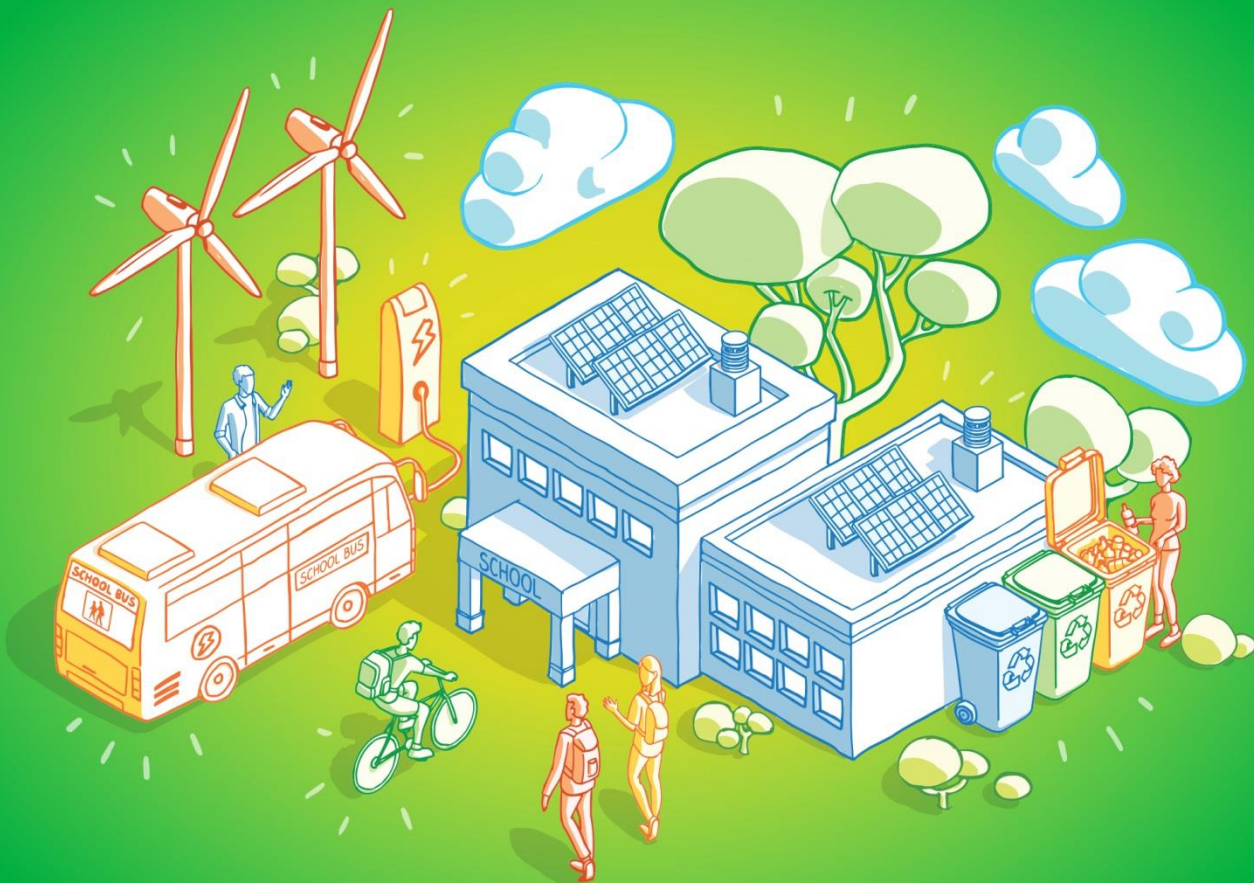




# ClimACT



CLIMACT - ACTING FOR THE TRANSITION TO A LOW CARBON ECONOMY  
IN SCHOOLS – DEVELOPMENT OF SUPPORT TOOLS

## E2.7.2 – Recommendations for Governments for the Adoption of EPC by the Scholar Sector



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Acronym	Full name
ECM	Energy Conservation Measure
EE	Energy Efficiency
EPC	Energy Performance Contract (same as ESPC)
ESCO	Energy Service Company
ESPC	Energy Savings Performance Contract (same as EPC)
EU	European Union
HVAC	Heating, Ventilation and Air Conditioning
IPMVP	International Performance Measurement and Verification Protocol
M&V	Measurement and Verification
MEPS	Minimum energy performance standards
O&M	Operation and Maintenance
UK	United Kingdom

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# Executive Summary

This deliverable is part of Activity 2.7 – *Development of new business models and management strategies for schools* and this task focuses on developing a document with recommendations for governments for the adoption of energy performance contracts (EPC) by the scholar sector. With this in mind, the present document compiles information about the pathways for engagement in EPCs for governments and public authorities.

The main outcome of this document is to define a pathway for public sector entities to engage in Energy Performance Contracts (EPCs), defining all steps to needed to achieve the contract phase and also every step during the contract. The document clarifies details about the public procurement laws, governmental EPC programmes and other specific and local ways to engage in EPCs. The document focus on the state-of-art of four different countries (France, Portugal, Spain and the United Kingdom) which represent the SUDOE region.

# 1 Introduction



Energy efficiency has an enormous potential, the investment in energy efficiency can bring several benefits to different stakeholders. Either by directly reducing energy demand and respective costs (which allows investment in other goods/services) or helping the achievement of other objectives (e.g. making healthier indoor environments or boosting industrial productivity). The improvement of energy efficiency is strategic to enhance the energy system and environmental sustainability, economic and social development and prosperity (IEA, 2014).

Energy services and the use of energy services companies (ESCOs) can play a critical role in promoting energy efficiency at the market level. Over the last years, the awareness and understanding of energy efficiency services has led to an increase of this market and to reduce the mistrust of customers. These were caused by the growing importance of the environmental impacts associated with energy consumption and also the rising cost of energy.

An ESCO is a commercial business providing a range of energy solutions including design and implementation of projects focused on energy savings, retrofitting and energy conservation. ESCOs develop, implement and provide or arrange financing for upfront energy efficiency investments for their clients. They provide a broad range of energy services to final energy users, addressing both individual buildings and groups of building premises, including: energy efficiency advice, energy audits, feasibility studies, design and implementation of retrofitting projects, energy conservation, equipment procurement, measurement and verification (M&V), operation and maintenance (O&M) and project financing.

IEA (2014) indicates that buildings have a great potential for cost-effective energy savings. However, several barriers such as split incentives between schools and central administration, lack of awareness, absence of qualified technicians and high initial investment costs prevent the implementation of energy savings measures and further development of this market.

Governments are able to eliminate these barriers and achieve building sector energy savings by implementing a package of policies, namely policies aimed at improving energy efficiency performance of critical building components in order to improve the overall energy performance of new and existing buildings (IEA, 2011).

## 1.1 Scope of the document

This deliverable aims to provide a document with recommendations for governments for the adoption of Energy Performance Contracts (EPC) by the scholar sector.

This document is strongly linked with Subtask C of International Energy Agency (IEA) Annex 46, namely with the following goals of this Subtask:

- Develop recommendations that can be used to improve existing EPC programs and implement new programs in countries that currently lack them;
- Compile recommendations of the best practice in a guide for innovative energy performance contracts.

At the same time, this document is strongly related with deliverable E2.7.1 – Easy Guide on EPC Business Models, which provides methodological guidelines on EPC and introduces novel business models for ESCOs that will be validated in the ClimACT schools.

## 1.2 Deliverable structure

This document starts with a brief introduction. Then the motivation for the adoption of EPC is analysed, followed by the implementation process of EPC and the best practices to develop this type of contracts.

The document is structured as follows:

- **Chapter 2** presents the motivation for the adoption of EPC for government facilities;
- **Chapter 3** presents the implementation process of EPC;
- **Chapter 4** describes the best practices for the adoption of EPC;
- **Chapter 5** describes the pathway for the adoption of an EPC in schools;
- Finally, **Chapter 6** presents the main conclusions of the present work.

## **2 Motivation for the adoption of EPC**

## 2.1 Energy Performance Contracts

An EPC is a partnership between a customer and an ESCO. Firstly, the ESCO conducts an energy analysis of the facility and identifies energy conservation measures (ECM) that, besides allowing to save energy, are able to improve energy performance and/or reduce operating costs at the customer's facility.

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In an EPC, the ESCO designs a project that meets the customer's needs. Then, the ESCO installs the improvements and guarantees the savings over the term of the contract and is paid from the savings that result from the project. Note that financing can be obtained by the ESCO, by the customer or by a 3<sup>rd</sup> party financing entity.

Figure 1 shows the effect an EPC has on expenses. Before the contract, the building owner pays a value to utilities and operation and maintenance (O&M). Then, the ESCO implements energy conservation measures that reduces the utility and O&M costs, resulting in savings. During the contract, part of these savings are paid to the ESCO to operate and maintain the equipment, and to pay the financing. Finally, when the contract ends, all savings accrue to the site (Shonder et al, 2010).

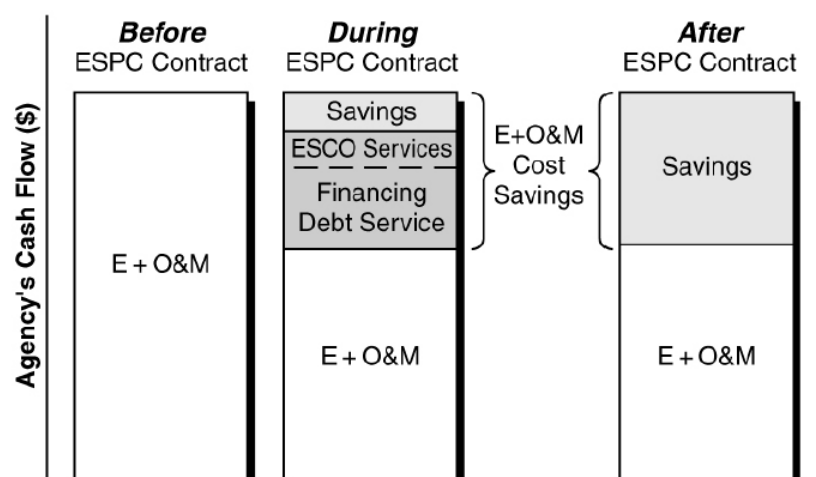


Figure 1 – How an EPC (or ESPC) affects the operating expenses for a building (Shonder et al, 2010).

Therefore, the approach is based on the transfer of technical risks from the client to the ESCO based on performance guarantees given by the ESCO. The ESCO remuneration is based on demonstrated performance, meaning that the clients can acquire infrastructure and equipment

improvements without having the engineering skills, capital funding and without taking on any risk in the process. The public school are viable candidates, with an enormous potential energy savings due to having many obsolete equipment, therefore good potential clients for EPCs.

To further understand EPC and the novel business models for ESCOs that will be validated in the ClimACT schools please read the ClimACT deliverable E2.7.1 – Easy Guide on EPC Business Models (ClimACT, 2017).

## 2.2 Motivation for authorities to engage in EPC

EPC enable upgrading equipment in buildings and to reduce energy and water use, pollutant emissions, operating costs and improve the working environment.

Governments use EPC because funds may not be available for necessary upgrades, they may lack expertise to design and implement comprehensive upgrades and/or may lack expertise to operate and maintain new equipment (Shonder, 2010).

Polzin et al (2016) found that financial and personnel constraints are a significant driver for municipalities to engage in an EPC with an ESCO. EPC's are a means, for municipalities, to reduce the financial means allocated to efficiency purposes without compromising the realization of energy efficiency (EE) projects. Despite that, municipalities are often faced with legal issues which prevents them from making commitments with ESCOs. The lack of specialized personnel is also a constrain because authorities lack the expertise to evaluate EPC and have mistrusts about this type of contracts. It's up to ESCOs to make standardised and simple contracts so that authorities may comprehend and trust the goals of the contract.

IEA (2011) estimates that the buildings sector will have potential energy savings worth around 20 exajoules (EJ) per year by the year of 2030. This more than the electricity consumed by China in 2014 (IEA Statistics). Despite this fact, there are some threats to this market-driven energy savings, such as: split incentives between building occupants and building owners, lack of awareness of efficient technologies, absence of qualified "green" technicians and high initial investment costs.

To eliminate these barriers, governments need to establish policies that promote the implementation of energy conservation measures in buildings, mainly focusing on the critical building components, in order to improve the energy performance of new and existing buildings.

Some of the policies, to improve energy efficiency in existing buildings, governments should implement are:

- Compulsory Energy Audits, Energy Ratings and Certification Schemes;
- Incentives to encourage investments in heat efficient building envelope, system improvements and increased market penetration of high-efficiency products;
- Support and encourage the construction of net-zero energy buildings;
- Require all new buildings, as well as buildings undergoing renovation, to meet energy codes and minimum energy performance standards (MEPS).

As for improving energy performance in critical buildings components (e.g. windows, HVAC systems) there should be established a policy for promoting energy management and control systems, which would allow for a better understanding of this components consumption and better target energy savings opportunities.

### **3 Implementation process of EPC**

The way governments put EPCs into place varies but, usually, EPCs can be divided in the following phases (US-DOE, 2011):

- Project development
- Implementation
- Acceptance phase
- Performance period
- Project close-out

The steps above can be summarized in the following figure:



**Figure 2 – Steps to implementing energy saving opportunities.**

This is a suggested process for implementing energy saving opportunities based on best practice examples from a number of different organisations. Approaches may differ slightly depending on organisation's policies or working practices (DECC, 2015a).

The following sections describe the activities that take place in each phase.

## 3.1 Project Development

In Phase 1, ESCOs provide a free of charge feasibility study to explore energy savings opportunities at the site. The government agency should start to get involved in the project by assembling a Project Team, which should have representatives from all key personnel responsible for the management and operation of the facility.

The customers' select an ESCO based on a preliminary audit that includes a description of energy conservation measures for the customer's building and estimates energy consumption and associated savings throughout the duration of the contract. When the customer agrees with the terms of the contract the project is started.

Some projects have low potential for an EPC so it is possible to bundle several building together in order to achieve the target savings for a feasible EPC.

The next step for the selected ESCO is to start doing an in-depth energy audit. The cost of this audit is, typically, included in the total financed amount.

Finally, all stakeholders review the scope of the project and submit its comments to the ESCO. When all negotiations are completed the EPC is ready. Generally, EPCs proposals define a percentage of the obtained savings to the ESCO that will repay the investment made for



installation of the energy conservation measures (ECMs), provision measurement and verification (M&V) services and operation and maintenance (O&M) of the new equipment during the contract period.

## 3.2 Implementation

Phase 2 entails the purchase of equipment, commissioning the installation of such equipment and ensure that the installed equipment is working as intended. Typically, the ESCO will provide turn-key services including construction management, commissioning, and measurement and verification.

## 3.3 Acceptance Phase

The Acceptance Phase consists in a period where the customer is in an adaptation process to all newly installed equipment. In this phase, the customer's feedback is essential to guarantee that all equipment is working as intended and it is corresponding to all customer's needs. Usually, ESCOs perform a commissioning to ensure that all equipment is working properly since ESCO earnings are highly dependent on achieved savings.

Also, it's on this phase that ESCOs provide training to building staff in order to teach how to use the new equipment's properly and to perform some basic maintenance checks.

## 3.4 Performance Period

The performance period corresponds to most of the contract period. This is the period where ESCO receive their payback according to the previously signed contract. During this period there are two essential activities to be performed by the ESCOs, the measurement and verification and the operation and maintenance.

M&V objective is to see if the savings that are being achieved are within the target defined by the ESCO. If savings are off-target it could be necessary to do an adjustment. It's important to measure savings in real-time since most of the times the savings go off-target the ESCO is losing money. Each month, the ESCO should produce a detailed M&V report for the customer, where he can see the results of the project and see the estimate of savings that is being achieved. O&M is performed to assure that equipment efficiency is maintained and energy savings stay within the target.

In the case of guaranteed savings EPCs, the customer has the right to withhold payments to the ESCO if the pre-agreed savings are not being achieved.

## 3.5 Project Close-out

When the performance contract ends, all financial obligations are resolved. Typically, all equipment stays with the client, but in some types of contracts the equipment might be rented, so when the contract ends, the equipment returns to its owner. ESCOs are no longer responsible

for operation and maintenance which means that the building owner must ensure that his staff is capable of assume this tasks. This tasks are essential to maintain the energy performance, so in this transition, the ESCO, should train the staff on the proper ways of performing O&M in the installed equipment's.

## 4 EPC Best Practices

ESCO markets have been receiving promotion support from the EU in the last 10-15 years. These efforts translated into an expansion trend in ESCO markets, especially the growth of the Energy Performance Contracting scheme.

European Union (EU) programs are reflected nationally by governments, where EPC programs have evolved over time to meet the unique requirements of each country. To further improve conditions for ESCO projects, a number of common elements were found to lead to success in the use of EPC for improving the efficiency of government buildings. This section discusses these common best practices.

## 4.1 Policy and Legal Framework

The existence of a policy and legal framework is fundamental for the successful use of EPC in government buildings.

To adopt EPC, government agencies required legal authority to obligate funds. This process varies between municipalities and has made it necessary for ESCOs to be familiar with a greater number of laws and regulations to operate across jurisdictional areas (Singh, et al. 2010). To overcome this barrier, action is required at a legal level before EPCs could be successful in public buildings.

To improve the current policy framework additional EPC related definitions should be added. The definition of specific EPC terms is important to decrease the mistrust of potential clients by improving their understanding. Also, all different types of contracts should be detailed and there should be clear rules regarding the implementation of EPCs in public buildings.

Additionally, all directives encouraging the use of EPCs are as important as the legislation permitting their use. A good example is the European Parliament Directive on energy end-use efficiency and energy services. This directive recognizes the importance of the public sector to set an example on energy efficiency to develop energy services markets and, to promote exemplary behaviours in the public sector this directive sets more ambitious targets for efficient energy consumption in the public buildings.

Dedicated ESCO legislation has been increasing in Europe, around one third of EU countries enjoys dedicated legislation however, the level of success of these measures is variable. Stakeholders pointed out that legislation, in some countries, misses essential measures to be effective such as: definitions of ESCO related terms, accounting rules, public procurement guidelines, transparency and other.

Besides dedicated regulation, other laws and regulation had a positive impact on the ESCO market even though this market was not their main target. Measures such as certification schemes or third-party verifications were a boost to the ESCO market (Bertoldi, Boza-Kiss, 2017). Despite this positive effect, these complementing measures, could still be more ambitious. Most of the times, when translating European targets to national targets, these targets are not as ambitious and lack potential to drive the energy efficiency markets.

In several ESCO market there was a government effort to remove regulatory barrier in public tenders, that was particularly beneficial for ESCOs. Requirements beyond initial costs are usually one of the reasons that make EPCs struggle to go through public tenders.

Other policies like requiring minimum energy performance in building, requiring performance labels and certificates or encourage the construction of net-zero energy building can also be an indirect incentive to the implementation of energy performance contracts.

## 4.2 Standard Model Contracts

Municipalities and government agencies with successful EPCs have usually used a standard model contract that can be fit to a specific building.

The definition of standard models reduces EPCs complexity and thus, it increases the client ability to understand every detail of the contract. Government EPCs are the proof of the success of standardization. The definition of this models also increases the confidence in EPCs since stakeholders understand that this type of contracts is verified and approved by the government.

While standard contract models are of key importance, if there is not some flexibility to adjust the contracts to a specific client, he may feel impaired since each client has specific need to improve the EE of their properties. Standard contracts reduce costs and complexity however they must not be very strict otherwise there will be no positive effects.

Umbrella contracts are another way to having standard terms and conditions in EPCs. The concept of an umbrella contract means that the contract is pre-awarded. This means that the government agencies are responsible for creating the contract against a standard one and the ESCO that agrees to implement the energy efficiency measure have to bind to that contract. ESCOs can tailor this type of contracts by including a separate document to the final proposal, which allow some flexibility.

“Project bundling” is another tool that can be used across jurisdictions to create incentives for successful EPCs. Government agencies generally are not allowed to retain money saved through ECMs, but the larger entities that fund them are, and having an EPC that covers a bundle of properties can unlock financing directly from the entities that finances the smaller government agencies that manage those properties.

## 4.3 Training and Dissemination

ESCO are often impaired when making an EPC since ESCOs take all responsibility with the project. An EPC is a partnership between an ESCO and the client and both parties take responsibility for some tasks, allowing ESCOs to reduce costs and make more attractive contracts.

EPCs involve a wide array of technical, financial, legal and energy related issues and government customers are usually divided in small organizations that manage one or few properties. Even in cases that those customers have technical expertise in all these areas, they might not be familiarized with EPCs. For this reason, successful EPCs with governments tend to happen when ESCOs provide customers with technical and contracting assistance. The introduction of

international verified and approved training programs would be a way to increase the awareness of EPCs and would benefit both the ESCOs and the rest of involved personnel.

The following services are examples of efforts that ESCOs and government could provide in order to promote EPCs (Shonder et al, 2010):

- Opportunity assessments and facilitation services;
- Advice and consultation on environmental assessments, project planning, tendering;
- Awarding of contracts, staff training and project monitoring;
- Assistance in customizing the model performance contracting documents;
- An online list of pre-qualified ESCOs in the country;
- Consultation services on evolving policy and operational issues;
- Customized approaches to training and workshops through reliable industry contacts.

Dissemination of successful EPCs can also increase awareness and trust among stakeholders. The EU EPC Campaign was launched in 2012 with the aim to enhance understanding of the business model. Even though this campaign was successful in some countries, there were critical issues that reduced the campaign effectiveness, such as risk sharing or split incentives. To have a successful dissemination campaign this issues must be the centre point of discussion. After understanding risk and related costs, potential clients would get a clearer picture of the role and reasons for the costs of an ESCO.

Showcasing successful public projects can trigger a positive market effect. EU regulations stipulate that public building fulfil an exemplary role, reason why energy performance regulations for public buildings are stricter than regulations for private buildings. These higher energy efficiency targets increase the need of energy efficiency measures in the public sector, which makes this sector the key to develop the ESCO market.

## 4.4 Competition

As in most markets, EPC prices benefit greatly from competition between contract providers. Governments often use this effect to increase the value of their EPCs by asking companies on the qualified ESCO list for proposals based on specific requirements. The requirements for the contracts are usually the result of a preliminary assessment, which often includes an analysis of previous energy records and consumptions patterns, an inventory of equipment's and results in a list of improvement measures to increase energy efficiency. This open call for proposals allow interested ESCOs to submit applications, thus fomenting competition. Proposals are evaluated by a team of experts assigned to that specific project. The evaluation process considers various criteria, to assure that the selected contract presents good value both in terms of cost and quality.

In addition to compete for public contracts, ESCOs are often required to foment competition by launching open calls to their subcontracts for specific EPC projects. This practice is becoming more common, and some ESCOs are starting to realize that it usually presents the best value for costumers. As a result, more companies are starting to do it voluntarily.

## 4.5 Financing Access

Governmental policies can ease access to the capital for the EPC project by developing specific financial programs and schemes (e.g. subsidies for EPC project preparation, soft loans, obligations schemes, white certificates). These credit lines have been seen as a key success factor to kick-start ESCO markets. If governments are able to finance their own EPCs through such programs, then this would increase the competition between ESCOs which would enable to decrease costs.

Revolving funds could provide EPC projects the necessary initial investments, reducing the current necessity of ESCOs funding their own projects. This way, ESCOs are able to overcome the issue related with financing access since commercial banks and other financing entities do not invest in ESCO projects because these are still seen as a high risk investment. Other types of funds (e.g. guarantee funds or forfeiting funds) can also help ESCOs by reducing the financial risk of the project.

## 4.6 Measurement and Verification

Generally, municipalities and government agencies do not want to assume any risk in EPC projects so, being able to guarantee savings and having well-defined requirements for M&V of savings is key to having successful EPCs.

ESCOs determine savings by comparing energy use and cost before and after the implementation of the energy efficiency measures. To assure that this value is not over or underestimated due to changing conditions, ESCOs develop a normalized energy baseline that characterizes the building's energy consumption.

Reaching an agreement between ESCO and client on the methodology of M&V is one of the most important parts of the contract but it is not always easy to settle an agreement as M&V of savings can be a very complex process that requires knowledge that might not be present in most of government facilities.

The most common reference for M&V is the International Performance Measurement and Verification Protocol (IPMVP). IPMVP details M&V techniques and is based on four general approaches to assessing savings. These approaches, or "Options", differ according to the project's complexity and are as follows:

- Option A: Energy savings are based on a partial measurement of energy use of the equipment affected by the ECMs; some parameters in the ECM are stipulated by the parties and not measured.
- Option B: Energy savings of an ECM at the equipment level are based on full measurement, no stipulations as in Option A.
- Option C: Energy savings are determined from utility meters or sub-meters to assess the energy performance of the entire building.
- Option D: Energy savings resulting from the EPC are determined using computer simulations.

For many projects, savings may be verified with a minimum of measurement and at a minimum cost. Other projects call for a more rigorous approach to M&V. In general, the more rigorous the verification requirements, the more expensive the verification process will be (Shonder et al, 2010).

The factors that affect the chosen approach of M&V in an EPC project are:

- Number of energy measures implemented;
- Size and complexity of energy conservation measures;
- Interactions between energy conservation measures;
- How risk is allocated between the owner and the contractor in a performance contract.

Using IPMVP, or other international recognized protocol, is one of the best practices that ESCOs can adopt as this protocols help ESCOs to explain the implemented methodology to customers and gives customers a guide to ensure that ESCOs are respecting their end of the contract.

Despite the existence of IPMVP and other measurement and verification protocols, ESCO clients are not acquainted with such protocols. To increase their confidence in this projects, governments should introduce a verification system for assessment tools.

## **4.7 Quality Assurance During Project Performance Period**

The lack of expertise for implementing energy efficiency measures is often a driver for governments to make a deal with an ESCO. Studying and implementing successful energy efficiency measures requires expert personnel which is not often an employer of the municipality that owns the buildings. ESCOs provides this expertise and ensure that all energy efficiency measures applied are working as expected.

A barrier generated by this lack of experts in energy efficiency is visible when assessing the savings generated by the project, that can be either guaranteed by the ESCO or a savings split between both entities, as municipalities have no way to verify the generated savings by themselves. Sometimes, third parties are involved in the project just for this verification process, assuring the quality throughout the project performance period.

Governments have addressed this issue in a number of different ways. Some governments recommend having third parties to perform M&V of savings while others just increased the recommended number of measuring instrumentation to ensure the desirable quality on M&V practices by ESCOs.

## **4.8 Continuous Program Improvement**

Several countries and their respective governments studies, highlight the necessity of regular assessment campaigns, for EPC success. Adapting to various paradigm shifts is vital to the success of EPC programs. For this reason, companies involved in EPC contracts must be encouraged to assess project implementation and efficiency performance, on a regular basis.



This policy supports continuous improvement of the contracts and guarantees that the contract meets both governmental and building owner's needs.

Besides regular assessment and adjustment campaigns, EPC programs benefit greatly from communication between the different involved parties. Discussion between different companies working in the same contract can work as an enabler for new improvement ideas and often helps overcoming obstacles. By creating conditions for an open discussion, companies are encouraged to share past experiences in EPC programs. This discussion can be held by organizing events and open discussion forums.

## 5 Pathway for the adoption of EPC

This section is a roadmap for public schools in the SUDOE region for the adoption of EPCs. The main goal is to detail all possible solutions to engage in EPCs and detail the legislation associated with each of the solutions.

## 5.1 Portuguese Public Schools

Unlike private buildings, public buildings cannot adjudicate new projects without additional proceedings. Public contracts are the most common procedure to adjudicate projects in the public administration. These usually require to have three or more tenders for a project and the adjudications goes to the best offer. These procedures have several variations depending on the nature of the requirement made by the public entity. Also, these procedures vary according to the quotation of the service that is being provided.

Energy performance contracts have, however, dedicated legislation in Portugal. This legislation regulates the formation and execution of energy performance contracts in the public administration (IEA, 2016). First, this legislation was only applicable to departments and agencies of the direct public administration but, as of 2015, this legislation also included local administration bodies.

With the dedicated ESCO legislation, a public programme was launched to raise the attractiveness of ESCOs business in the public administration. The program, called ECO.AP, pretends to facilitate the engagement in EPCs by standardizing the terms of the contract and communicating directly with all certified ESCOs. The national energy agency is responsible for certifying ESCOs according to their skills and financial capability.

Theoretically, EPC do not add expenses because these contracts are paid by the obtained energy savings. But, in practice, municipalities paid the electricity bill regarding the total value of the bill, without adding money over it. This causes that building owners need to paid for the EPC as a typical service, increasing the public debt. The objective of ECO.AP is exactly to allow public entities to engage in EPCs without increasing their debt.

Even though all public buildings managed by the central administration must use ECO.AP to engage in an EPC, public buildings managed by the local administration can use the general proceedings. These general proceedings are either a public tender or direct adjudication, depending on the value of the contract.

Besides using ECO.AP, public entities can also apply for energy efficiency funds. Some examples of financing programmes are Portugal2020 or POSEUR. When public entities apply to this type of funds they usually are already supported by the company which will execute the job. These type of projects have different legislation to regular public tenders.

## 5.2 Spanish Public Schools

In Spain, all public administration is regulated by the Tenders in the Public Sector Law. Even though this law does not specify public proceedings for EPCs or other ESCO business models, the

national energy agency clarifies how this law can be interpreted in terms of ESCO business models in the public sector.

The most common type of contract applied is what is called the 5P's contract. This type of contract assures that ESCOs, besides performing energy efficiency retrofits, must also maintain the installed equipment and install renewable energy solutions.

To engage on one of these EPC contracts, building owners must start an open adjudication process. In this process any company or person that works directly in the area can submit a proposal. Also, to be able to submit the proposal all contestants must be registered as a "Maintenance Company" according to the Regulation of Thermal Installations in Buildings (IDAE, 2007). After two stages of evaluation a contractor is found and the formal contract is made.

Besides engaging in public tenders, building owners in the public sector can also apply for energy efficiency funds to promote energy efficient retrofitting in their buildings.

## 5.3 French Public Schools

In France, there are multiple ways for public entities to engage in EPCs. The two most common ways are in the form of a partnership contract of energy performance, according to the law of partnership contracts or in the form of a public market of energy performance, according to the Code of Public Markets (EC-JRC, 2017).

Both these decrees were recently repealed and replaced by equivalent ones that apparently, due to the lack of information of new methodologies, have not changed the described methodologies to engage in EPCs in the public sector.

The biggest difference between these two choices is how payment is done. Under a partnership agreement the public entity pays a periodic rent corresponding to equipment, maintenance and operation. According to the Code of Public Markets the public entity should provide a down payment for the realization of services.

On both of these procedures it is mandatory that public entities initiate a public tender, where all qualified companies for the job can submit a proposal. However, there are some exceptions to the mandatory use of public tenders. If the EPC cannot be adjudicated without previous negotiation them, it is possible to adjudicate the EPCs through a competitive procedure with negotiation or through a competitive dialogue. Respectively, the first procedure objective is to define requirements to being able to perform what is required and limiting the number of candidates according to those requirements. The competitive dialogue procedure is a type of procedure that the public entity negotiates directly with invited candidates and there should be a minimum of three candidates.

## 5.4 United Kingdom Public Schools

In the United Kingdom (UK), public administration has a very different way to engage in EPCs. Unlike the other countries in the UK the local administration is very aware of the potentials of energy efficiency to reduce cost so they tend to fund projects by themselves. To do this, the

most common procedure is to create a “Arm’s Length” ESCO which is a small ESCO partially or totally detained by the council (Hannon, Bolton, 2015). This independent public company is able to finance energy efficient retrofitting with long term contracts that cannot be performed by a private company. Sometimes, local authorities establish a partnership with private ESCOs, as these companies can provide the “know how” and support financing the project.

In an overview, the ESCO market in the UK is a very tough to enter due to local authorities’ power to create local public ESCOs and financing their own projects. The only private ESCOs that succeed in this market are those who are a subsidiaries of energy utilities, providing a vast financing capability and being able to include the energy delivery in the contract.

For public sector engagement in EPCs with a private company all regulation on public procurement must be complied during tender and post tender phase. The UK Department of Energy and Climate Change developed a specific model contract for EPCs which was developed under the Article 18 of the Energy Efficiency Directive and has the objective of assisting public sector organizations in all procurement, tender and implementation proceedings of EPCs.

This model contract can be used as a single supplier framework agreement, making it very flexible to the requirement of the public bodies.

## 5.5 Summary of EPC engagement in the SUDOE region

All four countries that were analysed have similar law regarding public contracts. This is due to the European Directives 2014/23/UE and 2014/24/UE, which were transpose to the national laws. Despite these European directives there are some slight differences in the EPC engagement, for the public sector, in each country.

The biggest difference is that some countries have specific EPC legislation or a governmental EPC program that changes the way to engage in EPCs by skipping the Public Tender regulation. One example of this is Portugal, with the ECO.AP program.

Other countries do not face the barriers that are common in other countries, such as financing the projects. If a local government can finance their own EPCs and can acquire the “know how”, then there is no need to have a private partner. One example of this is the UK and their common practice of creating local public ESCOs.

All four countries can engage in EPCs by submitting a public tender. As detailed in the European directive on public contracting, these tenders might be open or restricted to a certain number of companies and can have prequalification requirements to assure that all proposal received are, in fact, able to meet all expectations of the public entity.

## 6 Conclusions

This deliverable is part of Activity 2.7 – Development of new business models and management strategies for schools and this task focuses on developing innovative business models for energy services companies (ESCOs) which are aligned with the stakeholders' requirements.

The EPCs allow public entities, not only to obtain financing from the private sector, but also to obtain engineering skills from this sector. ESCOs have the experience of drafting contracts with the public sector and also experience in building management and implementation of energy efficiency solutions. They use this experience to develop easily understandable projects in order to facilitate government entities to achieve energy reduction goals.

Despite all advantages of EPCs, the number of project made in public sector buildings in the last few years is very small. One of the reasons behind is the lack of knowledge on EPCs. Understanding how this type of contracts work and all the steps involved can be a catalyst to the ESCO market.

Since EPCs include finance charges, these contracts lead to an increase in public debt of municipalities. In some countries this is another major barrier as many municipalities are already indebted so they are not able to participate in an EPC although the contract allows to obtain economical savings from day one.

Also, something that is not very clear for many of the public entities who own buildings is the pathway to engage in one of this projects. The lack of dedicated ESCO legislation makes, legally, an EPCs the same type of contract as other service provided to the public body. However, EPCs are very different from traditional contracts, not only do EPCs include the installation of new equipment and maintenance throughout the contract period, but the fact that the payment to the ESCOs is relative to the savings obtained make these contracts a legal challenge for municipalities.

As the adoption of EPCs is both social and economically desirable, providing the potential to reduce energy costs and carbon emissions, make that EPCs should have a very strong market in the public sector. With policy changes and dedicated guidelines, EPCs have a large growth potential in the public sector. The main outcome of this document was the provision of guidelines on EPC engagement for schools so that schools can unlock some of this potential.

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