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# ESCO and EPC Sector Policy Recommendation Paper



## **Activity 2.2.**

### **Prepare and disseminate the policy recommendation paper**

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## 1. Introduction

The global objective of the “Supporting Civil Society Dialogue Between EU and Turkey Grant Scheme (CSD-VI)” call is to develop a sustainable civil society dialogue between Turkey and European Union (EU) Member States, which corresponds to the project's overall objective as the harmonization of EU acquis in the field of energy efficiency for an energy service company (ESCO) and energy performance contract (EPC) sectors.

Concerning the specific priorities of this call, the specific objectives of the project, named Facilitating ESCO and EPC sector through CSO Partnership (FACILITEE), are:

- 1) Promoting synergy and cooperation between CSOs in the ESCO and EPS sectors in Turkey and EU member states,
- 2) Developing governance and institutional capacity through CSOs to accelerate investments in energy efficiency and sustainability projects in Turkey,
- 3) Developing expertise and cooperation between Turkish and European CSOs, especially in the field of energy efficiency in buildings.

The main partners of the projects are Energy Efficiency and Management Association (EYODER), Energy Law Research Institute (EHAE) from Turkey, and FEDERESCO (Federazione Nazionale delle ESCO /Italian Association of ESCOs) from Italy.

A total of 13 activities have been identified under the three specific objectives mentioned above. The activities related to the Academic consultancy team, which were defined in the project and prepared in this report, are explained below:

Under specific objective 1, which is to promote synergy and collaboration between CSOs in the ESCO and EPC sectors in Turkey and EU member states, the result is dedicated to ensure sustainable dialogue in ESCO and EPC sectors by establishing networks among CSOs in adopting EU acquis. Under this result, Activity 1.1 and 1.2, are explained below:

**Activity 1.1.** Establish a common approach and shared goals among the CSOs **to perform a gap analysis and examine relevant legislation in Turkey and the EU**

Explanation: It is aimed to establish **three working groups** consisting of the representatives of Turkish CSOs and European counterparts in the field of ESCO and EPC for the purpose to perform gap analyses for each topic. The working groups will be the main tools that would help to create and maintain the dialogue mechanism among the partner CSOs and produce high-quality outputs that would serve the objectives of the program in general and this action in particular.

The working groups (WGs) are established as follows:

WG1: Legal Issues

WG2: Financial Issues

WG3: Insurance

The working groups will use online communication platforms (e.g. Zoom, GoToMeeting, etc.) and hold two face-to-face meetings as described under Activity 1.2.

**Activity 1.2.** Organize **face-to-face meetings** among CSOs in Turkey and the EU to exchange best practices on the EPC sector.

Explanation: It will be organized two face-to-face meetings for the working groups and representatives of Turkish CSOs and their European counterparts will be invited for the first meeting in Turkey. Following an introductory session, each working group will start working on their own. It is planned to establish online communication platforms for each working group to inform each other of their progress and maintain regular communication. The second meeting will be hosted by FEDERESCO after some progress is achieved. It is planned that the second meeting will be in Italy.



Expected Outputs: 2 face-to-face meetings will be held for each working group, online communication platforms established for each working group, and Minutes of meetings.

On this basis firstly, desk research then the working groups' studies are performed.

As a preliminary study for Activity 1.1 and 1.2, Activity 1.5 can be described as follows:

**Activity 1.5.** Perform **desk research** (including **gap analysis**) on the EPC concept

Explanation: It is planned to perform desk research for the evaluation of best practices for EPC implementation in the EU. Through this activity, it is aimed that EYODER members will become more familiar with the EPC context and best practices in the EU member states before establishing the working groups and organizing meetings with the European counterparts. In other words, this activity will act as a substructure for the activities to be carried out under the first objective.

Expected Outputs: Gap analysis report on the Turkish and European legislation in the field of EPC

Hence in the gap analysis report, both global and EU energy service markets are explained considering ESCO business and EPC concepts. Then, for Turkey, the current situation of the legislative framework and related applications, future challenges as market-based policy mechanisms as well as the EU Green Deal to support ESCO and EPC in the market and also preliminary gap analysis as a base for the working group studies together with the recommendation with regard to the possible design of the working groups are identified.

Under specific objective 2, which is to improve Turkish governance and institutional capacity building, especially through CSOs to trigger investments for energy efficiency and sustainability projects, the result is dedicated to ensure capacity building on the EPC concept and to complete the preparations for the first EPC implementation in public buildings in Turkey. Under this result, Activity 2.1 and 2.2, are explained below:

**Activity 2.1.** Organize a **workshop** on the policy recommendations for the improvement of Turkish legislation for the ESCO and EPC sector

Explanation: Following the completion of the studies of working groups, a one-day workshop will be organized in Turkey. The workshop will serve to produce policy recommendations for the improvement of Turkish legislation for the ESCO and EPC sectors. At this workshop, CSOs and European stakeholders in the EPC sector will be invited and this would open communication channels and strengthen sustainable dialogue between Turkish and European CSOs. The representatives of the public sector are also invited to this workshop to develop public sector-CSO dialogue and raise awareness of the EU legislation in the field of EPC.

Expected Outputs: Workshop report

**Activity 2.2.** Prepare and disseminate the **policy recommendation paper (report)**

Explanation: As an output of the workshop to be held under Activity 2.1, a policy recommendation report will be drafted and disseminated to the public sector representatives. The reports of each working group will be the chapters of this recommendation report. EYODER will draft the introduction and conclusion sections.

Expected Outputs: Reports of each working group to be consolidated under one report (EPC Policy Recommendation Paper)

Under specific objective 3, which is to facilitate the exchange of expertise, skills, and connections among the CSOs in the field of energy efficiency, particularly in buildings, the result is dedicated to increase bilateral exchange and cooperation among Turkish CSOs and European counterparts. Under this result, Activity 3.1 is explained below:

**Activity 3.1.** Organize an **international event** to promote the project outputs and networking

Explanation: It is planned to organize a closure event with the participation of international stakeholders to promote the project outputs that will contribute to show the determination of Turkey in EU accession. The main agenda of this international event will be the outcomes of the training sessions, the presentation of draft bidding documents, and the project's contribution to the energy efficiency debate in Turkey with a focus on the ESCO market and EPC business/sector.

Expected Outputs: Project's contributions to Turkey shared with the public

After the completion of the activities with the working groups, a workshop was organized with the participation of all working groups, sector stakeholders, and the public, and the outputs of the working groups were matured. Afterward, the draft EPC Policy Recommendation Report was prepared and presented at the EIF World Energy Congress & Expo. After the congress, the EPC Policy Recommendation Report was finalized with the congress outputs.

The rest of the report is organized as follows: in the second chapter methodology is explained; preliminary gap analysis is given in the third chapter; all working group studies and Italian case are explained in the fourth chapter; the recommendations obtained at the end of the study are listed in the fifth chapter; finally, in the sixth chapter, final remarks and policy implications are given.

## 2. Methodology

The methodology of the project is presented in Figure 1.

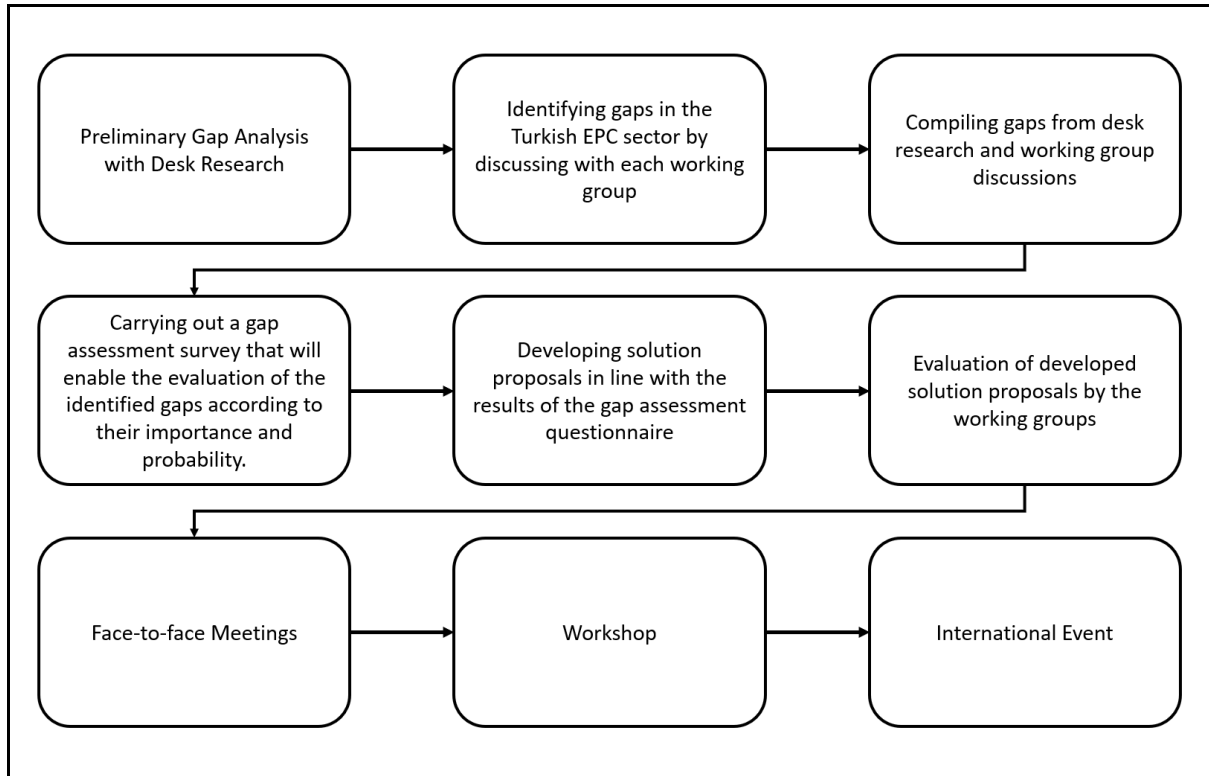


Figure 1. Methodology of the FACILITEE project (will be modified)

Detail explanations of each step can be explained as follows:

### **Desk research**

In the preliminary gap analysis report, both global and EU energy service markets are explained considering ESCO business and EPC concepts. Then, for Turkey, the current situation of the legislative framework and related applications, future challenges as market-based policy mechanisms as well as the EU Green Deal to support ESCO and EPC in the market.

### **Working Groups' Studies**

Three working groups, namely finance, legal, and insurance, consisting of experienced and competent experts in their fields were formed.

At first, an online introduction and planning meetings with the working groups were held. In these meetings, desk research results were presented to experts. Then, an online discussion meeting was held with working groups to reveal the gaps in the Turkish ESCO business and EPC market.

After that, gaps from desk research and working group discussions were compiled. For evaluation of the identified gaps according to their importance and probability, a gap assessment survey was prepared and answered by working groups' experts. In the survey, experts were asked to evaluate the identified gaps according to their importance and probability of occurrence by determining which region of the graph below is suitable for each gap (Figure 2).

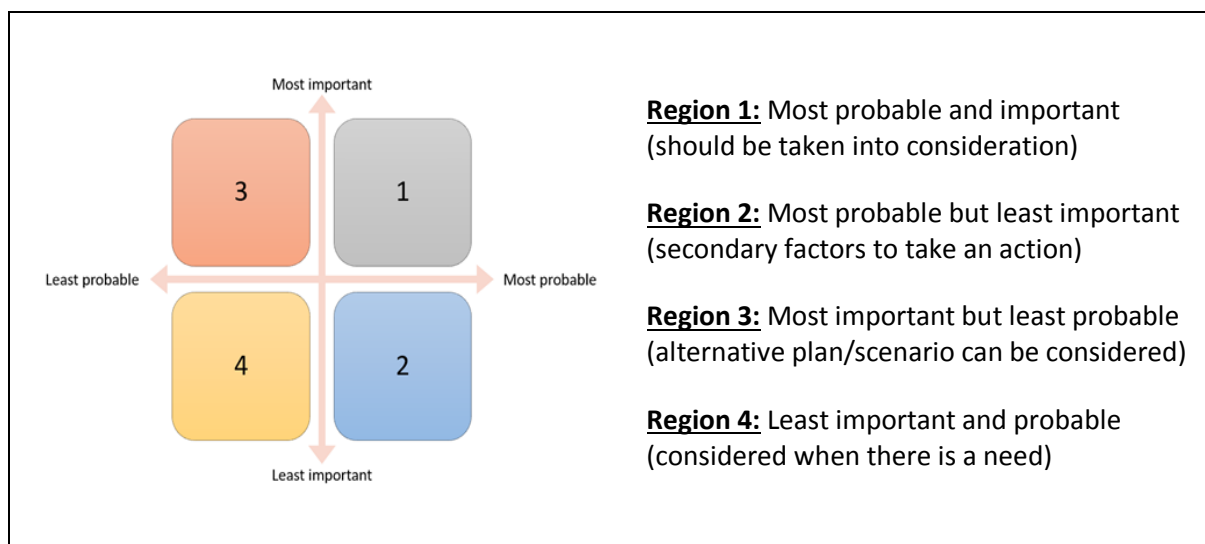


Figure 2. The evaluation of gaps based on importance and probability

After the survey results were obtained, discussion meetings were held with the working groups to fill the gaps. Starting from the gaps in the first region, solutions were discussed to eliminate or mitigate each gap. After obtaining the draft recommendations for the gaps, online meetings were held between Turkish and Italian working groups. At the face-to-face meetings, knowledge exchange was held with the participation of EYODER and Turkish working groups, as well as FEDERESCO and Italian working groups. Italian expert groups evaluated and shared the gaps in the Italian ESCO and EPC sectors and proposed solutions. Also, the current situations (regulations, problems, support, etc.) in the ESCO and EPS sectors in both countries were mutually explained at the face-to-face meetings.

### **Workshop**

After the completion of all the activities with the working groups, a workshop was organized with the participation of EYODER, EHAE, FEDERESCO, Turkish and Italian working groups, ESCOs, CSOs, ministerial representatives, and public officers who performed EPCs. In the workshop, the overall outputs of the working groups were discussed and matured.

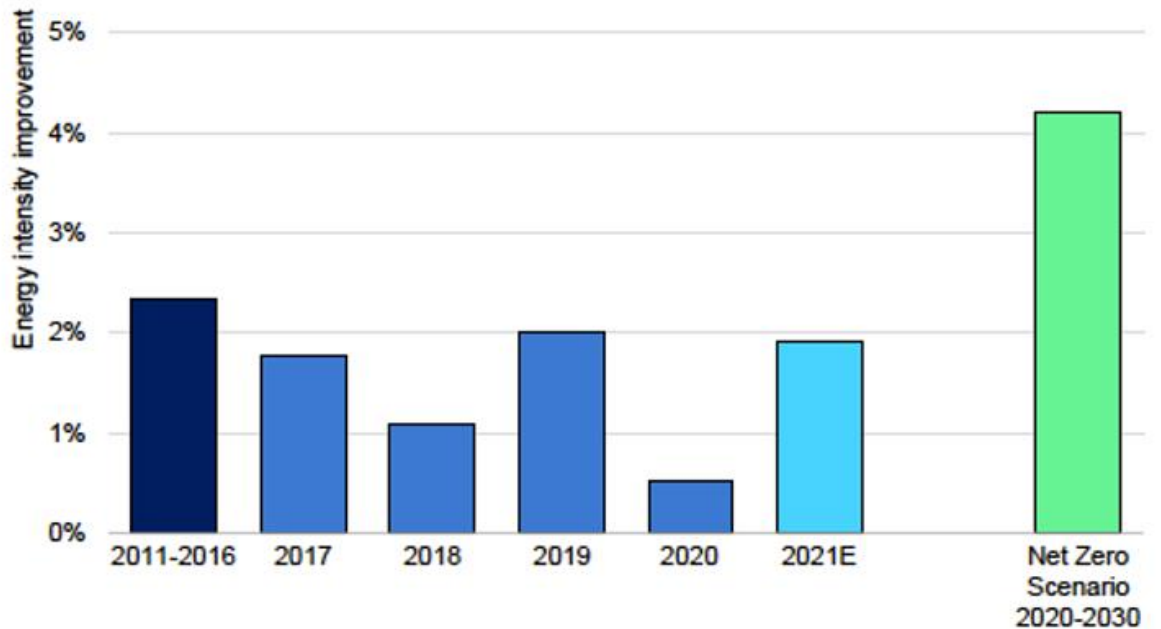
### **International Event**

After the workshop, the draft EPC Policy Recommendation Report was prepared and presented at the “Energy is Future (EIF) World Energy Congress & Expo”. In addition, at the congress, both the FACILITEE project was introduced and three panels were held where the results of each working group were discussed with the participation of EYODER, EHAE, FEDERESCO, and working group participants. After the congress, the EPC Policy Recommendation Report was finalized with the congress outputs.

### 3. Preliminary Gap Analysis

#### 3.1. Global Energy Service Market

According to the latest report, published by the International Energy Agency (IEA), in 2021, **global primary energy intensity** – a key measure of the economy’s energy efficiency – is expected to improve by 1.9% after improving by only 0.5% in 2020 (Figure 1). As can be understood from Figure 3, over the past five years, primary energy intensity has improved on average by 1.3% a year, down from 2.3% between 2011 and 2016, and well below the 4% described in the “Net Zero Emissions by 2050 Scenario” over 2020-2030 [1].



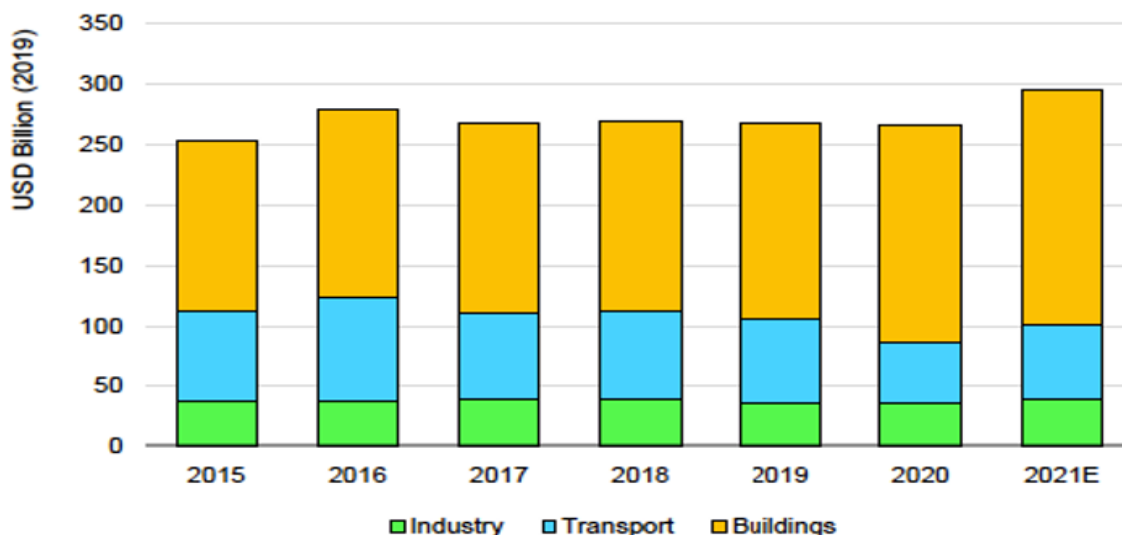
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Notes: 2011-2016 five-year average. 2021 estimate based on [World Energy Outlook 2021](#). Net Zero Emissions Scenario = IEA Net Zero Emissions by 2050 Scenario, 2020-2030 intensity improvements, ten year average.

Figure 3. Global primary energy intensity changes, 2011-2021 [1]

With disruptions due to Covid-19 shaping global energy and economic trends in 2020 and 2021, it is still unclear whether this year’s improved energy intensity will signal the start of a sustained recovery. However, increased investment trends, rising government spending on efficiency - in large part related to recovery plans enacted in response to the Covid-19 crisis, new announcements of higher climate ambition, and other policy measures offer some encouraging signals.

Government policies are expected to help **energy efficiency investment** rise by 10% in 2021 to almost USD 300 billion (Figure 4). This recent investment growth has been concentrated largely in Europe, however considering the IEA Net Zero Emissions by 2050 Scenario, the overall annual investment would need to triple by 2030 by means of global policies. In 2020, especially stronger building efficiency programs in Europe, additional and stricter standards and regulations, higher public spending, incentive structures, and streamlined planning laws and procedures can all help lift investment and make efficiency projects more attractive to private finance [1].

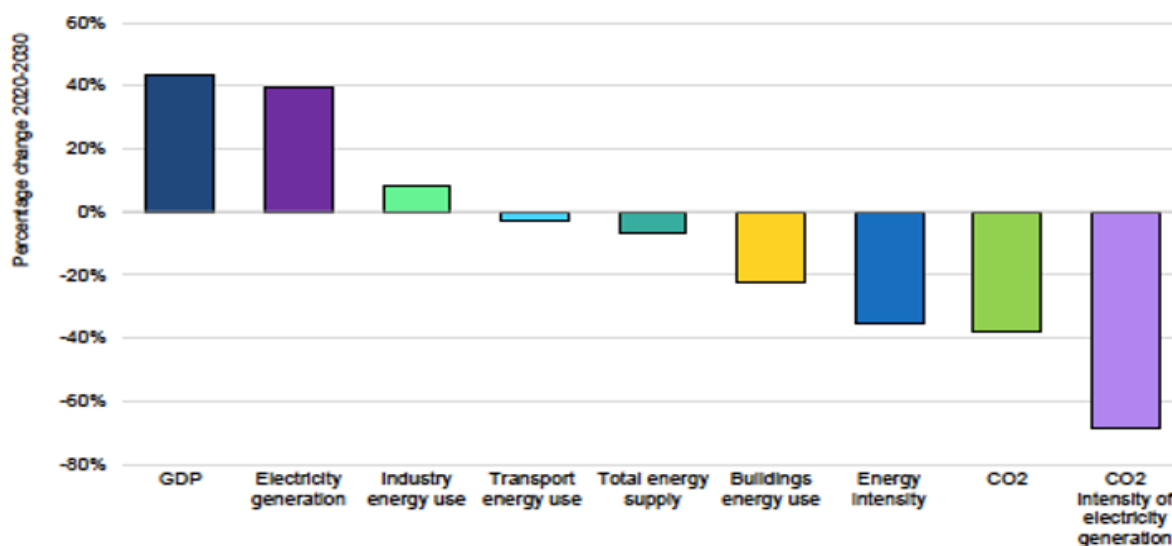


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Note: An energy efficiency investment is defined as the incremental spending on new energy-efficient equipment or the full cost of refurbishments that reduce energy use.

Figure 4. Energy efficiency investments, 2015-2021 [1]

In **the Net Zero Emissions by 2050 Scenario**, the energy intensity of the global economy improves by 35% by 2030. This is driven by energy efficiency combined with related measures such as electrification and behavioral change. This enables growth in clean energy sources, such as wind and solar generation, to outpace the overall demand for energy services. In this scenario, the global economy grows by 40% by 2030, driven by higher populations and income levels, but uses 7% less energy (Figure 5).



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Notes: GDP = USD 2019 billion at purchasing power parity; electricity = electricity generation; Sectoral energy use = final energy consumption; CO<sub>2</sub> = energy-related CO<sub>2</sub> emissions; energy intensity = TES/GDP.

Source: IEA analysis based on IEA (2021), [Net Zero by 2050 report](#).

Figure 5. Macroeconomic and energy indicators in the IEA Net Zero Emissions by 2050 Scenario, 2020-2030 [2]

Figure 6 presents the **key milestones towards net zero by 2050** on a sectoral basis (building, transport, industry, electricity & heat, etc.) together with the carbon dioxide reduction (CO<sub>2</sub>). For instance, in the building sectors, these key milestones are as follows:

- 2025 – no new sales of fossil fuel boilers
- 2030 – all new buildings are zero-carbon-ready
- 2035 – most appliances and cooling systems sold are best in class
- 2040 – 50% of existing buildings retrofitted to zero-carbon-ready levels
- 2045 – 50% of heating demand met by heat pumps
- 2050 – More than 85% of buildings are zero-carbon-ready.

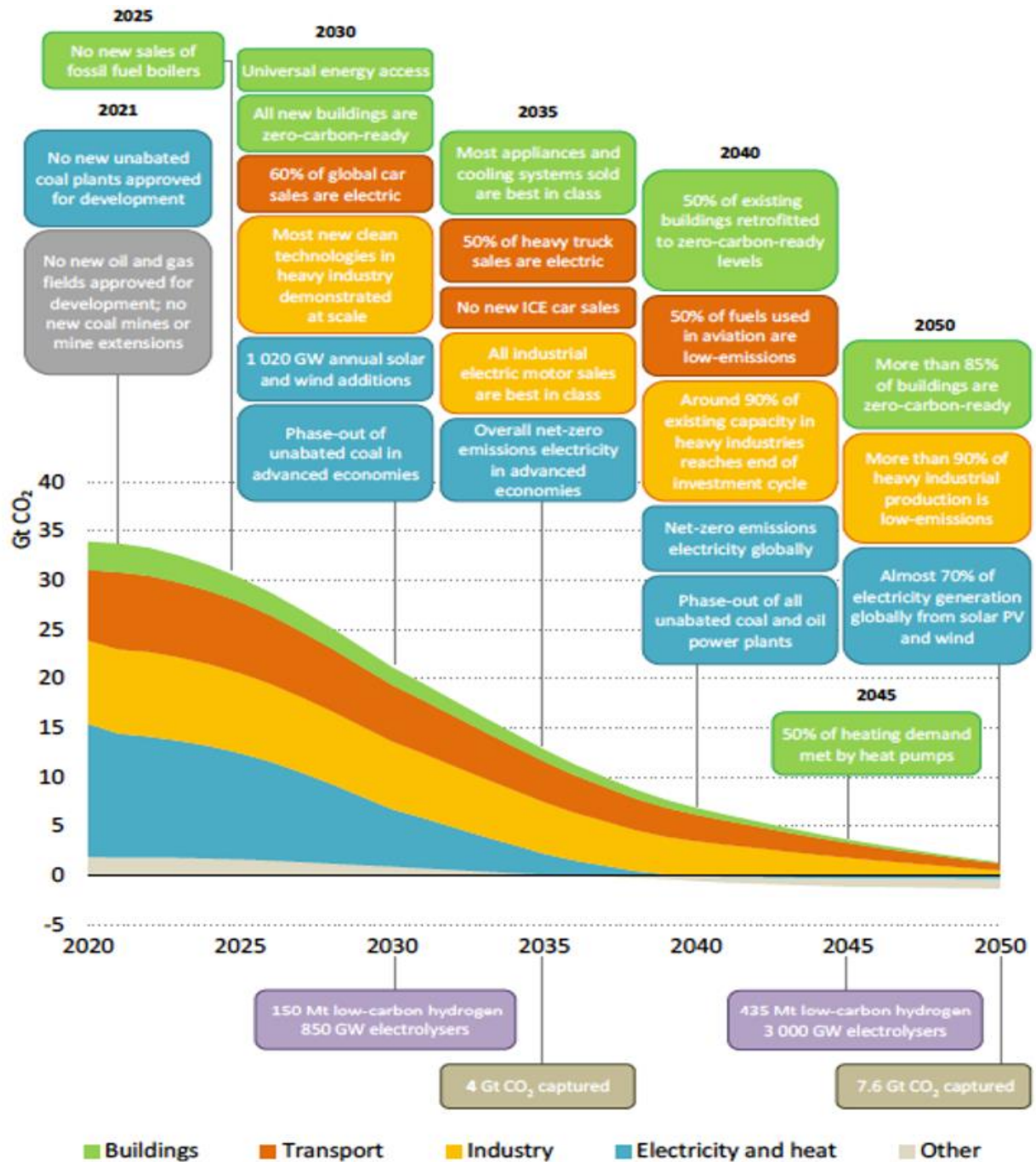
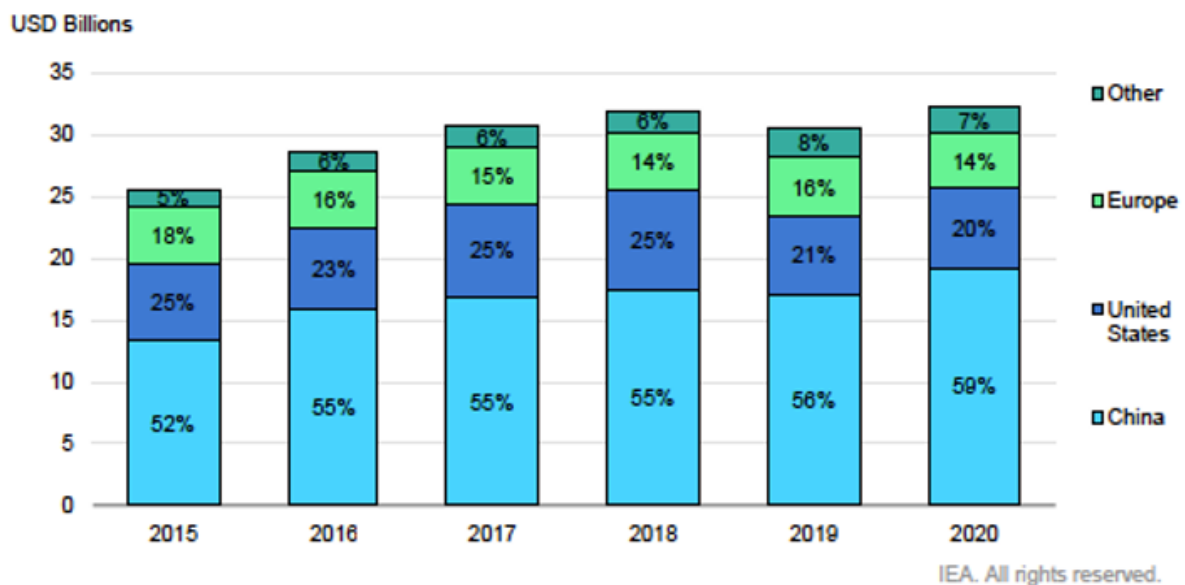


Figure 6. Key milestones in the pathway to net zero, 2020-2050 [2]



As we know to reach these key milestones, **energy service companies** (ESCOs) are crucial. They provide energy solutions ranging from generation and supply to energy efficiency and retrofitting projects. ESCOs help consumers identify, finance, and implement projects, thereby making it easier to invest. In particular, they can reduce the burden of making upfront capital expenditures and facilitate access to commercial financing. The global ESCO market as a whole increased by around 6% in 2020 to USD 33 billion. As can be seen from Figure 7, this growth was mainly centered in China, where investment rose by 12% despite the pandemic. Other major ESCO markets, including the United States, European markets and emerging markets, and developing economies, either remained flat or contracted. During 2020, the ESCO market became increasingly disrupted due to physical lockdown restrictions. ESCOs in Middle East countries such as Saudi Arabia and the United Arab Emirates reported increased awareness of the need for efficient ventilation and cooling, and associated benefits for indoor comfort and health, which boosted business.

The Chinese ESCO association (EMCA) reported that ESCOs quickly turned to use online tools and remote controls to keep their clients engaged and their business operations as robust as possible. Chinese ESCOs used 2020 as an opportunity to update their business models through the greater use of smart tools and technologies. The Chinese government also introduced additional tax incentives in May 2020 to encourage ESCO business development and innovation [1].

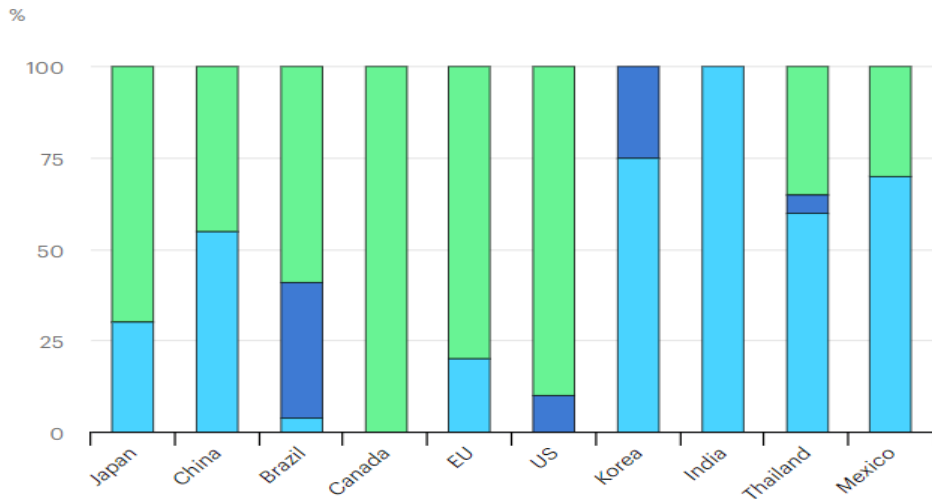


Source: IEA Annual ESCO market surveys.

Figure 7. Global ESCO market growth, 2015-2020 [1]

There are notable differences in ESCO markets between countries and regions. These include the definition of an energy performance contract (EPC), the policies that ESCOs are subject to, and technical capability. However, on average, ESCO projects are delivering energy savings upwards of 25%. While ESCOs can implement projects in buildings, industry, and transport in both the private and public sectors, the majority of ESCO projects take place in the non-residential buildings sector, followed by industry, with virtually no projects in the transport sector [3]. In the majority of Asian markets, ESCO activity within the industry sector represents the largest share of market activity, as a result of favorable policy measures, which have incentivized ESCO engagement (Figure 8). In the US and Europe, non-residential buildings dominate ESCO activities.



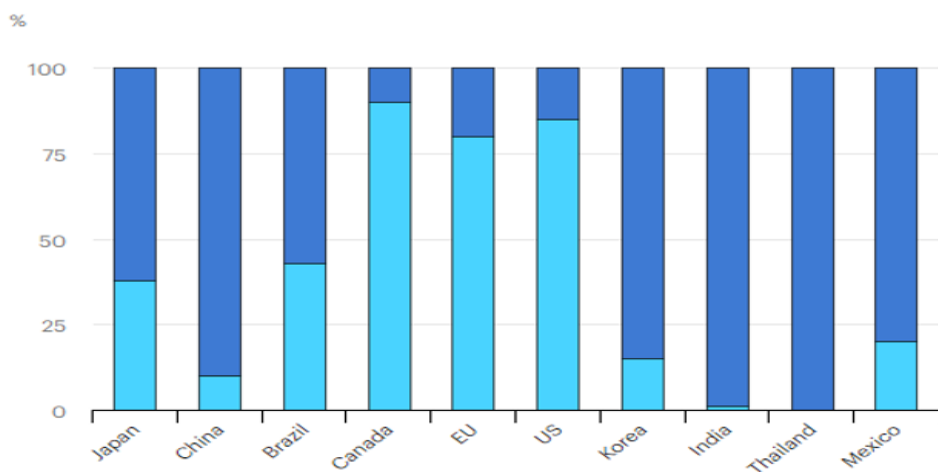


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● Industry ● Residential buildings ● Non-residential buildings

Figure 8. ESCO revenues by end-use sector 2018 [3]

Government policy is a key driver of ESCO activity and can influence whether ESCO projects are carried out in the private or public sector (Figure 9). In China, policy incentives have driven ESCO engagement in the private sector, while government procurement policies have been a barrier to ESCO market development in the public sector. In the US, on the other hand, public-sector ESCO activity has flourished as public-sector asset owners can obtain debt on favorable terms, which can be used to finance ESCO contracts. Also, in the EU, the public sector dominates the ESCO activities based on a legislative framework.



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● Public ● Private

Figure 9. ESCO revenues by public or private sectors 2018 [3]

Most agreements between customers and ESCOs are underpinned by **energy performance contracts** (EPCs). The EPC commits the ESCO to install the necessary equipment, provides a performance guarantee, and establishes the terms of any upfront or ongoing payments, which are intended to be less than the financial savings realized by the project. The two most common types of EPCs are referred to as (1) shared savings or (2) guaranteed savings model.

The EPC provides the customer with a guaranteed level of energy savings and the ESCO with a reliable source of revenue. EPCs typically last from two to 20 years, depending on the measures implemented. Depending on the customer’s preference and access to capital, the customer, the ESCO, or a combination of the two can be responsible for securing the finance for the project. A direct loan agreement with a third-party lender is an option for both parties.

National policy and accounting rules, which vary between countries and regions, determine which type of EPCs are preferred within a country (Figure 10). The Asian market is the most diverse: Japan uses the Shared Savings model for over 75% of its contracts, while other Asian countries use Guaranteed Savings for over 80% of their performance contracts. In the US, European, African, Middle Eastern, and Australian markets, Guaranteed Savings EPCs are heavily utilized. South American ESCOs, specifically in Chile, show a 60/40% split in favor of Shared Savings [4].

In addition, as can be observed from Figure 10, the **energy supply contracting** (ESC) business model is another proven model to implement efficient supply (from fossil and/or renewable sources) in new and existing buildings of the public, industrial, commercial and large residential sectors. The goal is to bring a reduction of final energy demand, although efficiency gains are usually limited to the energy supply system.

Indeed, under an ESC model, an Energy Service Company (ESCO) is only remunerated for the useful energy output, i.e., it supplies useful energy, such as electricity, heat, or steam under a long-term contract to a building owner or building user. It is therefore in the interest of the ESCO to reduce the final energy demand. The output is measured and verified in Megawatt hours delivered. ESC models run under long-term contracts of typically ten to fifteen years, depending on the technical lifetime of the equipment deployed [5].

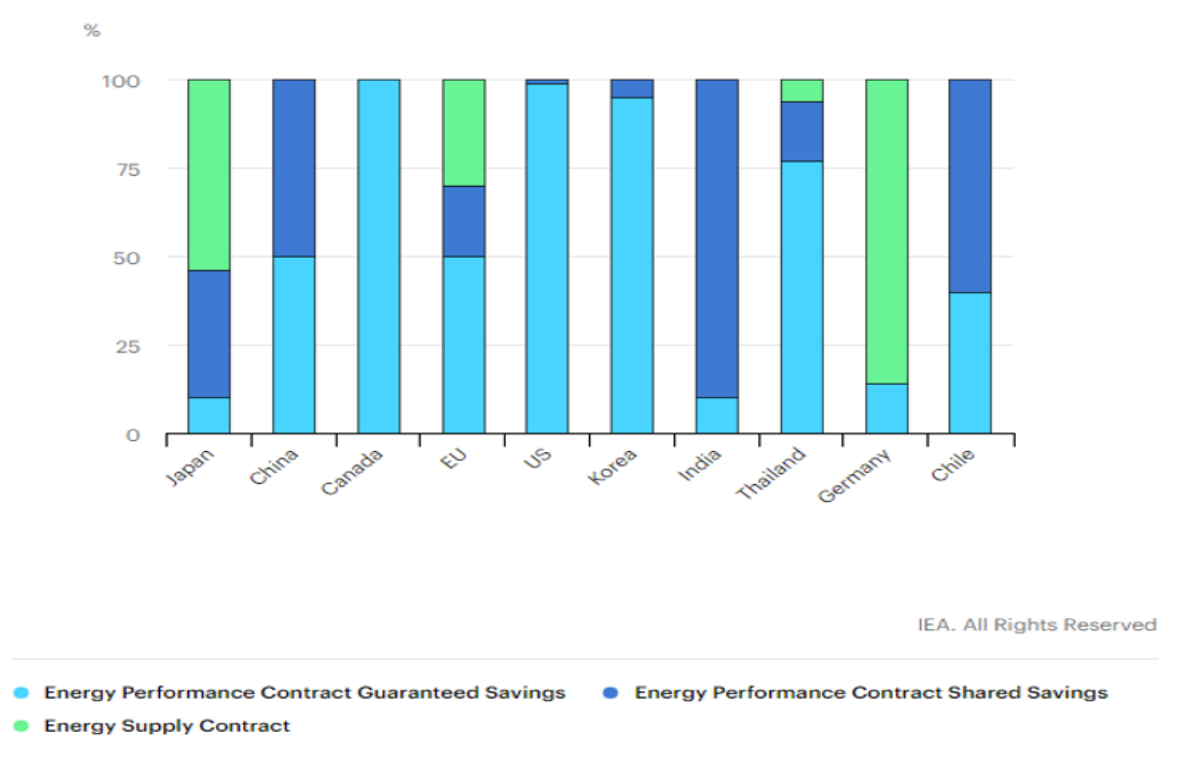


Figure 10. ESCO revenues by contract type, 2018 [3]

Several additional factors contribute to choosing one contract type over the other: generally, guaranteed savings models are used in more developed markets, with an established banking structure. However, where an ESCO might not have the lending ability, they may need to use a guaranteed savings model, where the customer is responsible for financing the project [6].

The uncertainty associated with the performance of efficiency measures inhibits third-party energy efficiency financing globally. In response, **energy savings insurance (ESI)** has emerged as a solution offered by a small number of financial institutions, private companies, and insurance companies, as a way to reduce the risk of an energy efficiency project. ESI is particularly useful for ESCOs or smaller enterprises with poor credit or who lack the means to secure third-party financing. Scaling up ESI will require more providers to enter the market, increasing competition and availability, which depends on widespread understanding among insurers of energy efficiency project risks.

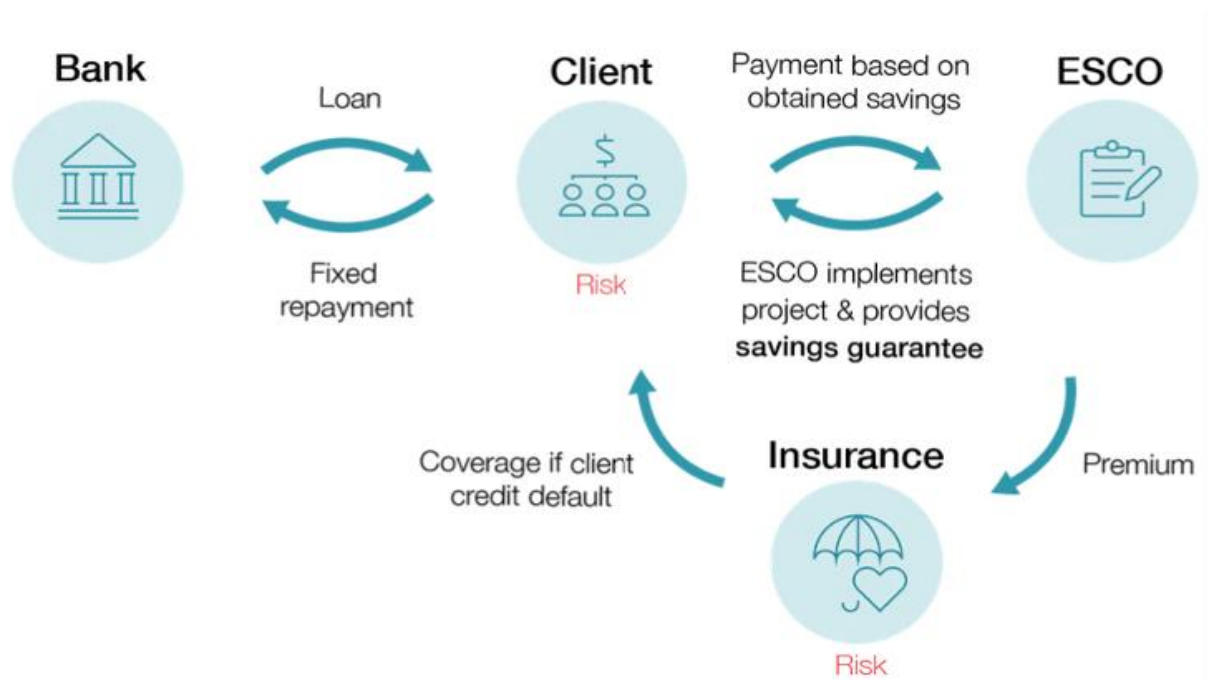


Figure 11. Credit risk insurance [4]

Typically, there are two types of insurance packages offered by insurers: credit (Figure 11) and technical (Figure 12). In the credit package, the insurance provider assumes the credit risk of a project, thereby ensuring that repayments owing to the ESCO can continue to be made, in the case of customer credit default. Under the technical package, the insurance provider covers the ESCO or technology provider in the event that promised energy savings are not achieved, assuming the technical risk associated with efficiency projects.



Figure 12. Technical risk insurance [4]

### 3.2. Energy Service Market in European Union

ESCO and EPC concepts and applications in the EU are expressed by means of the legislative framework together with related standards and the most relevant EU project in EPC sectors entitled “Driving Investment in Energy Efficiency Services Through Quality Assurance - QualitEE Project (2017-2020)”.

#### 3.2.1. Legislative Framework

At an EU level, the Directive on Energy Efficiency (EED) and the Energy Performance of Buildings Directive (EPBD) are two main legislations to increase demand for energy efficiency.

Directive 2012/27/EU on Energy Efficiency (EED), with amendments as 2018/2002/EU, establishes a common framework of measures for the promotion of energy efficiency within the EU to ensure the achievement of the Union’s target on energy efficiency. It lays down rules designed to remove market barriers and overcome market failures that impede efficiency in the supply and use of energy. It provides for the establishment of indicative national energy efficiency targets. It requires the application of mandatory energy-saving measures, including renovating public buildings, energy-saving schemes for utilities, and energy audits for all large firms. EED provides definitions of energy services, energy performance contracting, and energy service providers. It repeals the Energy Services Directive (2006/32/EC) and amends the definitions this directive had provided. Annex XIII of EED clearly requires guaranteed energy savings to be part of the compulsory items of the EPC model contract for public bodies. It has contributed to a common understanding of EPC among European experts. Article 18 of the EED also requires EU Member States to encourage the development of quality labels, which would provide an important step for clarity about what can be regarded as a good quality EPC project [7].

The Energy Performance of Buildings Directive 2010/31/EU (EPBD) is the key policy instrument promoting the improvement of the energy performance of buildings. The EPBD requires Member States to ensure compliance with several obligations including the energy performance certification of buildings; inspection of heating and air conditioning systems; energy performance requirements set for new buildings and existing buildings (or their) that undergo a major renovation. As it is often efficient for the responsible parties to use the services of EES providers to comply with the above-listed requirements, the EPBD is effectively supporting rising demand in the EES markets. In July 2018, the revised provisions to the EPBD by Directive (2018/844/EU) entered into force, which aims to accelerate the cost-effective renovation of existing buildings, with the vision of a decarbonized building stock by 2050 and the mobilization of investments. New provisions to enhance smart technologies and technical building systems (including automation) have been also introduced [7].

The European standard EN 15900:2010 defines energy efficiency services as an agreed task or tasks designed to lead to an energy efficiency improvement and other agreed performance

criteria. According to EN 15900:2010, EES shall include an energy audit (identification and selection of actions) as well as the implementation of actions and the measurement and verification of energy savings. A documented description of the proposed or agreed framework for the actions and the follow-up procedure shall also be provided. The improvement of energy efficiency shall be measured and verified over a contractually defined period through contractually agreed methods [7].

EN 16212:2012 Energy Efficiency and Savings Calculation provides a general approach for energy efficiency and energy savings calculations with top-down and bottom-up methods. It is applicable for energy savings in buildings, appliances, industrial processes, etc. It deals with savings on energy supplied to end-users and covers energy consumption in all end-use sectors. The standard is meant to be used for ex-post evaluations of realized savings as well as ex-ante evaluations of expected savings [7].

### 3.2.2. QualitEE Projects

Driving Investment in Energy Efficiency Services Through Quality Assurance - QualitEE Project (2017-2020) aims to increase investment in energy efficiency services in the building sector within the EU and improve trust in service providers. To achieve these aims, quality assessment criteria and business cases for quality assurance schemes have been developed. The QualitEE consortium comprises 12 partner organizations covering 18 European countries, an expert advisory board including the European standards body CEN/CENELEC, and 59 supporters from major financial institutions, government bodies, trade associations, and certification bodies. In this project, a survey analysis was performed with respondents from 15 EU countries; Austria (AT), Belgium (BE), Bulgaria (BG), Czech Republic (CZ), France (FR), Germany (DE), Greece (EL), Italy (IT), Latvia (LT), the Netherlands (NL), Portugal (PT), Slovakia (SK), Slovenia (SI), Spain (ES), and the United Kingdom (UK). Respondents include 109 representatives of ESCOs, where 53 of them operate on the EPC market only, 11 operate on the ESC market only, and 45 on both the EPC and ESC markets. Respondents include 79 representatives of EES facilitators, where 37 of them operate on the EPC market only, 17 operate on the ESC market only, and 25 on both the EPC and ESC markets. The main conclusions that can be derived from the project survey are as follows:

- In the case of the development in the EPC market, more than half of all respondents (53%) reported that their national EPC market had seen growth over the last 12 months, with 14% of respondents describing major growth (6% and higher) and 39% of respondents describing slight growth (of 1% to 5%). While 10% of respondents are witnessing a decline, 36% reported little or no change (Figure 13).

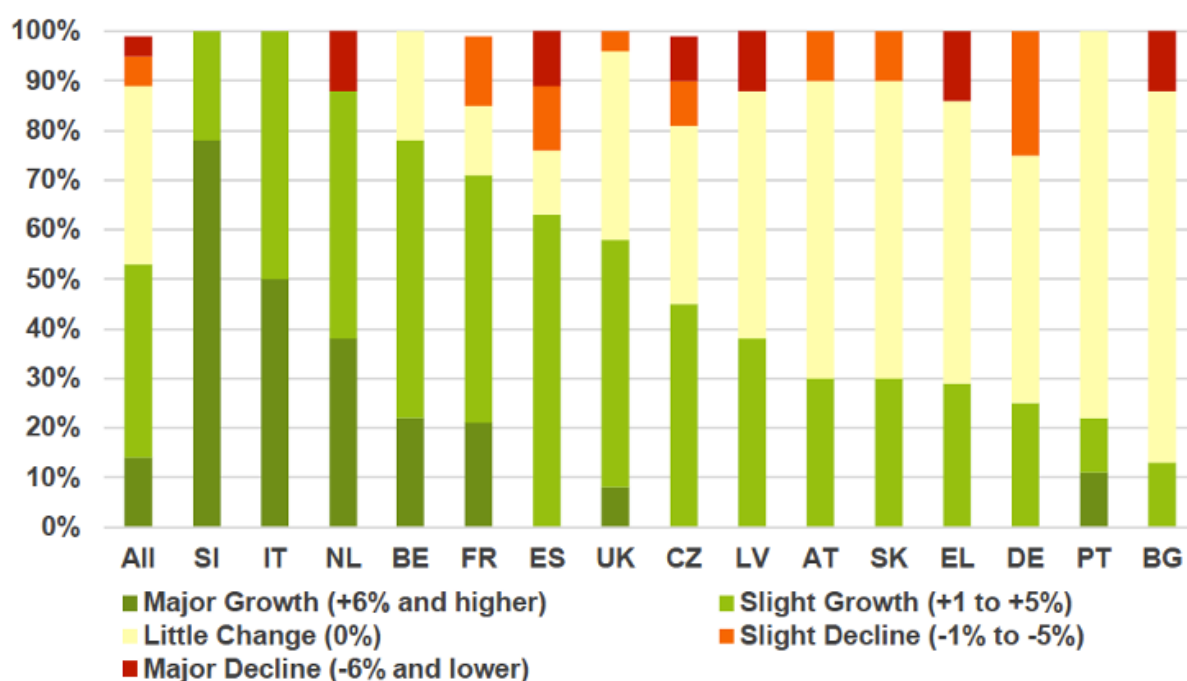


Figure 13. Changes in the EPC market over the last 12 months (2017) [7]

- The majority (63%) of respondents became involved in between one and five EPC projects in the last 12 months. Another 15% of respondents participated in 6 – 10 projects, which was the second most frequently selected category. Only 15% of respondents did not become involved in any new projects (Figure 14).

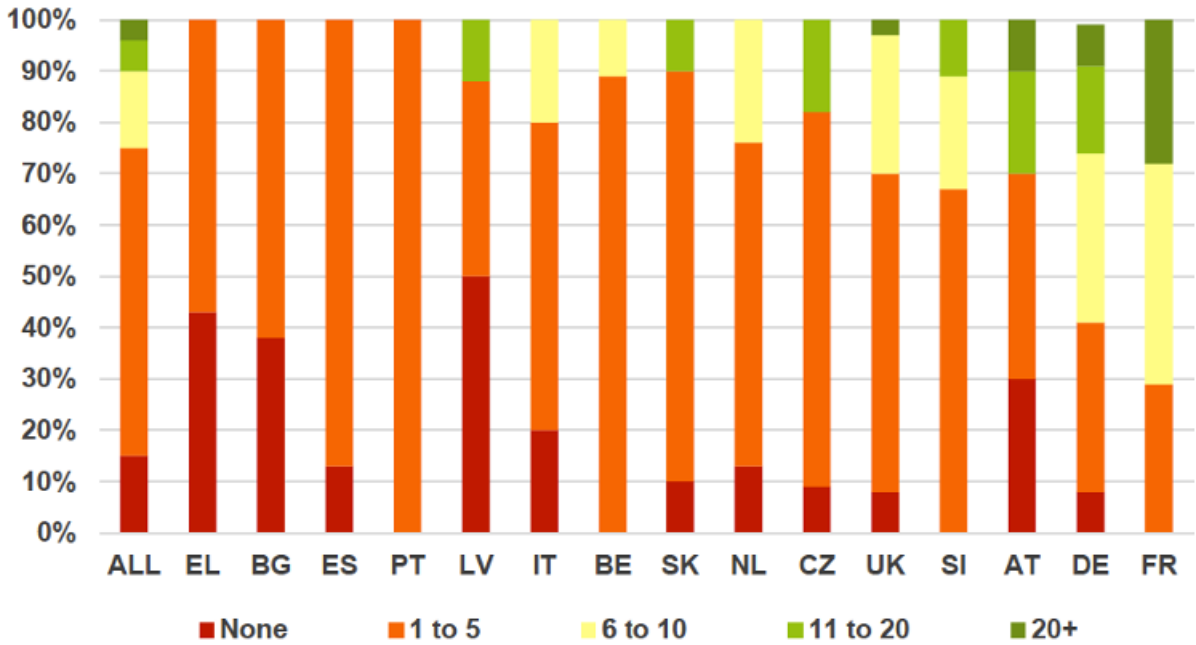


Figure 14. Number of EPC projects (that have reached Contract Signature) with in the last 12 months (2017) [7]

- The most common initial investment outlay for EPC projects across All Countries reported by 67% of respondents – EPC providers and facilitators – is less than EUR 1 million, while 29% of them selected the range from EUR 1 million to EUR 5 million. With only 4% of responses, investments exceeding EUR 5 million are rather rare (Figure 15).

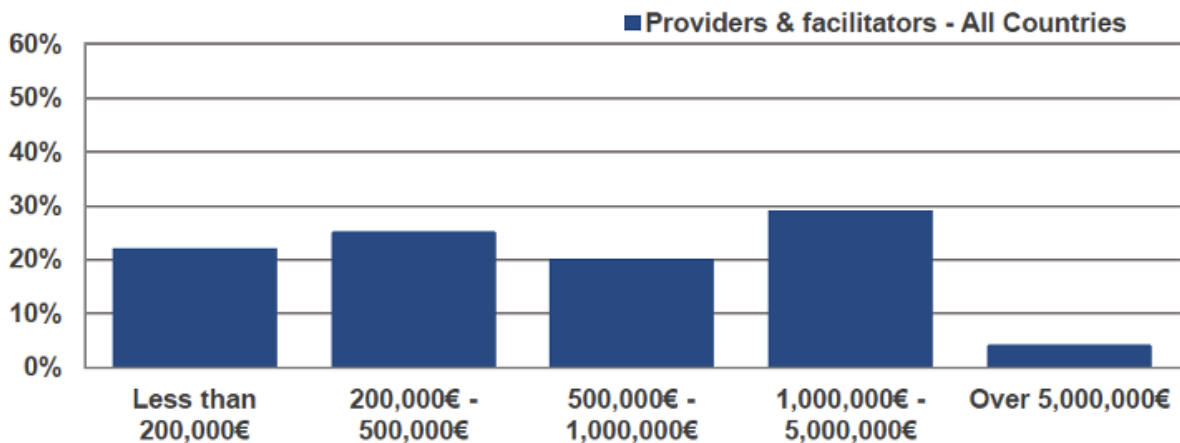


Figure 15. Common overall value (investment outlay) of the EPC projects (2017) [7]

- The majority of respondents (55%) agreed that the most common duration of EPC projects they are involved in is between five and ten years (Figure 16). About one-fifth of respondents mainly work on projects with contract duration of shorter than five years and another 22% on projects with a length of between 11-15 years. Only 4% of providers and facilitators typically implement projects longer than 15 years.

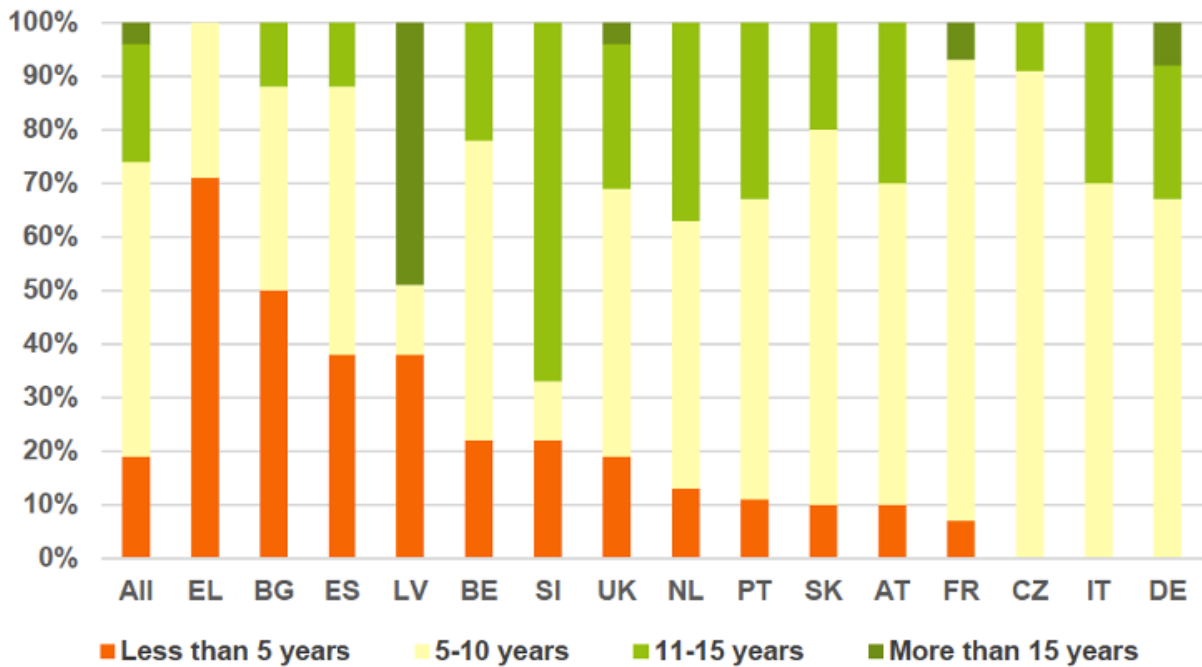


Figure 16. The common duration of the Energy Performance Contracts (2017) [7]

- The guaranteed savings model dominates EPC markets across All Countries in the survey. Half of the providers and facilitators reported that they offer solely the guaranteed savings model in their EPC projects (Figure 17). On the other hand, one-fifth of respondents use solely the shared savings model. The remaining respondents (30%) use both models in their projects.

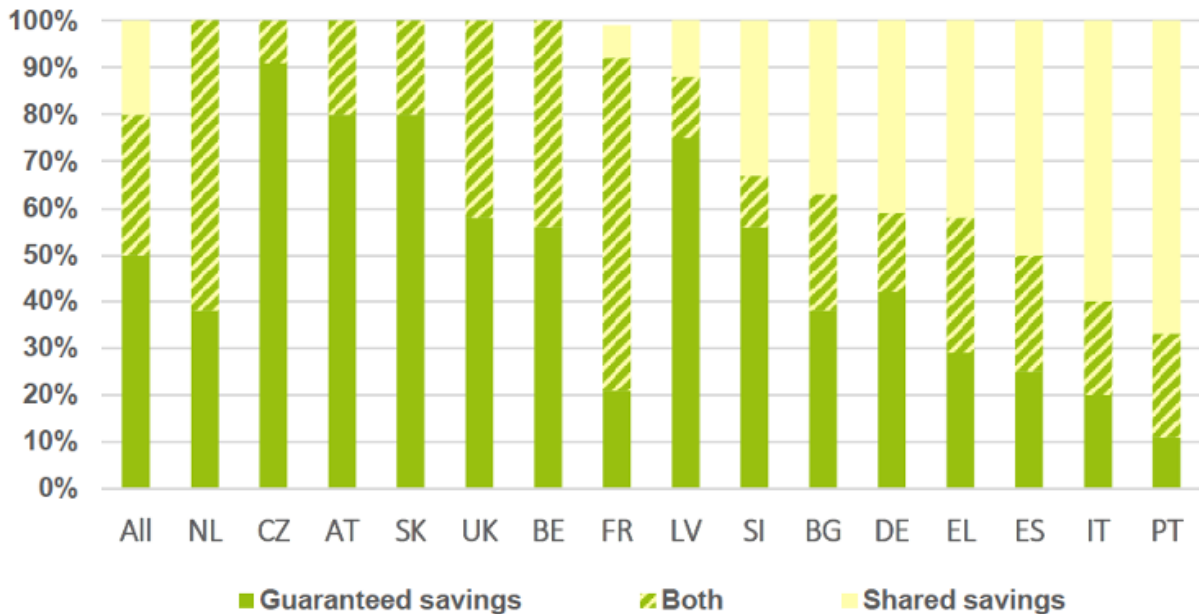


Figure 17. Type of energy savings model offered in the EPC projects (2017) [7]

- The survey confirms that the public sector drives EPC markets. The majority of EPC providers and facilitators (64%) report that their clients are most frequently municipalities (Figure 18). In general, municipalities are followed by two other key areas of the public sector, i.e., education (41%) and healthcare (34%), which share the third highest-ranked position with industrial clients (34%).

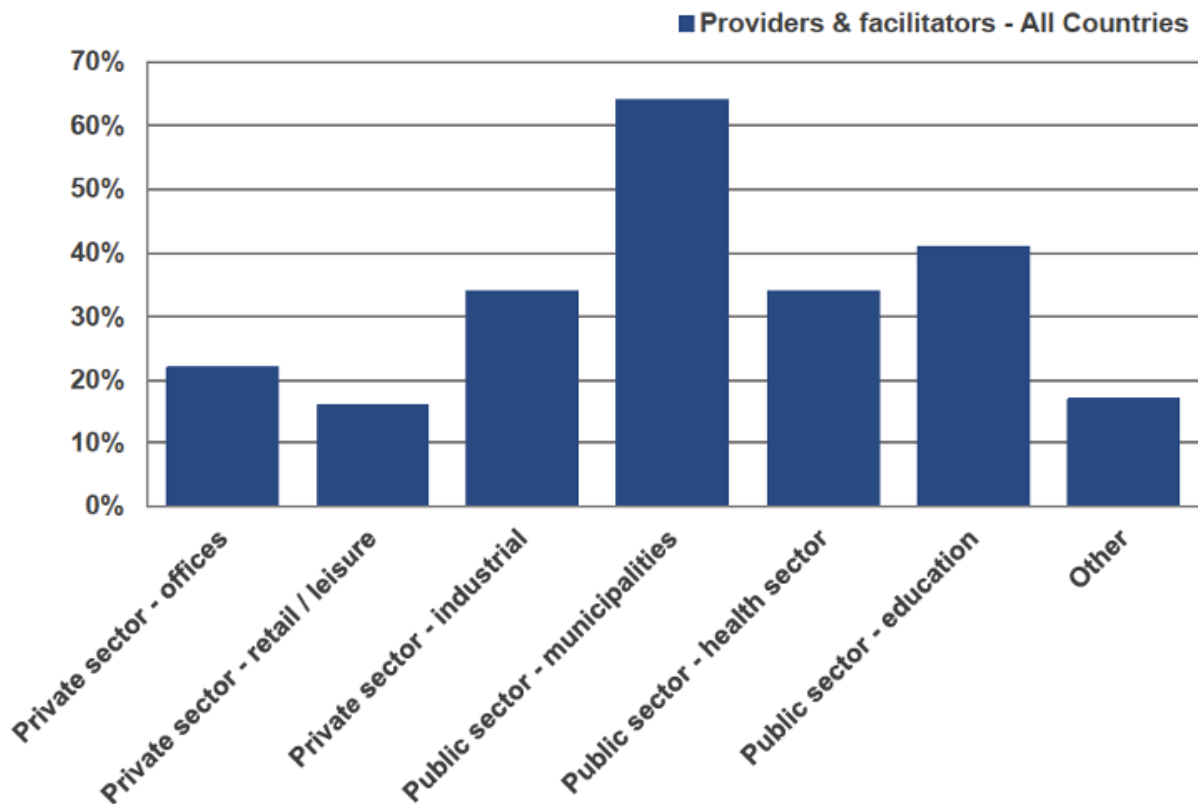


Figure 18. Sector coverage of EPC projects (2017) [7]

- The majority of EPC providers and facilitators in the survey (71%) highlighted that the EPC provider is typically responsible for energy savings performance analysis (often referred to as measurement & verification or M&V), while only 23% of respondents reported that a third party takes over responsibility for this task (Figure 19). In some cases, clients choose to use an independent third party to carry out performance reporting or provide verification of the EPC provider's reporting. This can reduce the risk of the EPC provider's vested interests (i.e., their interest in ensuring the highest level of performance is reported such that they maximize their remuneration under the savings guarantee) affecting the reliability or fairness of the performance reporting.



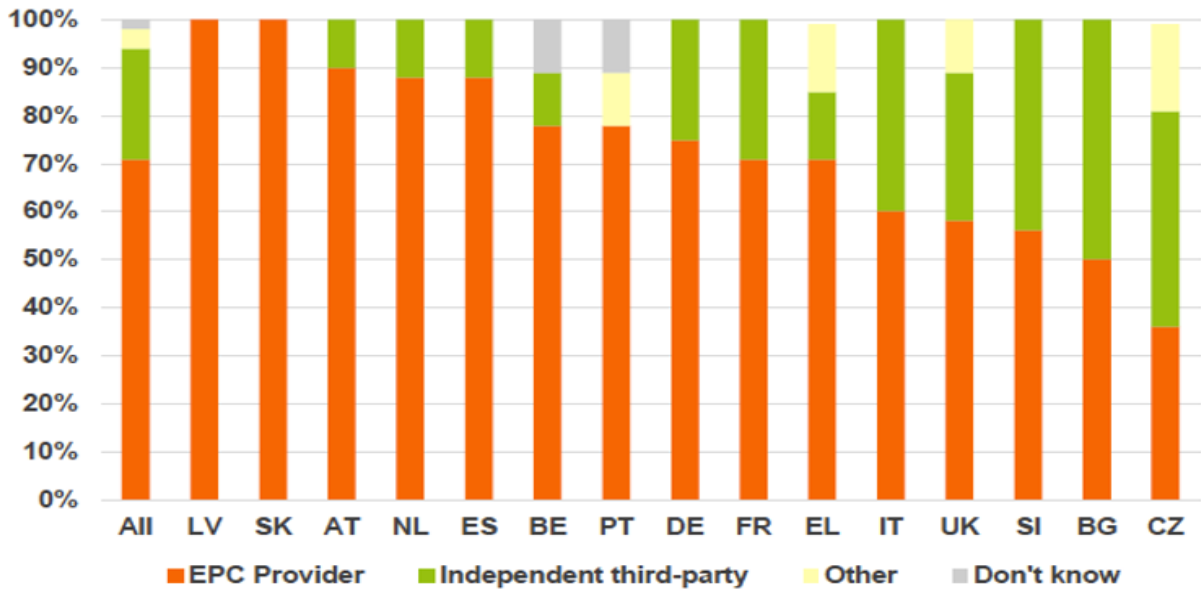


Figure 19. Delivering the energy savings performance analysis in the EPC projects (2017) [7]

- As can be understood from Figure 20, “Complexity of the concept/lack of information” (58%) and “lack of trust” in the ESCO industry as the top barriers to the development of the EPC market.

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

Figure 20. Main barriers to EPC business (2017) [7]

- Providers and facilitators indicated that for the EPC projects they are involved in, service provider debt (38%), client debt (34%), and service provider internal financing (33%) were the most used types of financing (Figure 21). The providers could select more than one option as an answer to the question, thus if 28% stated grants and subsidies, these were mostly in combination with other sources of financing. A similar share of providers and facilitators selected project financing (24%) and sale of claims (23%), which is where EPC service payments are sold by the service provider to investors on financial markets. Financial institutions most often selected debt borrowed by the service provider (35%) or by the client (35%), which is similar to the results received from providers and facilitators. The results differ when it comes to the sale of claims, which was cited by 35% of financial institutions (excl. France and the Netherlands), i.e., noticeably more than by the providers and facilitators (Figure 21).

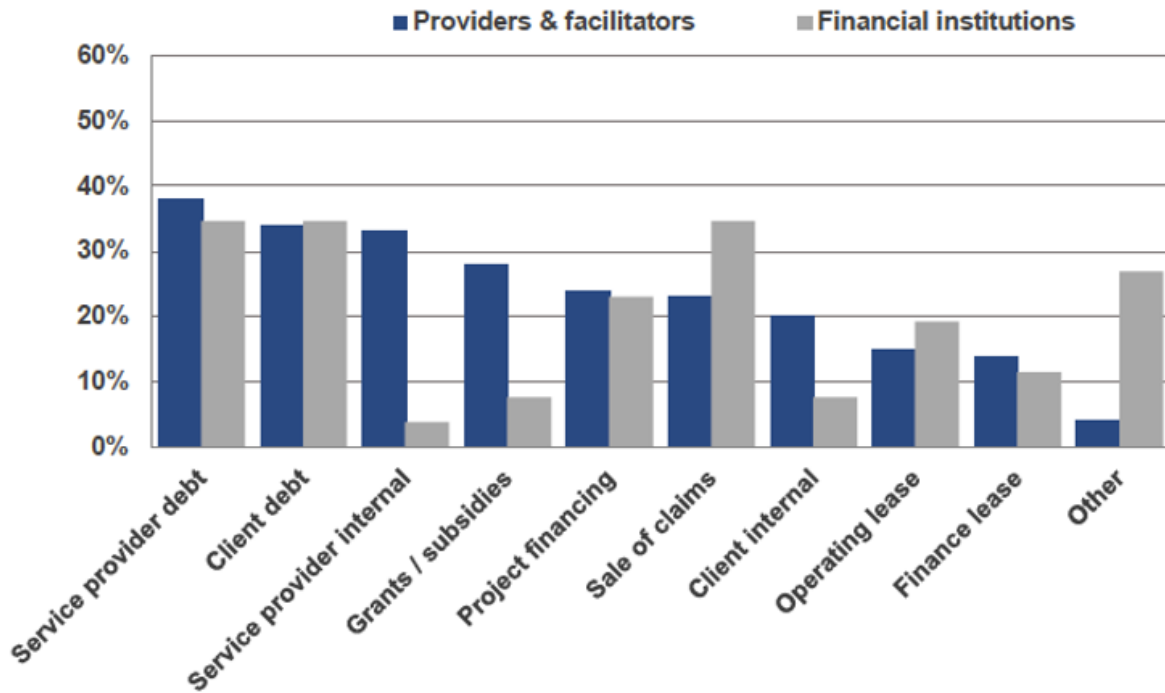


Figure 21. Financing options in EPC projects (2017) [7]

- The general view of respondents is that obtaining viable finance is "difficult" (54%) or "very difficult" (12%). Obtaining viable finance was seen as "easy" only by 29% of respondents (Figure 22).

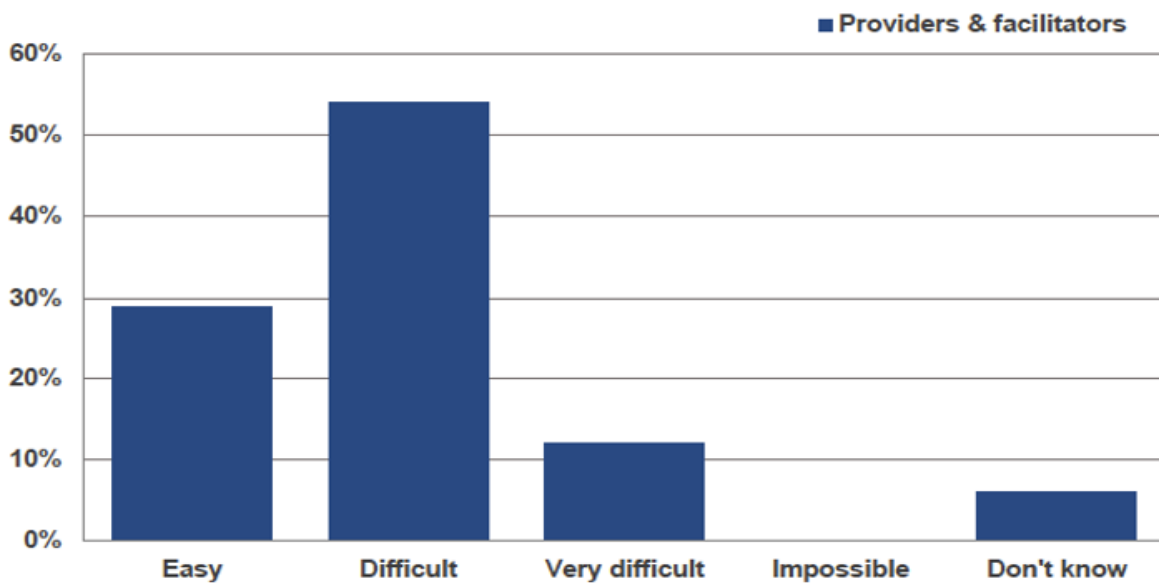


Figure 22. Easiness of obtaining viable finance for an EPC project (2017) [7]

- Financial institutions interviewed in the survey (excl. France and the Netherlands) unanimously agreed as 100% of them stated that creditworthiness is a key condition to be met for the EPC project to obtain financing (Figure 23). A large majority of financial institutions agreed that the provider must be creditworthy (76%), the project must be legally robust (abide by all legal requirements) (76%), the contract needs to be well formulated, including step-in rights, penalties, receivables, bankruptcy, etc. (76%), and the project must

be profitable (74%). Sharing of risks and the integrity of the project are the least relevant factors, as only 50% and 44% of respondents respectively stipulated that these conditions need to be met, however, a significant share of respondents think they should be considered.

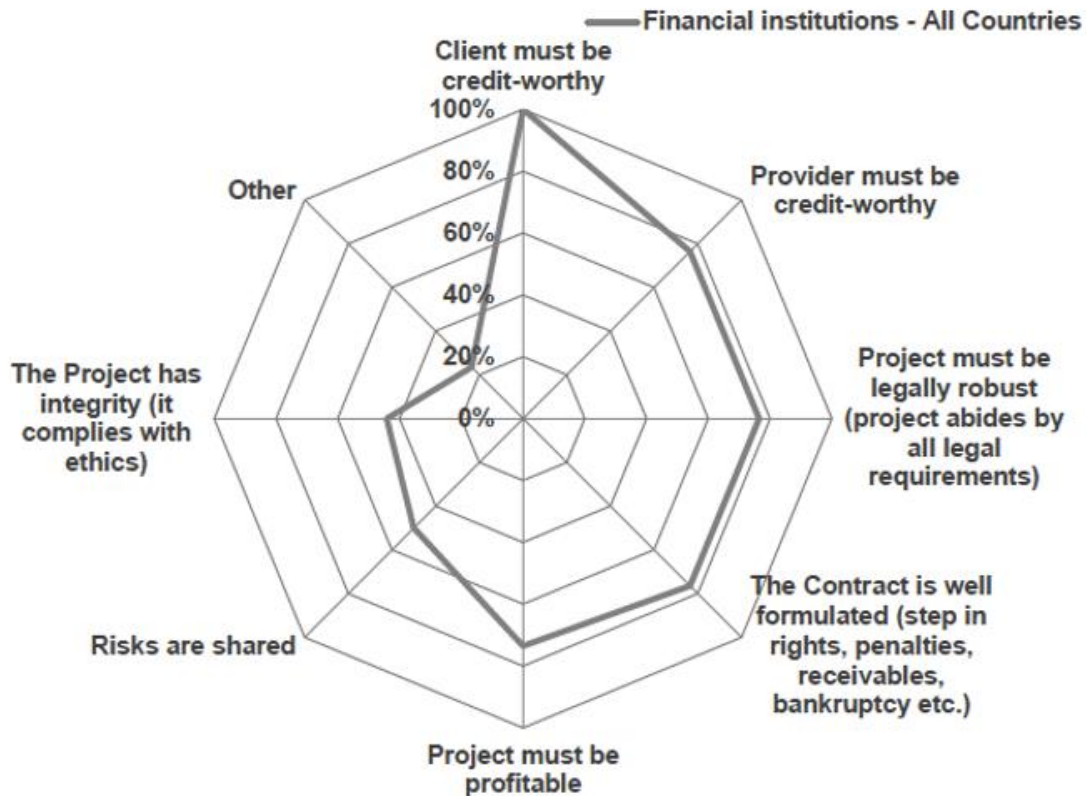


Figure 23. Conditions must be met for the EPC projects to obtain financing (2017) [7]

### 3.3. Energy Service Market in Turkey

After evaluating the global and EU-specific energy service markets with a focus on ESCO/EPC sectors, the current situation and future opportunities in Turkey are explained in this section.

#### 3.3.1. Current Legislative Framework and Applications

First of all, it will be useful to explain the related institution for organizing the energy service market in Turkey. The Ministry of Energy and Natural Resources (MENR) is the main responsible governmental institution in the energy service market. Besides, before 2011, The General Directorate of Electrical Power Resources Survey and Development Administration (EIE) had acted as a secretary for the market organization. On October 11, 2011, EIE was closed in line with Decree No. 662, which was published in the Official Journal No. 28103 [8]. The duties and authorities of EIE were transferred to the “General Directorate of Renewable Energy (DG of RE)”. However, in line with the Presidential Decree No. 27 published in the Official Journal No. 30855 on August 07, 2019, the DG of RE was reorganized as the “**Energy Efficiency and Environment Department (EVCED)**” under MENR [9].

**The Energy Efficiency Law** No. 5627, which is one of the first pieces of legislation regarding energy efficiency in Turkey, was adopted on 18/04/2007 and entered into force after being published in the

Official Journal dated 2/5/2007 and numbered 26510 [10]. The purpose of the law; is defined as "increasing efficiency in the use of energy resources and energy, to prevent its waste, to alleviate the burden of energy costs on the economy and to protect the environment". The law includes the procedures and principles to be followed in matters such as the definition and authorization of the boards related to energy efficiency, training, awareness and implementation principles, supports, and administrative sanctions, and defines important concepts such as "energy efficiency consultancy company" and "energy performance contract".

In the Law, to carry out energy efficiency studies, "**energy efficiency consultancy (EVD) companies**" rather than ESCO are defined. EVD companies can carry out audit and consultancy activities in line with the service agreements made with industrial enterprises and buildings. Here, the audit is described as "the studies conducted to reveal the possibilities for increasing energy efficiency and consisting of information gathering, measurement, evaluation, and reporting stages". After determining the energy efficiency measures with the audit, an energy efficiency project can be prepared. It is expected that a certain amount of energy savings will be guaranteed at the end of the project. EVD companies have to prove the amount of energy savings committed and achieved with measurements to be made before and after the project.

One of the types of agreements that EVD companies can make is an "**energy performance contract (EPC)**" and in the Law, it is defined as "a contract based on the principle of guaranteeing the energy savings to be achieved after the implementation project and paying the expenditures with these savings that will occur as a result of the implementation". Moreover, in Article 77 of the Law No. 7103 (The Law on Amendments to Tax Laws and Some Laws and Decrees), which was published in the Official Journal on 27/3/2018, a more comprehensive explanation was given on energy performance contracts and it has been announced that public institutions and organizations can also make energy performance contracts, provided that the contract period does not exceed 15 years [11]. The payment of the energy performance contract will be done from the budget in which the energy purchase expenses are made and the total annual payments will not exceed the amount of savings guaranteed.

With the **Presidential Decree on 15/08/2019 and numbered 2019/18**, a minimum 15% energy saving target has been defined until the end of 2023 for public buildings with an annual total energy consumption of 250 TOE and above or a total construction area of 10 000 m<sup>2</sup> and above [12]. Hence, it has been announced that energy performance contracts will be used in the investment to be made in a public building by **the Presidential decree published in the Official Journal No. 31220** on 21 August 2020 [13]. According to this decree, energy efficiency investments with long payback periods became possible by paving the way for the use of energy performance contracts in public buildings.

For 2023, energy efficiency-related actions, strategies, and targets are stated in "**National Energy Efficiency Action Plan (NEEAP) 2017-2023**". Under the NEEAP, it is aimed to reduce the primary energy consumption of Turkey by 14% through 55 actions defined in 6 categories as buildings and services, energy, transport, industry and technology, agriculture, and cross-cutting (horizontal) areas between 2017 and 2023 [14]. It is also expected to achieve 23.9 MTOE cumulative energy savings with a 10.9 billion USD investment by 2023. These cumulative savings shall be extended by 2033 and the required investment will be 30.2 billion USD at 2017 prices, to continue the effect of energy savings until 2040. It should be noted that the average payback period for actions is around 7 years.

Table 1 summarizes the actions for the EVD and EPS sectors in the UEVEP.

*Table 1. Actions related to EVD companies and EPCs stated in NEEAP*

Sector	Action
Cross-cutting areas	Y1. Establish and increase the effectiveness of energy management systems (TS ISO 50001)
	Y4. Develop standard guides and contracts containing technical, legal, and financial aspects for energy efficiency projects
	Y9. Perform more energy efficiency audits
Building sector	B10. Improve energy performance of existing public buildings
Industry sector	S6. Mapping energy saving potential
	S7. Improve voluntary agreements
Energy sector	E7. Improve energy efficiency in public lighting

Among these actions, specifically, EPC-related ones are explained below:

**Y4. Develop standard guides and contracts containing technical, legal, and financial aspects for energy efficiency projects:**

**Goal:** Enable consumers to benefit to the maximum extent from the energy efficiency service sector by developing infrastructures such as guides, standard contracts, and similar bases containing technical, legal, and financial aspects and a framework that will guide the sector.

*The standardization of the services of EVD companies and strengthening the financing side will help improve the service quality, and facilitate the financing and scaling up of energy efficiency services.*

**Activities to Undertake:**

- Standard contracts and guidelines will be prepared which are easy-to-understand and consist of clear clauses; standard contract forms, project processes, tools, and templates will be created.
- Sample projects will be drawn up to include an insurance system for Energy Performance Contracts and contract templates will be created.
- Technical training programs will be delivered to build capacity for EVD companies, and courses, conferences, and seminars will be organized for various sectors to introduce successful cases and best practices to encourage energy efficiency investments.

- Activities will be undertaken which make it possible to use the energy savings derived from energy efficiency projects as a security.
- A framework for cooperation will be built between EVD companies and financing institutions to support energy efficiency projects. A financial scheme will be developed to suit EVDs' business models in Turkey, and new financing support mechanisms will be created to develop the sector for small and mid-sized EVD companies particularly.

Outputs and Indicators:

Bases containing technical, legal, and financial aspects for energy efficiency projects prepared, increase in the number of energy efficiency projects

Responsible Institutions: Ministry of Energy and Natural Resources

Relevant Institutions: Ministry of Environment, Urbanization and Climate Change, Ministry of Industry and Technology, Ministry of Transport, EVD Companies, Financing Institutions

Timeline: Analysis and legislation work will be conducted in 2017 and 2018, and action will be implemented in 2019.

#### B10. Improve energy performance of existing public buildings:

Goal: Increase energy efficiency investments in public buildings through using EPCs that allow the financing of investments necessary for energy efficiency measures by savings.

Activities to Undertake:

- The legislative framework will be developed to enable public buildings to conclude long-term contracts.
- Standardized templates will be formulated for EPCs.
- The technical and financial capacities of EVD companies will be increased.
- A control and verification mechanism will be established.

Outputs and Indicators:

A legislative framework developed, standardized templates developed for EPCs, control and verification mechanism established

Responsible Institutions: Ministry of Energy and Natural Resources

Relevant Institutions: Ministry of Treasury and Finance, Financing Institutions, EVD companies

Timeline: The technical and administrative infrastructure work will be completed in 2018. The implementation will start in 2019.

#### E7. Improve energy efficiency in public lighting:

Goal: Replace armatures used in public lighting with efficient ones.

Activities to Undertake:

- Work will be undertaken to plan the replacement of sodium vapor lamps with LED lamps considering cost-benefit, time, and efficiency; also, necessary revisions will be made to the procedures and principles regarding LED lighting systems.
- TEDAS, EMRA, distribution companies, the Ministry of Environment, Urbanization and Climate Change, municipalities, the General Directorate of Highways, etc. will prepare detailed transition programs.
- Innovative technologies will be monitored and integrated into the legislative framework.

- Control and monitoring activities will be undertaken to maximize energy savings potential; the implementation of EPCs will be promoted associated with EVD companies.
  - Plan actualization and energy savings verification will be monitored.
  - Development of competences for local design and production in efficient lighting systems will be promoted.

Outputs and Indicators:

A legislative framework was developed, the number of transitions to LED, the quantity of energy saving actualized

Responsible Institutions: Ministry of Energy and Natural Resources

Relevant Institutions: Energy Market Regulatory Authority (EMRA), TEDAS, Electricity Distribution Companies, Municipalities, General Directorate of Highways, Ministry of Environment, Urbanization and Climate Change

Timeline: The legislative framework will be developed in 2017 and 2018, and the transition program will start in 2020.

When the progress of EVD companies is considered, Table 2 presents the number of EVDs between 2009 and 2022.

*Table 2. Number of EVD serving for industry and building sectors both between 2009 and 2022*

<b>Year</b>	<b>Number of EVD industry</b>	<b>Number of EVD buildings</b>	<b>Number of EVD both</b>	<b>Total</b>
2009	1	1	-	<b>2</b>
2010	4	2	1	<b>7</b>
2011	2	6	3	<b>11</b>
2014	6	24	5	<b>35</b>
2015	4	25	8	<b>37</b>
2020	7	30	8	<b>45</b>
2021	11	28	16	<b>55</b>
2022	8	23	21	<b>52</b>

As can be seen, the numbers have increased gradually and since 2014, the number of EVDs serving the building sector exceeds the number serving the industrial sector. This can be because of more un-evaluated energy-saving potentials in the building sector. In addition, the number of EVD companies serving both sectors increased more this year and this can be caused by the improvement of legislation in favor of the energy service market.



When EPC is of concern, in accordance with the additional article 1 of the Energy Efficiency Law, the "**Decision on the Procedures and Principles Regarding the Public Energy Performance Contracts**" has been published by the Presidency in 2020 [13]. With the **Communiqué** prepared by MENR in 2021 based on the aforementioned Decision, the details regarding the implementation of EPCs were explained, the format of the study report, the specifications, and the contract drafts were arranged as an annex to the Communiqué [14]. In addition, the guide on how to implement energy performance contracts in the public sector, the measurement verification experts' certification by MENR, and the International Measurement and Verification Protocol translated into Turkish are available as an annex of this Communiqué.

With EPCs signed between the contractor and the customer, the payments of the EVD company are made as much as the difference between the reference energy consumption and the actual consumption for a certain period, in return for the investment that is made. Savings are guaranteed with the contract and the savings are left to the customer at the end of the contract period. The number of EPC made by EVD companies is given in Figure 24.

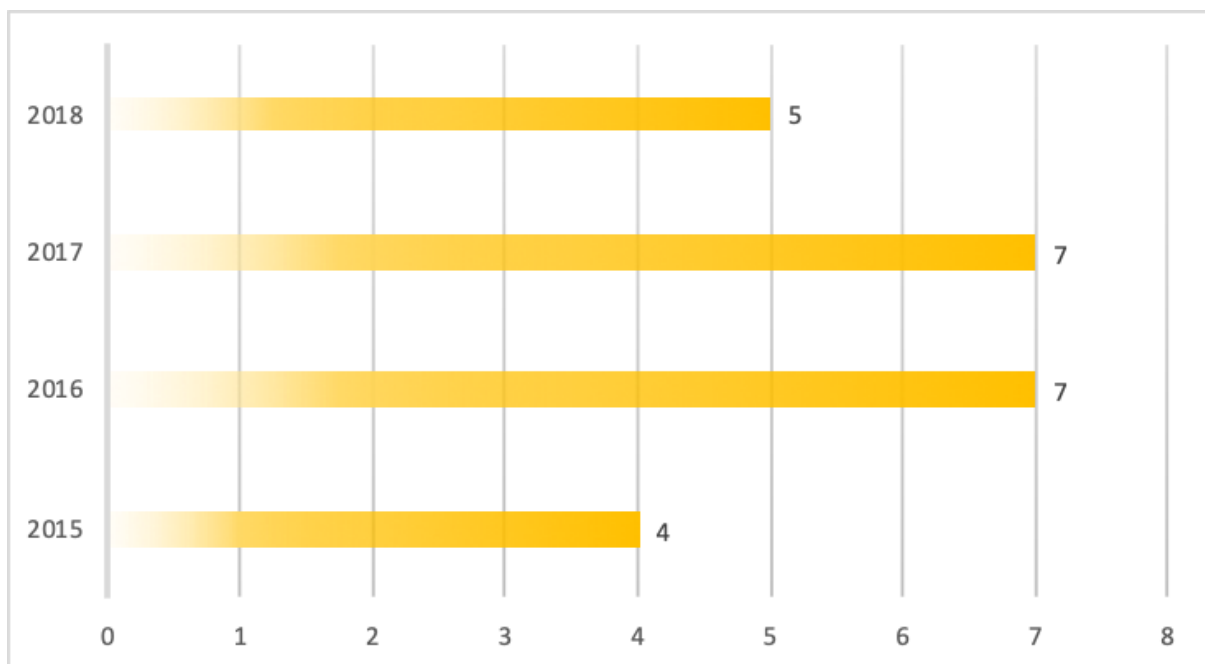


Figure 24. Number of energy performance contracts made by EVD companies [16]

The total amount of savings potential determined in EPCs issued is given in Figure 25 with the investment amounts required for realizing these savings. In 2015, while the energy-saving potential is around 980 toe/year corresponding to 1.1 million TL/year, the amount of investment required to achieve these savings is around 2.1 million TL. In 2016, the monetary equivalent of the amount of energy savings potential detected was 89 million TL/year with an increase of 89%. Between 2015 and 2017, saving potentials determined in EPCs increased, sharply by about 196%. On the other hand, there is a severe decrease between 2017 and 2018 and the saving potential decreased by nearly 76%. Though the simple payback period of investments for 2015 and 2016 is less than 2 years, this period is slightly above 2 years for 2017, and in 2018, this period exceeds 4 years.



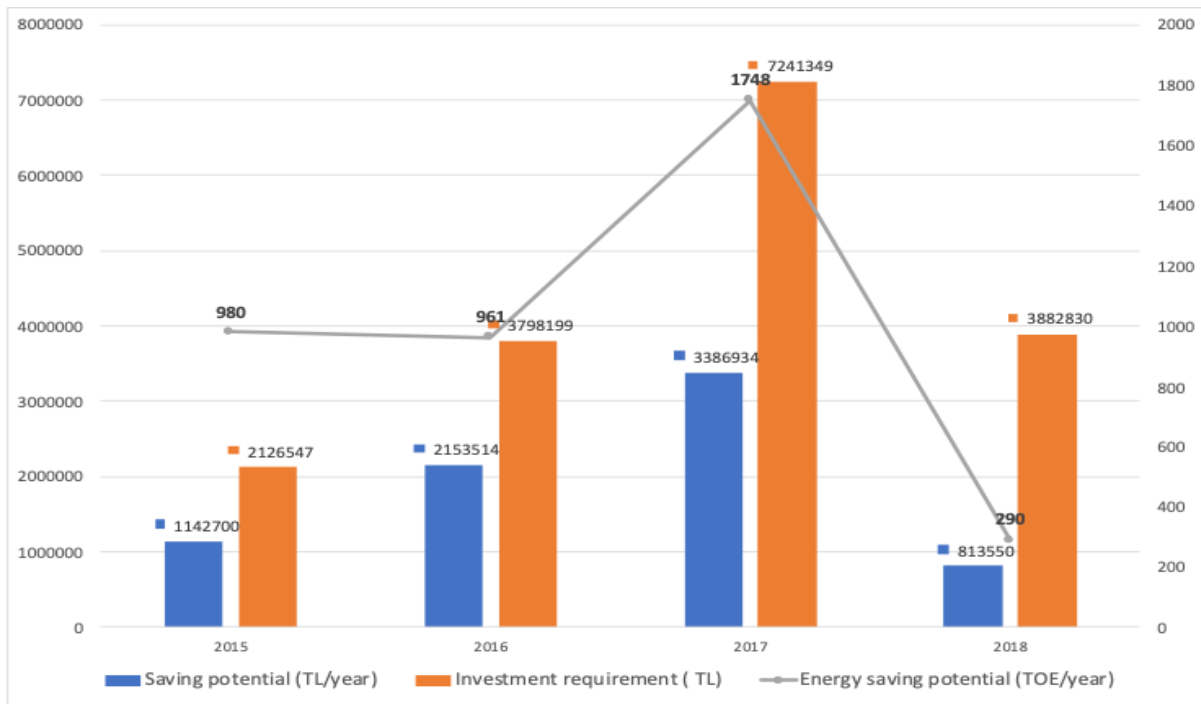


Figure 25. EPCs with saving potentials and investment requirements [18]

### 3.3.2. Future Challenges

In addition, the use of market-based energy efficiency policy mechanisms that utilize market forces to reach targets offers the potential for policymakers to access more cost-effective efficiency gains. Two types of programs fit well with market-based energy efficiency mechanism instruments: **Energy efficiency obligations** (EEOs—also known as energy-saving obligations, energy efficiency resource standards, energy efficiency performance standards, or white certificates) and **Auction mechanisms**. In the cross-cutting issues of NEEAP, EEO and auctions are stated as “**Y11 - Establish an obligation program for Energy Distribution or Retail Companies**” and “**Y3 - Support energy efficiency projects through energy efficiency auctions**”, respectively.

Energy Efficiency Obligation Scheme (EEOS) is a mechanism that places requirements on obligated parties to meet quantitative energy savings targets across their customer portfolio. Obligated parties can directly meet their obligations by implementing EE actions themselves or they can conclude partnership or contracting agreements with third parties such as ESCOs/EVD companies. Most of the EEOS have trading of the energy-saving option. In this case, obligated parties meet their obligations by buying energy savings from other obligated parties who exceeded their obligations or voluntary third parties. ESCOs/EVD companies are one of the most suitable options for voluntary third parties. Due to their energy efficiency project implementation experiences, ESCOs/EVD companies are important for the EEOS and EEOS can encourage the emergence of ESCOs/EVD companies and the development of EPCs as well. In some EEOS, white certificates are used for verified energy savings. Obligated parties can earn white certificates with their energy-saving actions, purchase certificates from other parties, or sell their excess certificates to other parties [17]. The purpose of white certificate schemes is to improve the liquidity of energy savings as a commodity and reduce prices possibly by increasing the role of ESCOs/EVD companies. A White Certificate market allows third parties to generate eligible energy savings outside of bilateral contracts with obligated parties and increase the mobilization of ESCOs/EVD companies [18]. According to EU experiences, EEOS may trigger the success of the energy service market in Turkey. Through EEOS, the EPCs would also be promoted by the third-party agreements and ESCO's/EVD companies' participation in the scheme. The development of these market-based policy mechanisms (especially EEOS) together with the

improvement of the EPC concept is stated in the agenda of NEEAP and they will serve to strengthen each other in the energy service market.

The EU announced the “European Green Deal” in 2019, setting the goal of being the first climate-neutral continent in 2050. The relevant actions within the scope of the European Green Deal will result in a transformation that will reshape the EU economy, energy, transport, industry, finance, construction, and agriculture sectors and gain an increasing trend year after year. In Turkey, one of the last strategic documents, for the harmonization with the EU in these areas, is the “**Green Deal Action Plan for Turkey 2021**” [19]. In the plan, it is stated that the green transformation of the Turkish economy and industry, together with establishing inclusive and sustainable growth, is considered essential to maintain and strengthen Turkey’s competitiveness in exports to third countries, especially the EU. The steps to be taken in this area are also important in terms of improving the integration of Turkey into global value chains and increasing the share of international investments in the energy service market.

Table 3 shows the significant targets and actions related to EE considering the Turkish Green Deal.

*Table 3. Significant Energy Efficiency-Related Targets and Actions derived from the Turkish Green Deal Action Plan*

Target	Action	Outputs	Related Institutions
To carry out studies regarding national carbon pricing	Considering the carbon border adjustment mechanism, determining the position of Turkey in terms of carbon pricing	Preparing position paper	Responsible Institutions Ministry of Environment, Urbanization and Climate Change  Relevant Institutions DG of Strategy and Budget, MENR, Ministry of Treasury and Finance, Ministry of Agriculture and Forestry, Ministry of Trade, and Ministry of Industry and Technology
	<b>Determining the impact of the national carbon pricing mechanism on energy sectors and the economy concerning additional costs</b>  Evaluating additional supporting mechanisms like EU emission trading	Supporting energy sectors regarding carbon pricing	Responsible Institutions Ministry of Environment, Urbanization and Climate Change  Relevant Institutions DG of Strategy and Budget, Ministry of Treasury and Finance, Ministry of Agriculture and Forestry, MENR, and Ministry of Industry and Technology

<b>To determine the required steps for a national financing mechanism based on additional financing requirements for green transformation</b>	Considering the financial support in the EU, evaluating the national financial support system, and making a need assessment study	Additional Financial Support for Waste Management  Investment with environmental license  Investments regarding energy efficiency	Responsible Institutions Ministry of Industry and Technology  Relevant Institutions DG of Strategy and Budget, Ministry of Treasury and Finance, Ministry of Environment, Urbanization and Climate Change, MENR, and Ministry of Trade
	<b>Evaluating the development of National Energy Efficiency Financing Mechanisms</b>	Preparing the report for the evaluation  <b>Preparing the Notice for energy performance contracting in public buildings</b>	Responsible Institutions MENR  Relevant Institutions DG of Strategy and Budget, Ministry of Industry and Technology, Ministry of Treasury and Finance, Ministry of Environment, Urbanization and Climate Change, MENR, Ministry of Trade, EMRA and TOBB

In a conclusion, concerning global, EU, and Turkish energy service markets and some important future challenges, a preliminary gap analysis for ESCO or EVD/EPC sector can assist to improve the legislation and true implementations from legal, financial, and insurance points of view.

### 3.4. Gap Analysis

In the EU, still many barriers limit growth in European ESCO markets as of 2018. Table 4 shows existing barriers limiting ESCO/EPC implementation in the Member States.

*Table 4. Most relevant barriers limiting ESCO/EPC implementation<sup>6</sup>*

Country	Barriers	Country	Barriers
Austria	The 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	Latvia	Lack of appropriate forms of finance, ambiguities in the legislative framework
Bulgaria	Ambiguities in the legislative framework, lack of appropriate forms of finance	Lithuania	Ambiguities of the legislative framework, mistrust from the (potential) clients, the inexperience of actors
Croatia	Lack of standardization, lack of co-financing or financial instruments aimed at ESCO projects	Luxemburg	n/a
Czech Rep.	Concerns about the rules on applications, ambiguities of the legislative framework	Malta	Political reluctance, and focus on other energy sector solutions; availability of alternative sources of finance.
Denmark	Relatively long lifetime of projects, a saturation of the public sector	Netherlands	The small size of projects and high transaction costs, ambiguities in the legislative framework
Estonia	The small size of projects and high transaction costs, regulative/administrative problems	Poland	Insufficient promotion of energy services, mistrust, incompatibility of ESCOs with other financial schemes
Finland	The small size of projects and high transaction costs, mistrust from the (potential) clients	Portugal	The small size of projects and high transaction costs, mistrust from the (potential) clients
France	Mistrust from the (potential) client, the small size of projects, and high transaction costs	Romania	Ambiguities in the legislative framework, banking system, and their ignorance of the ESCO activities

Germany	Mistrust from the (potential) client; the 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
Greece	Lack of appropriate forms of finance; the existence of in-house technical expertise	Slovenia	Lack of trust in ESCOs, complex book-keeping rules, and administrative barriers (in the public sector)
Hungary	Legal and regulatory instability, lack of trust and low reputation of the sector, financing sources (in residential and public)	Spain	The small size of projects and high transaction costs; mistrust from the (potential) clients
Ireland	Lack of experience of actors; lack of appropriate forms of finance	Sweden	Mistrust from the (potential) clients; collaboration and cultural issues; perceived business and technical risk
		United Kingdom	Mistrust from the (potential) clients; lack of trust from the ESCO industry

Since the project considers the main topics of interest as legal, financial and insurance, based on global and EU experiences together with the national situation in Turkey, Table 5 which was developed for this project can summarize the main barriers concerning legal, financial, and insurance topics.

*Table 5. Barriers with regard to EPC application considering legal, financial, and insurance issues*

Barrier	Legal Issues	Financial Issues	Insurance
The economic situation in Turkey	√	√	√
Wide scope energy efficiency legislation	√		
Administrative barriers	√		

Policy uncertainty (i.e., NEEP deadlines are already passed)	√		
The inexperience of actors in the market		√	√
Lack of governmental incentives for the building sector	√	√	
No national energy efficiency fund	√	√	
Need for project design for profitability and worthy risk management		√	√
The uncertainty associated with the performance of efficiency measures		√	√
Complex accounting/bookkeeping rules		√	√
Market-size and transaction costs (i.e., the small size of projects and high transaction costs)		√	√
Creditworthiness to obtain EPC financing		√	√
Need for well-formulated contracts		√	√
Poor insurance applications		√	√

Poor M&V applications		√	
Lack of awareness by the customers		√	

The project, it is aimed to establish three working groups consisting of the representatives of Turkish CSOs and European counterparts in the field of ESCO/EVD and EPC to perform detailed gap analyses for each topic. The working groups will be the main tools that would help to create and maintain the dialogue mechanism among the partner CSOs and produce high-quality outputs that would serve the objectives of the program in general and this action in particular.

#### 4. Working Groups' Studies

In this chapter, all the working group studies are explained in detail. Turkey and Italian cases are introduced separately. In the case of Italy section, the current ESCO-EPC market situation in Italy is given in detail.

The working groups (WGs) are established as presented in Table 6.

*Table 6. Working groups' information*

<b>Name</b>	<b># of experts</b>	<b># of EYODER representatives</b>	<b># of FEDERESCO representatives</b>	<b># of EHAE representatives</b>	<b>TOTAL #</b>
WG1 - Legal	5	2	1	1	9
WG2 - Finance	4	2	1	-	7
WG3 - Insurance	3	2	1	-	6

It can be stated that all experts for WG1, WG2, and WG3 are from pioneer law (including EHAE), financing and insurance institutions in Turkey, respectively. Representatives from EYODER are members of a related commission in the association. Two representatives of FEDERESCO are from the project team and one expert from related fields of the WGs is in each group.

##### 4.1. Case of Turkey

This section starts with a gap analysis of the Turkish EPC sector and concludes with a discussion of the gap analysis results and draft recommendations.

##### 4.1.1. Gap Analysis of the Turkish EPC Sector

Gaps in the Turkish EPC sector, obtained from both desk research and working group meetings, are listed for three working groups in Table 7.



Table 7. Main gaps in Turkish EPC sector for three working groups' topics

Legal	Finance	Insurance
1. The current economic situation in Turkey	1. The current economic situation in Turkey	1. The current economic situation in Turkey
2. Comprehensive energy efficiency legislation	2. Lack of governmental support for the building sector	2. Lack of special insurance products to meet the diversity of EPC projects
3. Legal and administrative obstacles	3. Insufficient EPC requirements defined for public buildings in the current regulation	3. Lack of understanding of insurance in Energy Efficiency and lack of multilateral (ESCO, finance, customer, etc.) awareness on this issue
4. Uncertainty of policy priorities	4. Evaluation of EPCs only in public sector	4. Inexperience of the actors in the market
5. Weakness and operability of support/penalty systems in EE Law	5. Lack of historical statistics and database of EPCs	5. Complexity of accounting/bookkeeping rules
6. Lack of mediation/arbitration expertise/supervision mechanism	6. Lack of national energy efficiency fund/financing mechanism	6. Insufficient EPC requirements defined for public buildings in the current regulation
7. Not evaluating public-private sector, private-private sector projects differently	7. Lack of a credit code defined specifically for EE	7. Lack of standard and well-designed contracts
8. Lack of standard and well-designed contracts	8. Failure to provide EE support/incentive to banks	8. Lack of guarantee and risk funds in project design
9. Problems arising from the rapid preparation and evaluation of technical specifications and tenders, especially in public EPCs	9. Lack of guarantee and risk funds in project design	9. Failure to make accurate performance evaluations of efficiency measures
10. Failure to make accurate performance evaluations of efficiency measures	10. Lack of financial value (like a commodity) of EPC	10. Lack of successful EPC applications in the market
11. Governmental support for the building sector has not yet been defined	11. Difficulty for customers to access financing (low credibility)	
12. Lack of national energy efficiency fund/financing mechanism	12. Often lack of credibility of the public sector (especially municipalities)	
13. Difficulties in finding solutions, especially in cases where financiers do not see ESCO/EPC as a guarantee, especially in cases of compelling reasons, an adverse effect is observed or implementation cannot be done	13. Insufficient financing capabilities of ESCOs	
14. Lack of experience and credibility of ESCOs for EPC applications	14. Lack of trust between the financier and the customer	
15. Lack of topics such as win-win and risk management in project design	15. Failure to make accurate performance evaluations of efficiency measures	
16. Scarcity of EPC applications	16. Lack of suitable insurance solutions	
17. Lack of knowledge and awareness about the ESCO/EPC sector	17. Lack of awareness of customer groups	
	18. Lack of synergy among market participants (finance+insurance+legal+ESCO+customer)	

#### 4.1.2. Gap Assessment Survey

For the evaluation of the identified gaps in the Turkish EPC sector according to their importance and probability, a gap assessment survey was prepared and answered by working groups' experts. Results of the gap assessment survey are given below in Figure 26, Figure 27, and Figure 28 for the legal, finance, and insurance working groups, respectively.

## Legal

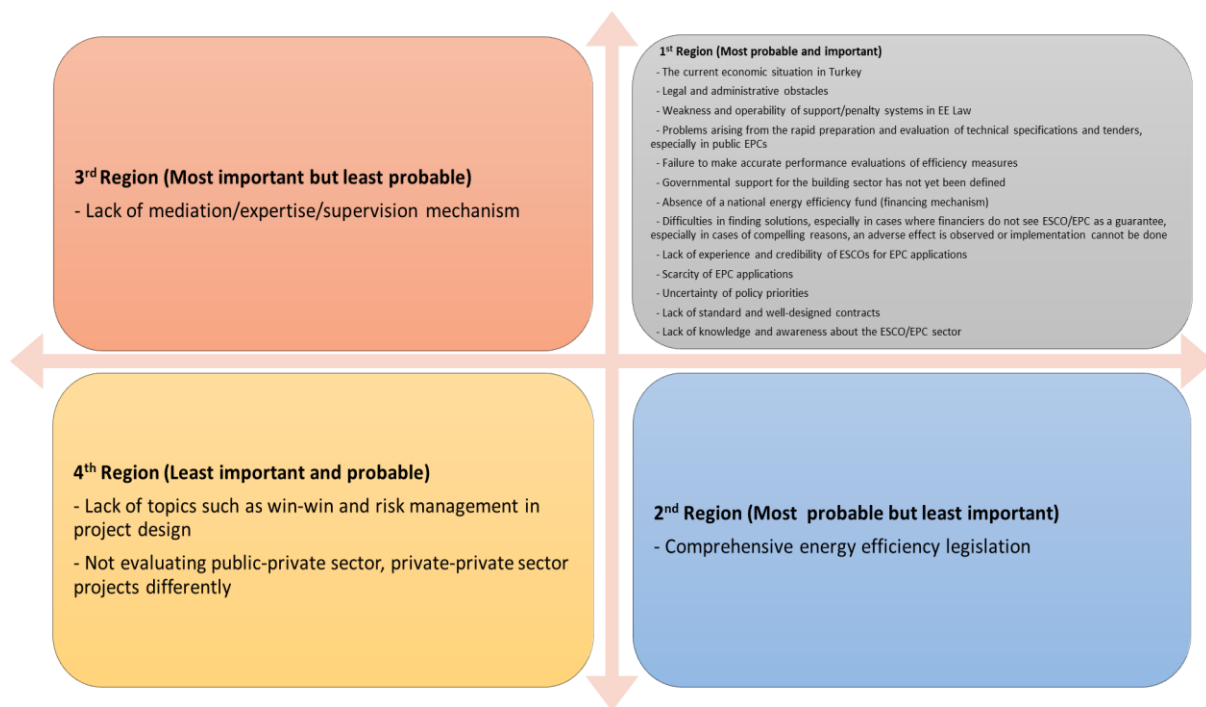


Figure 26. Assessment of gaps from the legal experts' perspective in terms of importance and probability

### 1<sup>st</sup> Region (Most probable and important)

- The current economic situation in Turkey
- Legal and administrative obstacles
- Weakness and operability of support/penalty systems in EE Law
- Problems arising from the rapid preparation and evaluation of technical specifications and tenders, especially in public EPCs
- Failure to make accurate performance evaluations of efficiency measures
- Governmental support for the building sector has not yet been defined
- Absence of a national energy efficiency fund (financing mechanism)
- Difficulties in finding solutions, especially in cases where financiers do not see ESCO/EPC as a guarantee, especially in cases of compelling reasons, an adverse effect is observed or implementation cannot be done
- Lack of experience and credibility of ESCOs for EPC applications
- Scarcity of EPC applications
- Uncertainty of policy priorities
- Lack of standard and well-designed contracts
- Lack of knowledge and awareness about the ESCO/EPC sector

### 2<sup>nd</sup> Region (Most probable but least important)

- Comprehensive energy efficiency legislation

### 3<sup>rd</sup> Region (Most important but least probable)

- Lack of mediation/expertise/supervision mechanism

#### 4<sup>th</sup> Region (Least important and probable)

- Lack of topics such as win-win and risk management in project design
- Not evaluating public-private sector, private-private sector projects differently

#### Finance

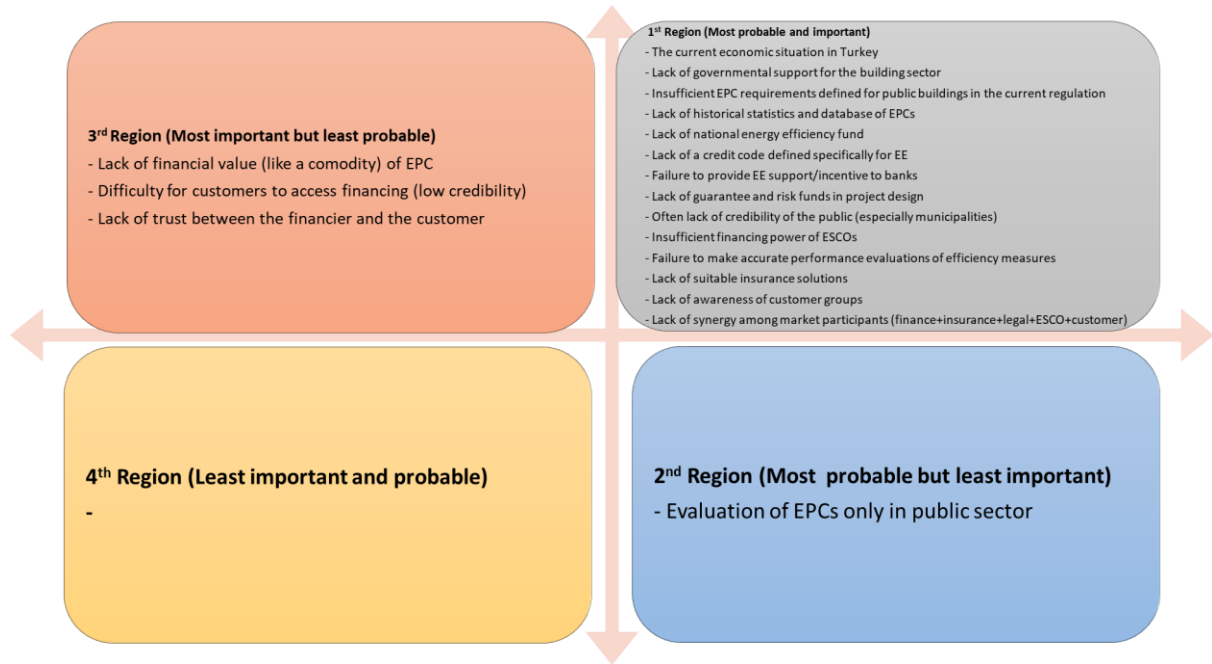


Figure 27. Assessment of gaps from the finance experts' perspective in terms of importance and probability

#### 1<sup>st</sup> Region (Most probable and important)

- The current economic situation in Turkey
- Lack of governmental support for the building sector
- Insufficient EPC requirements defined for public buildings in the current regulation
- Lack of historical statistics and database of EPCs
- Lack of national energy efficiency fund
- Lack of a credit code defined specifically for EE
- Failure to provide EE support/incentive to banks
- Lack of guarantee and risk funds in project design
- Often lack of credibility of the public (especially municipalities)
- Insufficient financing power of ESCOs
- Failure to make accurate performance evaluations of efficiency measures
- Lack of suitable insurance solutions
- Lack of awareness of customer groups
- Lack of synergy among market participants (finance+insurance+legal+ESCO+customer)

#### 2<sup>nd</sup> Region (Most probable but least important)

- Evaluation of EPCs only in public sector

### 3<sup>rd</sup> Region (Most important but least probable)

- Lack of financial value (like a commodity) of EPC
- Difficulty for customers to access financing (low credibility)
- Lack of trust between the financier and the customer

### Insurance

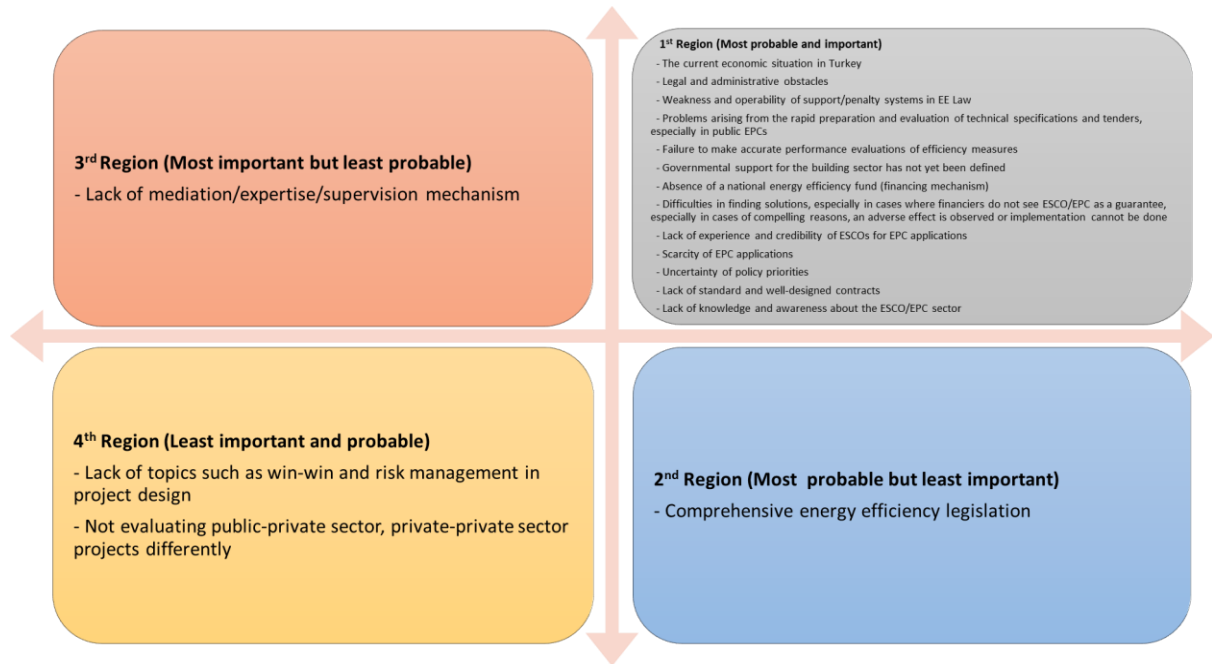


Figure 28. Assessment of gaps from the insurance experts' perspective in terms of importance and probability

### 1<sup>st</sup> Region (Most probable and important)

- The current economic situation in Turkey
- Lack of special insurance products to meet the diversity of EPC projects
- Lack of understanding of insurance in Energy Efficiency and lack of multilateral (ESCO, finance, customer, etc.) awareness on this issue
- Inexperience of the actors in the market
- Insufficient EPC requirements defined for public buildings in the current regulation
- Standard, TYPE etc. lack of well-designed contracts
- Lack of guarantee and risk funds in project design
- Failure to make accurate performance evaluations of efficiency measures
- Lack of successful EPC applications in the market

### 4<sup>th</sup> Region (Least important and probable)

- Complexity of accounting/bookkeeping rules

#### **4.1.3. Discussions on the Gaps in the Turkish EPC Sector**

Based on the assessment of the identified gaps by the working groups, an online discussion meeting was organized for three working groups, separately, and experts were asked about their comments to overcome these gaps. The first results are explained below:

##### ***Legal***

- It is necessary to add the legal dimension to the scope of policy priorities. For this purpose, it is important to analyze the current legislation in detail and to examine and compare the regulations in the European Union.
- Regarding the support/penalty systems together with their weakness of the operability in the Energy Efficiency Law, first of all, the authorized administrations should be clearly defined and relations should be established between them. Within the scope of the regulations; It should be clearly stated in the legal regulations what obligations are imposed on whom, what the support and punishment systems are, and who is responsible for supervision/monitoring.
- The penalty system can be in the form of deprivation or additional payments. For example, a system such as payment according to the amount of waste produced can be set up. Like license/permit etc. for new buildings, there may be a pre-requisite. In addition, deprivation of rights or tax liability can be considered in this context.
- The non-uniformity of the administrative procedure causes more problems in practice. Differences in technical specifications can be explained legally, but every unsuccessful example in the administrative procedure sets a precedent for another. Therefore, the administrative procedure, i.e. legislation and regulations, should be general and should be the same for all applications. It may be possible to introduce differences in technical specifications depending on institutions or projects. The preparation of technical specifications to meet different needs is important in terms of increasing successful sample applications.
- To prepare the technical specifications, it is necessary to conduct an audit study. Administrations need to train human resources to conduct studies and prepare technical specifications or to overcome this problem by hiring services in this regard.
- To make up for the lack of standard and well-designed contracts, it can be suggested that the contracts that can be standard be prepared according to the target groups. For example, it can be defined as a separate contract under Law No. 6306 on the Conversion of Areas Under Disaster Risk regarding existing buildings. In this context, it would be more appropriate to have general arrangements in the contracts.
- Legally, "arbitration" and "mediation" can be envisaged as quick solutions to conflicts. In addition, there should be a system that can promptly conclude the judicial process that can be foreseen for conflicts.

##### ***Finance***

- While energy efficiency solutions, generally, are charged in foreign currency, there is an obligation to give prices in TL for EPCs based on the Turkish Lira Protection Law. Exceptions can be defined for EVD/ESCO companies in this regard.
- In the "Communiqué Amending the Communiqué on the Implementation of Energy Performance Contracts in the Public Service" on March 18, 2022, instead of using the inflation value as the correction factor over TL price (which can only contribute to the elimination of exchange rate risk in terms of finance and banking sector), It was suggested that a correction factor to be determined over energy tariffs/prices would be more appropriate.
- It was stated that the existing data (such as energy consumption, and results of energy efficiency audits) regarding energy efficiency and EPCs should be shared transparently. From

the perspective of the financiers, this will be an important step. Because data connects the past to the future and shows developments. In this respect, it is important to indicate comparable indicators. In addition, as awareness increases in this way, the orientation towards EPCs will also increase. In this context, it is recommended that energy efficiency audits and EPCs will be digitalized and shared with stakeholders regarding certain constraints. It is very important to ensure that financial institutions can see the whole picture of energy efficiency investments.

- For the gap related to the lack of a defined credit code for energy efficiency, data from past studies can be a basis. For example, after the definition of SME was made, SME loans could be defined in the BDDK. The Ministry of Treasury and Finance and the BDDK are decisive in this area. Flexibility defined in housing loans (i.e. mortgage) may also be appropriate for energy efficiency studies.
- The Ministry of Treasury and Finance will be the determinant of the fund. It has been stated that since the fund will be on a TL basis, it is necessary to provide a basis for inflation/currency changes. For this purpose, a system can be established with comprehensive coordination and structuring. For example, it can be achieved in the long term with a “finance-oriented” structuring in climate finance.
- Credit guarantee funds and insurance can be considered complementary to each other. While the credit guarantee fund guarantees the debtor, that is, the payments, the insurance can also guarantee the EPC applications, that is, the performance. “Thematic guarantees” can be defined to pave the way for a more positive evaluation of private sector projects specific to energy efficiency. The determination of the collateral status is under the control of the BDDK.
- Since there may be a change in municipalities every five years, both EVD/ESCO and financial institutions do not prefer EPC applications for 10 years or more in municipalities. In this way, there can be a more centralized guarantee in large-scale projects, such as the Iller Bank, Ministry of Environment, Urbanization, and Climate Change. In addition to the cash budget, Iller Bank can allocate non-cash budgets (e.g. 2% of the cash budget) to the municipalities for realizing energy efficiency projects.
- It is necessary to increase the cooperation between equipment suppliers and ESCOs. Also, not all EVDs do EPC. ESCOs that can undertake such projects can be determined by imposing certain constraints on the EPC (such as constraints/rules on being an angel investor). In this way, old or unsuccessful applications will be prevented and it will be possible to create true knowledge and awareness, especially among end users. In addition, an ESCO group that can be differentiated in terms of both capacity and financing opportunities can be formed in this way.
- With the right measurement & verification strategies, the reliability of EPCs will be increased and the right data will be collected.
- It is important that when sufficient/qualified contracts are formed and thus the number of investors increases. EPC is a long-term contract and, in this process, a long-term trust/commitment is required by mutual stakeholders.

### ***Insurance***

- Since performance insurance is a very new product, insurance companies do not have reference data. Experience in this area is limited in the world. Both knowledge and studies should increase and the demand for insurance should grow. EVDs should be at the forefront, EPC practices should be widespread, and the results of good practice examples should be shared.

- It is offered that the MENR/EVÇED update the sentence “EVD commits to performance” to the EPC regulation as “EVD gives an assurance/financial argument that will secure performance”. This assurance/financial argument can be a letter of guarantee, a bail bond, or performance insurance. General conditions should be defined in the regulation. Any of the financial arguments should be preferable. There should be no imposition, and freedom of choice should be ensured.
- Insurance should take its place in public works and should be encouraged. For example, in an old study by TÜSIAD (Turkish Industrialists and Businessmen Association), “the application of 30% incentive amount for investors in the energy commission as 33% for insurance holders”.
- In terms of Measurement & Verification Issues, the policy should state “to make an independent M&V determination and apply to the insurance company to file a claim”.

## 4.2. Case of Italy

This section starts with an overview of the Italian ESCO-EPC market, continues with the gap analysis of the market and the risk assessment and mitigation of the EPC process, and concludes with a discussion of the gap analysis results and recommendations.

### 4.2.1. Overview of the Italian ESCO-EPC Market

In the Italian Regulatory Framework, there are two definitions according to **Legislative Decree No. 115 May 30, 2008** "Implementation of Directive 2006/32/EC Relating to The Efficiency of End Uses of Energy and Energy Services and Repeal of Directive 93/76 / EEC" for ESPCO (Energy Service Provider Company) and ESCO. While **ESP**CO can be defined as a physical or legal entity, including artisan companies and their consortium forms, whose purpose is the offer of energy services aimed at improving efficiency in the use of energy; **ESCO** is defined as a natural or legal person who provides energy services or other energy efficiency improvement measures in favor of the user and, in doing so, accepts a certain margin of financial risk. In this case, payment for the services provided is based, totally or partially, on the improvement in energy efficiency achieved and on the achievement of the other established performance criteria. The main difference coincides with the explicit reference, for ESCOs, to the assumption of financial risk. In other words, ESCOs exploit the increase in energy efficiency by linking the resulting economic savings to their profit: the higher the efficiency, the greater the energy and economic savings and therefore a greater profit.

Under this framework, sample activities of ESCOs can be listed as follows:

- energy diagnosis;
- legislative verification of the facilities;
- preparation of preliminary feasibility studies, with technical-economic analysis;
- planning of measures to improve energy efficiency;
- implementation of measures to improve energy efficiency;
- maintenance of energy efficiency improvement systems;
- monitoring of energy consumption, performance, and results;
- technical support for the acquisition and management of loans, incentives, and tenders.

The Italian standard **UNI 11352 of 2010**, updated in 2014, defines the minimum requirements for the voluntary certification of an ESCO. It is worth mentioning that UNI is not state laws, but voluntary technical standards. However, certain activities can only be carried out by entities certified according to the aforementioned standard. An ESCO certified in accordance with this standard can offer guarantees of results to its customers. The ESCO is remunerated based on the savings achieved (Financing Through Third Parties). The attention to the efficient use of energy is growing: from the Ministerial Decree of March 7, 2012, which provides for compliance with the UNI CEI 11352 Standard for Energy Services Companies that operate with Public Administrations, up to Legislative Decree

102/2014 which provides for mandatory certification UNI CEI 11352 for ESCOs offering the diagnosis service energy and obtaining Energy Efficiency Certificates for the savings achieved in the civil and industrial sectors. The UNI CEI 11352 standard outlines the followings:

1. General requirements that an ESCO must possess, and related checklist for their verification;
2. Essential requirements for an energy efficiency service;
3. Activities that an ESCO must be able to carry out directly / indirectly on its customer's energy system to provide energy efficiency service;
4. The capacity that an ESCO must possess to allow it to manage/carry out the activities necessary for the provision of the energy efficiency service;
5. Possible additional/optional activities that an ESCO can implement.

**An Energy Performance Contract is defined by Legislative Decree 115/2008** as a "contractual agreement between the beneficiary and the supplier regarding an energy efficiency improvement measure(s), in which payments for investments to this extent are carried out according to the level of improvement in energy efficiency established contractually". **Legislative Decree 102/2014**, on the other hand, defines the energy performance or EPC as a "contractual agreement between the beneficiary or whoever exercises negotiating power for it and the supplier of an energy efficiency improvement measure(s), verified and monitored during the entire duration of the contract, where the investments (works, supplies or services) made are paid according to the level of energy efficiency improvement established contractually or other agreed energy performance criteria, such as financial savings ". In the Italian legal system, EPCs are not provided for by the Civil Code. The parties of the EPC are an ESCO, BENEFICIARY/CLIENT, FINANCIAL INSTITUTION, and MANAGER. Obligations of an ESCO and a client can be listed below:

**For an ESCO:**

- To plan the intervention;
- Financial aspects;
- Technical and commercial risk of the operation;
- the technical management of the plants, as well as the related monitoring and maintenance activities;
- To purchase from suppliers of technologies, equipment, construction works, and management services.

**For a CLIENT:**

- Any financial participation in the implementation of the intervention;
- The possible participation of the user in the construction of the guarantees to be given to the third lender, where the ESCO is not financing the intervention;
- The commitment to pay the ESCO, for a contractually established number of years, a fee as compensation for both the performance and the energy savings obtained using the new plant;
- The methods of use of the energy system are subject to efficiency.

**Besides**, minimum requirements for the EPC signed with the public sector or in the related tender specifications can be summarized as follows (Annex 8 of the Legislative Decree 115/2008):

- A clear and transparent list of the efficiency measures to be applied or the results to be achieved in terms of efficiency;
- The guaranteed savings to be achieved by applying the measures provided for in the contract;
- The duration and the fundamental aspects of the contract, the terms and conditions envisaged;
- A clear and transparent list of the obligations incumbent on each contractual party;
- Date or dates of reference for determining the savings made;



- A clear and transparent list of the stages of implementation of a measure or package of measures and, where relevant, the related costs;
- The obligation to fully implement the measures envisaged in the contract and the documentation of all changes made during the project;
- Provisions governing the inclusion of equivalent requirements in any contract concessions to third parties;
- A clear and transparent indication of the financial implications of the project and the shareholding of the two parties in the savings pecuniary payments made (for example, remuneration of service providers);
- Clear and transparent provisions for quantifying and verifying the guaranteed savings achieved, quality controls, and guarantees;
- Provisions that clarify the procedure for managing changes to the framework conditions that affect the content and results of the contract (for example changes in energy prices, the intensity of use of a plant)
- Detailed information on the obligations of each of the contracting parties and the penalties in case of non-compliance.

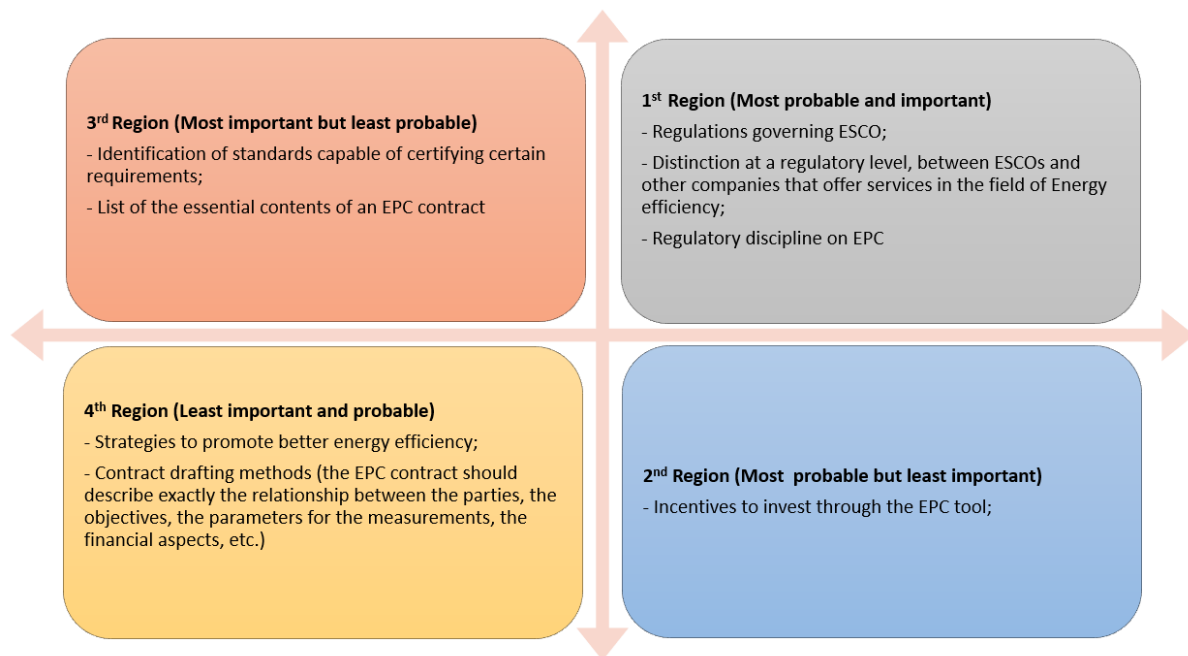
In addition, **FIRST OUT; FIRST IN; SHARED SAVINGS; and GUARANTEED SAVINGS** can be stated as the main types of EPC in Italy.

#### 4.2.2. Gap Analysis of the Italian EPC Sector

In the first face-to-face meeting, held on in Istanbul, Italian experts for legal, finance, and insurance issues explained the situation in Italy. These are explained as follows:

##### **Legal Issues**

Figure 29 presents the main barriers to ESCO/EPC sector in Italy from a legal perspective.



*Figure 29. Main barriers for ESCO/EPC sector in Italy from a legal perspective*

From a regulatory point of view, the most important barriers to be examined seem to be those relating to the regulation of ESCOs and EPCs. As regards the ESCOs, it is necessary to clarify, at the legislative level, that - unlike the other energy efficiency service providers - ESCOs offer integrated services that concern different sectors, and assume the technical risk of the result of their projects (e.g. guaranteed

savings). It is also necessary that particular attention be paid to the regulatory level towards the structure and essential characteristics of the EPC (possibly also identifying some minimum essential contents). Another particularly relevant aspect concerns the certifications: certifying the existence of some requisites and abilities belonging to the ESCOs; establishing objective parameters for measuring performance and/or results.

**Financial Issues**

As known, the structure, duration, and characteristics of EPC contracts are very different in the public and private sectors (Figure 30).

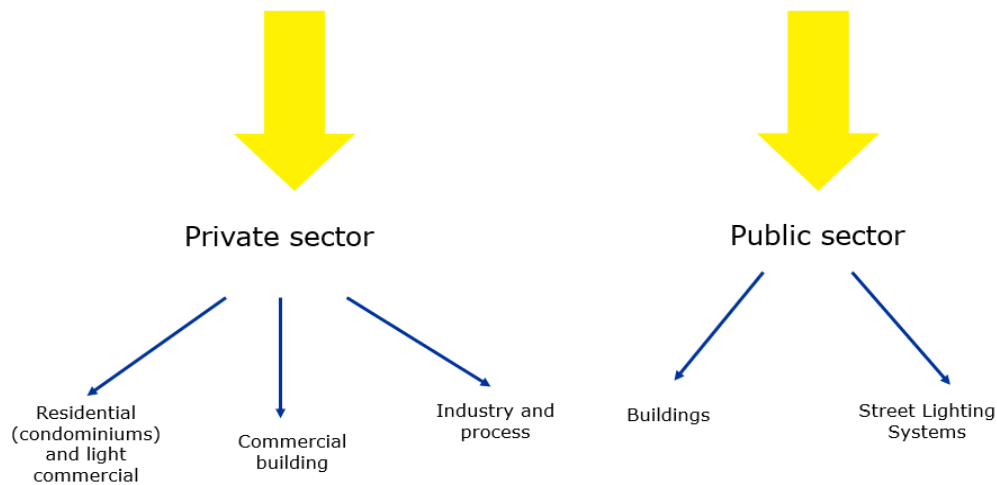


Figure 30. Characteristics of EPC contracts for the public and private sectors

Regarding the barriers to financial issues considering the public sector, the following issues can be listed.

**Barrier 1: Lack of technical, financial, and legal knowledge**

As can be seen from Figure 31, large-scale- and small-scale public bodies differ when technical, financial, and legal knowledge are compared.

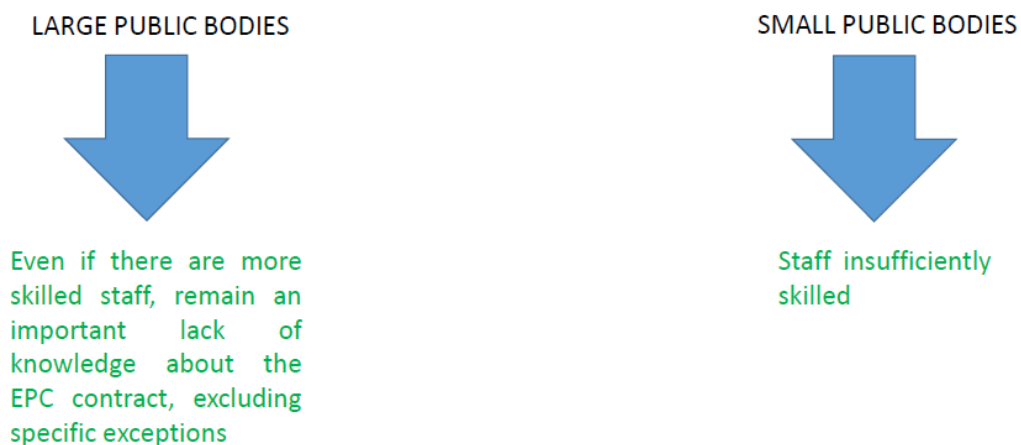


Figure 31. Comparison of large- and small-scale public bodies in terms of technical, financial, and legal knowledge

For large-scale public bodies, knowledge about EPC contracts can be insufficient, even if there are more skilled staff as compared to small-scale ones.

### Barrier 2: Energy consumption data availability

Figure 32 shows the differences between large and small public bodies when their energy consumption data availability is considered.



Figure 32. Comparison of large- and small-scale public bodies concerning data availability on energy consumption

As can be seen from Figure 32, small-scale public institutions have lack of enough time to manage the related data together with an insufficient number of skilled staff. Whereas, for the large-scale public bodies database among technical, accounting, and financial departments could not be linked with each other.

### Barrier 3: Competition between different funding schemes

There is often incompatibility between classical funding schemes (e.g. non-repayable loans) and EPC contracts, excluding some positive exceptions. The Municipality so typically prefers to realize a reduced number of interventions with grants or loans, despite the use of that money to do the action by EPC contracts, and, for example, extend the range of intervention of reducing the contract duration (often perceived as a strong limitation from the Municipality).

### Insurance Issues

The main characteristic of investments in energy efficiency can be regarded as producing profitability. It is not the measure of a single factor (ticketing, service fee, etc.) but the difference between two states (pre/before an intervention/implementation and post/after the intervention/implementation) influenced by different parameters and subjects caused by the customer, the ESCO and the market. Hence, the risk assessment focuses on the criteria which determine this change of the parameters and deciding which must be placed as a basis of the energy efficiency contract (Figure 33).

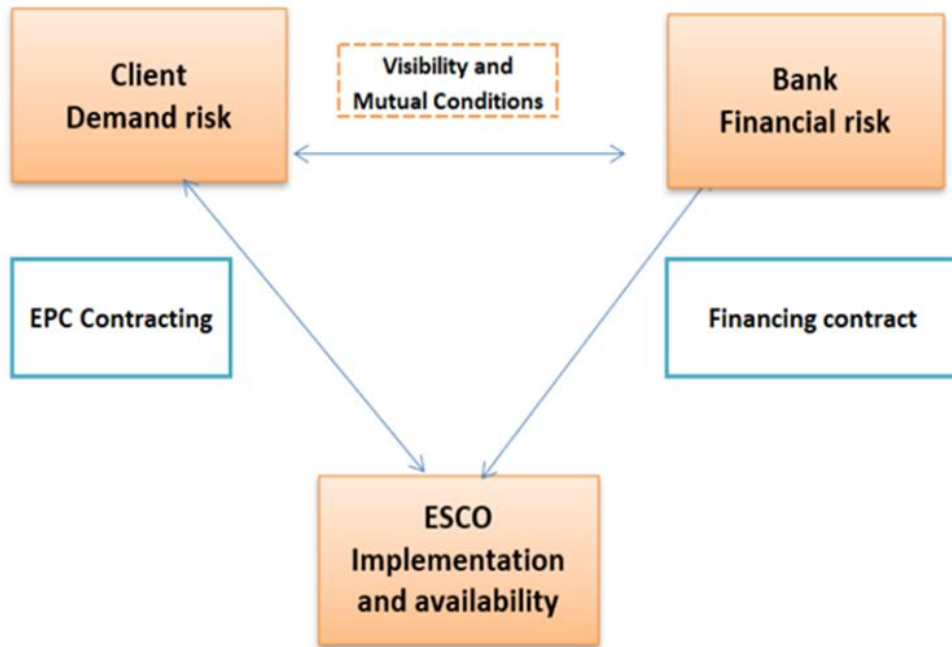


Figure 33. EPC Risk Scheme

In this case, insurance products in an EPC contract can be identified as an ability to:

- **Reassure:** It allows you to establish trust in the parties involved (Customers, Banks, ESCOs) to use the EPC tool for energy efficiency for establishing the ability of the parties involved to support the contractual obligations of an EPC.
- **Insure:** It is an Instrument for mitigating the risk of failure of an energy efficiency intervention/implementation through EPC for supporting the achievement of the objectives of an energy efficiency project with an EPC contract.

Hence, the main barriers for ESCO/EPC sector in Italy from an insurance perspective are given in **Hata! Başvuru kaynağı bulunamadı..**

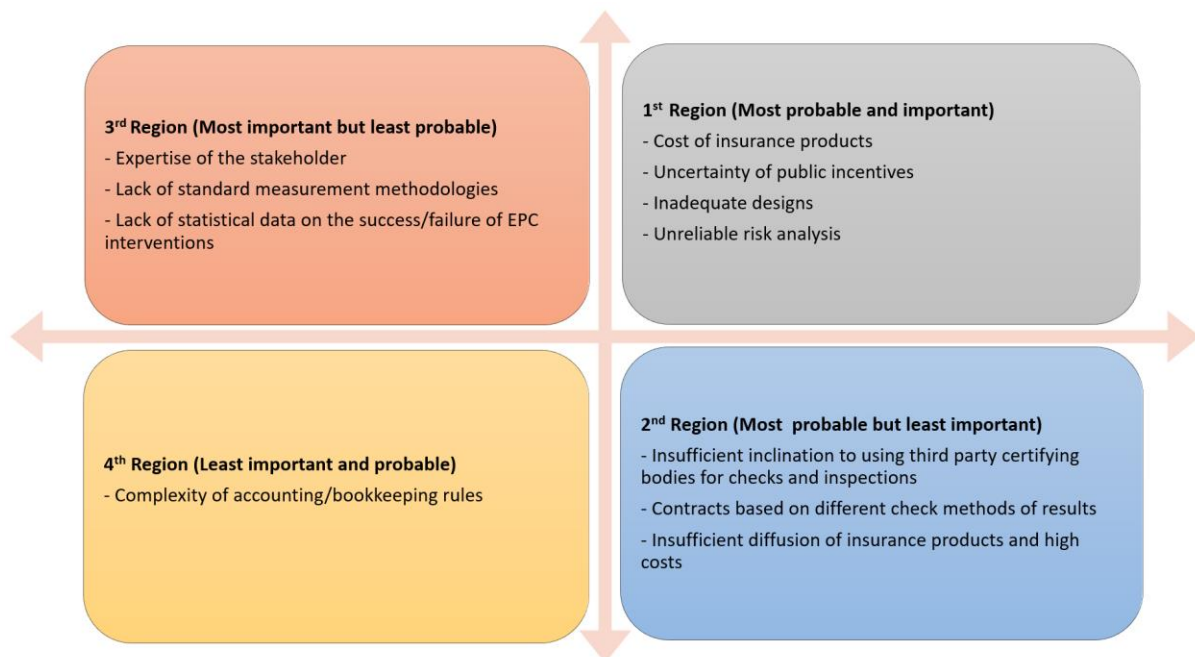


Figure 34. Main barriers for ESCO/EPC sector in Italy from an insurance perspective

As can be seen from **Hata! Başvuru kaynağı bulunamadı.**, the most probable and important barriers in Italy are; the cost of insurance products, the uncertainty of public incentives, inadequate designs, and unreliable risk analysis. In the second region which is most probable but least important, insufficient third-party certification for inspections/audits, different result checking methods of the contracts, and high cost of insurance products together with insufficient penetration to the market can be listed. In the most important but least probable region, the lack of statistical data about EPCs, inadequate experiences of the stakeholders, and lack of standard measurement methodologies can be emphasized. The complexity of accounting and bookkeeping rules can be classified as the least important and probable, meaning the 4<sup>th</sup> region.

#### 4.2.3. Risk Assessment and Mitigation in the Italian EPC Sector

In this section, risks and mitigation strategies in the Italian EPS sector are presented from different perspectives. On this basis Table 8, Table 9, and Table 10 show potential risks and risk mitigation options for banks, ESCOs, and clients, respectively.

*Table 8. Potential risks and risk mitigation options from banks' point of view*

Potential risks (from the bank's point of view)	Risk mitigation options
➤ Insolvency or bankruptcy of the lender, if the lender is the ESCO	<ul style="list-style-type: none"> <li>✓ Limit the duration of the loan <i>(may result in a reduction of acceptable EPC contract duration).</i></li> <li>✓ Include a risk premium in the interest rate <i>(higher interest rate – higher cost of the EPC).</i></li> <li>✓ Request a high share of ESCO's equity to be included in the financing concept <i>(high equity/loan ratio may limit the SPIN's number of projects).</i></li> <li>✓ Request for guarantees or collaterals/indemnity bonds. <i>(maybe to be provided by the building owner).</i></li> </ul>
➤ Delay or cease of payment of annuities if the lender is the public building owner.	✓ Request for guarantees and collaterals '.
➤ Dispute between the ESCO and the building owner concerning delivery of agreed measures and/or the achievement of guaranteed savings in case of a sale of claims/forfeiting/ factoring from the ESCO to the bank.	✓ Request an objection waiver from the building owner <i>(put the risk of disputes with the building owner).</i>

Risk mitigation measures taken by the banks will in most cases increase the cost of EPC business models.

*Table 9. Potential risks and risk mitigation options from ESCOs' point of view*

Potential risks (from the ESCO's point of view)	Risk mitigation options
<ul style="list-style-type: none"> <li>➤ Change of political framework conditions.</li> <li>➤ Cease of payment by the public building owner (e.g., if a building is no longer in use, or if the new local government wants to terminate the contract).</li> </ul>	<ul style="list-style-type: none"> <li>✓ Opt for a short contract duration as possible.</li> <li>✓ Include in the contract clear provisions for the full compensation of the ESCO's losses in case of termination of the contract before the approved contract duration.</li> </ul>
➤ Delays in payments of the public building owner.	✓ Request for compensation in case of delay of payments to be established in the contract.

➤ Dispute between the ESCO and the building owner concerning delivery, or proper evidence of delivery, of agreed measures and/or guaranteed savings.	<ul style="list-style-type: none"> <li>✓ Plausibility check of the requested performance guarantee.</li> <li>✓ Involvement of a certified third party by contract agreement.</li> <li>✓ Establishment of monthly installments to be paid by the building owner unconditionally during the entire contract duration.</li> <li>✓ Make penalties/incentives only after the dispute is settled.</li> </ul>
➤ Failures in achieving guaranteed savings.	<ul style="list-style-type: none"> <li>✓ Use insurance, if available.</li> </ul>

Risk mitigation measures taken by the ESCO will in most cases increase the cost and may reduce the customer's acceptance of proposed EPC business models.

*Table 10. Potential risks and risk mitigation options from clients' point of view*

Potential risks (from the public building owner's point of view)	Risk mitigation options
➤ The bankruptcy of the ESCO before the finalization and handover of equipment, facilities, and devices is due for delivery according to the contract.	<ul style="list-style-type: none"> <li>✓ Request for a bank guarantee covering the cost of the building owner that might occur in this case.</li> </ul>
➤ The bankruptcy of the ESCO after the acceptance of due delivery of equipment, facilities, and devices, in particular in the case of claims sold by the SPIN to a bank/factoring agent.	<ul style="list-style-type: none"> <li>✓ Request for a bank guarantee covering the cost of services to be provided by a substitute for the ESCO to ensure the achievement of guaranteed savings.</li> </ul>
➤ ESCO failing to deliver agreed on measures and/or guaranteed savings.	<ul style="list-style-type: none"> <li>✓ Establish strong penalties in the contract.</li> <li>✓ Provide for the reduction of monthly installments.</li> </ul>
➤ ESCO failed to provide any evidence of achieved savings within a certain period following the end of the agreed reporting period.	<ul style="list-style-type: none"> <li>✓ Establish in the contract the right to cease or reduce payments until the SPIN provides proper evidence of achieved savings.</li> <li>✓ Involve a certified third party by contract agreement</li> </ul>
➤ Dispute between the ESCO and the building owner concerning proper delivery of agreed measures and/or the achievement of guaranteed savings.	<ul style="list-style-type: none"> <li>✓ Involve a certified third party by contract agreement.</li> <li>✓ Establish in the contract the right to cease or reduce payments during the duration of the dispute, if this exceeds a certain limit.</li> </ul>

Risk mitigation measures taken by especially the public building owners may create additional barriers for ESCO to enter the EPC market and/or to submit an offer for a specific project.

Under these circumstances, the Italian contexts can be explained as follows:

#### **Italian Context - 1**

The Italian regulatory framework refers to the Code of Contracts D.lgs. 50/2016 and to Decreto Semplificazioni (DI 76/2020, art.8, paragraph 5, lett. c-quater). DI Semplificazioni changes the Procurement Code (Dlgs 50/2016, art. 180, c.2) by extending the rules of the PPP (in particular with reference to the methods of Project Financing) to EPC contracts. The main European references are:

Eurostat (see Regulation (EU) No. 549/2013 of the European Parliament and of the Council of 21 May 2013 on the European system of national and regional accounts in the European Union Text with EEA

relevance (ESA2010), paragraph 15.41 and paragraphs 20,276 to 20,282; Manual on Government Deficit and Debt (MGDD) - Implementation of ESA 2010 by Eurostat, ed. 2019, paragraph VI.4; A Guide to the Statistical Treatment of PPPs, EPEC - EIB, September 2016; A guide to the Statistical Treatment of Energy Performance Contracts, Eurostat - EIB, May 2.

### Italian Context - 2

In this context, it is planned to draw up a risk analysis of the project, according to the following classification:

- **Construction Risk**, the construction risk is related to delay in delivery times, non-compliance with project standards, increased costs, technical problems in the work, and failure to complete the work;
- **Demand Risk**, the demand risk is that linked to the different volumes of demand for the service that the concessionaire must satisfy, that is, the risk linked to the lack of users and, therefore, of cash flows;
- **Availability Risk**, the risk of availability, is linked to the ability, on the part of the concessionaire, to provide the agreed contractual services, both in terms of volume and expected quality standards;
- **Legislative-political-regulatory risk**, i.e. that regulatory changes that cannot be foreseen contractually, also resulting from soft law acts, lead to an increase in the costs for the consequent adjustment or, in extreme cases, the loss of the procedure or the assignment, as well as costs related to actions against the new legislation;
- **Financial risk**, which materializes in the failure to find financing resources to cover the costs within the pre-established times or in an increase in interest rates and/or failure to repay one or more loan installments, with a consequent increase in costs of inability to continue with the operation;
- **Industrial relations risk**, tied to relations with other subjects that negatively affect costs and times;
- **Residual value risk**, i.e. the risk of returning at the end of the contractual relationship an asset with a lower value than expected.

On top of these, the distribution of risks over time and EPC phases are presented in Figure 35 and **Hata! Başvuru kaynağı bulunamadı.**, respectively.

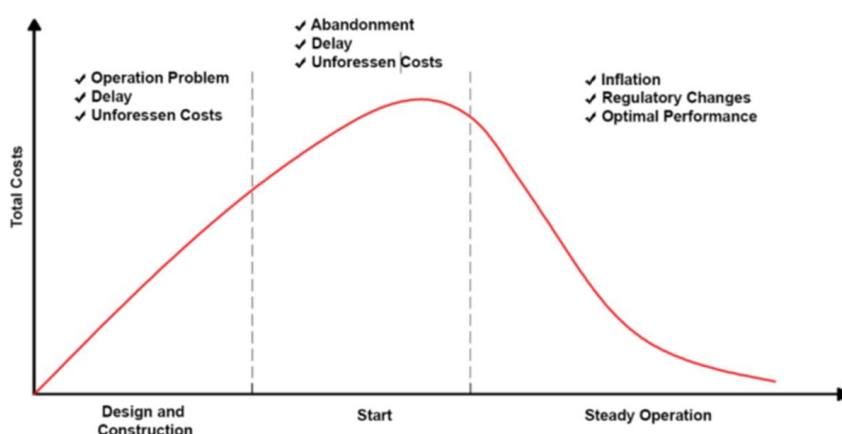


Figure 35. Distribution of risks over time versus the total cost

In the design and construction period, delays, operational problems, and unforeseen costs can be stated as the main potential risks, while at the beginning of the project, abandonment, delays, and unforeseen costs can be listed. On the other hand, during the operation period, inflation, regulatory



changes, and performance issues can create risk factors. In the EPC phases, risks can be classified as development, execution, and payment risks. In other words, once the operation is underway the risk associated with the project is divided into technical and financial risks.

- **The technical risk** remains with the service provider, this means that if the contractually agreed savings are not achieved, the EPC provider must compensate for the savings shortfalls. The service providers can avoid a large proportion of this risk using techniques to estimate the savings and, consequently, the eventual deviations from the plan.
- **The financial risk** is carried out by the refinancing institution and assessed depending on the client's creditworthiness. If the client's creditworthiness is high, the perceived risk is very low. However, if the client is not considered very trustworthy, it may require a mitigation mechanism.

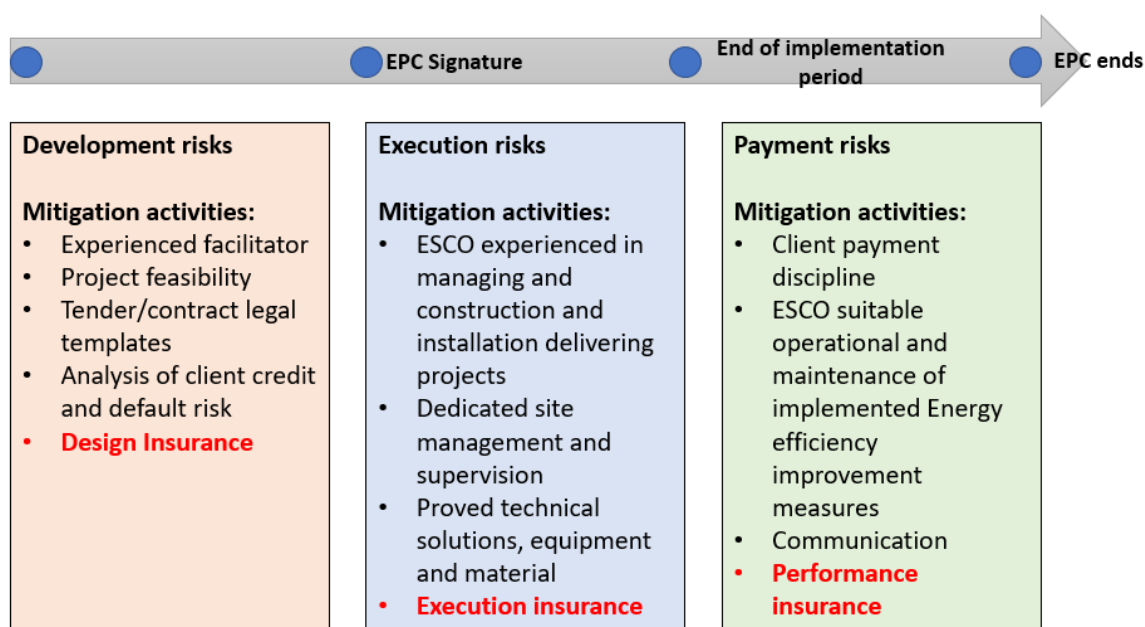


Figure 36. Potential risks in EPC phases

General risk mitigation handling options can include:

- **Assume/Accept:** Acknowledge the existence of a particular risk and make a deliberate decision to accept it without engaging in special efforts to control it. Approval of project or program leaders is required;
- **Avoid:** Adjust program requirements or constraints to eliminate or reduce the risk. This adjustment could be accommodated by a change in funding, schedule, or technical requirements;
- **Control:** Implement actions to minimize the impact or likelihood of the risk;
- **Transfer:** Reassign organizational accountability, responsibility, and authority to another stakeholder willing to accept the risk;
- **Watch/Monitor:** Monitor the environment for changes that affect the nature and/or the impact of the risk.

### **Risk Factors in the REFINE Project**

In an EU project, namely REFINE, the lack of attractive financing options for energy efficiency service (EES) projects is identified as a major barrier to the development of a functioning, robust EES market in Europe. The main aim of REFINE project is therefore to contribute to the supply of sufficient and attractive financing sources for energy efficiency investments. Additionally, the project's core



objectives are; enhancing the refinance ability of EES projects and amplifying the use of refinancing schemes in EES business practice. According to studies in the project, major risks for EES are summarized below:

- **Installation – Protection:** It refers to the extent to which the equipment or installation is protected and maintained to obtain the project’s energy savings;
- **Installation – Collateralization:** It refers to the extent to which the equipment can be used as a guarantee or collateral in a refinancing operation;
- **Installation – Technology:** It refers to the extent to which the best available technology is applied in the project;
- **Reliability of savings calculation:** It refers to the existence of an M&V plan according to accepted standards (timing, calculation algorithms, stakeholder responsible, etc.);
- **Operation and Maintenance:** It refers to who is the company that will perform the Operation and Management of the installation throughout the EES contract duration.
- **Cash flow / Credit Ratio:** It refers to the cash flow generated by the savings being able to cover the payments throughout the EES contract live duration;
- **Project termination & Continuity:** It refers to the situations that may cause the project to be terminated and the safeguards implemented for its continuity;
- **Additional Added Value:** It refers to an increase in the additional added value due to the project generating the possibility of higher rental prices, lower production costs, sustainability, etc.

#### **4.2.4. Discussions on the Gaps in the Italian EPC Sector**

This section discusses recommendations and models for solving gaps in the Italian EPS sector.

##### ***Legal***

- Qualify the ESCOs on a regulatory level, distinguishing them from other companies like ESPCO that provide services or consultancy in the energy efficiency market;
- Adopt regulatory standards through which the possession of certain requirements can be certified in an objective and verifiable manner;
- Provide, on a regulatory level, that some activities can only be carried out by companies in possession of certain objective, measurable and verifiable requirements, which can be demonstrated through the possession of certifications;
- Provide, on a regulatory level, a definition of EPC, and some minimum elements that characterize this contract;
- Provide, on a regulatory level, that the minimum requirements listed by law must necessarily be included in an EPC.

##### ***Finance and Insurance***

#### **The role of Monitoring and Verification (M&V) on risks, guarantees, and the insurance sector**

The purpose of the M&V project is to measure the contractual objectives which can be different:

- performance of the building
- reduction of consumption
- a certain level of quality
- a certain level of plants efficiency of the plants

The starting point is the definition of the objectives of the M&V. The final goal is to monitor the energy performance trend, but, essentially, at defined intervals, determine the energy savings or avoided energy consumption, to understand if we have achieved the expected energy saving objectives. To develop the M&V Plan, the following questions must be answered:

- What is to be achieved (objective)?

- What do we need to measure?
- Who should measure?
- How should we measure?
- With which measuring instruments (accuracy)?
- When should we measure?

The main regulatory references in M&V are as follows:

1. **EVO** “IPMVP - International Performance Measurement and Verification Protocol - Core Concepts”
2. **UNI ISO 50015** “Energy management systems — Measurement and verification of energy performance of organizations. General principles and guidance”;
3. **UNI ISO 50006** “Misurazione della prestazione energetica utilizzando il consumo di riferimento (Baseline – EnB) e gli indicatori di prestazione energetica (EnPI). Principi generali e linee guida”;
4. **UNI ISO 50047** “Energy savings - Determination of energy savings in organizations”;
5. **ISO 50021** “Energy management and energy savings - General guidelines for selecting energy savings evaluators” gives guidelines for selecting energy savings evaluators to determine ex-post (realized) energy savings for projects, organizations, and regions. It gives general principles and identifies the key factors to consider. It also defines roles and responsibilities, recommends the required competence, and provides key elements for assessing the knowledge and skills of energy savings evaluators. At the project and organization level, this document is applicable to both internal and external energy savings evaluators.

The major guarantee instruments are listed below:

1. FNEE - Fondo Nazionale Efficienza Energetica (Public)
2. SME Guarantee Fund (Public – not specific for EEI)
3. FIEE - Fondo Italiano per l'Efficienza Energetica SGR (FIEE SGR – private equity fund)
4. Go-Safe with ESI (private - ESI Energy-savings insurance – H2020 EU project)
5. CIS Broker Insurance for ESCOs (private insurance)
6. LIFE4ENERGY by Bank BPER (Private Finance for Energy Efficiency - PF4EE EU Project, with EIB guarantees)
7. Garanzie Confidi, Consorzio di Garanzia Collettiva dei Fidi (private Mutual or Associative funds - not dedicated to EEI)
8. Other insurance services for EE investments (privately offered by several insurance companies)
9. Regional Revolving Guarantee Funds (public, i.e. VDA, Tuscany)

### **Operational model-1**

The operating model used to develop an energy efficiency project and the relevant assessment process is based on the subdivision of activities for the various phases and each one is characterized by a quality level of the available data that is homogeneous throughout the various technical and financing projects.

Each phase is characterized by a verification model to assess activity to pass on to the next phase: the correct assessment of the elements is necessary for risk analysis and management (**Hata! Başvuru kaynağı bulunamadı.**).

Table 11. Operational model 1

Technical Process	P1	P2		P3	P4	
	Feasibility	Final design		Construction Site	Testing	Facility
Financing Process	Bankability assessment	Detailed assessment and allocation of financing	Disbursement of financing	Verification of the results and reimbursement of debts		
Verification Process	Bankability Assessment	Verification Assessment		Conformity Assessment	Assessment Implementation Conformity	Assessment Implementation Conformity
Risk	Identification	Mitigation Elements		Assessment	Management	

### Operational model-2

The validation of an energy efficiency project is the decisive step of a path of sequential checks up to the evaluation of the conclusive result; it can also be expressed as the probability of achieving the expected result, through a systematic organization of controls and measures, and any corrective actions, designed to contain the risk of project failure with respect to the planned objectives. The verification activities of an energy efficiency project concern not only the control of the realization of an asset but also the control of its management according to the financial aspect (Figure 37Hata! Başvuru kaynağı bulunamadı.).

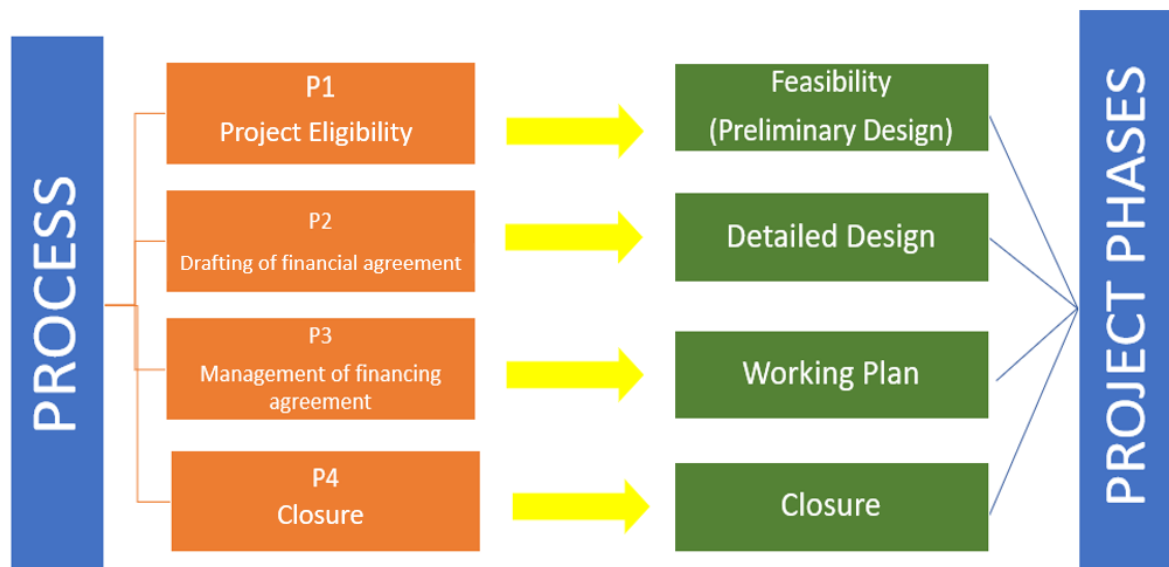


Figure 37. Operational model 2

### Recommendations

- Firstly, the establishment and continuous improvement of a database on cases of EPCs, either successful or not, should be made.
- The definition of risk mitigation strategies and the necessary guarantees require the application of risk analysis.
- For a risk analysis to be effective, it is necessary to examine the database on the causes of the cases of project failure and the major problems encountered.
- ESCOs must adopt a controlled management system, by using the management principles derived from the 9001 quality certification standard (with specific quality plans).

- The process of technical planning and financial planning of intervention must proceed in parallel, to allow a shared quality of the data available in the various phases and to avoid redesign costs, meaning it is important to share the methodology.
- To overcome the barriers to EPC development and to guarantee critical issues with insurance products, the design, construction, and management processes must be properly executed.
- It is, therefore, necessary to identify operationally the subjects who can be enabled to carry out Due Diligence that can be recognized by the parties involved in the financing and/or refinancing and in the creation of insurance products, or the sale of the energy efficiency intervention.
- It is worth mentioning that a technical validation process should be integrated into the project, to overcome the perceived high-performance risk of energy efficiency upgrades. An independent validation entity should evaluate the capacity of the project to deliver the promised energy savings, verifies the installation, and acts as an arbitrator if required. These subjects have already been identified in Italian legislation by third-party verification bodies that can carry out this type of conformity checks based on an accreditation obtained by Accredia (an Italian body for the accreditation of verification organizations).

In a summary, examining the characteristics of the actors (ESCOs, customers) for their bankability, reviewing the features of the project, and monitoring performance can be stated as the crucial points. Last but not the least, the risk assessment and management, intervening in the various phases of project development (design, construction, and management), must include controllability tools; that is, it is a matter of identifying a "Risk Plan".

## 5. General Results and Recommendations

After the completion of the working group activities, a workshop was organized to mature the draft proposals. In the workshop, the project was first introduced to the participants and the draft outputs of the working groups' studies were presented. Then, the draft results were matured with the questions specially prepared for the workshop, and the general results of the study were obtained. In this chapter, firstly the questions prepared for the workshop and the outputs of the workshop are given, then the overall recommendations of all activities are listed. Finally, this section ends with recommendations from the international event where the results of this project were presented and discussed.

### 5.1. Workshop

After completing the working groups' studies, a workshop was organized on the 3<sup>rd</sup> of October, 2022 to share the results with the sector, primarily. Representative experts, three from central governments, three from related CSOs, four from private companies, and four from the working groups (2 from finance and one from legal and insurance) attended together with two academic advisors and four EYODER representatives. The main discussion questions are listed in Table 12.

*Table 12. Discussion questions for the workshop*

AREA	QUESTIONS
<b>ORGANIZATIONAL STRUCTURE</b>	<p>What kind of motivations exists for energy efficiency in the Turkish public sector?</p> <p>What kind of control mechanism is envisaged for the evaluation of the minimum 15% energy-saving target in the obliged public institutions for 2023?</p> <p>How could the existing management structure be improved or revised to reach the target?</p> <p>Are the EVD-ESCO concepts adequately understood? How can the activities of ESCOs be supported? Are regional-based ESCOs necessary?</p> <p>What is the importance of a concrete CSO structure with a strong representation in the energy efficiency market and strong relations with both public and financial institutions? How can this structure be constructed?</p>
<b>EPCs</b>	<p>How adequate is the existing EPC structure? What are the points of improvement for increasing applications?</p> <p>Standardization of minimum requirements for EPC? Is it possible to prepare tender documents from a single institution?</p> <p>How can a risk management practice protect the public, the ESCO, and the financial institution through accredited third parties set up in Turkey?</p> <p>How should the issue of "guarantee" regarding repayment be handled in contracts signed with the public (especially for municipalities)</p> <p>What are your suggestions regarding the price regulation for TL for energy efficiency in EPCs? Could there be different correction factors for energy performance and maintenance in EPCs? What different kinds of support can there be, especially for efficient equipment manufacturers and distributors?</p> <p>In cases where the performance is not fulfilled, should there be a separate clause for the penalty system specific to the contract?</p> <p>How can the application of "arbitration" be extended in disputes?</p>
<b>SUPPORTIVE AREAS</b>	<p>What are the lessons learned from the implementation period of the I. National Energy Efficiency Action Plan? How can II. NEEAP be strengthened in terms of functionality?</p> <p>Is it necessary to define a credit code related to energy efficiency? How can it be constructed? Does being resource-specific increase diversity in financial sources?</p> <p>How will the Energy Efficiency Financing Mechanism be structured?</p> <p>How can the energy efficiency obligation system support the ECSO-EPC sector?</p>

As can be seen from the table, the questions are classified into three main sections, covering legal, financing, and insurance as organizational structure, EPCs, and supportive areas. Upon the discussions with the experts the main conclusions and recommendations from the answers to the questions can be summarized as follows:

**For the organizational structure:**

- The motivation of the public sector is the 15% target, itself, causing the reduction of energy expenditures and thus contribution to energy supply security.
- There is a growing demand in public institutions for energy efficiency, but on the other hand, it cannot be said that energy efficiency awareness is fully formed. This is especially common in provincial organizations. Hence, there is a need for awareness studies in these areas.
- Those institutions that have awareness and take responsibility are trying to do improvements, but for auditing, preparing a tender, and finding a contractor, etc. issues, and difficulties can be faced. Additionally, there are technical staff shortages in most public institutions. In terms of regulation, although regulations, procedures & principles, and guidelines have been published, implementation problems arise due to this technical inadequacy. Some institutions even do not have engineers or technical staff. As such, EPCs can focus more on renewable energy which is rather simple to manage, shifting the focus from energy efficiency. Therefore, a related public institution can prepare tenders and contracts.
- Whether or not the 15% target is complied with is monitored by means of obtaining data from institutions on an annual basis. However, there were disruptions during the pandemic period. Since the 15% energy efficiency target is valid until the end of 2023, it is expected that both the implementations on the public side will increase and the control mechanism will be on the way to monitor the success.
- It is necessary to make a clear distinction between EVD and ESCO. It is recommended to increase the capacities of EVDs and pave the way for them to become ESCOs. However, both EVDs and ESCOs can coexist in the market. ESCOs may not do rather simple work such as auditing or consulting but can accommodate EVDs for a variety of tasks.
- There are two different views on the authorization: The first is to define much more detailed standards when ESCOs are authorized, and the second is to remove the authorization and find the way to the market, freely.
- It was stated that an umbrella CSO could be established in the energy efficiency field.

**For EPCs:**

- The fact that EPCs take a long time brings uncertainties and risks. There is a need for good practice examples. Attention should be paid not only to the project phase but also to the operation and maintenance phases. In particular, measurement and verification should be considered as the key point.
- Quality is usually overlooked when purchasing equipment for public EPC. It is stated that most of the time only solutions based on existing requirements are preferred. This creates problems in terms of business and sustainability. According to the rules, the lowest bid has to be accepted and there is always audited by the Court of Accounts (Sayıştay). In this regard, there is a need for sharper and more specific regulations that also take into account quality issues.
- There is a standard format in EPC application procedures and principles for public buildings. Energy management units have been established in governorships of around 60 provinces. Although not all of them work effectively yet, standardization is being tried to be achieved for monitoring the public buildings in their provinces more accurately.
- The preparation of tenders for public buildings from one related institution will make things easier. Thus, the quality of the studies will increase and standardization will be achieved. The establishment of a public ESCO or the Super ESCO concept may be an alternative option. A

structure focused on this business can be created by merging a public bank or a development bank with an ESCO.

- Risk sharing must be done between all actors, and all risks should not be left to the EVD company alone.
- In public EPCs, how are the specified targets realistic is checked, and in inappropriate cases, a clarification is requested. Despite this, there are problems with not reaching 70% of the target saving. Risks are usually ignored, unfortunately. Therefore, risk analysis for each stage of the project will be very useful to solve this problem.
- Due to the current economic situation, the duration of the bids given by the EVD has fallen below 1 month, but the bid period for the public tender is defined as 90 days. To shorten this period, regulation and some flexibility can be provided in the administrative specification, but this situation is not known to everyone.
- It is stated that there is no case of not being able to receive payments from the central public. However, there are problems with the payments from the municipalities. All allowances of municipalities are made through Iller Bank. Iller Bank may act as a guarantee for contractors who cannot receive their payments from the municipality. In other words, contractors may receive their payments from Iller Bank, and Iller Bank may deduct these from municipalities' allowances. It has been stated by Iller Bank that this system can work for the market.
- An arrangement has been made for energy prices to reduce the currency effect, and a way has been opened for EVDs to bid, but considering the current economic situation, this arrangement is not considered sufficient. It is desirable that the process could be as free of uncertainties as possible.
- The mediation/arbitration mechanism is in the EPC regulation. In case of a dispute in the EPC process, an independent measurement and verification expert should be consulted before going to arbitration. It is desirable to solve the problems at the measurement and verification stage. However, matters that cannot be resolved at this stage may go to arbitration. On the other hand, the high cost of arbitration poses a problem. Since the EPC issue in public buildings is very new, the stages where disagreements may arise have not been reached yet. After that, revisions can be possible to increase the effectiveness of the arbitration.
- To be a measurement and verification specialist, it is necessary to have an audit-project certificate. Thus, it is aimed to train competent experts in the field of measurement and verification. Although the number of currently certified experts is low, it is considered sufficient for the current state of the market. It is planned to increase the training in the future.

**For supportive areas:**

- For II. NEEAP to be successful, sanctions must be defined and must have a legal basis.
- There are around 2500 public buildings, 1000+ industrial facilities, and 1000+ commercial service buildings. Controlling them is a serious workload. EVÇED has established an audit committee, but it cannot reach all of them. At this point, it is stated that the ENVER portal is a really important tool. Studies have been started on the ENVER portal to carry out these audits digitally. The portal has been overhauled and a new version is planned to be launched at the beginning of 2023.
- The creation of a credit code on energy efficiency would be beneficial in many ways. The amount and development of energy efficiency investments will be monitored easily. Moreover, the financing resources of banks for energy efficiency will increase. Various thematic loans can be defined with the energy efficiency loan code. For example, different applications for old and new buildings, equipment-based loans, etc.
- The Banking Regulation and Supervision Agency (BDDK) works in parallel with international codes, but creating an internal energy efficiency credit code will move Turkey forward. In particular, the definition of domestic equipment and the implementation of some tax exemptions will activate the market.

- There is a lack of information among bank personnel about the newly defined insulation loan as well as energy efficiency. It is necessary to carry out awareness studies on this subject.
- Walls and windows are the property of buildings. For investments in this area, it is not possible to include consumer loans with a maximum period of 24 months, but possible with mortgage loans with lower interest rates and longer periods. Although it is not known, these investments can already be included in the scope of mortgage loans, according to the Ministry of Treasury and Finance. However, the entire building must be mortgaged during the loan. Necessary arrangements and planning should be made in this regard and it should be ensured that it is easy to apply.
- Issues such as VAT reduction, energy bill reduction, or interest reduction have been studied within the Ministry of Environment, Urbanism, and Climate Change, but it should be stated that the Ministry of Treasury and Finance is decisive in this regard.
- Giving advantageous loans to new or high-energy class buildings and defining less advantageous loans to old buildings is another discussion topic. Since new buildings consist of middle-upper income groups and old buildings are generally low-income households, different solutions should be defined for disadvantaged groups in the arrangements to be made at this point. The following would be a plan of action in this respect:
  - For new buildings in the construction or pre-construction stage, higher energy class buildings can have preferential treatment in loans and all newly constructed buildings should have compulsory efficiency standards and all eligible new constructions should be equipped with solar panels and heat pumps. Mortgage loan conditions for these buildings should be improved.
  - For the existing building stock, young buildings up to 20 years of age should be required to comply with high energy efficiency standards complement with preferential loans, purchase price allocations, etc. along with penalties for non-compliance.
  - For buildings aged over 20 years that are in good condition with regard to earthquake risks, existing insulation requirements should be enforced with penalties and preferential loans or similar arrangements.
  - Municipalities/local governments should be more involved in energy management of their communities, especially for low/middle income households, providing technical assistance in conjunction with EVDs and “social electricity” from renewable energy plants in publicly owned sites.
- Possible energy efficiency obligation scheme that should be in the II. NEEAP may be beneficial for residential buildings.

## **5.2. Overall Recommendations**

### **5.2.1. Legal**

- Conducting a more detailed qualification review when authorizing ESCOs. Defining a set of standards and norms with minimum requirements to increase the reliability of ESCOs on the market.
- Preparing clear, understandable, user-friendly, ... contracts. The main text and appendices should complement each other. It should be prepared as simply as possible. The main responsibilities of the parties should be defined in the main text. Details should be included in the annex, for example, the technical parts should be attached.
- Establishing the penalty system for both the public and private sectors, including the penalties in the EPCs and applying the penalties when necessary. Adding an arbitration/mediation mechanism to contracts. Providing training of mediators on ESCOs, EPCs, and the energy efficiency market.
- Preparation of tenders for public buildings by a central governmental institution.
- Risk analysis of the projects by an accredited third party during the bidding and assigning risk scores to the project proposals. Taking this score into account when evaluating tenders.



- Identification of motivations and/or sanctions for achieving energy efficiency targets in public buildings.

### **5.2.2. Finance**

- Establishing a database on energy efficiency. Including ESCO-EPC sector-specific application examples on an accessible data platform.
- Defining a separate credit code/line for energy efficiency. Listing of energy efficient equipment eligible for the financing.
- Establishment of risk and guarantee funds for energy efficiency projects.
- A more central guarantee can be created for municipalities in large-scale projects such as the Iller Bank, Ministry of Environment, Urbanization, and Climate Change. “Thematic guarantees” can be defined to pave the way for a more positive evaluation of private sector projects specific to energy efficiency.
- Conducting risk assessments during the feasibility phase of energy efficiency projects.
- Development of the National Energy Efficiency Financing Mechanism. Within the Energy Efficiency Financing Mechanism, VAT discount, energy bill discount, or interest discount support can be defined for end users.
- Establishment of a reliable measurement and verification infrastructure.

### **5.2.3. Insurance**

- It is important to include and promote the insurance option in existing regulations in favor of EVD companies.
- There should be examples for increasing knowledge and studies on insurance.
- Establishing a pool of measurement and verification experts can be a tool for true verification in insurance applications.
- It is also very important for carrying out a risk assessment in ESCO/EPC projects and determining risk reduction options to support the insurance sector.

### **5.3. Recommendations from the international event**

The introduction of the FACILITEE project and the presentation of the draft recommendation report were performed at the 15<sup>th</sup> Energy is Future (EIF) conference on the 13<sup>th</sup> of October, 2022. The whole day, there were five sessions dedicated to the FACILITEE project and the studies of the working groups, namely the Opening session, FACILITEE Introduction, Energy Efficiency Financing from the perspective of FACILITEE, Insurance in Energy Efficiency from the perspective of FACILITEE and Legal issues regarding Energy Efficiency from the perspective of FACILITEE. There were experts from FEDERESCO, EYODER as well as from The Green Building Council of Italy together with working group’s experts and the academic advisors. The main conclusions and recommendations from these five sessions can be explained below:

#### **General issues that should be followed closely:**

- ESCO companies give a 360° solution and support professionals and operators in performing energy efficiency both in the public and the private sector covering data gathering and analysis, audit studies, design of the project, implementation, management, and performance analysis. In this way, qualified technical-specific know-how, integrated proposal, and management practices, reduced financial immobilizations, reduced consumption and expenditures, incentives availability, and monitoring together with energy management can be possible.
- Through EPC, third-party financing (TPF) identifies an ESCO that provides to search for both suppliers and financial resources and the initial cost of the work can be a load of ESCO if there is the availability of banking. The contract with the TPF is the best guarantee for the end user

as it is a system that enables them to improve energy efficiency without the use of equity, even while saving money.

- In the European energy efficiency market, the most important improvement will be due to digitalization, the development of software is going to grow 14% annually from 2017 to 2025. It is followed by growth of the engineering market (9% annually), operations (8% annually), and contracting (8% annually) practices.
- While going to climate neutrality, the followings are important for ESCO and EPC sectors:
  - Establishment of a green taxonomy
  - Creating standards and labels for green financial products
  - Fostering investment in sustainable projects and developing sustainable benchmarks
  - Strengthening the corporate sustainable disclosure
  - Increasing sustainable corporate governance thus reducing short-term thinking

### **Specific issues**

- The basic policy is to supply secure, continuous, sustainable energy at affordable costs. Unfortunately, subventions on energy prices are present. But this is not sustainable. The clue is energy efficiency.
- Energy is one of the areas of national security. Together with the supply side, demand-side measures like energy efficiency should be concerned. Related legislation should turn to implementations in a way that carrot and stick structure should be established well.
- EVD authorization system is market-oriented. Supports should be defined as it is in a growing phase. Moreover, authorized EVD companies should be monitored well and if there are problems in their activities, there should be strict sanctions to be effective in the short term. For example, the cancellation of the authorization of any EVD is the case when it does not reach the specified energy-saving target in three projects and this duration is too long for the market.
- The other perspective is that in such an emerging EVD market, more strict regulations could create a negative impact on growth. In other words, regulations can be a sharp knife. At this stage, the most important thing is to determine how to intervene correctly. Firstly, there should be a place for the growth of the market, then at the maturation, there will be monitoring and inspection.
- In the case of EPC, the contracts should be designed in order not to allow any disputes/controversies/conflicts. Three main areas are the contract type (guaranteed or shared savings), risk management, and financing. Together with financing insurance can be considered. When there are sub-contracts for service agreements or different stages of the project, critical point is to keep them as simple as possible with true definitions of the roles and the requirements.
- Arbitration can be applied to EPC projects by considering not only legal but also technical and financial issues hence both lawyers, economists, and engineers should be included. However, the arbitration will be costly. Contracts should be designed, accordingly. In another case, mediation can be an alternative for low-level investment projects.
- Risk and guarantee funds are very crucial in this very unpredictable environment due to various crises faced within the world. To be predictable, both technical and financing risks should be evaluated. Absolutely, technical, financial, and legal risks should be considered and a scoring mechanism for them should be established. It should be checked by independent and certified institutions. This will create very valuable data for the finance sector.
- Two guarantee mechanisms for municipalities and other public institutions should be developed, remembering the effect of a non-cash budget is six times more than a cash budget in favor of efficiency.
- Energy efficiency should have a code in the financing world and energy-efficient equipment should be defined in terms of minimum criteria.

- A reliable and accessible data network for ESCO/EPC projects should be organized to be able to see best practices and benchmarking.
- In the public sector, energy efficiency accounting should be constructed and the savings can be a source for other efficiency projects like a revolving fund.
- Up to now, most of the energy efficiency investments have been from equity capital. The other financing tools should be utilized. For this reason, related strategies by BDDK and the Ministry of Treasury and Finance should be short and medium-term rather than long-term. Tools like tax reduction for energy efficiency investments and refinancing the ESCO projects with the inclusion of the banks can be alternatives as in the Italian case.
- The low utilization of loans and other financing instruments stemmed partially from low awareness on the part of investors and financing institutions, but also from a lack of legislative structures facilitating the usage, monitoring and follow up. There needs to be concerted action by the banking regulatory authority and the treasury to first define energy management/efficiency loans as a distinct category and then incentivize financial institutions for extending such loans. Efficiency equipment lists could be an important facilitator in this respect.
- A “climate bank” can be established encompassing financing of energy efficiency, electrification renewable energy, energy storage and new technologies such as hydrogen in an integrated manner. In order to have a more widespread impact, the social aspect of the transition should be taken into account and projects should be developed to address vulnerabilities, such as energy poverty.
- Also, in the public sector, there will be a Super ESCO structure by merging a public bank or a development bank with an ESCO.

## 6. Conclusions and Policy Implications

The FACILITEE project results in the knowledge transfer for common objectives for both Turkey and Italy, by means of enforcing a common language, a better mutual understanding of the energy service markets, and the opportunities possible for the near future. There were open discussions on finance, legal, and insurance aspects to focus on the barriers and the strengths together with the concrete recommendations. In this way, bringing energy efficiency back to the center of attention to address the current energy, economic and environmental crises towards being carbon-neutral in the 2050s, enforcing the ESCOs at national and international levels, and attracting more investments and incentives on energy efficiency for the sustainability in the market is very critical to be declared.

The main conclusions from the project covering legal, financial and insurance subjects can be summarized as follows:

- **Highly representative public authority and CSOs:** In the energy service market to emphasize and create awareness and even a culture for energy efficiency, the public side should supervise legislation, implementation, and regulating issues, collaboratively with the related institutions. To support these, a strong CSO structure is very essential to push the market forward.
- **Minimum ESCO requirements:** To increase the reliability of ESCOs in the market, a more detailed qualification review should be done when authorizing ESCOs. For this, it is necessary to define a set of standards and norms with minimum requirements.
- **EVD or ESCO or both in the energy service market:** ESCO structure is critical for an emerging market like Turkey. On the other hand, current EVD companies are key lockers for the responsibilities of an energy service company. For that reason, two of them can act in the market, simultaneously and EVD companies can help ESCOs whenever needed in the project cycle. In this way, already-created knowledge can be used effectively.
- **Standardized tenders and contracts for sustainability:** For the public sector being a customer, it is required to standardize the tenders and contracts, especially from a legal perspective in order not to have any open discussion points. These documents should be simple, easy to understand, and user-friendly. To support standardization, Public Procurement Institution or similar structured body can prepare them.
- **Cradle-to-grave risk assessment for all phases of the ESCO/EPC project:** To solve major barriers in legal, financing, and insurance, risk assessment is identified as a key management practice in all phases of ESCO/EPC projects. To define and resolve the risks and to become the projectable energy service market, a risk assessment structure should be established and for the evaluation of this assessment, independent organizations should be established according to the related standard.
- **A credit code identifying energy efficiency:** Energy efficiency should have a credit code to be more precise for all actors. In this way, the banking sector can be more aware of energy efficiency projects causing a knowledge/culture formation in the financial sector and more alternative financing options can be opened by the banking sector for the development of the energy service market.

In the near future, there may be collaborations internationally between FACILITEE project's partners in the below-listed fields:

- To support the public and private sectors to better define the regulations, incentives schemes, and general framework to enforce the ESCO/EPC in Turkey.
- To cooperate at any level (training, research, market, finance) to accelerate the evolution of EVD companies into ESCOs and to deal with more complex projects with a holistic approach to energy efficiency together with EVD and Energy Efficiency Service providers in Turkey.
- To create specific certification and accreditation, especially for risk assessment in Turkey.

Under **the Civil Society Dialogue** developed in the project, the following can be possible in Turkey in cooperation between EYODER & FEDERESCO:

- To take the FEDERESCO structure as an example to establish powerful CSO representation in Turkey
  - It is a National Federation representing and promoting the energy efficiency industry in Italy, it has been founded in 2006 and it includes around 90 ESCOs.
  - It is a non-profit association dealing with the culture of energy efficiency and energy-saving, the best practices most appropriate for achieving the aims set by the Paris Agreement and the European Green Deal, the advantages of the Third Party Financing mechanism contemplated by Italian regulation, the adoption of the EPC schemes and the capacity building of associates and the transformation of energy service providers to ESCOs.
  - FEDERESCO participates in many national and international initiatives, bodies, and boards for developing laws and regulations, representing the ESCOs at the national and European-level promoting public incentives and private financing opportunities, and enforcing standardization.
- To define a dialogue between EYODER - FEDERESCO below listed pilot activities can be possible to facilitate.
  - to support the evolution of EVD companies into ESCOs
  - to develop further training initiatives (i.e., on Risk Assessment)
  - to adapt to the Turkish market the REFINE Rating System tool
  - to facilitate EPC experiences in the energy service market
  - to identify some use case (public or private) in Turkey involving a pool of Italian and Turkish experts to develop some concrete EE projects and this could evolve into some joint venture between Italian and Turkish ESCOs
  - to prepare a new co-funded or EU-funded cooperation project.

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