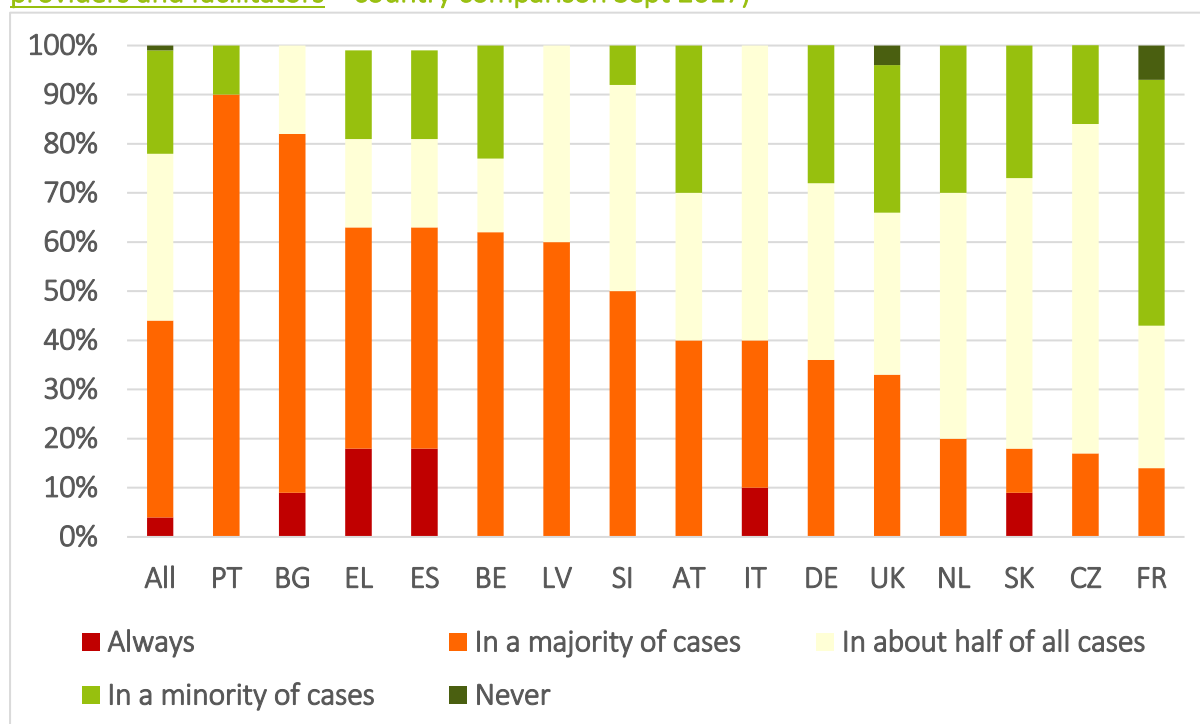
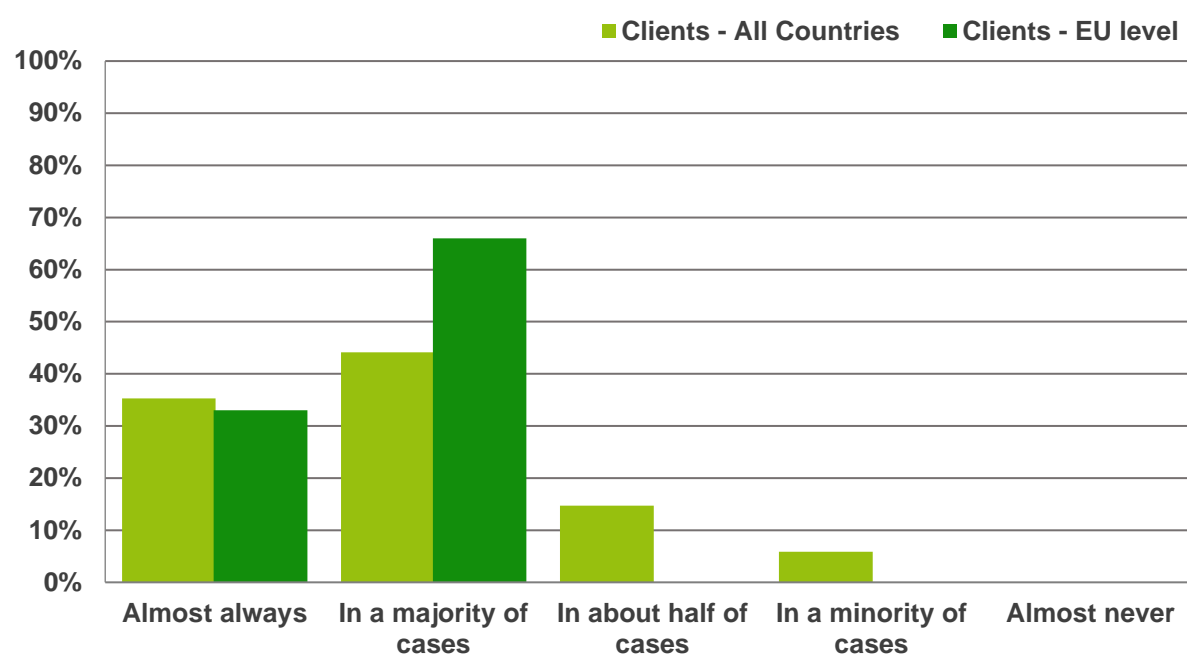


Figure 45 Do you trust service providers? (Percentage share of responses by clients¹⁸ Sept 2017)



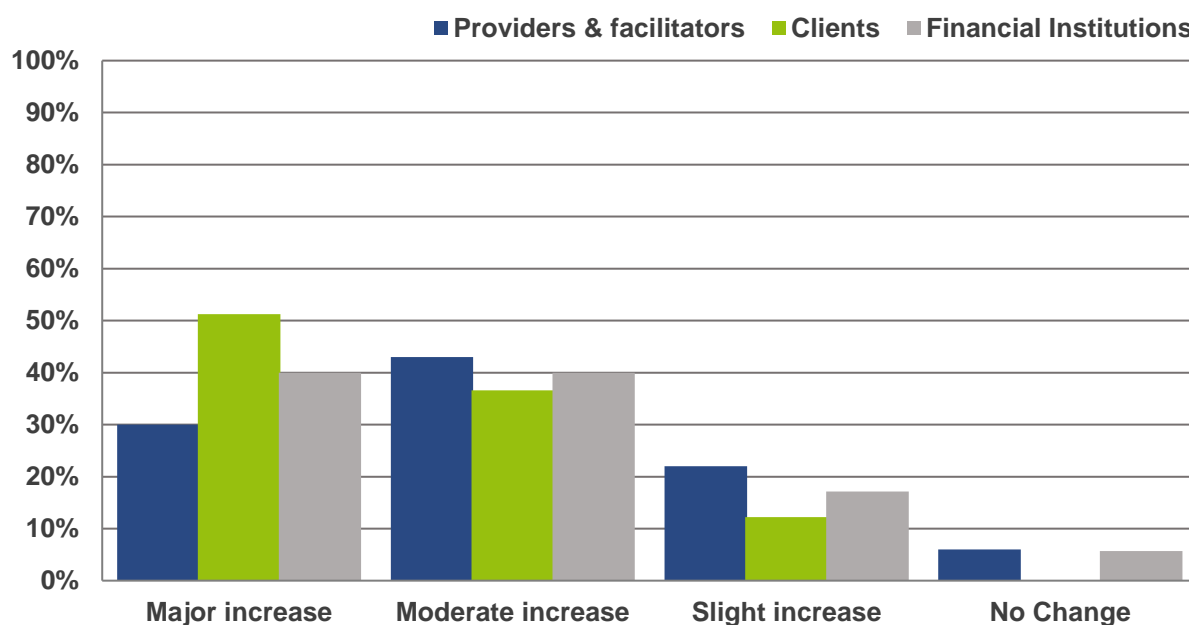
¹⁸ Respondents were interviewed in 13 EU countries; Austria, Belgium, Bulgaria, Czech Republic, Germany, Greece, Italy, Latvia, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). In addition three respondents operating at an EU level were interviewed (EU level).

Overall, all groups of respondents (providers and facilitators, clients and representatives of financial institutions) agreed that the implementation of a quality assurance scheme would result in increase of trust in EPC/ESC services and providers.

Most EPC provider and facilitator respondents across All Countries (73%) in the survey felt that **a quality assurance scheme would result in a "moderate" or "major" increase in trust** in energy efficiency services and their providers (Figure 46). Similarly, the vast majority of respondents representing financial institutions interviewed across All Countries in the survey (80% of respondents) believe that the implementation of a quality assurance scheme would bring a major or at least a moderate increase of trust in EPC or ESC services. Another 17% believe trust would at least slightly increase, while only 6% are sceptical that any change would occur. EU-level financial institutions are slightly less optimistic about the effects of the quality assurance scheme on trust. Two respondents expect a slight increase, while the third one expects a major increase in trust.

Personal interviews show slightly higher increase in trust expected by clients. More than half (51%) of clients interviewed across All Countries expect that a quality assurance scheme would bring a major increase in client trust in EPC/ESC services and providers and another 37% of them expect at least a moderate increase.

Figure 46 To what extent would a quality assurance scheme increase client trust in EPC/ESC services and providers? (Percentage share of responses by providers and facilitators; and clients¹⁹ Sept 2017)



¹⁹ Providers and facilitators in the survey operate in 15 EU countries; Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). Financial institutions and clients were interviewed across all the above listed countries with exception of France and the Netherlands.

The expectations of a quality assurance scheme differ among the market actors. While the providers and facilitators primarily expect an increase in customer trust, clients and financial institutions mainly expect an improvement in project quality.

The majority of respondents – providers and facilitators - across All Countries in the survey agreed that the main benefits of a quality assurance scheme would be an increase in customer trust (82%) and standardised quality criteria (57%). In contrast, only 46% of respondents expect that such a scheme would increase the quality of the projects. We can speculate this may be because service providers at this point see quality assurance rather as a marketing tool to distinguish them from the competition rather than as a step towards better service quality.

The majority of clients interviewed across All Countries in the survey agreed that an added value of the quality assurance scheme would be an increase in project quality (73%) and that the projects would be better designed from a technical and process point of view (71%). More than half of clients believed that data for technical assessment would be more readily available and reliable (54%) and that the preparation of procurement procedures would be less time-consuming (49%) and less costly (33%). EU-level clients identified the same overall benefits, but each had a different opinion about which particular benefit was the most important.

Respondents representing financial institutions across All Countries in the survey believe the quality assurance scheme would bring added value in a multitude of areas. The most commonly cited benefits are increased project quality (59% of respondents), less time needed to prepare procurement procedure (57%) and higher availability and reliability of data for technical assessment (54%).

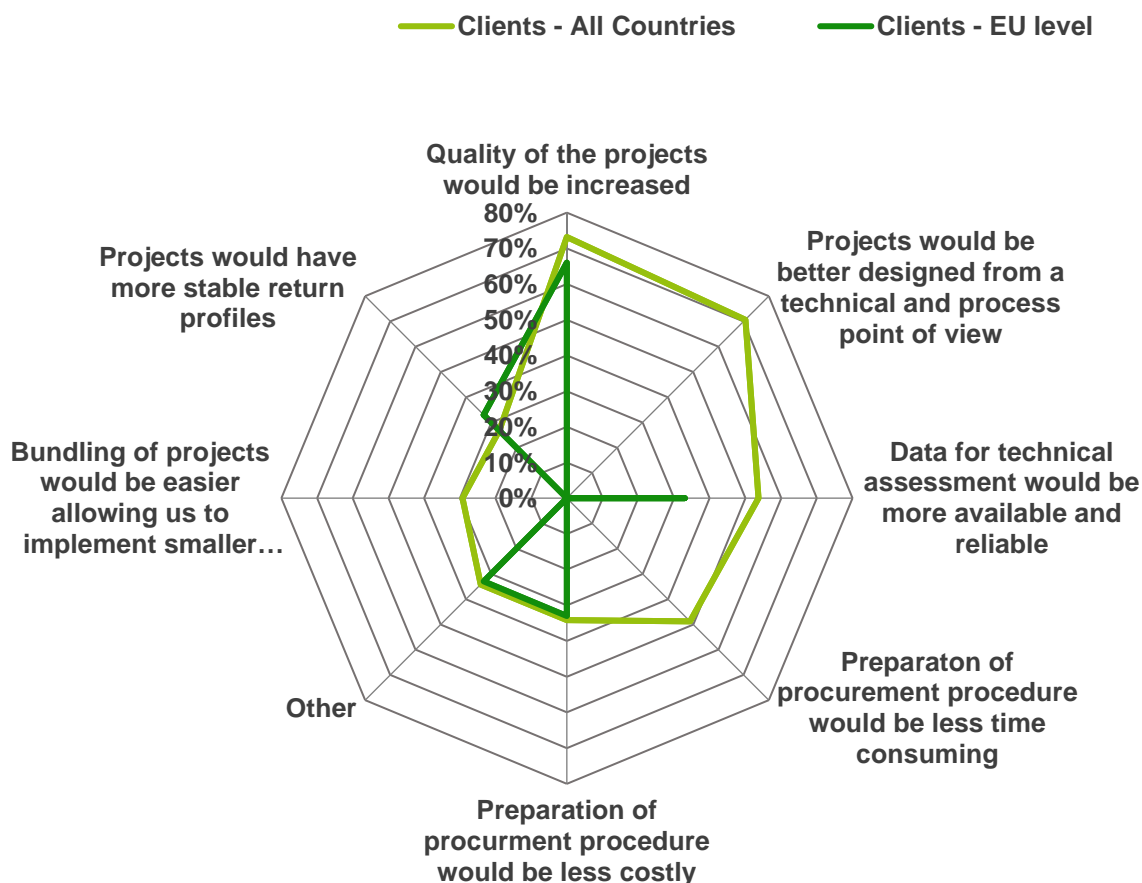
European EPC/ESC providers and facilitators across All Countries in the survey identified additional costs as the main drawback to a quality assurance scheme (Figure 50). However, there are much stronger concerns relating to additional costs of quality assurance rather than additional costs to fulfil the quality requirements. This supports the hypothesis from above, suggesting the providers and facilitators predominantly see the quality assurance as a marketing tool to their clients than actual tool to increase quality of the project.

Figure 47 In your opinion, what would be the added value of a quality assurance scheme like this? (Percentage share of responses by providers and facilitators across All Countries Sept 2017)



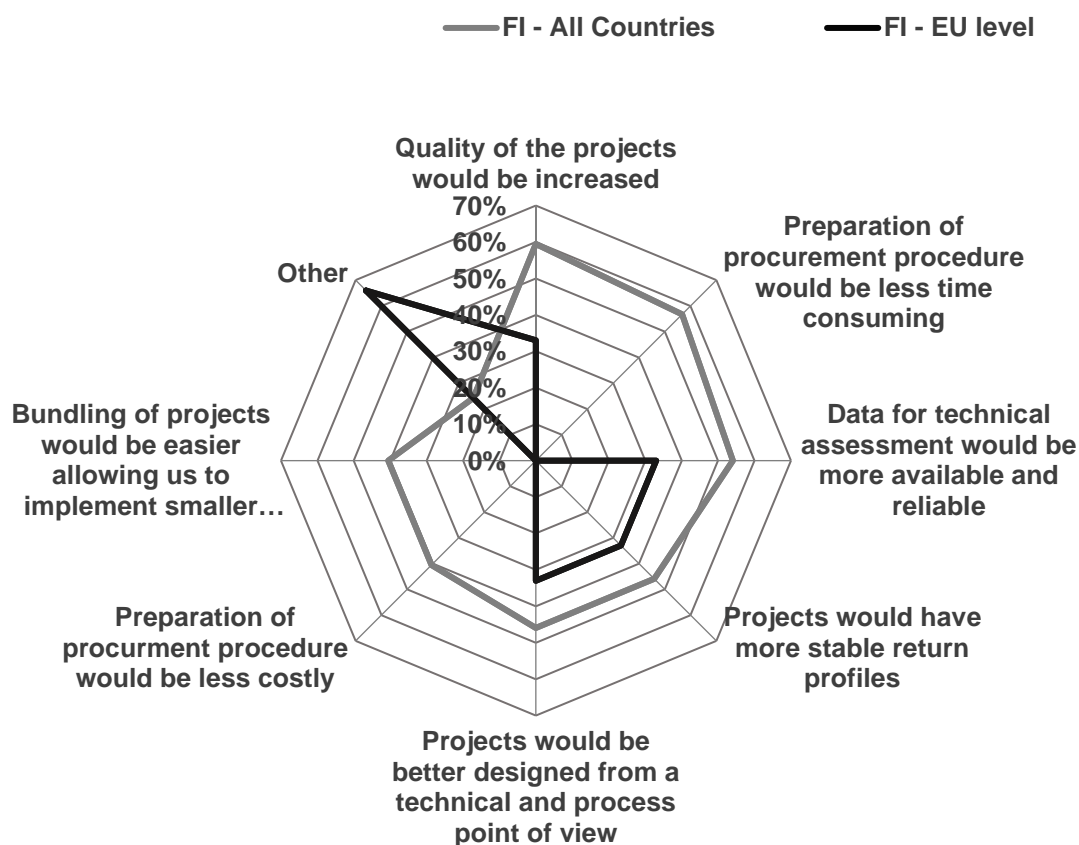
Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Figure 48 In your opinion, what would the added value of a quality assurance scheme such as this be for the projects implemented by your organisation? (Percentage share of responses by clients²⁰ Sept 2017)



²⁰ Respondents were interviewed in 13 EU countries; Austria, Belgium, Bulgaria, Czech Republic, Germany, Greece, Italy, Latvia, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). In addition three respondents operating at an EU level were interviewed (EU level).

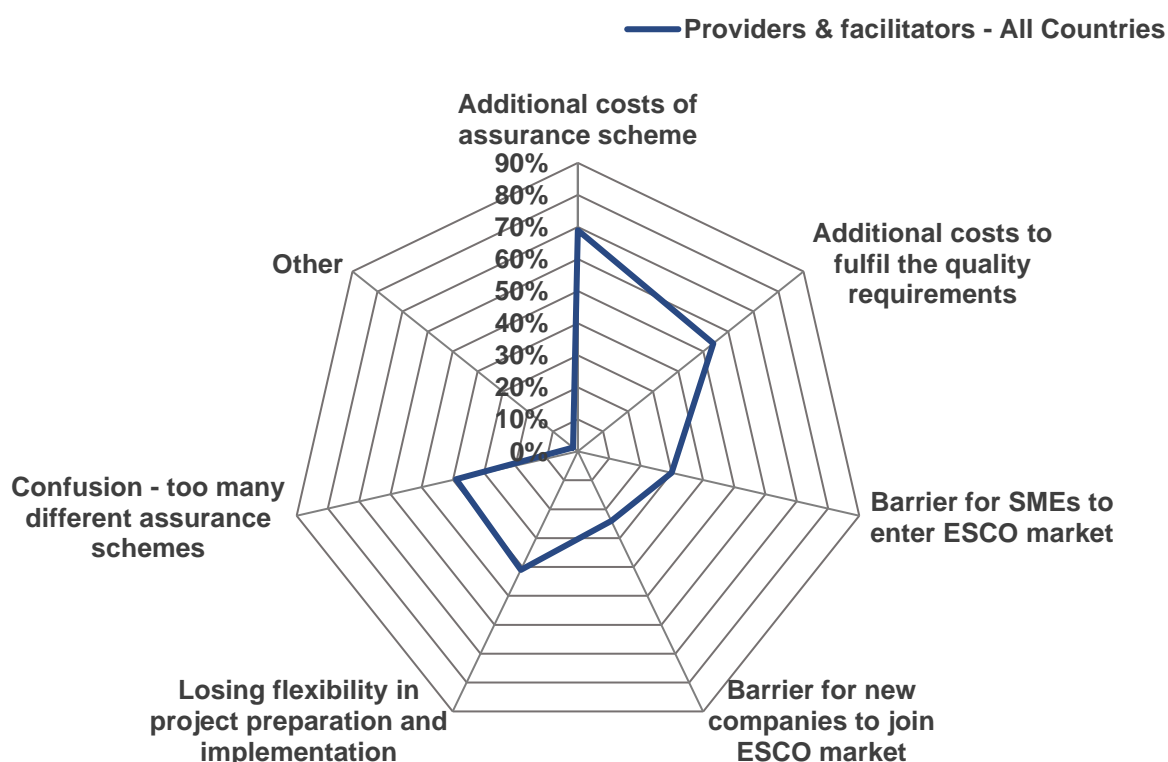
Figure 49 In your opinion, what would the added value of a quality assurance scheme such as this be for the projects implemented by your organisation? (Percentage share of responses by representatives of financial institutions²¹ Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

²¹ Respondents were interviewed in 13 EU countries; Austria, Belgium, Bulgaria, Czech Republic, Germany, Greece, Italy, Latvia, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). In addition three respondents operating at an EU level were interviewed (EU level).

Figure 50 In your opinion, what drawbacks or barriers may be created by a quality assurance scheme like this? (Percentage share of responses by providers and facilitators Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

Providers and facilitators were not as strong as clients and financial institutions in **indicating a preference to implementing projects subject to quality assurance** (Figure 51). While 88% of clients would always or in a majority of cases prefer implementing a project with quality assurance, similarly 89% of financial institutions would prefer to finance a project with quality assurance. In comparison, such preference was indicated by 65% providers and facilitators, which is considerably less, but still showing a high preference.

Quality criteria developed within quality assurance can be used in the procurement process to select the best quality projects. Survey respondents supported the idea that **well-defined procurement specifications increase the quality level of services** (Figure 52). The vast majority of the providers and facilitators (82%) selected either "always" or "in a majority of cases". More than half (51%) of clients interviewed across All Countries experienced that procurement specifications influenced quality of service and another 37% believe that it is the case at least half of the time. Only 37% of respondents are sceptical about the influence of procurement specifications. The EU-level clients that were interviewed disagree on this matter, and while two of them expect a major increase in quality, the third one expects no change.

Figure 51 Would you prefer (implementing/financing) a project, which is subject to quality assurance over a project without quality assurance? (Percentage share of responses by providers and facilitators; and clients²² Sept 2017)

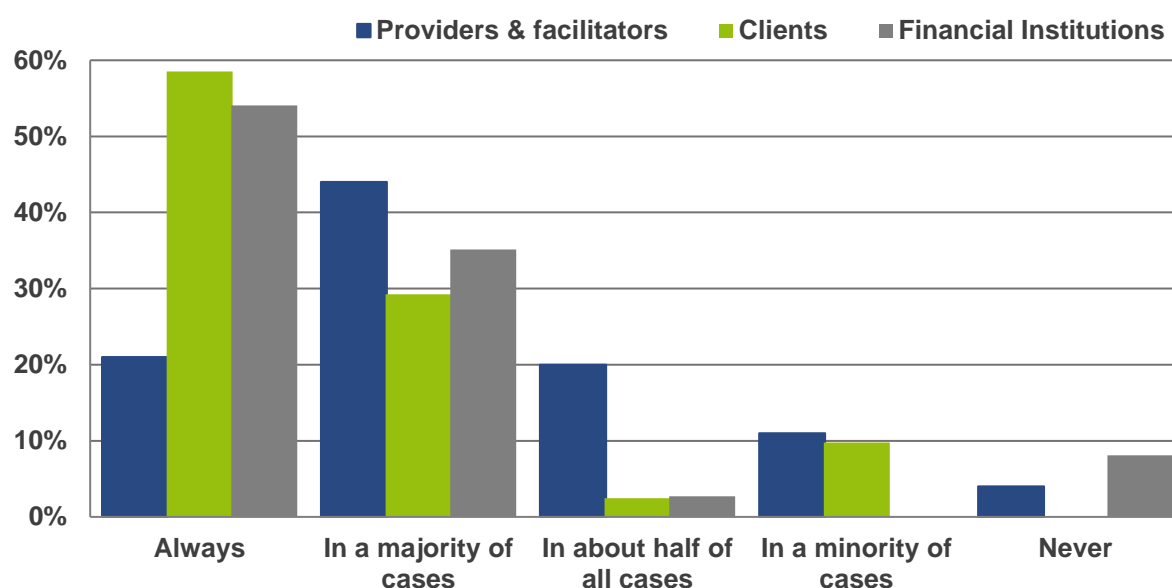
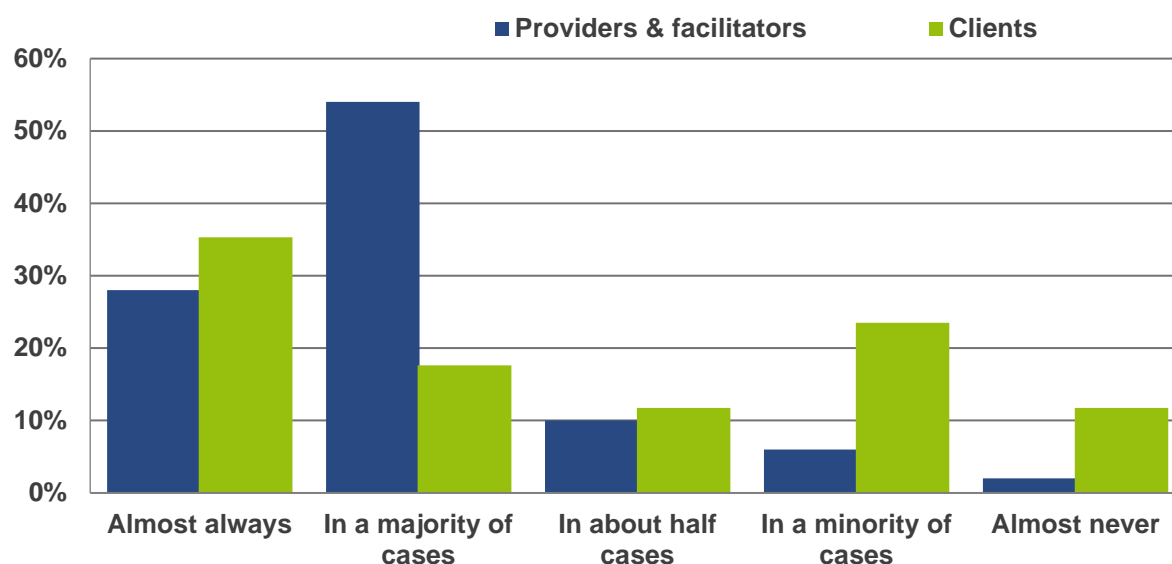


Figure 52 From your experiences, do well defined procurement specifications increase the quality level of EPC/ESC services? (Percentage share of responses by providers and facilitators; and clients²³ Sept 2017)



²² Providers and facilitators in the survey operate in 15 EU countries; Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). Financial institutions and clients were interviewed across all the above listed countries with exception of France and the Netherlands.

²³ Ibid.

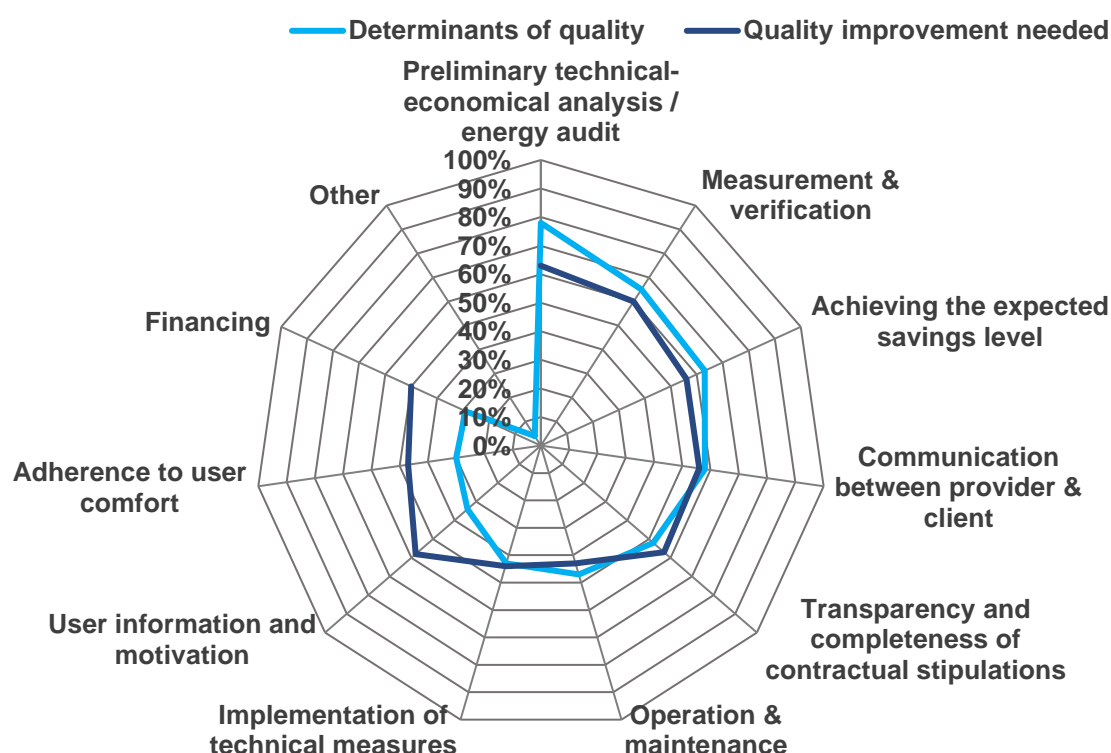
8.2 EPC quality determinants

The majority of respondents – EPC providers and facilitators - agreed that the most important determinants of quality in EPC projects are:

- ✔ Preliminary technical-economical analysis / energy audit (78%)
- ✔ Measurement & verification (65%)
- ✔ Achieving the expected savings level (63%)
- ✔ Communication between provider & client (58%)
- ✔ Transparency and completeness of contractual stipulations (52%)

When asked in which areas quality improvement is most needed in EPC project preparation and implementation, the top five areas indicated by EPC providers and facilitators were identical with the areas selected as quality determinants.





Figure 53 What are the most important determinants of quality in EPC projects and in which areas are quality improvement most needed in EPC project preparation and implementation? (Percentage share of responses by providers and facilitators across All Countries Sept 2017)



Notes: Quality determinants: respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%. Quality improvement most needed: respondents were asked to rank each determinant using the following options 'not needed', 'needed', 'strongly needed' and 'don't know'. An indicator was created by assigning a weighting of 0%, 50% & 100% to 'not needed', 'needed' & 'strongly needed' respectively and dividing by the number of responses. Where 'don't know' was selected this was excluded from the calculation of the indicator.

Different experiences are observed with respect to the quality of EPC services from the point of view of different market actors. Clients interviewed across All Countries report that they experience issues in quality in almost all areas, similarly to the providers and facilitators. On the other hand, financial institutions mainly identified issues with the transparency and completeness of contracts as well as (to a lesser extent) other issues.

The clients interviewed across All Countries most commonly had issues with the quality of EPC services in the following areas:

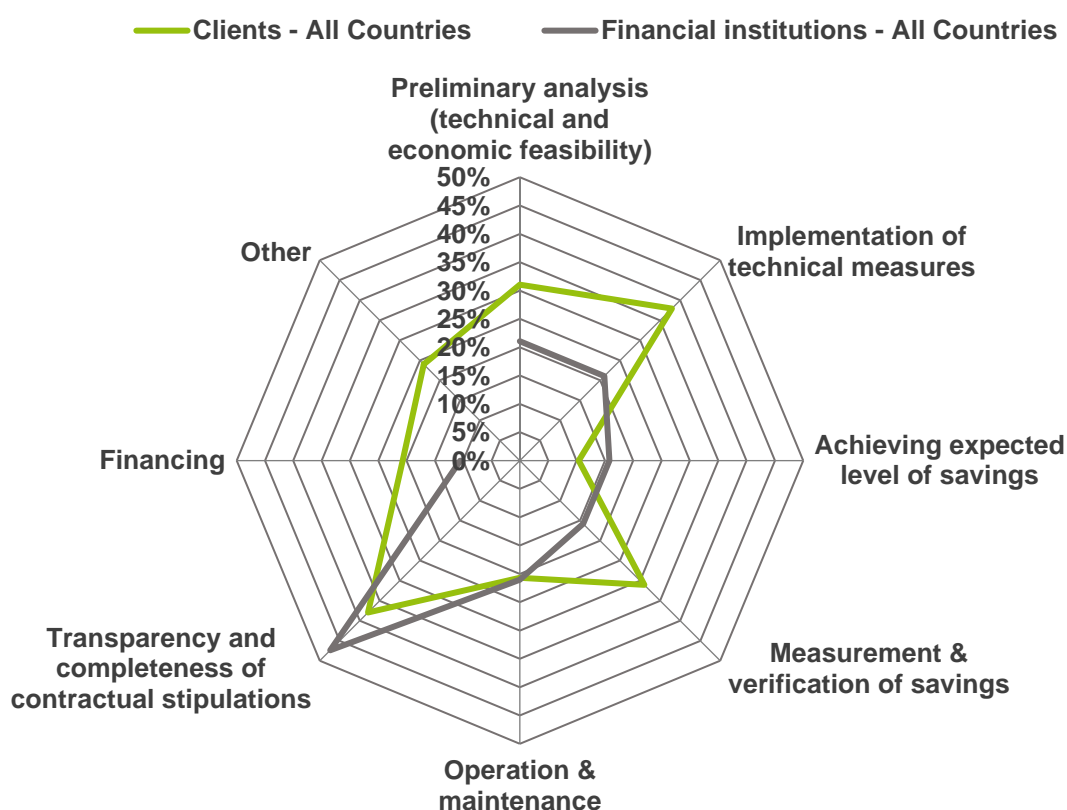
-  Implementation of technical measures (38%);
-  Transparency and completeness of contractual stipulations (38%);
-  Preliminary analysis (technical and economic feasibility) (31%);
-  Measurement & verification (31%).

Interestingly, only 10% of client respondents across All Countries had issues with "Achieving the expected savings level". In contrast, one out of three EU-level clients interviewed had an issue achieving the expected savings level.

The view of financial institutions across All Countries in the survey is rather different as almost half of them (47%) reported issues with "Transparency and completeness of contractual stipulations". Issues such as preliminary analysis, implementation of technical measures and operation and maintenance seem to be considerably less troublesome as only a fifth of the financial institutions selected them as an issue of concern.

The three EU-level financial institutions claimed that the preparation of tenders does not reach a substantial level of detail and reliability of information, which causes uncertainty for the providers. As information might not be reliable, the ESCO would have to invest more to implement the expected solution. Regarding trust in EPC suppliers; clients and financiers reported a need for transparency and quality of the energy audit and the M&V. If there is no certification, then each quality criteria must be reviewed by client and financial institutions. Complexity could therefore be reduced by establishing minimum requirements and an accredited certification process.

Figure 54 If you had any issues with quality of the EPC service, in which area did they mostly occur? (Percentage share of responses by clients and financial institutions²⁴ Sept 2017)



Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

8.3 ESC quality determinants

There was broad agreement amongst all surveyed groups – ESC providers and facilitators, clients and financial institutions that the areas of ESC projects which need the most attention when it comes to the quality are **preliminary technical-economic analysis / energy audit** and **implementation of technical measures**. While ESC providers and facilitators view "achieving savings on the supply side" as an important quality determinant only one quarter of them think improvements are needed in this area. Similarly, achieving savings were selected as problematic only by one quarter of clients and financial institutions. This is in contrast to EPC projects where this was one of the key areas identified for quality improvement.

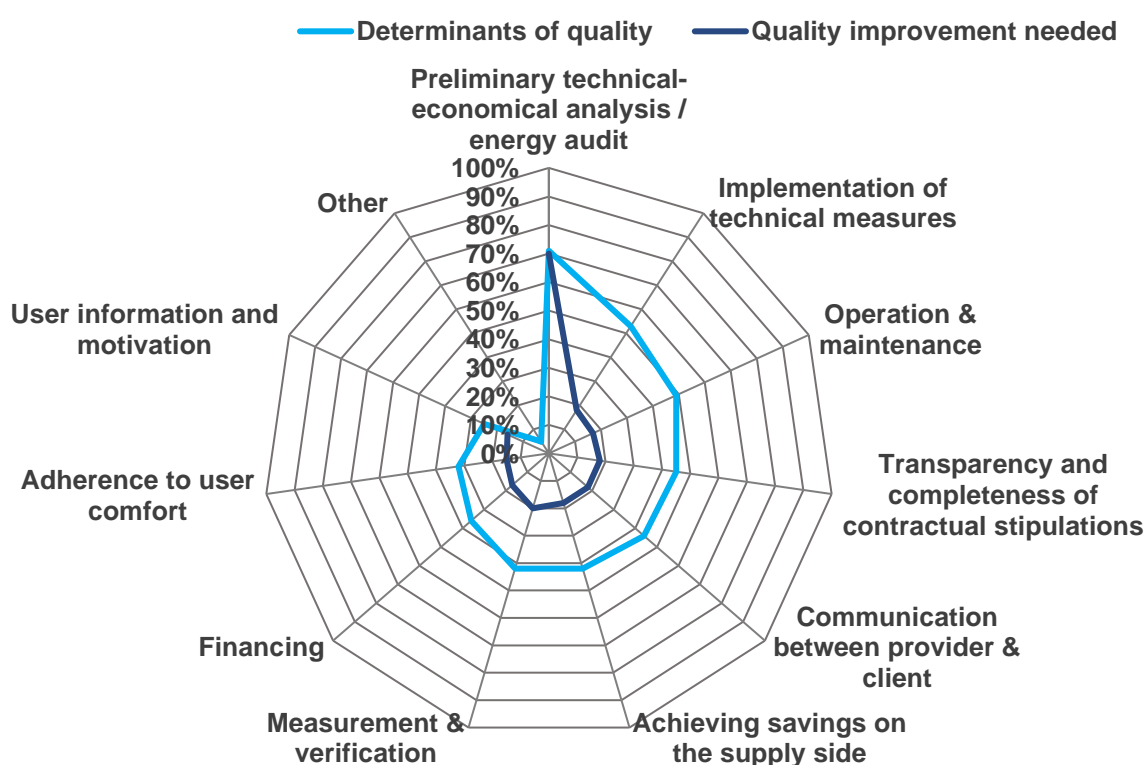
²⁴ Respondents were interviewed in 13 EU countries; Austria, Belgium, Bulgaria, Czech Republic, Germany, Greece, Italy, Latvia, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries).

The majority of ESC providers and facilitators agreed that the most important determinants of quality in ESC projects are:

- ✔ Preliminary technical-economical analysis / energy audit (71%);
- ✔ Implementation of technical measures (53%);
- ✔ Operation & maintenance (49%);
- ✔ Transparency and completeness of contractual stipulations (45%);
- ✔ Communication between provider & client (44%);
- ✔ Achieving savings on the supply side (42%).

When asked in which areas are quality improvement most needed in ESC project preparation and implementation, preliminary technical-economical analysis / energy audit was indicated by vast majority of respondents as area of top concern. All the other areas were indicated by 20% or less proportion of respondents.

Figure 55 What are the most important determinants of quality in ESC projects and in which areas are quality improvement most needed in ESC project preparation and implementation? (Percentage share of responses by providers and facilitators across All Countries Sept 2017)



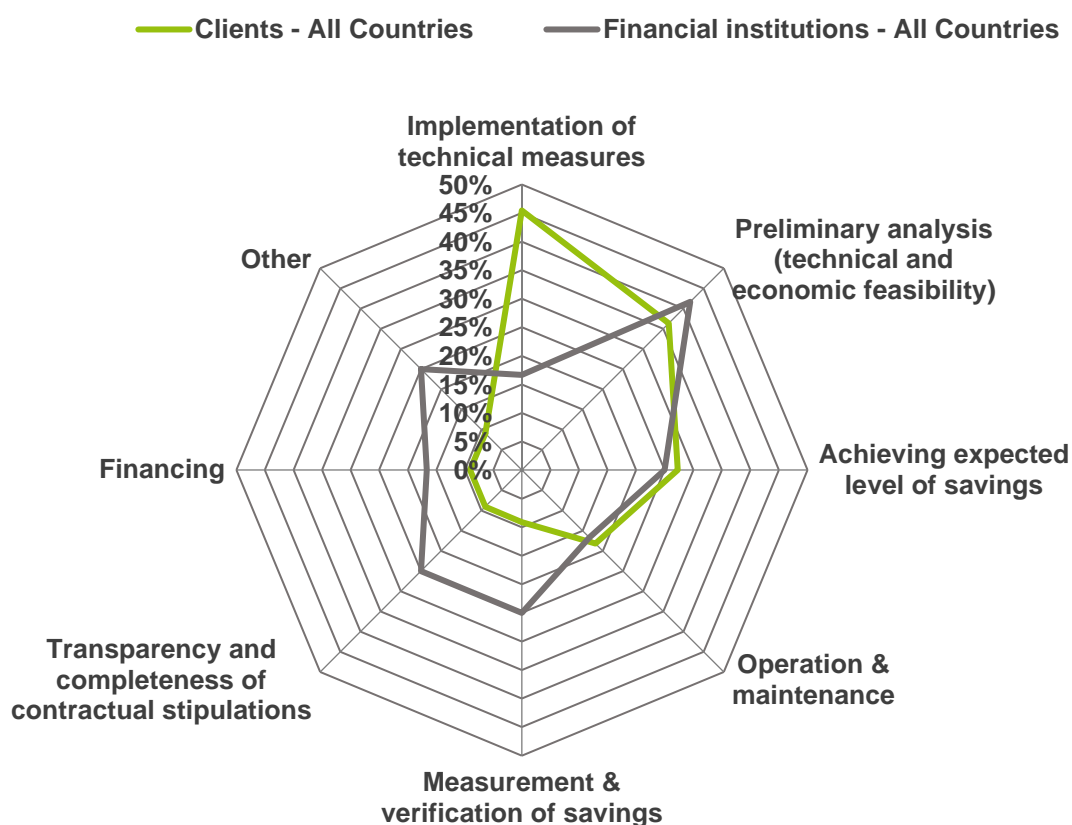
Notes: Quality determinants: respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%. Quality improvement most needed: respondents were asked to rank each determinant using the following options 'not needed', 'needed', 'strongly needed' and 'don't know'. An indicator was created by assigning a weighting of 0%, 50% & 100% to 'not needed', 'needed' & 'strongly needed' respectively and dividing by the number of responses. Where 'don't know' was selected this was excluded from the calculation of the indicator.

Financial institutions reported a higher level of quality issues with ESC than the clients interviewed across All Countries.

Clients interviewed across All Countries in the survey reported issues with the quality of ESC services mainly in three areas; "implementation of technical measures" (which clients stated as an issue in 45% of cases), "preliminary analysis (technical and economic feasibility)" (36%) and "achieving the expected level of savings" (27%). Only one issue was identified by an EU-level client, described as a problem by the facility owner in understanding the concept of flexible energy purchasing.

Financial institutions most commonly cited issues in the area of "preliminary analysis" (42% of respondents). A quarter of respondents had issues with ESC quality in the areas of "achieving expected level of saving", "measurement and verification" and "transparency and completeness of contract". For EU-level financial institutions, preliminary analysis, measurement and verification are the most relevant issues, and they also experienced other issues not listed here (transparency of risk allocation was stated).

Figure 56 If you had any issues with quality of the ESC service, in which area did they mostly occur? (Percentage share of responses by financial institutions; and clients Sept 2017)

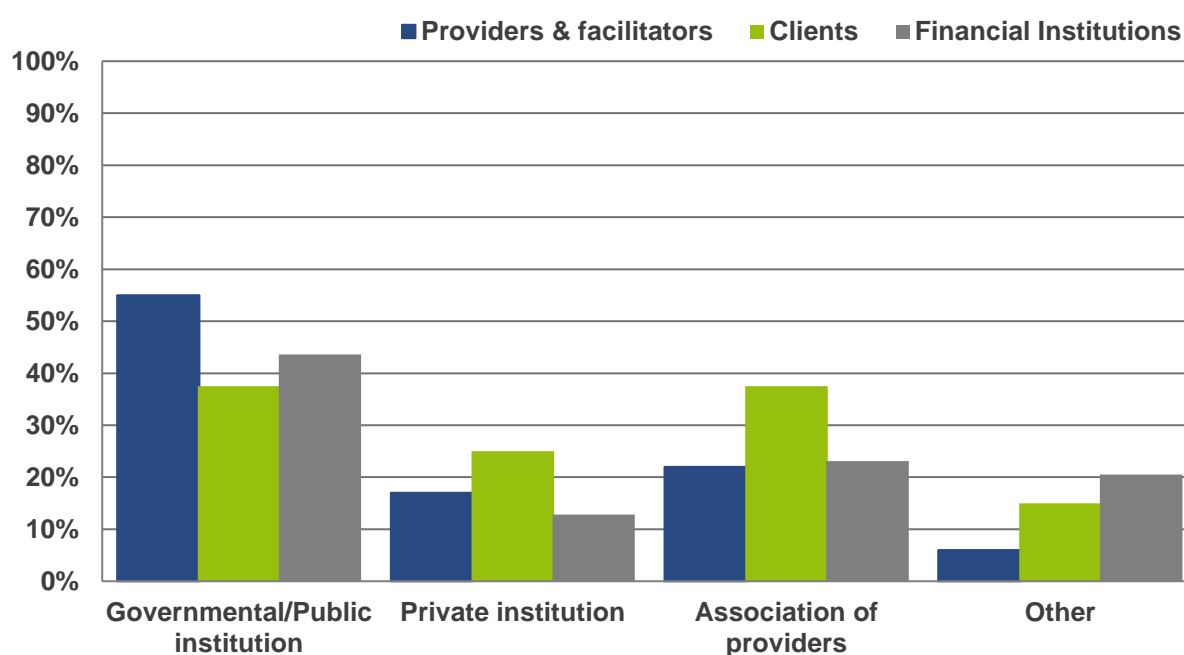


Note: Respondents may have selected multiple answers. The chart shows the proportion of respondents selecting each answer out of overall respondents to the question. Results therefore do not sum to 100%.

8.4 Desirable quality assurance system

The QualitEE survey aimed to investigate what would be the design of a quality assurance system preferred by the market actors. Both surveyed groups: providers and facilitators (55%) and financial institutions (44%) across All Countries in the survey clearly identified **governmental/public institutions as being the most respected bodies to issue quality assurance certification** for energy efficiency services. However, opinion of clients is split as equal share of them (38%) prefer governmental/public institutions or association of providers to fulfil this role. This is an interesting result as it indicates that clients show more respect for associations of providers than the providers themselves, however this result could also be attributed to providers preferring to demonstrate independence of the quality assurance body to the clients (as reported qualitatively by a few providers).

Figure 57 Which would be the most respected body to issue a quality assurance label or certification for EPC/ESC services in your country? (Percentage share of responses by providers and facilitators; and clients²⁵ Sept 2017)



The majority of EPC providers and facilitators across All Countries in the survey (53%) agreed that the cost for quality assurance should be met by the client. Only 37% of them indicated providers should cover these costs (Figure 58).

²⁵ Providers and facilitators in the survey operate in 15 EU countries; Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Greece, Italy, Latvia, the Netherlands, Portugal, Slovakia, Slovenia, Spain and the UK (All Countries). Financial institutions and clients were interviewed across all the above listed countries with exception of France and the Netherlands.

The majority (58%) of providers and facilitators in the survey agreed that a viable fee for quality assurance would be up to 1% of the value of a particular project and 39% of them think it would be somewhat higher – between 2 and 5% (Figure 59).

Figure 58 Who should pay for the quality assurance of EPC/ESC projects? (Percentage share of responses by providers and facilitators Sept 2017)

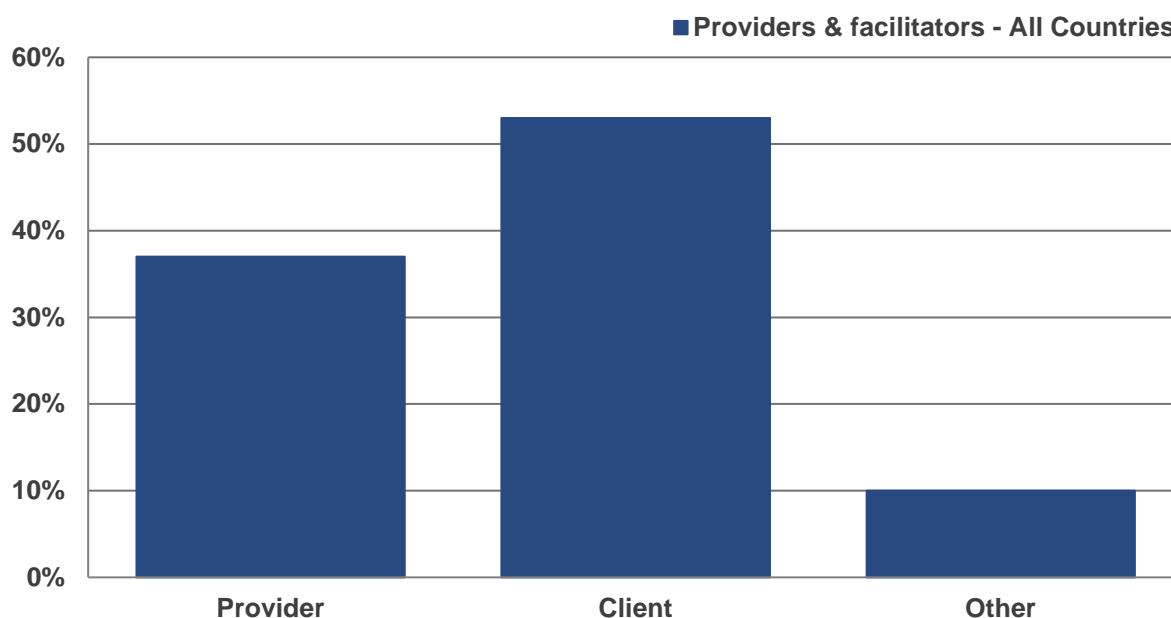
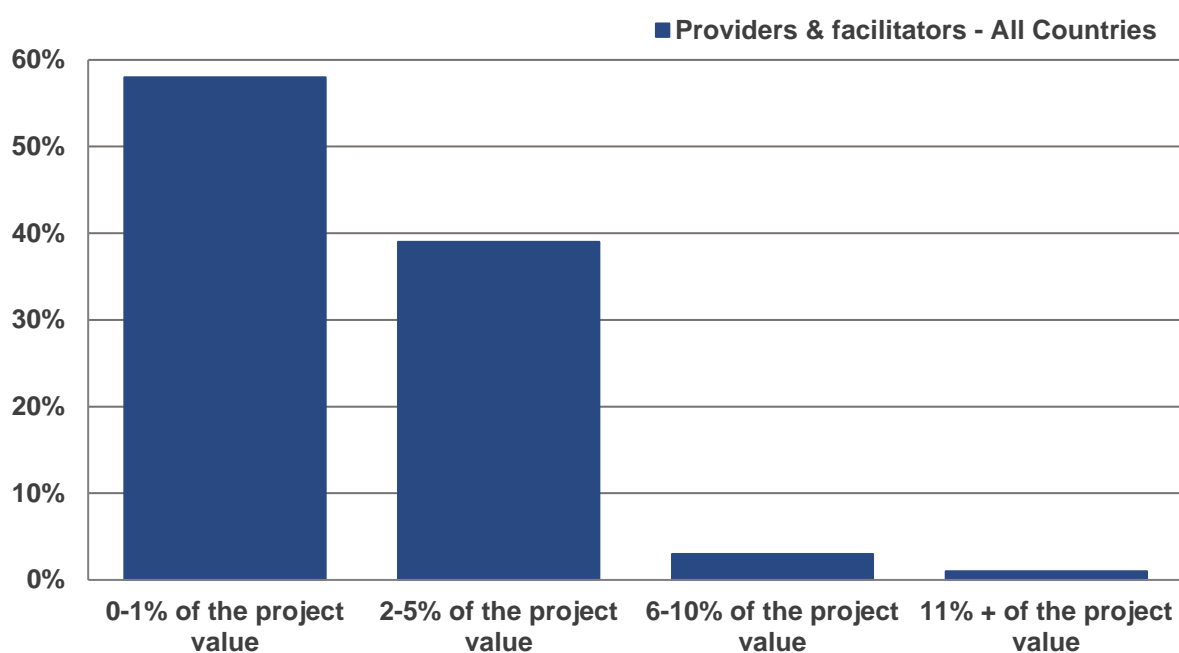


Figure 59 What would be a viable fee level for external quality assurance per EPC/ESC project? (Percentage share of responses by providers and facilitators Sept 2017)





8.5 Lessons learned from certification frameworks in the building sector

To design an effective and functional EES quality assurance scheme, it is worth taking into account lessons learned from quality assurance schemes in the other sectors, especially sectors close to energy efficiency services. Triple E Consulting – Energy, Environment & Economics B.V. (2014) reviewed and ranked voluntary building certification schemes used in Europe. Based on interviews with key stakeholders and in-depth analysis of the leading voluntary schemes they derived the following conclusions:

- ✔ There are six main voluntary certification schemes used in the EU: BREEAM, DGNB, HQE, LEED, Minergie and PassivHaus. BREEAM is the European market leader, accounting for more than 80% of all sustainable commercial building certifications in Europe (based on 2013 data). The main difference between the schemes is the environmental and energy aspects they cover and the weight they give to different environmental categories. This makes benchmarking or comparison between schemes difficult.
- ✔ The market for voluntary building certification schemes is young. The Western EU countries, many of which have their own national preferences, e.g. BREEAM in the UK, DGNB in Germany or HQE in France, all report a steady rise in certification and that certification of new buildings is becoming considered as mandatory for certain types of development. In contrast, other parts of Europe have only recently started using the rating schemes.
- ✔ Most countries are able to use existing schemes from other countries, however, these international schemes, such as LEED and BREEAM, are used to a very limited extent due to a combination of factors, including the high costs of the schemes, low market demand (e.g. a small country, stagnating construction sector, etc.), and/ or a lack of resources at the national level to develop and run these schemes. Low awareness of the advantages of these schemes is also a potential reason for low uptake.
- ✔ In the absence of financial incentives, the uptake of voluntary building certification schemes depend on the benefits perceived by the client in terms of marketing advantage and/or enhancements to building performance.
- ✔ Some of the key factors when choosing a certification scheme include reliability, cost and international acceptance.
- ✔ As for market demand, 67% of scheme operators surveyed think that current and potential customers need and want schemes which include wider sustainability issues.
- ✔ The most significant added value a voluntary common EU scheme could provide, is to allow for a consistent comparison between buildings across all the Member States while simultaneously offering high quality assessment and international acceptance. A

voluntary common EU scheme could also help improve the situation in countries with low standards of building certification and energy performance by providing a common methodology for assessment throughout the entire EU.

-  A commonly expressed concern was the need to avoid duplication of efforts and costs, between any new voluntary scheme and existing mandatory schemes (i.e. national Energy Performance Certificates required under EPBD). During the design phase the possibility to use parts of the inputs to and results of national Energy Performance Certificates for receiving certification under the voluntary common EU scheme should be considered. A similar approach is already followed by EC accredited certification schemes in other fields, e. g. in certain biofuel logos.
-  Experience at Member State level indicates that national or regional databases enable the implementation of control mechanisms which are necessary to strengthen the trust in the certificate and prevent fraud.

9 ACTIVITIES TO ESTABLISH NATIONAL QUALITY ASSURANCE OF ENERGY EFFICIENCY SERVICES

Currently, there are **several quality assurance schemes developed in the EU member states in the area of EES quality assurance** and additional schemes are under development. Based on the QualitEE country reports, this chapter provides an overview of current activities related to establishing quality assurance of energy efficiency services. The current status of quality assurance for EES in 15 national QualitEE countries is used as the starting point for further developments of quality assurance within the QualitEE project. The national partners have already created national promotion teams and platforms to support the development of the quality assurance schemes in 15 countries covered by the QualitEE project.





Most of the schemes described below are not very comprehensive and focus on a particular area of the EES, such as buildings or expert qualification. When it comes specifically to EPC and ESC services, which are the focus of this report, there are a few quality assurance schemes for providers (Slovakia, Portugal) and very few dedicated to the quality assurance of the services (Austria). In many countries there have been no attempts until now to develop a quality assurance scheme for EES (Bulgaria, Belgium, Latvia, Netherlands). Some of the schemes may look good on paper, but there is no proper enforcement of the requirements established and thus are not effective (Portugal).

Within the QualitEE project the QualitEE partner CREARA has pre-selected some of the EU based schemes to potentially serve as inspiration for establishing the specific characteristics of new quality assurance schemes in the QualitEE countries. Table 5 provides overview of these pre-selected schemes.

9.1 Austria

9.1.1 “Umweltzeichen Energie-Contracting”

The “Umweltzeichen Energie-Contracting”, an Austrian eco-label, is the only eco-label of the federal government which not only labels ecological products but also ecological services. The “Umweltzeichen Energie-Contracting” stands for:

-  Consistent terms for the EES;
-  Defined quality requirements and control mechanisms;
-  Transparent concepts and contract design;
-  Security for contractors and clients;

- ✔ A guarantee for the calculated saving. (Grim and Kuchar 2018)

The eco-label is awarded to those contracting providers whose services meet the following requirements:

- ✔ Evidence of environmental improvement in the form of energy and emission savings;
- ✔ Compliance with quality standards in the planning and implementation of the contracting measures;
- ✔ Use of environmentally friendly products or materials;
- ✔ Ecological requirements for the production site of the provider;
- ✔ Guarantee of projected saving by the contractor. (Grim and Kuchar 2018)

The achieved environmental effect is presented to the client or user in the “Energieausweis”, an energy performance certificate, as follows:

- ✔ Energy demand before and after the contracting measure in [kWh/year] and [%];
- ✔ Emissions before and after the contracting measure in [tCO₂eq/year] and [%];
- ✔ Emission reduction in [t CO₂eq/year] and [%].

Once an independent testing centre confirms that all criteria are met, the Federal Ministry of Sustainability and Tourism can issue the eco-label to the company. Further information on the criteria and a list of awarded companies can be found at www.umweltzeichen.at. Currently, the market demand for the Umweltzeichen Energie-Contracting is very limited as only four companies are labelled. (ÖGUT, 15.01.2018)









9.1.2 DECA Quality label for EES

The “DECA Qualitätssiegel”, a quality label, is new to the Austrian EES market since November 2017. It assesses the implementation of EES and defines a basic quality level for them. It can be applied to the following seven energy efficiency services:

- ✔ Energy consulting;
- ✔ Energy Performance Contracting;
- ✔ Energy Supply Contracting;
- ✔ Operational Management Contracting;
- ✔ Implementation of technical energy efficiency measures;
- ✔ Optimisation of existing objects (operation and maintenance projects);
- ✔ Introduction of an energy management system.

Evaluation is based on nine quality criteria (QC) which describe the basic characteristics of quality for various aspects of the service.

- ✔ QK 1 Adequate analysis

-
-  QK 2 Implementation of technical measures
 -  QK 3 Savings guarantee
 -  QK 4 Verification of energy savings
 -  QK 5 Value preservation, maintenance
 -  QK 6 Communication contractor – client
 -  QK 7 User comfort
 -  QK 8 User information and motivation
 -  QK 9 Transparency of contract

In each case, those quality criteria that are relevant are used to evaluate the different EES. The quality criteria are supported in each case by a set of assessment criteria. These are statements which must be positively verified to fulfil the quality criterion. For each assessment criterion, a concrete verification procedure is defined which makes it possible to make a traceable decision as to whether an assessment criterion has been fulfilled. The basis for using the quality label for an energy efficiency service is the registration of the service provider with DECA and the signing of the commitment (Principle of self-commitment). (Grim and Kuchar 2018)

The service provider commits to ensure that all energy efficiency services bearing the quality seal and provided by the company in question comply with the currently published DECA assessment criteria for the energy efficiency service in question, unless the customer has agreed to disregard any individual assessment criteria. During the project acquisition phase, a DECA quality seal without an identification number can be used by independent service providers. When an energy efficiency service bearing the DECA quality label is commissioned, a seal with an identification number must be generated through the DECA website. Since November 2017 five companies have become entitled to award their services with the DECA quality seal. (DECA, 14.01.2015) (Grim and Kuchar 2018)

The Austrian QualitEE consortium partner, e7, together with DECA plans to take measures to further the DECA quality seal from test phase to market uptake during the project phase of QualitEE.

9.2 Belgium

There are currently no plans in Belgium to certify EES, neither at the federal level, nor at a regional level. However, according to the QualitEE survey responses, there is some interest in standardised templates of performance contracts. During the interviews, some representatives of the financial institutions stated that a quality assurance scheme would increase trust in EPC/ESC to a moderate or major extent. (Goorden and Coolen 2018)

9.3 Bulgaria

In Bulgaria, no particular plans to introduce certification of EES have been identified. On the other hand, the Government is interested to study the possibilities for such a certification. (Nikolaev and Andreeva 2018)

9.4 The Czech Republic

Currently, there are two complementary quality assurance schemes under development in the Czech Republic. The first one known as the Reasonable Energy Savings programme is a quality assurance scheme for energy efficiency projects that has been already established, although no projects have registered at the time of writing. The second scheme, focused on the certification of EPC projects and providers, is in the initial stage of development. Both schemes are described more in detail in the sub-chapters below.

There are also qualification schemes, such as the one established for **energy specialists**. An energy specialist is a natural person holding an authorisation granted by the MIT (according to § 10 of Energy Management Act No. 406/2000) to perform an energy audit and an energy assessment, prepare an energy performance certificate, inspect boilers and thermal energy distribution systems in operation or inspect air-conditioning systems. A list of energy specialists is publicly accessible on the website of the MIT at <http://www.mpo-enex.cz/experti/>.

9.4.1 Reasonable Energy Savings programme

The Reasonable Energy Savings programme was established by the Ministry of Industry and Trade (MIT) with aim to provide examples of good practice in energy efficiency. Activities focused on the promotion of successful energy-saving projects, which have the potential to create an environment that will facilitate awareness and stimulate the development and preparation of high-quality energy-saving measures, without using investment funds in the public and private sectors. (Szomolanyiova 2018)

Under the programme, a website of online records of implemented measures to promote energy savings and their benefits has been created²⁶. Registered projects must meet quality requirements and comply with the principles of good practice, i.e. with the quality elements specified in the programme. After implementation, such projects can be awarded a certificate of quality, and it will be possible to use the quality mark with the programme's logo. It is also planned that energy service providers can be awarded the label of a high-quality energy services provider after meeting specific requirements. (Szomolanyiova 2018)

²⁶ www.usporysrozumem.cz

The aim of the programme is to stimulate a reduction in energy consumption and improve the quality of energy services with regard to compliance with the adopted European framework, in particular Articles 3 and 7 of Directive 2012/27/EU, both until 2020 and thereafter. The programme is one of the alternative scheme measures referred to in Article 7 of Directive 2012/27/EU. (Szomolanyiova 2018)

9.4.2 Certification of EPC services and providers

The certification of EPC services and providers is currently under development in cooperation between the QualitEE project, the MIT and the APES.

Various possibilities for the introduction of the quality assurance scheme for EPC in the Czech Republic have been analysed by the Certification of Energy Savings and Services study financed by the EFEKT2 Programme of the Ministry of Industry and Trade (SEVEN 2017). The study followed up on two other studies on EPC provider certification conducted by the APES with the financial support of the EFEKT Programme (SEVEN 2013; APES 2016).

The Certification of Energy Savings and Services study (SEVEN 2017) recommended a system based primarily on EPC project certification. The implementation of several projects which will gain EPC project certification is essential prerequisite for the subsequent certification of the EPC provider. The final recommendation is to establish a certification system independent of international standards, which is simpler and means lower costs of certification. (Szomolanyiova 2018)

EPC certification systems need to set quality criteria for the preparation and implementation of EPC projects and stipulate requirements for EPC providers. Provided that all evaluation criteria required for the EPC certificate have been met, the certification body shall issue the project certificate to the applicant. Within the QualitEE project, SEVEN carried out a detailed analysis to set criteria for detailed evaluation of EPC projects. Finally, 17 criteria have been selected from the draft version of the European technical criteria for the quality of energy efficiency services (EES)* (Leutgöb et al. 2017) prepared within the QualitEE project. In order to gain a certificate for an EPC project in the Czech Republic, these criteria will have to be fulfilled. The criteria focus on the following areas: savings guarantee, verification of energy savings, maintenance and repair, communication with clients, compliance with users' comfort requirements, and comprehensive contractual arrangements. (Szomolanyiova 2018)

As a follow up, the EPC certification system features need to be developed in more detail and discussed with the stakeholders on the EPC market. A political decision on which organisations will play three key roles in the system needs to be made; the first organisation which sets out the criteria, requirements and rules of the certification system; the authorising body which accredits the certification body, and the certification body which certifies projects and/or the EPC provider. (Szomolanyiova 2018)

9.5 France

There have been no attempts to create a comprehensive quality assurance scheme for EES until now. However, there are labels related to specific areas of EES provision as described below.

9.5.1 RGE label

RGE label (Recognised as Protector of the Environment) – This label is given to a professional if they work in accordance with standards NF X50-091 and NF EN ISO 17065, which assure that:

- ✔ The professional is administratively and fiscally in order;
- ✔ They have followed a certified training in their specialty;
- ✔ If they work with sub-contractors, they must be certified as an RGE;
- ✔ They have delivered at least 2 projects in the last 4 years, in the concerned activity;
- ✔ They must submit evidence to an audit (implementation control) 2 years after the end of works.

9.5.2 Qualibat, Qualit'EnR labels

Qualibat and Qualit'EnR labels are complementary to the RGE label; Qualibat labels quality in construction, Qualit'EnR labels quality in renewable energy production installations.

9.5.3 The NF HQE [™] Tertiary Buildings in operation Label

The NF HQE [™] Tertiary Buildings in operation Label is open to any owner, operator or user of non-residential buildings, both public and private. It enhances the environmental performance of buildings (with the exception of health care buildings): offices, shops, schools, cultural institutions, penitentiaries, etc. It can apply to a building or to a building stock and it may be requested independently by an owner, an operator or contracting authority and by a user. Split into three axes, it enhances the interventions of each building actor:

- ✔ sustainable Building Axis – concerning the intrinsic environmental quality of the building;
- ✔ sustainable Management Axis – concerning the environmental management in terms of technical services and service delivery, care and maintenance;
- ✔ sustainable Use Axis – regarding the tenant's operation of the building.

9.6 Germany

Currently there are no certifications or labels specifically designed for energy efficiency services in Germany. However, there have been label schemes implemented that address parts of EES.

9.6.1 The Blue Angel

The **Blue Angel** (Der Blaue Engel) is a German certification for products and services that have environmentally friendly aspects. It has been awarded since 1978 by the Jury Umweltzeichen (the Ecolabel Jury), a group of 13 people from environment and consumer protection groups, industry, unions, trade, media and churches. Blue Angel is the oldest ecolabel in the world, and it covers some 10,000 products in some 80 product categories. (Blue Angel The German Ecolabel 2018)

After the introduction of Germany's Blue Angel in 1978 as the first worldwide environmental label, other European and non-European countries followed this example and introduced their own national and supra-regional environmental labels. The common goal of these labels is to inform consumers about environmentally friendly products thereby giving global support to product-related environmental protection. In 1994, several countries cooperated in developing the Global Ecolabelling Network (GEN) - a non-profit interest group composed of ecolabel organisations throughout the world. (Blue Angel The German Ecolabel 2018)

The BlueAngel works at independent certification body and certifies energy services including energy saving contracts. The main criteria for certification of energy saving contracts are; CO₂e savings of 30% and greater, and primary energy savings of 25% and greater. (Blue Angel The German Ecolabel 2018)

9.6.2 Energy-Saving Hospital Label

For German hospitals, sustainability is linked with energy efficiency. In 2001, the association BUND e.V. (Friends of the earth Germany) has developed the **Energy-Saving Hospital Label** (Energie sparendes Krankenhaus Gütesiegel), an award any hospital in Germany can provide evidence of achieving significant energy savings and reductions in CO₂ emissions. (BUND – Gütesiegel Energie sparendes Krankenhaus 2018)

In Germany, nearly EUR 600 million energy cost savings and 6 million tons CO₂ savings have been achieved by hospitals involved with this programme. This has been achieved without any restrictions to the clinic's services and in many cases has improved comfort conditions. (BUND – Gütesiegel Energie sparendes Krankenhaus 2018)

9.6.3 TÜV Nord's / SÜD's Energy Efficiency Verification services

TÜV Nord's / SÜD's Energy Efficiency Verification services have been developed to support the efforts of manufacturers, importers and retailers to achieve compliance with energy efficiency regulations and voluntary energy efficiency programmes. In addition TÜV's global Energy Efficiency Centres of Excellence are equipped to test and certify energy-consuming products to worldwide energy efficiency requirements and standards, providing a single source for testing and certification services for all types of electrical equipment and appliances. (TÜV SÜD 2018)

TÜV SÜD offers a comprehensive suite of testing, certification and advisory services on the regulations, standards and voluntary energy efficiency and performance programs applicable to all types of energy-using products. TÜV SÜD technical experts can also assist in product design and development, quality testing, environmental certification and transport monitoring, and can provide customised services in support of global supply chain activities. The TÜV SÜD blue octagon certification mark is globally recognised as a symbol of product safety. (TÜV SÜD 2018)

TÜV SÜD's testing and certification services for energy-using products include:

- ✔ Testing - TÜV SÜD holds accreditations in the U.S., Canada and the European Union for regulatory and voluntary energy efficiency certification schemes.
- ✔ Documentation - TÜV SÜD can review the content of product documentation and advise of any changes necessary to ensure compliance with applicable requirements
- ✔ Regulations - TÜV SÜD technical experts keep up-to-date with regulations, standards and programmes applicable to energy-using products worldwide, and participate in a number of key industry groups and trade organisations.
- ✔ Other requirements - TÜV SÜD can offer support in complying with the requirements of other regulations and standards applicable to energy-using products. (TÜV SÜD 2018)

Energy efficiency testing is applicable to a broad range of energy-using equipment and appliances and includes a number of specific tests and assessments intended to evaluate various design features and use considerations of a given product. Energy efficiency testing can include:

- ✔ Energy consumption measurements;
- ✔ Energy efficiency assessment;
- ✔ Testing of power consumption in off mode;
- ✔ Testing of power consumption in standby mode;
- ✔ Availability of standby or power-saving functions;
- ✔ Power management features.

Ultimately, the use of specific energy efficiency tests depends on market regulations and buyer expectations. (TÜV SÜD 2018)

9.7 Greece

In Greece, there is currently no national EES certification scheme and there are no planned activities for a national EES certification scheme. The only existing certification scheme is the European-wide private initiative of the Investor Confidence Project.

9.8 Italy

9.8.1 Quality assurance for EES providers

Certification of ESCOs


The national technical standard for ESCOs (UNI CEI 11352) was introduced in Italy in 2010. In 2014, the standard was updated to focus more on the certification of ESCOs. The Standard refers to the European standard EN 15900 on energy efficiency services. Among other requirements (technical, financial, managerial), an ESCO must demonstrate to have or have had at least one energy performance contract to become certified. (ENEA FIRE 2016)

ACCREDIA, the national accreditation body, accredits which bodies are allowed to certify ESCOs under the standard. ACCREDIA also manages a database of certified organisations. The certification bodies that issued the certification must periodically send data to ACCREDIA for inclusion in its database.

A rise in the number of certified ESCOs can be partially attributed to new legislation requiring this certification to participate in national schemes. According to Legislative Decree 102/2014, energy audits may only be prepared by certified ESCOs, certified Energy Management Experts or certified Energy Auditors. Furthermore, companies are only able to participate in the White Certificate Mechanism if they are certified in accordance with standards UNI CEI 11352 and UNI CEI 11339. (Joule Assets Europe Group S.r.l. 2017)

Requirements for ESCOs

To be certified under standard UNI CEI 11352 as an ESCO, a company must comply with the following requirements (La Bottega dell'Energia n.d. and Joule Assets Europe Group S.r.l. 2017):

-  An ESCO will only make a profit if the project implemented results in quantifiable and/or measurable energy savings. The ESCO's profit itself will be directly related to the savings.

- ✔ The client does not have to participate in the investment; instead it is the ESCO that finances it directly or that obtains the necessary financing (through a mechanism known as Third Party Financing)
- ✔ An ESCO provides its customers with the guarantee of energy savings or the offer of a service with lower energy costs than those currently incurred.
- ✔ ESCO must have the following skills:
 - Organizational (administrative, legal, contractual, retraining, etc.)
 - Analytical (know how to perform an energy audit, a cost- benefit analysis, etc.)
 - Planning (drafting of project plans, supporting the client in the administrative work, etc.)
 - Operational (implementation of measures and installation of equipment, ability to implement an Energy Management System)
- ✔ The ESCO must ensure the availability of measured data to the client throughout the service provided and through an adequate reporting processes.
- ✔ The ESCO must be able to carry out energy efficiency services in accordance with standard UNI CEI EN 15900:2010.

There are two appendices to the standard: A: Checklist for verification of requirements and B: Minimum contents of the energy services offer by the ESCO. In Annex A, it is indicated that if the ESCO employs an Energy Management Expert certified according to UNI CEI 11339, demonstration of the fulfilment of some of the requirements for an ESCO as listed above will be much easier. (Joule Assets Europe Group S.r.l. 2017)

ESCOs versus other types of EES providers

At the beginning of this century around 30-40 ESCO were active in the Italian market. Most of their activity was in the public sector, for public lighting and heat service projects, as well as cogeneration. The introduction of the white certificate scheme, which allowed ESCOs to participate, greatly stimulated the market. Over 3,000 companies defined themselves ESCOs within the 10 years after the introduction of the white certificate scheme, although most of them were fundamentally consultancies.

Today ,there are about 1000 companies registered as certified ESCOs²⁷ (ACCREDIA October 2018).The introduction of UNI CEI 11352 standard considerably reduced the number of certified ESCOs. , Still today, only a part of the certified ESCOs are delivering EPCs (Dario Di Santo May 2018). This can be linked to the observation that the Italian energy efficiency market generally prefers “payment for work” rather than “payment for energy savings”.

In Italy, ESCOs certified according to the UNI CEI 11352 are easily confused with companies labelled “Società di Servizi Energetici” (SSE) defined the by “Twin Decrees” of July 20, 2004,

²⁷ https://www.accredia.it/app/uploads/2018/10/DatiESCO_15-10-2018.pdf

which can be literally translated into English as “Energy Service Company”. In order to be an SSE, it is sufficient that the company offers energy services (even without any proven experience in the field). In addition, companies labelled “Le Energy Service Provider Company” (ESPCo) have very similar names and definitions to ESCOs, further increasing confusion. The difference between an ESCO and an ESPCo is that the former takes on a financial risk in providing energy services (or through TPF), while the second does not. In practice, ESPCos typically only provide consulting services, without managing and/or monitoring a project’s savings. These similar naming conventions often lead to unfair behaviour of some companies. It is not infrequent to run into situations where an SSE claims to be an ESCO. For instance, SSEs that are accredited for the mechanism of the White Certificates present themselves on the market as an ESCO that, while having achieved the minimum requirements of UNI CEI 11352, offer services only as an SSE. ESPCos also present themselves as ESCOs. Therefore the clients are advised to ask the companies to provide them with the certification according to the UNI CEI 11352 standard as well as check they are present in one of the official lists (FIRE , FEDERESCO , ASSOESCO etc.) (La Bottega dell’Energia, n.d)

9.8.2 Quality assurance for EES services

While there is a quality assurance system for EES providers in Italy, there is no such system for energy efficiency services. The most relevant existing credential is the Energy Performance Certificate (APE), which indicates the energy performance and the energy efficiency rating of buildings, houses or apartments, classifying them with a scale from “A4” (the most energy-efficient) to “G” (the least efficient). In addition, there are a few initiatives within the EU’s Horizon 2020 programme (such as the Investor Confidence Project Europe and Trust EPC South) that are developing certificates applicable to energy efficiency services.

9.9 Latvia

Until now ESCOs have not been distinguished as a special business type and currently there is no certification of ESCOs and their services in Latvia. Although the EPC market is quite small, ALTUM (a state-owned development finance institution) is considering the possibility of establishing specific criteria for ESCOs and creating a register of ESCO companies. (Kamenders et al. 2018)

Within the Sunshine and Accelerate Sunshine projects, a standardised scheme (standardised EPC contracts, M&V forms, guidelines etc.) for energy efficiency projects in buildings is currently being developed. Some voluntary schemes including Passivhaus certification and RBEAM have been used in some energy efficiency projects in Latvia, but both certification procedures are not widely used and recognised. (Kamenders et al. 2018)

9.10 The Netherlands

In the Netherlands no system exists for formally certifying services in the energy sector. However, there is a system for certifying professionals that are active in different technical areas - QBIS²⁸. In QBIS there are various categories of professionals, such as energy contractors, energy advisors, EPC facilitators, etc. QBIS is based on the principle of transparency and peer review, rather than formal requirements. (Goorden and Coolen 2018)

For example, for the voluntary inspection of central heating systems, the installers are encouraged to join a quality mark under which they receive training and write exams, issue written inspection reports to the customers and report back to the certification body on performed inspections and energy-saving recommendations provided. The government has provided a grant to the sector for 2016 so that a communication campaign focussing on consumers can be conducted. (NEEAP 2017)

9.11 Portugal

Although there is no quality assurance system for energy efficiency services currently operating in Portugal, a regulatory framework for ESCOs working in the public sector has been implemented that aims to improve the quality of EES projects. Essentially a public contracting scheme was created, with a defined procurement process and contract template to be followed by all public institutions (Fonseca et al. 2015). However, despite strong initial activity the programme is now, seven years after its launch, being criticised for being ineffective (Tribunal de Contas 2018). This framework is described in the following sections.

9.11.1 ECO.AP Programme

The Energy Efficiency Programme in Public Administration (ECO.AP) originally aimed to achieve a 20% improvement in energy efficiency in public services and Public Administration bodies by 2020. This target was later raised to 30%. ECO.AP is an evolving programme that develops a set of energy efficiency measures for implementation into public services, agencies and facilities. These measures aim to change behaviour and promote effective management of energy, notably by **hiring Energy Services Companies (ESE)**. This programme also aimed to promote the Government recommendation on the mandatory disclosure of energy bills by Public Administration, approved by Resolution of the Assembly of the Republic Nº. 114/2010, 29 October, as well as to create a White Certificates scheme for the Public sector. (IEA 2014)

²⁸<http://www.qbis.nl>

9.11.2 Specifications for procedures of energy performance contracts under ECO.AP Program.

The specifications set out in the Energy Efficiency Programme in Public Administration (ECO.AP) should be adopted by respective entities in all procedures for EPCs launched under the programme (IEA 2013).

Decree-Law No 29/2011 establishes how the **energy performance contracts (CDE)** should be conducted between the Public Administration and the **Energy Services enterprises (ESEs)**. Order No 60/2013 approved the standard specifications for **procedures for the conclusion of energy efficiency management contracts**. (Third NEEAP of Portugal 2017). The definition of an ESE is based on the definition of energy service company from the previous Energy Services Directive 2006/32/EC:

Energy services enterprises provide energy services and other energy efficiency improving measures at a user's premises, assuming a degree of financial risk, whereby their remuneration for the services provided is wholly or partly based on the degree of achievement of energy efficiency improvements, and on satisfying other energy efficiency criteria that may be contractually set through an energy performance contract.

However, seven years on, **only three energy efficiency management contracts have been signed under the programme** and those were signed only by municipalities and not by central Government administration bodies. A significant number of entities operating in the direct and indirect administration of the State have still not implemented the measures envisaged in the Programme, in particular those regarding the appointment of local energy efficiency managers and the design and implementation of energy efficiency management plans. (Tribunal de Contas 2018)

9.11.3 Qualification System for Energy Services Companies (SQESE)

The launch of the ECO.AP Programme was accompanied by the implementation of a Qualification System for Energy Services Companies (SQESE) establishing **minimum requirements for technical and financial capacity for the qualification of Energy Services Companies (ESE) to participate in procurement procedures related to energy efficiency contracts with public administration bodies** (IEA 2013). SQESE was established by the Regulatory Order no. 15/2012.

The Ministry of Environment, Spatial Planning and Energy (Directorate-General for Energy and Geology - DGEG) established an official database for the registry of certified auditing companies and ESCOs. Apart from registration itself, the system grants companies the status of being qualified or not qualified for participation in public procurement. If they are not qualified according to the Portuguese Public Procurement Law (CCP - Código de Contratação Pública and particularly Eco.AP), they are not eligible to participate in public procurement. All the qualified ESCOs must be registered, but not all the registered ESCOs are qualified. There

are many companies registered as ESCOs that did not apply for the qualification scheme as without it they can still participate in private procurement.

To become qualified the ESCO must prove they employ suitable technicians required in the delivery of energy services and they must prove their financial capacity via official tax documents. If an ESCOs cannot fulfil the technical and financial requirements, they can qualify by partnering with another company (which does not have to be an ESCO) that can provide the missing requirement (technical or financial). If this "aggregated ESCO" wins a tender, they must form a joint venture for the duration of the EPC.

The system establishes two levels of **requirements of a technical and financial nature** depending on the energy consumption of buildings or equipment subject to the EPC:

- ✔ Level 1: buildings or equipment with annual energy consumption lower than 3 GWh;
- ✔ Level 2: buildings or equipment with annual energy consumption higher than 3 GWh. (Third NEEAP of Portugal 2017).

Technical capacity requirements are defined differently for each level. To be qualified for level 1, ESCOs must have employed technicians that meet the following criteria (Concerted Action Energy Services Directive 2013):

- ✔ At least two qualified experts, one qualified under the RSECE-Energy field in the framework of the National System for Energy and Indoor Air Quality Certification of Buildings (SCE), in two of the following three areas:
 - 1. RCCTE (Regulations on Thermal Behaviour of Buildings)
 - 2. RSECE (Regulations on HVAC Systems in Buildings) – Energy
 - 3. RSECE (Regulations on HVAC Systems in Buildings) - Indoor Air Quality;
- ✔ A technician with experience in energy auditing, who can demonstrate involvement in at least four energy audits over the past two years in Portugal or another EU Member State. Alternatively they can be qualified under the Management System of Intensive Energy Consumption (SGCIE).

To be qualified for level 2, ESCOs must employ technicians that meet the following criteria:

- ✔ At least two qualified experts within the SCE, one qualified under the RSECE-Energy field, whose skills enable the scope of the three areas mentioned above
- ✔ A qualified Certified Measurement and Verification Professional (CMVP), under the International Performance Measurement and Verification Protocol (IPMVP)
- ✔ A qualified technician under SGCIE, and
- ✔ A civil, mechanical or electrical engineer that recognised by the relevant professional association, and with experience in providing EES.

The financial requirements are defined to be the minimum financial capacity to be met by ESCO (cumulatively), referring to the last two completed projects or projects in progress:

- ✔ For level 1: turnover of at least € 250,000 and financial autonomy higher than 15%;
- ✔ For level 2: turnover higher than € 1,500,000 and financial autonomy higher than 20%.

In 2011, when the laws promoting energy efficiency in the public sector and regulating ESCO activities were ratified (Act No. 2/2011 and No. 29/2011) and the ECO.AP was launched, the number of ESCOs increased significantly. More than 100 companies registered as ESCOs in the national registry database provided by DGEG, and they expected to participate in the public procurement of energy services, in the scope of the ECO.AP programme (Fonseca et al. 2015). Since then, there has been no development in this database. The list of registered ESCOs and also the list of qualified ESCOs are still the same as at the beginning of the ECO.AP program. Many of the companies listed are no longer working in the EPC market and some have ceased trading. The list and qualification scheme has not been updated for several years. According to Espejjo Luque and Real Ruiz (2018), there are currently 132 qualified companies registered in the database.

9.12 Slovakia

In Slovakia, there has been a quality assurance scheme for EES providers in place since 2015, but there is no quality assurance for EES services.

9.12.1 Qualification system for EES providers

In 2015, a quality assurance system for EES providers was introduced to support the quality of EPC services. Under this system guaranteed energy services may only be provided holder of licence confirming professional competence to provide guaranteed energy services or a certified energy auditor. Obtaining of the licence is subject to passing an exam. All holders of the license are obliged to take part in programme specific training courses every three years. (Lauko and Rothova 2018)

On its website²⁹ the Ministry of Economy maintains a list of guaranteed energy service providers. The method used to make entries in the list is governed by the Implementing Decree of the Ministry of Economy No 99/2015 on providers of ancillary and guaranteed energy services. Energy service providers are required to send data on energy services provided in the previous calendar year to the energy efficiency monitoring system.

Act No. 321/2014 - which introduces the system - defines EPC services as follows: "A Guaranteed Energy Service is an energy service provided through an energy efficiency contract with a guaranteed energy saving". The Act further lists items to be included in the contract when working with a public body. The Act also contains the compulsory content of an energy efficiency contract where energy service provision affects the public sector.

²⁹<http://www.mhsr.sk/poskytovanie-energetickej-sluzby/145697s>

There is no special definition of quality assurance for the provision of Energy Supply Contracting. In many cases, EPC providers offer ESC as well. An ESC provider is considered as an energy supplier and thus needs to have a certificate and licence for a business operating in the field of power engineering (according the Act No. 251/2012 relating to energy industries) or a licence for a business in the field of heating engineering (according the Act No. 657/2004 relating to the heating industry)

9.13 Slovenia

In Slovenia there is no quality assurance of EES providers or services, however there are schemes related to the quality of EES as described below.

9.13.1 Scheme for the inspection of Air-conditioning Systems

Inspections of Air-conditioning Systems include an inventory and review of documentation, visual and functional check of the AC system and air-conditioned rooms, preparation of proposals for improvement and alternatives, and creation of the inspection report by independent expert with a state licence (Staničić 2018).

9.13.2 Inspection of Heating Systems Scheme

A draft Regulation for inspection of heating systems is set to be launched in 2018. Inspections of heating systems shall include an audit of the heat generator, control system and circulation pumps by an independent expert with state license. The inspections will also include an assessment of the efficiency of the heating systems and their suitability to the use of the building (Staničić 2018).

9.13.3 Building Renovation Quality Management Scheme

Between 2018 – 2020 the guidelines for quality management of the energy renovation of buildings are expected to be announced. These will take into account aspects of sustainability and building information modelling (Staničić 2018).

9.13.4 Conditions, requirements and evaluation criteria for EPC projects co-financed as part of the framework of the Operational programme for the implementation of the EU Cohesion Policy 2014-2020

In order to promote investments in energy renovation of buildings, which has enormous untapped energy saving potential in Slovenia, and to ensure that 3% of the total floor area of heated and/or cooled buildings owned and occupied by the central government is renovated each year, a comprehensive energy renovation of buildings in the public sector, comprising

technology measures and thermal envelope, is supported as one of the national cohesion programme priorities.

Investment support, which grants up to 40% of eligible costs, primarily aims to encourage the combination of public and private financing strands via EPC and public-private partnership (PPP), making it possible to deliver the required investments in energy efficiency, renewable energy sources (RES) and energy management. (Ministry of Infrastructure of the Republic of Slovenia 2018)

Conditions

The EPC project must demonstrate compliance with the following conditions to be eligible for investment support:

- ✔ the public partner has performed a preliminary procedure, in line with the PPP Act, on the basis of which the decision is made to operate a PPP EPC project through the energy efficiency service concession;
- ✔ the PPP EPC project is designed as a comprehensive energy renovation of the public building(s);
- ✔ only part of the investment that contributes to required and guaranteed level energy end-use savings and use of RES is supported. Cultural heritage buildings are subject to modified criteria in line with the national guidelines for energy renovation of cultural heritage buildings.
- ✔ buildings have undergone investment grade energy audits and have energy performance certificates;
- ✔ a measurement and verification plan has been prepared;
- ✔ the investment is over 750,000.00 € excluding VAT;
- ✔ sources of finance are identified and the 'funding gap method' was used to demonstrate the financing needs and proportionality of the state aid foreseen to be granted to the EPC project. Private financing should be more than 50%.
- ✔ in the case of building(s) co-ownership an owners' agreement on co-financing and implementation of the EPC project is put in place;
- ✔ municipalities should have an adopted Local Energy Concept. (Ministry of Infrastructure of the Republic of Slovenia 2018)

Requirements

Beside common provisions of the Cohesion Fund there are some specific requirements, that are included in the invitations to tender and must be fulfilled:

- ✔ the applicant/beneficiary must ensure that, in the event that the EPC provider is also an energy distributor and/or retail energy sales company which sells energy to energy users, the energy savings that result from the energy efficiency measures implemented and are subject to co-financing should not also be taken into account under the national energy efficiency obligation scheme;
- ✔ in the case that ELENA (EIB, EBRD) funds have already been received for the costs of preparing PPP EPC project documentation necessary for applying for the public calls, these funds are considered as a non-eligible expense, and the amount of ELENA funds obtained does not affect the amount of co-financing. (Ministry of Infrastructure of the Republic of Slovenia 2018)

Award criteria

The proposed projects that fulfill the prerequisite eligibility conditions are assessed on the basis of a set of award criteria. The criteria are divided into three award sets defined by sub-indicators and a supplement for cultural heritage buildings:

- A. Energy efficiency (weight 50%)
 - 1. The ratio between the annual final energy savings and the energy renovated building(s) area, which must be at least 30 kWh/m²/year, otherwise the bid is rejected, (sub-weight 80%)
 - 2. The ratio between additional production of energy from RES and the final energy consumption after energy renovation of building(s), (sub-weight 20%)
- B. Cost efficiency (weight 35%)
 - 3. The ratio between the annual final energy savings and the value of the PPP EPC eligible costs, which must be at least 15%, otherwise the bid is rejected, (sub-weight 100%)
- C. Contribution to social change and raising social awareness (weight 15%)
 - 4. The ratio between PPP EPC 'cohesion operation' investment cost without VAT and total 'cohesion operation' investment cost, (sub-weight 30%)
 - 5. The 'cohesion operation' investment cost without VAT, which must be at least EUR 750,000, (sub-weight 50%)
 - 6. Setting up electric vehicle charging station(s), yes/no, (sub-weight 20%)
- D. Specific award criteria for buildings of cultural heritage considering "virtual energy savings" of measures which, due to the protection of cultural heritage, cannot be fully or partially implemented, ("annual final energy savings" = "actual annual final energy savings" + "virtual annual energy savings") (Ministry of Infrastructure of the Republic of Slovenia 2018)

Award set / Sub-indicator		Weight	Sub-weight	Max. no. of sub-points	Max. no. of points
A.	Energy efficiency and RES				
	1. The ratio between the annual final energy savings and the energy renovated building(s) area	0.50	0.80	100.00	40.00
	2. The ratio between additional production of energy from RES and the final energy consumption after energy renovation of building(s)		0.20	100.00	10.00
	TOTAL A	0.50	1.00	100.0	50.00
B.	Cost efficiency				
	1. The ratio between the annual final energy savings and the value of the eligible PPP EPC costs	0.35	1.00	100.00	35.00
	TOTAL B	0.35	1.00	100.00	35.00
C.	Contribution to social change and raising social awareness				
	1. The ratio between PPP EPC 'cohesion operation' investment without VAT and total 'cohesion operation' investment cost	0.15	0.30	100.00	4.50
	2. The 'cohesion operation' investment cost without VAT		0.50	100.00	7.50
	3. Setting up electric vehicle charging station(s)		0.20	100.00	3.00
	TOTAL C	0.15	1.00	100.00	15.00
				TOTAL A + B + C	100.00

9.14 Spain

In Spain, an ESCO registration system and several ESCO certification schemes have been implemented to date. The latest certification scheme for ESCOs is defined under a new standard (UNE 216701) and is the only ESCO certification scheme in Spain which applies certification according to international standards.

9.14.1 ESCO registration

In order to increase awareness about energy service companies, the Institute for Energy Diversification and Saving (IDAE - Instituto para la Diversificación y Ahorro de la Energía) has created a database of ESCOs based on the information they have submitted to their regional authorities. This information is sent to the Ministry of Industry, Energy and Tourism (MINETAD), in accordance with Royal Decree 56/2016. (NEEAP – Spain 2017). All companies operating in the energy sector are required to be registered. To be registered, a declaration must be issued in which the owner of the company or its legal representative demonstrates that the enterprise meets a set of mandatory requirements. (Espejo Luque and Briano 2018)

9.14.2 Certification of EES providers

Certification of EES providers according to the UNE 216701 standard

Currently the most widely used system of certification for ESCOs is the system established by **Association for Standardization and Certification (AENOR)** in 2016 and subsequently became **standard UNE 216701 – “Classification of energy services providers”** published in May 2018 by UNE (Spanish Association for Standardization). UNE was created by the separation of two parts of AENOR into UNE, which is the only Standardization Body in Spain and AENOR, which has

now become a solely independent certification body. UNE represents Spain in the international (ISO / IEC) and in the European (CEN / CENELEC) standardisation organisations.

In the original standard, ESCOs were divided into the following categories; auditing/consulting, exploiting and/or investment ESCOs. The criteria also consider the previous experience and capabilities of the company such as turnover, number of technicians, total amount of contracts and regions of Spain where the company operates.

In 2018, a new category was added for new ESCOs that have no previous experience but want to be classified.

To date, 64 certifications have been issued to 32 ESCO companies³⁰. This is the most widely used certification in Spain, and it is getting increasing recognition among clients as well financial institutions. (Espejo Luque and Briano 2018).



The classification of ESCOs establishes clarity and confidence in the market regarding the different types of ESCOs that exist based on their service offerings. Moreover, it defines the parameters within each category that allow them to be objectively compared.

The new standard has been promoted by some of the most important associations of the sector: ATECYR, AMI, A3e and ADHAC.

This certification, according to the Spanish Procurement Law, can be required in Public Procurement.

Certification of EES providers by ANESE

In 2015, the National Association of Energy Service Companies (Asociación Nacional de Empresas de Servicios Energéticos – ANESE) launched the first certification for ESCOs. ANESE offers two types of certification:

-  ESE certificate for companies that have not yet implemented any project following the ESCO model, but are established to do so.
-  ESE PLUS certificate for companies that can prove with evidence that they have worked following the ESCO model.

Currently, two companies are registered³¹ as ESE and 14 companies are certified as ESE PLUS. (Espejo Luque and Briano 2018)

³⁰List of certifications issued by AENOR:

https://www.aenor.es/aenor/certificacion/mambiente/mab_pse_listado.asp#.Wt7n9S5uYdU

³¹ List of companies certified by ANESE, <http://www.anese.es/empresas-clasificadas-como-empresas-de-servicios-energeticos/>

9.14.3 Certification of energy efficiency services





There is no official certification of energy efficiency services in Spain however, a few companies are developing their own certificates, especially under projects within the European Union's Horizon 2020 research and innovation programme framework.

9.15 UK

In the UK there are no national quality assurance schemes that specifically certify or label Energy Performance Contracting or Energy Supply Contracting services and / or their providers. There are however, several relevant initiatives. Apart from the international ICP Europe project described in chapter 7, the following relevant initiatives are described below.

9.15.1 Registered Energy Services Providers

Following the requirements of the EED the UK Government has established a register of Energy Services Providers³² that covers the following energy services:

-  **Energy Auditing** – there is a register of ‘lead assessors’ qualified to carry out submissions to the Energy Savings Opportunity Scheme (ESOS), which is the UK’s implementation of Article 8 of the EU Energy Efficiency Directive (EED). This mandates large private sector undertakings to perform comprehensive Energy Audits and identify opportunities for energy saving every four years.
-  **Building Performance Assessment** – there are separate registers in England & Wales, Scotland and Northern Ireland of domestic and non-domestic ‘Energy Assessors’ that are qualified to issue building performance certificates (known as ‘Energy Performance Certificates’) under the Energy Performance of Buildings Directive.
-  **Green Deal** – certification for providers, suppliers, installers and assessors working on the Green Deal scheme. The Green Deal was a Government initiative that aimed to encourage homeowners and businesses to improve energy efficiency by providing a quality assured opportunity assessment, implementation and financing scheme that is paid on a property’s energy bill (thereby reducing barriers relating to lack of capital and the risk of moving out of the property before the energy efficiency improvements have paid for themselves). The scheme has been scrapped due to complexity and low customer demand.
-  **Energy Performance Contracting Providers** – the register signposts to providers that have been appointed to provide EPC services under the RE:FIT scheme. This is a public procurement framework for EPC that is discussed in the following sub-chapter.

³²https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/628628/2017_List_Registered_Energy_Service_Providers.pdf

9.15.2 Public Procurement Frameworks for EPC

There are four major Public Procurement Frameworks for Energy Performance Contracting; RE:FIT (England & Wales only), the Carbon & Energy Fund (focussed on the Health Sector), Essentia & the Non-Domestic Energy Efficiency Framework (Scotland only). These procurement frameworks reduce the administrative burden for public sector contracting authorities by offering a procurement route for EPC that avoids the need to go through a full procurement process under EU rules. This is because the framework is already pre-tendered under EU rules such that public contracting authorities using the framework only need to run a 'mini-competition' process which is only open to pre-qualified EPC providers. These EPC providers are appointed during the framework tender process under EU rules. They must demonstrate via tender return (and associated interviews) that they have the capabilities, qualifications, insurances and financial standing to deliver EPC. The lists of EPC providers appointed to each framework are available at the following links:


-  [RE:FIT](#)
-  [The Carbon & Energy Fund](#)
-  [Essentia](#)
-  [The Non-Domestic Energy Efficiency Framework](#)

These frameworks are only open to public contracting authorities, apart from Essentia, although all of Essentia's activities to date have focussed around the public health sector.

Whilst these lists are useful to inform clients of EPC providers that have achieved a minimum level of suitability to deliver EPC services, they have been criticised for excluding smaller EPC providers that cannot meet the requirements of larger public sector projects.

9.15.3 Quality assurance schemes used to access energy related fiscal incentives

There are three key Government led schemes that grant access to renewable energy and energy efficiency technology related fiscal incentives by ensuring a minimum level of product, service and installation quality:

-  **CHPQA** – the Combined Heat and Power Quality Assurance Scheme. Led by the Government (Department for Business, Energy and Industrial Strategy), which has developed the Good Quality CHP standard and a certification system. The scheme, which is managed by a private company appointed by Government, assesses the quality of CHP installations in terms of efficiency and metering quality. The Government Department for Business, Energy and Industrial Strategy and the private company act as the sole certification body. Certification offers access to fiscal benefits such as exemption in the climate change levy.
-  **Microgeneration Certification Scheme** – Government initiated scheme to regulate the quality of renewable energy products and installers. It facilitates access to renewable energy subsidies; the feed in tariff and renewable heat incentive. Standards are drawn

up by market stakeholders and certification bodies are accredited by the UK national accreditation body; UKAS.

- ✔ **Energy Technology List** – a Government managed system where specific energy efficiency products are evaluated and registered such that customers buying these technologies can receive enhanced capital allowances. In the first year these allowances let businesses set 100% of the cost of the products against taxable profits in a single tax year.

9.15.4 Heat Trust

Heat Trust is a voluntary scheme aimed at protection of consumers using heat supply agreements from heat networks. Set up by the Association for Decentralised Energy in 2015 it is a voluntary scheme with its own rules (i.e. standard) overseen by the independent and impartial Heat Trust Committee. Registered participants (operating companies) and sites (the heat networks) must apply and meet minimum standards, and then can use the Heat Trust Trademark. Independent audits are conducted by external auditors to ensure compliance. (Keegan 2018)

9.15.5 EPC Code of Practice for the UK (draft)

The 'EPC Code of Practice for the UK' is a detailed draft code of practice for Energy Performance Contracting that was developed by the Energy Managers Association and a strategy board including major EPC providers and facilitators. The most recent draft was circulated in March 2014 prior to market testing. No specific progress has been made subsequently and a certification framework has not been established. The EMA has since become UK administrator of the European Code of Conduct for EPC (Keegan 2018). The Energy Services & Technology Association (ESTA) has also adopted the European Code of Conduct for EPC.

Table 5: Overview of quality assurance schemes pre-selected to serve as a good practice examples

Cou ntry	Name of system	Quality assurance by/registry	Scope of EES	Subject of quality assurance	Description	Status	Year of implemen tation	Institutions involved
AT	DECA - quality criteria for energy efficiency services	private entity - QA done via "self declaration with plausibility check" by provider	EPC other	contract; provider indirectly	A quality assurance system for energy services. A set of quality criteria have been operationalised in order to apply them in a transparent and traceable way. An evaluation method and tool has been developed.	Test phase	2017	Board of DECA
AT	Thermoprofit	Independent certification body	ES	Service	Quality label for contracting services; It is a public-private partnership; The Thermoprofit Network consists of suppliers of total service packages. They co-operate with regional enterprises based on bidding processes for in the execution of projects. They commit themselves to the Thermoprofit quality standards and are certified by the Thermoprofit-Commission as qualified and professional contractors. The Graz Energy Agency co-ordinates the networks.	Implemented	1996	Graz Energie Agentur
AT	Eco-Label Energie-Contracting	governmental institution	EPC ESC	service	An eco-label that can be used to certify energy contracting services that fulfil the requirements imposed by the Directive.	Implemented	1990	Ministerium für ein Lebenswertes Österreich
AT	Building Certificate klimaaktiv	self-imposed	building design	provider, service, management systems	Klimaaktiv's primary objective is to launch and promote climate-friendly technologies and services. In doing so, klimaaktiv focuses on high standards of quality. The klimaaktiv building standard is the guiding principle for environmental and energy-efficient design throughout Austria. It operates with a system of self-declaration with plausibility check.	Implemented	2004	Federal Ministry of Agriculture, Forestry, Environment and Water Management
BE	Deontological (i.e. ethical) code of the Flemish association of Energy experts	private entity	energy audit, ES	energy expert	A code of ethics that is signed by energy experts that declares: 1. Social responsibility 2. Responsibility towards the client 3. Integrity	Implemented	ongoing	OVED

BE	Accreditation system of qualified NEN2767 auditors	private entity	energy audit, ES	auditor	Courses to be taken by building managers or representatives from EPC providers, in order become accredited NEN2767 auditor.	Implemented	ongoing	Centrum Duurzaam Bouwbeheer
BE/DE	"Performance Test Bench" (in German: Digitale Prüfstand)	private entity	energy audit	technical installations of existing buildings	There is neither formal certification nor label. The tool is used to assess the energy performance of the technical installations in an existing building.	Implemented	2015	Synavision
BG	National certification system for sustainable buildings	governmental institution	building	service	A set of standardised methods for assessment of integrated sustainability characteristics of buildings currently under development by the national technical committee БИС/ТК 101 "Sustainable Construction"	under development	2018	Ministry of Regional Development, Architect Chamber, Construction Research Institute, National Standardization Institute
BG	Energy Auditors	governmental institution	energy audit	provider	A regular energy audit is mandatory for certain buildings, industrial systems, and street lighting systems. Energy auditors must be certified by the government in order to carry out these energy audits. To achieve certification, they must be able to document that they have the minimal qualifications set in the relevant Ministerial Decree.	Implemented	2015	Ministry of Energy
BG	Quality Indicators for Heat Supply	governmental institution	ESC	service	Covers indicators concerning both the quality of heat energy and the quality of heat supply services (e.g. availability of written rules; available registries of producers, consumers, complaints, etc.; written answers to complaints; 24h call centre, etc.)	Implemented	2004	EWRC
BG	Quality Indicators for Electricity Supply	governmental institution	ESC	service	Covers indicators concerning both the quality of electricity and the quality of electricity supply services.	Implemented	2004	EWRC
BG	Quality Indicators for Gas Supply	governmental institution	ESC	service	Covers indicators concerning both the quality of gas and the quality of gas supply services.	Implemented	2004	EWRC

BG	Certification of Engineers-Designers	governmental institution	building design	provider	Administered by the Chamber of Engineers in the Investment Design. Certificates are available for various engineering fields – HVAC, electricity, heat and gas supply, etc.	Implemented		Chamber of engineers in the investment design
BG	Certification of Installers of renewable energy technologies	governmental institution	ES	provider	Only the listed certified installers are eligible to install biomass, solar PV, solar thermal, heat pumps, and geothermal technologies.	Implemented	2011	Sustainable Energy Development Agency
CZ	Proposal of the certification system for EPC providers	independent certification body	EPC	service, provider	Various models of a certification system for EPC providers have been discussed as well as institutionalisation of the system. A list of requirements for certified EPC providers has been made. In 2018 the proposal has been developed for the Ministry of Industry were both certification of EPC projects and EPC providers are proposed. The Certification of and EPC provider requires at least three certified EPC projects plus some other requirements for the company and its employees.	Under development	n.a.	Ministry of Industry and Trade, association of the energy service providers - APES
CZ	Reasonable energy savings	governmental institution	EES	service	Energy saving programme that provides a quality certificate and/or label guaranteed by the Government.	Under development		Ministry of Industry and Trade
CZ	energy experts	governmental institution	experts	provider	The Ministry of Industry operates lists of certified energy experts according to the Energy Management Act (406/2000) and Decree no. 213/2001 and decisions of the Ministry of Industry No. 118/2001. There are four types of energy experts: experts to perform energy audits, energy performance testing for buildings, boiler control and air-conditioning system control. The Energy Management Act requires the companies to use only certified energy experts listed to comply with the requirements of the Energy Management Act, as well as to conduct energy audit each 4 years for all Large companies.	Implemented	2001	Ministry of Industry and Trade

CZ	Certified Architects and Certified Engineers and Technicians	private entity	experts	provider	Act no. 360/1992 on the Professional Practice of Certified Architects and on the Professional Practice of Certified Engineers and Technicians Active in Construction sets forth requirements for pursuit of the professional activities of architects in the Czech Republic. Persons who attained necessary qualification for the pursuit of the professional activities of architect may perform chosen activities in construction after registration in the Czech Chamber of Architects.	Implemented	1992	Czech Chambers of Architects, Certified Engineers and Technicians Active in Construction
DE	Blauer Engel - Energiedienstleistungen mit Energiespar-Garantie-Verträgen	independent certification body	EPC	service	A certificate for energy services including energy saving contracts. The main criteria for certification of energy saving contracts are; CO ₂ e savings of 30% and greater, and primary energy savings of 25% and greater.	Implemented	1978	RAL gGmbH
DE	BUND Gütesiegel Energiesparendes Krankenhaus	private entity	Hospitals	service	The BUND Certificate for Energy Saving Hospitals is awarded to hospitals that fulfil certain energy consumption criteria. These criteria are: C1 reduction of CO ₂ emissions, C2 continuous reduction of energy consumption, C3 stable consumption at an optimal level and C4 implementation of an energy management system.	Implemented	2001	BUND, technical experts such as the BEA
DE	Energy Efficiency for Building and Sanitation – KfW Program 431 and the QA	private entity	buildings	service	There are different required elements that guarantees the quality of a project: 1. Participation of experts; 2. Minimum technical requirements; 3. Confirmation of the application, 4. Supervision of the construction. They also have other quality controls, such as auditing, demonstration test or on-site inspection	Implemented		KfW
DE	TÜV Süd/Nord - Building quality control	independent certification body	buildings , EPC	service	Two different certificates: the first one addressed to quality energy services; the second one addressed to buildings	Implemented		TÜV SÜD
DE	Passive House	private entity	buildings	service	For a building to be considered a Passive House, it must meet various criteria concerning to space heating demand, space cooling demand, primary energy demand, airtightness and thermal comfort.	Implemented	1990	Passive House Association

SI	Certification for Auditors of Air Conditioning Systems	governmental institution	ES	provider	Only certified auditors are eligible to perform regular checks of air conditioning systems.	Implemented	2014	Ministry of Infrastructure , University of Ljubljana, Faculty of Mechanical Engineering
SI	ENSVET	governmental institution (EcoFund)	ES	provider	ENSVET represents a program of free energy consultation for citizens. Eco-fund (in line with the Energy Law, EZ-1, Article 352) has set up the Network of ENSVET offices across Slovenia that offer energy consultation focusing on energy efficiency and use of renewable energy sources.	Implemented	2014	EcoFund, Building and Civil Engineering Institute

Source: pre-selection of the schemes was conducted by CREARA with support from QualitEE project partners

10 CONCLUSIONS

EPC and ESC market developments

The QualitEE survey (September 2017) showed positive developments of the EPC market across the 15 EU countries covered by the survey. More than half of all respondents – EPC providers and facilitators (53%) - reported that their **national EPC market had seen growth over the last 12 months**. The public sector was found to be driving EPC markets across All Countries. The most frequent clients are the municipalities, followed by education and healthcare sector and industry. The typical number of EPC projects initiated by an EPC provider within the last year was reported to be between one and five. The most common EPC contract length was reported to be five to ten years and initial investment outlay less than 1 million EUR.

When it comes to **energy supply contracting (ESC) projects, market growth was reported to be slower than in the case of EPC**. Both growth and stagnation were reported by about 45% respondents each. Almost all respondents had ESC clients from both the public and private sector, so there is a higher share of ESC projects in the private sector (vs. public sector) than for EPC projects. Most ESC providers and facilitators reported that they became involved in 1 – 5 ESC projects in 2017. ESC projects were also found to have a lower value than EPC projects, i.e. below EUR 500,000.

Market barriers

The most significant barriers to EPC business revealed in the survey are complexity of the concept / lack of information identified by 59% of the respondents, followed by lack of trust in the ESCO industry (53%), low energy prices (45%) and administrative barriers in public sector (44%). As far as the main drivers of EPC business are concerned, the most substantial aspect reported is the energy savings guarantee (59%) followed by limited budgets in public sector and pressure to reduce the costs.

Similarly to the EPC market, **lack of trust into ESCO industry (49%) is the top barrier to the ESC market** in the QualitEE survey. It is closely followed by a **lack of government support (45%)**. In contrast to the picture on the EPC market, complexity of the concept and administrative barriers were perceived as a barrier only by around 30% of respondents. While these barriers are similar to those on the EPC market, they are somehow less significant as the process of preparing and implementing ESC projects is usually less complex and does not include an energy saving guarantee. As a result, ESC projects are struggling less with complex administrative and accounting rules in the public sector.

Quality determinants

While **preliminary analysis for the EPC projects was highlighted in the survey as the key quality determinant**, quality improvement was reported to be needed also in all other areas of project preparation and implementation. **The preliminary technical-economical analysis (energy audit) was reported as major quality determinant by 79% of respondents, followed by achieving the**

expected level of savings and measurement & verification of savings identified by about 65% of respondents.

There was broad agreement amongst all surveyed groups (ESC providers and facilitators, clients and financial institutions) that the areas of ESC projects which need the most attention when it comes to the quality are **preliminary technical-economic analysis / energy audit** and **implementation of technical measures**.

Quality assurance scheme to increase client trust

QualitEE country reports prepared for 15 European countries provided recommended actions to overcome the identified market barriers. In all countries, **it was recommended to develop and implement quality assurance systems to overcome the apparent lack of trust in service providers and low customer demand**. Quality assurance for EES services and providers would provide a tool for the clients to distinguish good quality projects. Obtaining quality assurance is expected to give providers with a competitive advantage on the market.

Implementation of quality assurance systems for EPC are supported also by the Article 18 of the Energy Efficiency Directive (EED) that requires Member States to encourage the development of quality labels and making publicly available a list of available energy service providers that are qualified and/or certified along with their qualifications and/or certifications.

The expectations from quality assurance scheme differ among the market actors. While the providers and facilitators primarily expect an increase in customer trust, clients and financial institutions forecast an increase in the quality of projects. The majority of providers and facilitators across All Countries in the QualitEE survey agreed that the **main benefits of a quality assurance scheme would be an increase in customer trust** (82%) and standardised quality criteria (57%). The vast majority of clients interviewed agreed that an added value of the quality assurance scheme would be an increase in project quality (73%) and that the projects would be better designed from a technical and process point of view (71%). Financial institutions also expect an increase in project quality (59%), less time needed to prepare procurement procedure (57%) and higher availability and reliability of data for technical assessment (54%). This confirms that **establishing of quality assurance schemes for EES should be one of the key actions to support EES market growth**.

Standardisation

One way to generate greater trust in the ESCO industry and hence increase customer demand is quality improvement by standardisation of the EES and the EES providers. Existing standards and protocols can be also used to design requirements of the quality assurance systems:

- ✔ **European Standard EN ISO 50001:2011 Energy management systems - Requirements with guidance for use** was adopted to enable organisations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption. While there is a rapid growth in number of valid certificates for ISO 50001 (ISO 2018), the **energy efficiency itself (alone) is not yet the driving force for the implementation of an EnMS but the national policy incentives** (ISO 2014).

- ✔ The European standard **EN 15900:2010 defines energy efficiency services** provides definitions and minimum requirements for an EES.
- ✔ **EN 16212 Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods** provides a general approach for energy efficiency and energy savings calculations with top-down and bottom-up methods.
- ✔ A series of **European Standards set out requirements and provide guidance on how to carry out energy audits.**

Desirable quality assurance

The QualitEE survey aimed to investigate what would be the attributes of a quality assurance system preferred by most of the market actors. While providers and facilitators and financial institutions clearly identified **governmental/public institutions as being the most respected bodies** to issue quality assurance certification for EES, the preference of clients is split between governmental/public institutions and association of providers. The majority of EPC providers and facilitators agreed that the **cost for quality assurance should be met by the client** and a **viable fee for quality assurance would be up to 1% of the value of a particular project**. A review of voluntary building certification schemes used in Europe by Triple E Consulting (2014) showed reliability, cost and international acceptance are key factors influencing choice of the scheme.

All surveyed market groups indicated a **strong preference to implementing projects subject to quality assurance**. However, while a clear majority of clients (88%) and financial institutions (89%) reported that they would always, or in a majority cases prefer implementing a project with quality assurance, such preference was displayed by lower number of providers and facilitators (65%).

Quality criteria developed within quality assurance schemes can be used in the procurement process to select the best quality projects. Survey respondents supported the idea that **well-defined procurement specifications increase the quality level of services**.

Minimum financial requirements

Financial institutions interviewed across All Countries in the survey unanimously agreed that **creditworthiness is a key condition to be met for the EPC/ESC project to obtain financing**. A large majority of financial institutions agreed that the provider must be **creditworthy** (76%), the project must be **legally robust** (i.e. it must abide by all legal requirements) (76%), the **contract needs to be well formulated, including step-in rights, penalties, receivables, bankruptcy, etc.** (76%), and the **project must be profitable** (74%). Sharing of risks and the integrity of the project are the least relevant factors, as only 50% and 44% of respondents respectively stipulated that these conditions need to be met, however, still significant share of respondents think they should be considered. The idea of a **template created by financial institutions to guide the client**

- when providing information needed by the financial institution - received the overall support of all financial institutions.

Status quo and future of quality assurance

Currently, there are **several quality assurance schemes developed in the EU member states in the area of EES quality assurance** and additional schemes are under development. Most of these schemes are not very comprehensive and focus on a particular area of the EES, such as buildings or expert qualification. When it comes to the EPC and ESC services, which are the focus of this report, there are a few quality assurance schemes for the providers (Slovakia, Portugal) and very few dedicated to the quality assurance of the services (Austria). In many countries there have been no attempts until now to develop a quality assurance scheme for the EES (Bulgaria, Belgium, Latvia, Netherlands). Some of the schemes may look good on the paper, but there is no proper enforcement of the requirements established and therefore they are not effective (Portugal).

Overall, none of the implemented schemes are widely used or have been shown to significantly increase client trust, although some may have been implemented only recently and may show their potential later on. One such scheme is the DECA quality label, the most detailed scheme until now, which is tailored for EPC and ESC. It has developed very detailed specifications of the quality criteria and has acted as the starting point for development of the European quality criteria within the QualitEE project.

The schemes vary significantly among the countries and a few markets have several schemes, which have little in common (Germany, Spain, Austria). Almost forty percent of the providers and facilitators expressed their concern in the QualitEE survey that too many quality assurance schemes could create a barrier to the development of EES markets. Under developments led by the QualitEE project, there is potential to achieve a level of harmonisation of quality assurance schemes across the EU member states, which may offer several benefits, especially in relation to the establishment of common quality criteria.

11 REFERENCES

11.1 QualitEE Country reports

Botzios-Valaskakis A. (2018): Country report on the Energy Efficiency Services Market and Quality – Greece. QualitEE project. Available for download at <https://qualitee.eu/>

Cléro J.: (2018): Country report on the Energy Efficiency Services Market and Quality – France. QualitEE project. Available for download at <https://qualitee.eu/>

Goorden G., Coolen J. (2018): Country report on the Energy Efficiency Services Market and Quality – Belgium. QualitEE project. Available for download at <https://qualitee.eu/>

Goorden G., Coolen J. (2018): Country report on the Energy Efficiency Services Market and Quality – The Netherlands. QualitEE project. Available for download at <https://qualitee.eu/>

Grim M., Kuchar S. (2018): Country report on the Energy Efficiency Services Market and Quality – Austria. QualitEE project. Available for download at <https://qualitee.eu/>

Espejo Luque P. L., Briano J. I. (2018): Country report on the Energy Efficiency Services Market and Quality – Spain. QualitEE project. Available for download at <https://qualitee.eu/>

Espejo Luque P. L., **Real Ruiz A.** (2018): Country report on the Energy Efficiency Services Market and Quality – Portugal. QualitEE project. Available for download at <https://qualitee.eu/>

Espejo Luque P. L. E., **Real Ruiz A.** (2018): Country report on the Energy Efficiency Services Market and Quality – Italy. QualitEE project. Available for download at <https://qualitee.eu/>

Kamenders A., Kass K., Balodis V.: (2018): Country report on the Energy Efficiency Services Market and Quality – Latvia. QualitEE project. Available for download at <https://qualitee.eu/>

Keegan N.: (2018): Country report on the Energy Efficiency Services Market and Quality – UK. QualitEE project. Available for download at <https://qualitee.eu/>

Lauko M., Rothova M. (2018): Country report on the Energy Efficiency Services Market and Quality – Slovakia. QualitEE project. Available for download at https://qualitee.eu/sk/wp-content/uploads/sites/11/Slovak-Country-Report-on-EE-services-market-and-quality_2018.pdf

Nikolaev A. and Andreeva M. (2018): Country report on the Energy Efficiency Services Market and Quality – Bulgaria. QualitEE project. Available for download at <https://qualitee.eu/>

Schulze-Sturm S., Esseling Ch. (2018): Country report on the Energy Efficiency Services Market and Quality – Germany. QualitEE project. Available for download at <https://qualitee.eu/>

Staničić D.: (2018): Country report on the Energy Efficiency Services Market and Quality – Slovenia. QualitEE project. Available for download at <https://qualitee.eu/>

Szomolanyiova J. (2018): Country report on the Energy Efficiency Services Market and Quality – The Czech Republic. QualitEE project. Available for download at <https://qualitee.eu/>

11.2 Other literature

Accredia (October 2018): Elenco delle organizzazioni in possesso di certificazione accreditata accredia che forniscono servizi energetici (ESCO). Available at https://www.accredia.it/app/uploads/2018/10/DatiESCO_15-10-2018.pdf

Amann S., Leutgöb K. et al. (2015): Quality Certification for EPC services. Transparens project. Available for download at <http://www.transparens.eu/download-library/quality>

Ariely D. (2012): The Honest Truth About Dishonesty: How We Lie to Everyone--Especially Ourselves, HarperCollins, ISBN0007477333

Bertoldi P., Boza-Kiss B. (2016): Energy Services Market in the EU: NEEAP and EED Implementation, European Commission DG JRC, Institute for Energy and Transport

Blue Angel The German Ecolabel (2018) <https://www.blauer-engel.de/en> Boza-Kiss B., Bertoldi P., Economidou M. (2017): Energy Service Companies in the EU - Status review and recommendations for further market development with a focus on Energy Performance Contracting, EUR 28716 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-79-71475-7, doi:10.2760/12258, JRC106624. Available for download at <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/energy-service-companies-eu-status-review-and-recommendations-further-market-development>

BUND – Gütesiegel Energie sparendes Krankenhaus (2018). Available at <https://energiesparendes-krankenhaus.de/>

Bureau Veritas Italia (2014). Approfondimenti... Certificazione UNI 11352: un modello di riferimento per le ESCo. Available for download at: http://www.bureauveritas.it/home/news/did-you-know-that/approfondimento-cert-nuova+versione+uni+11352+ESCO?presentationtemplate=bv_master_v2/news_full_story_presentation_did_you_know_v2

Concerted Action Energy Services Directive (2013): Good Practice Factsheet: Portugal - Qualification System of Energy Services Companies. Available for download at <https://www.ca-eed.eu/Countries/Portugal>

Dario Di Santo (2018): Energy Efficiency in Italy - How has the market evolved? Interview with Dario Di Santo, Managing Director of FIRE. May 22, 2018. Available at <https://www.eu.jouleassets.com/new-blog/energy-efficiency-in-italy-fire-interview>

Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. Official Journal L315, pp. 1 – 56

ENEA-FIRE (2016): Market Report on the Italian EPC Market. GuarantEE project.

eu.ESCO (2011): Energy Performance Contracting in the European Union, Brussels

European Code of Conduct for Energy Performance Contracting (2014). Transparens project. Version as of 11 July 2014. Available for download at <http://transparens.eu/eu/epc-code-of-conduct>

Final report of the activity of the SFEM Working Group on communication on EN ISO 50001 (2014)

Fonseca P., Patrão C., Fong J., de Almeida A. (2015): Country Report on Recommendations for Action for Development of EPC Markets. Transparens project.

Fourth National Energy Efficiency Action Plan for the Netherlands (2017) April 2017. Available for download at <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>

Grazer Energieagentur GmbH (2011): European Energy Service Initiative – EESI, Advanced EPC documents - Integrated Energy Contracting, Available for download at http://www.grazer-ea.at/eesi/upload/download/standard%20documents/eesi_advanced_epc_integrated_energy_contracting.pdf

ISO (2018): The ISO Survey of Management System Standard Certifications (2011 - 2016). Available for download at <https://isotc.iso.org/livelink/livelink?func=ll&objId=18809652&objAction=Open&nexturl=%2Flivelink%2Flivelink%3Ffunc%3Dl%26objId%3D18808772%26objAction%3Dbrowse%26viewType%3D1>

Joule Assets Europe Group S.r.l. (2017): The White Paper on Opportunities and Challenges in the Italian Energy Efficiency Market. Available for download at <https://www.engerati.com/system/files/revisedwp-italian-energy-efficiency-market.pdf>

Ministry of Industry and Trade of the Czech Republic (MIT) (2017) Update of the National Energy Efficiency Action Plan of the Czech Republic. April 2017. Available for download at <https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans>

Ministry of Infrastructure of the Republic of Slovenia (2018): Public tender for the co-financing of energy renovation of buildings owned and used by municipalities in the years 2018, 2019 and 2020 (2018). Available at <http://www.energetika-portal.si/javne-objave/objava/r/javni-razpis-za-sofinanciranje-energetske-prenove-stavb-v-lasti-in-rabi-obcin-v-1172/>

SEVEN, Středisko pro efektivní využívání energie, o.p.s. (2017): Certifikace firem energetických služeb [Certification of energy service providers]

Szomolányiová J., Černý T. (2015a): Country Report on Uptake of the European Code of Conduct for the Energy Performance Contracting. Transparens project.

Szomolányiová J., Černý T. (2015b): Country Report on Uptake of the European Code of Conduct for the Energy Performance Contracting. Transparens project. Available for download at <http://transparens.eu/download-library/country-report-on-uptake-of-the-european-code-of-conduct>

Szomolányiová J., Černý, Staničić D., Herrman L. (2015): Towards Transparent Energy Performance Contracting Markets. Results of the Transparens project. Available for download at <http://www.transparens.eu/download-library/transparens2015>

Tribunal de Contas de Portugal (2018) Auditoria sobre Eficiência Energética em Edifícios Públicos. January 2018. Available for download at: http://www.tcontas.pt/pt/actos/rel_auditoria/2018/2s/rel003-2018-2s.pdf

Triple E Consulting – Energy, Environment & Economics B.V. (2014): Market study for a voluntary common European Union certification scheme for the energy performance of non-residential buildings

TÜV SÜD (2018). Available at <https://www.tuv-sud.com/activity/testing/energy-efficiency-testing>