transparense
INCREASING TRANSPARENCY OF ENERGY SERVICE MARKETS

# D3.1 Energy Performance Contracting Manual

## For EPC beginner markets

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| DTTN | Italy | ECNet | Denmark |
| LEI | Lithuania | NEE | Norway |

# Contents

# Abbreviations

| | |
|---|---|
| EED | Energy Efficiency Directive 2012/27/EU |
| EPC | energy performance contracting |
| ESCO | energy service company |
| IPMVP | international performance measurement and verification protocol |
| M&V | measurement and verification |

# 1 Introduction

The goal of the manual is to provide a basic guidance for implementation of Energy Performance Contracting (EPC) projects in the EPC beginner markets, but may be also useful for educational purposes in the markets on more advanced level. While the manual has been primarily prepared from point of view of the energy service companies (ESCOs), we believe the information will be useful also for EPC facilitators, clients and policy makers.

Energy Performance Contracting (EPC) is one type of energy services – a method proved to be very successful in achieving energy savings while taking over the risks and limiting needs for financial resources on the customer side. In the beginning of manual definition of EPC is provided as well as comparison with the other types of energy services.

The manual includes a guide on preparation and implementation of the EPC projects – from identification of the potential projects and clients, preparing successful tenders, going through all steps of the procurement procedure and finally implementing the EPC project. It also includes a chapter on strategies how to support establishment and development of well functioning EPC markets, directed to both for ESCOs providing EPC and policy makers.

# 2 Basics of EPC

## 2.1 What is Energy Performance Contracting?

Energy performance contracting (EPC) is when an energy service company (ESCO) is engaged to improve the energy efficiency of a facility, with the guaranteed energy savings paying for the capital investment required to implement improvements. Under a performance contract for energy saving, the ESCO examines a facility, evaluates the level of energy savings that could be achieved, and then offers to implement the project and guarantee those savings over an agreed term.

Key characteristics of an Energy Performance Contracting (EPC) project

- **Turnkey service:** The EPC provider provides all the services required to design and implement a comprehensive energy saving project at the customer‘s facility, from initial energy audit to measurement and verification of savings.
- **No need for up-front capital:** Energy efficiency investments are repaid directly from energy savings and related financial savings, so there is no need for up -front capital from the customer.
- **Risks for customers minimised:** The EPC provider assumes the contractually agreed performance risks of the project.
- **Savings guaranteed:** The EPC provider guarantees the achievement of the contractually agreed level of savings and is obliged to compensate savings shortfalls.
- **Support in securing financing:** The capital to finance the EPC project can either be supplied out of the client‘s own funds or by the EPC provider or a third party. Financing by the EPC provider is an option, not a necessary part of the EPC project.

Energy Performance Contracting allows facility owners and managers to upgrade ageing and inefficient assets while recovering capital required for the upgrade directly from the energy savings guaranteed by the ESCO.

The methodology of Energy Performance Contracting is results-driven: ensuring quality of performance.

## 2.2 Definition of EPC and EPC provider

While there is a vast number of definitions of EPC within Europe, within Transparense project we use the EU wide definition provided by the Energy Efficiency Directive[1] (EED):

**"'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;".

At the same time, within Transparense project, we assume that the above mentioned "contractually agreed level of energy efficiency improvement" is **guaranteed** by the EPC provider[2] as guarantee of savings is one of the a key elements of the EPC. This is in line with the EED, as in its Annex XIII, guaranteed savings[3] 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.

Further, within the Transparense, we define the companies providing EPC as follows:

" **'EPC provider'** 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"

Such definition respects the fact that EPC is only one type of energy services, and is in line with the definition of the energy services provider specified in the EED (for its definition see

[1] Directive 2012/27/EU of the European Parliament and of the Council on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC was approved on 25 October 2012.

[2] Guarantee of energy efficiency improvement is defined by EN 15900:2010 as "commitment of the service provider to achieve a quantified energy efficiency improvement".

[3] Annex XIII of the EED lists the minimum item as: „Guaranteed savings to be achieved by implementing the measures of the contract."

the glossary at the end of the report). Within the Transparense texts, we use the commonly used term "ESCO" as equivalent of the energy service provider[4].

The **minimum items that should be included in energy performance contracts with the public sector** or in the associated tender specifications are listed in Annex XIII of the EED and consist in:

- 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.

[4] This means we cover by the term ESCO only the companies providing energy efficiency services, not the companies who provide e.g. only financial services.

## 2.3 EU legislation

**Energy Efficiency Plan 2011** approved by the European Commission on 8th of March 2011 (COM (2011) 109 final) recognises energy performance contracting as an important tool in the refurbishment of buildings. It states that the EPC model has been tried and proved cost-effective in a number of Member States and it is relevant for triggering renovation in public buildings and for upgrading the energy efficiency level of public infrastructure such as street lighting.

In October 2012, the EU adopted a new **Directive 2012/27/EU on energy efficiency** (EED), which establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20 % headline target on energy efficiency. It lays down rules designed to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy, and provides for the establishment of indicative national energy efficiency targets for 2020. It requires application of mandatory energy-saving measures, including renovating public buildings[5], energy-saving schemes for utilities, and energy audits for all large firms.

EED also imposes obligations on Member States to **support energy services market** (model contracts, provision of information, removal of barriers…)

**1. Member States shall promote the energy services market and access for SMEs to this market by:**

(a) disseminating clear and easily accessible information on:

(i) available energy service contracts and clauses that should be included in such contracts **to guarantee energy savings and final customers' rights;**

(ii) financial instruments, incentives, grants and loans to support energy efficiency service projects;

(b) encouraging the development of **quality labels**, inter alia, by trade associations;"

(c) making publicly available and regularly updating a **list of available energy service providers** who are qualified and/or certified and their qualifications and/or certifications in accordance with Article 16…

[5] 3 % of the total floor area of heated and/or cooled buildings owned and occupied by its central government has to be renovated each year to meet at least the minimum energy performance requirements set by Article 4 of Directive 2010/31/EU. The 3 % rate shall be calculated on the total floor area of buildings with a total useful floor area over 500 m2 (250 m² as of 9 July 2015) owned and occupied by the central government of the Member State and which do not meet the national minimum energy performance requirements.

(d) **supporting the public sector in taking up energy service offers**, in particular for building refurbishment, by:

(i) providing **model contracts for energy performance** contracting which include at least the items listed in Annex XIII;

(ii) providing information on **best practices** for energy performance contracting, including, if available, cost- benefit analysis using a life-cycle approach;

(e) providing a qualitative review in the framework of the National Energy Efficiency Action Plan regarding the current and future development of the energy services market

**2. Member States shall support the proper functioning of the energy services market, where appropriate, by:**

(a) identifying and publicising **point(s) of contact** where final customers can obtain the information referred to in paragraph 1;

(b) taking, if necessary, **measures to remove the regulatory and non-regulatory barriers** that impede the uptake of energy performance contracting and other energy efficiency service models for the identification and/or implementation of energy saving measures;

(c) considering putting in place or assigning the role of an independent mechanism, such as an ombudsman, to ensure the efficient handling of complaints and **out-of- court settlement of disputes arising from energy service contracts**;

(d) **enabling independent market intermediaries** to play a role in stimulating market development on the demand and supply sides.

## 2.4 Advantages of EPC

In case of standard way of installation of energy efficient measures, the supplier is not responsible for achievement of cost savings. The end user – customer bears all risks as he is fully responsible for payment of supplied equipment, financial credit (if any) as well as for operation of the installed equipment and savings.

In contrast, within EPC only one supplier company (ESCO) is responsible for both achievement of total cost savings as well as implementation of the energy saving measures and operation of the installed equipment. The ESCO, would also ensure – if such interest exists on the part of the customer – also financing of the energy savings measures.

In general EPC have many benefits, such as:

- reduction of operating costs;
- facility improvement, solution to a specific need such as heating system refurbishment;
- alternative source of facilities funding—budget relief and financial risk relief;
- outsourcing of non-core activities to focus on mission;
- simplicity of having a single source provider;
- technical risk management and guaranteed performance;
- environmental benefits including improving the quality of the indoor environment and GHG emission savings induced by the energy savings.

Although some of these benefits are inherent in the EPC process, others will need to be expressly discussed with ESCOs and to be guaranteed by the EPC contract.

## 2.5 EPC and other energy service models

In the European countries, two major performance contracting models are used: guaranteed savings model (more frequently used) and the shared savings model.

### 2.5.1 Guaranteed savings in EPC contracts

In general, within the guaranteed savings model, the ESCO guarantees a certain level of energy savings and in this way shields the client from performance risk. The ESCO does this under a contract by assuming the entire design, installation and savings performance risks. Thus the clients should require **EPC contracts** to include clauses specifying the **obligation** of the EPC provider to **guarantee energy savings** and to pay the difference if they are not achieved.

While some European contracts guarantee the level of energy savings at nominal prices (current prices of the particular year), for EPC projects in general it is highly recommended to require a **guarantee of savings of energy costs** and other costs (such as wages) in **constant prices of the base year**. Usage of constant prices also enables easier comparison of different tenders. Alternatively, it is possible to include a clause stating that prices can never go below base year rate.

An important advantage of a guarantee of savings is that it lowers the risk borne by the financial institutions. The reason is that if energy consumption savings are not enough to cover debt service, the ESCO has to cover the shortfall.

If savings exceed the guaranteed level, the method of dividing the excess between the customer and the ESCO depends on the particular contract. Usually, the customer receives at least a 50 percent share of the excess savings.

### 2.5.2 Comparison of energy service models

The comparison of EPC with the models is showed in the table below. The most distinguishing feature of the EPC from the other energy service models is the guarantee of the achieved energy savings (in physical units). However, the energy savings may be also guaranteed in some cases when other models are applied.

### 2.5.3 Shared savings in performance contracts

In the shared savings model, in contrast to the guaranteed savings model, the **actual costs of ESM are not included in the contract**, and the client has no obligation to pay off those costs. In return, the ESCO does not guarantee the savings.

With shared savings, the monetary value of the measured savings over the contract period is divided between the client who owns the facility and the ESCO according to an agreed formula. Usually it is done by a percentage distribution of the savings between the ESCO and the client, which is agreed upon in advance and documented in the performance contract. There is no standard split as this depends on the cost of the project, the length of the contract and the risks taken by the ESCO and the customer.

The ESCO typically agrees that the facility owner will, in no instance, pay more for utilities than it did at the start of the contract. If there are no monetary savings, the following conditions apply:

- the client pays the energy bill and owes ESCO nothing for that period; and
- the ESCO is responsible for meeting the financial obligations associated with the up-front equipment purchases.

In a classic shared savings arrangement, the ESCO provides the financing as well as project development and implementation performance risks. The ESCO also bears the interest rate risk and risk of rising utility costs beyond the escalation clause agreed to in the contract.

**Table 1 Comparison of EPC with other types of energy services**

| | Energy Performance Contracting (EPC) / Guaranteed savings mode | Shared Savings model | Energy Supply Contracting (ESC)/Energy Contracting (EC) |
|---|---|---|---|
| **Service provider** | ESCO | ESCO | Energy Supply Service Company |
| **Key elements** | Implementation of energy saving measures (ESM) with ongoing monitoring & verification services to provide guaranteed energy savings | Implementation of ESM to provide cost savings associated with the overall energy bill | Efficient supply of useful energy such as heat, steam or electricity is contracted, measured and delivered in physical units. |
| **Energy savings potential** | High - comprehensive and detailed approach covering both supply and demand side | High - ESCO's primary focus and incentive is for energy cost savings with technical operation requirements as secondary. | Usually low - limited to the supply side (boilers, chillers, etc.) without regard to demand-side equipment. |
| **Guarantees** | Yes. The ESCO guarantees the performance related to the level of energy saved throughout the contract life (i.e. to energy cost savings in constant prices) | Not as standard. However, the ESCO may guarantee a minimum performance related to cost of energy saved in current prices throughout the contract life | May include incentives related to energy use reduction on the supply side, but without assuming any risk in case the expected efficiency improvement is not reached. |
| **Payment** | Payment derived from the energy savings achieved in constant prices of the base year | Payment linked to the current energy prices | Payment at a fixed rate/tariff without any energy performance requirements |
| **Provider's risk** | Assumes technical design, implementation and performance guarantee risks | Assumes performance risk, risk of energy price change (depends on current prices) and customer credit risk | Usually does not assume technical risk connected to ESM neither financial risk |
| **Energy savings transparency** | The energy consumption is measured before and after ESM are implemented. The transparency however depends on the quality of measurement & verification (M&V) is provided. In general the more independent M&V, the more transparent are the energy savings. | Depends whether and what quality M&V is provided. In general, the more independent M&V, the more transparent are the energy savings. | Low - a specific energy bill reduction is established (in monetary, not physical units). Usually the contract does not take into account the measurement of the energy efficiency. |

*Source: The original table by eu.ESCO (2011) was adopted and amended by SEVEn and EEVS for this manual*

### 2.5.4 Energy Supply Contracting

In the case of Energy Supply Contracting[6] (ESC) efficient supply of useful energy such as heat, steam or electricity is contracted, measured and delivered in physical units (such as MWh), thus it resembles district heating or cogeneration supply contracts. The energy service provider takes over the planning and construction of energy production and distribution systems or systems for measurement and control technology, the financing and operation of systems and the supply including maintenance during the contracted period. The service provider may also take over the purchase of fuel and electricity.

ESM are usually taken only on the energy supply side (boilers efficiency, etc.) as there is no motivation for the energy service company to implement measures on the energy demand side.

There is a number of ways in which the client pays for the ESC services. In Europe, most commonly, the price consists of the two following parts:

- The fixed part of the price covers all the investment. Usually the contract stipulates a minimum threshold volume for the take-off. When the client's takes-off is below this threshold, the fixed unit fee he has to pay is higher.
- The variable part of the price covers operating costs including costs of fuel.

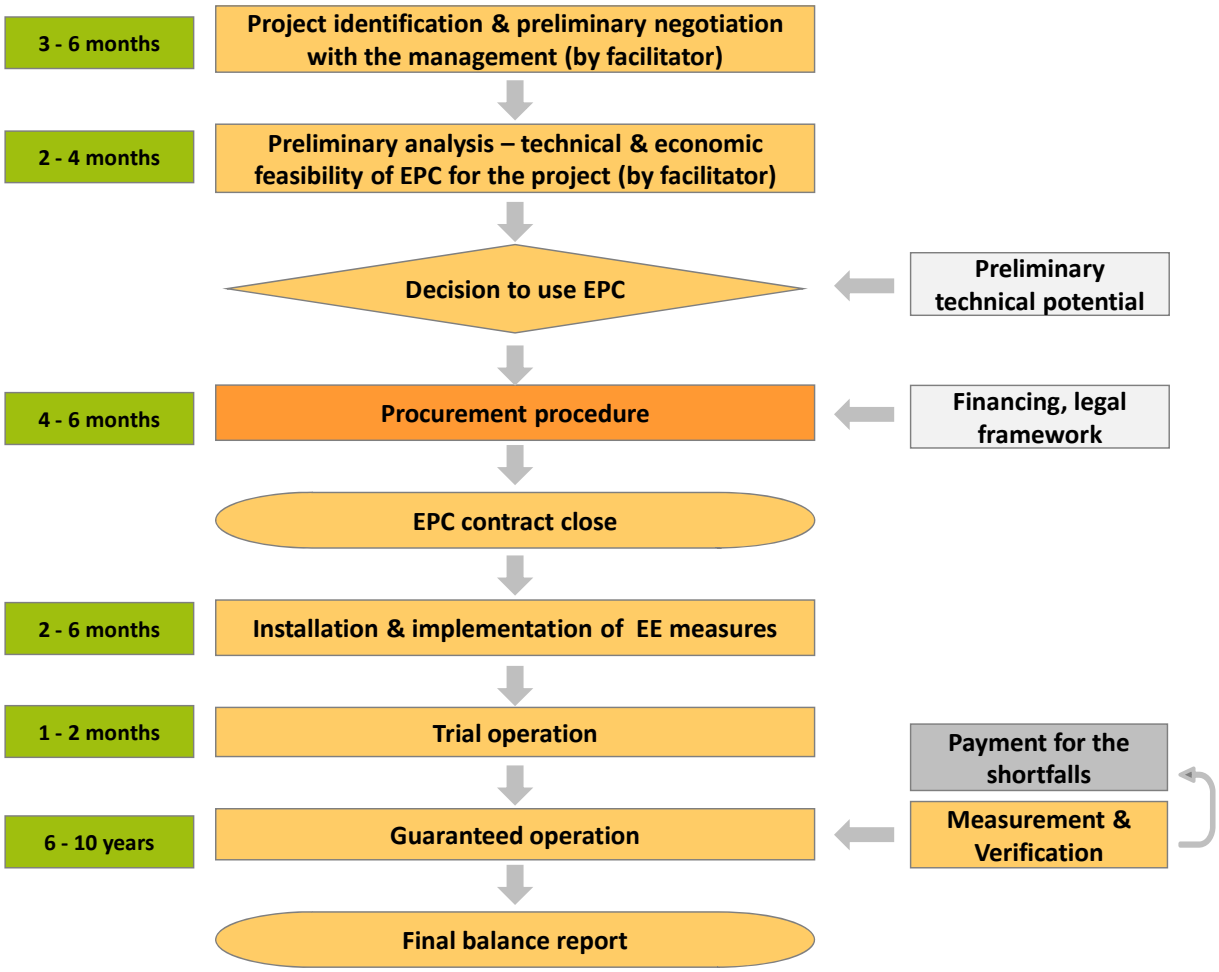
Another widespread type of Energy Supply Contracting in Europe is *Chauffage*, which has been widely used in France.

[6] In Central and Eastern Europe also known as "Energy Contracting".

# 3 The EPC process

The EPC procedure is usually time-consuming from preliminary negotiations to handing over of the energy saving equipment, trial operation and final balancing of the energy saving results of the project. The timing of the procedure will vary among the projects depending the particular circumstances. On the figure below an example of a typical EPC process can be seen.

**Figure 1 EPC process**




There is usually no commitment for the customer until closure of the EPC contract. Up until that time, the customer may decide not to implement the EPC project except for covering the costs of the energy audit and technical design completed to date. After contract closure

no payments are required until the project installation is completed, then they begin for the duration of the EPC as regular, linear payments.

### *The EPC provider*

EPC provider bears commercial as well as technical implementation and operation risks and guarantees the outcome and all inclusive cost of the services for the duration of the contract. It guarantees the savings of energy and/or related costs. The ESCO is obligated by the contract to repay savings shortfalls over the life of the contract.

It is important to create a long-term partnership between the EPC provider and the client based on their common goals: achievement of the energy and cost savings as well as optimising the economy of the project. EPC provider role is also to train the operational staff of the client.

### *The customer*

For the EPC project to develop and be implemented smoothly, it is important to get involvement of the appropriate management level for all key aspects of the EPC project:

**Customer organisation management** (at the level required to approve the necessary investment) must be fully supportive of the initiative, and understand the economic and business impacts of the project on their business.

**The facility operations manager** must be involved in the technical development and provide endorsement to whoever will sign the final approval, ensuring that all technical and operations risks are appropriately managed.

**The financial manager** must assess the economic outcomes of the project to the business and provide the required support to obtain final approvals from management, ensuring that all financial risks are managed, the economic benefits outweigh costs and proper integration with existing **maintenance arrangements**.

### *EPC process facilitator*

The EPC process may become more difficult and drawn out than the customer management is accustomed to. Thus an independent and experienced facilitator can help the customer through the unfamiliar aspects of negotiating an EPC and ensure the contract conditions balance the needs and interests of the customer and the ESCO well.

Such independent consultants can identify the technical and economic areas the customer should be aware of before the EPC is signed. They can also provide a review of the plans and

details prepared by the ESCO and facilitate the negotiation process, to arrive at a final plan agreed to by both parties.

Usually the independent consultants assist the customer throughout the whole EPC process but can also help with just some of the specific tasks, such as:

- defining the general scope of works;
- performing a preliminary audit to identify potential for savings and estimating costs;
- preparing documents for procurement such as the request for proposal (RFP) and evaluation procedures;
- assisting in the evaluation of proposals;
- reviewing the feasibility study;
- reviewing the proposed maintenance and verification plans;
- reviewing the proposed works specification including fit-for-use analysis of proposed energy saving measures (ESM);
- review of the final EPC contract;
- independent assessment of the monitoring and verification audits and reports which may, if required or requested, include a full independent determination of the actual savings achieved;
- dispute resolution; and
- promoting partnering between the customer and the ESCO.

## 3.1 Marketing and project identification

The initial identification of projects potentially suitable for EPC would be most typically provided by ESCOs or the EPC facilitators who would make usually first contact with the customers. One way of easing such contacts is via the seminars and conferences and education events organised by ESCOs and EPC facilitators or other consultants.

The customer is usually the owner or keeper of the property where the project takes place. If the customer shows interest in the EPC project, the information necessary for the preparation of the first proposal of energy saving measures is collected by the ESCO or EPC facilitator.

## 3.2 Preliminary analysis – is EPC suitable for the project?

When preparing a project on energy savings in buildings and facilities, it is necessary to begin with determination of the initial situation of the facility. Based on such analysis, energy saving measures (ESM) to improve the energy efficiency of the facility are then proposed. The final combination of ESM that will be implemented depends mainly on the economic analysis of the available options.

Based on the primary information or possibly inspection of buildings, the **initial draft solution is prepared. The solution includes list** of the measures to be taken into account together with volume of necessary investments and energy consumption cost reduction potential (calculated based on the reference energy consumption scenario). On the basis of this information the customer makes a decision as to whether further procedures are acceptable for him. The initial draft solution is usually prepared by the ESCO or EPC process facilitator.

## 3.3 Energy audit

Conducting of an energy audit is one possible way to carry out **preliminary analysis**, but it is not a necessary step. The concrete list of the proposed ESM is prepared by ESCOs as a part of proposals within the procurement procedure.

When the energy audit is already completed, it would be usable source of information for preliminary analysis preparation.

## 3.4 Conditions for suitable EPC projects

In general, it is most suitable to use the EPC method in the facilities where the following conditions are observed:

- High energy saving potential exists.
- There is a need for qualified implementation and operation of energy saving technologies and measures.
- The payback time of the energy saving measures is lower than expected contract duration.
- The owner of the facility is lacking a team of experts specialised and specifically qualified in energy saving technologies, in the financing of the energy saving technologies and their optimal operation (this is typically the case in public facilities).

For the **customer** the essential prerequisite is that the total cost savings achieved through the contract are larger than the payments to ESCO together with the transaction costs incurred. Transaction costs can constitute a considerable cost item. They include labour/staff costs, lawyers and other legal costs, consulting costs, and all costs associated with looking for an ESCO, negotiations, and preparing the contract, monitoring contract performance, resolving disputes, etc.

For the **ESCO**, the essential condition is that the contract revenues are larger than the total costs incurred by the ESCO.

## 3.5 Decision to use EPC

On the basis of the preliminary analysis the responsible management on the customer side decides whether or not to use EPC to finance the identified energy saving measures.

It is essential to secure the support of key decision makers who must approve the final EPC contract. This should be done before any effort is made to progress beyond the initial stage.

## 3.6 Procurement procedure

Once the responsible management decides on using the EPC for the given project, procurement for EPC provider is a subsequent key step within the EPC process. The public procurement procedure is often prepared in cooperation with an EPC process facilitator, who is able to define the appropriate procurement criteria and prepare the contract specification documentation and who will help to evaluate the tenders received.

The EPC procurement procedure in the **private sector** is less demanding and time consuming. However, some essential parts of the public procurement procedure may be used to obtain the best tender (e.g. tender evaluation, demand definition, etc.) also for private companies.

## 3.7 Contract conclusion

After the decision on the winner of the public procurement is announced, a specific period of time is left for possible objections by the other applicants in the procurement. Once this time has passed, the contract between the winning ESCO and the client is signed.

## 3.8 Installation of energy saving measures

On completion of the EPC contract on providing energy services with the guaranteed result, steps leading to the installation of the agreed measures are commenced. Based on the prepared project background documents, the comprehensive project documentation is prepared by ESCO and all contractually agreed measures are installed shortly afterwards.

Duration of implementation of the measures depends on size and complexity of the project.

## 3.9 Trial operation

After implementation of the measures, they are tested during the trial operation and any deviations from the expected performance of the equipment are fixed by ESCO.

Typically, all the installed equipment is formally handed over to the client after the trial period. However, there may be regulative and legislative reasons for an alternative approach, where the equipment is handed over to the customer at the end of the contractual period. In both variants, the trial period is a necessary part of the EPC process.

After trial operation the ESCO transfers the ownership of the installed equipment to client by certificate of completion. After signature of the certificate ESCO can draw up the invoice for total value of the work including financial costs (interest expenses), which will be paid by payments according to the repayment schedule as stated in the contract.

## 3.10 Operation and measurement & verification

After a trial operation a long-term professional supervision and check of the running and functionality of the measures takes place with a view to achieving at least the agreed level of energy savings.

Subsequently, usually after each year, the attained energy savings are evaluated and if the declared level is not reached, the ESCO is obliged to reimburse the relevant amount to the customer. The checking process is often delegated to a specialised consulting firm, usually the EPC process facilitator who originally assisted with organisation of the procurement. The transparency of the savings achieved depends on the quality of measurement & verification (M&V) provided. In general the more independent M&V on the ESCO, the more transparent are the energy savings.

In some cases the evaluation of actual achieved savings may also be carried out only at the end of the contract.

The guarantee of savings is set in the contract and the energy service company usually guarantees the annual volume of energy savings in physical units (such as MWh). If the savings are **smaller than the guaranteed volume of savings**, the corresponding amount is usually fully reimbursed by the ESCO to the client according to the contract. If the savings are higher than the guaranteed volume, excess savings are to be divided between ESCO and client according to the methodology defined by the contract.

During the contract period ESCO continuously supervises energy system functioning. It monitors energy consumption and intervenes in the case of undesirable action. Once the contract is terminated, the client is fully responsible for operation.

The **International Performance Measurement and Verification Protocol** (IPMVP) can provide an overview of current best practice techniques available for verifying results of energy efficiency projects. The IPMVP is not intended to prescribe contractual terms between the customer and ESCO, although it provides guidance on some of these issues. Once other contractual issues are decided, this document can help in the selection of the measurement & verification (M&V) approach that best matches: i) the project costs and savings magnitude, ii) technology-specific requirements, and iii) risk allocation between the client and ESCO.

## 3.11 Sanctions for non-compliance

In the event that the achieved saving are in reality lower than the guaranteed savings (after re-calculation for average climate conditions), the missing revenues/cost savings have to be paid by the ESCO to the client.

## 3.12 Final balance

At the end of the contractual period ESCO completes the project and fulfils all the contractual obligations. According to the contract ESCO submits the final report, which declares fulfilment of duties resulting from the contract and then leaves the site.

# 4 Public procurement procedure

In the **public sector**, the procurement procedure must be in compliance with the **national public procurement legislation** (based on the EU Public Sector Directive 2004/18/EC).

The EPC contract is complex and usually include all three types of public contracts:

- Public supply contract
- Public works contract
- Public service contract

For the EPC procurement above the treshold values defined by the Comimission Regulation (EU) No 1336/2013, the **negotiated procedure with prior publication of a contract notice** is used for the following reasons:

- single tenders (i.e. bids) can be adjusted during the negotiations with tenderers (i.e. bidders) within the award procedure;
- according to the Public Sector Directive, this type of award procedure can be used only in exceptional cases “when the nature of the works, supplies, or services or the risks attaching thereto do not permit prior overall pricing“.

The alternative - open procedure – is not suitable for a complex design solution typical for EPC as within such procedure the content of particular tenders may not be adjusted after the submission of tenders,.

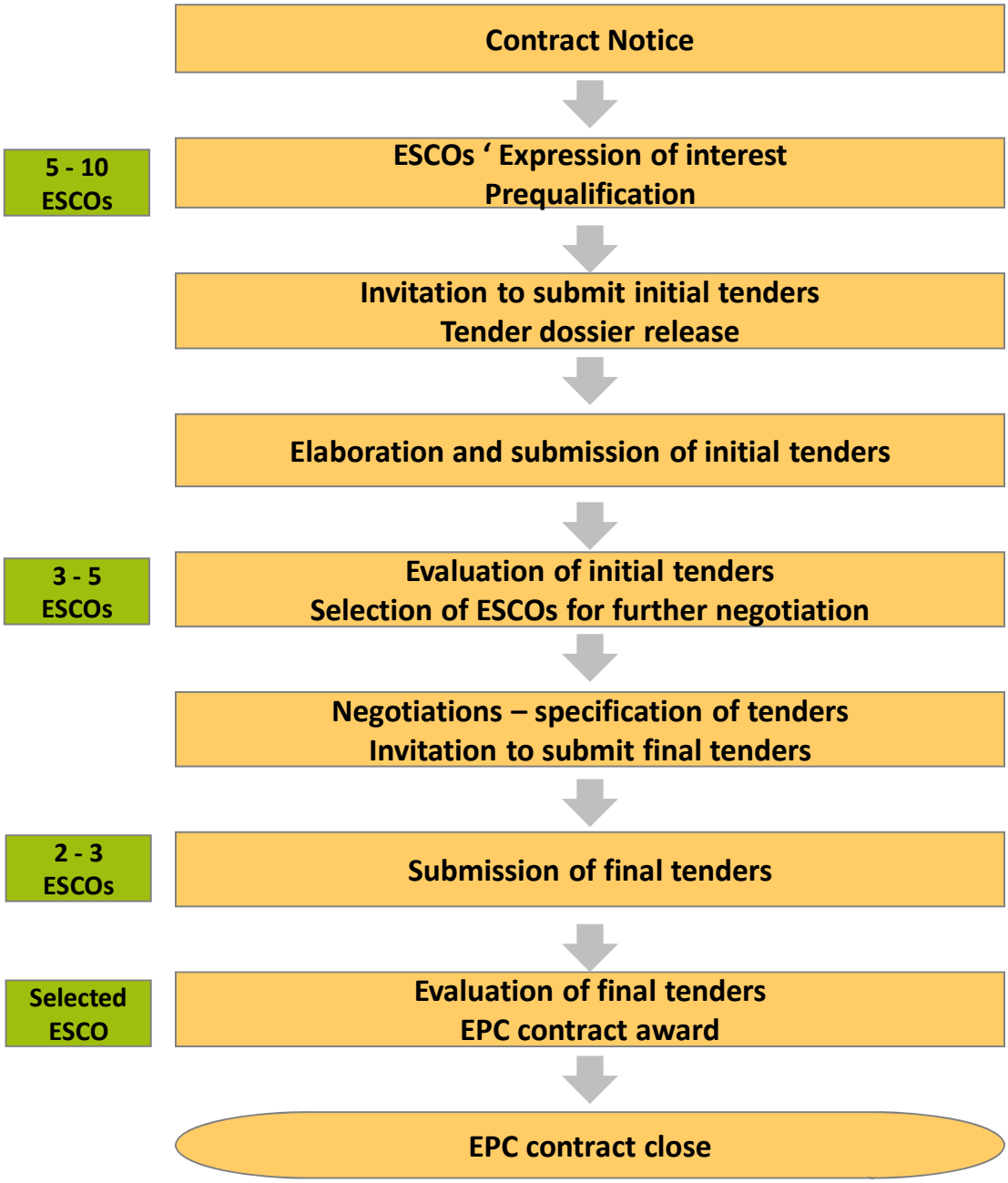
Utilisation of the EPC method in the public sector should be commenced by consent of the building owner for the EPC project. From the perspective of ESCO, it is necessary to have a certain guarantee on the future manner of the utilisation of the building or premises accepted by the owner who is authorised to approve future commitments of the client (contracting authority).

## 4.1 Publication of a contract notice

As the first step, the public procurement procedure has to be officially announced. This publication of a contract notice serves as preliminary notification to the potentially interested companies. The announcement should contain general information on the type of procurement as well as required qualifications of the potential applicants.

The client as the contracting authority must publish a contract notice in a local public procurement bullletin and for the procedures with the price above the treshold valueas also in “The Official Journal of the European Community”.

**Figure 2 EPC public procurement procedure**



## 4.2 ESCO's Expression of interest & prequalification

In this stage of a procurement procedure for EPC, the companies react to the publication of a contract notice and express their interest in taking part in the procurement procedure. They present the tenders and prove fulfillment of required prequalification criteria, , which must be met by the ESCOs interested in tender submission.

Usually the following prequalification criteria are implemented:

- Fundamental prequalification criteria (criminal convictions certificate of the responsible person).
- Professional criteria (certificate evidencing entry in the Companies' Register, trade authorisations necessary for performing the public contract, potentially certificates issued by professional organisations, etc.).
- Financial and economic and financial criteria (documents evidencing third-party liability insurance, the applicant's turnover in the last accounting period, documents evidencing economic and financial situation of the company such as, e.g., the balance sheet, the profit and loss statement, etc.).
- Technical criteria (a list of substantial analogous contracts concluded recently, a description of technical facilities available to the applicant, and other documents demonstrating the technical capabilities of the applicant such as quality certification (ISO 14000)).

These documents are checked and verified by the client (often represented by the facilitator). Only the applicants meeting all defined criteria are then invited to submit initial tender.

## 4.3 Invitation to submit initial tenders & tender dossier release

The ESCOs that fulfilled the required pre-qualification criteria will be asked to submit initial tenders and will be able to collect the tender dossier that is released by the client.

The tender dossier usually contains the following items:

- energy audit, if it had been already undertaken;
- technical underlying materials comprising project documentation, technical and revision reports, etc.;
- information about energy consumption during the last several years and about the state of repair of technical facilities and buildings;

- calculation of reference energy consumption, i.e. baseline (for adequate comparability of individual submitted tenders it is appropriate to specify the method used to calculate the reference energy consumption and the duration of the contractual relationship optimal for the project at hand, and to deliver forms for filling in basic information about the tender);
- specification of the measures demanded by the client that become a "mandatory" part of the bulk of measures;
- specification of detailed terms and conditions of the public contract (place of public contract performance, onsite inspection of the place of performance, the deadline for submission of tenders, the method of tender price calculation, specification of contractual terms and conditions, etc.).

Usually, the public institutions as customers request the following components to be included in the energy services:

- detailed proposal of energy saving measures (ESM) including deep technical description;
- procurement and instalment of the proposed measures;
- financing of the investments (some customers may choose to co-finance the project partly);
- guarantee for installed equipment, including repairing of damaged components;
- guaranteed energy savings and measurement & verification in agreed periods.

## 4.4 Determination of the evaluation methodology

Evaluation methodology and criteria are usually recommended by the facilitators that assist the EPC client to organise the procurement; however, they should respect the preferences of the client and the client gives the final approval to the evaluation methodology.

The evaluation criteria as well as the weights of the criteria should be the same for all the tenderers and should be specified already in the tender dossier. The criteria include both financial criteria, other quantitative criteria (e.g. energy or emission savings) and qualitative criteria (e.g. energy management level, quality of technology equipment).

### 4.4.1 Financial evaluation criteria

The concrete form of the financial evaluation criteria may vary, but they should aggregate the present value of all the monetary benefits and all the costs incurred by the EPC project to the client. Thus net present value (NPV) of an EPC project for the client is thus a suitable

criteria for the tender evaluation. It is calculated as sum of all the discounted incoming cashflows (operational cost savings) and outgoing cashflows (payments to the ESCO including costs of equipment installed, financial services, M&V etc.).

Equivalent criteria to NPV may be used, such as the discounted payback period or the internal rate of return (IRR) of the EPC project for the client.

Further, it needs to be decided on the following parameters for the calculation:

- The level of the discount rate that should reflect the financial situation of the client.
- The period for which the criteria will be applied – only contract duration, or also the period after terminating the contract?
- Method to reflect the possible scenario that the achieved savings exceed guaranteed savings and such "excess savings" are divided between the client and the EPC provider.

As described in the guidance on public procurement prepared by SEVEn (2011d), while during the contract period, the contractor continuously supervises system functioning and monitors energy consumption, or intervenes in the case of undesirable action, when the contract is terminated, the client is fully responsible for operation and there are no guarantees of savings. Thus in the evaluation, it is reasonable to give less weight to the savings expected after termination of the contract. The physical service life of the technical equipment of the energy systems in the buildings is approximately 15 years. The length of the evaluation period, which should be the same for all tenderers, is usually derived therefrom.

### 4.4.2 Non-financial quantitative criteria

In addition, some non-financial quantitative criteria may be considered[7], reflecting the special preferences of the client or the environmental benefits of the project, such as emissions savings or energy savings in the physical units. However, if the NPV of the EPC project for the client is used as a criteria, the level of the energy savings is already reflected in the energy cost savings that are input into the NPV calculation.

If the client wishes to achieve certain volume of the energy savings in physical units, it can be set as a minimum requirement.

[7] According to Singh et al.(2010), in Germany the guaranteed energy savings and the guaranteed investments are used as criteria for the evaluation of tenders.

### 4.4.3 Qualitative evaluation criteria

Until now, sets of different qualitative criteria have been used within the procurements. Some of them are the following:

- energy management level (proposal of system behaviour measuring and monitoring);
- compatibility of the proposed energy saving measures with the existing system;
- method of problem solving and maintenance level;
- level of proposal for motivating the user's personnel its involvement and training planned;
- quality of the technology equipment, service life and future availability of spare parts;
- project organisation,
- company references and qualification of the personnel (CVs)

However, practice has shown that evaluation of such criteria can be subjective and thus need a special attention and methodology for its use has to be defined already in the tender dossier.

### 4.4.4 Determination of the reference value of operating costs

The determination of the reference value of operating costs (baseline) or the initial level of costs connected with the energy consumption is one of the most important items of the EPC contract and is usually specified in the contract specification documentation for the procurement procedure.

Another part of the reference value of operating costs is the description of external as well as internal conditions under which the initial level has been achieved (e.g. for heat consumption – climatic conditions of the year in question, number of operated units – number of pupils, patients, timetable, number of beds, one-shift, multi-shift operation, etc.). Certain internal conditions can refer to the national standards set by the legislation. The calculation method based on external and internal climatic conditions using so-called day-degrees is applied to determination of the reference heat consumption.

## 4.5 Evaluation

In the tender dossier it is necessary to assign appropriate weights to individual evaluation criteria listed according to their relative importance in the final assessment. The method of

evaluation is to be specified in the tender dossier in detail. The assignment of the weights to both the quantitative and qualitative criteria play a very important role in evaluation as different set of weights may lead to a different choice of the tenderer. In the two tables below there are examples of assigning the weighting factors to the evaluation criteria.

**Table 2 Example of Weighting the Criteria in Proposal Evaluation - Denmark**

| Criteria | Weights |
|---|---|
| **Economic criteria** | **30%** |
| **Other criteria, in detail below:** | **70%** |
| The ESCO's ability to establish a fruitful partnership with the client | 15% |
| Description of the guarantee model | 10% |
| Description of the cooperation process with Phase 1, Phase 2 and Phase 3 | 20% |
| Project organization and CVs | 15% |
| Transfer of competences to the operational personnel at the client | 10% |

*Source: Danish Chamber of Commerce (2013)*

**Table 3 Example of Weighting the Criteria in Proposal Evaluation - Canada**

| Criteria | Weights |
|---|---|
| Financial: payback period; cost breakdown | 25% |
| Technical: completeness of energy savings estimate; engineering approach | 25% |
| Implementation: plan for making improvements; monitoring savings | 20% |
| Operation and Maintenance: preventive maintainance approach | 10% |
| Project Management: qualifications of personnel | 10% |
| Training: Approach for delivering training | 10% |

*Source: Natural Resources Canada (1995) in Singh et al. (2010)*

If a facilitator is involved in the process, he usually prepares an input documentation for evaluating committee which is established by the client and evaluates the tenders. The document contains all basic information, especially proposals submitted by applicants and definition of the evaluation process.

If **negotiated procedure with a notice** (as defined by the EU Public Sector Directive 2004/18/EC) is applied, the committee publishes preliminary order of precedence and client continues the tender by negotiation with the applicants (even in several rounds) till one of the proposals is agreed to be acceptable.

## 4.6 Contractual relationship

The procurement procedure including all acts undertaken in its course leads towards the conclusion of the most favourable contract for the client as the contracting authority.

Required content of an EPC contract should be specified in some way in the tender dossier, otherwise it is difficult for the client to compare the contractual terms and conditions in the individual tenders (i.e. bids) and to make sure that other particulars in the tender are appropriately included in the contract. In practice, the public tender dossier can include a draft "standard EPC contract" or a list of the compulsory terms and conditions to be part of the contract.

The tender dossier almost always demands that the applicants specify, both in their respective tenders and subsequently in the concluded contract, the amount of energy savings achieved and the warranties of attainment to enable appropriate checks. Subsequently, usually after each year, the attained energy savings are evaluated and, in the event the declared level is not reached, the ESCO is obliged to reimburse the relevant amount to the customer. The checking process is often entrusted to a specialised consulting company, e.g., the one that originally assisted with organisation of the procurement.

# 5 EPC Contract

A number of EPC model contracts have been developed in Europe. In practice, these types of contracts may function well as they are tailored to the legal and economic environment of the particular country. However, it is not possible to simply transfer a model contract from one country to another. Therefore, only the main features of the EPC contract are presented below, which needs to be further elaborated depending on the specific legislative, regulative and financial conditions in a particular country. Of course, the contract also needs to be adjusted to the characteristics of the particular EPC project, ideally with advice from experienced EPC project developers.

Below, the key elements and key clauses of the EPC contract are specified in the way most suitable for the public institutions; that is they include clause on 100% guarantee of savings and the baseline is required to be set in constant prices.

Not all clauses are reviewed in the following text as some are considered to be standard legal issues, which any construction or service contract would be required to address.

## 5.1 Key elements of the EPC contract

The EPC contract between ESCO and the client who is the facility owner contains guarantees of savings and regulates allocation of financial and technical risks for implementation and operation during the entire project duration of typically up to 10 years and often above 5 years[8].

The key elements, which have to be included in the EPC contract, are the following:

- **Guarantee of savings** – the ESCO guarantees a certain amount of yearly savings to be achieved throughout the duration of the contract. The contract has to clearly define what happens if the guaranteed savings are not achieved, i.e. there has to be a clear description of how the ESCO settles the negative difference between guaranteed savings and actual achieved savings. Further, it has to clearly define the procedure for the case of exceeding the guaranteed level of savings, which sets a method of distribution of access savings between the client and the ESCO.

[8] According to the Transparense survey 71% ESCOs reported up to 10 years (and 54% between 5-10 years) as the most common length of their EPC contracts – for more information see European EPC market overview by Garnier (2013).

- The **volume of investment** to bring the guaranteed savings and a commitment by the client to pay the investment after its installation.
- Clear **definition of a reference scenario** (baseline) of the future energy consumption that is to be set in physical units. For all financial and economic purposes the reference scenario is calculated in **current prices**. The contract specifies a rate of inflation to be used for the reference scenario calculation.
- Obligation of the ESCO to provide a **report on yearly savings** evaluation that documents the actual amount of achieved savings in the respective year – in both physical and monetary units.
- Responsibility of the ESCO to **design and implement the energy saving measures** correctly.
- Obligation of the client to provide pre-agreed **conditions for implementation** of the energy saving measures.
- Planned **duration of installation** of the investment.
- **Ownership transfer** of the installed energy saving technologies to the client.
- Means of **payment for the services** and savings. Usually these are paid as a monthly fixed advanced payment agreed by both parties. At the end of each year of the contract, after the savings evaluation documented in the report on yearly savings, the payments are settled.
- Declaration of the purpose **of operation of the facility** on which the Energy Performance Contract is effectuated.
- **Length of the contract.**
- **Method of recalculation of the guaranteed savings** in case any of the input parameters differs from the presumptions defined in the reference (baseline) energy consumption scenario.
- **Final report** – prior to the end of the paying-off period the ESCO hands over to the client the final report including the total amount of cost savings, guaranteed savings, given reduction in the price and bonuses calculated for the entire paying-off period, etc.

# 6 EPC project financing

Before signing the Energy Performance Contract it is necessary to ensure the financing of the project, though its provision does not have to be a part of the EPC project. The type and source of financing is discussed with the client before starting the procurement procedure. The process of securing the financing depends on the conditions in the particular market.

When offering EPC, the ESCO needs to have a very good knowledge of the financial market, potential sources of financing and suitability of various financial products for a given project and given customer. Selection of a suitable financial scheme is mostly part of a good quality service in EPC projects.

There are three main types of financing sources for EPC projects: third party financing, ESCO financing or customer financing. The choice of the most appropriate financing depends on a number of factors:

- conditions of different financing options within the country financing sector;
- creditworthiness of both the ESCO and the customer;
- available financial sources within the ESCO and the customer;
- economy of a particular project.

In the EU countries where the EPC market is already quite developed, the most usual type of financing is **third-party financing** (such as saleof claims, supplier credit etc.). In most cases ESCOs acquire financial resources through bank credits. Only in the case of smaller projects the ESCOs are capable of financing from their own available resources.

Lessons have been learned from the historical development of the EPC market in Czech Republic. Initially, EPC projects were mostly financed by the customer acquiring credit from a bank. Later, this type of financing became rare as the EPC market developed and the bank sector became gradually accustomed to the EPC schemes.

Municipalities usually have better and less costly access to bank credit than energy service companies and thus this may be the recommended approach until the EPC market becomes more developed.

## 6.1 Sources of financing

### 6.1.1 Third-party financing

Third-party financing is simply debt financing whereby the customer sources the project financing through a third party (usually a bank) and not from internal funds of the customer or the ESCO. The ESCO provides guaranteed savings that cover the debt repayment for the required contract term. The guaranteed energy savings provided by the ESCO are a guarantee of the future positive project cash flow and they reduce the repayment risk of the bank, which has a positive influence on the interest rate (eu.ESCO 2011).

The interest costs during the construction design and installation are included as part of the project financing agreement.

There are two main financial schemes used for third-party financing depending on whether the ESCO or the customer has a direct relationship with the source of financing (see part 3.2 below).

### 6.1.2 ESCO financing

ESCO financing refers to financing with internal funds of the ESCO and may involve use of its own capital or funding through other debt or lease instruments. ESCOs rarely use equity for financing, as this option limits their capacity to implement projects on a sustainable basis (eu.ESCO 2011).

### 6.1.3 Customer financing

Customer financing usually involves financing with internal funds of the customer backed by an energy savings guarantee provided by the ESCO. A customer financing source may also be associated with borrowing**,** but it comes from the customer's internal Capital Expenditure (CAPEX) budget and existing lines of credit (eu.ESCO 2011).

Some customers may see their own resources as the least costly source of financing. However, assessment of the costs of such financing should entail both opportunity costs and the risk of future sudden need for these resources, as future unexpected expenditures may endanger financial stability of the organisation (e.g. in the event of a natural disaster – floods, etc).

## 6.2 Third-party financing models

In general there are two types of third-party financing model – depending on whether the ESCO or the customer has a direct relation to the third party as a source of financing.

### 6.2.1 Credit of ESCO

**The ESCO takes the credit**, i.e. ensures financing of the EPC project in its own name and bears the whole risk of the project failure, even if the cause was out of its control. The customer basically does not meet with the source of financing (usually a bank) as can be seen from figure below.

For the customers, such method of financing is appealing; however, for the ESCO, it represents a risk. Problems can occur between the ESCO and the financial institution. To be granted a loan of millions of EUR, the ESCO has to be creditworthy and sufficiently secured in capital. Such a concept is therefore easier to implement for energy suppliers and large producers of energy efficient technologies. However, smaller, management-oriented ESCOs, for whom it would be more difficult to obtain credit to finance EPC projects may use sale of claims to obtain the financing.

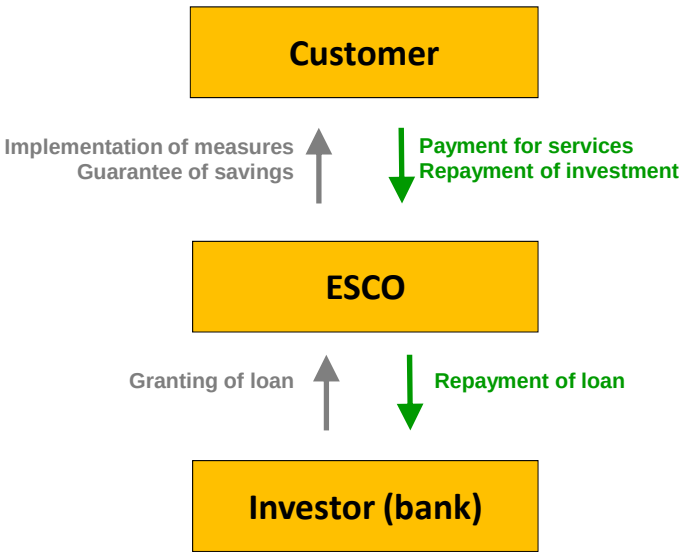
#### *Sale of claims*

An ESCO can sell claims against a customer to a financial institution after implementation of the saving measures. It is anticipated in the contract that the customer repays the instalments stipulated in the contract directly to a bank, while the ESCO guarantees the level of savings and consequent decrease in operational costs. The customer does not bear any additional risk; he just needs to be screened by the respective bank.

#### *Supplier credit*

Within an EPC model supplier credit occurs when the supplier – ESCO – accepts instalment payments for the technologies he sells to the customer. That means there is an agreement between a supplier and a buyer according to which the supplier defers payment. The advantage of such supplier credit for a customer is that the guarantees are provided within the EPC contract and do not have to be approved separately.

Figure 3 Credit of ESCO - relationship scheme




### 6.2.2 Credit of the customer

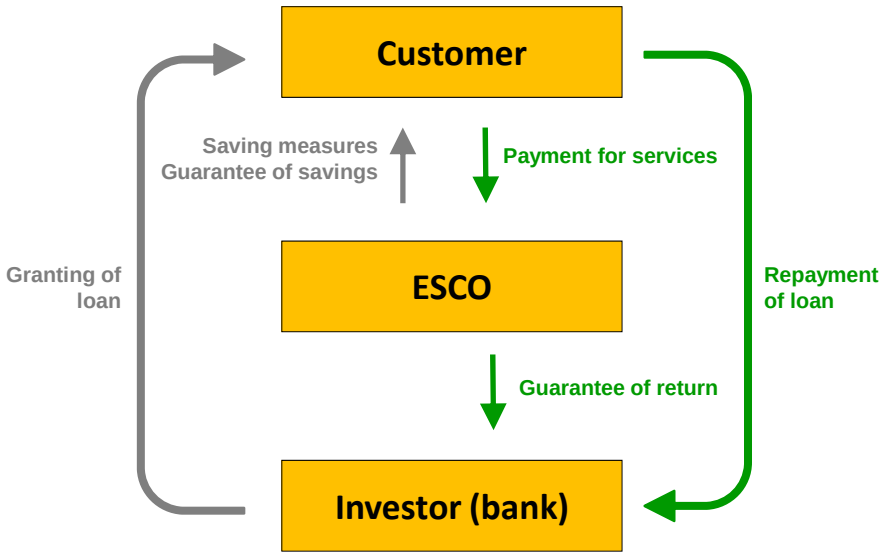
Credit of the customer presumes that the customer concludes a contract directly with the source of financing (usually bank), whereas the **ESCO "only" guarantees the achievement of technical parameters of the project** (see figure below). If the assumed parameters are not achieved owing to the ESCO, the ESCO is obliged to even up the difference between the actual level of savings and the instalment.

The advantages of such an approach include the possibility to use preferential specific credits or to obtain a subsidy, which usually only the customer can apply for. If the customer is credible for banks, he may also obtain lower interest rates or implement bigger projects than would otherwise be acceptable for the ESCO. In general, municipalities and towns without excessive debts are usually considered as customers with a good rating and are granted loans under very favourable conditions.

When a bank lends money, the borrower is obliged to pay the creditor a premium (interest) and to repay the loan in agreed instalments and within an agreed time period. To grant credit, the bank requires guarantees either in the form of property collaterals, as a third-party guarantee or in other forms (e.g. budgetary income of municipalities). The bank then

assesses the creditworthiness of the client, the quality of the project for which the money is lent and sets the interest rate accordingly. When granting credit, the energy savings and related operational cost savings guaranteed by an ESCO increase the credibility of a customer evaluated by the bank.

Figure 4 Credit of the Customer – relationship scheme




### 6.2.3 Combined credit of ESCO and customer

A combination of the above approaches has proven to be a very suitable way of financing EPC projects. In this case both parties (the ESCO and the customer) participate in ensuring the financing. A combination of the above approaches helps eliminate their disadvantages and supports their advantages. Furthermore this approach is a basis for much tighter business relations.

## 6.3 Financial leasing

In general, financial leasing companies essentially sell equipment to their customers. The customer – the lessee – typically rents the item for its entire useful life, or agrees to eventually pay for and own the item through a lease-to-own arrangement. The ownership of the object of lease, over the whole term of the financial lease contract belongs to the lessor.

In the countries with less developed financial market this type of financing is rarely used in EPC projects as it is relatively costly. It is used only in countries where leasing is more affordable, such as in the UK.

When leasing is used within the EPC model, the contract typically envisages the option right, i.e. the right of the lessee to purchase the object of lease upon the expiry of the contract. The price of such purchase is usually quite low as the payments typically amortise most of the economic value of the asset. The lessee has the right to use the lease object unimpeded during the validity of the financial lease contract, to derive all benefits from the object, but also to bear all risks and costs arising from the ownership right, although he is not the owner of the object in the formal and legal sense.

Thus in leasing the **ownership passes to the customer (borrower) after repayment**. Leasing also follows different rules for income tax; such rules however impact commercial companies rather than the public sector.

On one hand, leasing is usually more expensive than the preceding two financing instruments; on the other hand it does not require special guarantees – the equipment which is a subject of leasing is owned by the leasing company throughout the duration of the contract.

## 6.4 Subsidies, grants

Projects can also be partly financed from special support programmes administered by governmental institutions (ministries or special agencies and funds). Nevertheless, use of the subsidies usually complicates the implementation of EPC projects, as it needs to be adapted to the programme requirements either in timing or in the financing structure.

The approach which has been proven to work is administrative separation of the subsidised project (e.g. subsidy for building envelope reconstruction) from the EPC project.

# 7 EPC market development strategy

In general, the EPC market development strategy should consist in:

- overcoming the existing barriers;
- dissemination of information and know-how;
- supporting transparency and trustworhiness in EPC;
- support of EPC implementation in the public sector.

Currently, in most of the countries it is crucial to work on overcoming of the existing barriers to the **EPC project implementation**. To achieve this it is necessary to gain strong political support.

## 7.1 Overcoming barriers

In spite of a number of EPC advantages, the providers and customers of EPC face a number of legislative, administrative and financing barriers, which are described below.

### 7.1.1 Transaction costs

For both the public and private sectors, the disadvantage of EPC is that it requires a sophisticated contract with setting of the baseline consumption. Moreover, it requires capacities needed to deal with complex EPC procedures. EPC arrangements may not fit neatly into your existing procurement rules. Customers should check their internal procedures before a performance contract is signed, and a considerable amount of training may be required.

### 7.1.2 Split incentives

When realising EPC within the public sector (property and buildings managed by the state, regions and municipalities), the barrier of split incentives often arises. It happens when the managers of the publicly owned facilities have limited access to the achieved savings on the energy bills, which are often taken by the owner who is often the regional government or the state.

In general, in the public sector, the reduction in energy costs normally results in lower future appropriations. In such case the manager of the site has little motivation to implement an EPC project. Depending on the administrative rules applied for the public sector in a

particular country, some public organisations are able to retain the benefits of cost savings; however other ones are not allowed to do so.

A site manager may solve this problem by appropriate pre-project negotiation. Its success depends on the type of public organisation and the relationship between the owner and the manager. It is up to the relevant founder or budget provider to decide whether a part of the savings will be left to that subject also during the term of the contract.

For example, in the Czech Republic, the hospitals typically keep the full savings to themselves (due to the higher autonomy and ability to organise the projects on their own), while educational buildings (schools) do not have access to those savings, which then flow to the municipal budget. A combination is possible as well, where both the owner and the building management share the costs of the project and the savings.

### 7.1.3 Legislative framework

In many EU countries, EPC projects implemented in the public sector follow usually only general legislative rules as there are no specific rules. Thus it is often unclear how the EPC projects should be administered and processed in the accounting system.

There is also an EU wide barrier coming from the Fiscal Directive (COUNCIL DIRECTIVE 2011/85/EU of 8 November 2011, on requirements for budgetary frameworks of the Member States) which lays down detailed rules concerning the characteristics of the budgetary frameworks of the Member States. As concerns national systems of public accounting, Member States shall have in place public accounting systems based on the ESA (European System of Integrated Economic Accounts) 95 standard. Aggregate governmental debt of the particular member is calculated based on ESA 95 standard, which currently means that investments into the EPC projects contribute to the public debt of the particular country. In consequence, decision makers responsible for limiting the government debt often create barriers to implementation of EPC projects.

### 7.1.4 EPC project economy

For an EPC project, the payback period of the bulk of the energy saving measures to be implemented has to be less than the required number of years (often 10 years) to be commercially viable. That is why usually not all cost-effective energy saving measures identified at the project site may be financed by the EPC.

Only a certain size of EPC project is able to carry the overhead costs of developing a project by an ESCO and small projects are often not suitable for EPC financing. 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.

### 7.1.5 Risks

An ESCO's main job is managing technical risk—the EPC shifts that risk from customer to the ESCO, who assumes the risk that:

- the project will perform as designed;
- the project will remain within budget regardless of technical difficulties; and
- the equipment will be maintained and operated properly after installation.

EPC providers face both internal and external risks when implementing the projects. Thus when negotiating the contract the EPC client should assure that these risks are fully held by the EPC provider.

Internal risks are those inherent to the implementation nature of the energy savings:

- wrong investment cost estimate;
- wrong determination of energy consumption baseline;
- bad performance of the installation;
- incorrect operation and/or maintenance of the installation.

Other risks may arise in the period of contract duration and should be reflected in the EPC contract:

- changes in energy prices;
- changes in legislation and/or regulation (e.g. changes in rules for communal budgeting);
- changes in taxation;
- changes in the use of the facilities subject to the contract.

## 7.2 Supportive policies

### 7.2.1 Legislative and administrative measures

According to the Conclusions and policy recommendations from ChangeBest project prepared by SEVEn (2012), in many EU countries there are significant legislative and institutional barriers hindering development of energy services in the public sector. Thus one

of the strongest supportive policy from the government would be a fast removal of such barriers (consistently with the Energy Efficiency Directive). Below, there is a number of recommendations on the support policies, where many of them are updated versions of the recommendations prepared within the ChangeBest report for the energy efficiency services, which were made specific for the EPC:

- The member states should comply with the requirements of the EED Directive as described in part 2.3.
- The implementation of the EPC projects by the public institutions would be eased if the rules for EPC implementation in the public sector were prepared and approved by the government. This could include rules for project registration and approval, project accounting in compliance with the legislation, etc.. All legislative uncertainties and risks taken y the public organisations when implementing EPC should be removed.
- Legal adjustments should be provided if needed to remove any legal uncertainty and confusion in procurement procedures with regard to EPC.
- Elimination of the problem of split incentives in order to boost the implementation of EPC in the public sector. This will allow public institutions to maintain the allocated budgets after energy costs are decreased by EPC projects and finance EPC projects from such cost savings.
- Implementation of the EPC projects should not worsen the debt situation of public institutions or municipalities, thus the financial rules should be adjusted accordingly (this requires co-ordination on the EU level).
- Establishment of ambitious energy reduction targets for the public sector.

### 7.2.2 Financial measures

Governmental policies can ease access to the capital for the EPC project by developing specific financial programmes and schemes (e.g. subsidies for EPC project preparation, soft loans, obligations schemes, white certificates).

Profitability is a key driver for the EPC market growth. To increase the profitability of EPC, the following actions should be implemented:

- internalisation of external costs into the energy prices (e.g. through emissions trading schemes, excise taxes on energy products etc.),
- removal of all non-economic barriers that increase the transaction costs for implementation of EPC.

### 7.2.3 Transparency, Information dissemination and promotion

EPC demand can be increased by providing clients with reliable information on how to identify good quality EPC offers and suppliers. Thus information dissemination and measures to define and monitor quality of EPC with subsequent publishing of such information should be provided, such as:

- establishing codes of conduct setting the point of reference for a good quality EPC business; it should be required to follow the code of conduct in the public sector;
- Information and training programmes for EPC market players;
- support pilot projects and publish best practice examples of EPC projects;
- support platforms and networks for exchange of experiences etc.

A number of the recommended measures are being implemented by the EU projects as well as some national projects.

In general, market facilitators are needed to support EPC clients especially in the public sector in designing tenders, evaluating tenders, concluding contracts with energy services providers, and monitoring implementation. Specific programmes are consequently needed to support market intermediaries where appropriate.

# Definitions and glossary

| Term | Definition |
|---|---|
| **Energy Efficiency Directive (EED)** | Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency |
| **energy efficiency (EE)** | means the ratio of output of performance, service, goods or energy, to input of energy (as defined by EED) |
| **energy efficiency improvement** | means increase in energy efficiency as a result of technological, behavioural and/or economic changes (as defined in EN 15900:2010) |
| **energy management system** | means a set of interrelated or interacting elements of a plan which sets an energy efficiency objective and a strategy to achieve that objective (as defined by EED) |
| **energy savings** | means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption (as defined by EED) |
| **final energy consumption** | means all energy supplied to industry, transport, households, services and agriculture. It excludes deliveries to the energy transformation sector and the energy industries themselves (as defined by EED) |
| **guarantee of energy efficiency improvement** | means commitment of the service provider to achieve a quantified energy efficiency improvement (as defined in EN 15900:2010) |
| **energy performance contracting (EPC)** | means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings (as defined by EED) |

| | |
|---|---|
| **EPC provider** | 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 |
| **energy service provider /energy service company (ESCO)** | means a natural or legal person who delivers energy services or other energy efficiency improvement measures in a final customer's facility or premises (as defined by EED) |
| **energy service (ES)** | the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings (as defined by EED) |

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# Annex - Examples

## 7.3 Practical examples of comprehensive solutions by EPC method

### 7.3.1 EPC project in Institute for the Care of Mother and Child in Prague

Implemented solution: proposed solution and project management, reconstruction of steam boilers to hot water boilers, development of local independent-pressure exchangers producing hot water in four pavilions in the hospital, a comprehensive reconstruction of the heating system, installation of a new measuring and regulation system (Desigo PX) with a control room, energy management, and servicing of the measuring and regulation system (M&R) for the entire term of repayment.

The total costs amounted to **CZK 17.1 million**, guaranteed savings of 12 492 GJ/year, i.e., 42 percent. In monetary expression: **CZK 2.6 million, free of VAT**. The project is repaid in **7.5 years** (until 2012).

The EPC project in Institute for the Care of Mother and Child in Prague – Podolí represents an example of the implementation of the project by way of a comprehensive approach, that is, by way of harmonising the requirements of consumption and potentials of production. As part of its comprehensive supplies of services, Siemens produced a draft of measures and a management project in its tender. Then, it implemented the proposed solution. The contract also included energy management and servicing of the equipment, which eliminated the risk of inappropriate handling of the equipment and facilitated direct monitoring of the outcome of the project.

### 7.3.2 EPC project in Municipal Quarter of Praha 4 - Libuš

Facilities: Primary School Meteorologická, Nursery School K Lukám, Nursery School Mezi Domy, “Junior” Club

Implemented solution: project management, installation of a system of Direct Individual Room Control (DIRC) – installation of regulation thermostatic valves and thermoelectric valve heads, installation of circulation pumps with frequency converters, cabling, control-room PC, software, instruction of the operators, hydraulic regulation and electro-vision, and introduction of the energy management system. The relevant regimes can be set either locally or from the ENESA central control room. The option of management from the central

control room facilitates efficient energy management by the provider. As an additional feature, economical ceiling lights were installed.

The total investments: **CZK 5.4 million**; annual savings: **CZK 1.1 million**; term of repayment: **10 years**.

The savings were achieved by way of preventing overheating over and above values as stipulated in the relevant standards, individual reduction of heating in the separate rooms, maximum utilisation of sunlight heat gains and inner energy gains; electricity savings resulted from the application of new pumps and from savings in lighting. The above-described project represents an example of a consumption-oriented approach; heat is supplied from an external "central heat supply".

### 7.3.3 EPC project at Penam Rosice

Implemented solution: an extensive reconstruction of heat management covering heating and supplies of hot water, elimination of the existing steam boiler room, including central steam distribution piping and heat exchangers, decentralisation of heat sources producing technological steam, installation of an exchanger station facilitating utilisation of waste heat from the manufacturing technologies, development of central hot water distribution pipes, reconstruction of heat discharge stations, and installation of a system of measuring and regulation (M&R), and energy management.

The savings resulted from higher efficiency of the source of heat, shifting from steam to hot water heating, minimisation of heat losses in the distribution network, elimination of losses related to non-returnable central heating condensate, utilisation of waste heat from the manufacturing technologies, utilisation of condensate heat from technologies, setting of the systems of measuring and regulation (M&R), making use of synergies in IT support, administration, and servicing.

The total capital investment: **CZK 12.6 million**; annual savings were guaranteed in the minimal amount of **CZK 2.4 million**. Project repayment has been calculated at **7 years** (i.e., until 2014).

Again, this project also implemented in the private sector applies a comprehensive solution combining supplies and consumption.

The above-described projects generally apply reconstruction or modernisation of energy management, with primary solution relating to **efficiency of the sources of heat and options of heat regulation according to the regime of the heated facilities**. The projects always

apply individual solutions as required by the contracting authority and the conditions in the given facilities. Due to the application of this approach, it is difficult to specify a typical technology. In some of the facilities, we come across using of waste heat (e.g., EPC in the National Theatre in Prague where a heat pump was installed making use of waste heat from the hydraulic system in heating another part of the building); in operation requiring a year-round heat consumption, it is feasible to have an own co-generation source of electricity and heat (a combustion engine with a generator).

Beside measures reducing energy costs, also other measures are applied ever more often seeking reduction of costs **for water and sewage** (e.g., by making use of more economical diverters and sprinklers, making use of rain water, and/or even an own water well, instead of using drinking water). Modernizations of the energy sources of heat and further equipment then often helps the reduction **of other operational expenses** relating to the operation of energy management (e.g., lower costs of wages in respect of operation and maintenance, costs of repairs, etc.).

The contractual "**guaranteed savings**" then include savings of costs in respect of all those areas of costs.

**Table 4 Examples of EPC projects implemented in the Czech Republic**

| | Rubber company | Large hospital | Train station |
|---|---|---|---|
| **Investments** | **1 mil. EUR** | **4.5 mil. EUR** | **1.2 mil. EUR** |
| **Energy savings** | **14%** | **32%** | **43%** |
| **Annual cost savings** | 0.4 mil. EUR/y | 1.2 mil. EUR/y | 0.2 mil. EUR/y |
| **Simple payback** | 3 y | 4 y | 6 y |
| **Initial final energy consumption** | 400 TJ/y | 400 TJ/y | 20 TJ/y |
| **Measures** | Reconstruction of the heat production source | Reconstruction of the heat production source | Renovation of the heat distribution system |
| | Reconstruction of the heat distribution system | Reconstruction of the heat distribution system | Improved regulation |
| | Energy management | Energy management | |
| | Central operating system | | |

**Table 5 – Examples of selected EPC projects in public and private sectors in the Czech Republic**

| Facility | Capital investments [Mill. CZK] | Guaranteed savings* [Mill. CZK/y] | Maturity [y] | Contract commenced |
|---|---|---|---|---|
| **Public sector:** | | | | |
| **Institute for Care of Mother and Child in Prague – Podolí** | 17.1 | 2.6 / 18.2 | 7 | 2004 |
| **EPC project at Municipal Quarter in Praha 4 - Libuš** | 5.4 | 1.1 / 11.0 | 10 | 2008 |
| **National Theatre** | 24.8 | 4.1 / 49.9 | 10 | 2008 |
| **Psychiatric asylum in Jihlava** | 24.1 | 6.8 / 61.0 | 9 | 2009 |
| **Estates Theatre** | 30 | 4.0/ 57.3 | 12 | 2010 |
| **Hospital in Jihlava** | 46.4 | 8.1 / 81.1 | 10 | 2012 |
| **Private sector:** | | | | |
| **Mileta Hořovice a.s.** | 15 | 3.8 | 10 | 1999 |
| **Vulkán Hrádek n. Nisou a.s.** | 45 | 14 | 7 | 1999 |
| **Penam Rosice** | 12.6 | 2.4 | 7 | 2007 |
| **Gumotex Břeclav** | 26.1 | 4.9 | 8 | 2008 |

*Notes: Prices without VAT*

**) In the public sector: the amount of guaranteed savings in year one/for the entire duration of the contract (an aggregate value taking into consideration envisaged price increases).*