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Energy Service Market in the EU

Status review and recommendations 2019

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Contents

Abbreviations

Key abbreviations used in the report:

ADEME – French Environment and Energy Management Agency
ANRE – Romanian Energy Regulatory Authority
b - billion
BELESCO – the Belgian ESCO Association
BfEE – Federal Energy Efficiency Center (Germany)
CEM - Contract Energy Management
CHP – Combined heat and power
CO_2 – carbon dioxide
dena – German Energy Agency
EBRD - European Bank for Reconstruction and Development
EC – European Commission
EED – Energy Efficiency Directive, Directive 2012/27/EU
EEEF - European Energy Efficiency Fund
EEO or EEOS – Energy Efficiency Obligation Scheme
EES – Energy efficiency services
EESI2020 – European Energy Service Initiative towards the EU 2020 energy saving targets
EIB – European Investment Bank
ELENA - European Local Energy Assistance
EnPC – Energy Performance Contract (note the change of abbreviation used here, compared to previous reports)
EnS – Energy services
ESC – Energy Service Contract/Energy Supply Contracting
ESCO – Energy service company
ESD – Energy Services Directive, Directive 2006/32/EC
ESPC – Energy Supply Provider Company
EU – European Union
EUROSTAT - statistical office of the European Union
EVO – Efficiency Valuation Organisation
FEDENE – French federation of energy and environment services companies
FEEVI – National Energy Efficiency and Renewable Energy Sources Fund
GEF – Global Environment Facility
H2020 – Horizon 2020, the EU Research and Innovation programme
JRC – Joint Research Center (of the European Commission)
m - million
MECIT - The Ministry of Energy, Commerce, Industry and Tourism (Cyprus)
M&V – Measurement and Verification
MS – Member State
n/a – no information or no data or not available
NEA – Netherlands Enterprise Agency
NEEAP – National Energy Efficiency Action Plan
NZB or **NZEB** – nearly zero energy building(s)
OEB – Cyprus Employers & Industrialists Federation
PEKO - municipal house management authorities in Latvia
PPP – Public-private partnership
REGEA – Regional Energy Agency (Croatia)
RVO - Netherland Entrepreneur Agency
SEAI – Sustainable Energy Authority of Ireland
SME – small and medium-sized enterprises
SNEC - National Union of Climate Operation and Maintenance (France)
TPF – third party financing
yr. – year

Short forms for European Member States used in tables and figures:

AT – Austria, BE – Belgium, BG – Bulgaria, CR – Croatia, CY – Cyprus, CZ- Czech Republic, DE – Germany, DK – Denmark, EE – Estonia, ES – Spain, FI – Finland, FR – France, GR – Greece, HU – Hungary, IE – Ireland, IT – Italy, LV – Latvia, LT – Lithuania, LU – Luxemburg, MT – Malta, NL – the Netherlands, PL – Poland, PT – Portugal, RO – Romania, SK – Slovak Republic, SI – Slovenia, SE – Sweden, UK – the United Kingdom

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Executive summary

The European Union has committed to an economy based on energy efficiency as the first fuel, and has been progressing towards sustainable energy and climate change mitigation strategies via the combination of direct regulations and supporting market actors. Setting out the 2030 climate and energy framework, includes EU-wide targets, policy objectives, long-term goals, new and improved policies, as well as provisions for stepping-up Member States' efforts require measures and actions on all levels and by all market stakeholders. On this road, the private sector, including energy service markets can play a critical role. Energy service companies (ESCOs) have the necessary know-how to provide turnkey services and solutions achieving significant energy cost reductions while addressing various market related barriers on the ground. ESCOs can handle projects, manage or mobilize financial resources, undertake installation and maintenance work as well as collaborate with other market players. When providing Energy Performance Contracting (EnPC)[1], ESCOs share the unique characteristic to assume performance risks by linking their compensation to the performance of their implemented projects, thus incentivising themselves to deliver savings-oriented solutions.

The value of ESCOs in unlocking the energy saving potential in the market is recognized by various EU directives and initiatives in the European context, such as the Energy Efficiency Directive (2012/27/EU; EED), which sets explicit requirements to promote the market of energy services through its Article 18. The EED provides definitions for energy performance contracting, energy services and energy service providers and calls for Member States to take actions to strengthen the energy services market. The "Clean Energy for All Europeans" package frames the further development and strengthening of energy policy, and has been implemented with the revision of the key Directives in 2018, further underlining the role of the market. Accordingly, the role of energy services and EnPC must increase, in particular in the public sector. The use of EnPC is reinforced in the revised Energy Performance of Buildings Directive (2010/31/EU), in particular as regards provisions on inspections of heating and air conditioning systems and in the context of the strengthened obligations on national long-term renovation strategies.

Building on its previous reports, investigating the status of the ESCO market in the EU, the Joint Research Centre (JRC) reviewed the efforts made by Member States to stimulate the market of energy services in the broad sense, focusing on the compliance with Article 18, and has collected and updated current knowledge on the ESCO markets, in particular the size of the national markets with their main characteristics during the period 2015-2018.

The findings show new developments since the last report published by the JRC in 2017.

The average ESCO market of the European Union has been on a steady rise for the last decades, and the growth and maturity has continued or even increased slightly between 2015-2018. Even if the financial crisis of 2008 caused a short backdrop, and some national markets have been fluctuating or decreasing for local reasons afterwards, as of 2018, almost all Member States have a growing ESCO market. Belgium, Croatia, Denmark, Italy, Slovenia have experienced fast growth since 2015, and only Cyprus and Malta remain without ESCO activity due to either a lack of interest and small market size (Malta) or in spite of recent efforts, which might lead to a kick-start of the market (Cyprus). Luxembourg has had an ESCO market, which can be supplied by international companies, and local companies are rare. Only Sweden has reported a steady decrease in the market size and activity. In many countries (e.g. Austria, Denmark, Hungary, Lithuania, Slovenia, the United Kingdom, etc.) the clientele is changing, either because of a saturation of energy efficiency

[1] In this report we abbreviate Energy Performance Contracting with EnPC (and not with EPC) in order to differentiate from Energy Performance Certificates.

projects in the sectors where ESCOs were active before (Slovenia and Denmark), or because of new policies and broadening of the activities (Lithuania, the United Kingdom), or because of restrictions in the previously popular areas (Hungary, Austria).

Traditionally, energy services markets in Europe included a variety of contract types, many types of contractors (suppliers) and a few types of clients (mainly industry and public sector). As of 2018, there are even more types of contracts, among which, energy performance contracting or EnPC is more and more regarded as a distinguished contract type, and companies started to be classified based on their offerings. In parallel, both Energy Supply Contracting and Energy Performance Contracting have extended to almost all sectors by now (transport being an exception), including traditionally ignored ones, such as residential and SMEs. Contracts are flexible and can be adapted to the client's particular needs and conditions.

The Energy Efficiency Directive's specific article on energy services, Article 18, is being implemented to at least some level in all Member States, however implementation success is extremely patchy. A number of provisions are not (yet) taken effect in Member States. For example, information provision is considered largely successful, although this is a result of mostly bottom-up activity, with a strong role of the ESCOs themselves and of intermediaries and international projects. Information on financial instruments is less widespread, but claimed to be successful in Bulgaria, Belgium, Czech Republic, Germany, the Netherlands, Slovenia. Quality labels and certification systems can significantly contribute to the development of ESCO markets, but implementation is limited so far. Schemes exist in Austria, Czech Republic, Finland, and Spain, but the success and extent of application would need further research. Model contracts that are successful are published in Austria, Cyprus, Czech Republic, France, Germany, Greece, Slovenia, Spain and the United Kingdom.

In conclusion, the ESCO markets of the Member States have improved, in particular have matured in many countries, and ESCOs play an important role in energy efficiency. Barriers still remain, and the ESCO markets are very far from their potentials. The provisions of the EED are expected to help in this development; however, more needs to be done to actually implement them and to ensure their success.

1 Introduction

In 2003, the European Commission DG JRC conducted its first survey to map the energy services and the Energy Services Company (ESCO) markets across the EU Member States. This was followed by repeated surveys and assessments, which were formulated as updates, country reports and special reports, developing into a series by 2019. Furthermore, the JRC regularly organises ESCO workshops or related meetings which provide space for networking, opportunities for discussions, understanding market actors and market trends, and identifying exemplary cases across the EU.

Key JRC publications between 2003 and 2019 have been:

- European Commission, DG Joint Research Centre (EC DG JRC). 2005. European Energy Service Companies Status Report 2005. Authors: Bertoldi, P. and Rezessy, S.
- European Commission, DG Joint Research Centre (EC DG JRC). 2007. Latest Development of Energy Service Companies across Europe. A European ESCO Update. Authors: Bertoldi, P., Boza-Kiss B. and Rezessy, S.
- European Commission, DG Joint Research Centre (EC DG JRC). 2010. Energy Service Companies Market in Europe. Status Report 2010. Authors: Marino A., Bertoldi, P., Rezessy, S., and Boza-Kiss, B.
- European Commission, DG Joint Research Centre (EC DG JRC). 2014. The European ESCO Market Report 2013, Authors: Bertoldi, P., Boza-Kiss, B., Panev, S., and Labanca, N.
- European Commission, DG Joint Research Centre (EC DG JRC). 2017. Energy Service Companies in the EU – Status review and recommendations for further market development with a focus on Energy Performance Contracting, Authors: Boza-Kiss, B., Bertoldi, P., Economidou, M.
- European Commission, DG Joint Research Centre (EC DG JRC). 2017. Practices and opportunities for Energy Performance Contracting in the public sector in EU Member States, Authors: Boza-Kiss, B., Zangheri, P., Bertoldi, P., Economidou, M.

These reports are used as a background of the current research and report. The **above publications, as well as the JRC website[2] provide definitions, categories, and explanation** of the basics of ESCO companies and projects in detail, **therefore only the basics are described below**.

What ESCOs are

The EU Member States and the European Commission felt the need for a **common definition** of energy service companies (ESCOs) and the different types of contracts that they offer. This was expected to allow for extended possibilities for international marketing of the services, and to share experiences in allowing the ESCO industry to take larger role in energy efficiency implementation and financing.

The definition of ESCOs should be understood as stated in the Energy Efficiency Directive (2012/27/EU, "EED")[3]:

> "**energy service**" means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which

[2] https://ec.europa.eu/jrc/en/energy-efficiency/eed-support/energy-service-companies
[3] https://eur-lex.europa.eu/legal-content/HU/TXT/?uri=CELEX%3A32012L0027#

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**' is a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises;

"**energy performance contracting**" means a contractual arrangement between the beneficiary (or client) 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. Figure 1 shows the basic arrangement of an EnPC project.

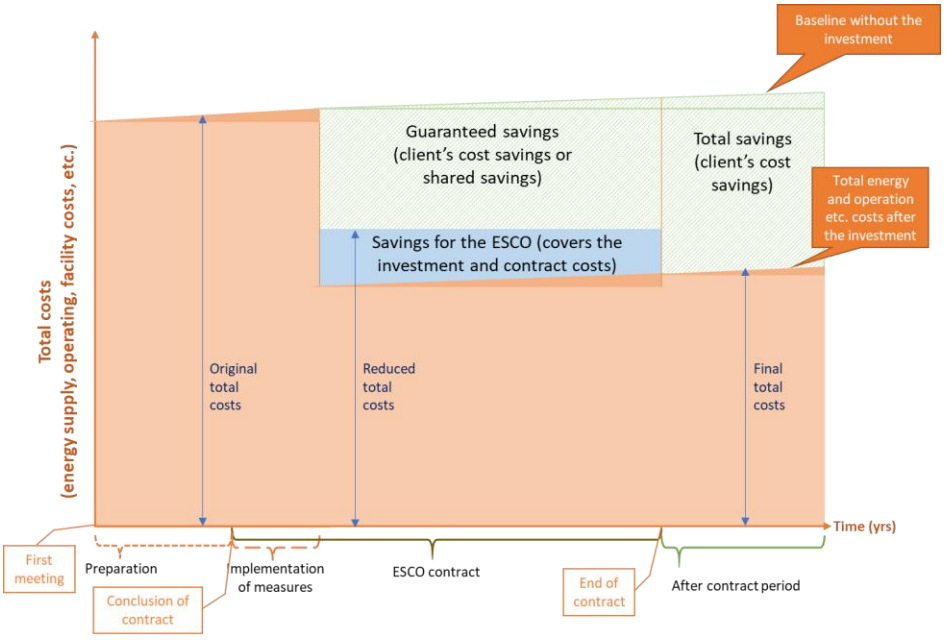

Figure 1. The costs and relative savings expected in an Energy Performance Contracting scheme. Own figure based on: Szomolanyiova and Sochor (2013)

The costs incurred by the client before the ESCO project include the supply of energy, operation, facility management and other running costs. The project is prepared via feasibility studies and data collection, baseline measurements, identification of measures and a number of meetings and consultations Figure 2. This period can take up to 1-2 years even. After concluding the contract, measurement implementation take place, which is often shorter than the preparation, but depends on the size of the facility or site and on the types of measures to be implemented.

The EnPC contract may be focused on the energy saving investments only, in which case operation remains in the hands of the client, but it is more typical that a service package is included with maintenance, operations, provision of energy services, etc. During this period the running costs have lowered, and the savings are split between the client and the ESCO.

This creates incentives for the client to undergo the EnPC project, and allows the ESCO to recover its investment costs, the transaction costs and the service costs. At the end of the project, the ownership of the new equipment is taken over by the client, and all cost savings are also retained by the client (Figure 2).

In the EnPC project, the ESCO turns the energy supply provision into a demand-side offer, by providing energy services. Therefore, the client will not purchase energy or fuel – which they do not actually need, but the client will buy the service of heated or cooled floors, comfort, lighting, etc.

Figure 2. An EnPC project supply chain. Source: Harper 2019

Despite a long history in Europe dating back to the 19th century, and the efforts by the European Commission and Member States to define energy services terms precisely, the energy services market is still characterised by definitional confusion. Differences in the interpretation of what is entailed by Energy Services Company (ESCO) still exist among experts and stakeholders in the field (see more in Section 3.3.). Although convergence has happened in the last 5-10 years, occasionally, national definitions are more appropriate in the national context (e.g. CEM in the United Kingdom), or local circumstances make it necessary to diverge from the common definition, e.g. because of previous bad experience and thus bad reputation of ESCOs (e.g. in Hungary). The complexity and variety of the offerings has increased, and the diversity of players in the market has also increased (see more in Bertoldi et al. (2014)), requiring further diversification of terms and definitions.

Based on the JRC research done since 2003, the **three main characteristics of an ESCO** in most of the European MSs are:

- they **guarantee energy savings** and/or **provision of** the same level of energy **service** at lower cost. A performance guarantee can take several forms. It can revolve around the actual flow of energy savings from a project, can stipulate that the energy savings will be sufficient to repay monthly debt service costs, or that the same level of energy service is provided for less money.
- their **remuneration is directly tied to the energy savings achieved**;
- they **can finance or assist in arranging financing** for the operation of an energy system **by providing a savings guarantee**, however this is not a pre-requisite for an ESCO arrangement. The funding for an ESCO project can originate from alternative sources, including the clients' own funds, ESCO financing, third-party financing, and grants, but most usually the combination of several.

According to **standard EN15900**, energy efficiency services are defined as an agreed task or set of tasks designed to lead to an energy efficiency improvement and other agreed performance criteria. An energy efficiency service shall:

- be designed to achieve an energy efficiency improvement and meet other agreed performance criteria, such as comfort level, production throughput, safety, etc.;
- be based on collected data related to energy consumption;
- include an energy audit as well as identification, selection and implementation of actions and verification.

Energy Service Companies (ESCOs) provide turnkey services covering a full range of activities: energy audit, design engineering, construction management, arrangement of long-term project financing, commissioning, operations and maintenance, savings monitoring and verification. Their distinct feature is associated with their remuneration structure, and in particular, their performance-based projects (i.e. energy performance contracts).

On the other hand, **energy service provider companies** (ESPC) provide energy services for a fixed fee or as added value to the supply of equipment or energy (such as heating), also referred to as energy supply contracting (ESC). They operate on a design and build principle and their compensation is based on a predefined fee. All companies such as energy auditors, issuers of energy performance certificates or engineering firms that do not assume performance risk fall under this term.

Among ESCO companies, **EPC (EnPC) providers** are often distinguished. These are ESCO companies, i.e. providers that implement energy efficiency or energy saving measures in the premises of a client repaying from the cost savings during operation phase (general ESCO), that also provide financial guarantee that the savings will be enough to cover the upfront costs and offer reimbursement should this prove wrong. In this meaning a savings guarantee links the ESCO/EnPC provider's remuneration to the achievement of the contractually set savings target.

While there are many other terms, and distinctions can be blurred, in the current report, the terms are used according to the above definitions[4].

An energy service contract describes a contractual relationship between an energy service supplier/provider and the final energy user (client). These differences between the broader meaning of Energy Supply Contracting (ESC, selling the fuel itself) and EnPCs, shared or guaranteed are illustrated in Table 1.

[4] For detailed defintions and comparisons see in Bertoldi et al. (2014)

Table 1. Key characteristics of EnPC and ESC compared. Source: Boza-Kiss et al. (2017a, 2017b)

	EnPC - Guaranteed savings model	EnPC - Shared Savings model	Energy Service Contracting (ESC)
Service provider	ESCO/EnPC provider	ESCO	Energy Service Provider Company (ESPC)
Key elements	Implementation of energy saving measures with ongoing monitoring & verification services to provide guaranteed energy savings.	Implementation of energy saving measures (mainly demand side) to provide cost savings associated with the overall energy/utility bill.	Efficient supply of useful energy such as heat, steam or electricity is contracted, measured and delivered in physical units.
Energy savings to be achieved	High priority - comprehensive and detailed approach covering both supply and demand side.	High priority - primary focus and incentive is for cost savings with technical operation requirements as secondary.	Low or no priority - limited to the supply side (boilers, chillers, etc.) without regard to demand-side equipment.
Guarantees provided by the ESCO	Yes, always. The ESCO guarantees the performance related to the level of energy saved throughout the contract life (i.e. to energy cost savings in constant prices).	Not as standard. However, the ESCO may guarantee a minimum performance related to cost of energy saved in current prices throughout the contract life.	No guarantees - May include incentives related to energy use reduction on the supply side, but without assuming any risk in case the expected efficiency improvement is not reached.
Payment	Payment derived from the energy savings achieved in constant prices of the base year.	Payment linked to the achieved change in energy costs.	Payment of a fixed rate/tariff, normally without energy performance requirements.
Provider's risk	ESCO assumes technical design, implementation and performance guarantee risks.	ESCO assumes performance risk, risk of energy price change (depends on current prices) and customer credit risk.	Provider usually does not assume technical or financial risk.
Energy savings transparency	High transparency - The energy consumption is measured before and after the measures are implemented. The transparency depends on the quality of measurement & verification. In general, the more independent M&V, the more transparent are the energy savings.	Transparency varied - Depends on whether and what quality M&V is provided. In general, the more independent M&V, the more transparent are the energy savings.	Low or no transparency - a specific energy bill reduction is established (in monetary, not physical units). Usually the contract does not take into account the measurement of the energy efficiency.

An ESCO project offers benefits for all participants, and to the wider society indirectly. While ESCOs are not the universal remedy for energy demand growth and sustainable development, they definitely have an important role to play in the energy efficiency markets and in achieving micro and macro level goals (Figure 3).

Property owner (client)
- Energy cost savings (or other utility cost)
- No or low upfront cost
- Healthier indoor environment
- Increase of comfort
- Building value increase
- Additional renovation components (aesthetics, status improvement, extension, etc.)
- Public image/prestige

Municipality/community
- Jobs – more balanced community
- Growth of the value of the building stock and more attractive district/area
- Healthier district
- Independency
- Development of communities

-> competitive benefit

ESCO/contractor
- Workplace
- Profit
- Long-term, reliable partnership
- Possibly further contracts with the same partner

Macroeconomy
- Jobs
- Development of real estate market – growth of GDP
- Motivation of residents' and/or investors to spend money locally
- Growth of energy security, decrease of need for

Figure 3. Benefits of ESCO projects from the various points of view of stakeholders. Based on: Hungarian Energy Center (2009) in Bertoldi et al. 2014.

Once the installation of the energy efficiency measures is complete, the project moves to evaluation of new performance phase. The specific nature of service provided will depend upon the contract. Energy savings are a key benefit that should be achieved as the EnPC service is paid by realized energy cost savings. The contract between the ESCO and client contains guarantees for cost savings and takes over financial and technical risks of implementation and operation for the entire project duration of typically 5 to 15 years.

Data sources and methodologies

The current report, the "Energy service markets in the EU - Status review and recommendations 2019" builds on an online expert survey primarily, reflecting market status as of 2018. This was combined and complemented with personal and phone interviews, as well as Workshop presentations organised by DG JRC and DG Energy on 27 March 2019. Furthermore, information was collected from national reports, scientific articles, legal documents, and grey literature.

The principal methodology of the research was based on stakeholder information and large-scale surveying of ESCOs, international and national ESCO experts and experts in related fields, academia, and financial institutions. Using the snow-ball technique, interviewees were asked for further contacts who were then also contacted. The questionnaire was based on the surveys used for the previous European ESCO Update Reports (Marino et al. 2011; Paolo Bertoldi et al. 2014; P. Bertoldi and Boza-Kiss 2017), and the link to the survey was emailed to potential informants. The list of respondents that agreed to be acknowledged is indicated at the end of the report, and the authors express their greatest gratitude to them. The field research was carried out mainly between December 2018-March 2019 (online survey), and during March-April 2019 and again in August 2019 (interviews and comments). The survey is referred to in this report as **JRC survey 2018**. Note that the information described in the report reflects the market status up to 2018.

Around 70 informative answers were received from the European Union Member States. This means on average at least 2-3 for a single country report. The authors encountered difficulties in collecting sufficiently detailed information in some countries. To overcome this

handicap, peer-reviewed literature, national reports, project documentation and publications, governmental archives, and information obtained in the context of the structural dialogue with the Member States[5] were consulted to verify the information gathered. Despite the extensive efforts of the authors to produce a correct overview of the situation, any comments, constructive critique or feedback is appreciated in order to be able to improve the information presented herein.

The main data sources of this analysis are data from the expert survey, the National Energy Efficiency Action Plans (NEEAP) 2017 and national reports from the QualitEE project[6].

1.1.1 Expert survey

The main aim of the survey is to understand the national energy service markets (EnS) and ESCOs market. We split the survey into two parts to relate to energy services in general and Energy Service Companies Markets (ESCOs). The main aim of splitting the survey was to collect information clearly related to the guaranteed savings market and the broader role of energy services. These are both discussed in the country fiches, when information was appropriately available. We sent the survey to national experts. To understand the national EnS and ESCOs market we asked information on the following components of the market:

- Market growth from 2015 to 2018;
- Supply side;
- Demand side;
- Policy framework (focus on the implementation of Art18, EED and national programmes);
- Main barriers and recommendations.

1.1.2 Document analysis and national reporting in the context of EU policy framework

It is required by the EED, that Member States provide information on significant energy efficiency improvement measures in their National Energy Efficiency Action Plan (NEEAPs) including in relation to the status of energy services, with direct reference to Article 18 (see more in Section 3.3.). Information from the NEEAP 2014 and NEEAP 2017 was also used for the purpose of this report to describe the policy framework in each Member State.

In view of 2030 framework for energy efficiency, Member States are required to include in their integrated national energy and climate plans information on policies and measures to promote energy services in the public sector and measures to remove regulatory barriers and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models.

1.1.3 Assessment and data in the Member State fiches

Annex I presents national summaries of the status of the ESCO markets as of 2018, and describe the market, national conditions and future perspectives. The following subsections are included:

1) Market size and market development

[5] Informational provided by DG ENER.

[6] The H2020 project "Driving investment in energy efficiency services through quality assurance", URL: https://qualitee.eu/

The market size is determined through the number of companies that work as ESCOs or that offer energy services in more general. When available, information is provided about specific demand or supply sectors. Market sizes are estimated based on the information provided by survey respondents. The answers are evaluated using past information from previous reports, and expert judgement. Sometimes sizes or number of market players refer only to a sector (e.g. public buildings), which is indicated. Whenever available, information relevant for the level of development, especially the existence of an ESCO association, availability of facilitators, and existence of public ESCOs is highlighted here.

2) Policy framework

The specific legal and regulatory framework is summarized that is closely relevant for ESCOs. The information is largely collected from literature, the NEEAPs and national documents.

3) Main barriers

The JRC survey provided useful input about barriers that still exist in the national markets. The responses may have some contradictions, which are resolved through expert judgement, and follow-up interviews. The pre-defined categories are expressed in a cross-comparable graph of columns, where the size of the column corresponds to the relative importance of the barrier associated by the respondents after normalisation. Any other barriers mentioned in the free text of the survey is indicated separately.

4) Further perspectives and recommendations

The national chapters end with recommendations expressed by the respondents or by literature on how to improve the market conditions or remove barriers.

1.1.4 Limitations

As with any research, the European ESCO research methodology has limitations that need to be taken into account when using the results presented in the current report.

First of all, the summaries and recommendations included in this report are based on expert opinion collected via research methods and **these are not to be considered as official statements either from the side of Member States nor from the European Commission**. The assessments and conclusions were purely based on the information collected through the online questionnaires and follow-up interviews with market stakeholders, combined with desk research. As such, it reflects the real-feel of the market status and of relevant policies – in particular about the effectiveness of policy implementation -, of those working on the ground. This may even significantly differ from the official or legally reported statuses or even from other research. Yet, the report is meant to reflect the market observations, concerns and forecasts of real market players.

Secondly, the understanding of the ESCO and EPC concepts is still not fully rolled-out evenly across Member States, and can even differ between respondents in the same country. This limits the comparability of information and data collected. To overcome this problem, we have included the most important terms and definitions (in line with official terminology in European policies) in the online survey and during interviews. This way, we also had a chance to promote the definitions provided by Directives and expected to be used European-wide.

Thirdly, data are extremely difficult to collect. Research activity has been growing in the field, and potential respondents have too many surveys to administer, thus they are reluctant to spend time with answering. The questionnaire was rather long (requiring about

20 minutes to fill in) in order to cover critical aspects. Close to 25% of the respondents skipped parts of the survey, which is a low rate considering the length. The success to reach out to all Member State lies in the established network, who keep updating the JRC from year to year. However, this also translates into less varied views collected. Therefore, additional interviews and document search were used to triangulate the results.

How to read

The report is composed of two key sections.

The first part is an overview and analysis of the ESCO and energy services markets. The analytical part discusses the comparative situation and future prospects of national ESCO markets of the EU Member States, and provides an assessment of energy services at the EU level, with special emphasis on the related provisions of the Energy Efficiency Directive, as well as other relevant regulations and EU measures. The section is focused on regulatory opportunities, barriers, success factors and possible futures.

The second part of the report, Annex I., is a collection of MS fiches, that is a descriptive presentation of the national ESCO markets, based on the same criteria: size and level of development of the energy services and ESCO markets (number of companies, types of projects, current and potential clients, key barriers and important success factors – where relevant, and finally the policy framework and future expectations. These sections are targeted at market stakeholders and local actors of the specific MSs and are not meant for complete reading.

2 ESCO market development in the EU and the Member States

Development of the ESCO markets since 2015

The 2018-19 market survey shows that the overall ESCO market development in almost all European Member States has been either stable or growing (Figure 4. and Table 2.)[7].

Figure 4. The speed and direction of development between 2015 and 2018 in national ESCO markets. The assessment is purely based on own research data (JRC survey 2018)

The strongest ESCO market **growth** has been seen in Belgium, Croatia, Denmark, Slovenia and Italy (Figure 4.). Energy services play an important role in the energy strategies in Belgium, and facilitators and public ESCOs push both the ESC and the EnPC markets forward. The Danish market has been slowing down compared to previous years, because the previously wide-spread public building renovation sector has largely saturated, and a transfer of activity to the private sector is taking place. In Slovenia and Croatia, funding in the form of grants and the demand from the local municipalities have played an important role for the boom of ESCO/EnPC projects in the last few years. The Italian market is one of the most well-developed ones (if the most developed above all) and has gone through stages of fluctuations. The recent years have seen rapid growth due to a number of factors.

Most of the Member States experienced a **slow increase** of the ESCO market since 2015: Finland, France, Germany, Ireland, Latvia, Lithuania, Hungary, the Netherlands, Spain, Slovakia, and United Kingdom. Of these, Finland, France, Germany, the Netherlands and the United Kingdom already have large and mature energy services or EnPC market, where the growth has been moderate compared to previous years. Still, maturation in Finland and the Netherlands primarily has been evident even between 2015-2018. The markets of Latvia, Lithuania, Romania and Ireland are small and have changed slowly in the recent years.

The ESCO market has **not experienced large changes** in the following countries: Austria, the Czech Republic, Bulgaria, Estonia, and Greece. Bulgaria and Greece have markets that are small and have not improved significantly during the observed period. Austria has a well-developed market, but regional differences between the development in various Lander are large, and expert opinion is split on the overall level of development.

On the other hand, Sweden has experienced a **rapid decrease** of its ESCO market since 2015.

Luxembourg's situation is special due to the international influence because of its location and size. As a result, ESC is quite well-developed, while EnPC has not really taken off.

[7] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

In Cyprus and Malta, the ESCO market remained at an **embryonic** stage, and there was no or limited effort identified through the survey analysis and interviews to increase the activity of these ESCO markets. The ESCO market in Cyprus has been maybe kick-started, although the impact of efforts is not yet clearly seen, while there is little intention in Malta to move ahead with energy services.

Table 2. ESCO market development between 2015 and 2018. Assessment is purely based on own research data. Source: JRC survey 2018.

Austria	→	Italy	↑
Belgium	↑	Latvia	↗
Bulgaria	→	Lithuania	↗
Croatia	↑	Luxembourg	○
Cyprus	○	Malta	○
Czech Republic	→	the Netherlands	↗
Denmark	↑	Poland	↗
Estonia	→	Portugal	↗
Finland	↗	Romania	↗
France	↗	Slovak Republic	↗
Germany	↗	Slovenia	↑
Greece	→	Spain	↗
Hungary	↗	Sweden	↓
Ireland	↗	the UK	↗

Note: green arrow means growth of the market, with fast increase (point upwards), or slow increase (pointing halfway), no change or stable market (yellow arrow to the right), decrease (red arrow), with slow decrease and fast decrease differentiated based on the direction.

The specific reasons for the ESCO market development vary from country to country. Knowledge and awareness are the main reasons mentioned by the experts having a positive or negative impact of the ESCO markets development. In the Member States, the knowledge has been increased through implemented projects, best practice examples and introduction of Code of Conduct for EnPC. Increased knowledge thanks to implemented projects has had a positive impact on the ESCO market growth in Belgium, Bulgaria, Denmark, Finland, Ireland and Latvia. Best practice examples have contributed to a higher awareness and corresponding growth of the ESCO market in Denmark and Romania. In Bulgaria, the knowledge has increased due to the introduction of Code of Conduct for EnPC[8]. Lack of knowledge and awareness was identified as a factor hindering ESCO market growth

[8] https://www.euesco.org/european-code-of-conduct-for-epc/index.html

in the following countries: Austria, Estonia, Lithuania, Spain and Sweden. Lack of knowledge about the impact of previous projects and positive examples are the main reasons for the rapid decrease of the ESCO development market in Sweden.

In several countries, the legislative framework was identified as an important factor influencing ESCO market development since 2015. According to our surveys, positive changes in the legislative framework contributed to the growth of the ESCO market in Denmark, Germany, Ireland, the Netherlands and Latvia. However, in Belgium and Portugal, the lack of legislative framework supporting ESCO development had negative effects.

Maturing market awareness has had a positive impact on the ESCO market growth since 2015 in Ireland and Finland. Other reasons having an influence on the recent ESCO development are increase of energy prices (Spain), successful public procurement framework (United Kingdom), benefits from tax relief related to electricity taxes (Germany), subsidies for start-ups (Germany), promotion through banks and financial institutions via real estate financial loan (the Netherlands). In Greece, the economic instability has had a negative impact on the ESCO market growth since 2015.

Table 3. shows the change in the ESCO markets, in terms of the number of ESCOs and the volume of the ESCO markets between 2007 and 2018. Although both markets, Energy Service and ESCO, have been assessed in several projects, a harmonized and reliable European database is still missing. This is why a quantitative cross-country analysis can hardly be done. In terms of the energy service market volume, France and Germany have the largest markets, followed by Italy. Germany also has the biggest Energy Performance Contracting market in terms of the number of companies, projects and market volume.

Table 3. Overview of the development of the size of the energy services, energy efficiency services, and ESCO markets across Europe. Sources are Vine (2005), Bertoldi et al. (2014), and the JRC survey 2018.

MS	first ESCO[9]	Number of ESCOs[10] [11][12]					ESCO market, EUR million annual [13]
		2007	2010	2013	2015	2018	2018
Austria	1995	ca. 30	5-14	over 50	41	400 (EnS); 27 (EES); 36 (ESC)	30-40 (only public buildings)
Belgium	1990	ca. 30	13-15	10-15	10-15	6-13	20-30
Bulgaria	1995	1-3 (12)	20	7-12 (?)	15	12	Less than 10
Croatia	2003	1(-2)	2	10	10	8-15	20 (EnS); 14 (ESCO)
Cyprus	2016	0	0	0	19	22	0
Czech Rep.	1993	7 (15)	8-10	20	15	15	9-15
Denmark	ca. 2010	4-5	10	15-20	15-20	4	70
Estonia	ca. 2014	2	2	2 (3?)	2-3 (<10)	4	5
Finland	2000	9-11	8	5-8	6-8	15	6.5
France	1800's /1937	3 (100)	10+100	350	300	45	13.5 billion (EnS); 40-60 million (EnPC)
Germany	1990-1995		250-500	500-550	ca. 500	560 (EnS); 138 (EnPC)	9 billion (EnS); 7.7 billion (EnPC)
Greece	ca. 2003	0-3	2	5	47	86 (3 providing EnPC)	n/a
Hungary	1990s		20-30	10	ca. 8-9	10 (5 EnPC)	n/a
Ireland			15	ca. 30		25	20
Italy	early 1980s	15-25	50 (100)	50-100	200-300	1500 (EnS); 340 (ESCO)	2 billion

[9] Data based on Vine (2005), Geissler (2005), and previous JRC reports on energy services, unless otherwise indicated.
[10] In some cases, the contradicting values found had to be consolidated based on expert knowledge. If information was available about the registered number (of e.g. ESCOs) vs. the actually active ones, both of these are indicated – with the previous value in parenthesis: ()
[11] Depending on the countries, information on EnS, EPC and EES is available. These data are provided accordingly.
[12] Number of ESCOs in 2007, 2010, 2013 and 2015 is based on Boza-Kiss et al. (2017a)
[13] These values are not comparable throughout MS due to data scope. For more information, please refer to the country chapters.

MS	first ESCO[9]	Number of ESCOs[10] [11][12]					ESCO market, EUR million annual [13]
		2007	2010	2013	2015	2018	2018
Latvia	2001	40	5	8	50-60	60 (EnS); 3-6 (ESCOs)	2-3
Lithuania	1998	6	6	3-5	6	n/a	n/a
Luxembourg	1990s	3-4	3-4	3-6	3-6	n/a	n/a
Malta	not yet	0	0	0	0	n/a	n/a
Netherlands	mid 2000	very few	50	50	100	57 (EnPC): 28 public, 27 private	90-150
Poland	1995	<5	3-10	30-50	3-4 (30)	25 (EnS), 20 (EnPC)	n/a
Portugal	n/a	ca. 7-8	10-12	n/a		12-15	50-100
Romania	1996	2	14	15-20	20	7-13	47
Slovakia	1995	30	5	6-8	8 (20-50)	40 (10 EnPC providers)	
Slovenia	2001	1-2	2-5	5-6	5-6	10 (4 EnPC providers)	25 million (EnPC in public sector only)
Spain	n/a	ca.100	> 15	20-60	1000	70	1-1.5 billion
Sweden	1978	12-15	5-10	n/a	4-5	~20	3.79 (public sector only)
UK	1966	20-24	20	30-50	>50	136 (EES); 62 (ESCOs);	108.3

Main barriers across Member States

Despite considerable efforts to promote ESCO market development, still many barriers limit growth in European ESCO markets as of 2018. Table 4. shows existing barriers limiting ESCO implementation in the Member States. Some barriers were already identified in the previous chapter to explain the market conditions; however this is a structural compilation. The following barriers were identified in the Member States: mistrust from the (potential) client, information and awareness, inexperience of actors, ambiguities in the legislative framework, and market-size related.

Mistrust from the (potential) client

Lack of trust usually originated from inhomogeneous ESCO offers in the market, lack of competition, lack of experience of clients, ESCOs and financial institutions, absence of credible and visible reference cases with a clear client focus, unclear definitions and failed contracts, and lack of standardized measurements and verifications (Paolo Bertoldi and Boza-Kiss 2017). Experts in most of the Member States identified this barrier as one of the main barriers limiting ESCO development: Austria, Belgium, Estonia, Finland, France, Hungary, Lithuania, Poland, Portugal, Slovakia, Slovenia, Sweden and the United Kingdom.

Information and awareness

The absence of best practice examples and their positive impact is very often identified as one of the main barriers limiting ESCO implementation. The lack of knowledge among end consumers regarding the economic potential of energy savings continues to impede the uptake of energy contracting projects. Lack of knowledge and awareness were identified in Austria, Estonia, Lithuania, Spain and Sweden.

Inexperience of actors

The lack of technical knowledge, handling of technical risks as well as lack of experience in procurement are issues faced by many countries. The inexperience of actors is a significant barrier in the following countries: Austria, Lithuania, Greece and Ireland.

Ambiguities in the legislative framework

The ambiguities in the legislative framework supporting ESCO development have had a negative impact on the ESCO development in the following countries: Bulgaria, Estonia, Latvia, Lithuania, the Netherlands, Poland and Romania. Lack of financial support was identified in Bulgaria, Croatia, Greece, Ireland, Italy and Latvia. Lack of clarity on application of new Eurostat rules was identified as a barrier in Belgium.

Market-size and transaction costs

Small scale projects are not compatible with energy performance contracting. For example, the reluctance of municipalities to engage in EnPCs, which can be in part explained by the small structure of many municipalities, is an impeding factor for the uptake of energy performance contracting by the public sector (Boza-Kiss et al. 2017b). Small size of projects and high transaction costs were identified as a barrier existing in many countries: Estonia, Finland, France, Germany, the Netherlands, Portugal.

Table 4 Most relevant barriers limiting ESCO implementation. Source: own data, JRC survey 2018.

Austria	Inexperience of actors; mistrust from the (potential) clients	**Italy**	Lack of appropriate forms of finance; mistrust from the (potential) clients
Belgium	Mistrust from the (potential) clients; unclarity on application of new Eurostat rules	**Latvia**	Lack of appropriate forms of finance; ambiguities in the legislative framework
Bulgaria	Ambiguities of the legislative framework; lack of appropriate forms of finance	**Lithuania**	Ambiguities of the legislative framework; mistrust from the (potential) clients; inexperience of actors
Croatia	Lack of standardisation; lack of co-financing or financial instruments aimed at ESCO projects	**Luxem-bourg**	n/a
Cyprus	Lack of supply side and experience	**Malta**	Political reluctance, and focus on other energy sector solutions; availability of alternative sources of finance.
Czech Rep.	Concerns about the Eurostat rules, ambiguities of the legislative framework	**Netherlands**	Small size of projects and high transaction costs; ambiguities in the legislative framework
Denmark	Relatively long lifetime of projects, saturation of the public sector	**Poland**	Insufficient promotion of energy services, mistrust, incompatibility of ESCOs with other financial schemes
Estonia	Small size of projects and high transaction costs; regulative/administrative problems	**Portugal**	Small size of projects and high transaction costs; mistrust from the (potential) clients
Finland	Small size of projects and high transaction costs; mistrust from the (potential) clients	**Romania**	Ambiguities in the legislative framework; banking system and their ignorance of the ESCO activities
France	Mistrust from the (potential) client; small size of projects and high transaction costs	**Slovakia**	Low awareness about guaranteed energy services, Mistrust towards providers of guaranteed energy services, and insufficient regulatory framework
Germany	Mistrust from the (potential) client; small size of projects and high transaction costs	**Slovenia**	Lack of trust in ESCOs, complex book-keeping rules and administrative barriers (in public sector)
Greece	Lack of appropriate forms of finance; existence of in-house	**Spain**	Small size of projects and high transaction costs; mistrust from the

	technical expertise		(potential) clients
Hungary	Legal and regulatory instability, lack of trust and low reputation of the sector, financing sources (in residential and public)	**Sweden**	Mistrust from the (potential) clients; collaboration and cultural issues; perceived business and technical risk
Ireland	Lack of experience of actors; lack of appropriate forms of finance	**United Kingdom**	Mistrust from the (potential) clients; lack of trust from the ESCO industry

Key drivers across Member States

The drivers behind the development of the energy services markets have some common features, but the combination of factors that kick-started and/or boosted certain markets varies significantly. These combinations of factors also depended very much on the time of the growth. In this report we focus on the period since 2015, and in particular on the years 2017-18. Due to the methodology, the data collection was closed in early 2019, therefore the assessments refer to the status before that.

Overall, ESCO markets may be driven by demand, by supply or by policies (Bertoldi et al. 2014) (see also Table 5).

Demand-driven markets are more developed: the concept is known, potential clients are aware and are looking for alternative project solutions such an ESCO project. In such markets, experienced clients or promotion of successful (demonstration) projects convince peers (usually in the public sector, but not only). The ESCO solution is a natural part of the energy efficiency and/or the renovation markets. In the period 2015-19, demand driven markets existed in parts of Austria, parts of Belgium, parts of Germany, Finland, Italy, the Netherlands, and for a while in Denmark, Slovenia and Spain. The future of the latter ones is to be seen: a roll-out in the public sector has been experienced, and after peaking the number of projects, it is unclear if the market can adapt to new clients and/or offer new services to existing clients. In the period of 2015-19, these markets were typically driven by:

- **Peer-examples**, in particular by municipalities: in Denmark, for example, many municipalities have made use the energy services to promote energy efficiency and energy savings, primarily in connection with the energy optimization of the municipalities' existing buildings. Similarly, in Slovenia a large-scale public building renovation programme used a replication process starting with funds from Structural Funds, and with current plans to roll-over to the private buildings sector.

- **Public ESCOs or Super ESCOs**[14], whose role is to identify new projects, and channel them to the implementor companies through partnership or via procurement. This is common in Belgium and Italy.

- **Facilitators**, including ESCO associations, whose main role is to represent market actors, provide trainings and networking and promotion events.

- **Quality labels and quality assurance systems** that ensure high quality of the services and projects.

[14] Also referred to as "integrating organisations" (Bertoldi et al. 2014), which contract public entities directly, and then subcontract the tasks to smaller, private suppliers on a competitive basis.

- **High-quality financing products,** such as guarantee system, revolving fund, forfeiting to enhance credit up-take and liquidity, e.g. in Germany, Czech Republic (even if latter is not considered to be demand driven during this last period).

Furthermore, driving factors are the lack of in-house expertise of the clients, high energy prices (maybe through taxes), trust and collaboration in the client sector, as well as need for general renovation, restructuring, as seen in Lithuania.

Supply-driven markets are less developed, and are typically pushed ahead via the efforts of supply-side actors, i.e. the ESCOs themselves, an association or other facilitators. This increases the costs of the services (because of the transaction costs of promotion and rate of project implementation), and increase the chance of failure. Trust is not developed, and even a failed project (or its prospect) can have drastic effect on the market. The most essential need for development is via increasing trust and awareness. In a policy environment, which is not supportive or even detrimental to energy services, the market stakeholders still have a niche to drive or kick-start the market. Drivers are:

- **An overall receptive and supportive policy framework for energy efficiency,** where ESCOs can establish themselves as one of the solutions. This is the case in the UK and Sweden, Denmark in the sense that in this period (2015-19) the general pro-environmental framework creates a supportive setting, but the replication of the public sector success in the private sector is rather dependent on the supply side actors.

- **Successful examples, demonstration projects** can raise awareness successfully.

- **ESCO associations, facilitators**, who uptake the burden of promoting and informing potential clients, organise networking opportunities, arrange financing, thus also work with the financial sector.

- **Mandatory audits**, which are not directly introduced because of the ESCO market, nevertheless raise awareness of the potential clients about the benefits of energy renovation. In Finland, the well-developed audit system is an entry point for ESCOs. Similarly, in the Czech Republic, in Austria and in Germany.

- **Grants for feasibility studies,** which have been rare in the studied period (in Cyprus, in Hungary, in Romania), but are foreseen in some countries for the future, e.g. by international financing institutions (e.g. by EBRD)

Finally, ESCO markets can be **policy-driven**, when policy-makers specifically support the ESCO markets directly or indirectly. This is often in combination with the above two-models. Our analysis has identified the following main drivers, but more details are provided in Section 3 and 4:

- **Obligation to renovate** 3% of total floor area of central government buildings (EED Art. 5) in combination with the Energy Efficiency National Fund: Lithuania, Cyprus, Bulgaria, Croatia, Italy;

- **Grants** (e.g. EIB ELENA, Energy Efficiency Fund): Croatia, Slovenia, Czech Republic, Germany;

- **Information instruments** (such as information campaigns, best practice examples): the Czech Republic, Denmark;

- **White certificates and EEOSs**: Italy, Poland, Slovenia. In Italy, as example, a significant revenue increase of the ESCO market is due to the legislative reform that took place in 2012 concerning white certificates when extra savings started being attributed as a premium for large energy efficiency projects implemented at industrial sites;

- **Procurement framework**: Spain, United Kingdom. In the UK, for example, the market for energy performance contracts is most developed in the public sector, partly driven by procurement frameworks for energy performance contracts.

There are many other, varied drivers in MSs that contribute to the development of ESCO markets, which are discussed in the Country Fiches (see Annex I.). This report is focused on policies, and therefore policy drivers are discussed separately in Section 3.

Maturity of the ESCO markets

The JRC has assessed the market size and market potential of national energy services, ESCO and occasionally the EnPC markets since 2005, however a comparative assessment has proven very challenging for two key reasons. First, definitions vary from country to country in spite of the common EU level definition, simply because of the local conditions and because of the flexibility of ESCOs and their contracts to tailor their offers (see also Section 1.2.4.). Depending on the policy-systems and financial support there are incentives in some countries to be listed as an ESCO, and monitoring is difficult (e.g. in Italy, Greece). Secondly, a proxy to describe the level of development of an ESCO market is not yet developed. So far, the number of companies, number and volume of projects, total revenues or total turn-over have been collected when possible.

Therefore; this market analysis has been based on the number of companies on the supply-side, i.e. organisations that offer or that can offer ESCO/EnPC services, and descriptive characterisation of the demand side. A "maturity indicator" is proposed and country markets are evaluated accordingly below, instead of the strictly quantitative evaluation.

Clearly, the European ESCO markets have been developing both in terms of volume and in complexity when compared to the findings of the previous ESCO status reports. Based on the analysis of the success factors of the markets across Europe, it is possible to identify key factors, critical framework conditions and market features that can possibly lead to a mature market. Such a list also indicates the likely directions of market transformation and the generally expected areas of improvement if a more functional ESCO sector is targeted.

That being stated, the conditions for a mature ESCO market can generally be described as follows:

- the **ESCO concept is generally known and understood**. Clients will still need additional information about the specific offer and contract types offered by suppliers, but a decision between own investment, ESCO project, outsourcing, etc. is done internally. The additional information is available from consultants, independent facilitators or public agencies;

- the market is **demand driven**, meaning that (potential) ESCO clients actively search for suppliers, and define their needs and requirements for an energy services project or package, announcing them and waiting for alternative solutions, which can be compared to each other;

- **trust** in the ESCO market exists, or it is even high. Clients have good experiences and they are ready to disseminate these results. Potential clients often get encouraged by success examples.

- there are **alternative contract forms**, several of them available in a standard format or supported by guidelines that have been prepared by an independent organisation with the involvement of market actors.

- there are **alternative financial solutions**, including client-financing and bank involvement.

- **transaction costs are relatively low**, historical data on energy consumption are available;

- **monitoring and verification** of savings is carried out with a standard and transparent method;

- there are **facilitators**, who can help clients decide about the available offers, while supporting the supplier side by undertaking lobbying activities, general promotion, training, certification, etc.

- the **energy and procurement general policy framework** does not hinder ESCO projects and there is rarely a need for dedicated legislation for ESCOs. Nevertheless, ESCO definitions, standards, and sometimes specific laws can be necessary. On the other hand the ESCO solution will be the route to a more sustainable economy (reduced energy consumption) and not the goal of a legislation;

- **quality labels or certificates** exist for companies or for projects, and increase trust, lower transaction costs, while also clean the market by clearly distinguishing players that qualify to a minimum performance level.

- **grants or preferential loans** – if available – do **not favour, nor disqualify** ESCOs. They should be gradual and provide non-refundable subsidies only for measures that have a very long payback time (i.e. would not be financed by market players), but are socially beneficial, and that are combined with more attractive measures in order to achieve e.g. deep retrofit or complex project or favour special social groups, etc.

- Of these indicators, the current analysis considers the establishment of associations, the existence of facilitators, quality labels and the utilization of monitoring and verification methods as proxies for maturity, based on data availability. In addition, markets that are demand driven are more mature than markets where the supply side needs to promote its products. Information about these indicators is combined with the evaluation of number of ESCOs and recent development of the markets (Section 2.1.). As a result, national markets are categorized into 4 groups (Figure 5, Table 5):A mature market: large and/or growing, with scores on indicators between 9-10: Austria, Belgium, Germany, Italy, the Netherlands, Slovakia, Slovenia, Spain, the United Kingdom;

- A well-developed market: small or large size and/or growing, with scores on indicators between 6-8: the Czech Republic, Finland, France, Luxembourg;

- Developing market: small or large size and/or growing, with scores on indicators between 4-5: Denmark, Ireland;

- Embryonic market: small and/or non-growing, with scores up to 3 points: Bulgaria, Cyprus, Croatia, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Romania.

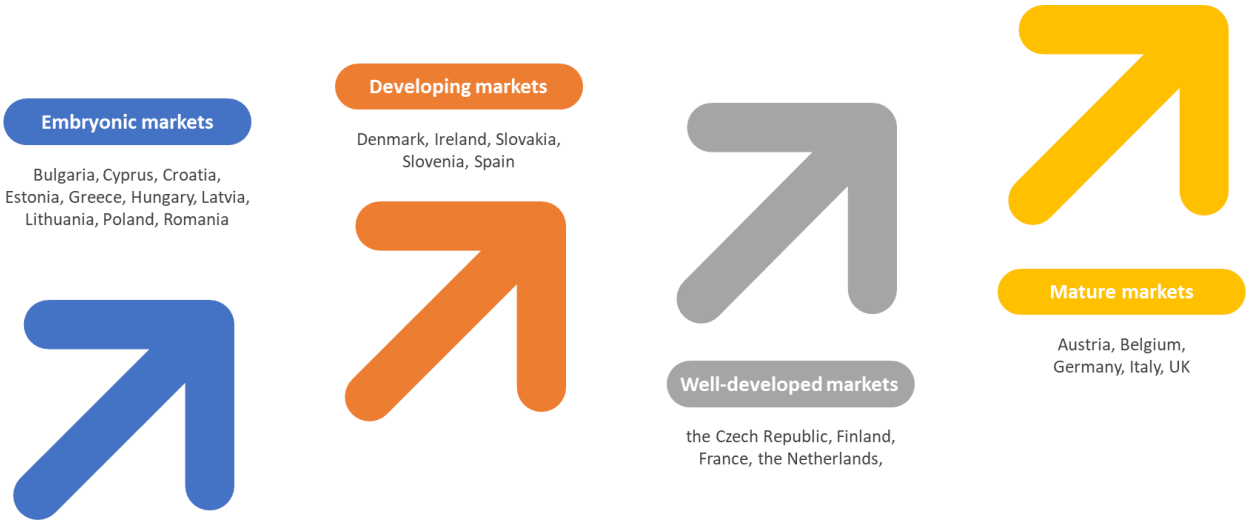

Figure 5. Level of maturity of the EU Member States using the proxies identified. Own data.

Table 5. Selected indicators of maturity of the ESCO markets across Member States. See explanation of indicators in the text. Source: own data from JRC survey 2018.

	Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification	Total score
Austria	✓	✓	✓	✓	✓	10
Belgium	✓	✓	✓	?	✓	9
Bulgaria	?	?	✗	?	n/a	(3+)
Cyprus	✗	?*	✗	✗	✗	1
Croatia	✗	✗	✗	✗	?	1
Czech Republic	✓	✓	?	✓	?	8
Denmark	✗	✓	?	✗	?	4
Estonia	✗	✗	✗	?	?	2
Finland	✗	✓	✓	✓	✓	8
France	✓	✓	?	?	✓	8
Germany	✓	✓	✓	✓	✓	10
Greece	✗	?	✗	✗	✗	1
Hungary	✗	?	✗	?	?	3
Ireland	?	?	✗	?	✓	5
Italy	✓	✓	✓	?	✓	9
Latvia	✗	✗	✗	?	?	2
Lithuania	✗	✗	✗	✗	✗	0
Luxembourg	✗	✓	✓	?	✓	7
Malta	✗	✗	✗	✗	✗	
Netherlands	✓	✓	✓	?	✓	9
Poland	✗	✓	✗	✗	?	3
Portugal	✗	✗	✗	?	?	2
Romania	✓	?	✗	✗	n/a	(3+)
Slovakia	✓	✓	?	✓	✓	9
Slovenia	✗	✓	✓	?	✓	9

	Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification	Total score
Spain						9
Sweden					n/a	(0+)
United Kingdom						9

Note: green=working (2 scores), orange=being established/boosted (1), with a general trend to develop, red=not established/not working (0). When not all indicators could be established, the total score is indicative (+).

3 Policy framework of the ESCO markets

Energy services and ESCOs have been seen as cost-effective market-based solutions to enhance the sustainable energy use agenda through promoting energy efficiency and renewable energy sources for the last few decades in Europe. First cradled in France as early as in the late 1880s (Bertoldi et al. 2007), then revived during the 1980s (Western Europe) and 1990s (Eastern Europe) market forces were the key motors of development. However, ESCO solutions do not only offer private gains, but also social benefits, therefore, after the initial purely market-based periods, strengthening policy support has been established at national and European level.

ESCO-related policies were first framed within the liberalisation of electricity and gas markets context, then as part of the energy efficiency and climate mitigation framework (Rezessy et al. 2005). Increasing policy support can be observed since the early 2000s at the European level, with more and more dedicated ESCO provisions. National and local governments first set up programs, initiated and financed information campaigns, demonstration projects, financial solutions, assisted in the development of guidelines, and in some cases the establishment of public ESCOs, while often acted also as clients of ESCOs.Yet, the markets are still far from tapping on their potentials and policies that support climate mitigation, adaptation and energy efficiency in general are still needed and valuable in order to curb ESCOs' potentials to significantly contribute to the decarbonisation and/or well-being targets.

The next sections will provide an overview of policies currently shaping the ESCO markets. First European level legislation and programmes are reviewed, focusing on the main ESCO policies, namely the Energy Efficiency Directive and the Clean Energy for All Europeans Package, with a focus on Article 18. This is followed by an overview other policies at EU and at MS levels. Above all, it is critical that policy making is based on a thorough understanding of the status of the local ESCO market. This primarily includes the identification of the policy goal and policy environment, as well as the comparison of alternative policies besides promoting ESCOs. In an environmentally sound policy system with liberalized markets and well-informed potential clients, ESCOs should be able to find their markets.

EU policies for energy services and ESCO markets

One of the first initiatives aimed at the ESCO market was undertaken in 1988, when the European Commission adopted a Recommendation to Member States to promote ESCOs and the use of third-party-financing (TPF), defining TPF and describing how ESCOs operate. In 1992, the European Council and Parliament adopted a Directive (93/76/EC), which invited Member States to design and implement programmes to use TPF in the public sector. Under the European Commission's THERMIE and SAVE programs, several studies and pilot projects were implemented to spur ESCO and TPF activities, mainly in public buildings and combined heat and power (CHP). In 1996, two standard ESCO-type contracts were published – for buildings and for industry. In 2002, the European Commission's GreenLight Program identified ESCOs operating in the lighting field, and created a preliminary list of ESCOs[15].

The EU significantly increased efforts to boost the European and national ESCO markets since the early 2000s:

- Directives ESD (2006/32/EC), EED (2012/27/EU), "Clean Energy for All Europeans" package (see below)
- prEN15900 standard

[15] https://ec.europa.eu/energy/intelligent/projects/en/projects/new-greenlight

- EU EPC campaign
- European Energy Efficiency Fund (EEE–F)
- ESCO market research (done regularly by the EC JRC since 2003)
- Database (JRC and Transparense)
- IEE projects, such as Eurocontract, EMEEES, ChangeBest, Permanent, Transparense, EESI, EESI2020, Combines, etc.
- FP and H2020 projects: good examples, business models

The major progress was achieved thanks to Energy Efficiency Directive (EED) which was amended in end 2018 to better reflect the policy landscape for 2030[16] and thanks to supportive financial and regulatory measures, at EU and national level. The following are only examples of the large set of support measures since 2012:

- ELENA, PDA H2020, JESSICA
- Cohesion Funds
- H2020 projects, such as TrustEPC, EnPC-INTRANS, Guarantee, QualitEE
- EIB guarantee funds
- Smart Finance for Smart Buildings initiative etc.

As mentioned above, the Energy Efficiency Directive (2012/27/EU) is in the centre of this set of measures. See Section 3.2.

Further support for energy services and energy efficiency in general comes as a result of the "Clean Energy for All Europeans" package[17]. All eight legislative proposals were adopted by early 2019, which are expected to stimulate Europe's industrial competitiveness, boost growth and jobs, reduce energy bills, help tackle energy poverty and improve air quality (see Updated legislation contains some important changes for ESCOs. The amended Energy Efficiency Directive includes a new EU energy efficiency target for 2030 (of at least 32.5%), and the extended energy efficiency obligation in Article 7 (a requirement for Member States to achieve new savings (0.8%) each year of final energy consumption). The recast of the Renewable Energy Directive contains provisions that promote consumer empowerment and that will enable consumers become prosumers which is in particular relevant for ESCOs active in renovation of buildings.

The amended EPBD covers a broad range of policies and supportive measures that will help Member States to accelerate renovation of buildings and improve the performance of existing building stock in both a short and long-term perspective. Member States will have to submit their reinforced national long-term renovation strategies with a view of decarbonising their national building stock by 2050, with indicative milestones for 2030, 2040 and 2050. Those strategies should contain a solid financial component and require that Member States facilitate access to appropriate mechanisms for advisory and assistance tools – e.g. one-stop-shops and energy advisory services that would allow informing and assisting consumers in relation to energy efficiency renovations and financing instruments. To support the implementation of these provisions, the Commission adopted a Recommendation on Building Renovation on 8 May 2019.

Alongside the legal changes, the public funding has been increased and tailored for direct investments, for research and market preparation, etc. Specifically, to unlock private financing for energy efficiency investments in buildings, the European Commission published

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[16] The EED entered into force on 4 December 2012; the Member States had to transpose it into national law by 5 June 2014

[17] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/clean-energy-all-europeans (30th November 2016)

the "Smart Finance for Smart Buildings" initiative in November 2016 as part of the Clean Energy for All package.

The initiative has three pillars, which could facilitate the promotion of ESCOs market:

- Using public funds more effectively (e.g. through faster deployment of financial instruments, more effective channelling and combination of public funds, setting national financial platforms, deploying Energy Performance Contracts (EPC), organising Sustainable Energy Investment Forums in all EU capitals to engage public, private and financial actors);
- facilitating aggregation of smaller and less attractive investments into 'bigger tickets' through reinforced project development assistance (PDA) and aggregation;
- reducing the perceived risks by financiers and investors of energy efficiency investments, through market evidence and performance track record on energy efficiency projects (DEEP database) and guidance on how to assess energy efficiency investments (EEFIG Underwriting Toolkit).

While constraining the direct funding, innovative financing alternatives are under development. The intensification of measures paves the way for the EU to lead the clean energy transition, not only adapt to it, and to underpin their commitment to the Paris Agreement. It is projected that the currently adopted energy efficiency measures will overpass the 40% GHG reduction targets by an additional 5% in 2030. Nevertheless, the achievement of the EU energy and climate targets should be rigorously and regularly monitored and reviewed to keep EU on track. Furthermore, there is need for active engagement at national and local levels to ensure that the EU goals are achieved. The new Regulation on Governance of Energy Union will enable the needed monitoring at EU level. The first step under the Governance Regulation is the preparation of the integrated energy and Climate plans which will serve as an in view of the achievement of the EU energy and climate objectives for 2030.)[18]. Updated legislation contains some important changes for ESCOs. The amended Energy Efficiency Directive includes a new EU energy efficiency target for 2030 (of at least 32.5%), and the extended energy efficiency obligation in Article 7 (a requirement for Member States to achieve new savings (0.8%) each year of final energy consumption). The recast of the Renewable Energy Directive contains provisions that promote consumer empowerment and that will enable consumers become prosumers which is in particular relevant for ESCOs active in renovation of buildings.

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[18] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[19] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1557992239852&uri=CELEX:32019H0786

Alongside the legal changes, the public funding has been increased and tailored for direct investments[20], for research and market preparation, etc. Specifically, to unlock private financing for energy efficiency investments in buildings, the European Commission published the "Smart Finance for Smart Buildings" initiative in November 2016 as part of the Clean Energy for All package.

The initiative has three pillars, which could facilitate the promotion of ESCOs market:

- Using public funds more effectively (e.g. through faster deployment of financial instruments, more effective channelling and combination of public funds, setting national financial platforms, deploying Energy Performance Contracts (EPC), organising Sustainable Energy Investment Forums in all EU capitals to engage public, private and financial actors);
- facilitating aggregation of smaller and less attractive investments into 'bigger tickets' through reinforced project development assistance (PDA) and aggregation;
- reducing the perceived risks by financiers and investors of energy efficiency investments, through market evidence and performance track record on energy efficiency projects (DEEP database[21]) and guidance on how to assess energy efficiency investments (EEFIG Underwriting Toolkit[22]).

While constraining the direct funding, innovative financing alternatives are under development. The intensification of measures paves the way for the EU to lead the clean energy transition, not only adapt to it, and to underpin their commitment to the Paris Agreement. It is projected that the currently adopted energy efficiency measures will overpass the 40% GHG reduction targets by an additional 5% in 2030. Nevertheless, the achievement of the EU energy and climate targets should be rigorously and regularly monitored and reviewed to keep EU on track. Furthermore, there is need for active engagement at national and local levels to ensure that the EU goals are achieved. The new Regulation on Governance of Energy Union will enable the needed monitoring at EU level. The first step under the Governance Regulation is the preparation of the integrated energy and Climate plans which will serve as an in view of the achievement of the EU energy and climate objectives for 2030.

Energy Efficiency Directive, Article 18

With these requirements, the EED has put forward a comprehensive set of measures in all Member States that require addressing existing market and regulatory barriers, increasing transparency and trust, while actively assisting in the provision of proper information to the potential customers and improving the market position of ESCO-type entrants.

There are a number of provisions relevant for the EnPC/ESCO sector (see the interrelations in Figure 6). The most central element is ***Article 18.*** "Energy services", which is a dedicated provision for promoting ESCO development.

Article 18 requires that Member States promote the energy services market by:

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[20] The European Structural and Investment Funds (ESIF) of EUR 18 billion between 2014-2020 is considered to be the most important financing stream in Europe for energy efficiency, indicating a tripling compared to the previous period. However, there are other European sources, such as the European Energy Efficiency Fund, the Private Finance for Energy Efficiency, EIB funds, etc. See more in the Impact Assessment SWD (2016) 414 final, Accompanying the Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/31/EU on the energy performance of buildings.

[21] https://deep.eefig.eu/

[22] https://valueandrisk.eefig.eu/

- ensuring access to clear information about EnPC contracts (in particular about guarantees and customers' rights), financial instruments and opportunities for energy efficiency projects;
- encouraging the development of quality labels;
- developing and ensuring access to a list of certified and/or qualified service providers;
- supporting the public sector to use ESCO services including providing model contracts;
- identify and publish points of contact, where final customers can receive help;
- providing best practices
- if necessary, remove regulatory and non-regulatory barriers;
- find a solution for proper handling of complaints by customers;
- considering using independent market intermediaries; and
- ensuring that energy distributors, distribution system operators and retail energy sales companies refrain from blocking the market of energy services and do not abuse their dominant position.

The status of the implementation of these provisions was assessed with the help of the 2018 market surveyed.

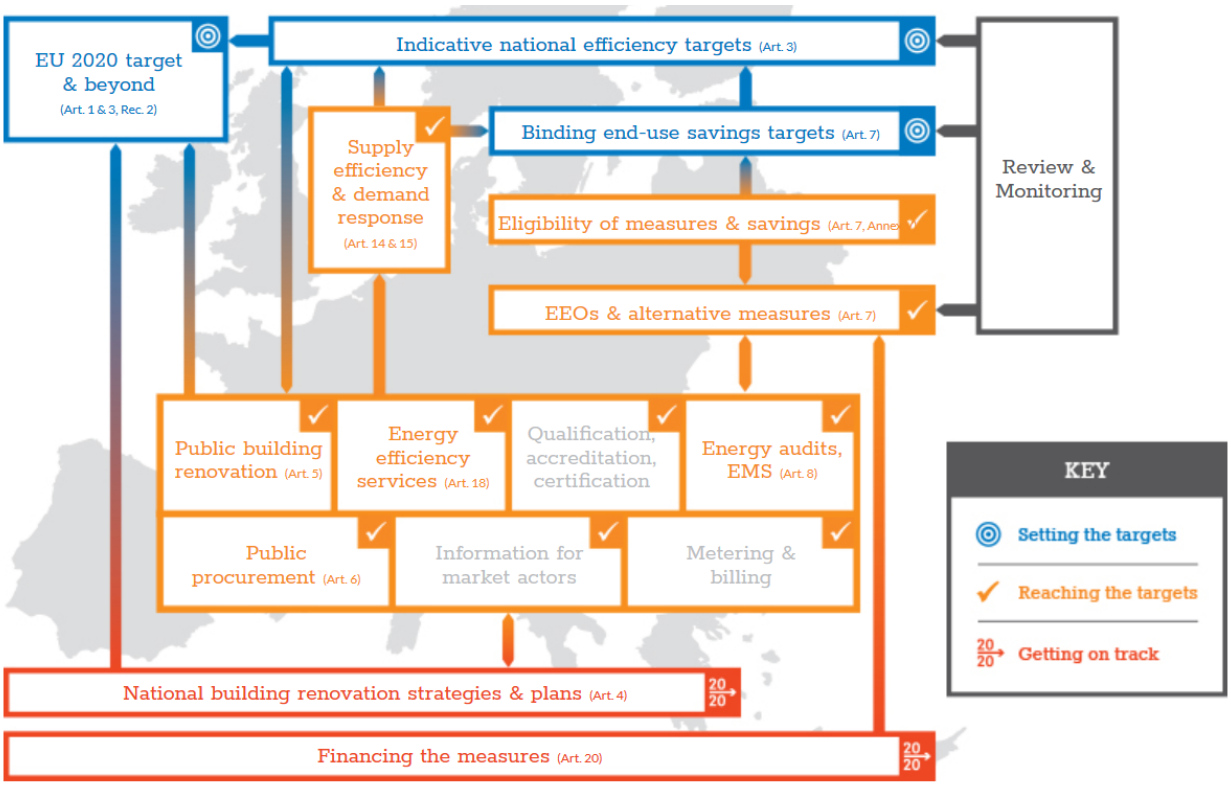

Figure 6. The relationships amongst the articles of the EED. Arrows indicate the links related to the stimulation of energy services.

Source: The Coalition for Energy Savings (2019).

In the survey collected in 2018, respondents were asked to evaluate the implementation of the requirements of Article 18 of the EED in the Member States. Table 6 gives an overview of the answers received. In the JRC survey 2018, respondents were asked for each of the provisions of Article 18 to judge whether they think the provision has been implemented in their national market and whether it has a positive impact on the national ESCO or energy services market in their view (see Annex II, question 1.15). The answers were further cross-checked through other questions and via interviews, when possible. In some cases there was no consistency among the opinion of respondents, in which case the more positive answers were taken into account, assuming that not all the respondents know about new developments or be of positive opinion. In Austria, Croatia, Italy and Romania major differences in answers were found.

Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the actual situation or official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

Table 6. Implementation and success of Article 18 provisions across Member States. Source: own data and analysis (JRC survey 2018). The table does not necessarily reflect the official opinion of MS or EC.

	Art.18.1(a)i	Art.18.1(a)ii	Art.18.1(b)	Art.18.1(d)i	Art.18.1(d)ii	Art.18.1(e)	Art.18.2(b)	Art.18.2(d)
Austria	◉	○	◉	◉	◉	○	○	○
Belgium	●	○	◎	○	◉	◎	◉	◉
Bulgaria	○	◉	○	◉	○	◎	○	○
Cyprus	◎	◎	○	◎	n/a	◉	◎	○
Croatia	◎	◉	○	○	○	◎	○	○
Czech Rep.	◉	●	◎	◎	◉	◎	○	◉
Denmark	○	○	○	○	○	○	○	○
Estonia	○	○	○	○	○	◎	○	○
Finland	●	●	●	●	◉	◉	◉	◉
France	●	●	○	◎	◎	○	○	○
Germany	◉	◉	○	◉	◎	◉	○	◎
Greece	◉	○	○	◉	○	○	○	○
Hungary	○	○	○	◎	○	○	○	○
Ireland	◎	◎	◉	○	◎	◉	○	○
Italy	●	●	◎	◉	◉	○	◎	◉
Latvia	○	◎	◎	○	○	◎	○	○
Lithuania	○	◉	○	○	○	○	○	○
Luxembourg	○	◎	○	◎	○	◉	◎	○
Malta	○	○	○	○	○	○	○	○
Netherlands	●	●	○	◎	◉	○	n/a	◉
Poland	◎	○	○	○	○	◉	○	○
Portugal	○	○	○	○	○	○	○	○
Romania	◉	○	○	○	○	○	○	○
Slovakia	●	●	◉	●	●	◎	◉	●
Slovenia	●	●	◎	●	●	◎	●	◎
Sweden	◎	○	◎	◎	◎	◎	◎	◎
Spain	◉	○	●	●	◉	○	◎	○
UK	◎	○	○	◎	○	◉	○	◉

Range of 5 levels: ○ = not implemented according to all survey respondents, ○ = partially implemented (answers vary), with no or limited success, ◎ = implemented, but success is either not reported, or limited success is reported, ◉ = implemented, and most respondents evaluate it as successful, ● = successfully implemented. Source: own data and assessment (JRC survey 2018).

Art.18.1ai: Disseminating information on available energy service contracts which provide guaranteed energy savings; Art.18.1aii: Disseminating information on financial instruments to support energy efficiency service projects; Art.18.1b: Encouraging the development of quality labels for ESCOs or their services; Art.18.1di: Providing model contracts for EnPC; Art.18.1dii: Providing information on best practices energy performance contracting; Art.18.1e: Providing information about the current and future development of the energy services market; Art.18.2b: Remove the regulatory and non-regulatory barriers that impede the uptake of EnPC and other ESCO services; Art.18.2d: Enabling independent market intermediaries (e.g. EPC or procurement facilitators, one-stop shops) to play a role in stimulating market development

The overall observations are the following (related to those Member States that have provided answers):

- Implementation is very patchy. There are large number of provisions that are not (yet) implemented in some Member States.
- Denmark and Portugal reported none of the provisions as implemented, which might be rather a result of market development independent of the EED requirements, and the market players are less aware of the results. Malta expressed no intentions to promote the ESCO market, and accordingly there is a lack of action.
- Many countries indicated only one provision to be implemented at all, and even that without considerable success: Estonia, Hungary, Lithuania and Romania. This is underlined by the country reports and more information is provided there.
- There are a few exemplary successes. In Finland, Slovakia and Slovenia four or more of the provisions are reported to be impactful.
- In 8 Member States (Austria, Belgium, Czech Republic, France, Germany, Italy, the Netherlands, and Spain), at least 4 of the provisions are implemented with considerable or high success.

The provisions are implemented with very varied level and success rate across the Member States and patterns are not yet clear.

- Information dissemination is reported as successful in Austria, Belgium, Czech Republic, France, Germany, the Netherlands, Poland, Slovenia, Spain.
    - For example, a successful EnPC dissemination project was reported in the one of the Province of Flemish Brabant[23]
    - In Austria information dissemination is not done at national level, but by intermediaries and companies
    - Dissemination by companies is very common, especially in small and emerging markets (Hungary, Croatia, Portugal, etc.)
- Information provision is typically done bottom-up, mostly by the ESCOs themselves, or by intermediaries where these exits. Furthermore, international projects are common to organise such activities and trainings.
- Information on financial instruments is successful in Bulgaria, Belgium, Czech Republic, Germany, the Netherlands, Slovenia.
- Quality labels are available in Austria, Czech Republic, Finland, and Spain.
    - Usually developed markets focus on quality schemes in order to further develop or "clean" the markets.
    - In Austria, the quality seal has been published a year ago and has not yet penetrated the market according to one respondent.
    - Plans on this are reported by a number of MSs as seen in the MS reports.
    - The EU Code of Conduct of EnPC[24] is available and signed in over 20 MSs, which can be considered as a frontrunner of a quality scheme.
- Model contracts that are successful are published in Austria, Cyprus, Czech Republic, France, Germany, Greece, Slovenia, Spain and the United Kingdom.
    - Recent activity in developed markets has been focused on this development, as well as MSs with emerging markets, such as Cyprus and Greece also considered model contracts among their priorities.
    - Model contracts in Austria were publicly funded.

[23] http://www.transparense.eu/be/news/how-province-flemish-brabant-successfully-developed-the-local-epc-marke
[24] https://www.euesco.org/european-code-of-conduct-for-epc/index.html

- Information on best practices was considered having made a positive impact in Austria, Belgium, Czech Republic, France, the Netherlands, Spain and Slovenia.
- Provision of information about current ESCO market and future expectations is considered successful by market actors in Croatia, Germany and Poland.
- Regulatory barriers have been removed in Slovenia and Spain.
- Intermediaries are enabled in Belgium, Croatia, Cyprus, Czech Republic, Germany, the Netherlands, and the United Kingdom.
    - The role of the project facilitator is not fully recognised or officially supported in Ireland.

Other policies as drivers

Respondents were asked to identify critical policies at the EU and national levels that have been important in moving the energy services and ESCO markets ahead.

The EU legislation has been evaluated by respondents of the JRC 2018 survey as a key driver of the development of national and local ESCO markets. The following elements should be stressed in particular:

- Article 18 EED has been considered as the key underlying factor in all Member States, except for Denmark, which experienced an ESCO market boom due to exemplary municipal projects, and France, where national programs were important. Other EED provisions were evaluated as important by Bulgaria, Belgium, Czech Republic, Ireland, Italy, Latvia, Portugal, Romania, Slovenia.

- The White Certificates scheme or EEOS were considered as important drivers in France, and Italy, and potential drivers in Bulgaria, Luxembourg and Greece.

- Financial incentives were important drivers in almost all MS. Financial schemes (subsidies), as well as fiscal incentives (rebates) were used. These were used in combination with other instruments (e.g. voluntary agreements, information, procurement rules, etc.) The following Member States reported using financial instruments: Austria, Belgium, Croatia, Finland (combined with voluntary agreements – see below), Germany (including tax rebates and subsidies), Greece, Ireland, Latvia, the Netherlands, Poland, Portugal, Romania (including fiscal measures), Slovenia, the United Kingdom (also taxation).

- Energy management systems were important in Austria, Croatia, Germany, Greece, Italy, Poland, Portugal, Romania. These are countries where industrial ESCO projects also happen. Furthermore, CHP promotion was mentioned as important in Croatia, Romania, Slovenia, Spain.

- Adapting procurement rules were important in countries where the public sector is a typical client, i.e. in Croatia, Finland, France, Slovenia.

- At local level, the Covenant of Mayors was also mentioned as key in Belgium, Croatia, Finland, Germany, Italy, Poland, Romania, Spain.

- ESCO markets in Finland and Sweden used voluntary agreements as basis, which have inter alia also been drivers in Poland. The United Kingdom also used voluntary agreements to develop their ESCO market.

- The introduction of an accreditation scheme or quality scheme was perceived positively in Slovenia, Slovakia, Spain, Sweden, Austria, Germany and the Netherlands.

4 Conclusions and recommendations

A number of lessons can be learnt from the national-level and the comparative analysis of market development, success factors and remaining barriers of energy services.

First and foremost, the drivers and barriers determining **ESCO markets are distinctly local**, i.e. what works in one Member State might not work in the other. The locally embedded legal, policy, fiscal and financial environment as well as the cultural and practical norms are very important for the model to function and be used. Secondly, the framework as well as the markets are dynamic. Impressive ESCO market booms in the last 20-30 years have occurred alongside significant contractions. Examples of the former are the Czech Republic and Sweden in the early 2000s, Denmark around 2010-15, the Netherlands, Slovenia around 2015-19, etc. Examples of the latter Hungary during 2005-2010 and further, Sweden after the early 2000s, and again in 2015-19, the current halt of public sector ESCO projects in Denmark even if that may be compensated by new business models in the private sector. The findings show that the effect of different factors largely depends on the particular national policy implementation and market maturity. Mature markets are found to be more resilient to negative impacts (such as the financial crisis) whilst relatively large improvements in policy development and implementation appear to have limited impact in less mature markets.

The diversity of geographic and temporal factors implies that comparison across countries, although possible, must be very robust and limited. Implications for **transfer of experience** should be based on a careful assessment of the changing local context. Therefore, the recommendations below are structured around the major barriers and/or opportunities identified, and are supported with examples to emphasize the relevance of the context and to ignite reflection about their relevance in different conditions.

It is important to emphasize again that the current analysis refers to the period 2015-2018, and developments and changes after that period are not covered in this report.

The development of energy efficiency markets, as in the case of ESCO markets, often needs policy support to counter aspects of low inertia, lock-in, informational, financial or structural barriers, etc. (Lund, 2007; IEA, 2011). The role of policies is to overcome these barriers to better reap the benefits and co-benefits that efficiency offers.

This report advocates that **energy services and ESCOs are not silver bullets** (Koeppel et al. 2006, Boza-Kiss et al. 2013, Bertoldi et al. 2014), but are important elements of a successful energy saving portfolio at the user side (buildings, industrial sites, etc.), as well as at the societal side (national policies and strategies). Therefore, recommendations (Sections 4.2-4.5.) are differentiated based on the groups of energy services and ESCO markets identified in Section 2.1. (see Figure 4., Figure 5. and Table 2.) and structured around barriers reported by respondents to the JRC survey (2018) in those circumstances, and how to overcome them.

4.2. Market needs and the potential

The current research shows that energy services already play an important role in Europe in achieving ambitious energy efficiency targets primarily in the private and public building sector and industry. Energy services have become a fundamental pillar of implementing energy saving measures in most European Member States.

Over 75% of respondents to the JRC survey 2018 to question 1.16 (see Annex II) stated that the Energy Efficiency Directive has been instrumental in the energy services market,

and has contributed to energy savings in Europe. All of these respondents named policies as having contributed positively to the development of ESCO markets.

In some cases, the weakness of ESCO markets appears to be related to the presence of alternative policies or instruments, e.g. in Sweden or in case of a section of the public sector of Denmark, and Slovenia. Energy services were a very popular solution in Denmark during 2010-15, when local governments advised each other to implement projects, yet some of them (about 30-40%) preferred to implement energy saving measures relying on their in-house expertise and workforce. In these cases, the potential of ESCOs was largely tapped by the market. Similar situation has been seen during the period 2015-18 in Slovenia.

4.3. Learning from developed ESCO markets

There are a number of traditionally well-developed markets in Europe, such as Germany, Italy, France, and some parts of Austria, and Czech Republic for a few decades. The ESCO markets of Belgium, Netherlands, Denmark[25] emerged without major policy-push and after a period of having a low density ESCO market. Slovakia, Slovenia, Spain have developed significantly in the last few years after a lot of work at the supply side, awareness raising and policy intention, including focused programmes for years or even decades. Similarly happened in the UK, whose level of development is fluctuating: significant efforts, policies and programmes have been implemented, with varied level of impacts.

4.3.1. What can others learn from them?

Having in mind that ESCO markets are locally embedded, and what works in one market may not be successful in another, the following success factors and policies were named as supportive to the development of ESCO segments.

General awareness about the benefits of energy efficiency and energy savings – common in countries with successful implementation indicated above – enhances the success of ESCO marketing, and also the depth of the saving measures. One reason could be that aware clients are motivated not only by economic savings, but by the pursuit of co-benefits, such as comfort, company value, health and productivity. Another reason is that the behaviour of aware clients and their employees, which are involved in the use of technologies and buildings, multiplies the benefits of technological investments.

Political commitment is one of the most effective driving forces for energy efficiency in general, but also for energy services. While a committed political framework may rather focus on other policy instruments than ESCO promotion (Bertoldi et al. 2014)[26], the latter are most effective when technical or financial resources are limited, and they can be picked-up easily by decision-makers. ESCO market support can be in the form of dedicated policy instruments (e.g. establishing public ESCOs as in Belgium, strengthening framework legislation as in Slovenia through the Public-Private Partnership Act, or through dedicated laws to clarify the meaning and content of energy services, e.g. in Spain's Royal Decree-Law 6/2010 and dedicated programmes such as the Programme PAREER in Spain for building renovation).

[25] Note that Denmark's categorization of level of development might seem inconsistent in this report, because on one hand the energy services market experienced a boom in the public sector during the period 2010-15, without major policy efforts, largely as a result of peer-to-peer information. However, there seems to be a levelling off in this sector, and according to the JRC survey 2018, ESCOs are diverting towards private sector clients. The success in this area is not yet evident. Thus, based on the public sector's success, Denmark is a well-developed market, while in the private sector it is only developing.

[26] Bertoldi et al (2014) refer to early developments in the Netherlands and Denmark as examples.

Successful model contracts and/or ESCO guidelines help implementation and a common understanding among market stakeholders, reducing transaction costs and increasing trust in the offers. This factor was reported as key for success of recent ESCO development by respondents of Finland, Slovakia, Slovenia and Spain (see Table 6.). The JRC survey also shows that the creation and official adoption of model contracts has intensified in recent years – in relation to the implementation of the EED.

Dissemination of information can be effective if targeted well and to the appropriate audience. As seen in relation to the implementation of Article 18 of EED (Section 3.2), a successful EnPC dissemination project was reported in the one of the Provinces of Flemish Brabant, while in Austria information dissemination is typically a success of intermediaries and companies. The Czech market could further progress due to success of information distribution. In Slovakia, the Energy Center Bratislava has intensified general and dedicated ESCO information dissemination as well as capacity building and networking.

ESCO associations and facilitators can be key stakeholders, and such is the case of many ESCO markets. The successful examples of long-standing ESCO associations have been replicated across many Member States. ESCO associations and facilitators were helpful in strengthening the markets in Belgium, Italy or Germany, and similar structures were established later in the Netherlands, Romania, Slovakia, Bulgaria. An ESCO association can act as a reference point for ESCOs customers and suppliers and, by grouping and concentration of ESCO professionals, can represent the point of view of the industry with a unified voice. Two European ESCO associations, EFIEES[27] and EU-ESCO[28] promote the ESCO concept and act as a reference point for their members. National or local ESCO associations are established and are active in 11 Member States, and 15 where EnPC facilitators help facilitate the market (see Table 5).

Demonstration projects and replication is common to the the roll-out of the ESCO solution in most of the developed markets. These have in common having being largely driven by demand. The successful projects were promoted through dedicated programs which involved a component of either demonstration by public authorities (e.g. LEMON programme in Italy), peer-to-peer networking (e.g. in Denmark), or by market facilitators (e.g. in Finland).

Removal of regulatory or administrative barriers through specific laws, as reported by respondents, has been successful in Slovenia and Spain. In general the respondents from different countries reported satisfaction with the activities and publications related to the Eurostat guidance. These could have revived some markets, such as the Czech Republic, Croatia, and Slovenia, that had been halted before by ambiguous book keeping rules (Boza-Kiss at al. 2017).

Further legislation and market transformation tools have had positive impact in a number of the developed markets. For instance, according to the survey respondents White certificates/EEOs – or their prospective deployment – have helped the markets in Italy, Slovenia. In the UK, for example, the market for energy performance contracts is most developed in the public sector, partly driven by well established procurement frameworks for energy performance contracts. The Czech ESCO market originally kicked-off via the Energy Management Act in 2001.

4.3.2. How these markets could still improve?

[27] Available at: www.efiees.org
[28] Available at: www.eu-esco.org

Although ESCOs are not the silver bullet there is room for exploring the potential of ESCOs and energy services to further appeal to more clients or for these to pursue and achieve more energy savings. Such is the case of developed markets where policy tools continue to pursue market upscaling and/or more ambitious projects. The following recommendations were articulated by respondents to the JRC survey 2018 or substantiated by documents reviewed.

Countering low energy prices are considered too low to successfully motivate energy savings on an economic perspective. Austria, Germany and Spain reported difficulties to convince potential clients to focus on energy savings due to a lack of convincing economic incentive. In particular, low energy prices limit the depth of renovation or the level of energy saving measures. Recommendations from participants in the JRC survey 2018 include the introduction of environmental or carbon taxes, earmarked levies, or providing tax advantages to energy savings.

Fostering Trust in the market and in the implementing companies. this has been critical in rolling-out the ESCO model in several Member States. Moreover, limited trust is one of the most commonly quoted barriers still remaining even in well-developed markets. Efforts addressed to improving awareness and/or the reputation of the ESCO solution has been done in various different ways, and is a particularly local solution. Respondent suggestions also involve ideas range from establishing ESCO associations and other ESCO networks, via them or independently disseminate general energy efficiency information and/or implement and promote pilot projects or best practice examples, publish and educate/train about model contracts, guidelines, train the suppliers and improve their customer care, establish a guarantee fund to back-up problematic projects, etc. A more detailed discussion of good examples is found in Section 4.5.

Reducing the **transaction costs** could provide an advantage to energy saving projects. This is discussed in more details in Section 4.5.

Tackling **split incentives** represent a possibility to step-up energy saving project coverage, and thus ESCO market expansion to the rented buildings market or to office buildings. Until now, solutions overcoming the split incentives via the ESCO solution are limited. The guarantEE project has been working to find alternative solutions in various countries. Other MS have introduced on-bill financing, and thus the energy service contract is linked to the asset (building), and can be sold or rented together with the asset itself.

4.4. Recommendations for Kick-starting and up-scaling

There are still many Member States that are either at the stage of kick-starting their markets (Cyprus, Estonia), while others have already invested policies and/or resources, but could not excel in energy services or have experienced a halt (Bulgaria, Poland, Romania, Greece, Hungary, etc.). Based on the learnings from successful development of ESCO Markets (Section 4.3), the following recommendations are tailored for countries that are starting off the ground, and for those that have already taken off and are willing to upscale their markets.

4.4.1. Starting off the ground

There are only two MS in Europe without actual ESCO activity, Cyprus and Malta. Malta has limited interest in developing the market because of a different focus for energy systems. Cyprus has been very committed, on the other hand, and has worked with a **combination of policy and market activities** (see more in Annex I). The general acceptance and attention on energy efficiency has been growing significantly in Cyprus in recent years. The government is dedicated to energy services, and there are institutional structures to support

the market (such as the Cypriot Energy Agency). Legal framework has been building up, gradually improving and adapting the legal and operational framework for ESCOs. There are pilot private projects, which may finally lead to a real kick-start and learning. Furthermore, the "I save I renovate" programme was planned to be combined with ESCO contracts in the future.

A combination of establishing the legal framework, clarification of rules, demonstration projects and provision of financing through a combined financial scheme is expected to lead to a successful establishment of a system, where ESCOs contribute to the overall energy saving targets.

4.4.2. Up-scaling

In countries, where ESCO projects have been already tested and exemplary development has taken place, basic barriers have been successfully overcome:

- In some countries, the pilot projects or other past projects were less or not at all successful or not convincing enough, and **trust** needs to be rebuilt. Options for this are discussed in Section 4.5.
- Demonstration projects may have been successful, e.g. in Lithuania and Latvia, however information about them is limited or not fully understood by further potential clients. The model may be also difficult to up-scale due to other barriers, such as lack of further political support (Latvia), remaining or existing legal barriers (e.g. Poland, Bulgaria, Romania). In these cases **improved awareness raising** (even about energy efficiency) could help, and/or removing legal barriers could contribute to stepping up the energy saving markets through the ESCO model.
- In other cases, financial grants were used to (partially) finance ESCO projects, however after they dry-up, the market stagnates because the market-systems were not created in the meantime. Therefore, instead of direct subsidies of ESCO projects, the respondents to the JRC survey (2018) recommend that the funds are used for feasibility studies to reduce **transaction costs and increase awareness**, or for a **guarantee fund** or as a **revolving fund** to make funding available on a long-term in a sustainable way.
- Scaling-up could be done via **other policies**, such as introduction or implementation of **mandatory audits, EEOs, building renovation obligations**, which are not directly introduced because of the ESCO market, nevertheless they raise awareness of the potential clients about the benefits of energy renovation. In Finland, the well-developed audit system is an entry point for ESCOs.

Assessing energy services on common grounds across Europe is a challenging task. Development of a comprehensive methodology across Europe, including data collection, reporting, monitoring and policy assessment would also be helpful in the future comparative analyses, including the impact of national and European legislation. We could better understand: What works and why? Table 7. gives an overview of future perspectives and recommendations per country provided by survey experts (JRC survey 2018), and the large differences in scope and coverage show also the difficulties in comparison.

Table 7. Future perspectives and recommendations. Source: own data collected in JRC survey 2018.

MS	Key recommendations	MS	Key recommendations
Austria	• Coordination of split budgets and separate responsibilities in the public sector. • Local independent market facilitators should be established in all federal regions.	**Italy**	• Due to the lack of technical skills of public administration staff at local level, the creation of a one-stop shop technical assistance service, which can support the development of projects, is envisaged. • Increase the knowledge of public authorities about EnPC opportunities

Belgium	• Mandatory requirement in regional legislation for commercial and public buildings: 40% energy savings for 2030
	• Energy Performance Contracting (EnPC) as a key tool for implementation and financing
	  ○ Promotion of the development of EnPC (with standardized contracts and guidelines)
	  ○ Making EnPC mandatory for public buildings (80 million m²)
		Latvia	• Allow municipalities to take long-term (above 5 years) commitments if the energy efficiency measures are implemented with guarantee.
			• Analyse the existing PPP regulation and determine if it is possible that EnPC project could fall under the PPP rules.

Bulgaria	• Improve EnPC project quality though model contracts, legal requirements, standards, and certification of services and providers • Wider availability of EnPC financing opportunities - public or PPP	**Lithuania**	• Obligations regarding public buildings renovation in national legislation. • Developing market of ESCO facilitators – for the preparation of procurement documents. • Standardization of procurement documents according to the PPP, Eurostat requirements.
Croatia	• Obligatory life-cost analysis and valuation of projects • National tender documentation along with contract model for EnPC (PPP)	**Luxem-bourg**	• Introduction of EEO scheme and third-party collaboration.
Cyprus	• With the tenders in the public sector (which have not received proper bids, but are being explored), and the first ESCO project in industry, and interest from the building sector, it is expected that the market will finally kick-off	**Malta**	• Interest for combination with existing services • Overcoming small project-sizes (pooling) and off-balance sheet options that could reduce perceived risks and transaction costs.
Czech Rep.	• Removal of administrative barriers • Certification of EES projects and EES providers • Subsidies for facilitation and preparation of EnPC projects • Remove barrier for EnPC in the state sector • Life cycle cost instead of minimum investment costs • Support comprehensive solution	**Netherlands**	• Strict legislation including effective enforcement. • Improve the knowledge in financial institutions. • Increase the awareness about the urgency and importance of energy efficiency in buildings. • Create financial schemes or small subsidies to hire EnPC facilitators.
Denmark	• Independent market intermediaries can play a major role	**Poland**	• energy price increase (e.g. due to CO2 taxes); • combination of ESCO solution with grants to increase depth of intervention; • clarification of debt consequences of EPC.

MS	Key recommendations	MS	Key recommendations
Estonia	• All investments for improving energy efficiency in the public sector must be procured focusing on results in LCC not focusing on investment in EUR. • Limit subsidies to cases which are using EnPC models in energy efficiency projects. • Funding for ESCOs.	**Portugal**	• Financial support, should be permanently open to a wide range of efficiency measures (instead of being driven towards specific types of equipment or sectors) • Redefinition of the ECO.AP programme in order to be more attractive to the ESCO industry • Put in place financial incentives for the implementation of EnPC • Implement a continuous certification scheme for ESCOs based on their performance.
Finland	• More examples of successful ESCO projects	**Romania**	• Introduction of a carbon tax • Crediting rules of the banks • Fiscal rules specifically for ESCO and Services
France	• Provide subsidies for projects bundling several actions with impact > 10% savings, and with guaranteed savings • Improve subsidies to make energy efficiency actions profitable, with the aim of upscaling renovations	**Slovakia**	• Progress on Quality Assurance Scheme and Facilitators Scheme • Combination of various financing schemes
Germany	• Contracting competence centres at regional or local level • Financial support for facilitation • Directive to use contracting in the public sector • More stable regulation over time.	**Slovenia**	• After the success in the public sector, the experiences are used for the development of financing building renovation in the residential buildings (with or without EnPC) • Quality Assurance Scheme and Facilitators Scheme
Greece	• Provide information on best practices energy performance contracting • Provide model contracts for EnPC • Build an authority that will monitor EnPC contracts	**Spain**	• Create a white certificates system • Link energy savings to tax advantages • Implement a Guarantee Fund to ESCO projects
Hungary	• Higher value and promotion to EE overall • ESCO procurement guidelines and promotion • Support for audits and feasibility studies • Allowing a combination of different schemes	**Sweden**	• Create trust between ESCOs and public sector to restart the energy service market in Sweden. • Help building owners/industries describe their "needs" as input to develop a service that they want to buy instead of the entrepreneurs developing a service on their own. • Develop Certification of Energy Service companies to increase trust.
Ireland	• Approval and recommendation from Central Government • Robust facilitation market and frameworks • Critical mass of delivered successful projects	**United Kingdom**	• Implementation of a quality assurance scheme for EnPC; • Extend the benefits of public procurement frameworks to private sector end users; • Provide clarity (at national level) regarding financing for EnPC and cases in which off-balance sheet treatment can be achieved.

4.5. Future aspiration for improvement

ESCOs and EnPC help to overcome technical, managerial, financial constraints to investments and pay off initial costs through the energy cost savings coming from the reduced energy demand. ESCOs provide an opportunity to curb increasing energy demand and control CO2 emissions while exploiting market benefits for customers by decreasing the energy costs of their clients and making profit for themselves. While ESCOs have been operational on a large scale since the late 1980searly 1990s, the energy service market in the European Union (and in Europe) is far from utilizing its full potential, even in countries with a particularly developed ESCO sector. While acknowledging other policies, it is valuable to recognise the role of ESCOs and energy services in tackling near-future challenges of achieving the energy and climate targets of the EU and its Member States.

Below are four key areas that were found to be most predominant and pertaining to most markets. These topics stand-out from other recommendations because they are horizontal across MS and across market development levels, and as such they could be tackled either at the EU level or via awareness raising across MS and developing similar policies.

4.5.1. Developing and regaining trust

The lack of trust and a need to develop it is mentioned by respondents and documents in almost all Member States. This is a universal area that needs to be managed at various levels and by many stakeholders. However, the **reasons behind the lack or low level of trust are varied, and may be tackled differently**.

In almost all MS, the quality of energy services is varied and the offers are not always comparable. This can result in unsuccessful tenders (e.g. Germany, Belgium, Cyprus) because of a lack of bidders. In Cyprus, companies are listed as ESCOs on the official register, however, they do not appear in tenders. It is unclear what role these companies play in a future ESCO market, while the tenders are unsuccessful due to low number of bids. A **stricter definition and registration of ESCOs** could facilitate the supply market, and **trainings** could improve the offers of existing companies.

The introduction of **ESCO and/or EnPC definitions** in many countries mostly as a result of EED has improved market clarity, ambiguity still remains in some MS due to delay in the adoption of such a definition, or misinterpretation of the definition. Often the notion of ESCO is popular, even if the company does not actually deal with energy services. On the other hand, in France, the number of ESCOs is underestimated because more general contracts often involve elements of ESCO services, even if the whole contract is not an ESCO contract. In both cases, the clients are confused, and it is unclear for them what ESCOs really offer. This situation reduces trust.

It can also result in projects that do not live up to the expectations of the market. In Hungary, Cyprus and Lithuania some projects under-performed and received attention, finally reducing trust in the whole concept and all ESCOs. While difficult, it is important to remove bad connotation through dedicated and **impartial awareness raising**. Efforts from the sides of the contractors and implementers (i.e. the ESCOs usually) are not enough, because their credibility has been eroded. Establishing new, convincing **demonstration projects** should also be considered.

Training of potential clients (their energy managers of larger sites and buildings) would help them be compatible to oversee the implementation and engage in conversation with the ESCOs. Clients' level of awareness can be further increased thanks to availability of model contracts (as required by Article 18.1.d.i of EED for the public sector), and/or to a **central procurement** in case of large buildings or sites.

Trust and credibility of the ESCO solution can be also increased by making **standard documents and guidelines** available. Article 18 of the EED has set the requirements

for these changes (e.g. model contracts Art.18.1di), but a full implementation of these in practice is to be seen. For the moment only about a third of the markets are equipped with model contracts that are successful in delivering trust and are actually used by stakeholders (see Table 6).

Much more effort to establish and maintain a credible, universal (possibly EU-level or EU-framed) **quality assurance systems or an accreditation system** would make it possible to ensure the minimum requirements for ESCOs and/or ESCO projects. The **European EPC Code of Conduct** was initiated in 2013-14, and could be an excellent starting point both on the side of coverage (20 countries) and in content (brief, clear rules). However, this needs to be institutionalized, value-raised[29] and an admission/removal system attached. In particular, it needs to ensure that only companies that actually abide the rules can join and remain members of the Code of Conduct community.

Finally, **independent measurement and verification methods** have been rolling-out in more developed markets. Their costs may limit their application, and it is to be considered to find funding to assist projects to finance independent measurements from public funds.

Without a credible method to prove energy savings, projects can be debated by the participants. This has led even to court cases (Latvia), or failed projects (Sweden) earlier (Marino et al. 2010). Measurement of projects where the public budget is also involved, because of a grant, is imperative. For example, grant programs in Slovakia and Hungary ran without ensuring a minimum performance improvement guaranteed by credible measurements.

Finally, the establishment of a **public guarantee or an insurance scheme** (similar to deposit guarantee funds for banks) would support project security, and potential clients would have guarantees to turn to in case of conflict, bankruptcy or failure. Such scheme is already working on an individual level (e.g. an ESCO in Hungary reported using it).

4.5.2. Understanding the benefits

It is assumed that economic benefits drive ESCO markets primarily. More **research** would be necessary **to verify this assumption**. From the perspective of the ESCOs and investors this is most probably the case, however on the clients side (and even for other stakeholders) other benefits could be also or even more valuable, such as improved comfort, value of the building/site, public image, etc. Promotion of energy saving projects and measures should not be only based on the economic benefits, but **highlight additional value of energy performance improvement**.

Yet, economic benefits and payback-times are hindered by additional costs of ESCO projects e.g. **transaction costs**. Therefore, it has been proposed to reduce or remove them, and there are various tools already tested or planned across MS. A repetitive recommendation from respondents of the JRC survey 2018, called for public funds being directed to (maybe even mandatory for some sectors) **feasibility studies or regular audits**. These would already inform potential clients about the benefits of energy savings and areas for effective measures. They could serve as the basis for discussions or even contracting between the client and the ESCO. While today ESCOs prefer to carry out their own audit, if **a standard feasibility study was introduced, with credible methodology**, costs could be significantly cut. The Energy Performance Certificates (EPC) could serve as a basis for this, but have been largely ignored for this purpose so far.

It was also recommended by respondents to the JRC survey 2018 that **more project bundling or pooling** would open the market to smaller projects. This has been

[29] Many comments were received to make it fee-based in order to attach value to it and to have funds to actually run the system.

successfully used in some instances, but a more advanced system or market practice, as well as cultural acceptance could enlarge opportunities. The classic example of Berlin has been already followed in e.g. Belgium, Portugal, the Czech Republic, and Latvia, but the potential is still high.

It is interesting to acknowledge that in demand driven markets, **peer-to-peer learning** about the benefits is more automatic and significantly reduces the need for promotion of the ESCOs. In the absence of such interaction, **publicly supported demonstration projects** can increase knowledge and understanding of the ESCO concept.

Finally, tackling **split incentives** would be also a way to encourage reaping benefits of energy saving. Split incentives is an important barrier to the market due to misperception of the value of energy savings for the tenant and the Landlord (or other split roles), blocking both from implementing energy saving measures. As discussed above in Section 4.3. solutions in the ESCO arena are limited, and under research. One scheme has been identified to work, which is on-bill financing e.g. in the UK, Latvia and France, whereas the energy service payment is linked to the asset (building), and can be sold or rented together with the asset itself.

4.5.3. On the road to decarbonisation

On a societal level, ESCO markets are expected to participate in achieving long-term decarbonisation. The "Clean Plant for All" strategic vision presented by the European Commission in November 2018 implies that the results of ESCO projects of an average of 20-30-50% energy savings are laudable, but not enough. ESCO markets need to find their place in moving towards deep renovation and other deep energy savings.

A solution proposed by several respondents is the **combination of different levels of financing**. It is possible to design a project financing system, where the measures are grouped into three categories. Those with the shortest pay-back time (2-3 years) and technologically simple could be expected to be implemented by the users/owners at their own expense (or with personal loans), given that the measures repay themselves very quickly. The measures with middle-term payback time (7-10 years) could be financed from loans and/or attract ESCO financing. And only measures that have very long payback times or major barriers should be offered subsidies or preferential loans. In Bulgaria, Regulation No RD-16-347 of 2 April 2009, which is the key ESCO regulation, laid down the requirements and procedures related to subsidies that can be combined with energy savings performance contracts.

On the way to decarbonisation, ESCOs may try into **new areas, new clients**. There is already interest in residential buildings or residential complexes. Combined projects for the demand and supply side, i.e. larger urban projects could become interesting as decision makers also become interested in systemic approach to deal with them. Finally, transport systems that are at the start of transition may also become interesting on a longer term for ESCOs.

The **obligations to renovate a minimum floor area** (e.g. 3% of total floor area of central government buildings (EED Art. 5)) is an indicative way how the combination of mandatory elements, ESCOs and e.g. the Energy Efficiency National Fund in Croatia may lead to a wider-scale and deeper level of energy savings.

4.5.4. Financing and fiscal concerns

Financing ESCO projects remains a difficulty in almost all Member States. Even in countries where **credit** is available, difficulties related to **liquidity** of the client and/or the ESCO, **availability of credit lines**, openness to loan-financing, or even the **accounting of project** dynamically reappears, even when these seem to be overcome for some time or for certain clients. Off-balance sheet solutions have not been developed yet. These could significantly improve the value of ESCO projects in the energy saving markets.

In this regard, the **Eurostat rules** used to represent a major barrier for the public sector, which has been largely overcome when the updated Guidance note on revised treatment of energy performance contracts in government accounts was published on 19 September 2017[30]. In 2015, Boza-Kiss et al. (2017) mapped the impact of the ambiguity about the interpretation of the European System of National and Regional Accounts by Eurostat (known as ESA 2010 and valid since September 2014). It was not fully clear whether investments made by an ESCO in publicly-owned buildings or installations were supposed to be added to the national accounting, thus to public debt, or not. The consequent Eurostat guidance note on 7 August 2015 actually supported a stricter definition, temporarily halting ESCO projects in the public sector in 15 Member States. In addition, the EIB issued a practitioners' guide on the updated Eurostat guidance in May 2018 : "A Guide to the Statistical Treatment of Energy Performance Contracts"[31] . Bender (2019) clarified that the Eurostat rules apply to statistical treatment and not as accounting rules or practices. Accordingly, in case of off-balance sheet projects, only the regular payments are to be recorded. On-balance sheet solutions also exist and apply only in case of governmental clients of ESCO services and under strict conditions on ESCOs. EIB has established dedicated credit lines to support ESCO financing, acts on awareness raising, supports technical assistance and offer sustainable financing.

These developments have largely improved (or reversed) ESCO market conditions in many countries (reported by Czech Republic and Hungary, for example). However, information has still not been fully spread, and more information dissemination would be useful, based on reported remaining confusion in Austria, Belgium, Bulgaria,

The four recommendations are the most relevant ones that are relevant in all EU MS, and potentially the EU could select to take a leading role or set up appropriate framework conditions to resolve the barriers. These would be extending the provisions in the Energy Efficiency Directive at the EU level, yet the measures for actual ESCO market promotion should largely remain at the national level. It is necessary to reemphasize that the ESCO markets and their environments are very dynamic, which can be framed only by dynamic policy-making.

[30] https://europa.eu/rapid/press-release_IP-17-3268_en.htm
[31] Available at: https://www.eib.org/en/publications/guide-to-statistical-treatment-of-epc

5 Annex I. – Country Fiches

The Annexes below provide national and local level information about the ESCO markets of every EU Member State.

Austria

4.1.1 Market size and market development

The Austrian energy services market is well developed and the ESCO market has a long history with guaranteed contracts. There is no official data on the Austrian ESCO market size available. The energy service market size in the building sector was estimated between EUR 30 and 40 million in 2018 in Austria, however EnPC for street lighting, supply contracting, and other energy services such as auditing are not included in this estimate.

The ESCO market has been stable since 2015, with limited growth in a few regions, while difficulties in others.

The ESCO market features a number of development factors, e.g. there is an ESCO association (DECA, the Association of 'Austrian Energy Efficiency and Performance Contractors), several facilitators help the market, the market is largely demand-driven, and trust is supported with quality labels.

Table 8. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	✓	✓	✓

Based on the indicators of maturity, the Austrian market is largely mature, although still suffers from framework conditions (see below).

Supply side

There were approximately 400 companies providing many types of energy services, including all energy auditors. The Austrian energy efficiency service (EES) market includes 27 ESCOs offering EnPC services and 36 providers offering ESC (QualitEE, 2018a).

The variation of ESCOs in terms of size and types is big: approximately 40% of ESCOs in Austria are small companies (up to 50 employees), 20% of all ESCOs are medium size companies (up to 250 employees), and, finally, 40% of all ESCOs are large size companies (above 250 employees). The main ESCO suppliers are energy supply companies and engineering and construction firms, followed by automation, control and equipment manufacturers. ESCOs typically offer a wide range of services, with the EnPC service typically not being the core business.

The majority of ESCOs in Austria are privately-owned national and international companies. The dominant contract used by ESCOs is EnPC with guaranteed savings. The QualitEE project shows very similar results: the predominant energy savings model (stated by 80% of Austrian respondents) used in EnPC projects is the guaranteed savings model (QualitEE 2018a).

Both EnPC and ESC markets consist of the following actors: providers including regional and municipal utilities, facilitators which offer diverse services such as consultation and assistance, clients typically including public sector and industry and, finally, associations and decision makers (QualitEE 2018a).

Demand side

According to the 2018 JRC survey participants, the most typical ESCO clients are public buildings including educational facilities (kindergartens, schools and universities) and offices owned by e.g. municipalities. Public lighting is also a popular ESCOs target. Our results are in line with the results of the QualitEE project: the public sector (municipalities & public buildings) is the main sector for the EnPC providers. The most important client groups are the "BIG – Bundesimmobiliengesellschaft n.b.H." (The Federal Real Estate Company, which manages Austrian publicly owned real estate) and the 2.100 municipalities (update May 1st, 2017), which own most of the public buildings in Austria (QualitEE 2018a). However, when it comes to the ESC providers, the client sector is very diverse. The list of the selected clients in QualitEE project report shows different types of clients such as hotels, residential neighbourhoods, Biogas plants etc. (QualitEE 2018a).

The dominant technologies implemented by ESCOs are building level heating and heating systems followed by street lighting. Other technologies typically implemented by ESCOs in Austria are building as a whole (including active and passive systems, energy efficiency and RES), district heating systems, industrial processes, horizontal technologies, motor systems, and automation and control systems.

The energy savings typically achieved by an ESCOs project vary from 15% to 25%. Average size of investments in ESCO/EnPC projects varies from less than 200 000€ to 5 000 000€. The typical project duration that ESCOs implement is 5 to 10 years. It varies depending on the type of the project; private (appr. 2-4 years) and public (appr. 10 years). This is in line with the findings of the QualitEE project (QualitEE 2018a).

4.1.2 Policy framework

In the JRC survey 2018, respondents were asked to evaluate the implementation of the requirements of Article 18 of the EED. The following provisions were implemented in Austria (see Table 6[32]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings, i.e. list of ESCOs;
- Encouraging the development of quality labels for ESCOs or their services;
- Providing model contracts for EnPC;
- Providing information on best practices energy performance contracting.

Model contracts for EnPC were developed by DECA. It was a publicly funded project, and model contractors are available online[33]. According to a survey expert, the information activities successfully contributed to the ESCO market development, thanks to initiatives from the private organisations and information spread about the implemented projects but not on a governmental basis.

There have been several initiatives implemented to promote energy service market in Austria. Firstly, an umbrella organisation was established to cover Energy Service Contractors by the Federal Government in 2004. This organisation aimed at promoting quality assurance and increasing market transparency. In 2013, this organisation was rearranged by establishing similar organisation called DECA[34] (Austrian Energy Efficiency and Performance Contractors). This organisation has had a networking function to disseminate information on high-quality energy services. Austrian climate protection

[32] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[33] https://www.oegut.at/de/projekte/energie/mustervertraege-contracting.php

[34] www.deca.at

initiative klimaaktiv[35] launched a contractive portal[36] with different information about energy performance contracting including (BMWFW 2017):

- Basic information on the instrument of energy performance contracting;
- Sector-specific information on opportunities and implemented projects;
- Information for companies that are considering setting up a new energy performance contracting division, or which are already offering such a service;
- A search function for providers of energy performance contracting services;
- Further information on the subject (links, studies, articles etc.).

Additionally, there is an Eco-label for the Energy Performance Contracting (Guideline UZ 50)[37]. The 'Energy Performance Contracting' eco-label formulates the requirements for the contractor and the energy performance achieved by an implemented project (BMWFW 2017).

In the public sector, Austria has been implementing energy performance project using ESCOs since 1997. Austria defined an energy savings plan based on three measures including energy contracting, energy management, and renovation plans as well as floor reduction. The largest part of the energy savings (30 GWh) must be achieved using energy contracting. Using the so called Bundescontracting, more than 600 buildings have been optimised and modernised in terms of energy efficiency. This makes the contracting programme one of Europe's largest contracting authorities for energy performance contracts. The duration of these projects is 10 years. 80% of the calculated savings go towards financing energy efficiency measures. The remaining 20% are returned to the building user. The guaranteed savings of the projects are on average ca. 20%.

4.1.3 Main barriers

The main barriers identified by survey participants are: inexperience of actors and mistrust from potential clients, followed by a lack of appropriate forms of financing, the small size of projects and high transaction costs.

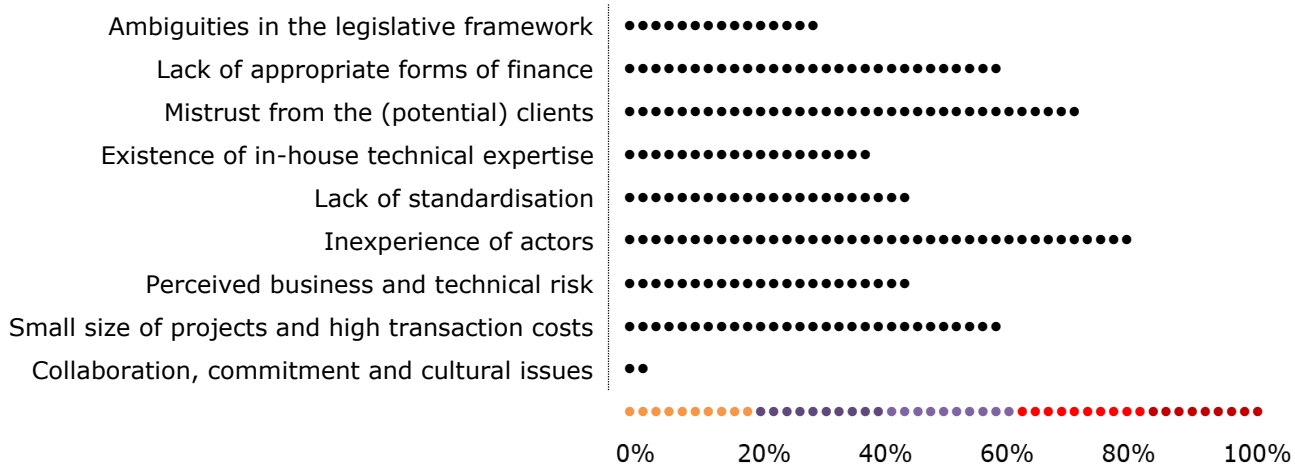

Figure 7. The relevance of main barriers that limit ESCO implementation

(100% = all respondents and sources indicate this as a major barrier on a scale of 5)

EnPC is still not well known across Austria, except for some regions. There were some weak practice examples creating distrust, and there is a lack of supporting frameworks.

[35] https://www.klimaaktiv.at/english/
[36] www.contracting-portal.at
[37] http://www.umweltzeichen.at/cms/home/produkte/gruene-energie/content.html?rl=33

There is only one region in Austria which provides subsidies for EnPC. Other hindering factors are low energy prices, complexity of service, lack of information on the client side and split incentives between landlords and tenants.

4.1.4 Future perspectives and recommendations

Most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market in Austria to further develop ESCO market:

- Coordination of split budgets and separate responsibilities in the public sector;
- Local independent market facilitators should be established in all federal regions;
- Nationwide harmonization of tendering procedure;
- Support among financial authorities (e.g. municipal supervision, ministry of finance) should be enforced: lack of knowledge about EnPC hinders many prospective projects; energy agencies speak the wrong language to empower those authorities;
- Guarantee instruments to improve risk sharing (esp. for small ESCOs);
- The updated Eurostat Guidance for EnPC in public sector still create legal uncertainty. A clear framework in favour of EnPC is essential.

Belgium

4.2.1 Market size and market development

The Belgian ESCO market is considered to be well-developed, with features of a supportive framework. There is no official data available on the Belgian ESCO market size. The market size estimated by the survey experts was between EUR 20 and 30 million per year in 2017. This data is estimated using the BELESCO (Belgian ESCO Association) database which includes information on 15 projects and reliable data on 300 buildings under contracts.

The ESCO market has been increasing fast since 2015. This growth has been realised primarily in the number of projects and the number of buildings under contract, The number of providers (ESCOs) increased from 6 to 13, the number of facilitators - from 3 to 5, while the estimated number of ESCO contracts - from 3 to 29 –being carried out in 301 buildings as opposed to 3 building per year in 2015.

The knowledge and awareness of energy service in general, and performance contracting in particular, has increased considerably during the past years at the level of the federal and regional public authorities (QualitEE 2018b). In the Belgian Energy Efficiency Action Plan, the ESCO and Energy Contracting markets are seen as key future components in the energy efficiency and renewable energy markets, delivering "performance based" business, contractual and operational models to the private and public building sector and the industry. In the Walloon Region, Renowatt[38] promotes and facilitates EnPC in the public sector in the Liege region. EnPC contracts in the value of EUR 60 million have been awarded to ESCOs, covering 134 buildings to be renovated (QualitEE 2018b). In the Flemish Region, the Vlaams Energiebedrijf (VEB) is gaining momentum and its mandate was widened towards facilitating EnPC contracting in the public sector. The first EnPC contract was awarded in 2016 in a public psychiatric healthcare centre (Rekem) (QualitEE 2018b). Public sector has benefited from PDA (H2020/ELENA/EEEF), R&D-projects (H2020: EESI, EESI2020, GuarantEE, Transparense, CITYnvest). Regional support program is available in Flanders on ESCO for SME.

BELESCO, the Belgian ESCO Association, was set up in 2010 founded by Fedesco[39], among others, in order to facilitate the faster development of the ESCO and EnPC markets in Belgium. BELESCO is a private non-profit organisation that was set-up to closely collaborate with private actors, and function as a knowledge centre and a centre of reference. It supports the ESCO market by disseminating information and serving as a point of contact including keeping a list of energy services providers.

There are several public ESCOs in Belgium, mainly in Flanders and Brussels, and they work as "integrating organisation", because they pool contracts and subcontract the projects to private ESCOs (Bertoldi et al. 2013).

Table 9. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	✓	🔍	✓

Based on the indicators of maturity, the Belgian market can be considered as among the more mature ones in Europe, and this development has happened largely recently. There is a still room of improvement in the ESCO market structure, for example the launch of a

[38] A project carrying out energy retrofit of public buildings, http://www.renowatt.be/fr/

[39] A public organisation, which has been dissolved recently

list of energy service providers would be important for Wallonia; the adoption of a model contract is yet on-going.

Quality labels are not widely available, although the EU Code of Conduct[40] is promoted. Also, with respect to quality labels, the H2020 QualitEE-project[41] is currently investigating *if* and *how* a formal Quality Assurance system might bring added value to the Belgian market of performance based energy services. This investigation is currently being made by Factor4[42], an EnPC consultancy, in cooperation with BCCA[43], a Belgian certification body active in the building sector.

Supply side

The estimated number of ESCOs is around 13 in Belgium in 2018. The majority of these companies are medium and large size companies. The large ESCOs typically have ESCO departments or even subsidiaries that in themselves are often relatively small, with sometimes just a handful of people. They have, however, the capacity to use other internal resources for engineering, installation, maintenance etc. In some cases, they have acquired companies with such expertise and integrated them into the group. Those companies typically still only do a small portion of their business for the ESCO business.

The variation of types of ESCOs is large: There is one energy supply company that has created a dedicated energy services subsidiary. There are four facility management and operation (or rather maintenance and technical management) companies that have developed energy services activities. There are two automation/control companies. There are five smaller ESCOs that emerged from engineering/auditing/energy advice companies (four of which are originated in Belgium, one in France). There are two regional public ESCOs (in Flanders) within Regional Network Distribution Companies, although they are in the process or emerging. The Flemish municipalities are their stakeholders and are owned by "multiple" municipalities.

In large companies, the ESCO department is small, but almost exclusively dedicated to ESCO services/EnPC, while the rest of these companies carry out other activities (contracting, maintenance, infrastructure, construction, energy supply, etc.). Small ESCOs adapt to the demand from the market, and while focusing on ESCO services/EnPC, they also offer audits, energy advice, etc.

Demand side

The typical clients targeted by ESCOs are as follows: public buildings including hospitals, educational facilities (schools, kindergartens, universities) and offices (e.g. municipalities). There are projects with industrial SMEs (but not process related). There are emerging pilot projects in social housing (identical houses in streets or neighbourhoods), and private and social residential multi-apartment buildings. Educational buildings are often part of municipal projects (primary schools), which may be bundled from various municipalities, or high schools/universities. There are new projects emerging dedicated to public secondary schools (managed at the regional level).

The typical technologies implemented by ESCOs are as follows: building as a whole including some building envelope measures (window/door replacement, roof insulation), but rarely complete refurbishment including wall and floor insulation, although this is expected to happen within the next years.

The average size of investments of ESCO/EnPC project varies depending on the implemented project: projects with SME's are often small, less than 200.000€; public projects with one municipality or university are typically from one to three million Euros of investments. There have been two large projects with investments of 25 million Euros and 5 million Euros in Belgium in the last years.

[40] https://www.euesco.org/european-code-of-conduct-for-epc/index.html
[41] http://www.qualitee.eu/be
[42] http://www.factor4.eu
[43] https://www.bcca.be/

The duration of the projects is approximately 10 years. It may vary depending on the project type: from 5 years (SMEs) and 10 (average) to 15 years (public sector).

The most common type of contract used in Belgium is EnPC with guaranteed savings (ESCOs guarantee the energy savings, clients takes the financial risk).

4.2.2 Policy framework

In the JRC ESCO survey 2018, the following provisions of Article 18 of the EED are implemented in Belgium (see Table 6[44]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings;
- Providing information on best practices energy performance contracting;
- Removing (some) regulatory and non-regulatory barriers that impede the uptake of EnPC and other ESCO services;
- Enabling independent market intermediaries (e.g. EnPC or procurement facilitators, one-stop shops) to play a role in stimulating market development.

All regions have different programmes and action plans towards energy services. However, on the national level, the Belgian Association of Energy Services Companies (BELESCO[45]) provides guiding material to draft EnPCs and provides a platform involving different stakeholders active in the energy service field. BELESCO represents large section of the ESCO market, and it is a good starting point when looking for an ESCO. Furthermore, the Economy Federal Public Service publishes an official list of providers on BELESCO´s website. The energy service market in Flanders is described by distinguishing the market into the clients addressed by energy services: energy service for companies, energy service for local authorities, energy service for public buildings and energy service for vulnerable families (NEEAP 2017d). There are different actions and policies addressing these different client group. In the Flemish action plan for nearly zero energy buildings (NZB), there is a programme called "ESCOs for SMEs" promoting contracts between ESCOs and SMEs. This project promotes the buildings sector's transition towards low energy and emissions. The Flemish Agency for Innovation and Entrepreneurship created a consortium which involves industry, financial organizations and energy sectors to carry out two main actions, supporting ESCO-SME cooperation and providing policy recommendations. The second client group of energy service, public buildings, is addressed by the investment programme for (new) school infrastructure via alternative financing. The private investment company DBFM (Design, Build, Finance, Mainten) Scholen van Morgen ('Schools of Tomorrow') was selected to implement the project by achieving an investment volume of approximately 1 billion euros.

In Brussels, the government has decided to implement a financial mechanism for energy renovations of the public buildings as a part of the Regional Plan for Climate, Air and Energy (PACE) (Gouvernement De Region 2017). For this initiative, EUR 9 million were allocated between 2017 and 2020.

In Wallonia, the project Renowatt using energy performance contracting in the public sector has increased EnPC usage. BELESCO's ESCO list also indicates some ESCOs activity in Wallonia, including several success stories, but information is limited. (Service Public De Wallonie 2017).

4.2.3 Main barriers

[44] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[45] https://www.belesco.be/about-belesco

The main barrier identified by survey participant is the remaining low level of trust from the potential clients.

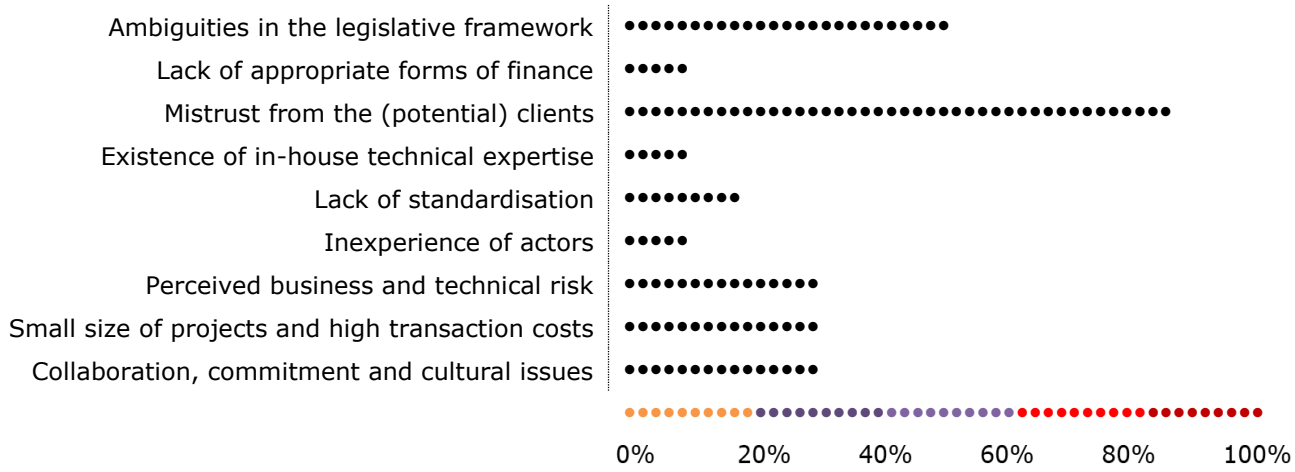

Figure 8. The relevance of main barriers that limit ESCO implementation

(100% = all respondents and sources indicate this as a major barrier on a scale of 5)

Other barriers identified by survey experts are as follows:

- Remaining ambiguity related to the application of Eurostat rules;
- Reluctance to outsource;
- Difficulty in "selling" ESCO services, due to lack of clarity on the real offers as opposed to other, similar models (public ESCOs, public one-stop-shops/facilitators) that seem to be slow in scaling-up, however limit private facilitator development. With this competition for public one-stop-shops (to whom ESCOs often transferred expertise), there is a risk of slowdown of market development. Public policy makers are insufficiently aware of this new market barrier.
- Lack of regulation to solve split incentive in office buildings, residential and social housing sector.
- Lack of model contracts, list of ESCOs, support structures, etc in Wallonia.

4.2.4 Future perspectives and recommendations

The members of BELESCO have formulated 5 key recommendations and measures aimed at mobilising private investments in the energy renovation of our country's building stock. The role of EnPC is significant[46]:

- Mandatory target in regional legislation for commercial and public buildings: 40% energy savings for 2030;
- Energy Performance Contracting (EnPC) as a key tool for implementation and financing;
    - Promotion of the development of EnPC (with standardized contracts and guidelines)
    - Making EnPC mandatory for public buildings (80 million m²)

[46] https://www.belesco.be/about-belesco/position-paper

- Stimulate the development of the Third-Party Financing (TPF);
- Awareness raising & capacity building;
- Adapt support schemes and regulations to market realities.

Other recommendations for a further successful development of the ESCO market:

- Subsidy for EnPC pilot projects for deep renovations (as in the PACE model);
- Solution for the split incentive problem;
- Tax shift, less labour etc. taxes paid via CO2-tax that will make energy saving projects more profitable;

While the Belgian ESCO market has been on a steady growth-line, and it is expected that the good experiences further replicate, some more effort is needed to overcome remaining barriers, and clarify company-roles, types of offerings and contracts. This can contribute to a higher trust, which is one of the major problems of the market.

Bulgaria

4.3.1 Market size and market development

Despite the large potential of energy savings both in the public and private sectors due to the remaining legacy of the buildings and industry sectors alike, the progress of development of the ESCO market in Bulgaria has been limited (Ministry of Energy of Bulgaria 2017). Although relevant regulation was introduced in 2009, and measures have been taken to increase awareness about the EnPC model, market is still in a phase of low development. According to the survey results of the QualitEE project (QualitEE 2018c), the value of the Bulgarian EnPC market in 2016 was worth less than EUR 10 million. While this estimate was given by three quarters of the respondents, some provided much higher numbers.

The development of the ESCO market has been stable since 2015, though still limited. The EU Code of Conduct for EnPC[47] has been drawn up, and the preparations and adoptions in the country have contributed to some market development. Furthermore, several European projects such as the EESI2020[48] and the EPC+[49] projects have been implemented at national level and are aimed at raising awareness and improving the capacity of stakeholders in terms of concluding, implementing and monitoring energy performance contracts (Ministry of Energy of Bulgaria 2017).

Table 10. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				n/a

Based on the indicators of maturity, the Bulgarian market is largely immature, while a lot of progress has taken place, e.g. an association was established, support for facilitators undertaken, the EU Code of Conduct covers the market, but all of these are in a preliminary stage, because the impact on the market is not yet evident.

Supply side

There are 12 ESCOs which provide or offer EnPC services in Bulgaria in 2018. Most of these companies are small sized (up to 50 employees).

The variation of ESCOs is big. EnPC is provided by different type of companies including engineering and construction firms, facility management and operation companies, automation, control and equipment manufacturer, equipment supplies and/or installers, consulting firms, energy auditors, other energy specialists.

According to the QualitEE project (QualitEE 2018c), clients in Bulgaria rarely use the services of individual consultants, energy consultancy companies, or energy agencies. There is no information about the number of specialized EnPC or EES project facilitators to support clients in identifying and procuring of projects.

Demand side

The typical clients targeted by ESCOs are public buildings including hospitals, educational facilities (schools, kindergartens, universities) and offices (e.g. municipalities), public lighting, private commercial office buildings, and industry sites.

The two main technologies implemented by ESCOs are buildings (including active and passive systems, energy efficiency and RES) and street lighting. The average size of

[47] https://www.euesco.org/european-code-of-conduct-for-epc/index.html
[48] https://ec.europa.eu/energy/intelligent/projects/en/projects/eesi-2020
[49] http://epcplus.org/

investments of ESCO/EnPC projects is between 200 000€ and 500 000€. The average duration of a project is 8 years. The common type of contract used by an ESCO is EnPC with guaranteed savings (ESCOs guarantee the energy savings, clients takes the financial risk).

4.3.2 Policy framework

Based on the information available, including the survey responses collected in 2018 (JRC 2018), Bulgaria has implemented the following requirements of Article 18 of the EED that have contributed to trigger the market:

- Disseminating information on financial instruments to support energy efficiency service projects;
- Providing model contracts for EnPC.

The key legal element of the ESCO market is the Regulation No RD-16-347 of 2 April 2009, which laid down the requirements and procedures related to financial support or grants that can be combined with energy savings performance (ESCO) contracts with central government and/or local authorities.

A model contract is not directly available in Bulgaria, but the above-said Regulation No RD-16-347 includes the mandatory elements of contracts with guaranteed savings in order to be eligible for funding.

The National Energy Efficiency and Renewable Energy Sources Fund (FEEVI) was established in 2004 as revolving fund with an initial budget of 13 million USD by the Global Environment Facility (GEF) through the World Bank, the Government of Austria, the Government of Bulgaria, and several private Bulgarian companies to provide loans and loan guarantees (to be used for loans from other financial institutions). In combination with the financing, technical assistance (advisory services and consultations) are also available. One of the products available from the Fund are portfolio guarantees for energy services companies aiming to increase the number of undertakings, which would not be possible due to liquidity (balance-sheet accounting). Funds are also available for providing guarantees to cover the risks relating to their partners (project beneficiaries).

In 2014-2015the EESI2020 project developed guidelines for facilitators and trained about 100 consultants. Moreover, recently, an EES providers' association – the Alliance for Energy Efficiency[50] – was established, the members of which are most of the active EnPC providers.

4.3.3 Main barriers

Figure 9. shows the relevance of the barriers limiting ESCO implementation in Bulgaria, based on the JRC survey of 2018 and the Bulgarian NEEAP 2017 (Ministry of Energy of Bulgaria 2017). The major barriers are ambiguities in the legislative framework, lack of appropriate forms of finance, mistrust from the (potential) clients, perceived business and technical risk, the small size of projects and high transaction costs.

[50] http://www.alliance-ee.bg/

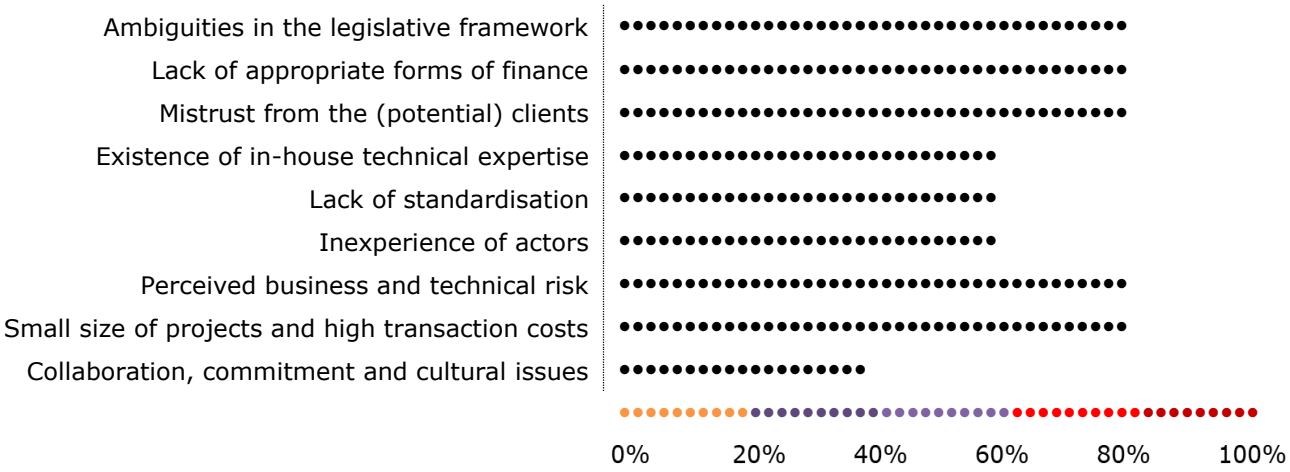

Figure 9. The relevance of main barriers that limit ESCO implementation.

(100% = all respondents and sources indicate this as a major barrier on a scale of 5)

Other barriers were also named in the NEEAP 2017 (Ministry of Energy of Bulgaria 2017), such as:

- limited experience on the supply side and lack of enough examples to replicate. In particularly so in the private sector;
- lack of certification of ESCO;
- insufficient size of the supply side, resulting in low number of bids, and thus inconclusive tenders;
- official information on ESCO, main types of EnPC and implemented EnPC in the public sector at national level is not maintained;
- Due to the Eurostat guidelines, an amendment of Article 17b of the Municipal Debt Act was adopted in 2015 requires that EnPC contract value is limited to 15% of the average annual capital cost of the municipality, which seriously limits the access to EnPC solutions in the public sector. This has not been revised after the Eurostat clarifications.
- in spite of some specific effort (such as through the EESI2020 project), there is still a lack of support to identify suitable projects (consultants and facilitators), etc.

4.3.4 Future perspectives and recommendations

The future of the Bulgarian ESCO market is still unclear, because some of the barriers are structural (difficulties in loans), though important and successful measures have been taken against them. The market and the framework still have to develop, which is possible given the improvement in both the market qualities (information dissemination, facilitator empowerment, model contract), but a tipping point is not yet reached. The following changes could further contribute to the development of the market:

- Improve EnPC project quality and resulting trust through the dissemination of success cases (especially regarding experiences with the contract mandatory contents, establish an ESCO certification or accreditation system; further empower intermediaries, such as facilitators;

- Restructure the grant system (revise the support level from 100% to a maximum of 20-30% of the eligible costs) in the public sector projects, and encourage the combined coverage of measures depending on the payback times, where measures with extremely long pay-back times should get non-refundable grants, other should be covered from own-budgets or e.g. using EnPC.

Cyprus

4.4.1 Market size and market development

The Cypriot energy services market is still at an emerging phase, but – for the first time – there seems to be a positive market prospective expressed by the market players . The legal framework has been created, including supporting documents and awareness raising. The first projects have been launched.

Energy efficiency in general has been gaining momentum in Cyprus in recent years. Building renovations were largely financed from governmental grant schemes, e.g. the *"I save I renovate"* programme 2014-2016, however these are considered to be combined with ESCO contracts in the future (Boza-Kiss and Bertoldi 2018).

The government, together with dedicated organisations, such as the Cypriot Energy Agency, has been gradually improving and adapting the legal and operational framework for ESCOs. After a few unsuccessful pilot projects (see below), there are currently pilot private projects under preparation, which may finally lead to a real kick-start and learning.

Table 11. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗*	✗	✗	✗

* Note: The Cyprus Energy Agency (CEA) and the Cyprus Employers and Industrialist Federation (OEB) have several activities (information dissemination on their website, trainings for market players, facilitation of tender procedures, etc.) that qualify them as facilitators.

Based on the indicators of maturity, the Cypriot market is still in embryonic state, and while some market development directions are positive (legal framework, model contract, list of providers, etc. – see below), the kick-start of the market is not yet seen.

Supply side

There are 64 certified energy auditors in 3 categories (buildings, airports, harbours and street lighting; Industrial facilities and processes, agricultural facilities; and transport). Furthermore, there are 22 registered ESCOs in the areas of photovoltaic installations, lighting, and energy refurbishments (Boza-Kiss and Bertoldi 2018).

Potential ESCOs in Cyprus are interested in upgrading HVAC systems, window replacement, lighting systems, building envelope insulation, renewable electricity systems. Above all, the interest is limited to short projects, with pay-back time less than 3 years, but maximum 5 years (Petran, Geissler, and Vlachos 2017).

Demand side

ESCO projects have been launched in industry and the public buildings and lightings sectors. An Austrian investor signed an ESCO contract in 2018 with one of the largest meat-producing companies on the island (Jovanović 2018).

On the demand side, interest for energy services in the buildings sector was expressed by hotels, hospitals and commercial buildings or large governmental buildings, large private buildings rented by the government. Managers and owners are primarily interested in the payback time (Petran, Geissler, and Vlachos 2017).

4.4.2 Policy framework

The ESCO market is framed by the 2014 Amending Law and Regulations on the operation of Energy Service Providers. The legal framework of the Cypriot ESCO market is fully dependent on EU legislation and their transposition.

- The first regulation for thermal insulation of buildings was introduced in 2007.
- The "Energy Performance of Buildings" law was introduced in 2009 – followed by various further regulations.
- From 2010 the Energy Performance Certificate is obligatory for all new buildings and for all the buildings that are available for sale or rent.
- The definition for the nearly Zero Energy Building[51] (nZEB) was introduced in 2014.
- All new buildings must be nZEB from 01/01/2021.
- In 2009 the European Directive 2006/32/EC was partially introduced to National Legislation through N 31(I)/2009 – Energy efficiency on final use (modifying laws N 53(I)/2012, N 56(I)/2014, N 149(I)/2015 adoption of 2012/27/EU).
- Regulations for energy audits (experts, qualifications, methodology, certification bodies) were introduced in 2012.
- Regulations for Energy Service Companies (ESCO's) were introduced in 2014.

Article 18 of the EED is considered as a key driver of the currently kick-starting ESCO market. Even though the provisions have been transposed to at least some extent, the impact on the market has been very limited (see Table 6[52]).

In 2015, several energy efficiency contracts were signed by public authorities in the context of Cyprus' commitment to an annual energy upgrading of 3% of buildings owned by the central government, and one regarding traffic lighting. These pilot projects were expected to kick-start the market, providing good examples and experience in the market collaboration. However, due to lack of enough bidders or not appropriate bids, the tenders were not successful. Technical assistance is being carried out to identify how to overcome these barriers. Besides, other studies have been undertaken to properly understand market conditions, including why the tenders have not been successful, and how to empower the market to take-off the ground, by identifying and lifting barriers.

Information dissemination, training and market support is provided by the Ministry of Energy, Commerce, Industry and Tourism (MECIT) and the Cyprus Energy Agency. MECIT, furthermore, broadcasted radio spots to increase knowledge and interest about the benefits of energy service offers. MECIT, the Cyprus Energy Agency and the Cyprus Employers & Industrialists Federation (OEB) have joined forces and established the Energy Efficiency Networks Committee, which is expected to further pave the way for successful collaboration within the market (Vlachos 2018).

The register of energy service providers is posted on the MECIT website[53]. The website of MECIT is devoted to information provision related to ESCOs, for example (a) support document 'Shared benefit contract', and (b) support document 'Guaranteed performance contract' can be downloaded.

4.4.3 Main barriers

The Cypriot energy services market suffers from a serious lack of trust on the clients' side with regards to the procedure and lack of technical expertise (to prepare and manage tenders) and experience of EnPC providers. A study was launched in 2017 by

[51] "Nearly zero energy building" means a building that has a very high energy performance, determined in accordance with the methodology for the calculations of the energy efficiency. The nearly zero, or very low amount of energy required, should -to a very significant extent (min 25%) - be covered by energy from renewable sources, including renewable energy produced on-site or near.

[52] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[53] http://www.mcit.gov.cy/mcit/mcit.nsf/All/5D6DEF111AE3CF55C22575C5002BFED5?OpenDocument

GIZ to identify main barriers: "Private Finance for Energy Efficiency - PF4EE European Investment Bank Product".

However, as seen above, these pilots could not be started because of the lack of proper bids. This means that while there is already an interest on the supply side (there are ESCOs registered), the market is still inexperienced and very small.

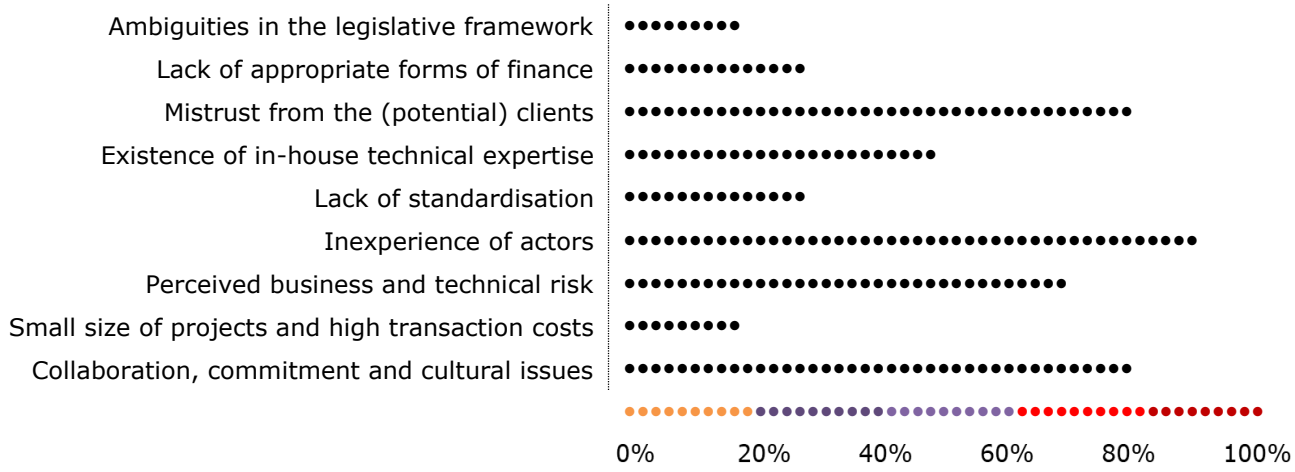

Figure 10. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

4.4.4 Future perspectives and recommendations

It is expected that after a first few successful projects are completed, the market can take-up the services quickly. The legal framework is available, example contracts and information can be easily accessed, and financing can be combined to potential projects. In the next years, a number of energy efficiency contracts are expected to be signed by public authorities in the context of Cyprus' commitment to an annual energy upgrading of 3% of buildings owned by the central government.

Croatia

4.5.1 Market size and market development

The estimated size of the energy service market in Croatia in 2018 was EUR 20 million, compared to an estimated size of the ESCO market of EUR 14 million in the same year. These figures include investment costs (i.e. capital expenditure) and refer to projects in public buildings and public lighting system.

The ESCO market has increased fast since 2015. This growth was strongly fuelled by EU grants, for example as of 2017, two ELENA funded projects were done (NEWLIGHT and RePubLEEc), targeted at public buildings and public lighting. Both projects have been coordinated by REGEA[54] (Regional Energy Agency). However, the ESCO market has not been increasing at a similar pace in other sectors, which would require further improvements in the legal environment, access to financing, competition, and higher energy prices are needed.

The first ESCO projects were implemented during the 2000s both in private and public sector (Alternative Fuels Infrastructure 2017). However, at that point the supply side (ESCOs and EOC providers) were only in small numbers.

In 2014 the market of ESCO services began to grow thanks to the following three reasons (Alternative Fuels Infrastructure 2017):

- the rise in energy prices encouraged consumers to invest in energy savings;
- the adoption of the Energy Efficiency Act (OG 127/2014) and the Regulation on contracting and the implementation of energy services in the public sector (OG 11/2015);
- the Environmental Protection and Energy Efficiency Fund provides grants for energy efficiency improvement in public buildings, inter alia, using the ESCO model.

In 2015 and 2016 over 50 energy efficiency projects were contracted in the public sector using the ESCO model: of these, ca. 20 projects targeted the reconstruction of public lighting and around 30 projects aimed at the renovation of public buildings –. The majority of bidders participating in the tenders for the projects for the reconstruction of public lighting were manufacturers and suppliers of public lighting equipment. As far as projects of reconstruction of public buildings go, most tenderers were construction and engineering companies. In many cases groupings of tenderers dividing technical, legal, commercial and financial risks, as well as the risk of performance guarantee, participate in these tenders.

Table 12. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	✗	🔍

Based on the indicators of maturity, the Croatian market – though has been maturing both in terms of legal framework and the market composition, it is still immature (see below).

Supply side

[54] http://regea.org/en/

There were over 15 energy service providers in Croatia in 2017; it is expected that in the future there will be even more interest for providing and using this type of services, especially in the event of further increase of energy prices, and the possibilities of obtaining grants and favourable loans with lower interest (Alternative Fuels Infrastructure, 2017).

There are 8 to 15 companies that provide and offer ESCO or EnPC services in Croatia in 2018. Most of them are dealing only with energy efficiency projects in public lighting systems. ESCOs are rather small with limited experience and limited source of capital for investment.

The type of companies acting as ESCOs are as follows: Energy supply companies, utilities, engineering and construction firms, equipment supplies and/or installers, and facility management and operation companies.

The majority, approximately 80% of all ESCOs are small size companied (up to 50 employees). There rest of companies are either medium size (up to 250 employees) or large companies (above 250 employees). ESCOs typically offer a wide range of services and typically, the EnPC service is not the core business of ESCOs.

The ownership of ESCOs is varied, including privately owned national or international companies, as well as joint stock companies.

Demand side

Public lighting is the typical sector for ESCO/EnPC. The dominant technologies implemented by ESCOs are street lighting followed by building level heating and hearing systems and building as a whole (including active and passive systems, energy efficiency and RES). This is a significant move away from the earlier dominant industry projects (Boza-Kiss, Bertoldi, and Economidou 2017)

The average size of investments of ESCO/EnPC project related to public lighting varies from 500 000€ to 1 000 000€. The average duration of such an ESCO projects is 10 years. The average energy consumption in a public lighting project can be reduced by 70%. The average duration of a project in the private sector (industry) is 6 years and the energy consumption might be reduced by 30%.

In 2014 the European Bank for Reconstruction and Development (EBRD) launched the Western Balkans Investment Framework: ESCO Project Pipeline Preparation in Croatia project , which is implemented by the CMS law firm and the GreenMax Capital Advisors consulting firm. The project provides free-of charge and non-binding technical assistance to local governments to prepare and implement tenders for public lighting refurbishment using the ESCO model, in accordance with the legal framework Furthermore, the project also disseminates the results of the projects of the local governments.

4.5.2 Policy framework

The Croatian ESCO market is framed by the Energy Efficiency Act (OG 127/2014) and the regulation OG 11/2015 on contracting and the implementation of energy services in the public sector. An official list of energy service providers is available[55]. The market was slowly moving already before the legal framework set-up, but has seen a boom since its introduction.

The market has been further strengthened by large scale implementation of public lighting refurbishment projects by local governments using EnPC/ESCO solutions, largely as part of the EBRD Regional Energy Efficiency project (see above).

The "Programme for combating energy poverty" is a new horizontal measure, which provides subsidies for the implementation of energy efficiency measures in vulnerable households to combat energy poverty. The measure shall also establish a system for

[55] https://www.enu.hr/ee-u-hrvatskoj/tko-je-tko-ee-rh/pruzatelji-energetskeusluge/

following social and demographic and energy indicators describing energy poverty at a national level.

In the JRC survey (2018) on energy services, respondents were asked to evaluate the implementation of the requirements of Article 18 of the EED. Based on the opinion of the market actors (see Table 6[56]), dissemination of information on financial instruments is ensured, while information on energy services and the current and future development of the market is done to some extent only. Other provisions seem to be not evident for market actors in Croatia.

4.5.3 Main barriers

Figure 11. shows the relative importance of the main barriers that limit ESCO-type project implementation in Croatia. The most critical barrier was reported to be the lack of standardisation, but many other barriers still inhibit the take-up of ESCO solution.

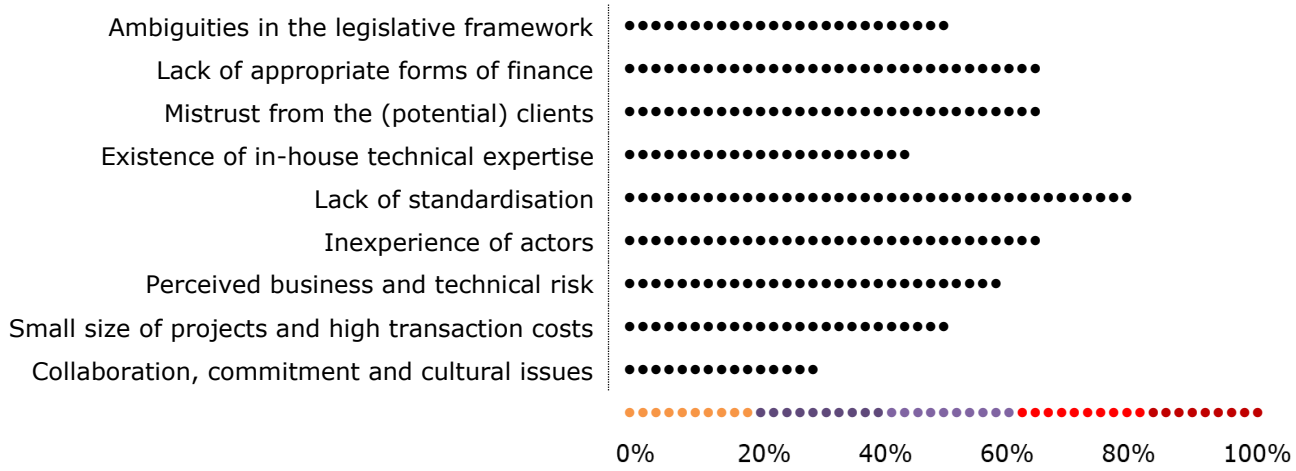

Figure 11. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

In addition to the above, the following barriers were found to inhibit EnPC in the building sector:

- Slow increase in the building sector is related to lack of co-financing or financial instruments aimed at ESCO projects, as opposed to available co-financing for traditional model projects. The combination of grants and ESCOs could allow deeper renovations, if the grant was used for measures with long payback period, that could top-up economically viable measures carried out by ESCOs;

- The EUROSTAT regulation on public debt (2015) guide note – there is no off-the-shelf contract that could be used for buildings without risks of public debt;

- Costly and time-consuming preparation of ESCO projects (technical assistance needed, even though this is available from ESIF OPCC it has not been used yet)

- Private sector is waiting for EU grants; therefore, in the last 2 years the majority of companies were unwilling to sign any ESCO projects.

[56] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

- In the last 2 years there has been no official programme from the Ministry for public building refurbishment with ESCO model. There are no possibilities for a combination of EU grants and ESCO model in public buildings.

4.5.4 Future perspectives and recommendations

The Croatian ESCO market is seen to have stepped out of its preliminary state, but it is still at a moderately developed level. The framework for public sector project has been well established, although more market support could further help replication. For a growth in private sector projects, further legal adjustments are recommended. Furthermore, the following recommendations were formulated in the 2018 JRC survey:

- Introduce mandatory full project/ life-cycle cost analysis and valuation of projects in public tendering;

- Guides and support documents for the preparation of tender documentation along with contract model for EnPC (PPP);

- Ensuring the combination of EU grants and ESCO financing in the light of payback times, therefore increasing interventions with larger savings;

- Trainings related to EnPC contracting.

Czech Republic

4.6.1 Market size and development

Historically, the success of EnPC in the Czech Republic can mainly be attributed partially to the continuous bottom-up efforts of energy service companies, and a legal framework that set-up framework conditions, e.g. mandatory energy management systems.

There is no official data on the size of the ESCO market in the Czech Republic. According to our survey experts, the ESCO market size was estimated to be approximately 9-15 million Euros depending on the data scope in 2018, whereas the guaranteed savings market was estimated to cover much of the activity. The size of the ESCO market was 9,2 million EUR in 2017. These projects do not include energy consulting, energy audits, energy contracting, installation of renewables etc.

Table 13. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

Based on the indicators of maturity and the opinion of the local market actors (JRC survey 2018), the Czech ESCO market is mature and has a well-developed structure (see below). The EnPC market features high level of know-how among EnPC providers and acceptance of EnPC by several banks, providing substantial financing opportunities for current EnPC projects (QualitEE 2018k).

The market has been growing very slowly but steadily, with about 10 EnPC projects implemented per year. Currently, the EnPC market is experiencing stagnation.

Demand side

The first EnPC project in the Czech Republic was implemented as early as 1993. Between 1994 and 2017, about 240 EnPC projects were implemented with a value above CZK 300 billion and leading to total energy savings of CZK 3.3 billion (Chance for Buildings 2018 cited in QualitEE, 2018d). According to the APES, in 2016 nine new EnPC projects were commissioned with a value of CZK 259 million and another nine new EnPC projects were commissioned in 2017 on 39 sites with a total value of CZK 249 million (Chance for Buildings 2018 cited in QualitEE, 2018d). In recent years, the annual volume of investments in the implementation of EnPC projects has stood at around EUR 10 million.

- The typical clients of ESCO are as follows: public buildings including hospitals, educational facilities (schools, kindergartens, universities) and offices (e.g. municipalities), public lighting, private commercial clients including office buildings, hotels and tourist facilities, and industry sites, processes.

- The typical technologies implemented by ESCOs are as follows: building level heating and heating systems, district heating systems, building level cooling and air conditioning, ventilation, district cooling, industrial processes, horizontal technologies, motor systems, co-generation, street lighting, automation and control systems. Typical EnPC projects also include water and operational cost savings.

- The average size of investment of ESCO/EnPC projects is between 500 000€ - 1 000 000€ and 1 000 000€ - 5 000 000€. The average duration of an ESCO project is estimated to be 10 years. Public projects, which make up 70-80% of the total EnPC market in the Czech Republic, have a duration of 8-12 years.

Supply side

Currently, there are approximately 15 companies in the market for the provision of energy services via EnPC; 13 of these companies have organised themselves into the Association of Energy Service Providers (AESP), founded in 2010 (QualitEE 2018k). The APES has 26 members, including 13 EnPC providers and 11 EnPC consultants (out of which six are EnPC facilitators).

- There were 15 companies acting as ESCOs in 2018. There were 11 ESCOs which implement projects using EnPC.
- Among these 11 EnPC providers, the majority are large companies (above 250 employees). These companies typically provide different types of energy services and have a small team dedicated to the EnPC project implementation.
- The type of ESCOs providing EnPC projects are as follows: engineering and construction firms, facility management and operation companies, automation, control and equipment manufacturers.
- ESCOs are typically private national and private international companies.
- In the Czech Republic, EnPC services are typically provided by companies offering a wider range of services. However, there are also companies which act as ESCOs and offer guaranteed energy performance.
- The development of the ESCO market has been stable or increasing very slowly from 2015 up to now. The ESCO market fluctuates from year to year, but the general trend shows small changes. There remain major barriers hindering a positive development: legal barriers (state organizations cannot accept financing using EnPC), limited support at the governmental level, general lack of trust in EnPC concept, and the unavailability of grants for energy efficiency projects.

4.6.2 Policy framework

There is direct state support for using EnPC through the State Programme on the Promotion of Energy Savings and the Utilisation of Renewable and Secondary Energy Sources (the EFEKT Programme). The Programme has been providing support to energy-saving projects since 1999.

Since 2010, market support efforts have been largely concentrated within the Association of Energy Service Providers (APES), which has been very active since its foundation in supporting the expansion of the Czech EnPC market by attempting to remove existing barriers and standardise EnPC model documents.

Since 2011, information on energy service companies has been available on the website of the Association of Energy Service Providers, along with other relevant information[57], however this is not a list of all EnPC providers nor of all ESCOs.

A model contract has been created primarily for the purpose of public contracting for guaranteed energy services by contracting authorities[58], and can be accessed on the website of the Ministry of Industry and Trade[59]. A list of providers of energy service, which is regularly updated, is published on the same website[60], in compliance with the amendment to Act No 406/2000 on energy management in force from 1 July 2015.The

[57] At www.apes.cz
[58] Available at www.apes.cz
[59] http://www.mpo.cz/dokument105425.html
[60] https://www.mpo.cz/cz/energetika/energeticka-ucinnost/energeticke-sluzby/seznam-poskytovatelu-energetickych-sluzeb--170967/

Ministry's website contains other documents promoting the development of guaranteed energy services, such as:

- Government Resolution No 109 of 22 February 2012 on finalisation of the methodology for use of the Energy Performance Contracting method – guaranteed energy services (Czech Government Resolution).
- Model contract for contracting with guaranteed energy service providers.
- Schedules to an agreement on the provision of guaranteed-result energy services via the EnPC method.
- Code of Conduct – Guaranteed energy services.
- The process of preparing public tendering procedure for the provision of guaranteed-result energy services via the EnPC method.
- Methodology for the preparation and implementation of energy-saving projects handled using the EnPC method.

4.6.3 Main barriers

Figure 12. shows the relevance of the barriers limiting ESCO implementation (JRC 2018). The main barrier in the Czech Republic remains to lie with the ambiguities in the legislative framework, especially in the public sector (JRC survey 2018), while most of the EU-proposed solutions have been implemented (see above). Furthermore, trust also remains to be a major barrier, which might be in line with the need to roll-out the use of better and more certification and monitoring. Lack of easy monitoring and small project sizes are also related to the relatively high transaction costs.

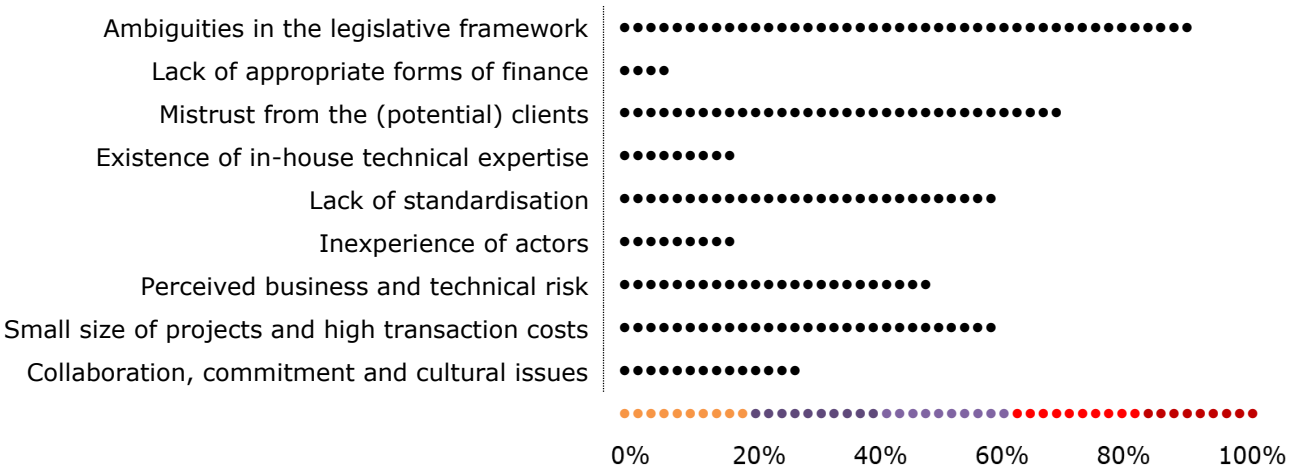

Figure 12. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

4.6.4 Future perspectives and recommendations

Trends over the past 10 years indicate that some further development can be expected. According to an expert estimate, we can expect the future implementation of projects including the provision of guaranteed-result energy services in approximately 30 to 50 structures, with average annual energy savings of between 600 and 1,000 GJ per

structure. That would be tantamount to overall energy savings of at least 30 TJ per year, and this range could increase further.

At the same time, the Czech market has been slowing down, and has been stagnating in the last years. There have been critical barriers that have been unresolved. Key actions to further develop the market were identified to be (JRC survey 2018, and (QualitEE 2018k):

- Removal of administrative barriers, especially for organisation units of the state;
- Certification of EES projects and EES providers;
- Subsidies for facilitation and preparation of EnPC projects;
- Remove barrier for EnPC in the state sector;
- Life cycle cost instead of minimum investment costs;
- Support comprehensive solution;
- Widely known certification of EES projects and EES providers to provide quality assurance for the clients to distinguish good quality projects and to set quality benchmarks for existing and new EES providers;
- Seminars, conferences, roundtables for public sector to provide information on the possibilities and benefits of the EES and EnPC in particular, education on how to prepare and implement EES project, including procurement procedure;
- Training for new EnPC providers to sustain the high quality of EnPC projects;
- Use of the European Code of Conduct for EnPC to promote the implementation of a basic set of values and principles that are considered fundamental for the successful, professional and transparent implementation of EnPC;
- Promotion of best practices in EnPC and ESC;
- Subsidies and grants – continue in support of soft measures (information, education, studies) and allowing for combination of EES with investment subsidies.

Denmark

4.7.1 Market size and development

The Danish energy services market is regarded as a relatively young market with energy contracting spreading in the last ten years. The emergence of the sector in Denmark can be mainly attributed to the public sector's overall aim to improve the energy performance of their building stock. This, accompanied with the lack of in-house expertise to realise this aim in certain municipalities pushed the public sector to involve a third-party such as ESCOs.

The Danish ESCO market enlarged quickly during the past 10 years because of the peer-to-peer promotion of the solution across municipalities. As of 2018, the municipality clients have implemented most of the projects planned, and there is a halt in the spread of activity. The ESCO companies have been increasing their offerings to private sector clients, and though the market has been lively, the spread is not yet as fast as it was in the municipal sector.

According to our survey results, the size of the Danish ESCO market in 2017 was approximately EUR 70 million including private and public sectors. The market volume by type of clients is estimated to be as follows: municipalities EUR 7 million, universities EUR 10 million, hospitals EUR 10-22 million and private sector EUR 2 – 5 million.

In the public sector, there has long been a focus on various models for energy services, and, in particular, various forms of ESCO model have been used in Danish municipalities. Many municipalities have made use of these energy services to promote energy efficiency and energy savings, primarily in connection with the energy optimisation of the municipalities' existing buildings. In December 2013, a study of the use of ESCOs by Danish municipalities found that around 30 out of 98 municipalities use ESCOs (Centre for Energy Efficiency 2017).

Table 14. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

Although the Danish market saw a rapid take-up in the public sector since 2010, and EnPC has been well-known and popular, with the saturation of the sector, and in the lack of maturity factors, such an association, quality labels, etc., it proves to be difficult to engage with clients from other sectors.

Supply side

There is a large variety of stakeholders active in energy-saving offerings for households, public institutions and enterprises. These actors include tradesmen and installation companies, consultant engineers, and more specialised energy saving companies. They are typically focused on the realisation of energy savings, and they offer consumers advice and other professional assistance prior to the actual realisation (Centre for Energy Efficiency 2017).

According to the survey results, there were 4 ESCOs in 2017. The types of these companies are automation, control and equipment manufacturers, and equipment supplies and/or installers. These companies typically provide different types of energy services and have a small team dedicated to the EnPC project implementation. ESCOs are typically private national and private international companies.

Demand side

There have been 25 ESCO contracts with a total of 22 municipalities during the last year. In addition, 13 ESCO energy savings contracts have been concluded with a total of 12 hospitals. In addition, seven contracts for ESCO are offered. The government supports the EnPC model; the Danish Energy Agency disseminates information and best practice concern ESCO in relation to energy renovations in particular. However, more action from the government is needed.

The typical clients of ESCOs in Denmark are as follows: public buildings including hospitals, educational facilities (schools, kindergartens, universities) and offices (e.g. municipalities), private commercial clients including office buildings, and industry sites, processes.

There are many private ESCO providers who, depending on the size of the project, help with advice, installation and operation. Most of the projects are aimed at buildings (NEEAP 2017).

The typical technologies implemented by ESCOs are as follows: building level heating and heating systems, district heating systems, building level cooling and air conditioning, ventilation, automation and control systems. The average size of investment of ESCO/EnPC projects is over 5000 000€. The average duration of an ESCO project is estimated to be 3 years.

4.7.2 Policy framework

According to the NEEAP 2017 of Denmark (Centre for Energy Efficiency 2017), the Government has been promoting the energy service market by using advice and informational instruments.

The Ministry of Energy, Utilities and Climate developed a website[61] about ESCO which provides information to the final customer on benefits of implementing EnPC projects.

A more general energy savings oriented website[62] has played also an important role in providing information about energy efficiency improvements for final customers. This website makes guidelines, advice and list of different technology and energy service providers available.

Overall, the market has been booming and then slowly growing thanks to broad support, which is a result fist of the peer-to-peer information and motivation in the public sector, and transfer intentions by the supply side to the private sector.

Denmark has also started an initiative to promote the replacement of oil-fired boilers in favour of more energy-efficient heat pumps by using energy services. According to the concept, the enterprises install and operate these for home-owners, who are charged for the heat that is supplied. The enterprises overtake responsibility for installation, ownership, maintenance and operation (Centre for Energy Efficiency 2017).

Denmark has been pioneering the one-stop-shop solution, which reduces transaction costs for tailored energy renovation solutions for single households, an area that has been very difficult for ESCOs in the past.

4.7.3 Main barriers

The key barrier indicated in the report on ESCOs projects in the Danish municipalities[63], is the relatively long lifetime of the projects, and therefore high transaction costs compared to projects managed by the client itself. Nevertheless, in case of clients with

[61] https://sparenergi.dk/offentlig/bygninger/esco
[62] www.sparenergi.dk
[63] ESCO i danske kommuner, en opsamling af motiver, overvejelser og foreløbige erfaringer med ESCO I kommunale bygninger' (ESCOs in Danish municipalities: a collection of themes, reflections and experiences so far with ESCOs in municipal buildings), Statens byggeforskningsinstitution (Danish Building Research Institute), Aalborg University 2013

less in-house expertise or fewer staff, ESCO has been a clear-cut solution, which has proven in the public sector.

The private sector has fewer success cases yet, although interest is growing.

Information about the specific barriers were not found.

4.7.4 Future perspectives and recommendations

According to an assessment by the Ministry of Energy, Utilities and Climate, the independent market intermediaries play an important role in developing energy service markets. An intermediary might be a workman who carries out an energy savings or advisory service that advises end customers on the implementation of energy savings.

Estonia

4.8.1 Market size and development

Energy service companies in Estonia are still not a significant market segment. There are only a few companies in Estonia that market themselves as energy service enterprises (Department of Communications Energy and Natural Resources 2017). The following companies are active in the Estonian energy services market: Adven, Fortum, MTÜ Eesti Energiasäästu Assotsiatsioon, Soletek and AU Energiateenus OÜ.

According to the JRC 2018 survey results, the estimated size of the market volume was EUR 5 million in 2017. There are 4 to 6 ESCOs providing EnPC. The Estonian ESCO market has been stable since 2015. Although some of the Article 18 provisions have already been implemented to promote and stimulate the market for energy services (i.e. development of a professional qualification scheme for creating a network of energy services qualified specialists), the market remains underdeveloped.

Table 15. Selected indicators of maturity of the market.
The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	🔍	🔍

Based on the indicators of maturity, the Estonian market is still immature and started to kick-off lately, but structures are preliminary yet and are mostly based on the EED requirements (see below).

Supply side

All ESCO companies are small companies (up to 50 employees). These companies are private national companies typically offering a wide range of service.

Demand side

The main areas targeted by ESCOs are as follows: lighting, heating, ventilation and air conditioning systems (HVAC), insulating buildings, automation and control systems.

According to a company providing energy services in Estonia, the average investment size of ESCO projects varies from 12 000 to 990 000 EURO. The average duration of a typical ESCO project is 48 months. The average energy savings of a typical ESCO project is 30%.

4.8.2 Policy framework

The Law on Energy Sector Organisation, Articles 31 and 32 regulate the energy services market in Estonia. However, the market is still underdeveloped.

The Ministry of Economic Affairs and Communications has been collaborating with potential and actual market players to facilitate market development, for example through networking opportunities (meetings), studies (exploring the local potential and barriers), promoting audits and energy management (through training and information, as well as list of auditors).

The "Resource efficiency of companies" initiative has been a framework for improving conditions – among others – of energy services in Estonia. A model contract is expected to be drafted in cooperation with the Ministry and market actors.

Information dissemination is still preliminary and the market development activity is more focused on describing and exploring the needs and potentials.

4.8.3 Main barriers

The most important barriers are related to regulative/administrative issues, lack of technical knowledge, difficulties in financing projects and to access to bank credit.

Figure 13. shows the relevance of the barriers limiting ESCO implementation in Estonia. It can be seen, that the major barrier is small size of projects and high transaction costs.

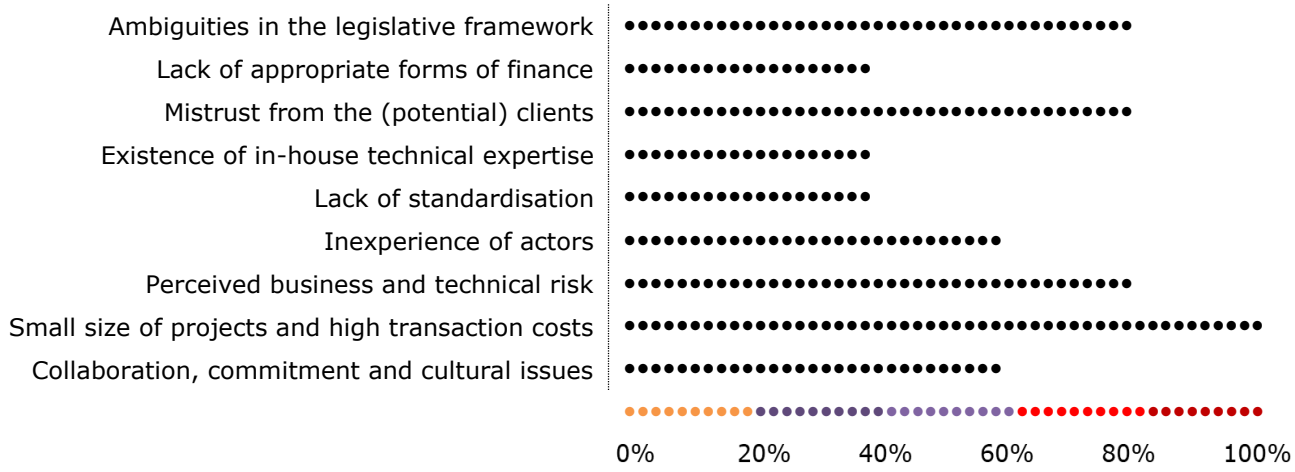

Figure 13. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

In 2013 SA Keskkonnainvesteeringute keskus (the Environmental Investment Centre) carried out a study entitled "An analysis of the possibilities for creating a market of energy service enterprises"[64] provides an overview of the most important barriers to the provision of energy services in Estonia (Department of Communications Energy and Natural Resources 2017):

- regulative/administrative issues:
    - the capacity to make public sector investments, and the legal aspects of off-balance sheet investment;
    - the lack of experience in procurement.
- technical issues:
    - clients do not feel like equal partners; above all, they lack technical knowledge and understanding;
    - clients' uncertainty about the future;
    - the technical nuances of energy service contracts.
- issues linked to financing:
    - overall awareness in the area of energy saving is low;
    - energy service enterprises' capacity to finance projects;
    - for Estonian banks and financial institutions, the system of energy services is novel;

[64] http://www.energiatalgud.ee/img_auth.php/0/08/ESCO_analyys.pdf

- clients' distrust of energy services – this pertains to financial guarantees and risks.

4.8.4 Future perspectives and recommendations

The three most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market in Estonia to further develop energy savings or carbon savings through ESCOs listed by survey participant:

- All investments for improving energy efficiency in public sector must be procured focusing on results in LCC not focusing on investment in EUR.
- Subsidies for only cases which are using EnPC models in energy efficiency projects.
- Funding for ESCOs.

Finland

4.9.1 Market size and market development

In Finland, the market for ESCO services is small, and the promotion of energy services is a significant part of Motiva's energy programme. Given the structured and well-developed energy audit system in Finland, there are many operators classified as providers of energy services, i.e. businesses that perform supported energy audits, qualified and accredited persons responsible for the audit of large companies, and ESCOs. Energy services in Finland have mainly been promoted by means of programmes coordinated by Tekes, the Finnish Funding Agency for Innovation. During the NEEAP 4 period, it was financially supported by the Witty City programmes (2013–2017, EUR 100 million) and Smart Energy (2017–2021, EUR 200 million), which incorporate energy services relating to housing and consumers coordinated by Tekes (NEEAP 2017c).

The total value of subsidized ESCO projects in Finland was EUR 6,5 million (8 projects). The ESCO market has experienced a slow increase since 2015. Several new ESCOs entered into the market over the last few years.

Table 16. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

Based on the indicators of maturity, the Finish market is close-to-mature. It is a market with special features, but has been developing well during the last years.

Supply side

Motiva[65] lists 15 ESCOs on its website. The typical type of companies providing EnPC are Energy supply companies, utilities; engineering and construction firms; automation, control and equipment manufacturers; equipment supplies and/or installers; consulting firms, energy auditors, and other energy specialists. These companies typically provide a wide range of services. ESCOs are typically private national and private international companies.

Demand side

The main areas targeted by ESCOs are as follows: public buildings including educational facilities (schools, kindergartens, universities), offices (e.g. municipalities), and private commercial buildings, and industry sites, processes; as well as multi-apartment buildings.

The average size of investment of ESCO projects varies from 500 000€ to 1 000 000€EURO. Subsidized ESCO projects have been from 150 000€ to 1,5 million EURO. The average duration of a typical ESCO project is 5 to 10 years.

4.9.2 Policy framework

The main source providing information on ESCOs in Finland is a sustainable Development Company (Motiva) (NEEAP 2017c). Motiva provides and maintains a list[66] on energy service providers, businesses that perform energy audits, individuals who issue energy

[65] https://www.motiva.fi/ratkaisut/energiatehokkuus-_ja_esco-palvelut/esco-yritykset_suomessa

[66] https://www.motiva.fi/ratkaisut/energiakatselmustoiminta/tem_n_tukemat_energiakatselmukset/patevoitynee t_energiakatselmoijat

certificates and ESCOs. Motiva also provides information on its website[67] on available subsidies for the EnPC projects. Moreover, Motiva has developed an ESCO project register[68], into which companies can enter information on implemented ESCO projects. Companies can operate their provided information and decide which information will be published. The projects are visible on Motiva´s initiative called GreenEnergyCases which is a good marketing tool for companies.

Motiva addresses different users such as public buildings and farmers with specific information. There is a model agreement for EnPC projects for the public buildings available on its website. Farmers are addressed by the initiative called The Neuvo 2020 Farm Advisory Scheme[69] which helps farmers become more energy efficient through means such as energy plans for farms and by providing information on energy services.

The ESCO procurement instructions for EnPC projects are available on Motiva website[70]. ESCO operations are also carried out using the sustainable public procurements guidance maintained by Motiva, in relation to both municipal operations and energy efficiency agreement operations for businesses.

According to the JRC ESCO survey 2018, quality labels for ESCOs or their services have been developing in Finland. Almost all provisions of Article 18 of EED are implemented in Finland (see Table 6[71]).

4.9.3 Main barriers

Figure 14. depicts the relative importance of barriers limiting the ESCO market in Finland. The major barriers are small size of projects and high transaction costs, mistrust from the (potential) clients, existence of in-house technical expertise, followed by the problems related to the lack of experience of actors, perceived business and technical risks and cultural issues.

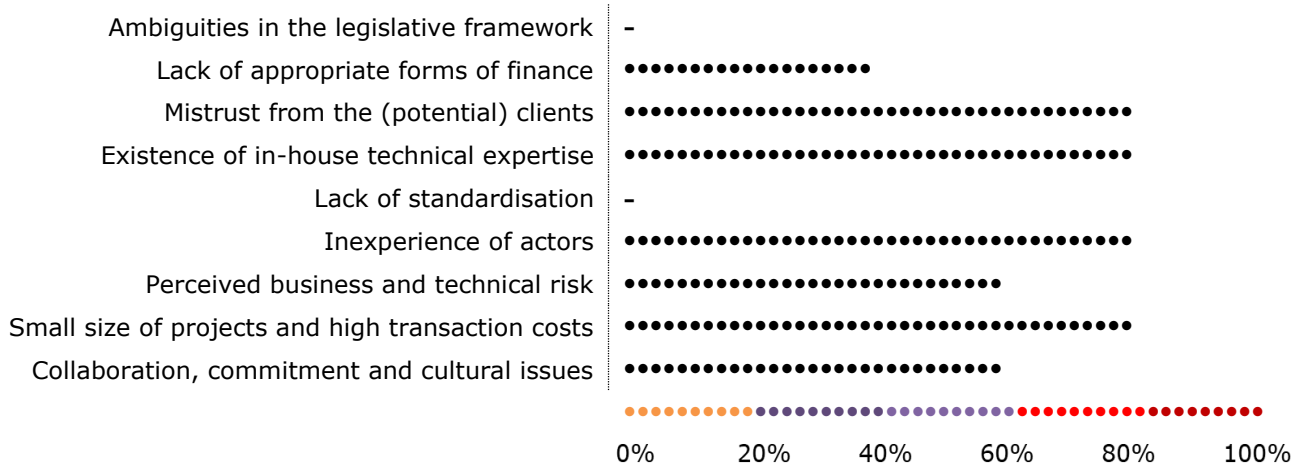

Figure 14. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

4.9.4 Future perspectives and recommendations

[67] https://www.motiva.fi/ratkaisut/energiakatselmustoiminta/tem_n_tukemat_energiakatselmukset/katselmus-_ja_investointituet/esco-hankkeiden_tuki

[68] https://www.motiva.fi/ratkaisut/energiatehokkuus-_ja_esco-palvelut/esimerkkeja_escoista

[69] http://energiatehokkaasti.fi/content/maatilojen-_energiapalvelut-neuvo-2020

[70] http://www.motivanhankintapalvelu.fi/tietopankki/energiansaastopalvelut/hankintaohjeet.html

[71] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

Based on the JRC 2018 survey, the most important future improvement to increase energy savings or carbon savings through the ESCO market could be achieved by more dissemination and more demonstration of successful ESCO projects.

France

4.10.1 Market size and development

According to ADEME (French Environment and Energy Management Agency), the total energy services market volume was EUR 13.5 billion in 2015 (Ademe 2016). The total energy services market volume excluding energy supply service was EUR 10.6 billion. In France, the energy services market is split into three main services: services related to analysis to assets, services related to studies and engineering, and services related to installation, operation and maintenance. Services related to installation, operation and maintenance make up the largest share of the total energy services market (see Figure 15). Services related to analysis to assets and services related to studies and engineering are considered as services contributing to energy efficiency and energy supply. If only energy services and energy efficiency services are taken into account (without including services contributing to energy efficiency and energy supply), the market total amounts to EUR 8.4 billion in 2015, compared to EUR 7.2 billion in 2013, as mentioned in the NEEAP 2014 (Ministry of the Environment 2017).

According to SNEC, the national union of climate operation and maintenance affiliated with the French federation of energy and environment services companies (FEDENE)[72], the estimated energy services market volume was EUR 8.8 billion including supply of energy in 2017. The data covers 70% of all central heated buildings and also includes cost of energy in addition to the project investment costs. The union represents 60 companies and their subsidiaries.

Table 17. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

The French ESCO market is very well-developed, and almost all of the market structured are well-functioning. There are several ESCO associations, and facilitators assist the market. Monitoring and verification procedures are widely used. The market is partially demand driven, although ESCOs themselves and their associations take on a lot of promotion.

The market volume taking only EnPC projects was EUR 40-60 million in 2016. There are 45 companies providing EnPC projects: 15-30 acting in the energy field and 15-30 in the construction field. On the regional level, Auvergne Rhone Alpes, there are 10-15 companies providing EnPC projects.

In 2015 the energy efficiency services market (excluding energy supply) saw a growth of over 16% compared to 2013. France supports the development of energy services in particular, energy performance contracts through the optimization of the existing buildings.

[72] https://www.fedene.fr/

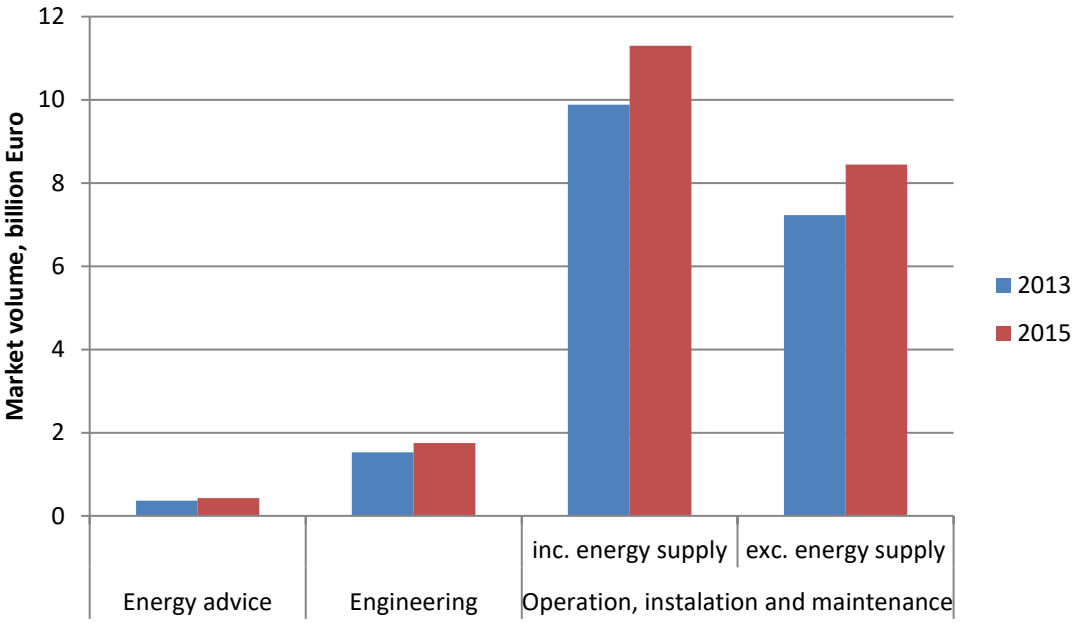

Figure 15. Energy service market volume by market segments in 2013 and 2015 in France (Ademe 2016).

The energy services market volume (including energy supply) increased by 14%, while the energy services market volume (excluding energy supply) increased by 16% from 2013 to 2015 (Ademe 2016).

Supply side

The main ESCO suppliers are facility management and operation companies. The second type of companies providing energy services are engineering and construction firms, followed by automation, control and equipment manufacturers. ESCOs typically offer a wide range of services, with the EnPC service typically not being the core business.

The dominant ownership statuses of ESCOs in France are private national and private international companies. The dominant contract used by ESCOs is EnPC with guaranteed savings (ESCOs guarantee the energy savings, clients take the financial risk).

Demand side

Public buildings, including educational facilities, offices and hospitals are the main clients of the ESCOs. The survey correspondents also identified the following sectors as potential future clients for ESCOs: public lighting, private commercial (office) buildings and private residential multi-apartment buildings.

The main technologies implemented by ESCOs are building level heating and heating systems and district heating followed by building as a whole (including active and passive systems, energy efficiency and RES), industrial processes, horizontal technologies, motor systems, and renewable supply.

The average size of investment of an ESCO/EnPC project ranges from 1 million to 5 million Euros. The average duration of ESCO projects is from 5-10 years. The average energy savings of a typical ESCO project vary from 10% to 30% of baseline consumption; in absolute terms, the energy savings vary from 250 MWh/year to 1000 MWh/year.

4.10.2 Policy framework

According to the JRC ESCO survey 2018 in line with the information from the NEEAP (Ministry of the Environment 2017), the following elements of the Article 18 were implemented in France (see Table 6[73]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings;
- Providing model contracts for EnPC;
- Providing information on best practices energy performance contracting.

ESCO projects and market has been promoted by White certificates/EEOS; financial incentives; procurement rules and other.

Energy Performance Contract Observatory (Observatoire des contrats de performance énergétique) provides Information on best practices for energy performance contracting of the initiative of the public authorities in June 2017[74]. Ministry of Ecological and Inclusive Transition (Ministère de la transition écologique et solidaire) published information on Energy service contracts (services, work and services, design, implementation, operation and maintenance): A guide to energy performance contracts (here). Ministry of Economic and Financial Affairs (formerly MAPPP) has also published a clause list for the purpose of adapting the energy performance contract to the terms of a partnership contract (here). The Environment & Energy Management Agency published a guide dedicated to the handling of disputes between private individuals and professionals in the context of energy service contracts (here).

4.10.3 Main barriers

In France, the most important barriers to ESCO projects were identified as the lack of trust on the side of the (potential) client and the lack of experience of market actors (

Figure 16). Other important barriers are small size of projects and high transaction costs, and lack of standardisation (JRC survey 2018).

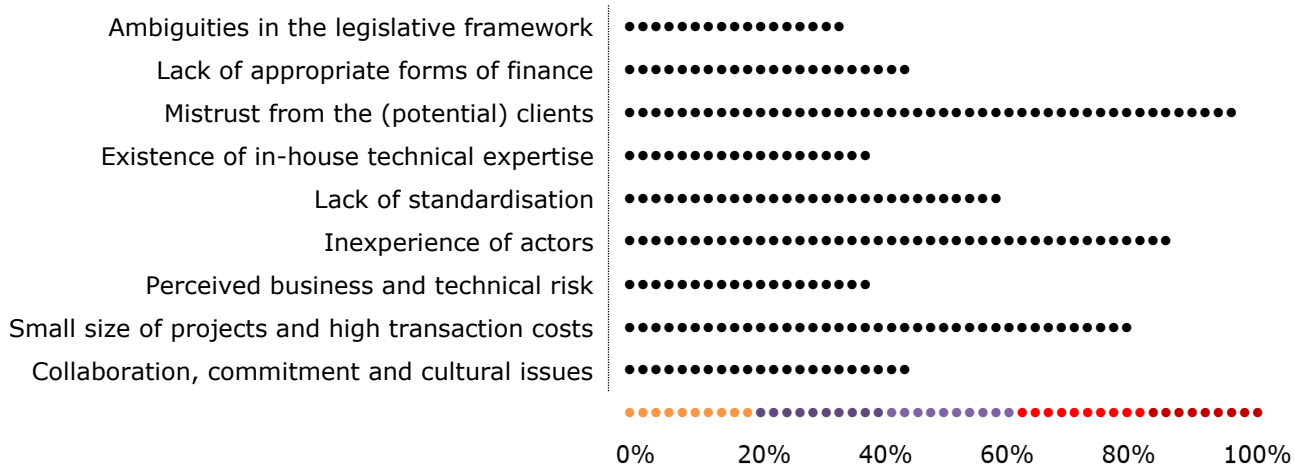

Figure 16. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

[73] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[74] http://www.ademe.fr/observatoire-premiers-contrats-performance-energetique-a-grande-echelle-garantie-resultat

There are many other barriers that the French ESCOs and other stakeholders consider as important limiting factors, including low energy prices, the complexity of the EnPC concept, lack of information about the potential and functioning of the services (QualitEE 2018d). The QualitEE project also identified that EnPC projects are typically financed by the client, either by contracting debt or from its own funds, or a combination of both. Either way, this can be an important background why more than half of the respondents mentioned that access to viable finance was difficult, and that projects have too long payback time also related to low energy prices.

4.10.4 Future perspectives and recommendations

Based on the JRC survey 2018, the following market changes can lead to an increase of the ESCO market in France:

- Providing subsidies for projects bundling several actions with impact > 10% savings, and with guaranteed savings;
- Improving subsidies to make energy efficiency actions profitable, with the aim of increase the renovation rate;
- Providing model contracts for EnPC;
- Providing training in the identification of reference situations and the potential for energy savings.

Germany

4.11.1 Market size and development

Germany has a well-developed energy services market (Bundesstelle für Energieeffizienz (BfEE) 2017) (QualitEE 2018e). According to the Federal Energy Efficiency Center (BfEE), the total market volume of energy services was between EUR 8.0-9.5 billion in 2017 (Bundesstelle für Energieeffizienz (BfEE) 2018). This number refers to market for energy advice, energy contracting and energy management services. The energy services sector in Germany is divided into these three categories, with energy contracting contributing by far the largest share of the market volume. The market volume of energy contracting was estimated at a volume of EUR 7.2-8.6 billion in 2017, and EUR 7.7 billion in 2016 (Howard 2019)).

The German ESCO market increased slowly from 2015 to 2018. Estimation made in QualitEE project shows that more than half of German respondents experienced a slight growth of EnPC and ESC markets in the last 12 months (QualitEE 2018e).

There are several reasons for this slight growth. SMEs expect that contracting will essentially bring cost advantages through lower energy costs and electricity tax savings. Environmental and climate protection also play an important role. These reasons are also mentioned as the main motivation for non-SMEs, which benefit from tax reliefs relating to electricity tax and EEG surcharge when introducing an energy management system (EEG = Renewable Energy Act). There are several programmes which support ESCO market growth. BAFA (Federal Office for Economic Affairs and Export Control) offers subsidies for start-ups (a programme called "Einsparzähler"). This programme offers research co-funding for energy service companies or research on new business models. There are also subsidies for facilitation provided on federal level. EIB ELENA funding has contributed to the development of the market (Appelt, Lohse, and Höflich 2015).

Table 18. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	✓	✓	✓

The German ESC and ESCO markets are the most developed in Europe, which is also reflected in the market stability and developed market structures, seen above.

However, several factors have been identified as slowing down the ESCO market development. For example, the market is not transparent, as many small start-ups provide business models not matching with the classic energy supply and energy savings performance contracting. Another factor slowing the ESCO market development is the complexity of energy conversion: requirements for the energy supply of buildings and communities are becoming more and more complex and can hardly be handled by building owners and users.

Supply side

I Federal Energy Efficiency Center (BfEE), estimated that there were approximately 6000 companies in Germany working in the energy services sector in 2017, including energy consulting, energy contracting (EnPC and other forms) and energy management services. Projection from the annual market survey of BfEE shows that there were 560 energy service companies and approximately 138 offer energy performance contracting. Almost 50% of the energy contracting providers were municipal- or other energy companies followed by contracting businesses with the share of 26%. 12% of contracting providers were energy consulting/engineering, 8% manufacturing/technical facility suppliers and

8% other providers representing different business areas such as real-estate companies and facility managers, energy agencies and certifiers. The majority of the energy service companies are small companies (up to 50 employees) (Bundesstelle für Energieeffizienz (BfEE) 2017).

75% of contracting providers use energy supply contracting. EnPCs make up 25% of the total contracts used by ESCOs in 2016. This number has increased by 15% compared to previous years (Bundesstelle für Energieeffizienz (BfEE) 2017). According to our survey respondents, the most common contract is EnPC with shared savings, meaning that ESCO and client share the savings and ESCOs take financial risk. In the report on best practice contracting projects implemented by the Energy Agency of North-Rhine Westfalia in Germany, among two typical contract types; ESC and EnPC, there have been two projects using public performance contracting, so-called "Bürger-Contracting" (Appelt, Lohse, and Höflich 2015).

The most typical energy service companies are energy supply companies. The second type of companies providing energy services is engineering and construction firms followed by equipment suppliers and/or installers as well as consulting firms, energy auditors and other energy specialists. The majority of ESCOs in Germany are private national and international companies. There also exist companies owned by public authorities (local, e.g. owned by municipality) and other bodies such as cooperatives. The main types of contracts used by ESCOs are EnPC with shared savings.

Demand side

According to BfEE, the most important customer group is the real-estate sector followed by public sector. Private households are the third most important customer group followed by other industrial sector and other commerce, trade and industry. The following sectors are less important to the contracting providers: energy-intensive industry, health-care, hotel and catering business as well as trade (Bundesstelle für Energieeffizienz (BfEE) 2017). The estimation made in QualitEE project shows that in the EnPC market sector, the public sector and municipalities is the most typical client. However, for the ESC, the main clients are private companies from the industrial sector followed by the public health sector and the private retail/leisure sector (QualitEE 2018e).

In a survey done by the BfEE, customer groups were asked if they use energy-contracting. SME operating in the hotel, hospital and leisure industry is the client group using contracting most often. The second and third largest groups are SMEs from the retail- /food sector and energy-intensive industries (Bundesstelle für Energieeffizienz (BfEE) 2017).

According to our survey correspondents, the main sectors which are the clients of ESCO/EnPC are as follows: public buildings including hospitals, educational facilities, and offices, private commercial buildings including office buildings, hotels, tourist facilities. The following sectors are also targeted by ESCOs: education buildings, public lighting, industry sector and the private residential sector (multi-apartment houses).

The key technologies that ESCOs implement are co-generation and renewable supply followed by building level heating. In addition to these systems, the correspondents also identified district heating, building as a whole, industrial processes, motor systems and horizontal technologies.

There are no specific and no average data available from the annual BfEE market survey about the typical project size. There are small projects, starting from 50k€, as well as large EnPC and large district heating projects with volumes of more than 5M€.

The average duration of ESCO projects is about 10 years. The average energy savings of a typical ESCO project vary from 20% to 40% of baseline consumption. According to estimates based on the results from 21 EnPC projects in the public sector, the energy savings are 25-30% of baseline consumption.

4.11.2 Policy framework

According to the JRC survey 2018, the following elements of the Article 18 were implemented in Germany (see Table 6[75]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings;
- Providing model contracts for EnPC;
- Providing information on best practices energy performance contracting;
- Enabling independent market intermediaries (e.g. EnPC or procurement facilitators, one-stop shops) to play a role in stimulating market development.

The implementation is very different throughout all German Federal states and in some Federal states, the ESCO market is very small.

German Federal Ministry Economics and Energy plans to implement competence centres for contracting in the German federal states to support the development of 10 examples of the EnPC projects in municipalities. A dialogue between the Federal ministry and ten states is performed by The German Energy Agency since 2015. The dialogue is aiming at the improvement of legal frameworks for EnPC in municipalities and the federal states. Model contracts provided by DENA is used in some federal states (e.g. Hessen, Bavaria).

Implementation of Energy Efficiency Directive (Art. 18) had an impact to promoted ESCO projects according to 70% of survey participants followed by financial incentive. Almost 30% of correspondents indicated that covenant of majors or other city level commitment had an impact on the ESCO development. Almost 20% of correspondents also added white certificates/EEOSs, taxation rules/rebates, official certification scheme of energy service providers and procurement rules.

In Germany, the following obligations have been implemented to support the proper functioning of the energy services markets (QualitEE 2018):

- Introduce an energy management according to ISO 50001;Carry out an energy audit according to EN 16247-1 (for non-SMEs);
- Structure of a register of energy service providers (BAFA Beraterdatenbank);
- Further development of CO2 Building Renovation Programme and the KfW energy efficiency program;
- Initiative of Energy Efficiency Networks;
- Optimization of existing energy consulting.

The Federal Energy Efficiency Center (BfEE) provides information on available energy service contracts which provide guaranteed energy savings on its website[76]. Furthermore, it offers information about the current and future development of the energy services market based on its annual market survey[77].

The German Energy Agency (dena) publishes a database with EnPC projects[78].

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[75] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[76] http://www.bfee-online.de/BfEE/DE/Energiedienstleistungen/Contracting/Mustervertraege/

[77] http://www.bfee-online.de/BfEE/DE/Energiedienstleistungen/Marktkennzahlen/marktkennzahlen_node.html

[78] https://www.kompetenzzentrum-contracting.de/anwendung/dena-praxisdatenbank-contracting/

4.11.3 Main barriers

The most relevant barriers limiting ESCO development in Germany are lack of trust from the (potential) clients and small size projects with high transaction costs. Other barriers are existence of in-house technical expertise and ambiguities in the legislative framework, perceived business and technical risk, lack of collaboration, commitment and cultural issues.

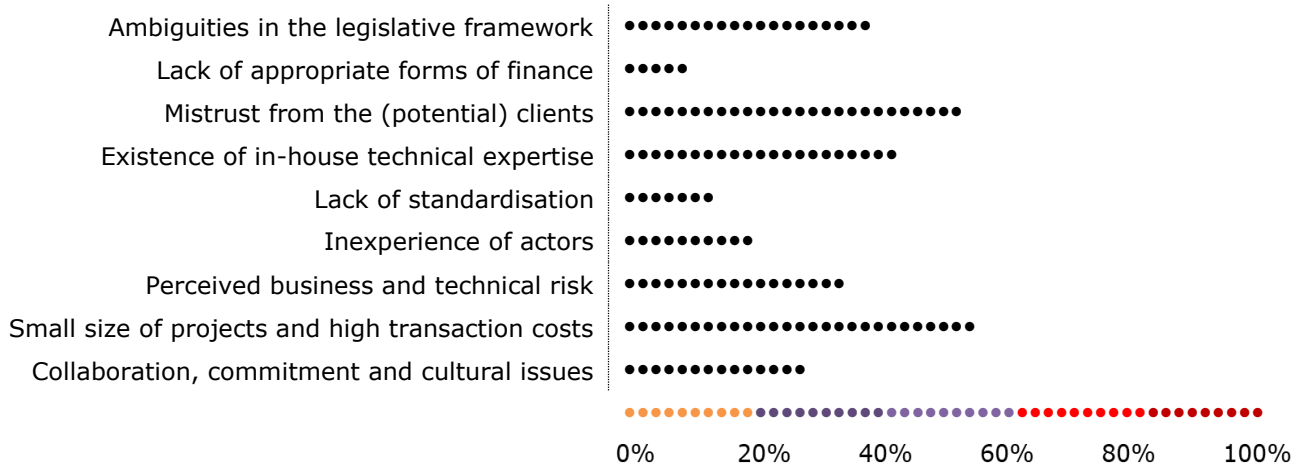

Figure 17. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

Further barriers also limit the ESCO offers, such as low energy prices (space heating and electricity), low share of the energy cost on the total cost, lack of appropriate forms of finance and others.

4.11.4 Future perspectives and recommendations

Survey participants provided the following recommendations:

- Contracting competence centres on regional or local level
- Financial support for facilitation
- Directive to use contracting in public business
- More stable regulation over time. Potential clients want stable laws for longer time
- Mandatory savings in every contract
- Tax incentives for energy-oriented building renovation (as discussed for a long time already by the federal government).

Greece

4.12.1 Market size and market development

The Greek energy services market has been not developing since 2015. Due to the country's economic instability, most companies are unable to raise capital themselves or borrow capital to finance EnPC projects. The implementation process of the EU Directive obligating Member States to renovate 3% of public building surface is nevertheless ongoing. Additionally, the obligation for non-SMEs to provide energy audits is in place from mid-2018.

According to the NEEAP 2017 of Greece (NEEAP 2017b), there have been several initiative promoting ESCO market development in Greece. The ESCO register shows an increased number of ESCOs in the recent years. However, even if this number doubled between 2014 and 2017, it seems that ESCO markets have not yet really emerged in Greece. The start of the EEO scheme in 2017 as well as the measures for the public sector could help to boost these markets.

Table 19. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
C				

The Greek market is not only burdened with a lot of barriers and an instable framework for ESCOs to succeed, but there are no ESCO market structures yet established.

Supply side

Based on the data provided by the ESCO registry[79], a total of 86 ESCOs are registered in Greece. The ESCO registry is split into the following four categories (QualitEE 2018i):

- Category A1 – Companies that have implemented or are currently implementing energy efficiency projects with Energy Performance Contracts with a total budget of at least € 300.000 in the last five years
- Category –2 - Companies that have implemented or are currently implementing energy projects (energy efficiency and/or renewable energy) with a total budget of at least € 1.000.000 in the last five years. These need not be accompanied by an EnPC contract.
- Category A3 – All the companies belonging to neither category A1 or A2.
- Category B – Natural persons that offer energy consultancy services.

Only category A1 are companies providing EnPC projects. There are 3 companies registered in category A (E'CO's providing energy services through EnPCs) and 83 are category B (ESCOs providing energy services without EnPCs).

All of the ESCO companies are small (up to 50 employees) or medium companies (up to 250 employees). The type of companies acting as ESCOs are as follows: engineering and construction firms, consulting firms, energy auditors, other energy specialist, energy supply companies, and issuers of energy performance certificates. All these companies are private national companies. ESCO/EnPC services are the primary business of these companies meaning that ESCOs typically offer guaranteed energy performance or ESCO services.

[79] www.escoregistry.gr

Demand side

Unlike in many other European countries, the typical clients of ESCOs in Greece are private commercial office buildings, hotels and tourist facilities as well as public lighting. The main technologies implemented by ESCOs are in buildings as a whole (including active and passive systems, energy efficiency and RES), heating and heating systems in buildings, cooling and air conditioning, automation and control systems as well as renewable supply. The average size of investments of ESCO/EnPC projects is less than 200 000€. The average duration of ESCO projects is between 5 and 10 years. The estimated average energy savings are 15% of baseline consumption. The most common type of contract used by ESCOs is EnPC with guaranteed savings and consultancy and technical guarantee.

4.12.2 Policy framework

According to the JRC ESCO survey 2018, a model contract has been developed in line with the requirements of Article 18.

In addition, an ESCO register has also been established, but only three EnPC providers are listed, while 80 other companies also appear in the list. Nevertheless, the established categories provide useful information on what these companies can offer.

This website[80] provides information on EnPC contracts to guarantee energy savings and final customers rights. The website shows the available financial instruments, incentives, grants and loans to support EnPC projects. Moreover, the website provides the best practices EnPC focusing on building renovation and showing information on a cost-benefit analysis with a lifecycle approach.

Through the Law 4342/2015, financial schemes supporting energy efficiency services projects and best practices for EnPC for building renovations, are available.

According to the NEEAP 2017 of Greece (NEEAP 2017b), the start of the EEO scheme in 2017 as well as the measures for the public sector could help to boost the ESCO market which has not yet really emerged in Greece.

4.12.3 Main barriers

Figure 18. shows the relevance of the barriers limiting ESCO implementation in Greece. It can be seen, that all barriers are indicated with an importance close to each other, in spite of the market staying in an immature state. In these circumstances, it is difficult to name one or few critical barriers, though the lack of appropriate forms of finance pops out.

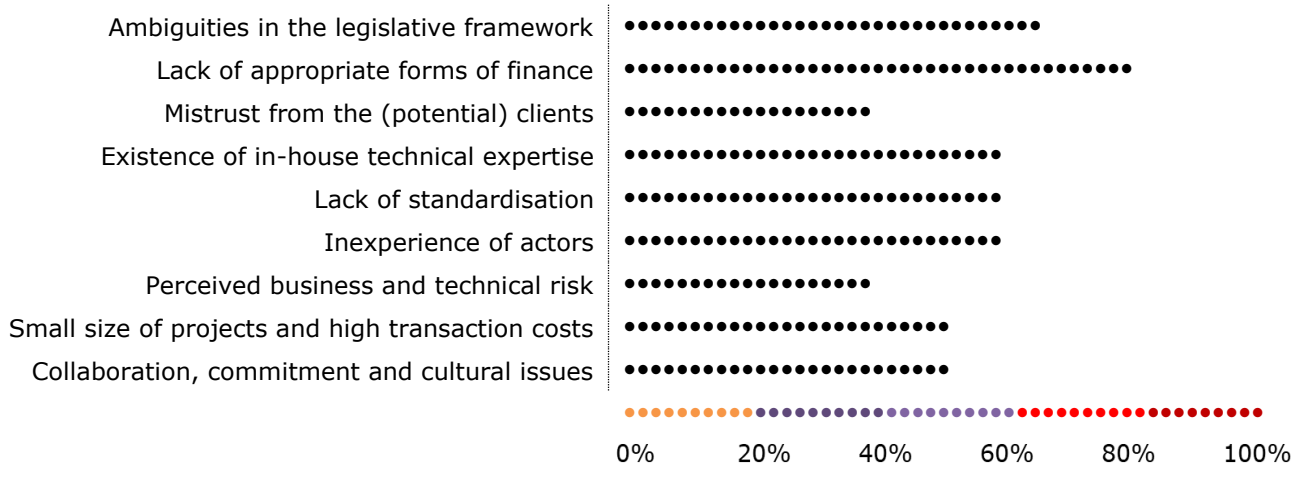

Figure 18. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

[80] http://www.escoregistry.gr/

4.12.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs:

- Provide information on best practices for energy performance contracting;
- Provide model contracts for EnPC;
- Build an authority that will monitor EnPC contracts;
- The key to further development is the actual implementation of the already existing legal framework.

Hungary

4.13.1 Market size and development

There is no official market size estimate available for the Hungarian ESCO market as of 2018 according to the knowledge of the authors. An estimate of EUR 300 million market value – that is market potential – was put forward in the JRC survey (JRC 2018). The Hungarian ESCO market has gone through significant fluctuations between 2000 and 2018, and activity continues to be very low since 2010, when the previously exemplary market halted. However, opposed to the earlier (2016-2017) status, the market has slightly strengthened (JRC 2018).

Table 20. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

The ESCO market in Hungary has deteriorated much from previous performance. There have been times (between 1995-2004), when demand was increasing and lead the market movements, while a lot of bottom-up promotion is necessary in the last – close to 10 – years. There have been plans to introduce quality labels and certification, or establish an association or even a public ESCO. But currently, the market is still largely struggling with the remaining or even increasing level of barriers (see below).

Supply side

ESC was highly attractive during the 1990s and early 2000s. EnPC used to be a well-established model between the early 2000s and 2010, however the market was very small in 2018. In 2013 around 6-7 companies were identified that were able to offer EnPC (Bertoldi et al. 2014), and this has not changed significantly (JRC 2018). There are currently around 10 ESCs and 5 EnPC providers.

The profile and main activity of ESCOs has been changing, on the other hand. ESCs are large utilities and installers, while EnPC providers typically have a broader profile, such as energy audits, procurement advisors, grant facilitators, facility managers. Their offers are flexible and include a number of steps in the supply chain, that is arranged in agreement with the clients.

Demand side

ESCO projects are mostly carried out in industry and tertiary sectors as of 2018-2018. The large international ESCO companies work with manufacturing industries, large tertiary buildings (offices, shopping malls), while the smaller national companies focus on extending their consultancy services to EnPCs in smaller tertiary buildings, as well as smaller industries.

There was a major street lighting project in the summer of 2016. There were 10s of multiapartment building renovation projects, combing various financing sources and implemented by EnPC providers or one-stop shops. The EnPC provider offered a full-value chain management, from searching for and arranging a combination of various financing sources, through implementation and monitoring. The scale of such renovations was smaller than around 2004-2010, but still providing exemplary results. However, these projects may diminish again due to the end of the so-called "Building Society Banks" (see under barriers).

ESCO projects in the public sector practically stopped by 2017, and are starting to emerge again in recent years. Their future depends on the legal and regulatory

environment, as well as the availability, appearance and disappearance of funding, as well as the changes in decision-making and political stability.

Technical solutions that ESCO projects are used for include the renovation of heating and cooling systems, public lighting, office lighting, district heating, RES installations.

Average size of the projects is very small, under EUR 200.000, and typical project duration is around 15 years (JRC 2018).

4.13.2 Policy framework

The Energy Efficiency Act (May 2015) provides definitions for "energy services" and "energy service provider/ESCO" ("enterprise that provides energy efficiency services or other energy efficiency improvement measures for the end u'er's facility or premises"), as well as provisions for energy efficiency contract (i.e. including guaranteed energy savings) concluded by public institutions (including mandatory contents).

The Energy Efficiency website[81] makes a contract template available together with other information about EE contracts. The website of the Nemzeti Fejlesztési és Stratégiai Intézet's (National Development and Strategy Institute) provides information on tendering possibilities. Other state-run websites provide information on EU-funded programmes[82].

The certified list of energy auditors and energy auditing bodies is available on the HEPURA[83] website; however, a list of EnPC providers is not available. The European EnPC Code of Conduct was adopted by ESCO market players in 2014 and administration is in the responsibility of Hungarian Energy Efficiency Institute (MEHI)[84], and this can also serve as indication of ESCO contract contents).

An overview of the European and national policies that influence the development of the market is shown in Figure 19.

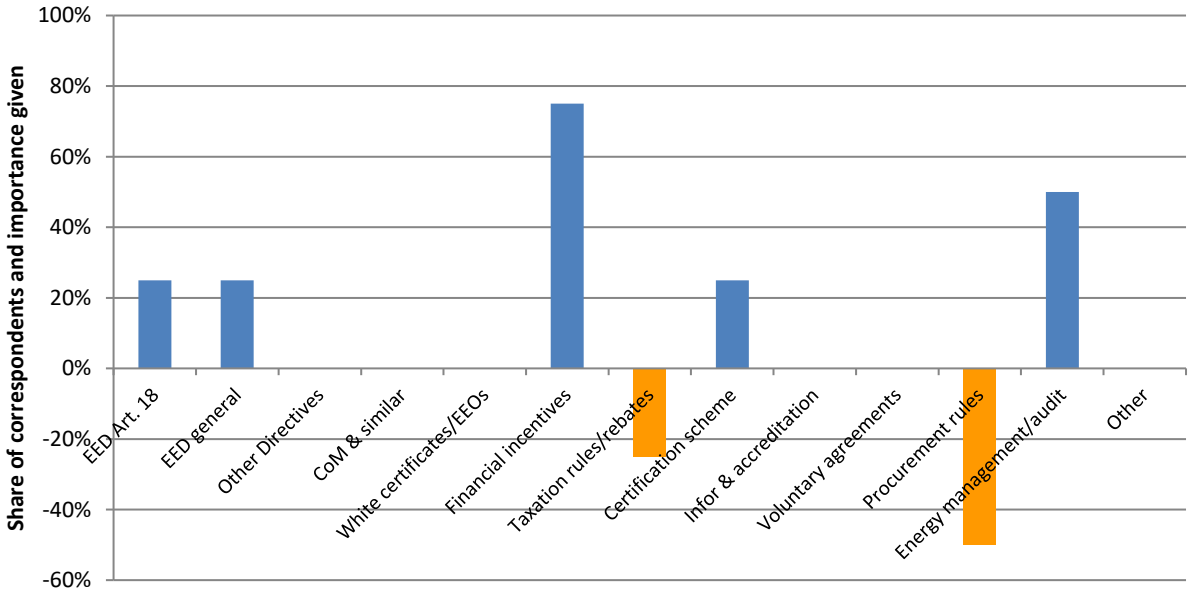

Figure 19. The level of influence of EU and national policies and measures on the ESCO market development. Note: Negative values mean a barrier. Source: own data and calculations (JRC 2018)

[81] http://enhat.mekh.hu/
[82] http://www.kormany.hu, https://www.palyazat.gov.hu/palyzatkeres and http://www.nfsi.hu/
[83] Hungarian energy and public utility regulatory authority
[84] http://www.mehi.hu/

4.13.3 Main barriers

Key barriers in the Hungarian ESCO market remain the lack of trust, combined with short-term thinking, low commitment, and regulatory uncertainty (JRC 2018). Furthermore, the low global price of energy has decreased interest in energy efficiency due to long payback times, but this is changing in 2018 (MEHI 2019). The expectations for grants or other support vehicles, preferential loans delay decisions on energy efficiency projects.

The key barrier – as was the case in 2017, too – is still the lack of regulatory stability. ESCO projects are long-term (15 years), and legislation and regulations often change very suddenly, centers of power are exchanged unexpectedly. For example, the multiapartment building renovation projects were largely based on a long-term regular savings account that had been established by housing associations (and private apartment owners) in the so-called "Building Society Banks". These long-term (8 years+) savings accounts were generously supported from the national budget and allowed a significantly higher rate of return than on the market. A government support of 30% of the saved amount could be collected (maximum 72,000 HUF, ca. EUR 250 per year) if used for construction or renovation afterwards. ESCOs offered products to housing associations that combined bank loans, own funds and these savings. However, the structure was stopped suddenly. The already collected funds are still sources for further ESCO (and other EE) projects, but these buildings need to search for new financing schemes in the future.

Almost all barriers are important in Hungary that are structural or related to trust (Figure 20).

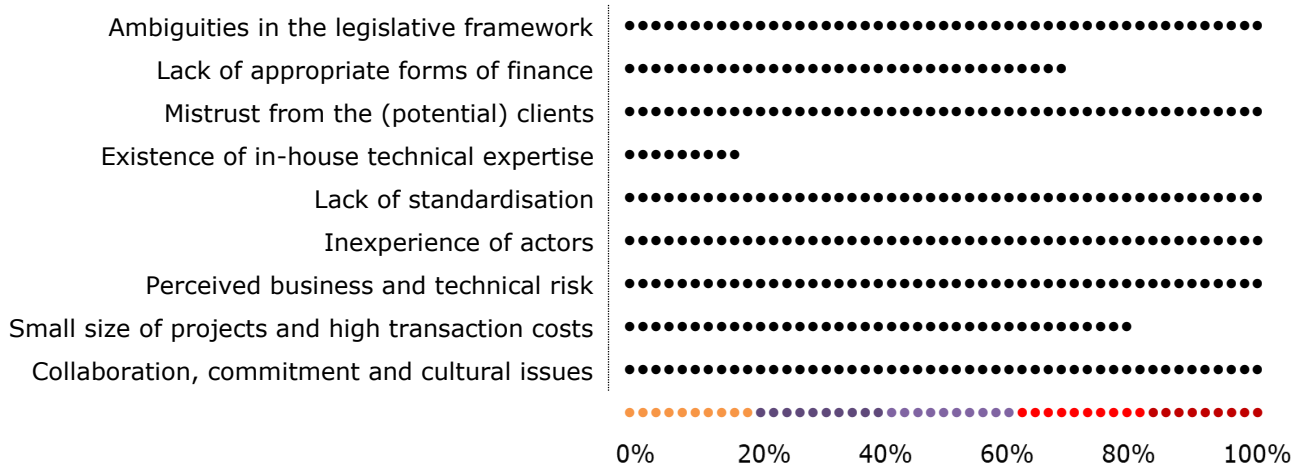

Figure 20. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

In the public sector, a key barrier is that procurement of an ESCO project is difficult and complicated. The client is suspicious, comparison of offers, but even the formulation of a tender documentation is not backed up with in-house expertise, and then the book-keeping is complicated or ambiguous. The overall and transaction costs increase due to the extra investment needed, and solutions give rise to possible corruption, and reduce transparency and trust.

Public ESCO projects are carried out usually on buildings or public lighting, and the client repays the investment from future savings. The regulation and practices are unclear whether these projects should be booked as investment or service. In the latter (and more common) case, the total cost limits are lower. Related to the EU budgetary restrictions, energy investments can reach the EU regulated limits, too, making them seen as risky or unwanted.

Furthermore, the conditions in investment projects supported from national budget, for example in the case of the support from the special corporate tax, the investment must remain in the ownership of the receiver. The same problem happens when using European funds, which does not allow for sharing the ownership (booking) between the beneficiary and the ESCO. Therefore, ESCO involvement is restricted because the object of the ESCO project cannot be in the books of the ESCO or any third-party (MEHI 2019).

4.13.4 Future outlook

There is an enormous saving potential in the public and private residential sectors, and there is more and more interest in investing in these. The economic potentials of energy efficiency are re-discovered. At the same time, most of the key barriers do not seem to fade away in the near future, and therefore ESCO are adjusting their activities to them. For example, contracts are drawn to include implementation steps (such as audit, preparation, installation, facility management, etc.) or steps in the investment coverage (not all building parts or lighting system parts at the same time). This also allows both the ESCO and the client to opt out at various stages.

The clarifications on the Eurostat rules on public debt and/or considering the ESCO projects as investment (and not as services) could open up access to a large set of projects for ESCOs (MEHI 2019).

The issues related to grant or support combination with ESCO projects could be overcome if the ESCOs were allowed to apply for funding, while implement projects at the premises of their clients. The grant could be layered, i.e. used for parts of the investment with long-term repayment time, and require the ESCO part to be used for short-term repayment measures. In total, it would be possible to deliver deep renovation or other complex investments. Alternatively, the client should be allowed to apply only for grants for complex projects, in which part of the project that has a short pay-back time would have to be carried out by the clients themselves (alone or with third-party involvement).

Furthermore, the name "ESCO" has a negative connotation in the Hungarian procurement segment, due to several unsuccessful projects with low or non-delivery. In-house advisors both find it risky (due to its bad connotation) and too complex to deal with ESCO projects. ESCOs on the other hand develop good contacts and invest large efforts in cleaning the reputation and demonstrate the success of exemplary projects. It is possible that the emergence of facilitators, including some small procurement advisors, auditors, and the EnPC Code of Conduct manager, MEHI, will be able to revive the ESCO market.

In summary, a revival of the ESCO sector is not foreseen, and several Hungarian ESCOs search for possibilities to work abroad, e.g. in Slovakia, Romania, Bulgaria and Austria.

Recommendations

1) Change conditions of grants, national support programs and EU projects to require complex investments that deliver larger savings. The short-payback part should be financed by the client (if needed involving a third-party), and only the long-term investment should be financed from grants or loans.

2) Clarify the definition of ESCO and EnPC, and introduce clear regulation following Article 18 provisions.

3) Spread the universal use of measurement based billing, independent monitoring and other ways to reduce transaction costs, while improving trust.

4) Disseminate and promote good and successful examples.

5) It is advised to use the shared savings model, in order to increase trust and higher interest for both parties in producing savings.

Ireland

4.15.1 Market size and market development

There is no official data on the ESCO size. An estimated value is 20 million Euros.

The ESCO market has been increasing slowly since 2015. These are several reasons for this development. Primarily the market is maturing, energy users are becoming more aware of this route to project delivery, and ESCO companies are fine tuning their market offer. Government support for EnPC in the public sector and new project examples have had a positive impact on the market development. However, there are several aspects hindering a strong development such as a lack of understanding as to what EnPC is, a lack of accountability, and institutional barriers/change management. The development is also held back by the uncertainty surrounding the ongoing Brexit negotiations.

Table 21. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

While an ESCO association has not been set up in Ireland; the Sustainable Energy Authority of Ireland (SEAI) has taken the role of representing ESCOs interests and developing promotional material.

Ireland has developed t"e "National Energy Services Framew"rk" to help stimulate the energy-efficiency market in the non-domestic sector (Department of Communications 2017). This Framework lays out the roadmap for energy efficiency projects to follow and specifically how an Energy Performance Contracting approach can be built in. The Framework provides a standard and structured approach for public sector and commercial organisations, supported by a suite of tools including comprehensive guidance documents, templates, model contracts, monitoring and verification requirements to support the efficient procurement and delivery of energy efficiency projects on the ground. There is a Project Assistance Grant support available from SEAI[85] which assists with the preparation of a business case and progressing with EnPC or EPRP approaches offsets the additional transactional costs that are often associated with legal, financial and technical advice which can be viewed as a barrier (Department of Communications 2017).

Supply side

The ESCO market in Ireland is relatively small; the estimated number of ESCOs is 25. There are sever'l 'as a serv'ce' companies offering lighting but few large ESCOs. Larger ESCOs are either connected to energy companies or are predominantly servicing the UK market. Most of these companies are small companies (up to 50 employees). Types of companies providing energy services in Ireland are as follows: energy supply companies, utilities, facility management and operation companies, consulting firms, energy auditors, other energy specialists as well as engineering and construction firms. Most of these companies are private national companies offering a wide range of services meaning that EnPC services are typically not the core business.

Demand side

The typical ESCO clients in Ireland are public buildings including hospitals, education buildings and offices followed by commercial office buildings and hotels as well as industry sites.

[85] Sustainable Energy Authority of Ireland

The main technologies implemented by ESCOs are building level heating and cooling systems, ventilation and air conditioning, building as a whole (including active and passive systems, energy efficiency and RES) as well as LED lighting in warehouses.

The average size of investment of a typical ESCO project varies depending on the size and type of the project; larger projects with hospitals, smaller in the local authority sector. The average duration of ESCO projects varies from 5 to 8 years.

4.15.2 Policy framework

According to the JRC ESCO survey 2018, the following elements of the Article 18 were implemented in Ireland (see Table 6[86]):

- Encouraging the development of quality labels for ESCOs or their services;
- Providing information about the current and future development of the energy services market.

The Department of Communications, Climate Action and Environment collaborated with SEAI to develop a National Energy Services Framework to help stimulate the energy-efficiency market in the non-domestic sector[87] (Department of Communications 2017). One of the measures identified in the initiative is the Energy Contracting approach. The framework provides guidance documents, templates, model contracts, monitoring and verification requirements to support the efficient procurement. The appetite for Energy Performance Contracting is still low and for many organisations moving from a traditional approach to procuring and financing large energy projects to Energy Performance Contracting approach is too big a step. Therefore, the Framework encourages all clients to integrate an energy performance related payment into contracts. This is often done to 'test' the approach and to build confidence before moving to full energy performance contracting.

SEAI website provides a register of contractors (residential)[88]. The Department of Communications, Climate Action and Environment established the Energy Efficiency Fund, to provide a source of finance to public and private projects. It was also intended to further develop the market for energy performance contracting and energy service companies.

4.15.3 Main barriers

The most relevant barriers limiting ESCO development in Ireland are as follows: availability of experience trusted advisors and facilitator (

Figure 21). The development is also held back by the uncertainty surrounding the ongoing Brexit negotiations; nobody wants to invest in capital projects until Brexit has been finalized. Furthermore, there is a fear of public procurement, as well as the perception that EnPC is difficult and more cost-intensive to implement than a traditional contract. While EnPC can in fact be quicker and cheaper to implement, the negative perception stems from large scale projects and private sector facilitators where fees can be higher than necessary. Smaller projects (€500-€1m) can be facilitated for EUR 25 thousand to EUR 50 thousand once the process has been developed and standard documents have been created.

[86] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[87] http://www.seai.ie/Your_Business/National_Energy_Services_Framework/

[88] https://hes.seai.ie/GrantProcess/ContractorSearch.aspx

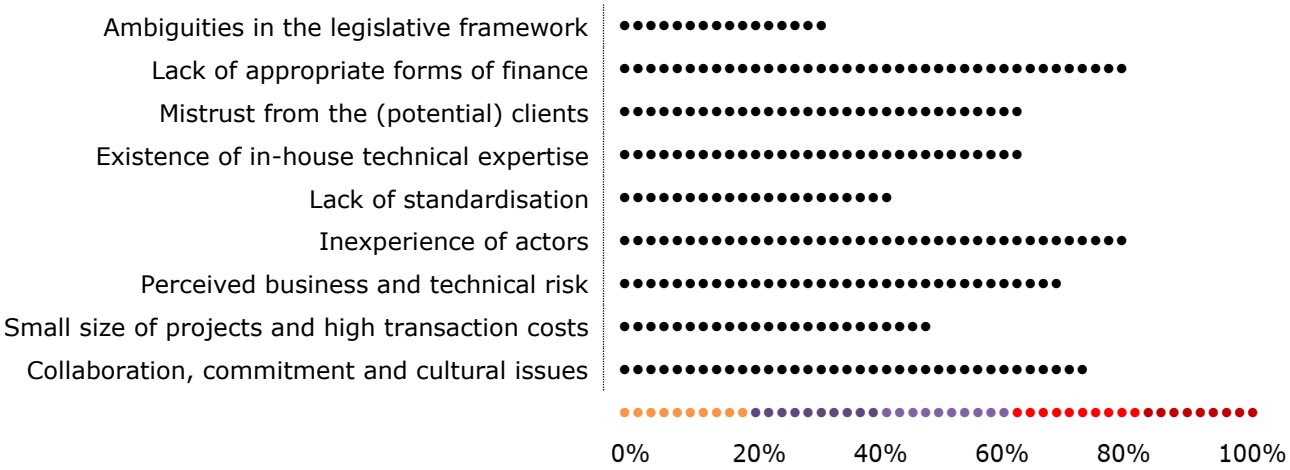

Figure 21. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

4.15.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs listed by survey participants are as follows:

- Approval and recommendation from Central Government
- Robust facilitation market and frameworks
- Critical mass of delivered successful projects
- Simplify and speed the procurement proce–s - which is considered too complex
- Support for project facilitato–s - essential for successful EnPC development in public sector
- Support for the development of ESCOs or companies offering energy guarantee services; the lack of ESCOs is an issue
- Further development of the template EnPC contract – legal support in addressing live project issues for initial EnPC projects – is critical for the positive image of EnPC in the country
- Further improve education and awareness
- Illustrate and promote successful case studies across multiple sectors to prove EnPCs deliver what they say they will
- Provide further financial support. Energy efficiency finance is not well mobilised as yet; there are huge opportunities to reduce energy footprint, though are currently unattainable due to finance/capex restrictions
- political support.

Italy

4.14.1 Market size and development

The ESCO market in Italy is considered to be one of the biggest and most developed in Europe (QualitEE 2018f), (Boza-Kiss, Bertoldi, and Economidou 2017). However, despite being developed, the ESCO market in Italy is growing in an inconsistent pattern. Also, the Energy Efficiency market may be distorted by white certificates and other incentives: if these incentives did not exist, most of the ESCOs which are SMEs would not have the capability to operate EnPC projects. Still, there are a few large companies that can implement this type of projects. SMEs do not have the capability to implement EnPC both from the demand and the supply sides in terms of resources (QualitEE 2018f).

ESCOs play a significant role in the implementation of energy efficiency measures, particularly in the public sector. According to the NEEAP, over 600 contracts were signed between 2009-2016, for a total value of EUR 2 billion. Under these contracts, 13,000 public sector buildings were served, which resulted in total savings of around 12 ktoe/year. These contracts comprise an integrated set of services provided by CONSIP[89] to public authorities covering the management, maintenance and energy efficiency of thermal and electrical installations for government buildings (PAE 2017).

Table 22. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

There are a large number of associations and industry groups that serve the ESCO market in one way or the other. These include the independent associations, such as AssoEsco and FederEsco, and representatives of utility suppliers and technology providers involved in CONFINDUSTRIA (Federation of Industrial Enterprises): AGESI, Associazione Imprese Facility Management ed Energia; ANIMA-ITALCOGEN (Associazione Costruttori e Distributori Impianti Cogenerazione, cogeneration plant installers and distributors); ANIE (Associazione Imprese Electrotecniche, electrotechnical companies); ASSOELETTRICA (association of electrical energy producers); ASSOGAS (association of gas producers and related services); FEDERUTILITY (utilities' producer association); and COGENA (Associazione Italiana per la Promozione della Cogenerazione), which is part of CONFCOMMERCIO (federation of commercial enterprises). Due to the exclusively large number of associations that are related to ESCOs, in the end the representation is not unified enough.

The ESCO market in Italy has experienced growth. Between 2011 and 2015, it tripled, with the turnover in 2015 amounting to 1.5 billion Euros (Table 23). This significant revenue increase for the ESCO market is also due to the 2012 legislative reform concerning the white certificate scheme when extra savings started being attributed as a premium for large energy efficiency projects implemented at industrial sites.

[89] CONSIP is a joint-stock company held by the Italian Ministry of economy and finance

Table 23. ESCO turnover in Italy

Year	ESCO turnover (€m)
2008	275
2009	387
2011	500
2015	1 500

Most of the survey participants (JRC 2018) indicated that the ESCO market in Italy has experienced fast growth since 2015, with an estimated growth rate of 8-9%. Many new ESCOs have entered the market during the last three years. A key reason for this development is the introduction of D.Lgs 102/2014 (Directive 2012/27/EU) which obligates mandatory audits to be performed by ESCOs or EE experts. In addition, ESCOs are entitled to incentive supplements (TEE).

Supply side

There are around 1,500 companies registered as Energy Services Enterprises. However, only 340 enterprises can be considered "energy service companies" under the standard UNI CEI 11352, which requires companies to have carried out at least one energy efficiency project (QualitEE 2018f).

The majority of ESCOs are medium and small size companies. The typical companies providing energy services using EnPC in Italy are as follows: energy supply companies, utilities, facility management and operation companies, consulting firms, energy auditors, other energy specialists as well as engineering and construction firms.

Most of these companies are private national companies offering a wide range of services, meaning that EnPC services are typically not the core business. ESCOs typically engage in audits, TEE and incentives, energy supply and contracts, ISO 50001, technologies installation, M&V.

Demand side

The typical clients of ESCOs are public buildings such as hospitals, education facilities (schools, kindergartens, universities) and offices (e.g. municipalities), public lighting and commercial buildings such as hotels, tourist facilities as well as industry sites.

The average duration of ESCO projects varies from 8 to 13 years. In the industry sector, the average duration of the project is 8-10 years, while residential projects typically last five years.

The technologies typically implemented by ESCOs in Italy are as follows: building as a whole (including active and passive systems, energy efficiency and RES), building level heating and cooling systems and air conditioning, street lighting, co-generation, automation and control systems.

The most common type of contract used by ESCOs in Italy is EnPC with guaranteed savings.

4.14.2 Policy framework

According to the JRC ESCO survey 2018, the following elements of the Article 18 were successful implemented in Italy (see Table 6[90]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings;
- Disseminating information on financial instruments to support energy efficiency service projects.

There are several websites providing the list of ESCOs and information on the energy service market. ACCREDIA[91] website provides a list with ESCOs certificated by UNI CEI 11352. The same website provides a list on certified professionals, organisation/businesses with certified management systems. Ministry of Economic Development provides information and Documentation of the energy service market. It also provides a National Energy Efficiency Fund to support energy efficiency measures carried out by public authorities, ESCOs and businesses to increase the energy efficiency of their own buildings, systems and production processes (NEEAP 2017 of Italy (PAE 2017)). Italian trade associations such as Assoesco, Federesco, Assoege and others provide information on energy service market.

EnPC projects have been carried in the public sector through Article 14(4) of Legislative Decree No 102/2014. ENEA is responsible for the development of the contractual EnPC model and guidelines for energy performance contracts for building renovation. These contracts address the buildings occupied by the Government. The context of the project covers these main following aspects:

- Definition of the energy upgrading measures and estimated minimum savings that must be guaranteed throughout the whole term of the contract by ESCO;
- Verification, control and monitoring of services throughout the whole term of the contract;
- Verification that the performance level of the building/plant system laid down by the contract has been achieved.

To reduce barriers and to provide information on energy performance contracts for buildings, research activity has been intensified and meetings with market operators and institutions have been stepped up. Several conferences and technical meetings of various sizes have been organised with different stakeholders operating in the sector:

- the CTI 'CT212' technical round table meeting on European technical standardisation on EnPCs;
- guaranteetEE project, which is working to overcome the split incentive dilemma and the lack of flexibility of EnPCs;
- ENEA/Catania University agreement on eliminating legal uncertainty and the Energy Performance Service classification.

[90] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[91] The Italian Accreditation Body

4.14.3 Main barriers

Figure 22. shows the relevance of the barriers limiting ESCO implementation in Italy. It can be seen, that the main barrier limiting ESCO implementation is lack of appropriate forms of finance followed by mistrust from the (potential) clients, ambiguities in the legislative framework and small size of projects and high transaction costs.

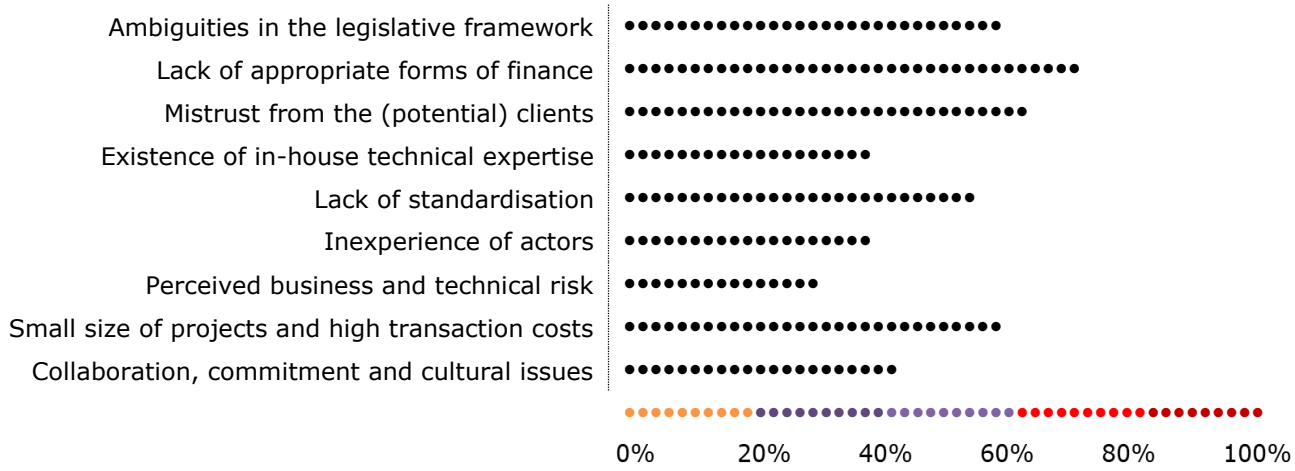

Figure 22. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

Other barriers to the development of the energy service market are as follows:

- Long and complex procedure: Despite the attempt to simplify the process of EnPC especially in the public sector, the process of EnPC is still complex.
- A shortage of resources and skills: at local level, the Italian local authorities association ANCI has found that local authorities, especially smaller ones, complain of a shortage of resources and skills, which is a barrier to planning energy efficiency measures.

4.14.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs listed by the survey participants are as follows:

- Due to the lack of technical skills of public administration at local level, the creation of a one-stop shop technical assistance service that can support the development of projects is envisaged.
- Increase the knowledge of public authorities about EnPC opportunities
- Promote the standardization of procedures and approaches in order to upscale the implementation of EnPC
- Simplify and standardise regulation; limit changes over time
- Provide easier access to financing
- Increase the amount and quality of energy consumption data available.

- Standardization of the whole process from audit to M&V might increase market confidence and might reduce the transaction costs. Materiality of the information and clear contractual risk allocation might also increase market confidence.

Latvia

4.16.1 Market size and market development

So far EnPC in Latvia has been used in some projects of deep renovation of apartment buildings and in some lighting projects in the tertiary sector. As stated in the JRC-IE report, only five companies were identified as ESCOs offering EnPCs as of 2009, representing a market size of EUR 1–1.5 million (at the moment about EUR 2–3 million/year) (QualitEE 2018g). Today, few projects are using EnPC: about 20–30 EnPC projects are being implemented in the building and lighting sectors with a total investment volume of about EUR 20 million. The recent Energy Efficiency Law has served as a stimulus to energy suppliers to get more interested, and they could potentially use EnPC to fulfil the obligation to save energy on the side of the consumer.

The first energy service or ESCO companies started operating in the area of building renovation. In order to promote the renovation of multi-apartment residential buildings, using ESCO companies, the Building and Energy Conservation Bureau was established. The Bureau's website provides the widest range of information on using energy services[92] (NEEAP 2017e). The energy service company SIA Renesco has already implemented at least 15 projects to renovate multi-apartment residential buildings[93] (NEEAP 2017e). The first EES pilot projects were developed in the Tukums municipality in 2001 in the lighting sector (Boza-Kiss et al. 2017b).

Since 2015, the Latvian ESCO market has experienced a slight increase. This is due to several reasons, including organisational and regulatory ones. Thanks to the H2020 projec‟s "Sunsh”ne" and "Accelerate Sunshine," there is more awareness of ESCOs, and new EnPC concepts including standardisation of documentations, which are being developed. The amendments were made in the regulatory framework: principles of energy service provider and Energy Performance Contracts are integrated in Energy efficiency law allowing them to participate in the multifamily building renovation using the Latvian Baltic Energy Efficiency Fund. An ALTUM competence centre was created, where customers can receive consultations on the preparation of technical documentation.

Taking into account the renovation of multifamily buildings, the potential of the energy services market is estimated at EUR 1-1,2 billion. This can be achieved by renovating 35,000-38,000 multifamily buildings, or approximately 5,000,000 m^2 heated area, and the average specific investment for comprehensive retrofit is 200-250 EUR/m^2.

Table 24. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	🔍	🔍

Supply side

There are approximately 60 companies providing energy supply services, but very few companies are actively offering EnPC (QualitEE 2018g). In 2018, there were 3-6 companies providing and facilitating ESCO or EnPC in Latvia. Several ESCO projects were implemented in the lighting sector in 2017. Most of these projects were implemented by a lighting service company, RCG LightHouse.[94] The company's annual turnover was approximately EUR 0,5M. Additionally, Renesco is currently implementing 15 EnPC based projects in the residential sector. All ESCOs which provide EnPC are small companies up

[92] http://ekubirojs.lv/en/home-eseb/
[93] http://www.renesco.lv/
[94] https://rcg-lighthouse.eu/

to 50 employees. Most of these companies are energy supply companies and consulting firms, energy auditors, other energy specialists. There are also engineering and construction firms and facility management and operation companies acting as ESCOs. The ownership of these companies varies from private international and private national to publicly owned.

Demand side

The main clients of ESCOs are private residential multi-apartment buildings, as well as warehouse and retail buildings which undertake new lighting installation. Recent projects include one with a public-school building and a small EnPC pilot implemented by J"C "State real esta"e."

The main technologies implemented by ESCOs are as follows: building as a whole (including active and passive systems, energy efficiency and RES), ventilation systems, private lighting (retail buildings and warehouses).

The average ESCO/EnPC project volume ranges from less than €200,000 to €200,0–0 - 500,000. Overall, most of EnPC projects in Latvia so far have been implemented in the apartment building sector and are in the investment range of EUR 150,000 to EUR 350,000.

About 88% of EnPC projects in Latvia comprise investments of monetary value of less than EUR 500,000. Most frequently, in 50% of cases the value of project investments is less than EUR 200,000, which is above the EU average (QualitEE 2018g).

The average duration of lighting projects is 3-5 years, whereas projects in multi-family buildings can take up to 20 years. The energy savings of a typical EnPC project is 50 up to 70%.

The most common type of contract used by ESCOs: ESCOs guarantee the savings and take the financial risk. As of today, EnPC projects have been implemented only in the residential sector. RCG Lighthouse has been using EnPC principles for lighting projects in retail buildings and warehouses. In both cases the service provider takes both the financial and technical risk. However, public authorities are in discussions for EnPC model development in the public sector (central government and municipalities), where the client takes the financial risk while the EnPC provider takes the technical risk and guarantees the energy savings.

4.16.2 Policy framework

In 2017, a new Energy Financial Instruments Division was established at the Ministry of Economics, which is going to be responsible for the development of new financing mechanisms for energy efficiency projects (QualitEE 2018g). The newly established division will oversee the development of the EnPC market. Most of the programs that support energy efficiency projects are administrated by ALTUM, a state-owned development finance institution, and CFCA, the Central Finance and Contracting Agency subordinated to the Ministry of Finance of the Republic of Latvia (QualitEE 2018g).

According to QualitEE project, the main principles of EnPC contracts are defined in the Energy Efficiency Law of Latvia. Several initiatives have addressed the ESCO market and contracting. Furthermore, the European Code of Conduct for EnPC has been developed within the project Transparense and tested in several pilot projects. Information on the Code of Conduct for EnPC can be found on the website[95] of the Ministry of Economics of Latvia.

There are several initiatives that provide information on energy service contracts. For instance, ALTUM is a state-owned development finance institution that makes available information about financial tools for ESCOS giving the possibility to participate in the implementation and financing of energy efficiency enhancement measures in multi-

[95] https://www.em.gov.lv/lv/nozares_politika/energoefektivitate_un_siltumapgade/energoefektivitate/energoefektivitates_pakalpojumi/

apartment buildings[96]. The Ministry of Economics provides Information on the best practices for energy performance contracting and cost-benefit analysis using a life cycle approach in the public sector[97]. Moreover, the Latvian government assigned the Latvian Environmental Investment Fund to promote the provision of the ESCO service to local governments. (see also Table 6[98])

4.16.3 Main barriers

The development of the energy services market is impeded by the ambiguity of some legal aspects of service contracts, such as title to the installed equipment, the lack of interest of energy service (district heating) companies in providing energy services, low customer awareness of ESCO possibilities and the absence of positive examples (NEEAP 2017e). The lack of clarity on financial aspects related to ESCO introduction, such as the division of financial savings among stakeholders and the lack of state guarantees for ESCO loans, is another barrier to the growth of the energy services market. Consultations with stakeholders, including the banking sector, on ESCO promotion are underway (NEEAP 2017e).

Other barriers identified by survey participants and (QualitEE 2018g) are the following: subsidy and policy uncertainty, lack of trust from the clients, reluctance to acquire debt, high risk level of financial investment in territories with low economic activity that increases loan interest rates, low energy prices, bankability of the projects and opportunity to rise affordable finance, lack of standardised contracts and M&V practices, public procurement rules that do not support the use of EnPC in the public sector (in the private sector there are no public procurement rules for EnPC projects consequently increasing ESCOs' transaction costs; in the public sector there are no rules, procedures and criteria in place), availability of long-term financing for ESCOs (long-term commercial financing continues to be a major barrier because banks are reluctant to lend against long-term energy efficiency projects; ESCOs, typically small, cannot borrow to further their business), lack of information about and complexity of the concept (both at policy level and at the level of residents/owners).

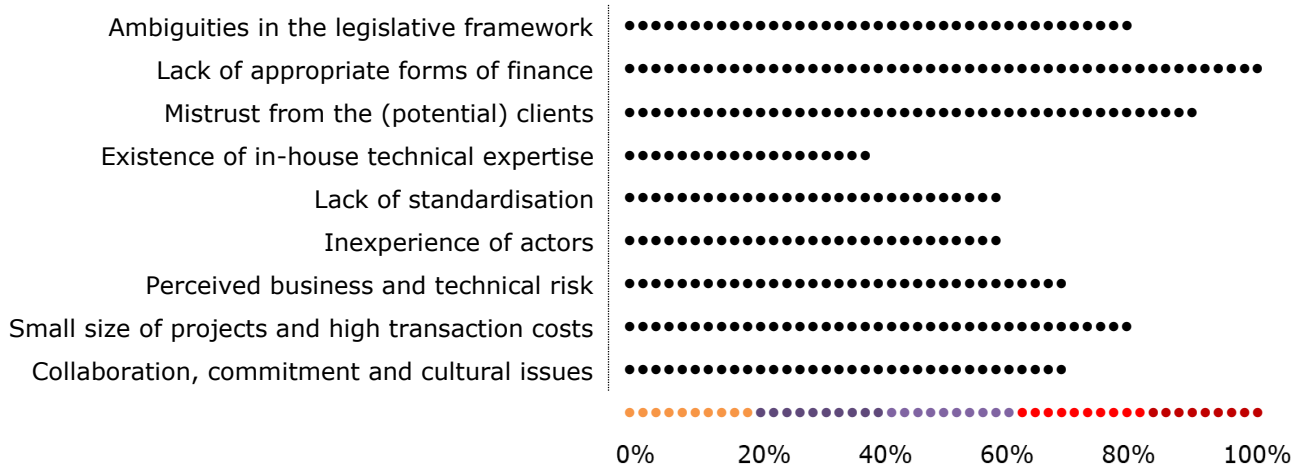

Figure 23. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

Back in 2007-2014, Latvia had a negative experience in creating an EnPC market in the residential sector. This was one of the reasons for the moderate success of the

[96] https://www.altum.lv/lv/pakalpojumi/energoefektivitate/

[97] https://www.em.gov.lv/lv/nozares_politika/energoefektivitate_un_siltumapgade/energoefektivitate/energoefektivitates_pakalpojumi/

[98] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

implementation of the Energy Efficiency Directive Article 18. The negative experience was due to poor communication with the stakeholders involved in the EnPC projects (maintenance companies, municipalities, district heating companies, ministries). Due to the bad communication between these stakeholders and several weak points in the EnPC model, EnPC projects had a bad reputation. Only recently, in 2018, has the EnPC model begun to overcome the barri‟r "the lack of tr”st". The result of this positive effect is the meeting organized by the Ministry of Economics between the Ministry of Finance, the Ministry of Health (discussions ongoing on EnPC pilot in few hospitals), the Ministry of Regional Development and Environmental Protection and the Latvian Environmental Investment Fund. A roundtable was organized by the Ministry of Economics and the EASME. The roundtable showed that there is a huge interest (more than 80 participants) from the market players – banks, investors, potential EnPC providers etc. The aim of this national discussion was to launch a dialogue among the stakeholders on the efforts required to raise more funding for the implementation of energy efficiency projects by defining common goals and possible improvements in current policies and business practices. The roundtable discussion was held on the initiative of the “Sustainable Energy Investment Forums”. Moreover, a positive impact was given by the Energy Efficiency Law which was approved in 2016.

4.16.4 Future perspectives and recommendations

Recommendations to further develop of ESCOs based on the JRC ESCO survey 2018:

- Allow municipalities to take long-term (above 5 years) commitments if the energy efficiency measures are implemented with guarantee.

- Analyse the existing PPP regulation and determine if it is possible that EnPC project could fall under the PPP rules. The 50% threshold can be met only when the depreciated book value of the building without land is used, if the value of the asset is based on the market value then there is no chance to reach the 50% threshold with energy efficiency measures.

- Allow state owned companies and municipalities more easily borrow the financing from State Treasury if the energy efficiency measures are implemented with guarantee. Reduce the bureaucratic procedures.

- Instead of grand support system, better provide loans with lower interest rate. In average 1 % of interest rate is equal to 7-12 % of grant.

Lithuania

4.17.1 Market size and market development

Energy performance contracting and ESCOs is still an emerging field in Lithuania (GuarantEE 2016). In 2014, VIPA[99] and EBRD signed an agreement to support the development of the ESCO Market in Lithuania. Its main goal is to prepare the standardized documents for the EnPC projects and tenders for ESCO energy efficiency projects in Lithuania. The agreement also aims to provide financial, technical and legal support for pilot projects (Poderis 2018).

In 2015, VIPA received 22 applications for financing central government building modernisation projects using ESCO model. 9 applications were approved, and 3 pilot projects have since been initiated (GuarantEE 2016). The on-going pilot projects include different types of buildings: the special investigation service building, an agricultural school, and a vocational training centre (Poderis 2018).

The key parameters of public sector EnPC projects financed by VIPA are as follows (GuarantEE 2016): the average annual energy costs are EUR 22.8 thousand per year (average building area is 2,200 m²); the average guaranteed savings are 50.88%; and average investments are EUR 330,000.

Overall, the ESCO market has been growing very slowly in Lithuania since 2015. Using the ESCO model for building renovation projects is still not popular in Lithuania.

Table 25. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	✗	✗

The typical type of ESCOs in Lithuania are maintenance of buildings companies and technical and heat management companies. The ownership of these companies varies from private international and private national to publicly owned. ESCOs typically offer a wide range of services. The typical ESCO/EnPC clients are public buildings, private commercial buildings and public lighting. The typical technologies, that ESCOs implement are building as a whole (including active and passive systems, energy efficiency and RES), building level heating and heating systems, and automation and control systems. The most common type of contract used by ESCOs are as follows: EnPC with guaranteed savings, EnPC with shared savings and facility management projects.

4.17.2 Policy framework

According to the JRC ESCO survey 2018, the implementation of the provisions of Article 18 of EED refer to the dissemination of information on financial instruments to support energy efficiency service projects (see Table 6[100]).

According to NEEEAP 2017, in the 2017-2020 financing period for public buildings, two financing models are planned to be implemented: The energy service company (ESCO) model or a repayable subsidy. Under the Energy Efficiency Fund, the ESCO model targets two type of sectors: public buildings and modernising street lighting (Minister for Energy of the Republic of Lithuania 2019). To disseminate information, both the Ministry of Energy and the VIPA organize seminars to encourage public building managers to renovate buildings by using the ESCO model. The Energy Efficiency Improvement of

[99] Public Investment Development Agency, www.vipa.lt

[100] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

Public Buildings Program (PBP) was approved by the Government of Lithuania in 2014 to modernize central government public buildings. By using the program, the energy consumption for heating and lighting, and greenhouse gas (CO2) emissions of the public buildings have to be decreased. The implementation of PBP is delegated to the Ministry of Energy and the Ministry of Environment (JRC survey 2018).

As of November 2018, there are no public buildings renovated under the PBP programme. Seeing the low motivation of public institutions to develop projects, the government has introduced the "carrot and stick" principle: in May 2018, PBP was changed to introduce two new elements: 1. the financing model was updated so that every energy efficiency project could get up to 30 percent of repayable assistance (the repayable assistance is provided in a one-stop-shop principle together with the loan from ENEF); 2. obligations regarding public buildings renovation until 2020 were approved for each ministry. However, even with these changes VIPA sees lack of public sector motivation to implement energy efficiency projects for public buildings (Information provided by a national expert).

Register of Legal Acts[101] provide on standard documents for the implementation of the EnPC projects which was approved by Order No 1-221 of the Minister for Energy of the Republic of Lithuania of 23 September 201‘ ('Order No 1-’21'). These documents contain the forms of financial and technical offers, a draft contract and principles for savings calculation. So far, six contracts have been already signed in accordance with the aforementioned documents.

4.17.3 Main barriers

The number of barriers are high, the market is still very immature. Although many barriers are important, some of the most relevant ones are ambiguities in the legislative framework, lack of trust from the (potential) client and inexperience of actors (

Figure 24).

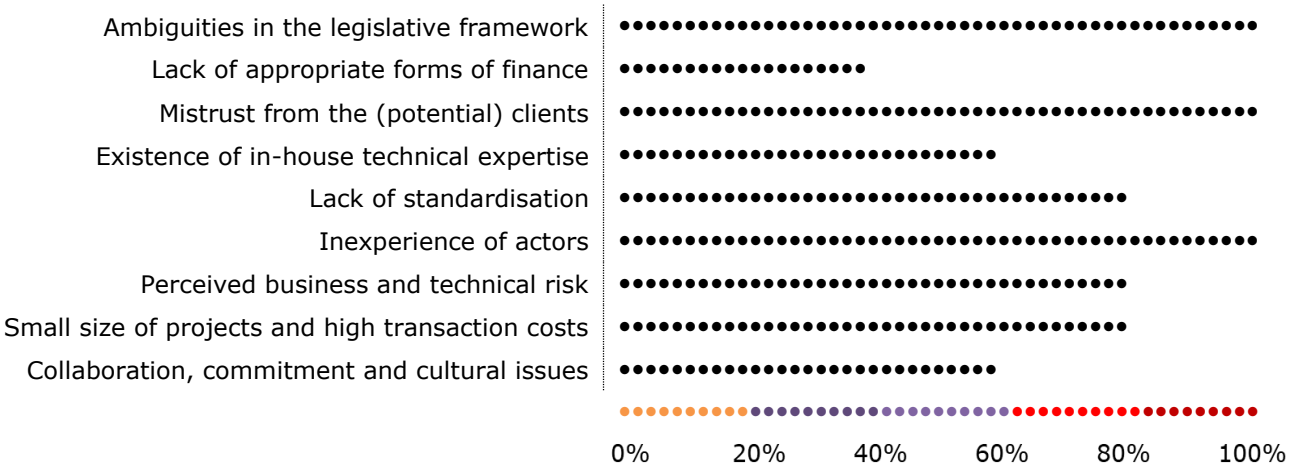

Figure 24. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

[101] www.e-tar.lt

4.17.4 Future perspectives and recommendations

Recommendations to further develop of ESCOs (JRC ESCO survey 2018):

- Obligations regarding public buildings renovation in national legislation;
- Developing market of ESCO facilitators – for the preparation of procurement documents;
- Standardization of procurement documents according to the PPP, Eurostat requirements.

Luxembourg

4.18.1 Market size and market development

The market for energy supply contracting in Luxembourg began to develop in the 1990s, however due to the special geographical location of Luxembourg, the ESCO market is very international. All in all, the country has a mature ESCO market. Over the last 20 years, ESCO projects for cogeneration plants and district heating networks have been implemented in many municipalities, larger buildings and industrial enterprises using energy supply contracting (Ministry of Economy 2017).

The EnPC market is in the developmental phase (Boza-Kiss, Bertoldi, and Economidou 2017). According to NEEAP 2017, the overall potential for development of the energy services market is high. The energy savings obligation scheme should help to tap this potential. Under this scheme, all electricity and gas suppliers are obliged to generate energy savings at end-user level. This obligation will encourage energy suppliers to integrate energy services within their business model by either offering energy services themselves or using the services of third parties (Ministry of Economy 2017).

Table 26. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

4.18.2 Policy framework

A list of ESCOs is not available. According to the NEEAP 2017, due to the immaturity of the market, such a list cannot be established (Ministry of Economy 2017). Instead lists of energy advisors and energy auditors for certification of buildings are published.

Introduction of EEO schemes shall stimulate the development of the Luxembourg market for energy services (Ministry of Economy 2017), although decision about the policy is not yet clear. Electricity and natural gas suppliers are forced by the obligation scheme to review their business model and to make other services, such as energy services, available to end customers to implement energy efficiency measures. Since energy services are not the main economic activity of the suppliers, they are inclined to use independent intermediaries to perform this task.

A model EnPC contract[102] was developed by the Ministry for Development and Infrastructure and myenergy[103], the national energy sector advisory body. This model contract is designed primarily for use in the public sector.

4.18.3 Main barriers

There is not enough information available about the main barriers limiting the Luxembourgers ESCO market development.

4.18.4 Future perspectives and recommendations

Information is very limited about the future perspectives and recommendations related to the ESCO market development in Luxembourg. A key driver was named in the NEEAP 2017, through the introduction of an EEO scheme, which shall encourage the collaboration with third-parties.

[102] http://promotiondusecteur.myenergy.lu/
[103] https://www.myenergy.lu/

Malta

4.19.1 Market size and market development

There are many companies operating in Malta that provide energy services, but energy contracting has not been applied, and there are no ESCOs that operate in Malta (Energy and projects 2017) (Boza-Kiss, Bertoldi, and Economidou 2017).

The possibility to adopt energy service contracts in the public sector by applying energy performance contract has been discussed by the Maltese government. However, due to uncertainty of the effectiveness of this application, no concrete results have materialised. The private sector also had similar experience (Energy and projects 2017).

Table 27. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	✗	✗

4.19.2 Policy framework

There is no intention in Malta to promote the ESCO market due to the specific energy market features. The establishment of an ESCO market is believed to erode the benefits currently accrued from the derogation acquired under the electricity directive Malta (Maltese Authorities, 2014). Information on the providers of various energy services in the building sector is available on the BICC[104] website. (see also Table 6[105])

4.19.3 Main barriers

As mentioned in the previous chapter, the main barriers limiting the ESCO market development in Malta are as follows (Energy and projects 2017):

- structure and ownership of local enterprises,
- availability of alternative sources of finance.

4.19.4 Future perspectives and recommendations

The Energy and Water Agency[106] carried out a public consultation about the development of Energy Performance Contracting in Malta.

- All respondents agreed to a transitory business model, i.e. a contractor is only partly paid for the energy efficiency investment from saved energy cost. However, it was clear from the replies that the possibility of a financial instrument to encourage the investment was required due to a) the limited balance sheet would affect the size of the ESCO investments, b) the small market, and c) that interventions in energy efficiency carry a higher risk associated with efficient and continuous operability.

[104] Building Industry Consultative Council https://bicc.gov.mt/en/Pages/HOME.aspx
[105] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.
[106] https://www.energywateragency.gov.mt/

- Although clauses in agreements can vary making maintenance of investment either solely the responsibility of the ESCO or executed by the ESCO and covered through a maintenance fee, it has to be part of the agreement.

- Standard clauses should be mandatory.

The Netherlands

4.20.1 Market size and market development

According to NEEAP, at the end of 2016, 57 energy performance contracts, 28 in the public and 27 in the private sector were identified. In 2015, the number of EnPC projects was 11, 9 in the public sector and 2 in the private sector (Figure 25).

An estimated size of the overall ESCO market is EUR 90 to 150 million. The estimation was made by selecting 60 projects in 2016 and estimating the average contract value.

According to NEEAP 2017, the extent of the use of ESCO services is on the rise in the Netherlands (Ministry of Economy & Ministry of Interior 2017). The JRC ESCO survey 2018 showed that the ESCO market has slowly increased since 2015, mainly thanks to current and upcoming legislation on energy efficiency measures and energy performance of offices. Banks/financial institutions are promoting energy efficiency measures via Real Estate Finance loans.

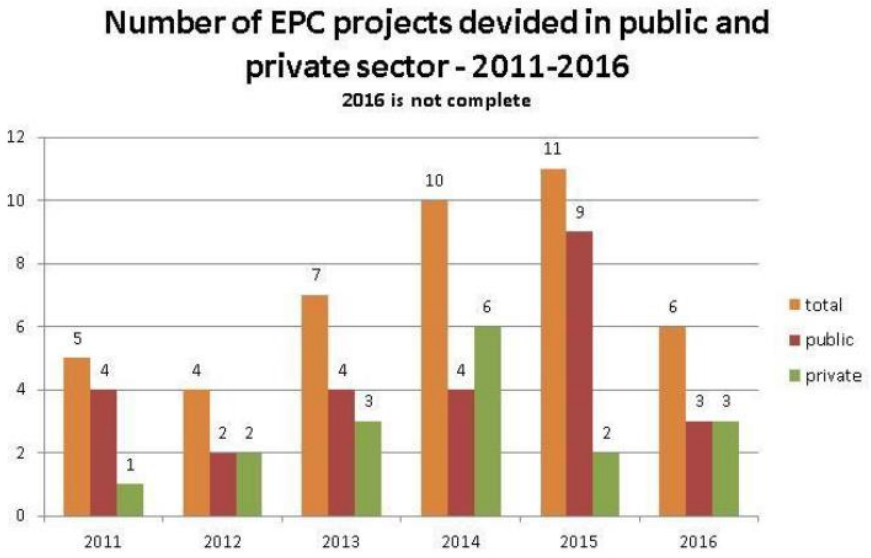

Figure 25. Growth of energy performance contracts (EnPC) in the Netherlands (Ministry of Economy & Ministry of Interior 2017).

Table 28. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	C ✓	✓	🔍	✓

Supply side

Estimates about the number of ESCO companies vary between 25 and 100 providers, of which a minor half are estimated to offer performance based services, including a guarantee (QualitEE 2018m).

The majority of ESCOs operating in the Netherlands are either small companies (up to 50 employees) or medium companies (up to 250 employees). A lot of energy advisors are one-man businesses and SMEs who can do energy services.

ESCOs typically offer a wide range of services. The main type of companies acting as ESCOs are energy supply companies, utilities, and engineering and construction firms,

and facility management and operation companies, as well as equipment supplies and/or installers. The typical ownership of ESCOs in the Netherlands is private national and private international.

Demand side

The typical ESCO clients in the Netherlands are public buildings including hospitals, education buildings and offices followed by commercial office buildings and hotels, and public lighting as well as industry sites and processes. The sport accommodations are also a client of ESCOs. Woningabonnement[107] is one of the initiatives in private residential family buildings. According to QualitEE report, most of the Energy Efficiency Services in the Netherlands are contracted in the public sector, and more specifically in educational buildings sector with office buildings; municipalities are the third most important category (QualitEE 2018m).

The typical technologies implemented by ESCOs are building as a whole (including active and passive systems, energy efficiency and RES), district heating systems and renewable supply. Geothermal energy is often used in the Netherlands. It is a mix of district heating and building level heating.

According to a survey by The Netherlands Enterprise Agency, RVO in 2016, the average size of a typical ESCO project ranges from less than €200,000 to over €5,000,000. The average duration of ESCO projects is between 10 and 15 years. According to QualitEE report, most frequent (in 50% of the cases) are medium-sized EnPC projects with an investment value between €200 000 – €500 000 (QualitEE 2018m). The types of contract used by ESCOs are as follows: EnPC with guaranteed savings (ESCOs guarantee the energy savings, clients take the financial risk), EnPC with shared savings (ESCO and client share the savings, ESCOs take financial risk), contract energy management (chauffage) and facility management project.

4.20.2 Policy framework

According to the JRC ESCO survey 2018, the following elements of the Article 18 were implemented in the Netherlands (see Table 6[108]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings;
- Disseminating information on financial instruments to support energy efficiency service projects.

There are 600 energy service companies operating in the Netherlands; 237 companies are registered as companies that can give energy advice (such as energy certificates), and 501 companies are registered as companies that are certified to install renewable energy. There are 313 personal members of the Association for Energy Advisors.

Netherlands Enterprise Agency (NEA) provides a template for a performance contract, financial structures and possible subsidies[109], and an Awarding of Contracts Guideline (Ministry of Economy & Ministry of Interior 2017). The Sustainable Housing Platform (PDH) has created an online tool that allows contracting parties to easily create a customised energy performance contract. The PDH has also published an infographic with ten tips for contracting authorities and a guideline for energy legislation-compliant offices (Ministry of Economy & Ministry of Interior 2017).

[107] http://www.woningabonnement.nl/

[108] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[109] Companies can use the Energy Investment Allowance (EIA) to invest in energy-efficient technology and durable energy under favorable fiscal conditions.

In 2015, 40 ESCOs signed the Code of Conduct that was developed under the EU Transparense programme.

4.20.3 Main barriers

Figure 26. gives an overview of the barriers limiting ESCO implementation in the Netherlands. The major barriers are small size of projects and high transaction costs and ambiguities in the legislative framework. Other barriers identified by survey correspondents are as follows:

- Lack of knowledge in financial institutions.
- Lack of urgency to energy efficiency in buildings.
- Lack of financial schemes or small subsidies to hire EnPC facilitators.

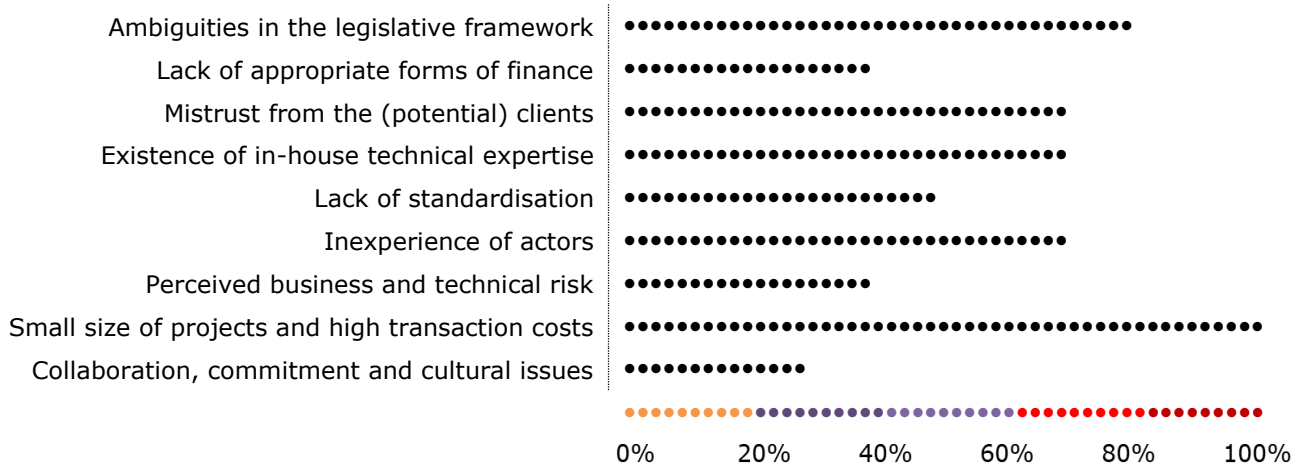

Figure 26. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

QualitEE project identified three barriers which are seen as more important in the Netherlands compared to other project countries (QualitEE 2018m):

- High costs of project development.
- Lack of trust in the ESCO industry.
- Complexity of the concept/lack of information.

4.20.4 Future perspectives and recommendations

The Dutch ESCO market is foreseen to increase significantly in the coming years because the working method fits in with a trend towards further cooperation, not simply tendering on the lowest price, but on the cost-profit ratio and finding and using core competencies (Ministry of Economy & Ministry of Interior 2017).

Key recommendations to further develop of ESCOs are as follows:

- Strict legislation including effective enforcement;
- Improve the knowledge in financial institutions;
- Increase the awareness about the urgency and importance about energy efficiency in buildings;
- Create financial schemes or small subsidies to hire EnPC facilitators.

Poland

4.21.1 Market size and market development

The status of the Polish market for energy services is described in the NEEAP without providing reference to its size and turnover. The majority of services provided by ESCOs in Poland involve advice/audit, energy efficiency in buildings, district heating and cooling, lighting, CHP, energy generation and distribution.

Table 29. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✓	✗	✗	🔍

Figure 27. shows the types of services ESCOs provide. Advice and energy audits are the most popular and most frequently provided services. In most cases, they comprise the preparation of expert reports which define the potential areas for energy savings, as well as recommendations for specific (technical, organisational) solutions, including an estimation of their cost-effectiveness.

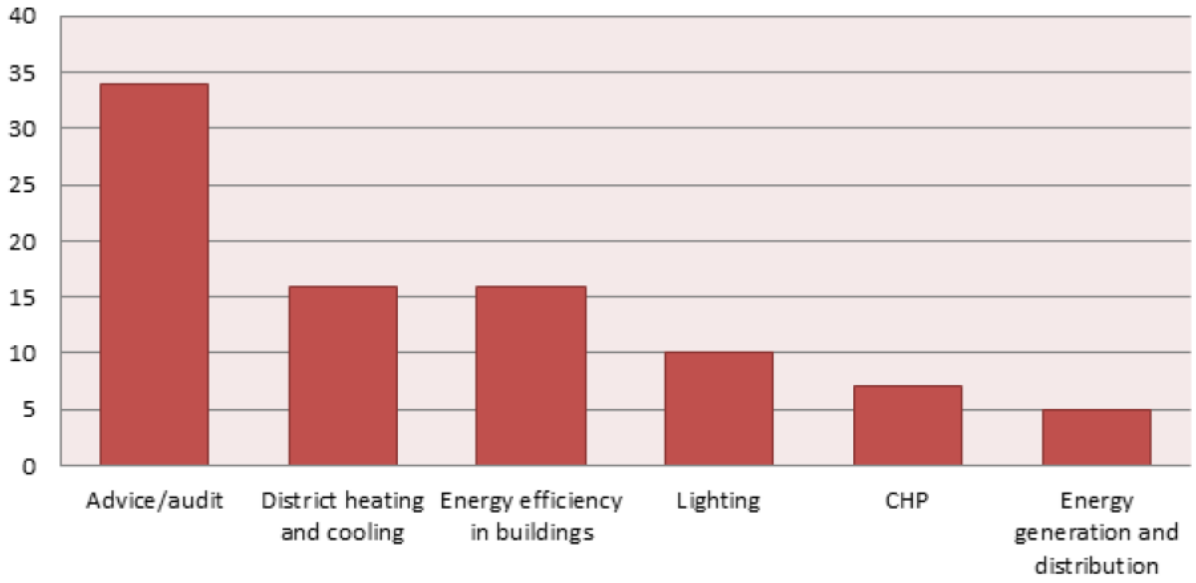

Figure 27. Scope of services provided by Polish ESCOs

Source: NEEAP 2017

ESCOs operate in different sectors and for different clients. Their clients may include the public, commercial, and energy sectors, industry, small and medium-sized enterprises, and even households, which, taken together, represent a significant potential for reducing energy consumption. There are significant opportunities for the development of the ESCO model in the public administration sector. Even though the volume of projects for the public administration sector has declined in recent years, the sector remains one of the key segments of the ESCO market in Poland.

The drivers of the energy services market include dynamic development of energy technologies (including smart grids), the relation of the prices of construction services and materials to prices of energy carriers, the growing energy awareness of end users, and the involvement of non-energy companies, for example telecommunication

operators, in the energy services market. It is expected that energy companies will keep adding new services to their offerings, seemingly not related to their core operations.

4.21.2 Policy framework

In order to support the development of the ESCO market, a guide on energy efficiency funding related to the public sector together with guidance on EnPC[110] has been published online by the Ministry of Energy.[111] The website of the Ministry of Energy also includes a list of ESCOs active on the Polish market.

Relevant legislation has been implemented in order to support the development of the energy services market.

The Energy Efficiency Act of 20 May 2016 requires obliged entities to deliver energy efficiency projects focusing on final energy users, providing that such entities comply with the requirements in place for energy service companies. The Act also allows energy service companies to obtain white certificates following the same procedure applicable to obliged entities, on behalf of other entities in which energy efficiency improvement projects generating cumulative energy savings of at least 10 toe will be delivered.

Another piece of legislation relevant in the context of the implementation of Article 18 of Directive 2012/27/EU is the Act of 19 December 2008 on public-private partnership[112]. This follows from the fact that under the Act public bodies implement energy performance contracts through public-private partnerships they enter into. The Act sets out detailed rules for cooperation between public bodies and private partners (including ESCOs) on the delivery of joint projects.

4.21.3 Main barriers

The Polish ESCO market still suffers from several barriers. Some of these are summarized by

Figure 28. The legal framework is still ambiguous and further review is seen necessary by market actors (JRC survey 2018). Lack of trust is distressing the market due to scarcity of appropriate financing and due to lack of good examples, while information about bad examples. Transaction costs are high as a result. Also, the relatively low energy prices and bottom-up efforts necessary for promotion (no association) increase transaction prices.

[110] Link to the guide on the website of the Ministry of Energy: http://www.me.gov.pl/files/upload/10722/Podrecznik-Sektor_publiczny_OSTATECZNY.pdf

[111] A list of active ESCOs is also published on the Ministry of Energy website.

[112] (Journal of Laws of 2017, item 1834)

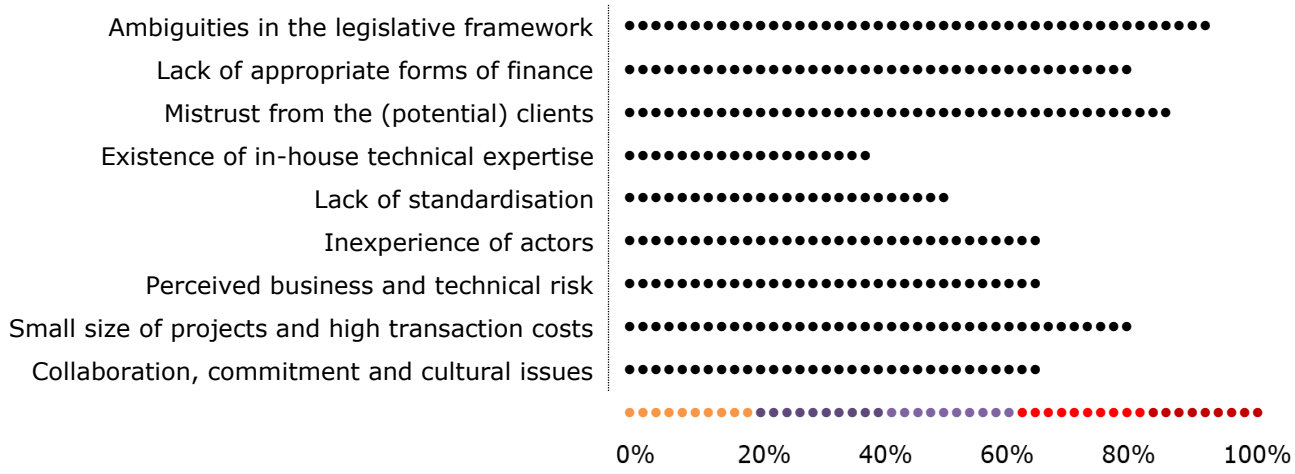

Figure 28. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

4.21.4 Future perspectives and recommendations

The future of the Polish ESCO market was not clearly depicted by respondents to the JRC survey 2018 or by available documents. Efforts are taken at national and at municipal level, while arket actors recommended:

- increasing energy prices (e.g. via CO2 taxes);
- combination of the ESCO solution with EU or national funds to increase depth of intervention;
- clarification of debt consequences of EnPC[113].

[113] The European System of National and Regional Accounts by Eurostat caused confusion in the understanding of public debt (see Boza-Kiss et al. 2017), however this has been clarified in 2018 between Eurostat and the Member States. Yet, some MS have delayed in updating the information locally, which may cause this and similar concerns.

Portugal

4.22.1 Market size and market development

In Portugal, according to the NEEAP, the energy services market has not developed as expected. This is in spite of regulatory efforts and a large-scale ESCO-specific programme started in 2011, the Eco.AP.

There is no official data on the current ESCO market volume. The estimated size of the ESCO market varies from EUR 50 to 100 million in 2017, taking into account investment in efficiency measures.

The ESCO market has experienced a slow increase since 2015. One of the reasons for this development is a lack of financing. Overall, the market was dominated by PV projects. It is easier and safer to invest in renewable projects, even with longer payback periods, than energy efficiency projects. Most industrialists still wait for EU funds to implement efficiency measures.

Table 30. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	🔍	🔍

The market is largely immature. Quality labels have been developed in a preliminary level, e.g. via the Transparense project (a Code of Conduct) and the Investor Confident Project Europe certification.

Supply side

The Portuguese EES market was dominated by about 12-15 providers for some years, including private ESCOs with financial capacity, private small ESCOs, joint ventures and large energy companies through their commercial divisions (QualitEE 2018h).

ESCOs in Portugal typically offer a wide range of services. The main type of companies acting as ESCOs are energy supply companies, utilities, and engineering and construction firms, and facility management and operation companies as well as consulting firms, energy auditors, other energy specialists. The typical ownership of ESCOs in Portugal is private national and private international.

Demand side

The ESCO clients in Portugal are both from the private and public sector. Private sector projects were developing on bottom-up initiatives and on market basis. Public buildings including hospitals, education buildings and offices followed by commercial buildings such as hotels and tourist facilities, and public lighting were initiated by national programs, but the success was limited. In the private sector, the clients came from the retail and leisure and industrial sectors, while in the public sector most clients belonged to municipalities and their health and education sectors (QualitEE 2018h).

The typical technologies implemented by ESCOs are building as a whole (including active and passive systems, energy efficiency and RES), street lighting, and automation and control systems.

The average size of ESCO/EnPC projects is less than €200,000. The average duration of ESCO projects is 7 to 8 years. The most common type of contract used by ESCOs is EnPC with shared savings (ESCO and client share the savings, ESCOs take financial risk) and EnPC with guaranteed savings (ESCOs guarantee the energy savings, clients take the financial risk).

4.22.2 Policy framework

Law No 29/2011 provided rules on how EnPCs should be conducted between the Public Administration and the ESCOs. According to NEEAP 2017, despite regulatory efforts, the energy services market has not developed as hoped. Under the Eco.AP programme there were around ten contracts with an investment of around twenty million euros, all of which in the field of lighting (public and traffic lights) (Council of Ministers, 2017s).

The list of energy services providers in Portugal is published on the website[114]. The Directorate-General of Energy and Geology also publishes a list of companies providing energy services[115]. Information and awareness campaigns are seen as ways to promote this market (Council of Ministers 2017). (see also Table 6[116])

4.22.3 Main barriers

Figure 29. identifies barriers limiting ESCO implementation in Portugal. The main barriers are the small size of projects and high transaction costs, mistrust from the (potential) clients followed by lack of appropriate forms of finance.

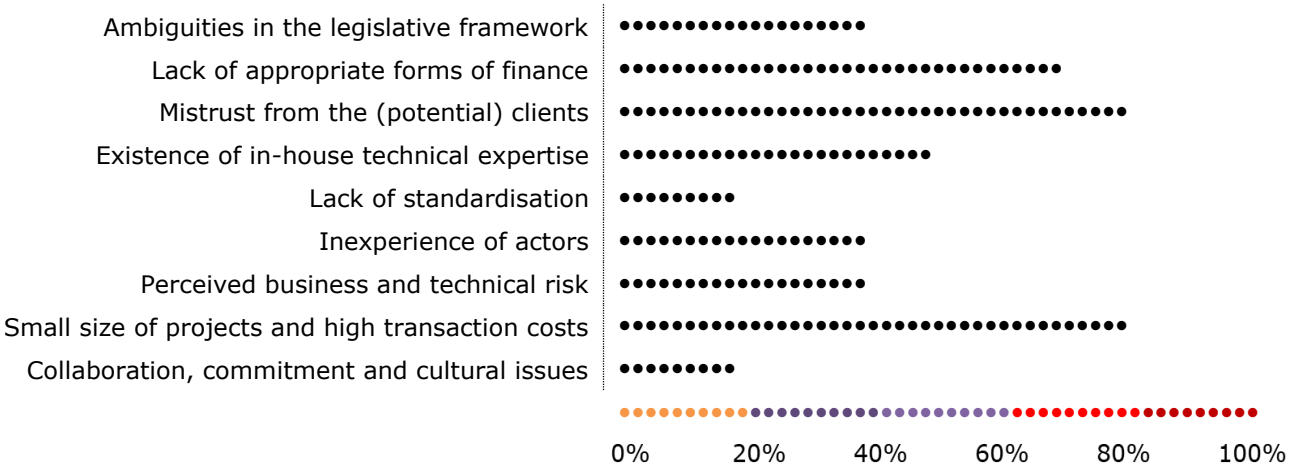

Figure 29. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

According to the JRC survey (2018), the promising ECO.AP is not attractive, especially for ESCOs and for the financial sector, mainly because the public contract framework established does not allow the blocking of funds of public entities for paying off the savings and therefore there are no guaranties for ESCOs and Banks to receive their investments. Moreover, the ECO.AP scheme is too strict for ESCOs. ESCOs feel that the ECO.AP is not a good business for them in the terms is it organized and structured. The ECO.AP framework is too complicated and takes too long.

114 http://www.dgeg.pt/?cn=83098476AAAAAAAAAAAAAAA

115 www.dgeg.gov.pt

116 Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

4.22.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs are as follows:

- Financial assistance, to a wide range of efficiency measures should be permanently open (instead of being driven towards specific types of equipment or sectors (such as "VSD's for motors up to 150kW").

- Redefinition of the ECO.AP programme in order to be more attractive to the ESCO industry.

- Implement financial incentives for the implementation of EnPC.

- Implement a continuous certification scheme for ESCOs based on their performance.

Romania

4.23.1 Market size and market development

There are no official statistics regarding the number of ESCOs operating in Romania. The website of the Romanian Energy Regulatory Authority (ANRE) lists 13 active companies, as part of the National List of Signatories of European Code of Conduct for Energy Performance Contracting. Currently, the Romanian ESCOs Companies Association (ESCOROM) has only 7 members (companies), 6 of which are active, while another one is in the process of leaving the Association and ESCO activity. According to the members of ESCOROM, the total turnover of ESCOs in 2017 was EUR 47 million.

The ESCO market in Romania has increased slowly since 2015. This increase is only due to the contracts concluded between private entities. In Romania, there is no ESCO market for the public sector. National legislation on contracting ESCOs for the public domain has resulted in public entities avoiding the use of this energy efficiency financing mechanism. During 2015-2016, there were two pilot projects for contracting ESCO services (for public buildings) in two cities (totalling around EUR 2 million), but they have not been finalized. Currently, ESCO services work in the private field and involve activities in energy efficiency and energy management services for industrial and commercial segments. It is expected that a framework contract model on energy performance contracting will be completed soon, unlocking the ESCO market in the public sector.

In May 2018, ANRE initiated the consultation process at the level of a Working Group (named GL ESCO), with a view to disseminating the issues regarding the clarification of the necessary legislative framework for the functioning of ESCOs in Romania by identifying the main legal/administrative barriers on the implementation of the Energy Performance Contract (EnPC) in the public sector, as well as the establishment of legal solutions for overcoming them. A draft contract (EnPC) focused on public lighting has been developed, which is currently under discussions with the ESCO WG members.

Table 31. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				n/a

Supply side

Most of the ESCOs in Romania are small size companies (up to 50 employees). The main type of companies acting as ESCOs are energy supply companies, utilities, facility management and operation companies, as well as consulting firms, energy auditors, other energy specialists. ESCOs typically offer a wide range of services. These companies are mostly performing soft projects (preparation, consultancy, energy audits, strategies, studies etc.).

A European pilot project is currently being developed in Bucharest (implementation of energy efficiency measures for residential blocks), where ESCO's role is taken over by the local administrative authority (the City Hall of District 6).

Demand side

The typical ESCO clients in Romania are public buildings including hospitals, education and cultural buildings and offices followed by commercial office buildings and hotels as well as public lighting.

The main technologies that ESCOs implements are district heating systems, co-generation, building as a whole (including active and passive systems, energy efficiency and RES) and street lighting (to roll-out the LED technology).

The average energy savings of a typical ESCO project vary from 20% to 40% of baseline consumption; in absolute terms, the energy savings vary from 1000 to 2000 MWh/project/year. The average energy savings depend on the type of project and the measures being implemented. In order to recover the investment, the energy savings cannot be less than 30% (in the case of buildings). In the case of public lighting, savings are between 40% and 50%.

4.23.2 Policy framework

Law No. 121/2014 on Energy Efficiency is the framework legal document of the Romanian ESCO market, transposing the Energy Efficiency Directive into Romanian Law. The practical application of the Law has not been worked out. For example, EnPC is defined by the Law in Chapter I, Art. 4, para. 12., which is a word by word translation of the EED definition, and is not practical for business use. Other rules, such as the Fiscal Code, the Public Procurement Law do not reflect the admissibility of ESCOs in e.g. public tenders. Furthermore, the provisions of the Law remain general and are not appropriate to address the main barriers to market development. To counteract the problem, a working group was established in 2017 to prepare the amendment of the Law 121, but the result is not known.

A list of ESCOs is available on the site of the European Code of Conduct for EnPC[117]. This was established in 2015 by ARPEE and ESCOROM as co-administrators under an EU project (Transparence).

Also, on the website of the energy regulator (www.anre.ro), a list[118] of the energy service companies agreed by ANRE is available.

4.23.3 Main barriers

The main barrier on ESCO market development for public sector is related to the current legislative framework (the gaps on the public finance law, as well as the gaps on public acquisition legal framework) which don't provide situations compatible with the ESCO's operating principle.

Also, one of the relevant barriers limiting ESCO development in Romania is the banking system and their low level of awareness of the ESCO activities, inadequate risk analysis procedures and the banks' lack of interest in the energy sector. Other barriers are reflected by the figure below (

Figure 30):

[117] http://www.anre.ro/ro/eficienta-energetica/informatii-de-interes-public/lista-companiilor-de-servicii-energetice

[118] https://portal.anre.ro/PublicLists/ListeEficienta/PrestatoriServiciiPJEF

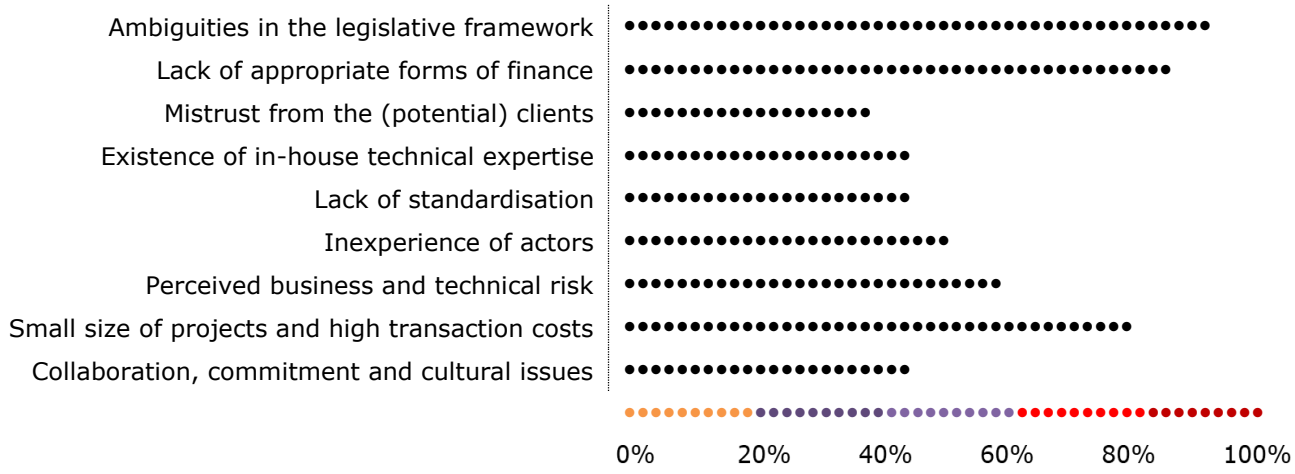

Figure 30. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

In order to overcome the identified barriers and to facilitate the opening of ESCO market for public administration, a series of events were organized by the Sustainable Energy Investment Forums in Bucharest on February 1st October 11th 2018 and June 6th, 2019)[119].

4.23.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs are as follows:

- Crediting rules of the banks;
- Fiscal rules specifically for ESCO and Services;
- EnPC framework template;
- Energy Efficiency Investment Fund;
- The Public Finance Act – inclusion of the ESCO mechanism: creating a budget line for ESCO payment and mentioning payments in (equal) instalments – at the level of the local public authority accounting system;
- The Procurement Law - adaptation to the selection criteria of an ESCO;
- Development and implementation at national level of a general EnPC framework, to be applicable in the public sector;
- ESCO facilitators (to facilitate the relationships and communication between authorities/policy makers, service providers and service beneficiaries);
- Introduction of a carbon tax;
- Dissemination of the success stories from other EU countries where the ESCO market is operational.

[119] The material is accessible at https://ec.europa.eu/energy/en/topics/energy-efficiency/financing-energy-efficiency/sustainable-energy-investment-forums/second-roundtable-finance-energy-efficiency-romania-6-june-2019-bucharest-romania

Slovakia

4.24.1 Market size and market development

The energy services market in Slovakia is increasing in the ESC section. Most of the projects cover central heating refurbishments, and heat delivery to public buildings and offices. The performance of the projects is also growing (Figure 31).

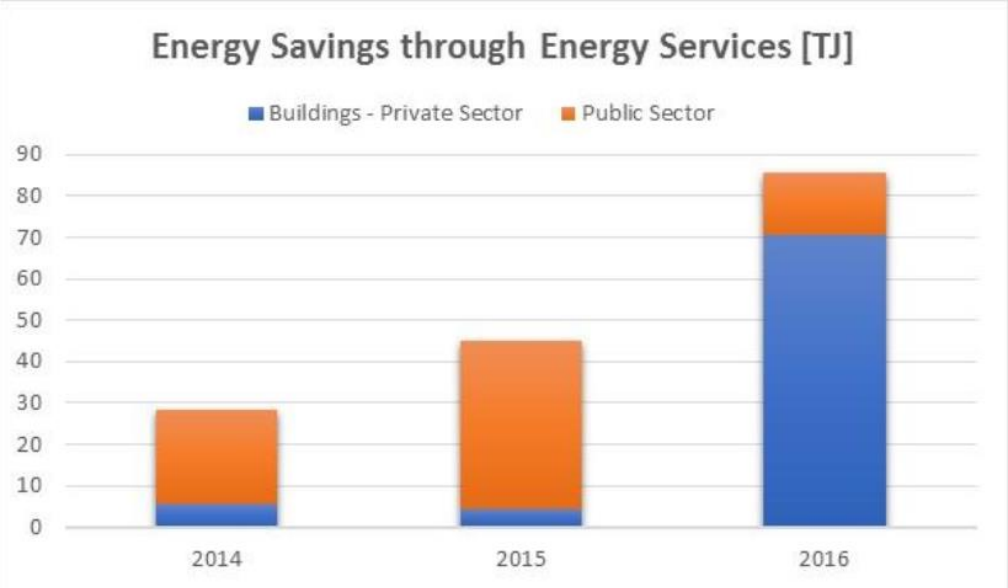

Figure 31. Energy savings realized since 2014 in Slovakia with the help of energy services.

Source: draft Slovak NEEAP 2017-2019 in (Lauko 2018)

The EnPC market is moderately developed, with ca. eight ESCOs with projects (of the about 20-50 potential ESCOs). The market was reported as growing already in 2016, and since then. There are 10 EnPC providers (of the 15-20 potential ones), with around 40-50 projects during 2014-16 (Boza-Kiss and Bertoldi 2018), and around 30 more since 2016 (Lauko 2018).

Table 32. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	🔍	✓	✓

Companies – besides traditional energy saving measures – also install new innovative technologies or carry out interesting projects, e.g. installation of water-water heat pump system for the Bratislava National Football Stadium. There are also examples of going beyond traditional energy utilities and safeguarding water efficiency, too. According to market actors, such services are bankable in Slovakia on a commercial basis also in new residential and non-residential buildings.(Boza-Kiss and Bertoldi 2018)

Yet, according to the Slovak NEEAP, ESCO activity has been largely limited to the public sector.

Guaranteed energy services would have represented only about 1.6% of the financing of EE investments monitored over 2014-2016. The Slovak NEEAP points out that this may be because the legislative framework supporting these services is recent (end of 2014).

The data about energy services in buildings indeed show an increase from 4 TJ/y reported in 2015 to 71 TJ/y for 2016 (provisional figure). However, this amount remains limited (4%) compared to the total savings monitored for buildings in 2016 (1660 TJ/y). In addition, about new annual savings of 78 TJ/y were achieved from energy services in the public sector over 2014-2016. The plans for 2017-2020 then seem very conservative for buildings with new savings of about 27 TJ/y and more optimistic for the public sector with about 209 TJ/y.

Energy service providers are required to send data on energy services provided in the previous calendar year to the energy efficiency monitoring system.

Table 33 Energy savings achieved via energy services

Energy savings (TJ) via energy services	2014	2015	2016
Provision of energy services in the buildings sector	5.67	4.22	70.61
Provision of energy services in the public sector	22.64	40.64	14.93

4.24.2 Policy framework

All provisions of Article 18 of the EED is have been implemented Information on energy performance can be also found in the Energy Efficiency Action Plan[120].

The central legal element of the ESCO market is Act No 321/2014 on energy efficiency, which introduced a basic system for the provision of energy services, the concept of a person professionally competent to provide a guaranteed energy service, the content of an energy efficiency contract for the public sector, and information obligations for the Slovak Innovation and Energy Agency. Other regulators and informational barriers were also removed in recent years. The Energy Efficiency Act provides the definition of energy services and defined mandatory content for contracts in the public sector. The Act also introduced a qualification scheme for service providers and the obligation for energy service providers to send data to the monitoring system (MSEE) about the energy services they provided.

The Slovak Ministry of the Economy published and regularly updates the list of energy services providers, as required by the EED[121]. Information on model contracts is published on the websites of the Slovak Innovation and Energy Agency[122] and the Association of Energy Service Providers[123] together with other relevant market information, in particular, practical information on options to use energy performance contracting, ways of financing projects, and project risks.

The Slovak Innovation and Energy Agency provides support for the development of energy services' markets, including training for providers of services.

There is also information on exemplary energy performance contracting projects. Recommendations for the public sector also feature as part of the Slovak Innovation and Energy Agency's free advice[124].

Recommendations for producing an energy audit for a public building that can be used to receive funding from the Quality of Environment Operational Programme are provided[125].

4.24.3 Main barriers

[120] www.mhsr.sk
[121] http://www.mhsr.sk/energetika/energeticka-efektivnost/poskytovanie-energetickej-sluzby
[122] http://www.siea.sk/clanky-legislativa/c-10693/zakon-c-321-2014-z-z-energeticke-sluzby/
[123] http://www.apes-sk.eu/co-je-epc/definicia-epc/vzorova-zmluva/
[124] http://www.siea.sk/bezplatne-poradenstvo/
[125] http://www.siea.sk/aktuality/c-8910/odporucania-na-spracovanie-energetickeho-auditu-verejnej-budovy

According to the Slovak NEEAP main barriers limiting the development of energy services in Slovakia are as follows (see also

Figure 32):

- low awareness about guaranteed energy services,
- low trust shown towards providers of guaranteed energy services, and
- insufficient basic regulatory framework.

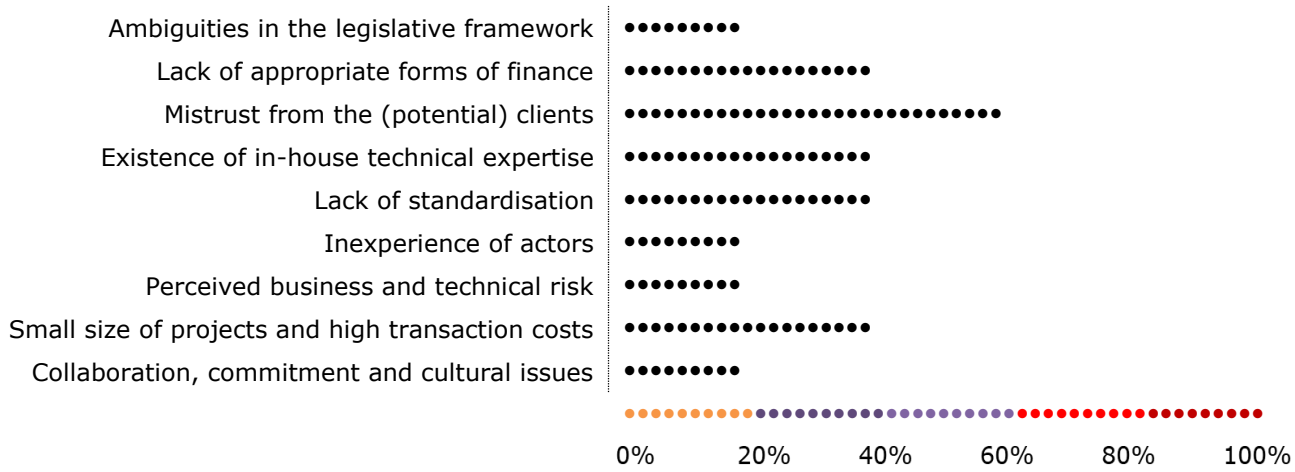

Figure 32. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

As shown above, several key barriers (mainly legal and regulatory) were removed by Act No 321/2014 on energy efficiency. However, barriers related to financing and financial mechanisms remain, partly due to the "competition" with grant schemes (e.g., due to the long time needed for the application to EU funds, during which project holders are reluctant to consider other options), as described in the Slovak NEEAP 2017.

Slovenia[126]

4.25.1 Market size and market development

A short description of the energy services market and the use of EnPC is provided in the Slovenian NEEAP (Government of Slovenia 2017). Based on this, energy contracting plays a crucial role in the energy renovation of buildings in the public sector, and EnPC is successfully implemented in Slovenia.

The Slovenian ESCO market has been on a consistent growth curve since 2012, with a major expansion between 2016 and 2018. The size of the ESCO market is estimated to be around EUR 50 million. The EnPC market in the public sector was calculated to be EUR 23.38 million in 2017 (total value of realized projects in that year, excluding energy costs), growing to EUR 25.01 million as of September 2018. In comparison, energy efficient public procurement amounted to EUR 12.35 million in 2017, and EUR 7.29 million as of September in 2018 (JRC 2018 survey).

Table 34. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
				

Supply side

An official list of energy efficiency service providers is not available in Slovenia. Nevertheless, the market is small enough for the market players to be able to map key participants (Staničić 2018). As of 2018, there were 10 companies that provide energy services, of which 4 are EnPC providers (JRC 2018 survey). This shows that the market is still somewhat supply deprived. Furthermore, there are EnPC facilitators that assist market actors to identify and design projects.

Facilitators in Slovenia are considered to be one of crucial conditions for the past and further national EnPC and ESC market development. The role of facilitators is especially important for smaller public administrations. There are five project facilitators in Slovenia, and only one of them can be considered highly experienced.

[126] *This chapter is kindly co-authored by Damir Staničić (Jozef Stefan Institute, Energy Efficiency Centre).*

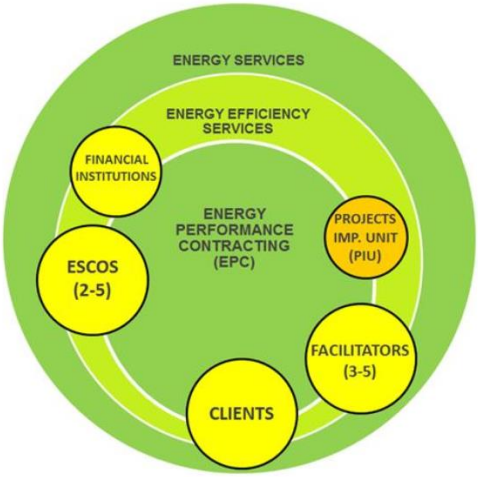

Figure 33. Market map of the Slovenian EnPC market (Staničić 2018).

The majority of the energy service companies (60%) are medium sized (up to 250 employees), and about 40% of them are large (above 250 employees). These ratios are 75%-25% respectively for EnPC providers. These companies are all national private companies and their profiles include engineering firms, consulting companies, and equipment producers/suppliers. They are focused on energy service provision with guaranteed savings (ESCOs guarantee the energy savings, clients take the financial risk).

Typical EnPC projects have a capital outlay of between EUR 0.7 and EUR 5 million. EnPC projects are in average 15 years-long, and EnPC is used even as part of deep energy renovation of buildings. Financing of these EnPC projects is combined from using the EnPC provider's financing up to more than 50% of the investment cost, client's own funds up to 9%, and a grant of maximum 40% depending on the measures and the achieved savings.

The projects typically achieve 60% energy savings (JRC survey 2018).

The EnPC providers take over investment and operation risk. Mainly IT supported operation, measurement and verification processes are used.

Demand side

Energy services and EnPC is most prominently used by public buildings (office buildings, schools, kindergartens, elderly care homes, etc.) and street lighting, mainly due to public clients lack of own capital for EE investments and public buildings energy renovation programme deploying innovative business models to attract private finance. It is estimated that 90% of the EnPC/ESC projects are implemented in the public sector.

In the private sector, mostly industrial clients implement lighting and combined heat and power (CHP) projects. These projects are not well known, because they are not advertised, because they are carried out on a cost-saving level. Some extremely successful energy efficient lighting projects were reported beside the ESC CHP projects supported through the feed-in tariff scheme, but information is limited, probably subject to confidentiality agreements. It is estimated that the sector's EnPC market potential lies in horizontal energy efficiency measures and renewable energy sources (Green EPC) and not in specific technological processes (Staničić 2018).

Buildings in commercial sector have lower EnPC implementing potential compared to the public sector as the commercial clients don't consider energy costs a priority yet (Staničić 2018).

4.25.2 Policy framework

The requirements of the EED Article 18 and Annex XIII are fully transposed into Slovenian law (Government of Slovenia, 2017).

The Slovenian market has successfully implemented the following provisions of Article 18 of the EED (see Table 6[127]):

- Disseminating information on available energy service contracts which provide guaranteed energy savings
- Disseminating information on financial instruments to support energy efficiency service projects
- Providing model contracts for EnPC
- Providing information on best practices energy performance contracting
- Remove the regulatory and non-regulatory barriers that impede the uptake of EnPC and other ESCO services

The following provisions, while implemented, need more attention:

- Encouraging the development of quality labels for ESCOs or their services
- Providing information about the current and future development of the energy services market
- Enabling independent market intermediaries (e.g. EnPC or procurement facilitators, one-stop shops) to play a role in stimulating market development.

In Slovenia, the contractual provision of energy savings is carried out in accordance with the existing Public-Private Partnership Act (Zakon o javno-zasebnem partnerstvu – ZJZP), which is under revision. The revised Law will clarify the difference between contractual forms (concessions, public-private partnerships and public procurement), and will make it easier to implement public-private partnerships. At the same time, simplification of procedure is expected to speed up and reduce costs for both public and private partners.

The significant increase in the number of EnPC projects occurred within the framework of the energy efficiency obligation scheme (EEO) between 2012 and 2014. The advancement of EnPC in the public sector in the last few years has been driven by the success of public buildings deep energy renovation scheme in Ljubljana and other municipalities.

Information and guidelines, as well as model documents have been instrumental. For the purpose of informing stakeholders about energy renovation and contractual provision of savings, the Ministry of Infrastructure has set up a project office, which publishes all documentation (instructions, guidelines, sample documents, public calls for tender and calls to promoters, etc.) necessary for the preparation and implementation of projects related to energy renovation and contractual provision of savings on its website.

Public guidelines for the implementation of energy efficiency improvement measures in public buildings using EPC was published in 2014. This was updated in 2016 by the Project Office for the energy renovation of buildings[128]. Model contracts for EnPC in the public sector are provided and updated in line with the latest Eurostat Guidelines.

Financing of public EnPC projects in the last years' boom has been based on a combination of own, internal funds, the internal finds of the EnPC provider and up to 40% cohesion grant financing (Government of Slovenia 2017). An optimal set of financial products has been created to ensure the establishment of a comprehensive

[127] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[128] All available at http://www.energetika-portal.si/podrocja/energetika/energetska-prenova-javnih-stavb/projektna-pisarna/

support environment for the EnPC. Financial instruments[129] were first identified (DSEPS amendments, EEFIG report[130]), which allow risk sharing (guarantee scheme), refinancing of investments (buyback of receivables, purchase of green bonds), financing of less profitable investments (state ESCO) and providing start-up capital for the creation of new energy companies services (capital injections).

Besides direct and indirect financial instruments, EnPC technical assistance is performed through the ELENA Fund and involves mainly local energy agencies as projects facilitators. The market was facilitated through demonstration projects, and as of 2018, the large-scale application in Ljubljana has been replicated across the country.

The NEEAP published in 2017 and the Long-term Strategy for Mobilising Investments in the Energy Renovation of Building Stock (2015) provide a strategic background for EnPC application.

Pilot projects of NZEB renovation of a multi-apartment buildings are carried out with the help of the model of EnPC.

A system for the qualification of EnPC providers and facilitators, as well as project quality assurance system are under development, following the example of developed EnPC markets (Germany, Czech Republic, Austria).

Education and training of energy renovation professionals also dealing with EnPC projects has been improved.

4.25.3 Main barriers

As seen above, the Slovenian ESC and EnPC market has been supported by a large set of factors, including legal, regulatory, information and especially information and technical assistance.

In 2018, ESCO market players identified three key barriers (Staničić 2018) for the guaranteed savings market: lack of trust in the ESCO industry, complex book-keeping rules and administrative barriers in public sector. Financing is – for the moment – not a problem, because of the support from the Cohesion Funds and ELENA. For the wider energy services market low energy prices and the complexity of the concept were identified as critical barriers.

A national programme to support operation of greater number of facilitators, in order to help to generate clients demand and increase number of implemented EnPC and ESC projects, is still lacking. Subsidizing of some EES project preparation costs, for example cost of energy audit performed by facilitator, could speed up preparation of EnPC/ESC projects pipelines in the public sector, and reduce transaction costs.

[129] The financial instruments identified in this Action Plan do not relate to instruments that are defined in Article 7 of the Market in Financial Instruments Act (UL RS No 108/10 – official consolidated text, 78/11, 55/12, 105/12 – ZBan-1J, 63/13 – ZS-K, 30/16 and 9/17).

[130] Energy Efficiency Financial Institutions Group ('EEFIG') Final Report covering Buildings, Industry and SMEs: Energy Efficiency—the first fuel for the EU Economy; How to drive new finance for energy efficiency investments, February 2015.

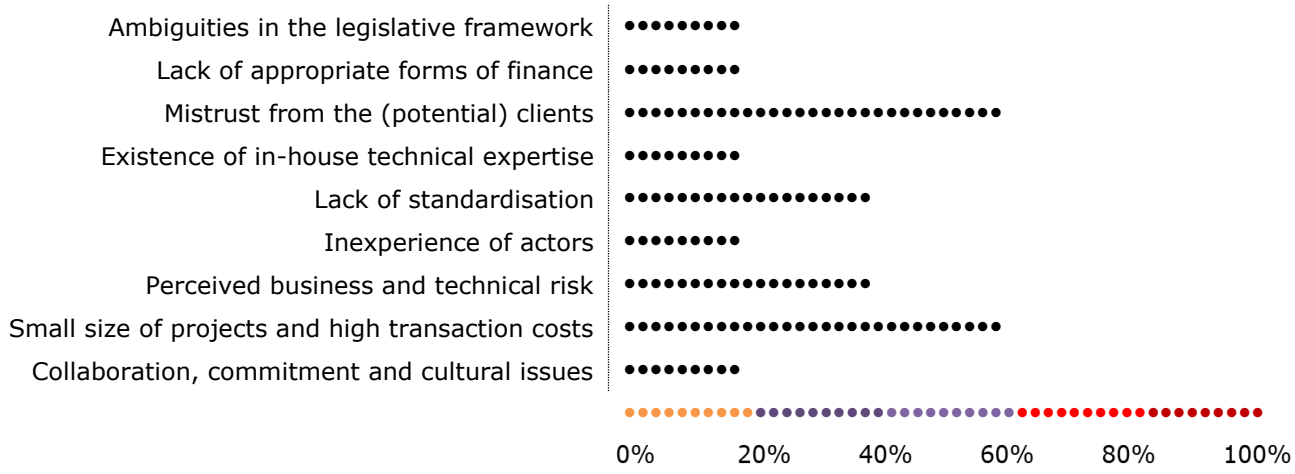

Figure 34. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

There is not ESCO association in Slovenia, which is explained by the small number of market players and easy communication among them anyway.

4.25.4 Future perspectives and recommendations

Energy services in Slovenia have today and in the near future a critical role to play. Energy contracting is a key model of a comprehensive energy renovation of buildings in the public sector until 2020 based on the NEEAP and current experiences.

The EnPC sector is foreseen to develop further, although the rate of increase may halt or drastically slow down due to the saturation of public projects. The Government plans to focus on the energy renovation of residential buildings more, and the applicability of EnPC is being explored as of early 2019, with an anticipation that other instruments may be more suitable. Key factors for future outlook :

More attention is given now on the development of financial instruments for mobilising investments in the deep energy renovation of private residential buildings, and plans are under preparation as of 2018 to cover the next financing period.

Furthermore, the introduction of energy efficiency services Quality Assurance Scheme and Facilitators Scheme is expected to engage the energy services offers with a wider client scale.

Spain

4.26.1 Market size and market development

There is no official information on the current size of the overall ESCO market in Spain. The Association of Maintenance Companies (AMI), which is one of the biggest ESCO associations in Spain, estimates the size of the ESCO market for 2018 at app. EUR 1.5 billion. Another ESCO association, ANESE, estimated the current size of the ESCO market at 1 billion Euros. The value refers to the entire Spanish market (public and private) and involves 70 Spanish ESCOs.

According to almost 80% of our survey correspondents, the ESCO market has seen a slow increase since 2015. One of the main drivers for this trend is the increase of energy prices. Electricity prices in Spain have increased by approximately 33% over the last two years, resulting in a pressure to reduce energy costs. According to ANESE's Observatory, energy services in Spain are driven by the final client using ESCOs to renovate the buildings through EnPC.

Table 35. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	✓	🔍	✓

Barriers that hinder market growth include the lack of promotion and encouragement by Public Bodies, the lack of successful case examples, and financing conditions not good enough for ESCOs.

Supply side

According to IDAE (Institute for Energy Diversification and Savings)[131], there are currently 1,238 companies registered as ESCOs in Spain (QualitEE 2018j). The figure below shows the number of energy providers by regions. Madrid and Andalusia account for almost half of the total number of companies.

[131] http://www.idae.es/empresas/servicios-energeticos

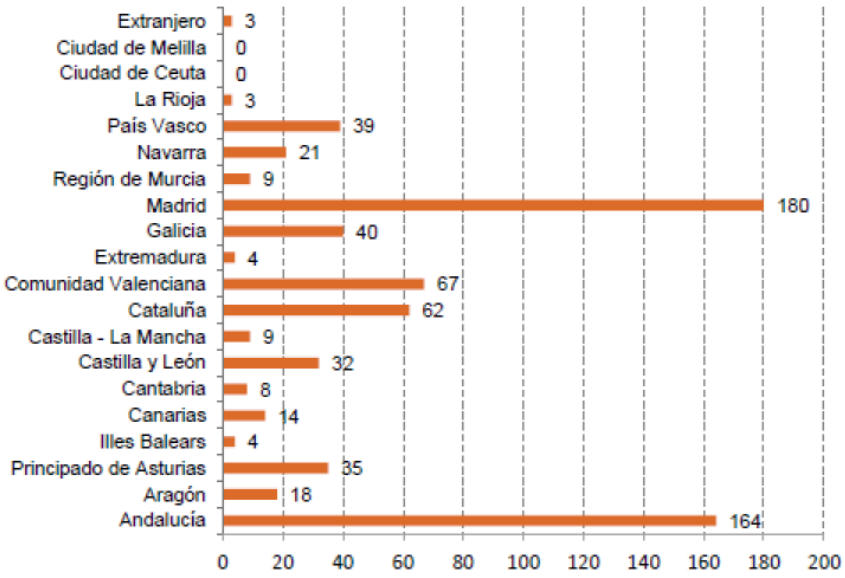

Figure 35. Number of energy service providers, by region in Spain

(Ministry of Energy 2017b)

However, while many of these companies consider themselves to be ESCOs, they are only manufacturers, consultants or financial companies. They do not invest in energy performance, as is required from an EnPC service company or an ESCO. Our survey shows that there are 25 companies that invest in new equipment for ensuring energy savings in Spain.

According to ESCO association, ANESE, there are 96 companies acting as ESCOs in Spain. 48% of these companies are small size companies (up to 50 employees). 29% of investigated ESCOs are medium size companies (up to 250 employees) and 23% large size companies (above 250 employees).

In contrast to ANESE's data about the typical size of ESCOs, another ESCO association, AMI, indicates that 90% of all ESCO members of the association are large companies (above 250 employees).

ESCO activities in Spain include engineering, installation or assembling (QualitEE 2018j). The type of companies which act as ESCOs are as follows: energy supply companies, utilities, facility maintenance companies, and engineering and construction firms, and facility management and operation companies, and automation, control and equipment manufacturers, and equipment supplies and/or installers, and consulting firms, energy auditors, other energy specialists as well as Issuers of energy performance certificates. These companies are typically either private national or private international companies.

Over the last five years, distributors and installers of renewable technologies (solar thermal and biomass mainly) have become ESCOs, seeking to diversify their activities and become more competitive in the market (QualitEE 2018j).

According to ANESE's Observatory of Spanish ESCOs Market,[132] ESCOs typically offer a wide range of services. However, almost 23% of Spanish ESCOs only offer guaranteed energy performance or ESCO services.

[132] http://www.anese.es/observatorio/

Demand side

The typical ESCO clients in Spain are public buildings including hospitals, education buildings and offices followed by commercial office buildings and hotels, and public lighting as well as industry sites and processes. According to QualitEE report, ESCOs have increased their activities on the public administration and private sector business niches in Spain in recent years (QualitEE 2018j).

The typical technologies implemented by ESCOs are building level heating and heating systems, industrial processes, horizontal technologies, motor systems and street lighting. A research published by ENERAGEN on the EnPC projects tendering processes[133] within the public sector from 2009 to 2014, shows that among the total of projects, 45% are dedicated to public lighting and all of these have a municipal scope. The other technologies tendered are renovation of buildings, both lighting and renovation of buildings and installation of biomass (QualitEE 2018j).

According to ANESE's Observatory of Spanish ESCOs Market, the average size of Spanish ESCO/EnPC projects is 433.132 €. The average duration of ESCO projects is 7.8 years. The most common type of contract used by ESCOs is EnPC with shared savings (ESCO and client share the savings, ESCOs take financial risk). According to estimation of AMI and ADHAC (the Spanish Association of District Heating ESCOs), the average contract duration of ESCO projects range from 10 to 15 years. The average size of ESCO/EnPC projects might vary from 500,000 to 5000,000 Euros. The types of contract used by ESCOs are as follows: EnPC with shared savings (ESCO and client share the savings, ESCOs take financial risk), Build-own-operate-transfer (BOOT) and Contract energy management (chauffage).

According to ANESE's Observatory, the average energy savings of a typical ESCO project is 35,86 % of baseline consumption. An estimation of AMI shows that 25% of energy savings can be achieved in buildings and up to 75% in the public lighting.

4.26.2 Policy framework

According to the JRC ESCO survey 2018, the following elements of the Article 18 were successful implemented in Spain (see Table 6[134]):

- Disseminating information on available energy service contracts that provide guaranteed energy savings
- Encouraging the development of quality labels for ESCOs or their services
- Providing model contracts for EnPC
- Providing information on best practices energy performance contracting
- Remove the regulatory and non-regulatory barriers that impede the uptake of EnPC and other ESCO services.

The Spanish NEEAP provides an overview of the 3 types of measures to promote the energy services: legislative, economic support and promotion measures (the NEEAP 2017 of Spain (Ministry of Energy 2017b)). Royal Decree-Law 6/2010 provides a definition of Energy service companies. The definition complies exactly with the definition given in Directive 2006/32/EC. More recently, Law 8/2013 defines the criteria of financing the investments in energy efficiency measures with the energy saved. In terms of economic support of energy service market, there exist the following funds and programmes:

- The JESSICA fund[135]

[133] http://www.famp.es/export/sites/famp/.galleries/documentos-lab-eficiencia-energetica/DOCUMENTO-21.pdf

[134] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

- Programme PAREER dedicated to building renovation[136]

- The programmes BIOMCASA II, GEOTCASA, SOLCASA and GIT are assumed to have also objective to promote Energy Service Companies and foment heating and cooling systems that use biomass, solar energy or geothermal energy through project financing[137]

To promote Energy Services, IDAE provides information on financial instruments, incentives and loans to support projects developed by ESCOs[138]. National associations of energy service companies also provide information on energy service. There are three energy service associations; AMI[139] (Asociación de Empresas de Mantenimiento Integral y Servicios Energéticos, ANESE[140] (Asociación Nacional de Empresas de Servicios Energéticos), A3e[141] (Asociación de Empresas de Eficiencia Energética.

4.26.3 Main barriers

Figure 36. details the relevant barriers limiting ESCO implementation in Spain. The major barriers are the small size of projects and high transaction costs, mistrust from the (potential) clients followed by a lack of appropriate forms of finance.

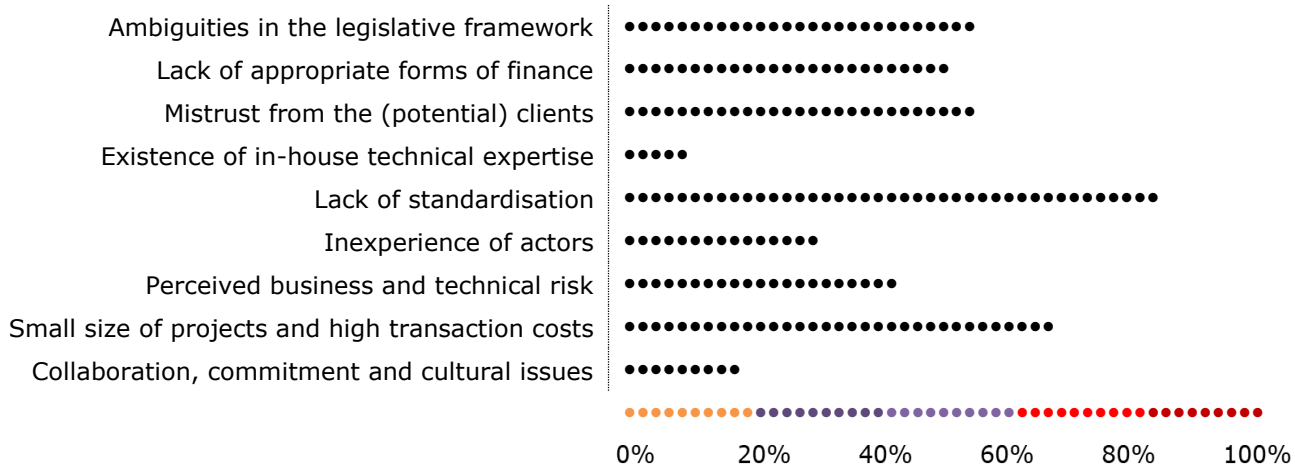

Figure 36. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

Other barriers identified by the survey respondents are as follows:

- The Spanish Government created a group to prepare EnPC models in accordance with the new accounting guidelines by Eurostat. However, the new government has stopped the works.

- Lack of standardisation of EnPCs models.

- Ambiguities are explained by the organizational structure of Spain, with different autonomous communities that have their own laws. In bidding processes, each

135 http://www.idae.es/ayudas-y-financiacion/fondo-jessica-fidae
136 http://www.idae.es/ayudas-y-financiacion/programa-de-ayudas-para-la-rehabilitacion-energetica-de-edificios-existentes
137 http://www.idae.es/index.php/idpag.33/relcategoria.1024/relmenu.377/mod.pags/mem.detalle
138 http://www.idae.es/index.php/idpag.33/relcategoria.1024/relmenu.377/mod.pags/mem.detalle
139 http://www.amiasociacion.es/
140 http://www.anese.es/
141 http://www.asociacion3e.org/

regional Government applies its own regulation with particularities that difficult the competitiveness of the national market.

4.26.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs are as follows:

- Create a white certificate scheme.
- Link energy savings to tax advantages.
- Implement a Guarantee Fund to ESCO projects.
- Prepare and publish EnPC models (buildings) for public procurements.
- Use the Spanish national energy saving fund to promote EnPCs.
- Creation of a National Guarantee Fund for EnPC projects.
- Assistance program for SMEs for the execution of energy audits and the implementation of identified energy efficiency measures.

Sweden

4.27.1 Market size and market development

According to NEEAP 2017 and survey correspondents, there is currently a lack of knowledge about the market size of energy service and ESCOs in Sweden. The average volume of energy service procured in the public sector amounts to SEK 40 million a year (EUR 3.792 million[142]). This is an estimated volume from the period 2006-2011 and is likely a substantial underestimation of the real numbers (NEEAP 2017f). In the 2006-2011 period, the volume of energy services procured in the public sector more than tripled. Most of the procurements of energy services are related to properties, 15% of procurements were in transport and 8% were in organization (NEEAP 2017f).

According to our survey estimation, the overall ESCO/EnPC market has been decreasing rapidly since 2015. The main reason for this development is the lack of long-term experience of the early EnPC projects, especially those implemented in the early 2000, and related consequences. The lack of experience of these projects stops new projects from being implemented. Another reason for the decrease of the market is the lack of trust from the customers.

Table 36. Selected indicators of maturity of the market.
Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✗	✗	✗	✗	n/a

An estimation found in the survey shows that there are 10-15 energy utilities and four private companies (Siemens, Schneider, Caverion and Rejlers) providing energy services including EnPC projects. Typically, these companies are private national, private international or public owned companies offering a wide range of services.

The typical ESCO clients in Sweden are public buildings including hospitals, education buildings and offices, followed by public lighting and industry sites, as well as privately owned multi-apartment houses.

The typical technologies implemented by ESCOs are building as a whole (including active and passive systems, energy efficiency and RES), building level heating and heating systems, and automation and control systems. The average size of investment of ESCO/EnPC project varies from EUR 200 thousand to EUR 5 million. The average duration of ESCO projects is 8 years. The types of contract used by ESCOs in Sweden are EnPC with guaranteed savings and EnPC with shared savings.

4.27.2 Policy framework

Swedish Energy Agency is responsible for dissemination of information about energy service market (the NEEAP 2017 of Sweden (NEEAP 2017f)). The information is provided on the Agency's website[143]. There are several projects and programmes being jointly financed with the EU's Structural Funds programme. These programmes support SMEs by offering information on energy services and participation in energy efficiency networks. The Swedish Energy Agency and the Swedish National Agency for Public Procurement provide information for the public sector concerning both energy services and life-cycle costs [144],[145]. (see also Table 6[146])

[142] EUR 1 = SEK 10.5003, ECD euro reference exchange rate from 2 March 2019. Available at: https://www.ecb.europa.eu/stats/policy_and_exchange_rates/euro_reference_exchange_rates/html/eurofxref-graph-sek.en.html
[143] http://www.energimyndigheten.se/energieffektivisering/foretag-och-organisationer/energitjanster/
[144] http://www.upphandlingsmyndigheten.se/omraden/energi-och-klimat/

4.27.3 Main barriers

Figure 37. details the relevant barriers limiting ESCO implementation in Sweden. The major barriers are mistrust from the (potential) clients, collaboration, commitment and cultural issues, and perceived business and technical risk.

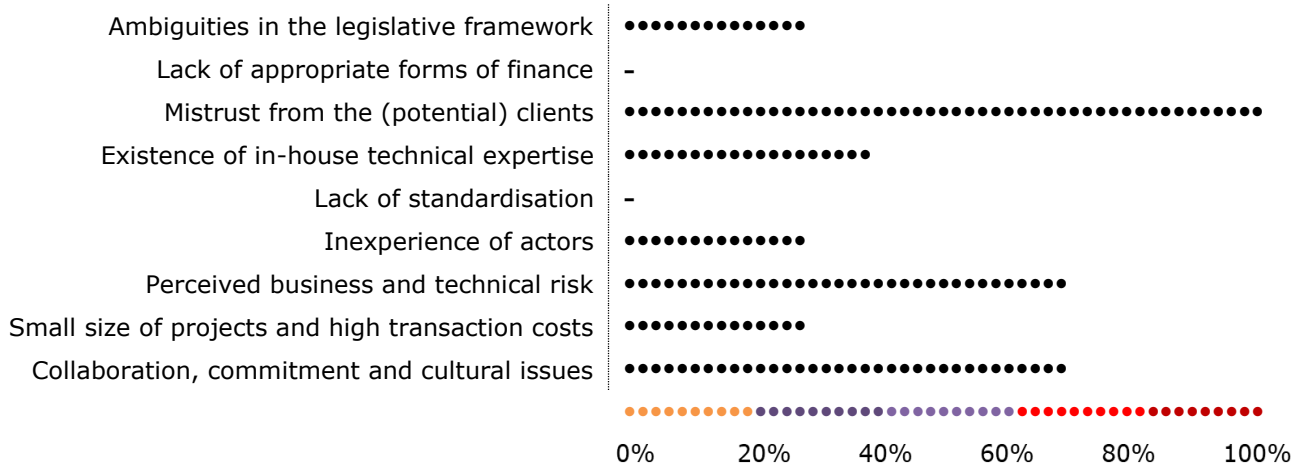

Figure 37. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5

According to NEEAP 2017, the main barriers limiting further development are the rules for the procurement procedure and legislation on municipal energy companies' activities. The legislation on municipal energy companies' activities is mainly criticised by municipally-owned companies. Other barriers identified by operators are low demand and lack of expertise and project management at clients. Several of these issues are due to the fact that clients and suppliers do not share the same goals and vision in the project[147] (cited in (NEEAP 2017f).

4.27.4 Future perspectives and recommendations

The most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market to further develop of ESCOs are as follows:

- Create trust between ESCOs and public sector to restart the energy service market in Sweden.
- Help building owners/industries describe their "needs" as input to develop a service that they want to buy instead of the entrepreneurs developing a service on their own.
- Develop Certification of Energy Service companies to increase trust.

[145] http://www.upphandlingsmyndigheten.se/omraden/lcc/lcc-kalkyler/

[146] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

[147] The Swedish Energy Agency – "Energitjänster i Sverige. Statusrapport för tjänster för energieffektivisering" [Energy Services in Sweden. A status report for energy efficiency services] ER 2013:22

United Kingdom

4.28.1 Market size and market development

The energy service market in the United Kingdom started in 1960 with the introduction of the "Contract energy Management" model. This model is still used today and is often characterized as "taking over the boiler house," meaning that an outsourced company operate onsite heat/steam generation assess. In the 1980s, the EPC model was introduced. (Nolden, Sorrell, and Polzin 2016) cited in (QualitEE 2018l).

According to a Navigant Research estimation, the total annual energy efficiency service market in the United Kingdom was £349 million in 2017 (Navigant Research 2017) cited in (BEIS 2018). The UK non-domestic energy efficiency market size, taking into account the total volume of public sector energy service contracts (capital projects), is estimated to be £161 million per year (BEIS 2018). QualitEE project survey estimated the market size for EPC to be EUR 108.3 million (QualitEE 2018l).

50% of UK respondents to the QualitEE project's survey believe that the local market for EPC has experienced 'slight growth' in the last 12 months (QualitEE 2018l). This development was largely driven by successful public procurement frameworks. All our survey experts agree that the ESCO market in the United Kingdom has increased slowly since 2015. The BEIS research found that the market is growing slowly in the public sector, driven by public sector procurement frameworks (e.g. refit) (BEIS 2018). Recently, the government included a related policy statement in its Clean Growth Strategy (2017): "The Government will work with stakeholders to improve the market for energy services, building confidence across commercial and industrial customers." A policy consultation is currently underway.[148]

Table 37. Selected indicators of maturity of the market.

Note: The indicators are explained in section 2.4.

Association	Facilitators	Demand-drive	Quality labels	Monitoring, verification
✓	✓	🔍	✓	✓

According to NEEAP, the energy services market in the United Kingdom continues to develop as a route for organisations to implement energy efficiency projects and has been driven through action taken by both government and industry. The market for energy performance contracts is most developed in the public sector, in part driven by procurement frameworks for energy performance contracts. The NAAEP also states that the Trade bodies have also played a role in the market's development. The Energy Services and Technology Association (ESTA) Energy Performance Contracting Group (EPCG) is dedicated to support the EnPC market and the Energy Managers Association (EMA) also provide support and are the Code Administrators for the European Code of Conduct for Energy Performance Contracting.

Supply side

A study provided by (BEIS 2018) shows that the total number of companies offering energy efficiency service in the UK is 136. The UK market for energy service companies is divided into the following sub-categories: ESCOs, ESCOs specifically offering EnPCs, Equipment suppliers and consultants. The study also identified 29 organisations that provide facilitation and intermediation, as well as organisations providing specialist

148 https://www.gov.uk/government/consultations/helping-businesses-to-improve-the-way-they-use-energy-call-for-evidence

finance. The table below reflects the breakdown of the companies offering energy efficiency services.

Table 38. Classification of companies in the United Kingdom offering energy efficiency services (BEIS 2018).

Type of service offered	Number
ESCOs	32
ESCOs specifically offering EnPCs	30
Equipment suppliers	28
Consultants	46
Organisations who provide facilitation and intermediation	14
Organisations who provide specialist finance	15

Most ESCOs operating in the United Kingdom are small- and medium-size companies. SME companies successful in the United Kingdom (Breathe & Ameresco) are offshoots of large US firms.

ESCOs typically offer a wide range of services. The main type of companies acting as ESCOs are energy supply companies, utilities, and engineering and construction firms, and facility management and operation companies as well as consulting firms, energy auditors, other energy specialists. The typical ownership of ESCOs in the United Kingdom is private national and private international.

Demand side

A study resulting from an interview provided by (BEIS 2018) shows that the customers are commercial clients, commercial sector and public sector. Six out of 15 ESCOs said their clients were mainly public sector, and nearly all ESCOs said their customer base included commercial clients, whilst seven said they had clients in the industrial sector (BEIS 2018). Key clients for EnPC are public sector organisations, as identified by the QualitEE report (QualitEE 2018l). As our survey results show, public buildings including hospitals, education facilities (schools, kindergardens, universities) and offices (owned e.g. by municipalities) are the main ESCO clients, followed by commercial buildings and industry sites and processes.

The key technologies implemented by ESCOs are building as a whole (including active and passive systems, energy efficiency and RES), co-generation and lighting including street lighting, and internal and external building lighting.

The BEIS research referred that the average size of investments is above found minimum size of £1m (BEIS 2018). The majority of the QualitEE project survey participants correspond that EnPC providers and facilitators in the United Kingdom are mainly involved in higher value EnPC projects worth at least 1,000,000 EUR or more (QualitEE 2018l). The average duration of ESCO projects varies from 8 to 10 years depending on the project type. Many public sector EnPCs use Salix finance,[149] which requires an 8-year payback.

[149] Salix Finance Ltd. Provides interest-free Government funding to the public sector to improve their energy efficiency, reduce carbon emissions and lower energy bills. https://www.salixfinance.co.uk/

4.28.2 Policy framework

According to the JRC survey 2018, the following elements of the Article 18 are implemented in the United Kingdom (see Table 6[150]):

- Providing model contracts for EnPC;
- Enabling independent market intermediaries (e.g. EnPC or procurement facilitators, one-stop shops) to play a role in stimulating market development.

ESCO projects and market has been promoted thanks to the Energy Efficiency Directive (Art. 18), financial incentives, taxation / rebates and voluntary agreements. Many of the actions have been carried out by Government but are not well known about or used by the market. Public procurement framework has been encouraged by the Government. and have been successful thanks to market intermediaries acting as facilitators typically focussing their efforts up to the point of contract signature. There is not an established market for "one stop" private EnPC facilitators although consultants in different areas - energy auditing, legal, commercial, procurement, independent M&V specialise in EnPC and are used by clients and ESCOs as required (survey expert information based on (QualitEE 2018l)).

European Regional Development Fund (ERDF) contributed by developing ESCO market by providing technical/commercial assistance e.g. REFIT London, MLEI Cambridgeshire. Public Procurement Frameworks such as REFIT, CEF, NDEE & Essentia have also an impact on the ESCO market development in the United Kingdom.

According to NEEAP 2017, the market for energy performance contracts is most developed in the public sector, in part driven by procurement frameworks for energy performance contracts. The government provided Model Energy Performance Contract, accompanying guidance notes and a guide to best practices for the public sector which is available at the governmental website (here)

The Green Investment Bank, which was set up by the government to accelerate the UK's transition to a greener economy, has supported the development of the market, by investing in energy efficiency projects and developing financing products for project developers including energy service companies (NEEAP 2017a).

4.28.3 Main barriers

Figure 38. details relevant barriers limiting ESCO implementation in the United Kingdom. The major barriers are mistrust from the (potential) clients, and small size of projects and high transaction costs.

UK EnPC providers and facilitators in the QualitEE project selected 'Lack of trust in the ESCO industry' and 'Complexity of the concept / Lack of information' as the two key barriers to EnPC business (QualitEE 2018l).

[150] Note that the information and views in this assessment are solely based on own research data (JRC survey 2018) and document analysis carried out by the authors, and do not necessarily reflect the official opinion of the Member States or of the European Commission. See more on methods in Section 1.2.

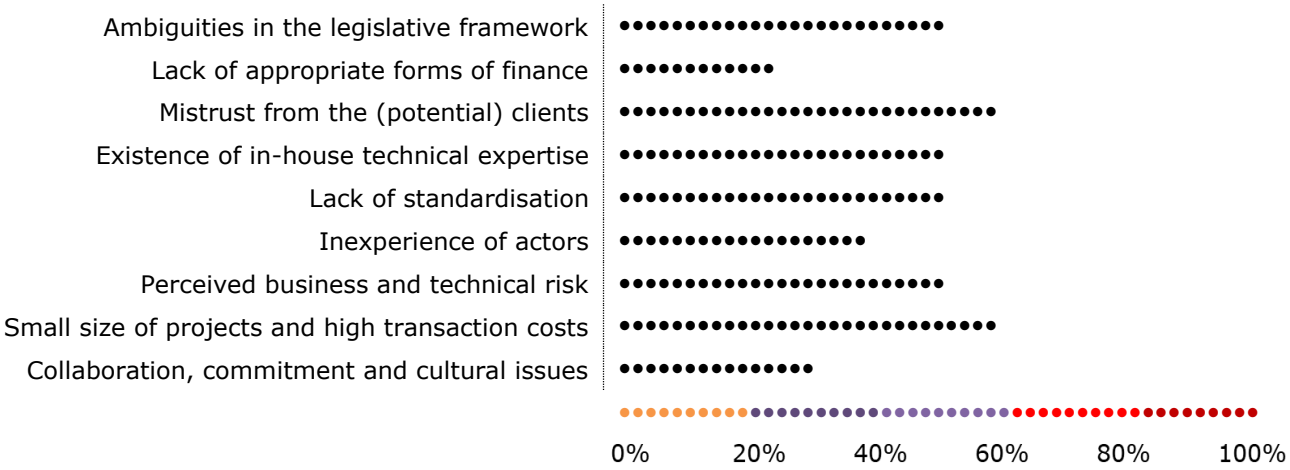

Figure 38. The relevance of main barriers that limit ESCO implementation.

Note: 100% = all respondents and sources indicate this as a major barrier on a scale of 5.

4.28.4 Future perspectives and recommendations

The most important recommendations relevant to the development of the ESCO market are (JRC survey 2018, QualitEE 2018l):

- Implementation of a quality assurance scheme for EnPC;
- Extend the benefits of public procurement frameworks to private sector end users;
- Provide clarity (on a national level) regarding financing for EnPC and cases in which off-balance sheet treatment can be achieved.
- Energy Savings guarantees should allow the transfer of technical, performance and financial risks to those that have more capacity to evaluate and manage them.
- Increasing energy prices in particular for supply contracting relate to the protection that supply contracts and power purchase agreements can provide from energy price volatility.
- With the complexity of technical and economic analysis for complex systems such as heat networks, combined heat and power and renewables, this would be expected to be a key driver.

6 Annex II. – Questionnaire

The text of the questionnaire that was used in the JRC online survey (JRC 2018) is found below. The questionnaire link[151] was sent out to around 200 contacts by email, and it was distributed through social media (LinkedIn and Facebook).

EUROPEAN COMMISSION
JOINT RESEARCH CENTRE

Directorate C - Energy, Transport and Climate
Energy Efficiency & Renewables Unit

European ESCO Market Questionnaire 2018

The **European Commission, JRC** regularly publishes an Energy Services Market Report (see here). In preparation of the 2018 update, we are collecting information about the development of the ESCO markets in the Member States.

To this end, I hope you are willing to share with us your knowledge of your national Energy Services market or ESCO/EPC market through the below survey. The information and data provided will be **solely used for research purposes to prepare a public report and will not be shared or published**. Only aggregated data will be published. These reports are targeted at policy makers and the European ESCO market players and are available for free.

Thank you and best regards:

Paolo Bertoldi

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Fax. +39 0332 78 5869

EMAIL: paolo.bertoldi@ec.europa.eu

[151] https://e3p.jrc.ec.europa.eu/node/636

Introduction

In this survey we will ask questions about the status of the energy services market and/or the ESCO market for your own country. We kindly ask you to answer to the best of your knowledge, based on your experience, using market information or simply your estimates. Whenever possible, indicate the confidence level of the data provided and/or please send us the source research or source document.

This survey consists of two parts, **Energy Services Market and ESCO Market**. We would appreciate information on both markets.

Note that we use the following definitions in this survey:

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.

ESCO (Energy Service Company): Unlike other energy service providers, equipment providers or facility managers, ESCOs share or take over the customer's technical and/or financial risk of the project. An ESCO covers the technical risk by guaranteeing the energy savings, which can lower the cost of financing. The ESCO and the client can also split the technical risk in accordance with a pre-arranged percentage by introducing a shared savings scheme in the contract. The remuneration of the ESCO is directly tied to the energy savings achieved. Depending on the resources of the ESCO and on the market demand, ESCOs may finance projects themselves or assist in the arrangement of project financing by means of providing performance guarantees. We understand here Energy Performance Contracting (EPC) to be offered by ESCOs.

EPC (Energy Performance Contracting): 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.

Affiliation type, country and personal information

What is your affiliation type? Please select all that best describes you. <You can select more than one answer>

☐ ESCO (a company whose core activity is providing ESCO services).
- ☐ Private ESCO
- ☐ Public ESCO
- ☐ PPP ESCO
- ☐ Other, please specify,_____ <free text>

☐ Other company, which offers ESCO solutions among others (eg. construction company, engineering enterprise, equipment manufacturer, real estate company, architect, etc.)
- ☐ Private
- ☐ Public
- ☐ PPP

☐ Utility
☐ Governmental organization
☐ Intergovernmental organization
☐ Financial institution
☐ Consultant
☐ Academic/research
☐ ESCO facilitator

☐ Other, please specify _____

Country of relevance: Please select from the list the country for which you can provide information.

Choose an item.

Personal information. Please provide the following personal data so that we can contact you for follow-up and to share the report with you when ready. You can indicate your privacy requirements below.

Name: Click here to enter text.

Affiliation: Click here to enter text.

Email: Click here to enter text.

Country Click here to enter text.

Protection of your personal data

Privacy options

- ◉ You agree that we list your name and affiliation in the acknowledgement section of the report. Please note that email will not be disclosed nor published. Also note that statements will not be linked to names.
- ○ You do not agree to indicating your name in the report or elsewhere in any format.

*Privacy Statement DPO 2758:
See https://e3p.jrc.ec.europa.eu/node/636 the following link and the document on "Privacy Statement"

Section on Energy Service Markets

1.1. What is the current size of the overall energy services market in your country?

<If possible, express this value in EUR, for 2017, referring to the total value of realized energy services per year, excluding the costs of energy (i.e. value of energy efficiency and /or RES investment, energy audits, service costs, etc.). Please, provide an estimate even if research based data is not available.>

Click here to enter text.

Comments:

Provide information about the value indicated. For example specify

1) the year the data refers to, unless 2017.

2) if the value given is not (fully) the total value of realized energy services per year, excluding the costs of energy, then what does it cover more precisely?

3) does the value refer to the whole market or a segment of it?

4) what is the source of the information (survey, research, estimate, expert opinion, etc.)

1.2. How many companies provide and offer energy services in your country as of 2018? (Those that have had projects running in or shortly before 2018). Insert a number:

Click here to enter text.

Add any comment if you have:

1.3. How many of the active energy service providers are small, medium or large companies:

	% share of energy service market
Small (up to 50 employees)	
Medium (up to 250 employees)	
Large (above 250 employees)	

Add any comment if you have:

1.4. What types of companies provide energy services in your country? Choose as many as relevant.

☐ Energy supply companies, utilities

☐ Engineering and construction firms

☐ Facility management and operation companies

☐ Automation, control and equipment manufacturers

☐ Equipment supplies and/or installers

☐ Consulting firms, energy auditors, other energy specialists

☐ Issuers of energy performance certificates

☐ other, please, specify Click here to enter text.

Add any comment if you have:

1.5. How has the energy services market changed since 2015?

- ◉ Decreasing fast
- ○ Decreasing slowly
- ○ Stable
- ○ Increasing slowly
- ○ Increasing fast

Add any comment if you have:

1.6. Why does this change take place? What factors influence the change primarily? Explain legal, regulatory, organisational, financial, economic, social framework reasons.

Click here to enter text.

Section on ESCO markets

1.1. What is the current size of the overall ESCO market in your country?

<If possible, express this value in EUR, for 2017, referring to the total value of realized energy services per year, excluding the costs of energy (i.e. value of energy efficiency and /or RES investment, energy audits, service costs, etc.). Please, provide an estimate even if research based data is not available.>

Click here to enter text.

Comments:

Provide information about the value indicated. For example specify

1) the year the data refers to, unless 2017.

2) if the value given is not (fully) the total value of realized energy services per year, excluding the costs of energy, then what does it cover more precisely?

3) does the value refer to the whole market or a segment of it?

4) what is the source of the information (survey, research, estimate, expert opinion, etc.)

1.2. How many companies provide and offer ESCO or EPC in your country as of 2018? (Those that have had projects running in or shortly before 2018). Insert a number:

Click here to enter text.

Add any comment if you have:

1.3. How many of the active ESCO/EPC providers are small, medium or large companies:

	% share of energy service market
Small (up to 50 employees)	
Medium (up to 250 employees)	
Large (above 250 employees)	

Add any comment if you have:

1.4. What types of companies provide energy services in your country? Choose as many as relevant.

☐ Energy supply companies, utilities

☐ Engineering and construction firms

☐ Facility management and operation companies

☐ Automation, control and equipment manufacturers

☐ Equipment supplies and/or installers

☐ Consulting firms, energy auditors, other energy specialists

☐ Issuers of energy performance certificates

☐ Other, please, specify Click here to enter text.

Add any comment if you have:

1.5. What is the ownership of ESCOs? Tick all that apply

☐ Private national

☐ Private international

☐ Public (national)

☐ Public (local, e.g. owned by municipality)

☐ PPP

☐ Other, please specify Click here to enter text.

1.6. Are ESCO/EPC services typically the core business of ESCOs or do these companies offer a wider range of products?

○ Typically ESCOs offer guaranteed energy performance or ESCO services

○ ESCOs typically offer a wide range of services

Add any comment if you have:

1.7. How has the ESCO/EPC market changed since 2015?

○ Decreasing fast

- ○ Decreasing slowly
- ○ Stable
- ○ Increasing slowly
- ○ Increasing fast

Add any comment if you have:

1.8. Why does this change take place? What factors influence the change primarily? Explain legal, regulatory, organisational, financial, economic, social framework reasons.

Click here to enter text.

1.9. Which sectors are typically ESCO/EPC clients? Tick all that apply.

☐ Public buildings – hospitals

☐ Public buildings – educational facilities (schools, kindergartens, universities)

☐ Public buildings – offices (e.g. municipalities)

☐ Public buildings – other, please specify Click here to enter text.

☐ Public lighting

☐ Private commercial - office buildings

☐ Private commercial – hotels, tourist facilities

☐ Industry sites, processes

☐ Private residential – multiapartment buildings

☐ Private residential – urban areas

☐ Social housing

☐ Other special projects, e.g. in transport, public space, please specify Click here to enter text.

Add any comment if you have:

1.10. Which are the key technologies that ESCOs implement? Tick 3 most important ones.

☐ Building as a whole (including active and passive systems, energy efficiency and RES)

☐ Building level heating and heating systems

☐ District heating systems

☐ Building level cooling and air conditioning, ventilation

☐ District cooling

☐ Building envelope

☐ Industrial processes, horizontal technologies, motor systems

☐ Co-generation

☐ Renewable supply

☐ Street lighting

☐ Automation and control systems

☐ Other (please, specify, Click here to enter text.)

Add any comment if you have:

1.11. What is the average size of investment of ESCO/EPC projects? Please, choose as many as apply.

☐ Less than 200 000€

☐ 200 000€ - 500 000€

☐ 500 000€ - 1 000 000€

☐ 1 000 000€ - 5 000 000€

☐ Over 5 000 000€

Add any comment if you have:

1.12. What is the average duration of ESCO projects? (e.g. the period for which the contract is signed). Please, give an estimate in years:

Click here to enter text.

Add any comment if you have:

1.13. What is the average energy savings of a typical ESCO project? Please, give an estimate of any of the following figures (fill in one or more, as appropriate).

Click here to enter text.% of baseline consumption

Click here to enter text.MWh/project/year

Add any comment if you have:

1.14. Which is the most common type of contract used by ESCOs in your country?

☐ EPC with guaranteed savings (ESCOs guarantee the energy savings, clients take the financial risk),

☐ EPC with shared savings (ESCO and client share the savings, ESCOs take financial risk)

☐ Build-own-operate-transfer (BOOT),

☐ Contract energy management (chauffage),

☐ Facility management project,

☐ Consultancy and technical guarantee,

☐ Other (please, specify, Click here to enter text.)

Add any comment if you have:

1.15. Which of the following provisions of the Energy Efficiency Directive Article 18 have been implemented (or are in the process) in your country and which of them has had a positive impact on the energy service or ESCO market?

	Implemented (tick if yes)	**Successful (tick if yes)**
Disseminating information on available energy service contracts which provide guaranteed energy savings	☐	☐
Disseminating information on financial instruments to support energy efficiency service projects	☐	☐

Encouraging the development of quality labels for ESCOs or their services	☐	☐
Providing model contracts for EPC	☐	☐
Providing information on best practices energy performance contracting	☐	☐
Providing information about the current and future development of the energy services market	☐	☐
Remove the regulatory and non-regulatory barriers that impede the uptake of EPC and other ESCO services	☐	☐
Enabling independent market intermediaries (e.g. EPC or procurement facilitators, one-stop shops) to play a role in stimulating market development	☐	☐

Please, give us more information about why you think or do not think the above were successful. We would highly appreciate if you could quote examples, documents, legal pieces or even send them to us by email to paolo.bertoldi@ec.europa.eu

1.16. Which, if any, EU or national programs or policies have promoted ESCO projects? Please, choose as many as apply.

☐ Energy Efficiency Directive (Art. 18)

☐ Energy Efficiency Directive – other provisions

☐ CHP, Ecodesign or other Directive

☐ Covenant of Majors or other city level commitment

☐ White certificates/EEOs

☐ Financial incentives,

☐ Taxation rules/rebates,

☐ Information and accreditation schemes

☐ Voluntary agreements

☐ Procurement rules

☐ Energy management roles, audit rules

☐ Other, please specify Click here to enter text.

If possible, specify how these impacted the market. Add any comment if you have:

1.17. List three most important recommendations or changes in the regulatory, legal, financial or informational framework of the ESCO market in your country to further develop energy savings or carbon savings through ESCOs?

	Recommendation
1	
2	
3	

Add any comment if you have:

1.18. Please indicate most relevant barriers limiting ESCO implementation in your country using indicators from 5 to 1 (5=most important barrier and 1=barrier exist, but does not limit the market much). Please do not assign any number to those barriers that are not relevant in your country.

	Indicators from 5 to 1 (1, 2, 3, 4 or 5)
Ambiguities in the legislative framework	
Lack of appropriate forms of finance	
Mistrust from the (potential) clients	
Existence of in-house technical expertise	
Lack of standardisation	
Inexperience of actors	
Perceived business and technical risk	
Small size of projects and high transaction costs	

Collaboration, commitment and cultural issues	
Other	

Please specify other barriers if any:

Add any comment if you have:

This is the end of the survey.

Thank you very much for your collaboration!!!

If you have information on more than one EU MS, we kindly ask you to submit this survey and go back to the beginning of this survey to provide information about another country.

If you have provided us with an email address, we will send you the report when published.

7 Annex III - European and national ESCO projects

There have been several projects supporting Energy Performance Contracting and financing energy efficiency on the European and national level (on-going or recently finished projects).

- EU
    - QualitEE: Driving Investment in Energy Efficiency Services Through Quality Assurance https://qualitee.eu/
    - EPC+: Energy Performance Contracting Plus http://epcplus.org/ Aims at promoting the implementation of Energy Performance Contracting (EPC) in Small to Medium-sized enterprises (SMEs) of the private sector.
    - Change Best: Energy Efficiency Services project http://www.changebest.eu/
    - guarantEE: Building Energy Services in Europe https://guarantee-project.eu/
    - Streetlight EPC (IEE): Triggering the market uptake of energy performance contracting through street lighting refurbishment projects http://www.streetlight-epc.eu/
    - BUILDINTEREST: Improving the attractiveness of investments in energy efficiency and sustainability in buildings / Sustainable Energy Financing Plattform for NL, FR, IT https://www.buildinterest.community/wp-content/uploads/2018/08/Overview-of-solutions.pdf
    - TRUST-EPC-SOUTH: Building TRUST in Energy Performance Contracting for tertiary sector energy efficiency and sustainable energy projects in Southern European Countries (ES, IT, FR, EL, PT, HR) http://www.trustepc.eu/en
    - EnPC-INTRANS: Capacity Building on Energy Performance Contracting in European Markets in Transition https://www.enpc-intrans.eu/language/en/project/ (HR, DE, EL, LV, RO, SK, SI)
    - E-FIX: Developing and transferring an innovative Energy FInancing miX in order to activate private sector finance for increased investments in sustainable energy projects. Aim is to trigger private investments for EE and REN projects with a combination of capacity building activities and the roll-out of operational financing schemes, including energy performance contracting, crowdfunding and leasing models. Geographical focus on CEE and Kaukasus (PL, CZ, AT, HR, AM and GE).
- Belgium
    - FALCO: Financing Ambitious Local Climate Objectives. Housing and SMEs, developing a financing solution for Flemish signatories to the Covenant of Mayors and aims to use private capital instead of public budgets for its financing operations. https://cordis.europa.eu/project/rcn/210071_en.html
    - easyCOPRO: Open book EPC for Brussels' condominiums. https://www.easycopro.be/

- ESCOLIMBURG: Public-Private ESCO schemes, housing, Retrofit and Renewables action plan for public building stock, ESCO-model taking into account scaling, bundling, repeatability, quality, comfort for the end user, cost efficiency, cost transparency, communicability of the processes, improved collaboration, allocation of risks. http://www.escolimburg2020.be/

- France
  - BuildInterest: https://www.buildinterest.community/wp-content/uploads/2018/08/Overview-of-solutions.pdf
  - TRUST-EPC-SOUTH: Building TRUST in Energy Performance Contracting for tertiary sector energy efficiency and sustainable energy projects in Southern European Countries (ES, IT, FR, EL, PT, HR) http://www.trustepc.eu/en/public-deliverables
  - POSIT'IF: Promote, Organize, Support, Imagine the energy Transition in Ile-de-France territory. EPC in housing/condominiums, Energy Efficiency Contracts, Professionals trained on EPC contract management. http://www.energiespositif.fr/
  - PSEE Alsace: MLEI PSEE Alsace – Region of Alsace. Public-Private ESCO schemes. https://ec.europa.eu/energy/intelligent/projects/en/projects/mlei-psee-alsace

- Italy
  - BuildInterest: https://www.buildinterest.community/wp-content/uploads/2018/08/Overview-of-solutions.pdf
  - TRUST-EPC-SOUTH: Building TRUST in Energy Performance Contracting for tertiary sector energy efficiency and sustainable energy projects in Southern European Countries (ES, IT, FR, EL, PT, HR) http://www.trustepc.eu/en/public-deliverables
  - FESTA: Fostering local energy investments in the Province of Matera. Bundling EPC projects, Public buildings http://cordis.europa.eu/project/rcn/194636_en.html
  - LEMON: Less Energy More OpportuNities. public and private ESCOs. Social housing. http://www.lemon-project.eu/
  - MARTE: Marche Region Technical assistance for healthcare buildings. Energy retrofit energy retrofit of healthcare facilities combining EPC with structural funds http://www.marteproject.eu/en
  - 2020TOGETHER: 2020: TOrino is GEtting THERe! public buildings and street lighting. Bundling of small municipalities. http://www.cittametropolitana.torino.it/cms/europa-e-cooperazione/progetto-2020-together
  - PadovaFIT: EPC in housing (heating, cooling and lighting systems), PadovaFIT! financing scheme, model business plans. http://www.padovafit.it/

- Ireland
    - Novice: New Buildings Energy Renovation Business Models incorporating dual energy services. EPC plus Demand Response. http://www.novice-project.eu/
- Latvia
    - EnPC-INTRANS: Project Capacity Building on Energy Performance Contracting in European Markets in Transition https://www.enpc-intrans.eu/language/en/project/ (HR, DE, EL, LV, RO, SK, SI)
    - Sunshine project: Save your bUildiNg by SavINg Energy – towards 202020m2 of deeply renovated multifamily residential buildings. SUNShINE supports public and private ESCO's and leads to an innovative investment scheme with a pipeline of projects worth €30m, guaranteed savings over 26GWh/year, and 202020m2 of deeply renovated buildings.
- The Netherlands
    - ESCOSC: 9 ESCO projects, business models have been worked out for municipalities and social housing corporations. http://www.escosc.nl/
- Spain
    - Enerinvest: https://www.enerinvest.es/en/ investment platform considering EPC as potential financing tool; Investment platform considering EPC as potential financing tool
    - BEenerGI: Bundling sustainable energy investments for Girona´s municipalities. Bundling EPC projects, Street lighting and small district energy systems with biomass http://beenergi.ddgi.cat

8 Literature and personal communications

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