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STEPPING - Supporting The EPC Public Procurement IN Going-beyond

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Pilot implementation handbook

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Prepared by

AESS - Energy and Sustainable Development Agency

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Definitions and acronyms

EED - Energy Efficiency Directive (2012/27/EU Directive). It establishes a framework to promote energy efficiency (EE) in European Union.

ECM - Energy Conservation Measures. They are those interventions aiming at increasing the energy efficiency of a concerned building.

ESC - Energy Supply Contracting. It is the efficient supply of energy. The contracting partner provides products such as heat, chilling, compressed air or electricity. The subject of the contract is not the energy value, like for example litres of oil, but the utility value – billed in Euros per volume items of heat, steam or compressed air.

EPC – Energy Performance Contract is a form of 'creative financing' for capital improvement which allows funding energy upgrades from cost reductions. Under an EPC arrangement an external organisation (ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment. Essentially the ESCO will not receive its payment unless the project delivers energy savings as expected.

EPC Facilitator – It provides the necessary know-how and experience to support the building manager with the successful implementation of an EPC project. The EPC Facilitator acts as a mediator between client and ESCO to build up a sustainable relationship and to create trust between the future contract partners. Often in the European framework this corresponds to an energy agency or similar organisation.

EPC Provider - it means a natural or legal person who delivers energy services in the form of Energy Performance Contracting (EPC) in a final customer's facility or premises. It often corresponds to an ESCO. The EPC provider shall maintain a qualified staff in order to provide the right technical, commercial, legal and financial know-how and skills. It ensures that its experts have the adequate qualifications and capacities related to the preparation and implementation of the EPC project. Less experience on the Client's side can be balanced by a specialised advisory company (such as an EPC facilitator) that will steer it toward the correct implementation and procurement of the EPC project.

ESCO - Energy Services Company – according to Art. 3.i) of Directive 2006/32/CE - is: "a physical or legal body that delivers energy services or other energy efficiency improvement measures in the user's facility or premises and, in so doing, accepts some degree of financial risk. The payment for the services delivered is based, in whole or in part, on improving the energy efficiency obtained and on the achievement of the other agreed performance criteria".

IGA- Investment Grade Audit. The investment-grade audit expands on the detailed audit and relies on a complete engineering study in order to detail technical and economical issues necessary to justify the investment related to the transformations.

IGP - Investment Grade Proposal. It's the first stage of your EPC project at which you commit expenditure to the ESCO. The IGP is an in-depth assessment and proposal phase in which the ESCO need to access to your buildings and collect building information data. The ESCO will need to be sure that the solutions are appropriate and that the savings and savings baseline are accurately calculated.

IER - Initial Energy costs (baseline). The basis of the energy costs baseline is the energy consumption in a reference year (e.g. past year before implementation of EPC) in connection with the energy supply prices applicable to the client at a certain key date (e.g. 31.12. reference year). The baseline is to be provided to all bidders in the invitation to tender.

IRR - Internal rate of return. It is a metric used in capital budgeting measuring the profitability of potential investments. Internal rate of return is a discount rate that makes the net present value of all cash flows from a particular project equal to zero. IRR can be considered as the rate of growth a project is expected to generate.

M&V – Measurement and Verification (plan). The aim of a measurement and verification (M&V) Plan is to quantify the impact of implemented Energy Efficiency Projects (EEP). This impact is quantified by comparing the energy use before and after the intervention of EPP. The "before" case is referred to as the baseline; the "after" case is referred to as the post-intervention or modified (actual) consumption pattern.

O&M – Operation and Maintenance. An operation and maintenance (O&M) agreement is an agreement between the project company and the operator. The project company delegates the operation, maintenance and often performance management of the project to a reputable operator with expertise under the terms of the O&M agreement. The operator could be one of the sponsors of the project company or third-party operator. In other cases the project company may carry out by itself the operation and maintenance of the project and may eventually arrange for the technical assistance of an experienced company under a technical assistance agreement.

Payback period - It is the length of time that it takes for the cumulative gains from an investment to equal the cumulative cost. It's the time it takes for an investment to pay for itself. Investments with shorter payback periods are considered to have lower risk than those with longer payback periods. The calculation is more cumbersome than that of simple ROI.

ROI - Simple Return period On Investment. Simple ROI is considered as the initial investment of the action divided by the yearly savings.

1. Introduction

The legislative framework at EU level and the importance of EPC contracts

The aim of the STEPPING project is to boost the adoption of EPC contracts for an effective improvement of public buildings energy efficiency in the Mediterranean countries. While those models are indeed diffuse in the Northern Europe, many barriers and obstacles are still in place in the Southern countries for their proper implementation.

The purpose of the present handbook is to share a common framework on EPC issues and experiences at Mediterranean level so that each STEPPING partner has all the elements for the pilot implementation phase of the project.

Let's start from the definitions and reasons of EPC contracts.

The legal framework applicable to the Energy Performance Contract (EPC) is derived from both European Union (EU) and national legislations. At the EU level, the core definition of the EPC is to be found in the Directive 2006/32/EC, but it has not yet been fully transposed into the legislation of all European countries. Furthermore, most existing definitions are not "operational", that is to say sufficiently explicit to establish the elements, conditions and modalities of implementation. No standardized and comprehensive typology of EPC models has yet been widely accepted. Consequently, actors of the energy efficiency markets have different understandings of performance-based contractual models; in most cases the functionalities and the characterizing clauses that should explicitly define an EPC are still unclear.
In order to improve understanding of EPC's characteristics and risks by the potential clients and thus facilitate the ESCOs' (Energy Service Companies) marketing of their services, it is essential to clarify underlying characterizing concepts behind these particular contractual models.

The 2012/27/EU Directive - Energy Efficiency Directive (EED) establishes a framework to promote energy efficiency (EE) in European Union to ensure the fulfilment of the objective of 20% increased energy efficiency by 2020.

Member States should promote the energy services market and access of SMEs to this market by:

- Disseminating clear and easily accessible information regarding financial instruments, incentives, grants and loans to support Energy Efficiency projects
- Publicly available and regularly updated list of available energy services companies
- Support the public sector in terms of request for proposals for energy services (especially for rehabilitation of buildings).

Within this Directive, the definition of Energy Performance Contracting is the following: "energy performance contracting' means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings."

Guarantee of savings is one of the key elements of the EPC. This is in line with the EED, as in its Annex XIII, guaranteed savings are listed among the minimum items to be included in energy performance contracts with the

public sector or in the associated tender specifications. Moreover, in the article 18 of EED, Member States are required to promote the energy services market and access for SMEs to this market by, inter alia**,** disseminating clear and easily accessible information on available energy service contracts and clauses that should be included in such contracts to **guarantee energy savings** and final customers' rights.

EPC in a nutshell

The basic principle of Energy Performance Contracting is that energy efficiency investments are paid for [*in whole or in part*] over time by the value of energy savings achieved.

Key elements of any energy performance contract are:
–An external organization (ESCO) implements energy saving measures to improve energy efficiency of a facility and utilizes the stream of income from cost savings to pay for the investment.
–The contract is structured so that the compensation is contingent on demonstrated performance, i.e. the ESCO takes a risk.
–There is an agreed method for measuring and verifying energy savings.

(Source: SEAI 2014 / KSSENA)

Why and when an EPC?
When evaluating the suitability of a project, or group of energy saving opportunities, for EPC there are 5 key considerations.

The first and core consideration is that the project has to be **viable** in its own right: in order to justify anybody spending capital on implementing an energy saving project, the savings generally have to be sufficient to recover the original capital cost and investment return over a number of years (3 to 20 years). If the energy savings (and any maintenance savings) are insufficient, then the customer may have to fund a portion of the works as a "cost of ownership". Furthermore, the project must be of sufficient scale to justify the transaction cost and attract finance.
If the project is viable, then one must consider how the capital will be supplied to finance the works, how the savings will be distributed and how the various risks will be allocated. Traditionally these are all borne by the customer but an EPC allocates them to the customer, the ESCO and the financer.

The **capital** can be supplied out of the customer's own funds, by the ESCO or by a third party (e.g. a public capital fund, a private capital fund, an energy utility, a bank). The overall capital is likely to be financed from a number of sources. If capital is supplied by an ESCO or third party, then a multi-year contract is required so they can recover their investment with interest.
The associated contract options are discussed further in the next section. The cost of this capital is critical and this depends largely on the risks.

The next consideration is **risk**. As already discussed there is a risk that equipment will not perform as was expected, or projected savings will not materialise because the underlying assumptions in predicting savings were incorrect. This risk is typically borne by the ESCO, this being their area of expertise and added value. The risk may

be borne entirely by the ESCO, such as when the ESCO guarantees the savings, or in part, such as when the savings are shared.

There is also a credit risk, i.e. the risk that the customer can't, or won't, pay at some point in the future. This will be assessed by the ESCO or the third party financier and will affect the cost of capital.

Finally there is the energy price risk. If energy prices change, so does the value of the savings. As the customer is already inherently exposed to fluctuations in energy prices and has most to gain if energy prices fall, this risk is typically borne by the customer. This can be done by agreeing a fixed energy price, or an energy price floor, at which savings are valued.

The fourth consideration is **savings**. Not just the value of savings, but also how those savings are allocated amongst the different parties. Generally the higher the savings, and the greater the proportion of savings that are allocated to the ESCO or financier, the shorter the contract term.

In addition, a correctly **energy baseline** design is the last consideration. The baseline of the project identifies energy consumption equation, which reflects the energy uses or energy consumption of the client. A rigorous baseline is necessary to know how to act if there are future significant changes in the client's process during the contract. In a way, the baseline is useful for linking the risk with the savings, for instance, if the client increase or decrease energy consumption during the contract, energy savings have to be calculated from initial baseline. Therefore, in the baseline design clauses taking into account these kinds of deviations must be present.

Typically the contract life is determined by the length of time needed for the savings to repay all the costs of the project (capital, project management, financing costs, etc). It may be extended if the customer wishes the repayment terms to be lower by spreading them over a longer period of time; or where the client wishes the ESCO to guarantee the savings for a longer period of time. There is usually a premium for this.

EPCs have many benefits. Some reasons to choose an EPC for a project include:

- reduction of operating costs;
- facility improvement;
- outsourcing of non-core activities to focus on mission;
- simplicity of having a single source provider;
- dissatisfaction with traditional construction process results;
- alternative source of facilities funding—budget relief;
- access to systems experts and partnership with ESCO;
- potential to focus on improving the quality of the indoor environment—indoor air quality (IAQ);
- increase of the buildings energy renovation rate;
- code compliance;
- risk management;
- potential access to capital;
- solution to a specific need;
- guaranteed performance for a long period;
- value-based solution;
- accountability over the term of the contract;
- environmental benefits;
- long-term increase of the building value.

Although some of these benefits are inherent in the EPC process, others will need to be expressly discussed with the awarded ESCO. Like all objectives, it is recommendable to discuss these openly with the awarded ESCO to ensure they are met.

In short, the reasons for adopting EPC contracts for improving the energy efficiency of public buildings can be summed up as in the table below.

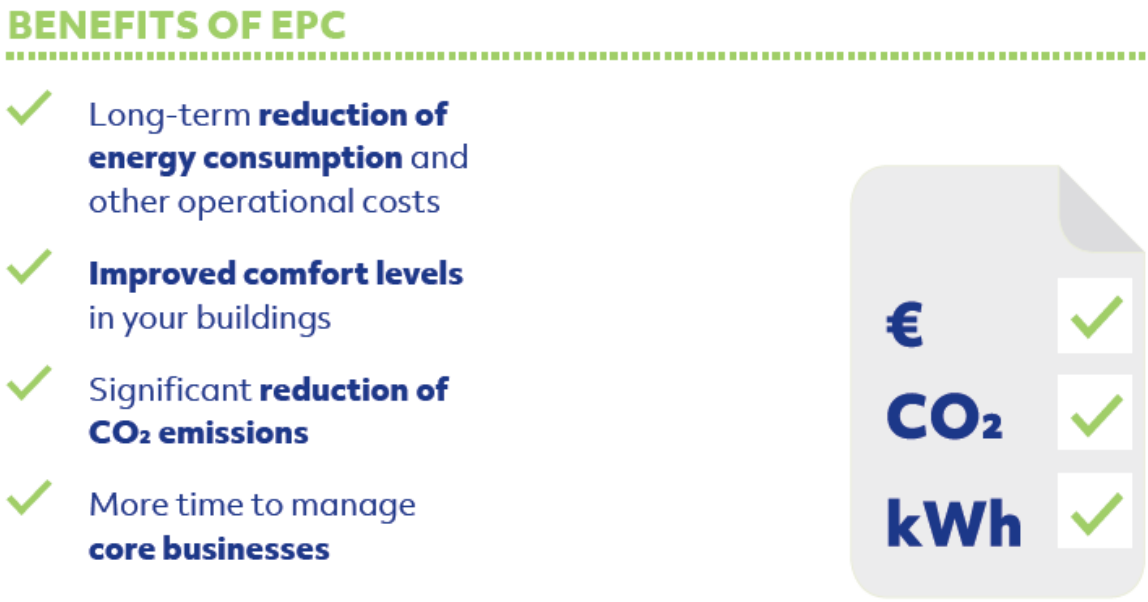

Figure 1 -Source: CODEMA, Dublin's Energy Agency

When an EPC may not be the best choice

While energy performance contracting has numerous benefits, it may not be the best option in all situations. You can consider the following when deciding whether an EPC is the best option for the Public Body facility.

1. Ensure you are comfortable with a long-term relationship and the benefits this will provide before proceeding with an EPC. One possible drawback is the loss of flexibility associated with signing a contract with a single contractor for a lengthy time period—this is an obvious corollary of the benefits of using a single source contractor for the entire project.

2. It is important to ask if the potential size of the EPC carries the overhead costs of developing a project by an ESCO. Performance contracts are turnkey arrangements that involve not only the capital investment cost, but also engineering audits, the implementation and corresponding project management time, and ongoing monitoring and maintenance. Thus, the threshold of economic viability for energy service companies may exclude smaller opportunities.

3. It is also important to ask if you are willing to try something new and innovative, given the potential benefits that could be realised. Whilst performance contracting can provide the capital to both public and private sector Customers to fund energy saving improvements, these arrangements may not fit neatly into the Public Body's

existing procurement rules. Customers should check their internal procedures before a performance contract can be signed, and a considerable amount of education may be required to overcome possible reservation of this unconventional approach.

The different types of energy services

Energy services achieve economical and environmental benefits. Renewable energy solutions such as biomass, geothermal, wind and solar energy are usually considered in the contracting approach. The energy service value chain shows two different basic models of energy contracting:

- Energy Supply Contracting (ESC) and

- Energy Performance Contracting (EPC) The principal difference is that EPC goes beyond ESC. Whereas ESC is based on a business model that guarantees energy supply; EPC is a business model for energy savings. The goal is to avoid wasting energy and to invest the savings in energy efficiency.

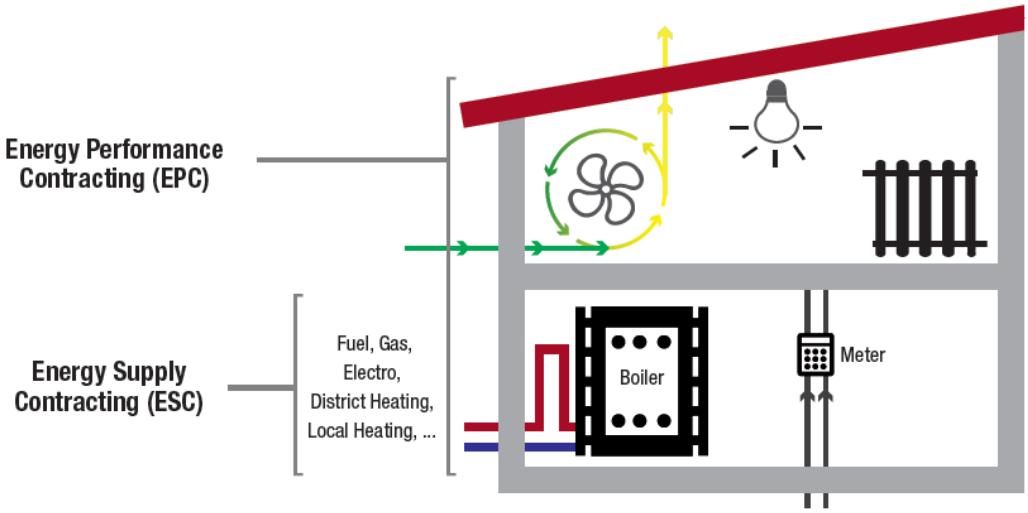

Figure 2- Source: Energy Contracting, Successful energy services business models, eu.esco

Energy Supply Contracting (ESC) is the efficient supply of energy. The contracting partner provides products such as heat, chilling, compressed air or electricity. The subject of the contract is not the energy value, like for example litres of oil, but the utility value – billed in Euros per volume items of heat, steam or compressed air. Financing, engineering design, planning, constructing, operation and maintenance of energy production plants as well as management of energy distribution are often all included in the complete service package. The ESC is a service primarily used in the commercial and industrial sectors, however residential dwellings may also be included for reductions in primary energy use for a long period and accelerate the return on investment. Contracting is an extensive energy service, provided by an Energy Service Company (ESCO). The ESCO guarantees savings that cover all implied costs. It accepts the operational risks for contracts with durations generally above 5 years and normal time spans of 10-15 years. The ESCO typically offers customized energy contracting packages that contain

planning, operation, and maintenance elements. In addition, it also manages energy purchasing and financing of the various projects. Example in a district heating scheme energy supply contract. The business model encompasses the entire process from the purchasing of fuel to the delivery and invoicing of energy. CHP plants and renewable energy solutions frequently are also included in energy supply contracts. The benefits of ESC are a significant boost in efficiency, clear and optimized operational costs, more supply assurance and the usage of the most recent safety standards. The customer no longer needs to worry about their energy supply concerns and, in addition there is an increase in environmental performance. The focus of the ESC service model is on the efficiency of the energy supply with the aim to bring the efficiency to its maximum while at the same time providing security of supply

The application span of **Energy Performance Contracting** involves the entire building – as one incorporated energy consuming unit. It is a type of long term contractual agreement where the customer benefits from new or upgraded energy equipment and the ESCO's remuneration is directly tied to the savings achieved by the reduced energy consumption. The cost of investment is paid back from the savings, and in case the ESCO fails to achieve that, they must cover the difference between the actual and the guaranteed costs. More than a funding model, an EPC is a programme of **practical engineered energy efficiency measures** that are implemented in buildings to deliver real energy savings such as HVAC, lighting, controls and building fabric improvements. In addition, to ensure the building is used in the most efficient way, building occupants could receive training on energy efficiency practices. The intention is to keep the total energy consumption to a minimum – by way of demand side energy efficiency methods. To ensure promised energy savings have been achieved over the contract duration, a procedure termed "measurement and verification" is used. Adhering to an internationally recognized protocol such as the International Performance Measurement and Verification Protocol (IPMVP), customers can be assured that guaranteed savings have actually been delivered despite changes to the climate, the building and its use over time. The procedure is subject to the EPC contract, regulating the partnership between the ESCO and the customer. The contract regulates general issues such as property rights, usage of the systems and partnership duration. Furthermore it stipulates the amount and structure of the investment, its implementation, how it is controlled as well as the maintenance of the energy saving measures which have been taken. It particularly determines the extent and distribution of the annual savings. The key benefits include risk transfer, the ability to modernise a building's energy infrastructure without necessarily having the funds and accessing external expertise. The key focus is on saving energy at the point of use first, before optimizing the supply of that energy.

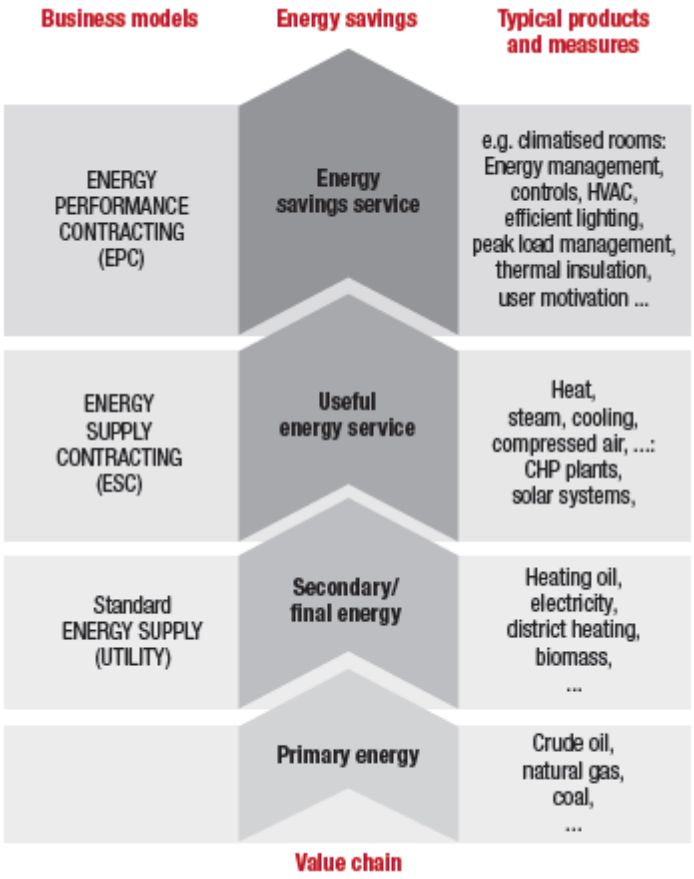

Figure 3 - *Source: Bleyl, Jan W., Schinnerl, Daniel: "Energy Contracting" to Achive Energy Efficiency and Renewables using comprehensive Refurbishment of Buildings as an example. In: Urban Energy Transition, Elsevier 2008*

There are a number of different ways of structuring a performance contract. The most common is **'guaranteed savings'**, in which all the contractor's costs (equipment, installation, mark-up, fees and so on) are repaid annually out of the savings as they accrue. The length of the contract (typically four to eight years) is usually chosen so that all costs are paid for out by the end of the contract period.

This method allows the addition of extra measures as the contract progresses, with the increased savings covering the higher costs.

In Spain, for instance, in the guaranteed savings model, the ESCO guarantees a certain level of energy savings and the client does not assume any performance risk. In this case, the customer is usually financed the project by banks or a financing agency. Then, ESCO can do more projects without getting highly leveraged.
It is a proper model if the country has a great banking structure and a good expertise in this type of projects, because the financial institutions are familiar with this type of projects. In this way, the confidence arises and the financial institutions provide directly funds procuring a good financing price.

The second type of contract is known as **'shared savings'**. In this arrangement, the business and the contractor agree to share the savings over the contract period according to an agreed formula. The actual cost of the measures is not included in the contract, and the business has no obligation to pay off those costs. In return, the performance contractor does not guarantee the savings. Contract terms are usually longer - up to 10 years - because it takes longer for the investment to be recovered, and the risks to the contractor are higher.

In the shared savings model, ESCO is responsible for whole project's activity and the centralization of all the actions regarding the engineering, procurement, construction and funding. The owner does not have direct control over the implementation of the project (this player receives the project ready for operation). However, the final recipient and ESCO keep an exchange of "know-how" during the project life. ESCO is directly linked with third party financing and it takes over the loan. Then, small (in terms of invoicing) or new ESCOs are not able to enter this model for being too highly leveraged and unable to contract further debt for subsequent projects.

The third type is the '**chauffage**' or full energy/environmental services contract. Here, a performance contractor effectively takes over the operation of a customer's utility or production facilities as well as upgrading them, and often pays the customer's utility bills as well. The business pays the contractor a regular fee equal to the utility bills before the project or some other negotiated fee. The complete management of a building or facility by a contracted third party in some European countries is more common.

Recently, in the framework of EU projects, advanced models of EPC contracts have been proposed. The following have been reported in the framework of the EESI (European Energy Service Initiative) project:

"EPC plus" – EPC with comprehensive refurbishment:
"EPC plus" extends the service of the ESCO to comprehensive structural measures on the building shell like insulation or window replacement. These services are usually not part of the classical EPC because of excessively long pay-back periods. The contractual arrangement contains special regulation on financing. Usually the customer has to pay a share of the investment through a grant or by combination of EPC with subsidy programs. EPC plus is very suitable in buildings with high need for renovation.
The combination of both structural renovation and energetic optimization leads to high energy savings up to 50%. Examples have been developed in e.g. the Czech Republic and France.

"Integrated Energy Contracting (IEC)":
The Integrated Energy Contracting Model combines the objectives of reduction of energy demand through the implementation of energy efficiency measures and efficient supply of the remaining useful energy demand. The ESCO will take over implementation and operation of the energy service package at its' own expenses and responsibility according to the project specific requirements set by the client. In return, the ESCO will get remuneration for the useful energy delivered (i.e. per kWh), depending on the actual consumption as well as flat rate service remuneration for operation & maintenance, including quality assurance. IEC is a combination of elements of ESC and EPC. This model has mainly been used in Austria so far.

"EPC light" – energy management with guaranteed elements:
EPC light aims at achieving energy savings mainly through optimization and organizational measures with low or no investments in technical equipment. The ESCO acts as an external energy manager taking over the responsibility to operate and optimize the energy related installations (heat boilers, building automation, lighting control).
Since pay-back of high investments on hardware is not necessary in EPC light, the contract duration is short (2-3 years). In this model the energy savings are still guaranteed by the ESCO. This model is very interesting for

customers with little capacity or few resources for sustainable energy management. The first EPC light pilot project was developed in Berlin.

"Green EPC" – EPC with special focus on renewable technologies:
Since climate protection is one major concern of policy and motivation to energy saving measures, advanced EPC models with special focus on reduction of green house gas emissions are essential. Models and examples with special focus on the implementation of primary energy savings and/or the technological focus on renewable energy technologies have been developed in Sweden, Germany and France.

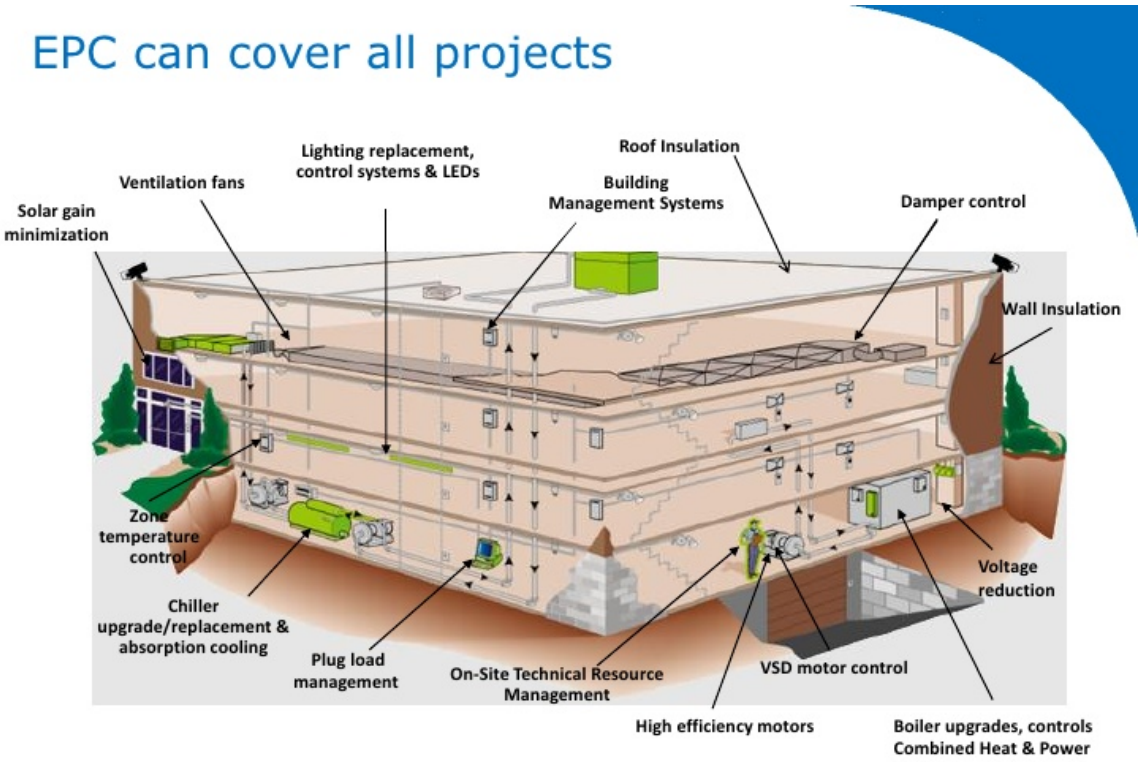

Figure 4 - *Source: Envido UK*

2. Preliminary Phase

The EPC development process

When engaging and procuring an ESCO, there are four basic steps to the Energy Performance Contract development process, shown here in the following schemes.
This starts with a preliminary audit to identify energy efficiency options and potential savings; it is followed by a detailed analysis of savings, generally undertaken by the ESCO; next a contract is agreed and the energy efficiency projects are implemented; and finally, the contract enters a guarantee phase when energy savings are measured and verified.

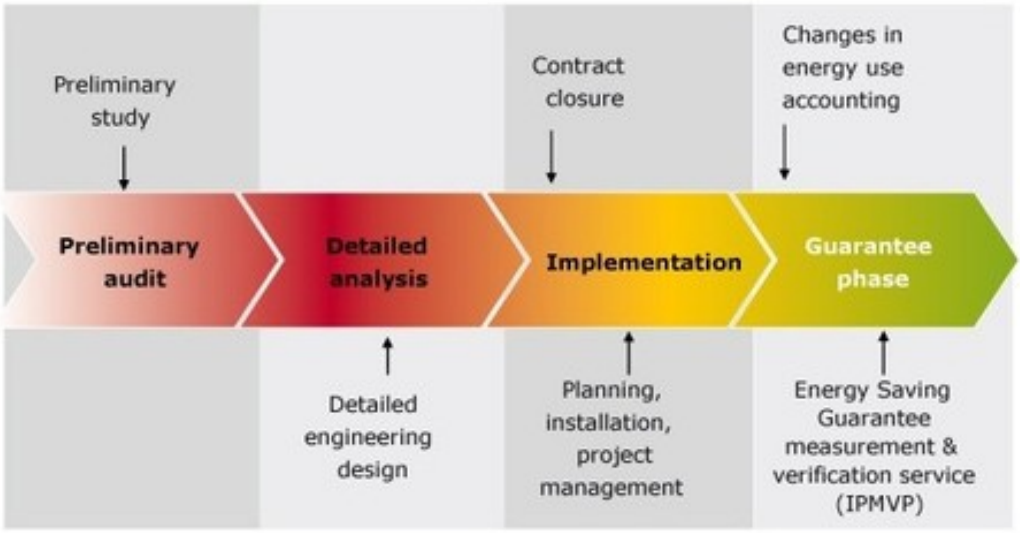

Figure 5 - *Source: European Association of energy services companies*

Figure 6 - Source: CODEMA, Dublin's Energy Agency

2.1 Identifying the "priority buildings": criteria for selecting buildings

The first check which buildings are suitable for an EPC project can be made relatively easy.

Some qualities that might make a building a good EPC candidate include:

- Excessive or higher than market annual utility costs with savings opportunities;
- Equipment/systems are outdated or near the end of their useful life;

- Relatively consistent energy-use patterns over several years – relatively consistent facility use (i.e. office, bank, etc.) and stabilized occupancy;
- Access to several years of utility records;
- Assets identified for strategic repositioning (such as desire i.e. for LEED certification) or reported in the SEAP or other policy plans/documents to undergo a major renovation;
- Assets that are already planned to undergo a major capital improvement;
- Larger facilities with complex building systems and
- Larger facilities with high energy consumption to hot water (For example: public sport centres where there is a swimming pool).

VALUATION OF BUILDINGS SUITABLE FOR EPC AND POOLING OF BUILDINGS

must haves	**building 1**	**building 2**
the building		
...was not constructed or renovated during the last 3 years	✓	✓
...is owned by the client	✓	✓
...will be used in current way for the next about 10 years (no change in using planning)	✓	✓
...is constantly used and conditioned	✓	✓
a baseline can be defined (last 3 years)	✓	✓
valuation of energy efficiency measures possible:		
specific energy consumption is higher than standard of comparable buildings	++	+
absolute energy costs (in relation)	++	-
change of enery source	++	+
replacement of boiler	x	x

Figure 7 - An example of overview of investigated buildings for pooling from EESI2020 project (http://eesi2020.eu/wp-content/uploads/2014/08/valuation-of-buildings-suitable-for-EPC_eng.xlsx)

There are also some excluding or on the opposite facilitating factors to be taken into account (i.e. in some cases the concerned public building has an historical/architectural binding and therefore not relevant intervention can be undertaken on it).

In **Italy** there is a frequent issue with seismic upgrading of buildings to be mandatorily taken into account when refurbishing buildings: this can be sometime a barrier to energy efficiency improvements but some others it can be an opportunity since often if buildings are upgraded from a seismic point of view, they get also relevant public subsidies/financing, which in their turn can be used also for the implementations of energy conservation measures.

In **France** there are some problems with asbestos due to the specific treatment needed to remove it and store it as a special waste. When there is asbestos in the elements on which it is planned to work (roof, boiler, paintings, fire protection, flocking …), the costs are significantly higher. Opportunities are also generated by the White Certificates System for some specific actions. In 2012-2014, White certificates provided 70 to 80 % subsidies for boiler refurbishment and for 3 years, you can insulate your roof for only 1€/m². The same situation exists with public Eco-subsidies when you need for example to reach some minimum savings level to access to the subsidies. The development of a new district heating is a good opportunity to set up EPC offers for the buildings that will be connected to the network. Other opportunities for EPC solutions given by the regulation in France include a new regulation that, since April 2017, obliges tertiary building owners to lead energy audits and set up an energy saving plan with minimum 25% savings until 2025. A good opportunity to introduce EPC offers to reach the mandatory goals. Then sometimes, a specific situation for one action (for example a district heating or the development of natural gas in a community) can be the motivation of an EPC solution.

Although **Malta** has not implemented yet any EPC, a binding factor in relation to energy efficiency measures on public buildings would definitely be the conservation of historical architectural features and streetscape. Often public buildings are scheduled for their historical relevancy and when it comes to planning energy retrofitting actions, there are a number of restrictions due to the conservation issue. Proposed measures have to be sensible to these restrictions and planned in a way to seek an accurate level of integration between the existing architecture and energy upgrading.

In **Spain**, there are two different perspectives: opportunities from the point of view of the customer and from the point of view of the ESCO. In the first group, clients choose an EPC contract because it is the best way to save in their energy bill and energy efficiency project is also a great opportunity to improve/replace their facilities. From viewpoint of ESCOs, they consider that EPC contract offers a stronger customer loyalty, because during ~8 years of the contract (Spanish average) there is a customer-ESCO relationship, which can create new business opportunities. Years ago, 2008-2012, the main barrier in the Spanish market was the lack of financing of EPC projects. But, a recent study edited by ANESE (Association of Spanish ESCOs) offers other perspective: the main barrier in the ESCO sector is the lack of confidence because final customers do not know exactly how a EPC o ESC works. Therefore, this lack of knowledge generates, i.e., delays in the overall EPC signature process (between 9 and 10 months).

In **Greece**, many public buildings are listed buildings and any intervention require the approval by the Ministry of Culture and Sports, the Ministry of Environment, Energy and Climate Change and the Architectural Committee. Also, there is the possibility that the buildings are not listed, but that they belong to protected areas with specific construction restrictions. In both cases, any interventions could not be applicable or be more expensive than standard procedures. Nevertheless, financing incentives exist for listed buildings that could be used even if they don’t focus on energy saving issues.

Excluding factors for EPC in **Slovenia** are the shortage of ESCOs, skilled and prepared to take the long term risks. In fact, currently only one ESCO has been operating on the Slovenian market, big enough to cope with all the conditions usually followed within the Public Procurement rules.

Often it can make economic sense to combine/bundling several facilities into a single project offering. Although the projects need not be executed simultaneously, multiple building projects with excessive energy costs are usually very attractive to service providers and may allow the owner to get improved overall pricing, financing

terms and greater execution efficiency by obtaining a greater number of energy improvements through a single procurement.

Sometimes nevertheless, in some Mediterranean regions, there is the need to work on emblematic buildings (such schools) even if they are not the best for EPC solutions because a 'schools refurbishment plan' for example can give a common motivation to the concerned municipalities.

2.2 The activities of screening and check on: consumption, existing contract, general conditions of buildings

The preliminary phase consists in a first detailed analysis of the so called "state of play" about the overall energy systems/usage in the concerned building(s).

Normally in the preliminary phase an **EPC Facilitator** is involved. The EPC Facilitator provides the necessary know-how and experience to support the building manager with the successful implementation of an EPC project. The EPC Facilitator acts as a mediator between client and ESCO to build up a sustainable relationship and to create trust between the future contract partners.

Often activities such as check on historical building consumption, existing contracts (either on supply of energy or on O&M), general conditions of the buildings, check on saving potential and estimation of the volume of investment are carried out by the EPC Facilitator (i.e. energy agency or similar) along with the Energy Manager of the Public Body.

These activities are aimed at assessing the suitability of the concerned building(s) for an EPC contract.

The basis of the energy costs baseline is the energy consumption in a reference year (e.g. past year before implementation of EPC) in connection with the energy supply prices applicable to the client at a certain key date (e.g. 31/12 of the reference year).

The baseline is to be provided to all bidders in the invitation to tender. They will prepare their saving forecast on this basis. In the context of the implementation planning, the baseline might be finally checked and confirmed by the contractually bound ESCO.

Here are some general remarks regarding the determination of the energy costs baseline:
· Higher energy prices are a better refinancing basis for efficiency measures. Therefore, higher reference prices should rather be estimated for the baseline in the case of price fluctuation or foreseeable price increases.
· Maintenance costs are usually not included in the baseline and, accordingly, any maintenance cost saving (which may well be achieved) will not be rated as a cost saving within the meaning of the saving guarantee. Exceptions are possible at the client's request if the amount of the achievable cost saving can be forecasted in the run-up to the invitation to tender.
· All consumption units should be stated in kWh (if applicable with the appropriate factors/calorific values) to take account of possible changes of the energy sources (e.g. from oil to gas). For the calculation of CO_2 emission savings, the current CO_2 emissions and factors have to be shown in the baseline as well.
The consumption of the respective energy demand types of the most recent completed calendar year preceding the EPC project will be used as the basis for the ESCO's saving guarantee and the annual proof of savings to be provided later on. That year is called reference year (baseline year).

Be careful to distinguish the historical consumption baseline (consumption of the last years) and the EPC consumption baseline (which have to take into account for example the climate and the real use of the building). Establishment of the EPC baseline can be done within the audit.

To ensure that the selected year is representative, the underlying energy consumption figures should be compared to those of the two preceding years. As an alternative, an average consumption value of the three previous years may be defined as baseline. The calculation methodology has to be defined in the EPC contract. As specific energy prices for each metering point, if applicable broken down by price components such as kilowatt hour rate and basic price, these prices should be shown explicitly as reference energy prices in the EPC contract prior to the start of EPC.

As soon as possible in the process, it is recommended to install sub meters to have a more detailed knowledge of the consumption (for example in relation to hot water or to lighting).

Check List: Taking Stock of Your Building(s)

Objective: To collect data to determine if an energy performance contract process and project is worthwhile for your building(s).

1. Basic building information

- ☐ Facility description
- ☐ Number, size and type of building(s)
- ☐ Occupancy (How is the building being used? e.g. offices: 9 hours/day, barracks: 24 hours/day)
- ☐ Ownership (tenant, owned, leased, etc.)
- ☐ Building management structure (Who maintains and operates the buildings?)
- ☐ Critical processes and activities (Is energy use predictable and consistent?)

2. Baseline information

- ☐ By source and by building (where applicable): energy consumption and costs for
  - ☐ Electricity
  - ☐ Natural gas
  - ☐ Refined petroleum products or "fuel oil" (Remember, natural gas is a fossil fuel.)
  - ☐ Water
  - ☐ Other (biomass, wind power, solar)
- ☐ Electrical demand, costs and peaks
- ☐ Brief description of utilities' rate structures

3. Retrofit opportunities

- ☐ State of the existing energy equipment (service life, efficiency, performance issues)
- ☐ Potential retrofits on existing equipment
- ☐ Energy efficiency or maintenance savings opportunities
- ☐ Estimated savings
- ☐ Greenhouse gas reduction opportunities
- ☐ Renewable energy, cogeneration and geothermal opportunities, where applicable

4. Recommendations

- ☐ Identification of major areas that require more analysis
- ☐ Identify actions that can be taken immediately and longer-term actions
- ☐ Recommissioning to ensure the persistence of the energy efficiency improvements
- ☐ Suitability for an energy performance contract

Figure 8 - An example of check list used for evaluating if an EPC is suitable for the concerned building(s)

3. The Energy audit

3.1 The proposed Energy Conservation Measures

Which measures can be implemented in order to improve the energy efficiency of a building? The answer to this question is simply an accurate energy audit to be carried out by an expert within the public building itself or by an external reliable organisation (EPC facilitator), possibly different from the ESCO in charge of the implementation of those measures.

An energy audit is an examination of a building for energy efficiency improvement purposes. Through analysis of energy usage, building characteristics, weather data, and the typical usage of the building, an energy audit uncovers energy conservation opportunities. These measures are then assessed to identify savings, improve the quality of life within the building and provide environmental benefits.

The best option would be to have an energy audit for each building concerned in the EPC process. As a general rule, indeed, if the number of buildings to be included in the EPC contract is huge (100 or more), the practice is to make accurate energy audits only on a specific sample of concerned buildings (on the basis of agreed criteria for the selection of buildings to be audited).

If not carried out by the ESCO itself for the purposes of EPC (or by an external auditor, but with the view of the needs of EPC), the energy audit will always have to be complemented by further analyses.

The energy audit must take into account the following factors:
- Credibility: the actual data should be acquired in number and quality necessary for the development of the energy inventory of the Energy System; energy consumption must be consistent with the billing and/or with the findings of the measuring equipment;
- Completeness: the energy system described should cover significant energy aspects (uses);
- Traceability: there must be an energy inventory with the identification of the origin of the data, how to process such and the procedures employed in the energy audit;
- Utility: measures to improve energy efficiency must be identified and assessed in terms of cost/benefit. Improvements must be expressed and properly documented according to the sector, the purpose and scope;
- Verifiability: the elements that allow the client to verify the attainment of energy efficiency improvements resulting from the application of the proposed actions must be identified.

The carrying out of the audit of buildings is currently regulated by the Italian Unification Body through two different standards, which are fully in force: the European standard EN 16247-2:2014 and the Italian standard UNI CEI / TR 11428:2011 (applicable to any sector subject to energy audit).

The objectives of the energy audit are:
- Streamlining the flow of energy;
- The recovery of lost energy;
- The identification of technologies for energy saving;
- The optimization of energy supply contracts;
- The management of the technical and economic risks;
- The improvement in the method of Operation and Maintenance (O&M).

The Italian Law 115/08 defines the building energy audit as:

"... A systematic procedure to obtain adequate knowledge about the energy consumption of a building or group of buildings, a business and / or industrial or public or private facility, to ***identify and quantify the energy savings and the cost-effective opportunities and to report the results.*** *"*

The audit is normally developed according to three consequential stages :

1. an **initial screening** for a macro evaluation,
2. a **detailed analysis** supported by calculations made by software from specific technical and field measurements (thermography measures heat flow , etc.),
3. a **final report** with the preliminary indication of the possible ECMs to improve energy efficiency, the related costs, the economic and environmental benefits, ROI, energy class obtained, possibly highlighting everything according to different scenarios.

At this point the so-called "Baselines" can be retraced and defined, *i.e.* the consumption and costs of referential fuel and electricity, and the costs of Operation and Maintenance (O&M).
Fuel consumption, measured in physical terms (m^3 of gas or of diesel fuel) at least for the last three years, must be reported to the relevant Degrees Day detected by the nearest weather station and may be normalized according to Degrees Day in Law).

In compliance with the aforementioned standard, the contractual consideration refers to objective parameters established during the initial energy audit, parameters that are independent of the normal consumption of fuel and electricity systems managed by ESCOo in the context of the EPC contract.
So in an EPC contract ESCO agrees, in addition to financing energy improvements, to obtain, on the basis of a "full service" management contract, a specific target for energy savings that is realized with a reduction in consumption compared to that recorded in the period prior to the improvements.
The energy performance contract Energy Service Plus, provides for additional performance as compared to the "Energy Service" contract, "the reduction in the primary energy index for winter heating by at least 10% compared to the index shown in the certification "... and to be prepared in the manner specified by the "Energy Service", and thus charged to the client... "through the implementation of structural upgrading of energy efficiency of the plants or of the building's shell that are shown above and aimed at improving the process of the transformation and the use of energy".
"The index of primary energy for winter heating" shown in the documented certification is not the "Real consumption" of the building, but rather its "requirements", *i.e.* the amount of energy required to maintain the internal temperature of a building or an apartment to the "assigned temperature", typically 20°C, regardless of the occupation of the premises and the actual operating mode of the plants. A building, for example, depending on its specific type of use, may submit a "Primary Energy Index" which is even 30% or 40% greater than the actual consumption.

It is therefore convenient to pay attention to the values reported in the Energy Performance Certificates (EPC) and the correspondence between demand and consumption; in this sense, the baseline consumption should be based on the actual consumption of the building (*e.g.* the "energy signature") and the calculation of energy savings for the redevelopment should be based on percentage ratios (*ex ante* and *ex post* interventions by the use of software recognized by CTI).

The fusion of the principles of EPC contracts being used ("guaranteed savings" and "shared savings") will instead have the function of regulating the management of "mandatory" savings, generated by the actions indicated by energy audits, and "optional" savings that will in turn be generated according to the additional improvements offered in the tenders against a scoring system.

The guaranteed savings are the fee to repay the mandatory investments; in the case of higher consumption this fee will be reduced accordingly, while in the case of greater savings compared to the "mandatory baseline" a subdivision of the savings will proceed.
The majority of savings generated by proposed or selected energy improvements according to what is outlined in the tenders between the virtuous but not mandatory acts, in accordance with a defined percentage in the tenders, are then granted to the public body; this mechanism is part of the old **EPC** system of **"guaranteed savings".**
The choice of "mandatory" energy-saving actions and of those which are "optional" is based on the results of the energy audits; normally the most cost-effective actions are included as mandatory, while those that pay off in a longer time are included as optional so as not to prejudice the success of the tenders and in order to leave some degrees of freedom in the potential of the market.
Thus one outlines the structure of the tenders: a trial of comprehensive energy service including supply and maintenance, of which the baseline consumption has been reduced due to the mandatory interventions required by energy audits, but which has room for even better performing in view of further offered energy improvements competing within a scoring system.
It is clear that in order to handle this type of contract, the methodology for monitoring, verification and reporting of results will be a key point of the specification.

An accurate energy baseline is crucial in determining the amount of savings that could be available in an EPC. ESCOs will usually conduct their own baseline analyses, but it is beneficial for the municipality to have a picture of current consumption before proceeding further.

- MassEnergyInsight (MEI) is a great tool to develop an energy baseline for municipal buildings. A variety of reports relevant to ESPCs can be generated directly from its dashboard.

- Fact-check all utility accounts, such as electric and gas, to ensure that the information is up to date. Municipalities often find themselves still being charged for old or closed accounts. Upload other fuel data (heating oil, propane) as necessary.

- Ensure a complete building inventory by adding useful information such as surface, year of construction, completed upgrades/retrofits, and number of occupants, if available.

As AESS, for each carried out intervention an overall assessment useful to identify priority interventions is made as reported in the following table.

Savings	Payback Period
Indicates the percentage reduction in annual primary energy consumption compared with the existing situation.	Indicates the economic return on investment in terms of years.
■■■■ >70% ■■■ 40÷70% ■■ 20÷40% ■ <20%	■■■■ <5 year ■■■ 5÷10 year ■■ 10÷20 year ■ >20 year
Reliability	**Feasibility**
Indicates the duration in time in terms of reliability and effectiveness of the intervention.	Indicates the possibility or not to implement the intervention.
■■■■ **Hight - benefits for a period equal to the building** ■■■ **Good - performance with ease of maintenance** ■■ **Medium - performance with frequent interventions of maintenance** ■ **Low - substantial technical effort and expertise costly**	■■■■ Top - minimum effort and expertise not elevated ■■■ Normal - routine interventions ■■ Difficult - expertise with high levels of qualification ■ Very diffcult

Figure 9

The higher the number of “little squares”, the better the suitability for an EPC contract.

The actions proposed, based on the payback analysis, provide different options such as:

Operations Management:

- Information and sensitization of staff,
- Changing the way of maintenance,
- Changing the mode of acquisition of goods and services,
- Energy Management System Certification according to ISO 50001.

Technological Measures (Structural and Plant):

- Reduction of heat input on the windows through solar films,
- Redevelopment of the heating and cooling systems,
- Upgrading of the indoor and outdoor lighting,
- Installation of automation controls,
- Installation of photovoltaic systems, and others RES.

Energy consumption thus defined must then be compared to the unit costs of the last recorded bills. For the public administrations which cannot in general "write-off" the VAT, the cost of energy and O&M should be shown pre-VAT.
Finally, different strategies should be envisaged for redevelopment and possible savings should be identified, along with the cost and time of return on investment.
On the basis of these elements one performs a feasibility study by simulating various scenarios, be they technical, economic or financial.
Thus, the mandatory minimum targets of the "Investment Programme" are determined which will then be put to tender.

It is of fundamental importance in this phase the correct determination of "mandatory" savings, which, as already mentioned above, should be determined as percentage indices, *i.e.* as the ratio between the energy performance index before and after the intervention of redevelopment calculated by the use of software as required by national legislation.

Concerning energy audits in the framework of EPC projects in other countries, in **Malta**, the Sustainable Energy and Conservation Unit within the Ministry for Energy and Health and the Regulator for Energy and Water Services concluded that drafting of Energy Audit reports especially those required under obligatory provision of the Energy Efficiency Directive had to be harmonised and systematically upgraded to reflect the provisions of EN 16247 and ISO 50002. Energy Auditors shall then carry out energy audits in line with:
(a) EN ISO 50002 or EN 16247 -1 (Energy Audits), or
(b) If including an energy audit, EN ISO 14000 (Environmental Management Systems)

Energy audits in Malta can vary and range from a basic or preliminary energy audit, where indicative or typical savings are identified and/or calculated, to comprehensive energy audit which addresses the whole site, process, systems and fleets of an enterprise. The latter audit is what is obligatory for non-SMEs and has to be based upon: (i) up-to-date, measured, traceable operational data on energy consumption, (ii) build, whenever possible, on life-cycle cost analysis (LCCA), (iii) be proportionate, and sufficiently representative to permit the drawing of a reliable picture of overall energy performance and the reliable identification of the most significant opportunities for improvement; (iv) include validated calculations for the proposed measures so as to provide clear information on potential savings; and v) present a time frame for implementation of recommendations And (ii) Energy Managers to establish, implement, maintain and improve an energy management system in line with ISO 50001 (Energy Management Systems).

Presently there is an incentive promoted by MaltaEnterprise, called “Energy Audit Voucher Scheme”, through which undertakings that have their annual energy consumption between 10,000 kWhr and 75,000 kWhr, may engage on Energy Auditory to carry out a high level energy review of the activity. Through the energy audit, the business would identify actions and investments that may be carried out to reduce energy consumption. The value of this voucher is capped according to the Annual Electricity Consumption and can reach a maximum benefit of 380 euros per undertakings.

AREANATejo **in Portugal** has been adopting the following methodology:

1) Analysis of all energy bills (at least for one year) of all energy sources. Identify and characterize, by space / division of the building, all existing energy consuming equipment.
2) Make real measurements, at least for a week or two, in the general electrical panel and in the most relevant partial electrical panels, in order to sectorize the consumptions.
3) Make a balance of the energy consumptions of all electrical equipment comparing it with the real measurements obtained in the previous point.
4) Identify measures to improve energy efficiency (ask for budgets for measures).
5) Identify the payback period for each measure.
6) Present the energy audit report to stakeholders and articulate the financing options for identified measures (if any).

This methodology may vary taking into account some regional/national call for financing (with some special rules and procedures).

In the experience of RAEE in **France** attention must be paid to global savings: the sum of the savings generated by individual actions one by one is not equal to the global savings generated by the sum of actions.

For example, if replacing a boiler generates 20% savings and a new thermal regulation 10 %, changing the boiler and the regulation will not generate 30% savings but a bit less, 28% (Initial consumption : 100 kWh : New boiler (100-20% * 100) = 80 kWh + new regulation (80-10%*80) = 72 kWh).

Furthermore some measures are strictly connected and cannot be separated and/or must be done one after the other (i.e., it's not a good idea to change all the windows without working on the ventilation or if you want to insulate the building in 2 years, it's not a good idea to change the boiler now because it will be oversized after insulation).

Officially, **in Spain**, the National Royal Decree RD 56/2016 (it is the transposition of the Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency) establishes the methodology in relation to energy audits. Energy audits contains following principles:

- Energy audits shall be based on up-to-date, measured and verifiable operational data on energy consumption and, in the case of electricity, on load profiles, if they are available.
- They shall cover a detailed examination of the energy consumption profile of buildings or groups of buildings, of an industrial or commercial installation or operation, or of a private or public service, including transports, if applicable, fleets vehicular.
- They will be based, wherever possible on profitability criteria in the analysis of life-cycle cost, rather than in simple repayment periods, in order to take into account long-term savings, the residual values of long-term investments and discount rates.
- They shall be proportionate and sufficiently representative to provide a reliable picture of overall energy performance, and the most significant improvement opportunities can be reliably determined.

Other important requirement of energy audits is the creation of a data base where save the consumption historical analysis in order to study in detail energy performance.

Big companies (with more than 250 employees or companies that its annual turnover exceed from EUR 50 million) must do an energy audits at least each 4 years. Since the Royal Decree RD 56/2016 was published, 2.659 companies have done energy audits (IDAE, 2017). Approximately, more than 60% of big companies have yet done the energy audit.

UNE-EN 16247-2:2014. Energy Audits . Part 2. Buildings, as well as UNE-EN 16247-5:2015: Energy Audits. Part 5: Competence of energy auditors, also apply for energy audits carried out in Spain.

3.2 Investment Grade Proposal

It is in the early stage of an EPC process that is recommendable to assess the capital investment needed for implementing all the ECMs suggested by the energy audit. Either through available resources from the Public Body itself, from available private/public subsidies/grants/funds or from third party financier (ESCO, bank, etc).

Here it comes the so called Investment Grade Proposal, defined as follows.

Investment Grade Proposal explores the viability of the EPC and gives you a business case that captures savings, costs, risks and wider benefits.

Basically the amount of investment needed is the result of several factors taken into account: baseline, savings which can be achieved according to the performed energy audit and contract duration (feasible/desired by the Public Administration).

It can be the awarded ESCO to complete the investment grade proposal through an Investment Grade Audit that will include an analysis of each proposed project with projected savings and itemized project costs. The ESCO will present a project proposal that includes recommended measures, financing term and projected annual cash-flow analysis. The ESCO can also propose different options. These results can form the basis for negotiating a subsequent EPC contract.

In most private and public settings, upgrades to a facility's energy infrastructure must compete for capital funding with non-energy-related investments. Both energy and non-energy investments are rated on a single set of financial criteria that generally stress the expected return on investment (ROI). The projected operating savings from the implementation of energy projects must be developed such that they provide a high level of confidence. In fact, investors often demand guaranteed savings.

The investment-grade audit expands on the detailed audit described above and relies on a **complete engineering study** in order to detail technical and economical issues necessary to justify the investment related to the transformations.

When an ESCO designs an investment proposal, more specifically in an EPC (where the ESCO guarantees only energy savings, in kWh), it is very important to separate energy saving (kWh) from the energy price (€/kWh). In long periods of time, energy prices can have large fluctuations, so to link the profit generation to the energy price is very risky.

4. Involving the local EPC market

4.1 Meeting the relevant stakeholders: local companies/ESCos and banks

In a sound EPC development process, all the concerned actors are involved since the very beginning.

The purpose of this participative approach is twofold:

- On the one hand to get significant suggestions from the market (Local companies and ESCOs) and from the financial institutions (credit institutions, equity private funds, crowdfunding platform, etc.) on how to build up proposals also in line with their expectations;
- On the other to avoid – without their relevant perspective – to get at the end no answer from the market to the call for tenders for the EPC contract.

The ESCO and concerned local companies could be indeed engaged at an early stage, depending upon: building owner's ability to absorb preliminary costs, the services needed by the owner, the risk allocation strategy, the terms of the contract, and the procurement constraints of the organisation.

In the French experience, the choice of measures must be also related to the local market skills and its capacity to meet such a demand.

For example, in case of need to work on roof insulation and replace a boiler, you have to know that the concerned enterprises are different and have to organize a gathering to give a common offer with shared saving guarantee and this takes time and probably needs an assistance to them… If you just go straight to the market, only big enterprises will be able to give you an offer.

Small enterprises have normally lower engineering capacity, small geographical work area, less work force and less financial capacity (if relevant innovation is requested or 10 M€ investment are expected or if very high penalty are introduced in case savings are not reached, inevitably a little chance is given to the small and local enterprises, part of the local/regional economy). They therefore need a kind of assistance/training on the EPC process and procedures.

One other important point is the energy supply and the proportion of this supply in the contract. If the contract is 1 M€ with 80% of gas supply, local enterprises will not be able to compete with the big suppliers.

The last thing is the distribution of the investment between the categories of work (heating and ventilation, insulation, lighting…). If more investment on HVAC works are expected, the leaders of the consortium will likely be HVAC enterprises. If the highest investment concerns the windows replacement, the leadership will be taken by construction enterprises. Not always those leaderships are easy to manage the savings guarantee (i.e. in France, within the same contract, the construction company was the leader of the contract during the implementation phase and the HVAC enterprise took the leadership later on for the rest of the contract duration).

In Spain there are around 8,500 municipalities, most of they have a small size, therefore it is difficult for them to get the resources for lunching a EPC tender. In order to speed up the process in buildings of municipalities, it is important to create a working team that could act as EPC facilitator supporting the municipalities in the whole EPC tender process. Therefore, it is critical to provide both the tender document plus the procedure that covers from the beginning to the start up of the EPC project. For better achieving this task, it is crucial to count with both the public administration procedures knowledge as well as the ESCO market and companies' knowledge.

The STEPPING partners are therefore invited in their pilot implementation to create a **local committee** assisting the process of EPC development in their selected area/region.

Local market studies can be then also made to have a vision of the market to be shared with these local stakeholders. The local committee meetings will be also an opportunity to detect the needs and tools useful to boost the market development (i.e. training to SMEs from Chamber of Commerce? Meetings with insurance companies? Public guarantee for small enterprises investments?).

4.2 Threshold for making companies participating to the Tender

Is there any threshold/minimum amount of energy saving/buildings to be refurbished making the call for tenders and the related EPC contract more appealing? Yes, there is, at least in some of the countries of the STEPPING partnership.

Proposed contractual models and their tailor-made financing mechanisms should render projects feasible, bankable and profitable for every party involved. Consideration should be indeed given to bundling a number of opportunities of varying investment attractiveness into a single project.

With the relevant exception of EPC light (where no relevant investment is foreseen), the energy costs baseline should be above a certain economic threshold (about €200,000 in most EU countries) for a project to be suitable for EPC. Only then the relation between basic expenditure and achievable savings will be interesting for ESCOs in economic terms. Pooling of several buildings into a single EPC contract can be an option to aggregate a reasonable volume for the baseline. In special cases, e.g. involving self-financing by the client, smaller project sizes can also be realized.

At the financial institution side, limited knowledge and experience of EPC market is a major barrier. Short or no track record of (domestic) EPC projects, comprising monitored and registered achieved energy savings, set-backs, risks and returns, makes financial institutions less willing to participate in their financing. Another barrier is a required high level of due diligence of insolvency risks and creditworthiness of the ESCO and/or the customer, performance risk, and volatile energy price risk, leading to high project development and transaction costs and resulting in high cost of capital neutralizing the risks.
The fact that EPC projects are hardly standardized and often relatively small puts additional pressure on the costs and makes EPC projects less attractive for financial institutions. The EPC-Project Facilitators who could aggregate scaled bankable projects are starting to work in this direction. Financial products available at the financial market mainly are not customized to remove specific EPC financing constrains. Public funds often are normally not used to leverage private financing.

In Italy – where the market is not entirely prompt for EPC contracts - for example, supply of energy is often included in the EPC contract as this provide a sort of guarantee for the financial institutions and therefore makes EPC projects more bankable thus more easily providing the capital needed for the EPC investments.

In Spain, the threshold depends on the payback of each project, more than a certain amount of money. If the return on investment is 5 or more years, signing the contract is more difficult, because the customer is usually reluctant to sign this kind of project (they consider only long-term contracts). In addition, setting the threshold for a certain amount of money depends on the type of project. For example, in public sector, the average budget per project is 1.355.000 € while in the private sector, the average budget per project is 349.000 € (ANESE, 2017), and the average budget per project could be even less. The average budget per project in the residential sector is 100.000 €.
In line with what above mentioned, bundling/aggregation is an important task in this market due to the fact that there is a high amount of similar projects with a low technical risk that could be very attractive for financing when achieving a reasonable size.

5. Detailed analysis Phase

The preliminary energy audit and the related analysis following (either in terms of technical or financial interventions) represent just the first step/elementary level to be undertaken in a sound EPC development process. Further detailed assessments must be carried out, once decided the EPC process to continue. These detailed studies of course have an impact on final costs and therefore often the choice by the concerned Public Administration – at least at Italian level - is to include in the contract also those detailed studies in charge of the awarded ESCO.

5.1 Feasibility studies

The feasibility study verifies the site information provided by the energy audit and confirms the viability of the energy efficiency improvements outlined in the energy service company's proposal.

At a minimum, the feasibility study includes the following activities:

• physical inspection of the design and condition of all energy systems

• measurement of airflow rates, combustion efficiency and other variables

• review of standards of service and comfort, e.g. temperature and air quality required by building occupants, and a comparison of existing conditions with these standards

• analysis of energy-use patterns

• use of computerized simulation models.

As required after completing the feasibility study, the energy service company will provide the Public Body with a report summarizing its findings and recommending a comprehensive set of system improvements and related activities, such as training and monitoring.

The energy savings forecasted following the feasibility study must approximate the savings (at least 90 percent) highlighted in the initial energy audit. If the results of the study are less attractive than the results originally proposed, it should planned a contract renegotiation or withdrawal. The energy service company could also retain the right to terminate the contract at the end of the feasibility study phase if it finds that the forecast energy savings do not cover the project's overall costs and that the Public Body is not going to provide any capital or subsidy/grant available in order to support the project.

According to the Spanish experience, the following parameters are strongly recommended to be reported in a feasibility study report:

- *Energy baseline design* of the energy consumptions. It must include the energy uses definition of the facilities.
- *Amortization table* (ROI included) based on energy savings.

- *Measurement and Verification protocol design*. It is necessary to invest time and money in this part before developing the project. Future incomes depend on energy savings so correct and agree on measures are the key of success: which measurement equipment will be necessary and how measures will be undertaken must be reported in the feasibility study.

5.2 Legal framework at national level, typologies of EPC contracts: contracting models applied

Italy

The EU Energy Efficiency Directive is being transposed in Italy through Legislative Decree 102/14, which provides some important innovations and obligations about energy efficiency. In particular, the role of ESCO is promoted, as well as the use of Energy Performance Contracts (EPC) and Third-Party Financing (TPF). This decree also transposes the energy audit obligation and highlights the role of white certificates (energy saving obligation), already in place in Italy since 2004.
The Legislative Decree 115/2008, transposition of 2006/32/EC directive on energy services, is still a relevant legislation for ESCOs, defined as service companies that offers contracts, guarantees energy savings and participates in the financial risk of operations. The Decree defines also the requirements that an "energy service contract" and "energy service contract plus" (which corresponds, within certain limits, to the EPC model) must meet. The energy service contract, a contract for the supply of heating, efficient management, maintenance and eventually upgrading of the heating systems, was originally introduced by a Presidential Decree 412 in 1993. Energy service contracts were historically focused on good management, maintenance and eventually upgrade of thermal plants. Energy service plus contracts focus on both building and plants, also if, due to short pay-back times required and the habit to the previous approach, measures on plants are more diffused. It is also worth to mention that a model contract and contract guidelines for EPC in public sector aren't available yet in Italy.
The national technical standard for ESCOs, the UNI CEI 11352, was introduced in 2010. A second, more certification oriented edition was published in 2014. The Standard refers to the European standard EN 15900 on energy efficiency services. Among the other requirements (technical, financial, managerial), to be certified an ESCO must demonstrate to have signed at least one energy performance contract.

Regarding energy performance contracts, Legislative Decree 102/14 established that ENEA (National Agency for Environment and Energy) should draw up a model contract for the improvement and spread out in Italy of energy performance contracts, similar to the European Energy performance contracting EPC.
Legislative Decree 102/14, also defines energy performance contracts, that are *contractual agreements between a beneficiary and a provider of an energy efficiency improvement measure, verified and monitored during the entire duration of the contract, where investments are paid according to the contractually agreed level of energy efficiency improvement (or other agreed energy performance criteria, such as financial savings)*.

From the definition it follows that a primary role in achieving the purpose of the contract is represented by the phase prior to the signing of the same, concerning the design of the intervention system upgrading.

Malta:

In Malta the EPC regulation is under consultation process. The Legal Notice 196 of 2014 is currently transposing the Energy Efficiency Directive 2012/27/EU. With particular regards to EPC, the LN 196/2014 highlights that: the Ministry of Energy shall promote the energy services market and access for small and medium-sized enterprises to this market by supporting the public sector in taking up energy service offers, notably for building refurbishment, by: (i) providing model contracts for energy performance contracting which at least include the items listed in the Twelfth Schedule.

The mentioned Twelfth Schedules included at the end of the same Legal Notice lists the Minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications :

- Clear and transparent list of the efficiency measures to be implemented or the efficiency results to be obtained.
- Guaranteed savings to be achieved by implementing the measures of the contract.
- Duration and milestones of the contract, terms and period of notice.
- Clear and transparent list of the obligations of each contracting party.
- Reference date(s) to establish achieved savings.
- Clear and transparent list of steps to be performed to implement a measure or package of measures and, where relevant associated costs.
- Obligation to fully implement the measures in the contract and documentation of all changes made during the project.
- Regulations specifying the inclusion of equivalent requirements in any subcontracting with third parties.
- Clear and transparent display of financial implications of the project and distribution of the share of both parties in the monetary savings achieved (i.e. remuneration of the service provider).
- Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks and guarantees.
- Provisions clarifying the procedure to deal with changing framework conditions that affect the content and the outcome of the contract (i.e. changing energy prices, use intensity of an installation).
- Detailed information on the obligations of each of the contracting party and of the penalties for their breach.

Portugal

The framework for the energy efficiency management contracts - contractual agreements between the Public Entity and the supplier, an Energy Services Company (ESCO), relating to an energy efficiency improvement measure in which investments are paid on the basis of energy savings - is given by Decree-Law 29/2011 of 28 February that establishes:

- The legal regime applicable to the training and execution of energy efficiency management contracts to be concluded between the services and bodies of the direct, indirect and autonomous Public Administration and energy service companies;
- Introduces the figure of the qualification system of energy services companies;
- Defines the publication of a standard specifications, to be published by the members of the Government responsible for the area of economics and finance;
- The need for the adoption of measurement and verification procedures.

Normative Order No. 15/2012, of July 3 - Implements the Qualification System of Energy Services Companies in two levels of qualification:

- Level 1 – consumption ≤ 3 GWh;
- Level 2 – consumption > 3 GWh.

Also makes the validity of the qualification decision, defined for 3 years, the financial requirements the technical requirements of each ESCO and the possibility of individual or group qualification. The information on the Energy Services Companies available on the website of the Directorate General of Energy and Geology (http://www.dgeg.pt/):

- List of registered ESCO

- List of qualified ESCO under Regulatory Order no. 15/2012

The Meeting of the Council of Ministers no. 67/2012 of 9 August establishes the form of the Implementation Agreement and operationalizes the Program itself.

Subsequently, Administrative Rule no. 60/2013 of 5 February defines:

- The publication of the standard specifications to be used in the launch of procedures, in which: the standard specifications for the procedures for the formation of energy efficiency management contracts are approved, which is an annex to the present order, of which it is an integral part;
- Buildings and equipment that are or may be covered, either definitively or provisionally, by or in a program for the reform of public administration services and rationalization of resources, are not eligible, without prejudice to the express indication to the contrary of the member of the Government Responsible for the area of finance, and for this purpose, be required to confirm prior to the launch of the respective procedure for the formation of energy efficiency management contract;
- The jury of each procedure for the formation of energy efficiency management contracts to be launched under the ECO.AP Program necessarily includes a representative of the Ministry of Finance, to be designated by an order of the member of the Government responsible for the area of finance, and a Representative of the Ministry of Economy and Employment.

<u>France</u>

In France, there are 2 main forms of public procurement regarding EPCs defined by Legislative Decree of 2011 August 25 and Order of July23th 2015:

- Public procurement:
    - service contracts : mainly O&M and services without significant investment (EPC Light)
    - global public performance contracts (works + services with or without design) (Article 73 of the current Public Procurement Code) with 2 conditions :
        - the aim is to find quantified performance targets (the texts are not limited to energy performance alone);
        - include measurable performance guaranties

  In these contracts, investment has to be made by the public authority and not the ESCO.

- Public private partnership contracts : global public performance contracts with design, works, services and investment with the following condition:
    - Market value > 2 Million euros

  the public authority has to demonstrate that, taking into account the characteristics of the proposed project, such a contract presents a more favorable balance, notably on the financial level, than the traditional public procurement. The public person, who wishes to contract such partnership contract, must therefore justify this choice by means of a prior comparative analysis submitted to the authorization of Administrative authorities (for the State) or legislative bodies (for local authorities).

Spain

The first mention to ESCOs in Spain was the RD 6/2010, Article 19, where the ESCO definition appears. After this, the "Instituto de Diversificación y Ahorro Energético" (IDAE), which is the public body responsible for energy efficiency politics, created an official list in its web where any ESCO could appear, it worked as public registry for customer. But there was a problem, in this list, any kind of company appeared, not only ESCOs, but also engineering companies, consulting firms, maintenance companies or contractors. Therefore, this supposed a lack of standard ESCO model and there was a misunderstanding about what ESCO model is. There were more than 2.000 companies in this list, when there were no more than 60-100 ESCOs in Spain. This list was active until last year, when the Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency was transposed through Royal Decree RD 56/2016. This RD establishes a new list, this time, it includes energy service providers in general, not only ESCOs, but also other kinds of companies.

Apart of these regulatory initiatives, the Spanish Association of Energy Service Companies (ANESE) launched a certified classification (named ESE and ESEplus) of Energy Services Companies (ESCOs) in Spain with the aim of establishing higher quality standards for ESCOs companies. This classification allows to the customers to Access the ESCO model with more trust and reliability.

In this classification system, ESCOs implement a guaranteed savings model prove their capabilities, experience, technological capacities and technical potential by means of a seal certified by an independent expert. For ANESE Seal, currently the certification company TÜV Rheinland is the independent certification company. Nowadays, there are 16 ESCOs with this certified in Spain and more than 20 in wait-list (ANESE, 2017). In the following table, there are the differences between ANESE Seal and the official energy service providers list:

Requirement:	**ANESE Seal**	**ESCO** (RD 56/2016)
Provide energy services and improve energy efficiency	**yes**	**yes**
Accept some degree of financial risk	**yes**	**no**
Base (fully or partially) the payment of the energy services on the performance of the energy efficiency improvements	**yes**	**no**
Have employees with suitable technical or professional qualifications (university degree, certificate of professionalism)	**yes**	**yes**
Have technical means to provide the energy services	**yes**	**yes**
Prove that a measurement and verification protocol for the energy savings provided during the life time of the project/contract is implemented	**yes**	**no**
Be registered in the Official Agency of each country and have a Civil liability	**yes**	**yes**
Be audited and certified by an Independent Certification Company to verify that it fulfils with the requirements	**yes**	**no**
Be audited to demonstrate that it is qualified to implement the ESCO model of guarantee of savings.	**yes**	**no**
Has the possibility of certifying in several technologies (lighting; Engines; Heating and Cooling Systems, Regulation and Control Systems; Thermal Enclosures; Industrial Applications	**yes**	**no**

Figure 10 - Source: ANESE

Regarding EPC contracts in public sector, there have still not existed any standard model where include guaranteed energy savings. In public sector, 5 services contract ("*contrato de las 5Ps/5 prestaciones*") is the

contract more used to develop energy efficiency services. This contract was created in 2008 by IDAE, its 5 services are:

- Service 1- Energy Management (Energy supply)
- Service 2- Maintenance
- Service 3 - Total Guarantee
- Service 4 - Works for Improvement and renewal of energy installations.
- Service 5- Energy investments and renewable energies

In essence, this model is a typical public mix contract of equipment and services including the financing of the equipment. The energy savings relay on the improvement of energy consumption of the new equipment.

It has been used as standard by municipalities but nowadays its methodology is outdated. This lack of a new standard has produced that each municipalities or regions in Spain has tried to develop their own version of the tender, but this is a very slow process and therefore and organized group of experts is needed in order to facilitate the implementation of the EPC model in the public sector.

Greece

In Greece, the national legal framework of EPC in public buildings is in place. However, an EPC market is not yet developed in the country.

The existing Law 3855/2010 (Government Gazette No 95, Series I, 23-06-2010) 'Measures to improve energy efficiency in end use, energy services and other provisions' establishes the framework necessary to promote energy saving measures in Greece, and harmonizes Greek law with Directive 2006/32/EC on energy end-use efficiency and energy services. This law established the institutional framework for the provision of energy services. Specifically:

- Introduced the requirement to establish an ESCO Registry for the registration of ESCOs providing energy services and other measures to improve energy efficiency.
- Detailed description of the issues relating to the Energy Performance Contract (EPC), an agreement concluded in writing between the final customer and the Energy Service Company (ESCO) and contains the formal data to be included in a contract, as provided for in Law 2251/1994 (Government Gazette, Series I, No 191, 16-11-1994) on consumer protection.

The EPC should specify, among other things:

- The design and management of the energy service.
- The methodology for assessing energy savings and estimating the overall financial benefit.
- The purchase, the installation and commissioning of the necessary energy-using equipment (electromechanical and electronic systems), and building envelope materials improving energy efficiency.
- The management, the operating method and the maintenance of the equipment.

- The overall cost of the project, which includes the cost of supply and installation of the necessary equipment, the cost of its operation and maintenance, the financial cost and the fee paid to the ESCO.
- The procedure for assessing the energy benefit.
- The reimbursement method and time.

The Directorate for Energy Policy and Energy Efficiency of the Ministry of Environment, Energy and Climate Change prepared posted two contract template for EPC in public buildings:

- The guaranteed savings model (based on the level of energy saved)
- The shared savings EPC model (based on the cost of energy saved).

Slovenia

In 2014 the Republic of Slovenia has adopted a new Energy Law (EZ-1), that came into effect in March 2014. In Article 351 it addresses aspects of Articles 17 and 18 of the Energy Efficiency Directive (EED, 2012/27/EU), particularly providing information and training as well as development of energy services. A dedicated web platform - www.trajnostnaenergija.si – was set up by the electricity market operator Borzen already in 2014. It is the main vehicle through which various sub-programmes are publicized and available to the public. Regarding EED Article 18 on energy services/contracting, a special section (http://trajnostnaenergija.si/Trajnostna-energija/Energetsko-pogodbeništvo/Modeli-energetskegapogodbeništva/Pogodbeno-zagotavljanje-energije), containing contract samples, relevant legislation, project templates – and a clear focus on best practices (projects already carried out that can serve as an example) and also list of potential new projects. This was done in close collaboration between the Ministry of Infrastructure, Borzen (who carries out the programmes pertaining to Article 351), local energy agencies, ESCOs and others. Since energy supplier as required (by a Decree) to achieve a certain amount of yearly energy savings, they are motivated to offer also ESCO services, so this model / market has been picking up in recent years. There are three on-going pilot/ demonstration comprehensive energy renovation projects, each covering different category of public sector building stock: one building fulfilling nearly - zero renovation criteria, one building with more building operators (three different public service providers/ bodies occupying the same building), and three buildings of the same type from the same owner at three different locations. All will be performed in the scope of energy performance contracting. Additionally, the Ministry of Infrastructure plans to publish a call on a yearly basis to all interested investors who plan comprehensive energy renovation of their public buildings helping them with grants from Cohesion Fund.

Typologies of EPC contracts

An EPC is a suitable way to implement an energy efficiency project if the Public Body does not have engineering skills, manpower or management time, capital funding or technology knowledge.
An EPC could be particularly interesting for some kinds of clients (e.g. public sector) if it also use third party financing, requiring no or limited upfront costs for the clients, since the investments are repaid by the economic savings achieved. It is also possible to combine third-party financing with risk-sharing facilities.

Actually, there is not just one kind of EPC because it does not exist a standard; there are many archetype contracts (*guarantee savings, shared savings, chauffage*) and each one has different advantages and weaknesses: often, indeed, an EPC offered by an ESCO has different features deriving from a combination of them: the two

most used contract types are **guaranteed savings** and **shared savings**. In the first type the performance is related to level of energy saved, which is guaranteed to meet debt service obligations down to a floor price, while in shared savings the performance is related to cost of energy saved and the ESCO bills upon actual results. A guaranteed saving approach is being done especially in situations in which the client is interested in including deep renovation measures in an EPC project. As the payback period of deep renovation measures is usually higher than the duration of an EPC project, a participation of the client in the construction costs or a public subsidy is usually the only way to achieve this goal (this approach is sometimes referred as "EPC+").

5.3 Technical choices

Technical and definitive choices can be made by the ESCo itself within the bid or by the concerned Public Authority imposing a sort of definitive project to be just implemented by the ESCO.

According to AESS approach and experience, leaving to the ESCo the final technical proposal (in Italy we call it "implementation/executive project") has to be preferred. This for 2 main reasons:

1. the awarded ESCo has normally internal skills likely providing a range of technical/innovative solutions - in order to reach the set objective of energy saving - the Public Body is on average not provided with. For sure the Public Body can negotiate measures deemed as prior but often – at least in the Italian context – the ESCo can provide more and more effective technical solutions than the Public Body alone.
2. The ESCO is responsible for the achievement of the energy saving goal set in the Call and has to run the risk of the design of technical solutions the ESCO itself is going to implement and manage for a number of years and. Therefore the ESCO itself must be responsible for the possible failure to achieve savings (imposing to the ESCO a project of technical choices selected by the Public Body could let the ESCO to feel free about the implementation risk and could limit technical, innovative and quantitative improvements further proposed in the offers, thus concretely reducing the chance for a likely higher energy saving result).

AESS experience shows as – if a good but still "light" project is included in the Call for tenders – the market normally "replies" offering on average an energy saving doubled than the one initially foreseen.

Not including the implementation on very final technical choices in the Call, does not imply further costs to the Public Body as they will – if needed – covered by the ESCO (at least for the same, often for a higher energy saving target set in the Call).

Finally, also a recent Italian survey among Public Bodies carried out by the National Network of Local Energy Agencies, confirms the great trouble from Public Bodies to invest their own resources on elaboration of the implementation/executive projects compared to lighter but still binding projects to ESCOs (the energy audit carried out in line with the EU standard already provides all the needed parameters for building up a good - and manageable for coming years - EPC contract).

In France, the detailed technical solutions provided by the public body imply that the most important job for them is before the tender. The room for innovation for the ESCOs in this case is little and a very good audit is needed. This way, though, it is easier for small enterprises to participate, as they normally do not have internal study services.

In the case technical choices are made by the ESCO, the audit ensures all ESCOs have the same common baseline situation. The room for innovation here is higher but then public bodies should have very good technical and financial capacity to compare all the offers that will be in most cases very different.

In Spain, the actual process is a barrier for a correct development of the ESCO market in public sector. Municipalities are get used to tender a project with the technical proposal of the project (in some way, the Public Authority also impose a sort of definitive project to be just implemented by the ESCO), so there are several problems:

- Municipalities staff have technical limitations so the project proposal has design limitations or, for instance, the energy audit is not enough to draw a strong energy base line of the project. Therefore, when an ESCO wins the tender, it discovers other energy consumption or that the project technical proposal is not the ideal for this case, but the ESCO must to follow the tender, so its creativity is cut off.
- Requested savings in the tender are too high. In some cases, the requirements had been so high that no ESCOs presented an offer for the tender.
- These kinds of issues are common in Spain; the recommendation is that Councils/Municipalities should focus their efforts in performing an energy analysis that allows them to define a rigorous energy baseline. But the definition of service level agreements (SLAs) is the most important task that a Municipalities should do (for instance, which ideal buildings temperature is, which maintenance services are included in the contract, levels of street lighting in lumen, etc.).

To establish these tasks, it is recommended that the Council/Municipality counts on an external technical assistance. Once the Council defines its service level agreements, it will tender a proposal with guaranteed energy savings (based in the energy analysis and the baseline done in the previous phase with external technical assistance). Then, each ESCO can offer its own technical proposal with creativity and with more freedom that actual system. The only requirements for ESCO would be to cover service level agreements defined by the Council (see figure 10 below).

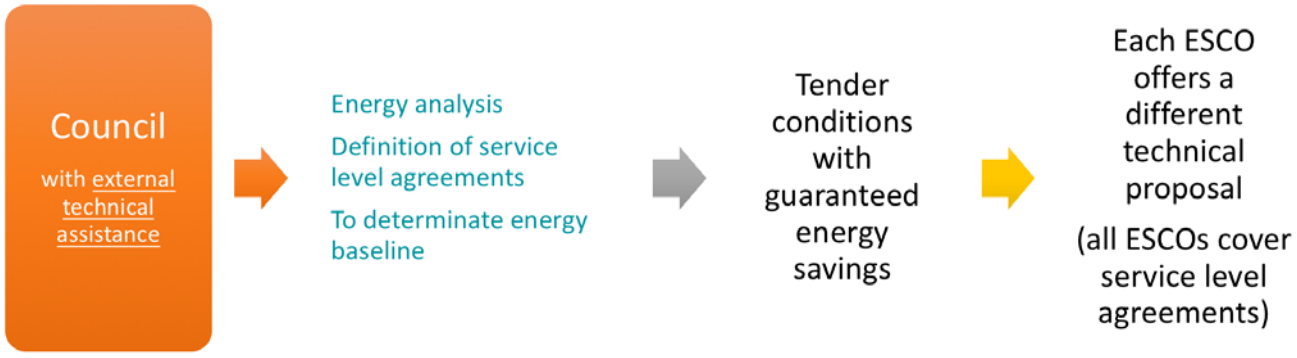

Figure 10

Proceeding in such a way, the final customer (in this case the Council or Municipality) will obtain the best technical and financial solutions proposed by the experts, the ESCO, and not by them, as usually occurs in the present EPC tenders.

In Greece technical choices made by the Public Body itself or by the ESCO could be applied based on the sources and the technical support that the Public Body have to proceed to a detailed analysis and plan. Usually an energy audit and a first draft of solutions is in place by the Public Body in order to have a common baseline for the candidate ESCOs. Clear targets are set to be followed based on the energy savings and/or the cost of energy saved.

In Slovenia, the final technical choice is usually left to the awarded ESCO. Sometimes Public bodies apply for funds through various projects, with which they finance the detailed documentation by themselves.

5.4 Debt capacity from interested Public Authorities

The possibility for Public Authorities to externalize the debt related to energy retrofitting through EPC, and thus maintain their capacity to invest in other public issues, is essential in the interest of the public sector towards such scheme. A clarification by national and/or EU authorities on the way to consider EPC liabilities in public accounts would be however crucial. Also this important element contributes to define the share of investments the Public Body is potentially able to cover.

EPCs indeed quantify and guarantee long-term energy savings. EPCs can serve as a basis for a business model where intangible energy savings are transposed into a secured cash-flow (guaranteed energy performance), so that they can be presented as counterpart to investment in energy performance and secure debt repayment.

Involving third parties (of different size and statute) in financing energy efficiency-EPCs open thus the way for private capitals to be invested in energy savings, providing an alternative to the insufficiency of available public funds.

Public Bodies can thus allocate their equity and debt capacity to other investments but also other energy efficiency investments that would not be made through EPCs. Indeed, *it cannot be expected that all investments would be realized through EPCs*, especially in case of deep retrofit measures with long pay-back time where a participation of the Public Body to the overall investment is normally expected.

In Italy, a major bottleneck for EPC on the regulatory level is the very restrictive approval practice of EPC in local authorities by the supervisory authorities, which control public debt levels. Especially for indebted communities, for which EPC could be explicitly interesting, the approval for EPC projects is very hard to obtain in several Regions. Unfortunately, this restrictive practice is also supported by the Eurostat Guidance Note (2015) on the European level, making difficult the development of EPC markets in many countries: in fact for the public administration it does not allow to consider off-balance the expenses incurred in the case of energy upgrading through third parties with the ESCO as lender, except in very special cases.

In Italy, due the so called Stability Covenant (Patto di Stabilità), municipalities are not allowed to allocate equity amounts in order to (co-)finance long payback period interventions, typical of energy efficiency projects in the building sector. The on-going work on EPC's guidelines/model contract at national level is also addressing this issue.
Since no EPC has been implemented so far in Malta, there is no record on how the contracts can work with Public Authorities. Therefore the issue of financing and public debt is not experienced. Another peculiarity of Malta is that the public funds are managed at a Government level, meaning that Local Council are not able to directly

manage or use public financial allocations. This could possibly have its own consequence on the issue of debt when it comes to implementing an EPC contract. However this field still needs to be explored.
The Consultative Document states that: "the EPC provider supports the Client in finding the most suitable solution providing for project financing taking into account the relevant conditions of both parties. The capital to finance the EPC project can either be supplied out of the Client's own funds, by the EPC provider or by a third party. Provision of financing by the EPC provider is an option, not a necessary part of the EPC project."

The Spanish situation is similar to the Italian one. Control of the public debt levels is also a restriction to develop investment in energy efficiency projects. Although an ESCO or a third party funds the project, the project is considered debt for the Municipality (because generally the assets becomes part of the assets of the public administration), so the public administration cannot develop the project. As in the Italian case, public administrations in Spain follows the guidelines laid down by EUROSTAT ("Manual on Government Deficit and Debt – Implementation of ESA 2010-2016 edition").

To develop an EPC in public administration, one way is to use renting as a solution. This solution has several restrictions in order to avoid that this contract becomes debt to the Municipality:

- The contract timing must be shorter than equipment life-cycle.
- The contract does not include any service neither purchase option.

There are other contract models in Spain that Municipalities can use to develop energy efficiency project: public-private partnerships. These kinds of models are not considered public debt, but they have limitations too:

- Private partner assumes more risk than public partner
- Private partner funds more than the 50% of assets value.

The last bullet point is a barrier for ESCO model, because it is not common to find an energy saving measure that costs more than 50% of the facility (boiler replacement cost << 50% of building value).

More than debt capacity, the main issue for the development of EPC in Greece is the current situation of economic instability. For that reason, EPCs are limited in interventions that required low payback periods such as interventions regarding the electromechanical installations, lighting, etc. In most cases, the ESCOs are responsible for financing the project on their own or through loans.

In Slovenia many Municipalities have already established themselves a debt for financing necessary projects. If there is a political agreement in the Municipality Council, and if the Municipality has its prior debt inside the financial limits, there is no problem for the financial execution.

Debt capacity is not a major issue in the other partners' countries.

6. Estimation of investment needed

6.1 Financial and investment plans

The next step is to estimate the potential of savings and the investment volume. Therefore it is advisable to use the know-how of an experienced EPC-facilitator/operator. At a first visit the EPC-facilitator assesses the actual status of the buildings and examines relevant parameters for feasible measures. With this data an estimation of the saving potential and the necessary investments can be made, taking into account that the investment volume should be related to the saving potential and the desired contract term. In case of a pool of buildings it is necessary to justify at this point, if the chosen buildings are suitable for the pool: some objects may have more or less saving potential than estimated in first round of choice.

Financial and investment plans define indeed the level of economical sustainability of an EPC project.

They are aimed at formalising the amount of payment yearly due to the ESCO, possible instalments, and overall amount of investments.

Funding options and approaches
Funding is a critical part of any EPC and Customers generally understand that the energy savings are used to pay for the equipment and services provided by the ESCO.
However, the Public Body may not be aware of the finer points. It is important to understand that paying for the investment from savings is a function of the total investment costs, the terms of the contract, financing, and the savings generated. If the cost of the ECMs installed under the contract is to be paid from savings, the accumulated savings over the life of the contract need to be equal to ,or be greater than, the total cost of the project, including financing costs.
Once the project costs have been determined, and the level of savings agreed, the ESCO needs to establish the source, determine the applicable terms, and establish whether project financing can be structured to meet the Public Body's needs. Obviously this will be done in consultation with the Public Body, and if it is providing the capital, may require additional work on Public Body's part.

In any EPC project, there are basically three sources that can be used to fund an ESCO project:
1. direct financing provided from the balance sheet of the ESCO (rarely done);
2. third party financing: leveraged by the ESCO, equipment suppliers, or leasing firms; or
3. direct financing by the Customer using traditional sources of project funds.

The source of funds depends on a number of factors, including:
• the type of EPC being entered into (guaranteed or shared savings);
1. under a guaranteed savings contract the Customer is typically the borrower and has the financing repayment obligation. The creditworthiness of the Customer will be a major determining factor on the terms of any financing;
2. under a shared savings contract, the ESCO is typically the borrower and accepts technical and financial project risks. In this case the creditworthiness of the ESCO will establish the terms of financing;
• available terms from the different sources;
• tax implications; and
• availability of funding from the source.

If the performance contractor provides the financing, it is termed 'off balance sheet' or 'non-recourse' financing. The contractor can use its own funds, borrow money, or sign a leasing arrangement. The Public Body has no debt, and its only obligation is to pay the contractor all or a share of the savings during the contract period.

If the Public Body finances the investment, it has a debt. However, the contractor guarantees that the savings will provide enough cash flow to repay the loan as well as to cover fees and costs.

Intermediate situations (financing is provided partly by the Public Body and partly by the contractor) can of course occur (in Italy this is a common option).

6.2 Investment Grade Audit (IGA)

There are four levels of analysis pertaining to energy audits:

Level 0: **Energy benchmarking** examines the historic utility data of the building and compares it against similar buildings. This uncovers inefficiencies of the building and allows for an educated decision on whether an audit is worthwhile.

Level 1: A **walk-through audit** is a brief assessment to identify low cost energy improvements and areas where more detailed future audits can focus.

Level 2: A **general audit** is a comprehensive evaluation of the building and potential energy conservation measures through detailed information collection, in-depth interviews with facilities or operations managers, and the analysis of energy profiles created through interval metering.

Level 3: An **investment-grade audit** is a comprehensive analysis of potentially pricey energy efficiency improvements with a distinct focus on financial concerns and return on investment.

Investment-grade audits are often done as a part of an energy performance contract conducted by an energy services company (ESCO). An EPC commonly includes a wide range of efficiency measures, including envelope improvements, installation of more efficient HVAC systems, installation of renewables, and utility conservation methods. The ESCO in some cases works to acquire funding for the project, performs the investment grade audits, and then maintains the upgrades until the expected savings are reached.

Comprehensive audits such as these often include measures such as the sub metering of individual energy consuming systems within the building, and the monitoring and analysis of specific situations that cause variances

in energy and utility use. Ultimately, they provide a technical and financial assessment of energy conservation opportunities and projected savings.

An investment grade audit should cover at least the following:

- Operating hours analysis
- Inventory of all energy consuming equipment
- Energy rates and cost figures for all utilities
- Analysis of at least one year of historical utility billing data (3 years are the ideal timeframe)
- Energy balance analysis
- Identification of the major energy consuming equipment and processes in the building
- Analysis of opportunities for energy efficiency measures and their potential savings and payback periods
- Identification of suitable retrofits and technology for these measures
- Identification of potential measures in similar buildings, which are not feasible for the building in question.
- Baseline for the reference consumption.
- Identification of required service level agreements by the customer.

Because energy efficiency projects require significant engineering, design, and construction work, investment-grade audits are quite expensive and time-consuming. Plus, they often compete for funding on the Public Body level with other potential investments. But since stakeholders are usually focused on return on investment, the guaranteed savings offered by an ESCO and investment-grade energy audit can make them attractive.

7. Implementation Phase - Development of EPC contract scheme and tender

7.1 Risks assessment

In any performance contract, the contractor takes on the risk of the expected savings not being achieved. A contract can take account of factors that would affect the savings such as warmer winters or cooler summers, or changes in the use of the building. Other factors, such as insolvency of the energy user or non-payment of fees, are problems faced by any contractor.

Risk can be diminished in several ways, including the use of due diligence when assessing the project.

If performance contracting is to be used, an institution should:

- Be able to finance the project itself or have sufficient financial health to meet the payments required;
- Have the authority to sign an energy performance contract;
- Have reasonable knowledge of expected major capital expansions, and changes in ownership, facility use and occupancy that are likely to occur over the life of the contract;
- Have internal technical, legal and managerial capability to understand performance contracting and to work with an ESCO or rely on an EPC facilitator.

In terms of risk management, the ESCO normally assumes most of the related financial and technical risks in implementing energy saving measures.

The contractor assumes the performance risk for the project based on contractually agreed cost savings generated by a marked decrease of the building's consumption of energy (electricity and gas), operational labour, and other resources.
In most cases, guaranteed CO_2 reductions are not included in the contract. However CO_2 emissions reductions can be calculated based on the building's lower energy use.

The performance risk provision generally works according to one of the following three scenarios:

Shared Savings
The building owner and the ESCO or a third-party special purpose ownership and financing company agree to share the sums accrued through energy and other operational cost savings. The division of savings is contractually determined. In many cases, the ESCO will benefit from a higher percentage of savings in the first years of the contract in order to pay back its investments in installed equipment. The building owner thus benefits from increased savings over time.

Guaranteed Savings
In this scenario the ESCO guarantees to the building owner that the efficiency improvements will lead to a certain percentage of energy savings over the lifetime of the contract. Details are, once again, contractually determined on a case-by-case basis, but in all cases the ESCO is obliged to pay the owner for any shortfall in the amount of guaranteed savings. The shortfall — should it occur — is revealed during regular measurement and verification (M&V) of the project's performance.

Shared Savings and Guaranteed Savings
There are cases where customer and ESCO sign a contract that include characteristic of both models. For instance, there is an objective of certain percentage of energy savings (that is the same over the contract lifetime) and if there are more energy savings one month, these extra savings will be shared.
It is more and more common to find contracts with contractual penalties. If the ESCO does not achieve certain energy savings, ESCO must pay the difference, so this kind of financial penalties is a great tool in order to give confidence to the client.
To partially reduce this risk, nowadays it is possible to incorporate in the contract an insurance that could be cover all or part of the compromised savings during the O&M period.
On the other side, the ESCO, through its financial partner, must carefully analyse the final customer risk. The ESCO will invest in equipment that rarely would be able to recover in case of no payment from the customer.

7.2 Variables affecting the economic/financial Plan

Often the detailed worked out financial plans have to be amended/updated since there are variables rapidly changing and significantly affecting the overall investments results over the time.

Among the most important variables to be monitored and taken into account are:

- Interest rates
- Energy prices (electricity and thermal vector)

- Maintenance & Operation costs
- Variations of energy base line

Energy base line year adjustments

At any time in the life of the contract, the energy service company may determine that your organization has modified conditions from those in the reference year. These modifications could range from an increase in the quantity of personal computers to a major addition to the building. They could also involve the extension of occupancy periods. Such factors erode the basis for energy savings agreed upon in the contract and therefore necessitate adjustments.

Any large building usually undergoes some changes each year that could be the subject of base year adjustments. Because each adjustment takes some effort to quantify and evaluate, it is usually wise to batch several adjustments together and consider them all at the same time, on an annual basis. Nevertheless, because if not wishing any significant unforeseen expenses, the Public Body should encourage presenting notable adjustments to the base year as soon as they are recognized.

Utility price fluctuations

The model contract terms should be designed to protect the energy service company and to ensure that it shares part of the windfall from a price drop with the public Body. In fact, in an EPC contract, ESCO usually takes into account only energy savings in kWh. Energy fluctuations have more impact in Energy Supply Contracts (ESC).

If prices go up, the model contract should allow the energy service company to collect more from energy savings, while the Public Body pays more for its energy. This accelerated collection retires the debt faster and allows the Public Body to pay off the project costs more quickly and take over the energy savings stream more quickly.

Interest rate fluctuations

Interest rate adjustments are common because rates at the time of contract signing cannot be held firm throughout the construction and payback periods. The protection for the energy service company against interest rate increases will extend the contract term to cover interest rate impacts. The impact of interest rate fluctuations can be partially managed by the energy service company decisions on financing terms. Although the Public Body may not be able to set the financing rate, it can suggest appropriate refinancing strategies.

8. Elaboration of tender schemes, contracts and specifications for the proper deployment of the pilots.

8.1 Tender approaches

Within an EPC, if the public contracting authority has prepared and published its own tendering policy, then that contracting authority must also take into account the obligations arising from that tendering policy, in addition to the rules and principles governing tenders at European and national level. Regarding the regulatory framework, it should be noted that three new European tender directives have been published in March 2014.

An energy performance contract with an ESCo can assume many forms. It can target (i) just the implementation of energy management/monitoring (ESCo light), (ii) a single specific measure, e.g. the delivery of LED lighting (product ESCo), (iii) more radical energy-saving measures, such as the design and delivery of climate control systems (system ESCo), (iv) more comprehensive measures in the envelope of a building with construction work, renovation, and the delivery of systems (building ESCo) or of multiple buildings in an area (area ESCo). The contract can also entail the financing of work and systems, e.g through a loan, rent or lease, as well as administration and maintenance. Since the measures to be implemented can be very diverse (solar panels, insulation, wind, biomass, management systems, and lighting, for instance), this results in a wide range of possible services, supplies, and works that can make up an energy performance contract.

For the application of the European rules governing tenders, it is important to make a distinction between *public works* contracts, *public supply* contracts, and *public service* contracts.

• A “public works contract” pertains to (the design and) the execution of structural or civil-engineering works destined as such to fulfil an economic or technical function.

• A “public supply contract” pertains to the purchase, leasing, rent or hire-purchase, with or without purchase option, of products, potentially including the additional affixing and/or installation of that supply.

• A “public service contract” pertains to the performance of services, in which any potential products to be delivered are lower in value than those services and in which potential work to be performed is secondary in nature. As indicated above, energy performance contracts are often integrated contracts, which can comprise construction work in the building envelope, the supply of systems and energy, financing, management and maintenance services, and energy conservation guarantees. As a result, energy performance contracts are in most cases mixed agreements, consisting of a combination of public works contracts, public supply contracts and/or public service contracts, and may even contain a concession element.

In the case of an energy performance contract that entails works as well as supplies and/or services, the contract’s main subject must be used to determine whether it concerns a public works contract, a public supply contract or a public service contract. The main subject of the contract must be determined on the basis of the essential obligations that are typical of the concerned contract. The value of the various constituent parts of the contract is merely a factor in the determination of the main subject. When the services and/or supplies are secondary to the works, it concerns a public works contract and vice versa. The value of the supplies and/or services is decisive if the energy performance contract pertains solely to supplies and services. When the value of the services exceeds that of the supplies, it concerns a public service contract and vice versa.

What can be important is whether an energy performance contract qualifies as a public works contract, public supply contract or public service contract, as the determination of the presence of a European obligation to put out to tender uses different threshold values for the various types of public contracts.

Contracts of departments inviting tenders of which the estimated value exceeds the European threshold values must in principle be put out to tender. The open and private procedures are standard procedures that can in that case be used for any contract by the department inviting tenders. The competitive dialogue and the negotiation procedures with and without prior notice are exceptional procedures that can only be used in special

circumstances and for contracts with a value below the threshold value. The competitive dialogue offers the most advantages in the case of more complex energy performance contracts.

Standard procedures: open procedure and private procedure.

Open procedure The open procedure is a standard procedure that can always be used. This procedure has a single round, in which all interested ESCo submit a tender. The disadvantage of this procedure is that everyone can submit a tender, which can raise the cost of the procedure and the time consumption for tenderers and departments inviting tenders. In the case of energy performance contracts, the open procedure can namely be suitable for less complex forms, such as an ESCo that solely focuses on the implementation of energy management/monitoring (ESCo light) or on a single specific measure, e.g. the supply of LED lighting (product ESCo). One of the other procedures is probably more suitable for more complex forms, in which e.g. the technical conservation measure to be implemented has not yet been selected.

Private procedure The private procedure is the standard procedure in which candidates and tenders are assessed in two different rounds. The first round (pre-qualification phase) serves to select those ESCos that will be invited to submit a tender. The tenders of the selected candidates are then assessed in the second round (award phase). The private procedure is more suitable than the open procedure as energy performance contracts are often more complex contracts and require more extensive tenders. However, neither the open nor the private procedure provide ESCos with much margin for innovative ideas.

The two standard procedures are probably not the most suitable tender procedures in situations in which multiple energy-saving solutions are possible and in which one or more measures have not yet been selected.

Exempted procedures: competitive dialogue and negotiation procedure

Competitive dialogue The competitive dialogue can be used by departments inviting tenders for exceptionally complex contracts. A public contract is exceptionally complex when the department inviting tenders is objectively incapable of determining the technical resources or of specifying the legal or financial terms of a project. The competitive dialogue is the most suitable procedure in situations in which a department wants to put out to tender an energy performance contract for various drastic energy-saving measures, without being able to indicate in advance which solutions can resolve this or without being able to assess which technical and/or financial/legal solutions the market can provide. When selecting the competitive dialogue, the department inviting tenders conducts a dialogue with the selected candidates for the purpose of determining the resources/solutions that are most suitable for fulfilling the needs of the department inviting tenders as well as possible. The dialogue can cover all aspects of the concerned public contract. A department inviting tenders will continue the dialogue until it has selected, after comparison if necessary, the solutions that can fulfil its needs. After the dialogue, the participants are asked to submit a final tender for the select solution(s).

Negotiation procedure The negotiation procedure is a procedure in which the department inviting tenders consults with the enterprises it selected and in which it determines the terms of the contract through negotiations with one or more of those enterprises. The special circumstances in which the negotiation procedure can be applied are interpreted very restrictively in the case law. The department inviting tenders that invokes one of the special circumstances must prove the existence of these circumstances. The cases in which the use of the negotiation procedure is justified can be divided into categories: those in which a prior notice of the contract

must be published and those in which no prior notice must be published. The situations in which the negotiation procedure can be used without prior notice do not provide justifications specific to energy performance contracts. Two of the situations in which the negotiation procedure with prior notice may be used, may be relevant in special circumstances to putting energy performance contracts out to tender :

- When the nature and uncertain circumstances make it impossible to determine the total price in advance;
- When it concerns a public financial services contract or a public intellectual services contract for which the specifications for that public contract cannot be determined sufficiently accurately due to the nature of the services to be performed.

With respect to the situation in which the total price can be determined in advance, the European commission notes in its Green Paper on Public-Private Partnership (PPP) that the derogation applies exclusively to exceptional situations in which there is prior uncertainty about the nature or the scope of the work to be performed, but not situations in which the uncertainties are attributable to other causes, such as when it is difficult to determine the price in advance due to the complexity of the financial-legal structure. In situations in which the total price of energy performance contracts cannot be determined exactly in advance, the cause will often not reside (mainly) in the nature or scope of the work to be performed. It is therefore recommended to act with reticence when using the negotiation procedure to put energy performance contracts out to tender. The derogation for financial services (including banking services) can be important when a financial service provider grants financing for an energy performance contract (e.g. bank financing for a system). When the negotiation procedure with prior notice has been selected and justified, the department inviting tenders will negotiate the tenders submitted with the tenderers, for the purpose of adapting these tenders to the imposed requirements in order to find the best tender to award the contract to. This also reveals the practical difference between the competitive dialogue and the negotiation procedure, namely the moment of consultation and negotiation. In the negotiation procedure, the consultation occurs once the tenders have been submitted, while the consultation for the competitive dialogue takes place prior to the submission of the final tender.

8.2 Awarding procedure

The award of a contract within the context of the invitation to tender is divided into (a) the selection of candidates with the required capacities by means of selection criteria, and (b) the selection of an tender on the basis of award criteria.

Selection criteria pertain to the enterprise that registers or submits a tender. Grounds of exclusion are used to check whether the candidate is subject to personal circumstances that preclude admission to the procedure. For example, enterprises that are in involuntary liquidation or that have obtained a moratorium on payments, that did not pay their taxes or social security contributions, that have committed serious professional errors or that have committed an offence.

Suitability requirements indicate the minimum level of the competences the tenderer must possess to qualify for being awarded the contract. The suitability requirements can be requirements that pertain to the economic and financial strength and the technical and professional competence.

Selection criteria are subsequently used in a pre-selection procedure to restrict the number of participants (shortlist) that will be invited to submit a tender.

The requirements with regard to financial and economic strength pertain to the strength of the candidate or tenderer and to potential third parties whose strength that candidate or tenderer can invoke. Giving substance to these requirements demands a tailor-made approach and depends on the nature, scope, and value of the energy performance contract. Normally this aspect is defined by national legislation: e.g. pieces of evidence with which the department inviting tenders can check these requirements, namely the banker's opinion, occupational hazard insurance, submission of balance sheets, and a statement concerning turnover. Financial ratios can be imposed, but this should be done carefully. Due to the diversity in accounting methods and differences between industries, it is not unusual for the mutual comparability of those ratios to be problematic. Potential ratios must therefore be defined clearly in the tender documents.

Examples of financial and economical requirements include e.g. that the candidate is insured against business risks and has taken out a corporate liability insurance policy at the least.

The requirements concerning technical and professional competence pertain to the required competence of the enterprise for the fulfilment of the energy performance contract. When imposing these requirements, it is important to find wording that fits in with the core competencies that are relevant to the fulfilment of the energy performance contract. Giving substance to the technical and professional competence also demands a tailor-made approach and depends on the nature, scope, and value of the energy performance contract.

Examples of requirements as regards experience

Using one or more reference projects, the candidate must demonstrate that its experience consist of each of the core competencies mentioned below:

1. Experience in the analysis and design of energy-saving measures. The reference project for this core competency must fulfil the following preconditions: -The project was completed in the last three years; -The work performed was executed by the candidate itself or under its responsibility; -It concerns a [utility] building; -The gross floor area amounts (in total) to a minimum of [=].000 m2.

2. Experience in the design of energy-efficient systems. The reference project for this core competency must fulfil the following preconditions: -The project was completed in the last three years; -The work performed was executed by the candidate itself or under its responsibility; -It concerns a [utility] building; -The gross floor area amounts (in total) to a minimum of [=].000 m2.

3. Experience in the implementation of energy-saving measures, in which the work performed pertains at the least to:
- The installation of energy-saving measures for electro technical and mechanical systems
- Measures in the building envelope.

The reference project for this core competency must fulfil the following preconditions: -The project was completed within the last five years; -The work performed was executed by the candidate itself or under its responsibility; -It concerns a [utility] building;

4A. Experience in the maintenance and repair of buildings and systems, in which the work performed pertains at the least to:
-Providing for the management;
-Regular maintenance (i.e. remedial, preventive and corrective maintenance);
-Daily maintenance;
-Rectification of failures in structural parts and systems.
The reference project for this core competency must fulfil the following preconditions: -The management and maintenance were performed for at least [two] years within the five-year period preceding the final registration date. -The work performed was executed by the candidate itself or under its responsibility; -It concerns a [utility] building; -The gross floor area amounts (in total) to a minimum of [=].000 m2.

4B. Experience in monitoring energy performance and maintenance, in which the work performed pertains at the least to:
- The installation and management of a digital system used to measure, record, and report the energy performance of a building on the basis of a generic interchange format.
- Monitoring on at least two of the following energy flows: gas, electricity, and heat (and potentially water).

The reference project for this core competency must fulfil the following preconditions:
-The monitoring was performed for at least [one] year within the [five]-year period preceding the final registration date.
-The management and maintenance were performed for at least [two] years within the five-year period preceding the final registration date.
-The work performed was executed by the candidate itself or under its responsibility; -It concerns a [utility] building;
-The gross floor area amounts (in total) to a minimum of [=].000 m2.

In the context of energy performance contracts, environmental management measures at enterprises can namely be suitable to serve as evidence to demonstrate their technical capacity. Environmental management systems are tools that pertain to the enterprise itself and that target the improvement of its general environmental performance, including the use of natural resources, the training of employees, and the use of environmentally-friendly production methods. Enterprises can have their environmental management system certified on the basis of one of the two most important environmental management systems used in the EU: The Environmental Management and Audit Scheme (EMAS) or the European/International standard for environmental management systems (EN/ISO 14001). Europe counts approximately 89,000 ISO 14001-certified organisations and approximately 4,500 EMAS certified organisations. The EMAS certification comprises the requirements of EN/ISO 14001 as well as additional elements pertaining to evaluation and audit, the involvement of employees, and continuous improvement of the environmental performance, and communication with the public and the employees. The nature of an energy performance contract will in general justify the request for an environmental management measure in an invitation to tender. The department inviting tenders must also accept other pieces of evidence if those pieces demonstrate that equivalent measures of environmental management have been fulfilled. This means that the department inviting tenders cannot demand that enterprises have an EMAS or ISO

registration or that they (fully) fulfil the requirements for registration. Note: Depending on the nature, scope, and value of the energy performance contract to be put out to tender, it must be determined whether and, if yes, which (combination of) model requirements (with related preconditions) are (is) applicable in a specific invitation to tender. The simultaneous use of all or multiple model requirements can be disproportional with as an undesirable consequence that none or fewer of the enterprises can fulfil them.

Examples of certification requirements
From the moment the candidate submits its registration and throughout the entire fulfilment period, the candidate must possess:
1. a valid certificate of an environmental management system in conformity with ISO 14001 or an equivalent;
2. a valid certificate of a safety management system in conformity with the Safety Checklist Contractors (Safety, Health, and Environment or an equivalent certified safety management system applicable to the mentioned works;
3. a valid certificate of a quality management system in conformity with ISO 9001:2008 or an equivalent.

If several suitable companies remain after verifying the registrations on their completeness, legal validity, grounds for exclusion, and suitability requirements, then the department inviting tenders can opt for restricting the number of candidates admitted to the next phase by means of (additional) selection criteria. One potential method of restricting that number is to create a ranking of the suitable candidates on the basis of the degree in which the reference projects supplied fulfil the requested core competencies and/or the number of competencies in a single reference/project. In addition, a further assessment can be made of the extent in which the core competencies pertain to e.g. the type of building to which the contract pertains or the specific background of the contracting authority. For example: 'experience in energy conservation for office buildings/sports centres/[other]', or 'energy conservation for buildings with a public function'.

In Spain, if the Public Administration wants to tender an EPC, which is a long-time contract, where the company must guarantee a certain level of energy savings, it is necessary that the ESCO proves to know perfectly the ESCO model, and of course, it is capable to put it into practise. Thanks to ANESE Classification, since 2015, in Spain, there are defined the followings requirements, which could be also used as selection criteria:

- Corporate purpose: it should appear clearly and concisely the activities, actions and process regarding energy services and energy saving that company develops. Alternatively, the company can evidence its purpose through a presentation about its development strategy or its corporate memory where there is evidences that the company works in this field.
- Be registered in the "Comunidad Autónoma" (Region of Spain) where the company is located, as an installer and maintainers (if applicable).
- Be registered in the list of Energy Services Provider (Real Decreto 56/2016).
- Technical capacity: the company must have employees with suitable technical or professional qualifications (university degree, license, certificate of professionalism).
- Be registered in the Official Agency of each country and have a Civil liability.
- Methodology + model of contracts: the company must cover the entire value chain of an ESCO. It is:

- Energy audit.
- Project design.
- Present an offer where all the energy savings works appear. This offer has to include an amortization plan with reference to ROI. In addition, the contract have to include energy savings clauses as well.
- Implement the project.
- Maintenance and operation.
- Measurement and verification of energy savings.

If some of these phases are subcontracted, it is necessary present evidences (agreements, contracts. etc.).

- For each technology of speciality (Lighting, Motors, HVAC systems, Automatic control and regulation, Isolation or/and Industrial applications), the company must report the actual contractual volume, some contract model and the calculations where energy savings appear. For proving experience in each technology of speciality, an ESCO must report a minimum indicator for each speciality:

Lighting	1.400	Number of light points
Motors	5.000	kW
Automatic control and regulation	1.000	Inputs/outputs signal
Isolation	2.500	m2
HVAC	5.000	kW
Industrial applications	7.500	kW thermal + electric power consumed

Furthermore, the ESCO must:

- Prove there is an energy savings clause. And there are also penalties for non-compliance.
- Prove the company is committed to replace the equipment during the contract period. Total warranty.

Some requirements are specific to Spain, but they can apply in other European countries.

- It has to be specify the protocol of Measurement and Verification to be used during the life of the contract.

Award criteria for the assessment of tenders - Most of European legislations prescribe that a public contract must in principle be awarded on the basis of the criterion 'economically most advantageous tender'. If the department inviting tenders nevertheless opts for awarding the contract on the basis of the lowest price in derogation of the previous sentence, the department must justify the application of that criterion in the tender documents. The lowest price criterion will be difficult to apply in many energy performance contracts and will require the use of a combination of award criteria, such as a reduction in energy consumption, energy cost-savings potential, term of the contract, and net present value. The economically most advantageous tender comprises a combination of additional criteria selected by the department inviting tenders that must be

connected with the subject of the contract (energy performance contract). Examples of these criteria are quality, price, technical value, aesthetical and functional attributes, environmental attributes, operating costs, profitability, customer service, and technical assistance, delivery date or date of transfer, and fulfilment period. This is not an exhaustive list of examples. The department inviting tenders is obliged to disclose in the notice or in the tender documents the relative weight of each of the criteria it selected for the determination of the economically most advantageous tender. In addition, it is recommended to also disclose the scoring method in advance, if possible.

It is possible to apply award criteria on the basis of environmental conditions, provided that these criteria:

• are connected with the subject of the contract;

• do not grant unlimited freedom of choice to the department inviting tenders;

• are announced in advance;

• are not selection criteria;

• are in agreement with the fundamental principles of EU law, non-discrimination in particular.

Furthermore, a selection will have to be made of substantive requirements (specifications) to be attached to the contract. The (minimum) requirements that the contract must fulfil can be specified technically or functionally.

Technical specifications provide an exact description of the work, the service or product to be supplied (dimensions, performance, characteristics, etc.).

Functional specifications provide a description of the intended results, the required performance or the envisioned purpose of the work, the service or product to be provided. In that case, the tenderers must describe how the results will be achieved with their tender. In the case of energy performance contracts, it makes sense to provide functional specifications as it is often the purpose to make use of the knowledge, experience, and inventiveness of market parties with regard to energy-saving measures.

8.3 O&M Plan

Most ESCOs establish a training schedule for operation and maintenance (O&M) coinciding with the commissioning of the ECMs. If possible, the ESCO should involve the Public Body in the commissioning process and use that as a valuable part of training. If the Public Body will be using third parties for maintenance, then discussion should centre on how those parties could participate in training. In addition to initial training, the ESCO will likely suggest periodic training updates. This is particularly important if staff turnover creates gaps in knowledge. In such cases, the Public Body can usually request training, or the ESCO may offer training to new staff. It is strongly recommended that the ESCO be given this latitude to charge for training, as it has no control over Public Body's human resources management practices, which can directly impact on ECM O&M and therefore on the ESCO's guaranteed energy savings obligation.

ESCOs will normally offer a regular training program as part of a continuous improvement processes. This is particularly evident when the ESCO is compensated for enhanced or over-performance (i.e. paid a bonus for exceeding the annual guaranteed energy savings amount). Through training, the ESCO can keep staff focused on

energy savings and can also use their day-today experience to fine tune systems for even more savings. This 'win-win' strategy is one of the biggest benefits of a well-run EPC and it helps to ensure the sustainability of the savings well after the EPC has terminated. The additional benefit of training during ESCO projects is staff exposure to new equipment, standards of practice and general improvement in skills that otherwise would not have occurred.
This training usually improves morale and job satisfaction for the following types of reasons:
1. it shows interest by management in the O&M responsibilities and systems that may not have been evident before, demonstrating to staff that all areas are important to the success of the business;
2. it shows that the Public Body value its staff's ability to contribute;
3. it enhances the Public Body staff's skills and experience with new and state-of-the-art equipment; and
4. it demonstrates how changes can significantly impact on savings, which may lead to a more proactive approach to identifying operational changes in the future.

8.4 EPC contract clauses

In addition to the above mentioned points, it is recommended to set clauses in an EPC contract, which are necessary to ensure the success of the project. An example of clauses widely used in Spanish EPC as follows.

1. Type of contract	In this part, a choice should be made between EPC or ESC. Since these kinds of specific contracts do not exist in the contractual public law, it is necessary to look for a similar model. For example, in Spain, there are six types of contract in the Public Administration and an EPC could fix in several of them, it will depend on services which ESCO gives to the Municipalities. Choosing one contract or another also depends on who is responsible for operational risk. In Spain, if ESCO takes this responsibility, then a "contrato de gestión de servicios en modalidad de concesion" (service management contract in a concession way) would be the best option, but, if Municipality takes the responsibility, it would be better choice a "contrato de servicios" (service contract).
2. Subject of contract: energy services with guaranteed energy savings	An EPC contract should include the following services: Energy supply Maintenance with total guarantee. In this point, it has to be defined which equipment and which facilities will be covered by the ESCO and which one by the Council. For instance, ESCO has to maintain only the heating system or it has to maintain the lighting system as well. Design and propose energy saving measurements. It is very important to consider technical parameters and financial parameters (it is recommended to include the project finance of the proposal) Measurement and Verification Plan of energy savings. In a EPC model, the energy savings will be measure in kWh.
3. Service level agreements	The Council/Municipalities have to define service level agreements (SLA), better than to define the technical proposal. These service level agreements will ensure comfort level of the citizens and workers, above anything else. SLA variations can be included in the contract and they will be related to energy baseline modifications. Here, excluded services should be explained in detail too. For example, who is the responsible for energy consumptions from sources not subject to the scope of the project.

4. Goal of energy savings	The purpose of an EPC is to save a certain amount of energy, in comparison with energy baseline previous to the implementation of the contract. In this part of the contract, it has to appear how energy savings will be shared between ESCO and Municipality. Be aware that the consumption in the facilities can increase, because damaged equipment does not count (energy terms) before the replacement, but when this equipment is replaced, it consumes energy. Therefore, the definition of baseline is essential, and in the same way, it should be included how the energy saving potential has been calculated.
5. Ownership of energy supply contract	In an energy performance contract, where ESCO is responsible for energy management, the ownership of energy supply contract usually belongs to the ESCO. But in no way, the Municipality loses the energy control. Nowadays, in Spain, there is a problem when changing ownership of energy supply contract: this procedure takes a long time so there is a problem, because usually the ESCO starts the contract with public administration but it has not yet got the ownership of the energy supply. So it cannot manage the energy. A proposal to solve this issue is to start the contract when ESCO has the ownership, regardless of the ESCO has won the tender.
6. Contract length	The duration of the contract is usually more than the payback period. This issue is sometimes a problem for the ESCO, because in the middle of the contract or almost at the end, ESCO have to do a new replacement in order to continue achieving the energy saving, then in some cases, ESCO has not enough time to recover the second investment. A proposal to solve this issue, at the end of the contract, ESCO will transfer its debts to the Council, and at the same time, the Council will transfer this debt to the new contractors who win the new tender.
7. Assignment of collection rights	As a new financial mechanism for ESCOs, they have the possibility to sell their collection rights to a third party in order to get liquidity to develop other projects. In Spain, it is possible and this kind of clauses are contemplated in the contract. The only requirement is that ESCO has to notify the operation to the Council.
8. Budget of project	The Municipality will evaluate each different offer, so each ESCO should present a viability economical plan for its proposal.
9. Price review and energy baseline	Both clauses are essential in an EPC. They are together in the same part because price review depends on the energy baseline and a change in the energy baseline affects to benefits of the contract. So, there is a mutual relationship between these issues. In addition, if in an EPC there is price review section, it would be important to set which items are or not included in the price review (for instance: only energy supply or maintenance as well)
10. M&V Protocol	It is mandatory to describe the measurement and verification protocol to be used in the contract.
11. ESCO's credentials	As described in section "8.2 Awarding procedure", selection criteria of ESCOs have to be clear in the tender.
12. Exclusions	It is necessary to clarify by contract that energy savings cannot fund other external services (for example: wifi network, legalization of installations, etc.).
13. Maximum Budget	The Municipality have to present how much money will be used to the different service level agreements (energy supply, maintenance, etc.), in this way, ESCO can present an offer, taking into account these limitations.

9. Guarantee Phase

9.1 Share of savings and penalties

Within an EPC process, in the offer the company guarantees the energy saving %, declares the amount of investment it can cover, indicates what % of financial saving will acknowledged to the client and set the contract duration. The call is assessed through the criteria of the value for money, taking into account the overall economic and technical elements.
The awarded ESCO is obliged to undertake the measures and to provide other services (maintenance, training, communication, …) but normally does not provide the fuel and it does not have the responsibility on all the energy systems (in charge of the ordinary manager). The company is in charge only for the part of the system it has implemented measures on. The guarantee is expressed through formulas foreseeing a payment to the client in case consumption are higher than the amount set in the call. In case of energy saving higher than the guaranteed ones, a % of this is kept by the client (Sharing savings).

There are a range of options when it comes to the ESCO taking some of the risk that a project may not deliver the energy savings originally envisaged. For instance, in a *performance payment* arrangement it might be agreed that 80% of the ESCOs fees are fixed, but 20% is variable based on the extent to which savings materialise and are verified as projected. In a case where an ESCO is delivering savings through facility and energy management activities, rather than investments, a *gain-share* arrangement could be that the ESCO gets a percentage of the value of the savings achieved. In a *performance guarantee* the ESCO might only receive the final payment once it demonstrates that savings reach a particular level, either in energy or percentage terms. In all these cases the ESCO supplies a product or service and assumes a degree of performance risk, but much of the risk remains with the customer; the ESCO's payment is not entirely or directly based on the level of savings achieved.

The **performance indicators** used for monitoring the goals of a set energy saving can also drive the technical solutions which will be finally presented by the participating ESCos. Additionally to energy consumption indicators (expressed in terms of primary energy or final energy), it is recommended to report in the Call:

- An objective of CO2 emissions avoided
- An objective related to energy produced from RES (renewable energy sources).

This often drive technical solutions more often produced at local level and more environmental friendly.

In terms of prize/bonus, the most used one is the incentive to achieve real energy savings: if the measured consumption is in line with the contractually agreed target, then the economic profit is shared between the Public Body and the ESCO. The sharing percentage is fixed within the contract and also it depends on type of contract (see 7.1 Risks assessment). Nonetheless, if the savings doesn't reach the target the additional costs related to the not-achieved savings are covered by the ESCO, wholly or partially.

It is in crucial in this process that each part is aware of the risks it runs or wish to transfers.

The *EPC comfort score for the building pool* is the average of the EPC-comfort scores of the individual administrative buildings, weighted according to the floor surface of each building. The ESCO will receive a financial bonus if the EPC-comfort score becomes higher than the baseline value and will have to pay a penalty if the measured score will become lower.

The Comfort performance guarantee can be integrated in an EPC-contract on a quite similar way as the energy savings guarantee. In a Belgian EPC-project initiated by Fedesco the ESCO receives a bonus (pays a penalty) of 1 € per % increased (decreased) comfort score and per m² floor surface. The baseline value is the comfort score as surveyed before the start of the EPC-project.

In Spain, there is not any standard about how to share energy savings in an EPC contract, but the EPC contract most common is the guaranteed savings. If the ESCO does not achieve the energy saving goal, it must pay the difference.

Regarding successful indicators or key performance indicators there is also a lack of standard in EPC model, because each technology achieves different savings and evaluates on the same way several projects (different sizes), which include several technologies. But, with the aim to overcome this issue, ANESE, together with another European ESCO Associations and companies are working in order to set these key performance indicators.

Being able of evaluating the companies' capacities, would increase transparency in the procurement process thanks to a better understanding of the ESCO experience and methodology. All this will promote the execution of energy efficiency projects and foster the investment.

9.2 Measurement and Verification Plan

In each contract year of the EPC, the ESCO has to provide a proof of energy savings. The basis for this are the energy bills for the contract buildings which the client is obliged to provide for the relevant settlement periods. If **defined so in the contract**, also meter reading or reports of the energy management tools may be sufficient.
The ESCO then has to determine the adjusted net amount of savings actually achieved using the calculation rules in accordance with the EPC contract, in a manner which is comprehensible to the client, enter the amount and its remuneration claim into the settlement sheet and present the sheet to the client.
The calculation method for the settlement is analogous to that for the baseline determination. In addition, some adjustment steps are necessary (day, price, climate and usage adjustment) that establish comparability between reference year and settlement year. For the determination of the settlement, either the calculation file for the energy costs baseline handed over upon signing of the contract is updated or the contractor uses proprietary files/modules.

The International Performance Measurement and Verification Protocol (IPMVP) (DOE 2002), published by the US American Energy Efficiency and Renewable energy Clearinghouse, provides internationally accepted concepts and options for determining energy and water savings. The IPMVP is sometimes used as the reference protocol for EPC in commercial buildings or in industries. Some IPMVP rules would also be applicable for public buildings in Europe, but in daily practice, the IPMVP is perceived as too complex for most of the EPC projects in public buildings. Still, some of the EU Member States, e.g. Greece, intend to establish the IPMVP as the standard protocol also for EPC in public buildings. Consequently, ESCOs and their public clients often develop and use their own tailor-made calculation model for the measurement and verification of energy savings achieved in comparison to the agreed baseline data.

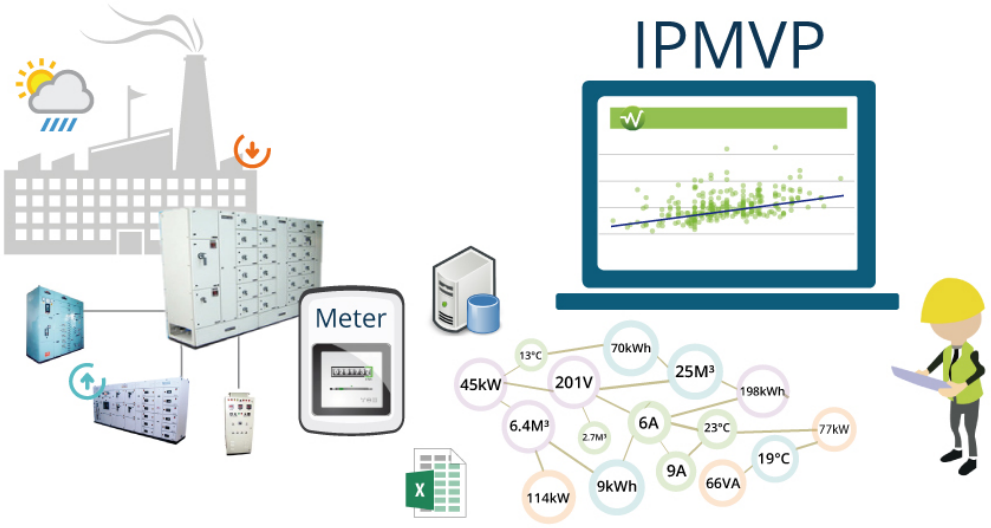

Figure 11 – Source: wattics.com

There are three different measurement options, which can be used in the verification of the energy savings. This calculation determines the difference between the reference and the measured values. The verification options are following:

- Option 1: Use measured values
- Option 2: Measurement of individual power parameters in combination with operands
- Option 3: Mathematical methods by using authorized M&V methods.

Differences between these options are related e.g. to the way how following factors are taken into consideration: the implementation effort, the ongoing costs in the verification process, the costs of tracking changes, and the risks for the contractor related to the achievement of the energy savings.

Relevant verification methods and calculation examples may be included in EPC projects which are expected to create specific challenges regarding the measurement and verification of achieved energy savings.

Monitoring and verification of guaranteed savings is often complex and may lead to debates between the ESCO and the building owner.
Adjustments may be required regularly, depending on, for example:
- Weather conditions.
- Changes in consumer behaviour.
- Type, intensity and frequency of building use.
- Installation or additional, or removal of old consumer devices.
- Replacement of old consumer devices by new, more energy efficient devices.
- Changes in building structures (additional renovations) and of installed facilities.

During the preparation of tender documents it is necessary to identify the tools for the monitoring, verification and reporting of the performance achieved by the successful bidders and a System of Monitoring and Verification

of Performance (SMVP) can provide a periodic scheduling of control activities, a constant monitoring in electronic format of data, a seasonal report of performance data for the reference periods, an electronic data store, and finally the exchange of updated information following simple written request of the client.
As regards more particularly the electronic system of data collection, the same must contain:
- The general reference data for the single building;
- Key figures on consumption, in terms of both energy and money, of thermal energy and electricity;
- Any data on the production of electricity and its monetary value;
- All prices;
- The guaranteed and actual savings and the possible differences in monetary terms;
- The reduction in CO2 emissions;
- An annual monitoring report.

As energy cost and consumption are too often invisible to all but a select few within an organization, a sound measurement and verification plan (M&V) can help confirm actual energy cost savings through:

- Comprehensive Measurement – Tasked to an ESCO, this process uses industry best practices to measure savings created within an individual facility through an energy efficiency, water efficiency or renewable energy initiative.
- While using these protocols has become almost “mandatory”, the resulting costs can be expensive based on project type and scope. This makes matching the approved measurement strategy to the level of risk vitally important.
- Confirming energy cost savings depends on factors related to the risk of noncontract performance. If risk is low, the effort applied to measure and verify may be limited in intensity. Savings are calculated using a simple formula: Energy Savings = Base Year Energy Use – Post Retrofit Energy Use + or – Adjustments
- Adjustments – significant changes in weather differences, operational hours – provide a more realistic comparison of post-retrofit conditions to those of the base year. If these factors are left unaccounted for, it is possible that any realized savings would be improperly calculated.

Third Party Verification – In situations where the ESCO has more experience than the building owner:
• Municipalities will often engage the services of a neutral third party to review the ESCO’s reports, ensure transparency and confirm unbiased results.
• Important if you are counting on project savings to pay your financing obligation and looking to confirm the ESCO is meeting your energy savings guarantee.
• Begin this initiative along with the measurement and verification plan.
This “trust but verify” arrangement ensures both parties believe the information that determines payments is valid and accurate.

Post-Project Risk Mitigation –Following these steps can mitigate against potential risks:
• Improve engineering design and project budgeting by including all project deliverables and line item costs in the project’s total economic snapshot.
• Document all financial transactions to enable auditing by an independent third-party. Critical for projects where energy savings are central to performance-based payments and/or an EPC guarantee.
• Increase the chances of securing financing with the best terms possible. A realistic plan can boost investor confidence in your energy efficiency initiatives.
• Manage energy budgets more effectively. Measurement and verification guidelines help govern energy use to account for budget variances and adjust for changing facility-operating conditions.

Systems tend to drift from their optimal settings after implementation, and new issues arise over time as building environments inevitably change. Measurement of post-retrofit performance is only useful to the extent that corrective action is taken as issues are identified. This process has been termed “Monitoring-based Commissioning,” and refers to the process of optimizing building operations on a continuous basis. As with the M&V, this function can either be carried out with in-house resources or may be contracted to a third party.

The mere presence of new equipment does not guarantee optimal performance; ongoing maintenance, measurement and verification, and performance evaluation are critical to the long-term success of EPC projects and also for the enforcement of the performance guarantee, if applicable. The owner and/or operator as well as the service provider have responsibilities in this ongoing process. Even in a short-term performance assurance option, post-implementation performance should still be closely monitored.
If the owner or operator is not capable of executing proper operation and maintenance of the project(s) after the retrofit, the owner/operator should request a proposal for such services from the implementing or other service provider. In this circumstance, the owner/operator would need to execute a separate contract to ensure such proper operation and maintenance is provided to ensure performance goals are achieved.

Annex A - Action template for EPC in public buildings to be included in the SEAP/SECAP

The energy policy of a Public Body (and of a Municipality specifically) is often summed up in the so called Sustainable Energy Action Plan/SEAP (since 2015 **Sustainable Energy and Climate Action Plan/SECAP**) it has adopted and formally approved within the European Initiative Covenant of Mayors.

Here an example of action template AESS normally suggests to the assisted Municipalities in the working out of their SEAP/SECAP.

Action x – Energy refurbishment, monitoring and certification of public buildings

Action description

The national law on Energy Services foresees that….

The Municipality of xxx intends to energy refurbish its property buildings.

Today a contract including energy O&M and the systems and buildings refurbishment is into force. The contract duration is 7 years and the overall amount of the contract is set for 2.6 MEuro, VAT not included.

The specific tender through which the contract has been awarded concern the heating boilers replacement of 9 office buildings, 9 school buildings, 5 social housing buildings and 7 sport centres (overall 30 buildings). Remote control and thermal regulation are foreseen on all buildings. On 5 buildings new solar thermal systems have been installed. In 8 buildings thermostatic valves have been installed. The foreseen energy saving correspond to yearly 30%, while the cost saving to 19% per year.

If at the end of each Operation year the savings are higher than foreseen, those will be shared for the 70% with the ESCO and for the 30% with the Municipality.

The Municipality is going to yearly monitor the energy savings achieved through remote sensing and a thorough check on consumptions for each building.

Timeline (start, end of milestone)	2010-2014
Costs estimation	20.000 Euro (Call for tenders preparation through EPC facilitator)
Financing	TPF
Energy saving expected	2.047 MWh/y
avoided CO2 estimation	485 t/y
Referent	Public Works department
Indicator	Saved MWh

Annex B - Recommendations from previous projects/organisations expert on EPC

From ESSI2020 project (www.eesi2020.eu)

Introduction of supportive policy and legislation

- As the strong policy support for EPC market development is needed, it is recommended to anchor EPC and related public supporting programs into Member States National Energy Efficiency Action Plans and National Renewable Energy Action Plans.
- Additionally, a deep renovation (comprehensive refurbishment) roadmap should be prepared, allocating technical and financial energy savings and renewable energy potential to be reached through EPC which is an important tool in the renovation of buildings.
- EPC implementation processes should be streamlined through secondary and tertiary legislation dedicated to EPC, standardized EPC Terms of Reference and model contracts for EPC at national level (including EPC Plus, EPC Light, IEC, Green EPC).
- Support greater number of 3rd party EPC-Project Facilitators and EPC-Market Facilitators (i.e. institutions that develop EPC-projects and support their implementation).
- Mandatory checks if EPC is economically feasible and regulation for feasible EPC implementation should be introduced.
- Obligatory energy audits should be introduced in the public sector or included in energy management systems, in order to identify and quantify cost-effective energy efficiency measures and renewable energy technologies as the crucial input to the EPC.
- Considering poor availability of energy data and exemplary role of public bodies buildings, obligatory energy management should be introduced, taking into account relevant standards, such as EN ISO 50001 (Energy Management Systems).

Availability of information and know-how

- In order to support the establishment of public procurement processes enabling implementation of EPC projects, clarifications of potential pitfalls and performance of tailor made supportive activities are needed.
- Member States should make available officially approved standardized EPC tools to all parties interested. These tools should include model contracts, too. The goal is to minimize perceived energy contracting implementation and contractual arrangements risks, transaction costs and time needed for the preparation of projects as well as to enable the entry of new actors into the EPC market.
- Training sessions for a variety of officials in local authorities, as well as politicians, are needed to strengthen demand-side competence on EPC.
- In order to remedy the lack of knowledge among potential EPC customers, and knowledge asymmetries between customers/potential customers and ESCOs, a forum is needed where customers may exchange experiences.
- The lacking availability of websites providing much needed information on EPC in long-term, such as good practice examples, needs to be remedied and a longer term solution established.
- The reported shortage of competent staff could be alleviated by further scientific studies on the topic, preferably interdisciplinary (engineering, financial issues, etc.).
- A protocol and accompanying tools for the assessment of applicability of possible business models, for deployment of energy efficiency measures and renewable energy sources in the building environment, should be developed.

Provision of financing

- Budgetary provisions favourable for EPC should be established, based on positive outcome of cost benefit analysis of the introduction of this market-oriented instrument.
- Potential value of establishing EPC dedicated credit lines by a public entity (such as a government agency and\or donor organization) should be assessed, in order to provide low-interest loans to local financing institutions (LFIs) to encourage them to offer sub-loans to implementers of EPC project. Inclusion of technical assistance to the participating LFIs to enhance their technical capacity should be planned, too.
- Member States should consider establishment of risk-sharing facility by a public entity (such as a government agency and\or multilateral banks), providing partial risk or partial credit guarantee to absorb some EPC project risks and facilitating involvement of LFIs in EPC financing. Targeted technical assistance supporting both LFIs in the marketing and delivering of financing services and EPC project developers in the preparation of projects for investments should be planned as a part of the risk-sharing facility activities.
- In order to increase the share of profitable energy efficiency measures and renewable energy technologies, policy makers need to consider investment subsidies for local authorities to undertake EPC.
- Member States should consider boosting of the deep renovation of the building stock, both public and private, by introduction of specific financing facility, i.e. a deep renovation fund and implementing public buildings deep renovation EPC pilot projects.
- Financial support for further structuring of the EPC market should be provided by financially supporting the establishment and first start-up activities of EPC-specialized associations and federations, and EPC-information activities within existing institutions. Due to high EPC transaction costs, especially at the inception phase of the project, subsidizing of EPC preparation costs can decrease the reluctance towards this business model.
- Member States and regions should make full use of the Structural Funds and the Cohesion Fund to supplement EPC Plus financing, contributing to deep renovation of public buildings and housing.

Further development of the market

- To achieve a stronger market development for ESCO services a further development of EPC business models and related model contracts is necessary.
- EPC Light can be the first step into an external energy management, introduction for EPC projects or the follow-up model for expiring classical EPC projects. Because the EPC Light “soft” measures implemented are not “visible”, it is necessary to inform on and promote the use of the EPC Light in targeted environment.
- EPC Plus should be preferentially used as the model for a deep renovation in the public sector. It reduces both the delivered and the final energy consumption of a building by a significant percentage compared with the pre-renovation levels.
- Further EPC market evolution should be underpinned by introduction of the EPC Codes of Conduct as a tool to acquire customer trustfulness and to increase the transparency of the EPC market setting quality principles and requirements.
- Member States should analyse level of technical competence, objectivity and reliability in the EPC market in terms of recommendations on quality certification of EPC Services.

Annex C - The European EPC Code of Conduct

The European Code of Conduct for Energy Performance Contracting (the EPC Code of Conduct) (Transparense project, 2014) is a set of values and principles that are considered fundamental for the successful, professional and transparent implementation of Energy Performance Contracting projects in European countries. It defines the principles of the behaviour primarily of EPC providers. At the same time, the EPC Code of Conduct is an EPC quality indicator for clients on what they should expect and require from EPC providers and which principles they themselves should adhere to in order to achieve expected energy savings and related benefits. The EPC Code of Conduct is a voluntary commitment and is not legally binding. It was launched by the Transparense project in 2014 and endorsed by the European Association of Energy Service Companies (eu.ESCO) and the European Federation of Intelligent Energy Efficiency Services (EFIEES). Both associations support its use when implementing EPC projects. Since the Transparense project was completed in September 2015, the two European associations continue in administrating and maintaining the European Code of Conduct for EPC and related activities as it is in line with their goals in supporting the European EPC markets. The Code of Conduct is being put into practice having already a significant number of more than 160 signatories across Europe, including 12 national associations of EPC providers. The main role of the Code of Conduct is to bring confidence to the EPC market in the EU taking into account its variety across the member states. Compliance with the Code of Conduct serves as a minimum guarantee of the quality of EPC projects implemented.
The following values and principles laid down in the EPC Code of Conduct are recommended to be used as a reference for the assessment and selection of EPC projects and providers:

Values promoted in the EPC Code of Conduct

The EPC Code of Conduct reflects the values shared among European EPC providers. These values illustrate the effective, professional and transparent approach to managing EPC projects in terms of:

1. Efficiency:

- Energy savings
- Economic efficiency
- Sustainability in time

2. Professionalism

- Expertise and High-quality service
- Health and safety concerns
- Good name in the sector and project
- Reliability and Responsibility
- Respect and Responsiveness
- Objectivity

3. Transparency

- Integrity and Openness
- Long-term approach
- Transparency of all steps and financing arrangements
- Clear, regular and honest communication

Within STEPPING pilot actions, the EPC Code of Conduct will be adopted and proposed to the market by all partners.

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