

Energy Performance Contracting Will Improve Climate and Business

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Keywords

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Abstract

Introduction

Many examples show that energy savings by 20-40 % are possible through performance contracts with incentives for sharing. Within the International Energy Agency (IEA) DSM Agreement, collaborative work has been fulfilled between 8 participating countries. The objective has been to facilitate the use of performance contracts and other energy service company (ESCO) arrangements. Performance Contracting is a mechanism for promoting the installation of energy efficient building equipment and systems. The savings in energy bills is shared between the facility owner and the ESCO. Performance criteria will encourage contractors to develop more efficient solutions. Property owners will have the opportunity to refurbish their facilities without spending investment capital.

Approach

The participating countries have summarised the present situation in the individual countries and suggested international and national actions. At workshops the findings have been analysed and the countries have agreed about suitable process alternatives and the most important short-term actions.

Results

The Country Reports presented have pointed out very interesting action areas. They include the creation of guidelines for procurement and contracts, information activities (e.g. national/international workshops, communications, etc.) and raising the awareness of the use of EPC-contracts through government bodies leading the way with pilot projects. This will contribute to the enlargement of the market for EPC-contracts. Estimates show that only a very small part of the possible market -between 2-4 % - has been penetrated, so there are very large business opportunities, which will also facilitate reaching the Kyoto climate targets.

Introduction and rationale

Energy service contracting, or energy *performance contracting* (abbr. *EPC*, or *ESPC* in U.S. federal contracts) is an established mechanism for promoting the installation of energy efficient building equipment and systems. Facility owners and energy service contractors, or ESCOs, enter into agreements to perform retrofit installations of equipment that can save money on building operations. The savings in energy bills, which are the result of the more efficient equipment installed, are shared between the facility owner and the ESCO under the terms of the agreement. Most importantly, the ESCO takes on the project's performance risk by guaranteeing a specified level of energy savings. The ESCO's compensation is directly tied to achieving these savings. The financing can either be by the ESCO, by the suppliers of the system or components, by financial institutions, or by an outside party – or in different combinations. The situation before, during and after an *EPC contract arrangement* is illustrated in [Figure 1](#). The cost for energy (E) + operation (O) and maintenance (M) is illustrated *before* a contract, *during* a contract, where the total savings are used for financing and debt service of the new equipment and the remainder shared by the owner and the ESCO, and *after* the contract when the total savings go to the owner. EPC is a mechanism that introduces "payment in relation to performance". Different problems and barriers have reduced the introduction and wider spreading of this method.

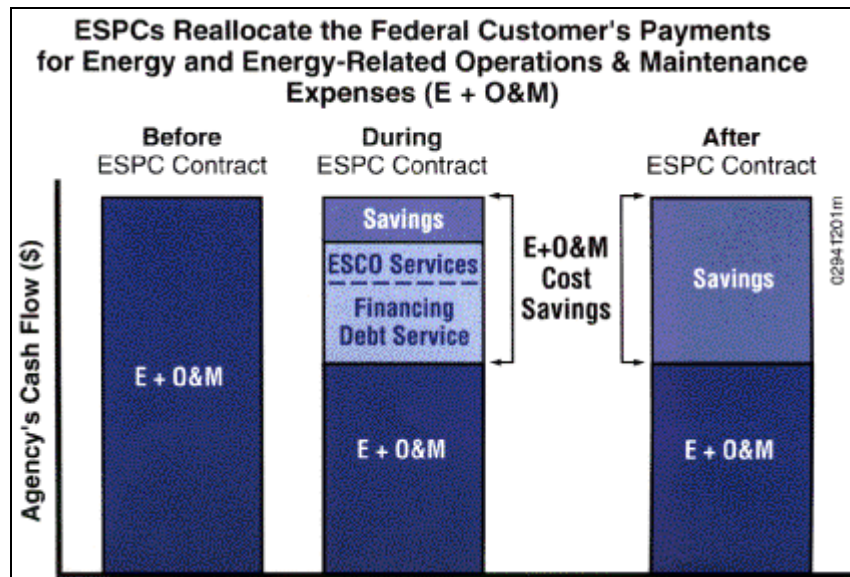


Figure 1. Illustration of cash flow for EPC contracts. (Source: FEMP, 2001)

There may be different motives for choosing a performance contract or other ESCO financial arrangements:

- For some facility owners and users the main reason can be lack of investment capital.
- For others it is simply a very economical business strategy. We only pay when we see value-added functions, as reduced energy bills.
- For the ESCOs, it is a good business argument and a way of connecting with customers and starting new business relations.
- For some companies and government organisations it can be a very efficient way of inspiring innovations and facilitating the introduction of more efficient solutions.

The countries participating in IEA DSM Task X “Performance Contracting” – Finland, France, Italy, Japan, The Netherlands, Norway, Sweden and the United States - have contributed Country Reports and Country Plans describing the situation in their country regarding establishment and utilisation of the performance contracting industry. Countries with mature performance contracting industries can provide information on already existing model contracts, problems/barriers, case studies, and market size. Countries with an interest in EPC, but not so much experience yet, contribute information about barriers.

Different stakeholders, financiers, legal experts, and specialists in benchmarking, measurement and verification issues have been approached during the work.

A Summary Report on the work has been drawn up. There are of course important limitations for the report, as it is based to a large extent on experience and the current situation in the participating countries. The degree of deregulation and privatisation of the energy market also varies between the countries, and this has a great influence on the actions suggested. Important influence on the work has also been received from some countries that are not formally participating in Task X - Austria, Germany and the United Kingdom for instance - as well as from an EU SAVE Project.

From the 1992 Earth Summit up to the Kyoto international COP Meeting, scientific evidence and concern for Climate Change have increased, and at the Bonn Meeting, the “COP6”, an agreement emerged among most parties. It contains three novel instruments, “flexibility mechanisms” – or “flex mechs” – Emissions Trading, Joint Implementation (JI) and the Clean Development Mechanism (CDM), similar to JI but for projects undertaken in developing countries.

As these international agreements will come into power after ratification in a sufficient number of countries, it will be more important to have mechanisms such as performance contracting available on an international market.

Definitions and acronyms

Energy Performance Contracting (EPC) is a contractual agreement for the obligations of owner and ESCO, where refurbishment of energy equipment and systems in buildings is paid for in relation to actual performance.

An *Energy Service Company (ESCO)* is defined as a company engaged in developing, installing and financing comprehensive, performance-based facility improvement projects, typically 7-10 years in duration, centred around improving the energy efficiency and reducing maintenance costs for facilities owned or operated by customers (NAESCO, 1997). The cost savings achieved as a result of the installed energy efficiency measures are used to pay for the project. Performance requirements distinguish ESCOs from consulting engineers, specialising in efficiency improvements. The latter are typically paid a fee for technical advice, and do not assume the risk. Their recommendations will yield actual cost savings or energy consumption reductions.

The *performance* criteria will *mainly refer to energy*, but could also include other aspects, as better indoor air quality and offer of services. The development towards including services other than energy has been stressed in the work and is also pointed out as important in the conclusions from an EU conference about SAVE work (Lambert, 1999).

TPF refers in this report to *Third Party Financing*.

Studies of different material in Europe lead to the conclusion that TPF and EPC is used very much with the same meaning (Leutgöb et al, 2000). This is also the case in a document from the World Energy Efficiency Association (WEEA, 1999).

ESCO operation and services

Types of ESCOs

There are different types of ESCOs. Most countries mention ESCOs with a background in engineering and design, equipment, energy supply, facility management and maintenance, monitoring and financing. Four categories of ESCOs have been mentioned: Utilities, consulting companies, manufacturers selling their own products and/or services, and ESCOs purely monitoring and financing the projects. The ESCO-companies may have financial capabilities to a larger or lesser extent, and also have a variable interest in taking on the financial risks.

Services and products offered

Many different types of services and products are offered by ESCOs, see [Figure 2](#). Normally, an ESCO contract should include some *fundamental elements* (items 1-4 in Figure 2):

- *Energy savings* that are *guaranteed*.
- *Financial arrangement* - by the ESCO or mediated.
- A *security* solution.

The most *frequent services* offered are also illustrated in Figure 2 (items 5-6):

- Technical consultation and detailed design.
- Upgrading of some parts in the facilities, such as lighting, control systems, HVAC, installation of new monitoring systems.
- Management of engineering and construction.
- Monitoring during commissioning and contract period.
- Minimum advice about financing or, in some markets, most often financing completely or to some extent.

In the Country Reports, many examples of *additional services* (items 7-10 in Figure 2) are mentioned, for example:

- Supply of electricity, heating, and cooling (full delivery assistance with tendering).
- Refurbishment in general of buildings.
- Training, operation and maintenance service.
- Installation and operation of renewable energy systems, for example solar systems, with guaranteed results in delivered kWh/year.
- Outsourcing.

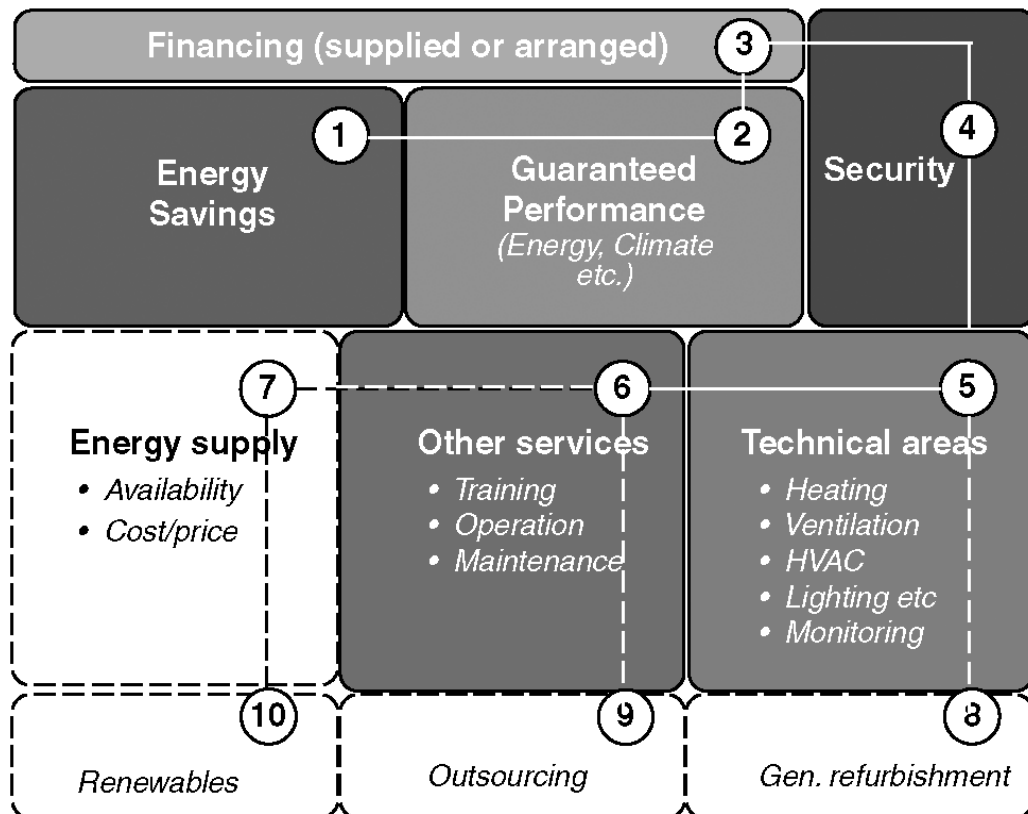


Figure 2. Fundamental elements and most frequent and additional services in Energy Performance Contracting.

EPC process

Initiation of project

The initiative for suggesting or considering an EPC process and contract can be taken by different organisations, such as

- Government, or local government organisations and public energy agencies
- Facility owners
- ESCOs

Principles

In principle, the process starts with an introductory study based on the building owner's actual needs, the current energy situation in one or more buildings, and an invitation to one or several ESCOs to submit tenders or proposals.

Size of ESCO industry in different countries

The number of ESCOs in different countries varies from very few in a couple of countries to hundreds, as in the United States.

The size of the industry and market potential has been estimated in various earlier reports and also in some of the Country Reports.

A cautious estimate would indicate that the market could increase by ten times or more (Lambert, 1999; Leutgöb et al, 2000; Country Report Japan & Country Report United States, 2002-2203). A market penetration of the EPC mechanism would result in very important energy savings and a reduction of CO₂ emissions.

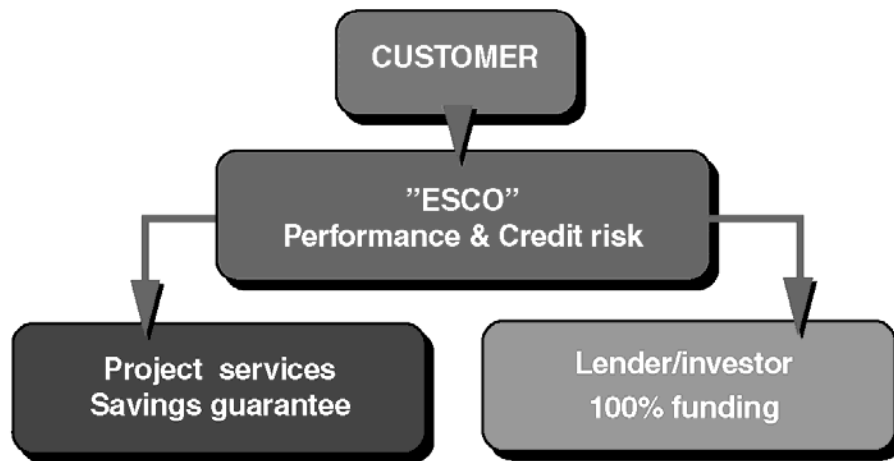


Figure 3. Shared savings. (Source: US Country Report).

Contract arrangements

Many agreements are strongly tailored to the needs and expectations of the single client, and many of them are confidential. The Federal Energy Management Program, FEMP, in the United States has developed a full set of guidelines and model contracts.

There are two different important aspects about the process, which influence the structure of the process and the contract arrangements – whether a *competition* is arranged at the beginning (a legal requirement for public organisations), and the *distribution of different risks* between the parties.

Four conceptual solutions for the risks are often used:

- Shared savings, where the ESCO offers the financing and takes both the performance and the credit risk, see [Figure 3](#). The customer/owner has *one* contract, which includes energy savings as well as financing.
- Guaranteed savings, where the ESCO takes the performance risk and the customer is responsible for the financing, see [Figure 4](#). The customer/owner has *two* contracts – one with the ESCO about energy savings, and the other with a financial institution.
- First out, where all energy cost savings are used to pay interests and amortisation of the loans until full repayment.
- Contracts for energy management, "chauffage" (heating) contracts.

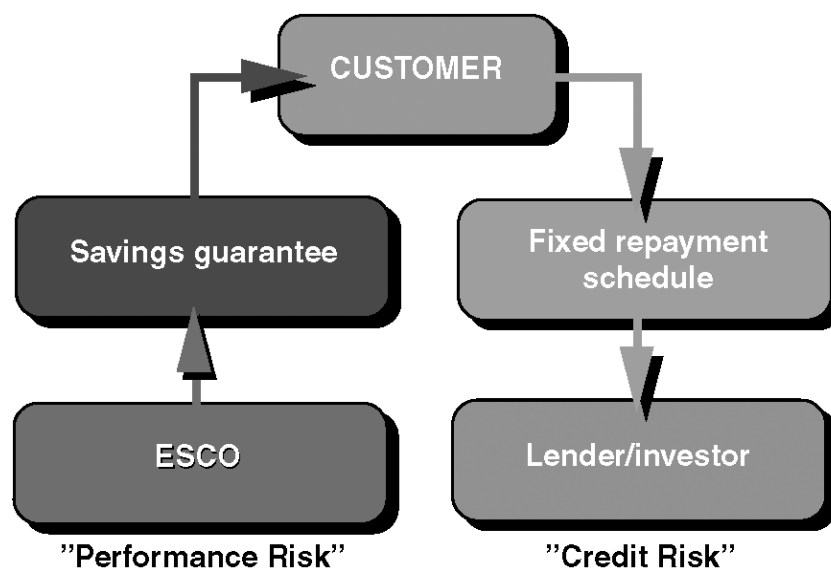


Figure 4. Guaranteed savings. (Source: US Country Report).

There are also differences in respect of contracts with public entities and contracts with industry.

Barriers and opportunities

Barriers

The introduction of EPC solutions is progressing very slowly on the new markets. Those contractors that have started to work find that it is a very long process to reach a final contract. The participating countries have identified some *important barriers* in their reports, which can be summarised as follows:

- Slow movement from buyers
- Lack of understanding of the opportunities
- Lack of information
- Time-consuming work for raising interest in general and for formulation of contracts
- Lack of public recognition – positive attitude and culture
- Lack of generally accepted procedures for EPC projects
- Procurement rules (absence of bidding system)
- Lack of General Contract Conditions
- Lack of technical experts
- Lack of capital
- Different responsibilities for investment and operation
- Low energy prices

Difficulties in finding and organising data on energy consumption and expenditure may also slow down the work. Energy Audits produced by others than ESCOs can raise some hesitation. Profits that are seen by an ESCO as too low in relation to the envisaged risks, when the audit has been carried out by another organisation, can be a barrier.

Opportunities

Many good examples of opportunities are also mentioned in the reports.

General advantages

- Real projects show the energy savings potential, often between 20-40 per cent. Case studies have shown occasional energy savings up to 50 per cent. About 1,600 cases in the US NAESCO database point at average savings of 23 per cent of the total electric bills and of 47 per cent for lighting-only projects.
- A great potential also for energy savings in many public buildings, especially in municipality buildings. But the problem is that operating and investment budgets are not co-ordinated.
- The ESCO can contribute financial solutions when there is a lack of necessary funds in the building owners' organisations, and the ESCO can also offer outsourcing of energy services.
- Considerable margins for energy and cost savings in many cases.
- A clear demand for more efficient heating and air conditioning in the service and office sectors.

Market segments

The potential by market segments has been indicated by the countries and in earlier reports and is included in [Table 1](#). There is a great potential for energy savings in many public buildings, especially in municipality buildings. Some Country Reports also show that the largest total energy savings potential may be easier to achieve in office buildings than in industry or residential buildings, because of a larger amount of similar projects. The findings are however very country specific.

Stressing other advantages besides energy has been mentioned, for example: better outdoor air quality and reduced climate risks, better indoor air quality and working conditions.

Table 1. Overview of Market Segments for EPC

	<i>Fin-land</i>	<i>France</i>	<i>Italy</i>	<i>Japan</i>	<i>Nether-lands</i>	<i>Nor-way</i>	<i>Swe-den</i>	<i>USA</i>
Promising Market Segments:								
- Service sector:								
- public	X	X	X	X		X	X	X
- private				X	X	X	X	X
- Commercial		X	X	X		X	X	X
- Residential					X	X	X	
- Process industry	X	X		X			X	X
- Other industry	X		X			X	X	
Existing Standard Contracts	X	X	X	X			X	X

Government policy

A summary of different policy measures mentioned in the Country Reports is found in [table 2](#). Information about EU initiatives in this area is also included.

Table 2. Overview of National Government EPC Programmes & Policies

	<i>Fin-land</i>	<i>France</i>	<i>Italy</i>	<i>Japan</i>	<i>Nether-lands</i>	<i>Nor-way</i>	<i>Swe-den</i>	<i>USA</i>	<i>EU</i>
Government Programmes & Policies:									
- Procurement adaptation								X	X
- Public buying	X	X	X	X		X	X	X	
- Work out Standard Contracts	X	X	X				X	X	X
- Energy Audits	X	X			X	X			
- Energy Agency or equal facilitating	X			X	X	X	X	X	
- Compulsory Regulations			X						X
- Financial mechanisms		X		X	X		X		
- Subsidies	X	X	X	X	X				
- Tax advantages			X						
- M & V								X	X
- Changes in laws			X	X	X			X	
- Information	X	X	X	X	X	X	X	X	X

In *Finland*, subsidised energy audits for buildings are an important action.

In *France*, the SOFERGIE firms have initiated certain measures to implement energy efficiency programmes. They specialise in the financing of investments generating energy conservation. A large programme for CHP (Combined Heat & Power) introduction has been very successful. A new national programme for energy conservation, FIDEME, has been launched.

In *Italy*, the activity with compulsory *Energy Managers* has been in use for some time. And the introduction of EPC is actively supported.

In *Japan*, different models of *subsidies* are introduced or considered.

In *The Netherlands*, Novem has been operating a large and ambitious Energy Efficiency and Environment Programme for a number of years.

In *Norway*, the energy taxes were doubled between 1997 until 2001, but then somewhat lowered again. Investment subsidies and trade with energy certificates are being considered, and the new energy organisation ENOVA has been established.

In *Sweden*, the use of standard contracts and demonstration projects is being discussed within the Swedish Energy Agency.

In the *United States*, there are a number of federal initiatives, and state programmes have been introduced in the form of clarification of procurement rules, and actions to enable government and state organisations to enter into long-term contracts up to 25 years.

Process, procurement and contract suggestions

Many of the countries have suggested that more standardised contractual documents be developed. The Scandinavian countries often use generally accepted model contracts. Some countries already employ a lot of standard documents.

Some contracts include complicated measurement and verification, while at the other end of the scale there are contracts that are closer to "gentlemen's agreements". The cost of measurement and verification is estimated to be between 3 and 6 per cent of the total cost.

A legal expert and procurement specialist has been commissioned to investigate the legal aspects of performance contracting. He comes to the conclusion that EPC certainly is a process where public entities have to comply with international rules of procurement and work under competitive circumstances. This means that when public entities are involved, some kind of competitive situation has to take place at the initiation stage of an EPC contract. It is also important to avoid conflicts of interest.

Pre-qualification and a *two-stage process* seem to be a suitable solution, [Figure 5](#).

In this process, competition is included at the beginning with pre-qualification and the possibility to award a *contract conditionally*, giving the contract parties the possibility to step out after checking the conditions that have been presumed in a pre-audit produced by a consultant at an earlier stage.

Contacts about public procurement have been initiated with different legal bodies, including the European Commission DG Market. The work on procurement and process is planned to continue during a new subtask of Task X.

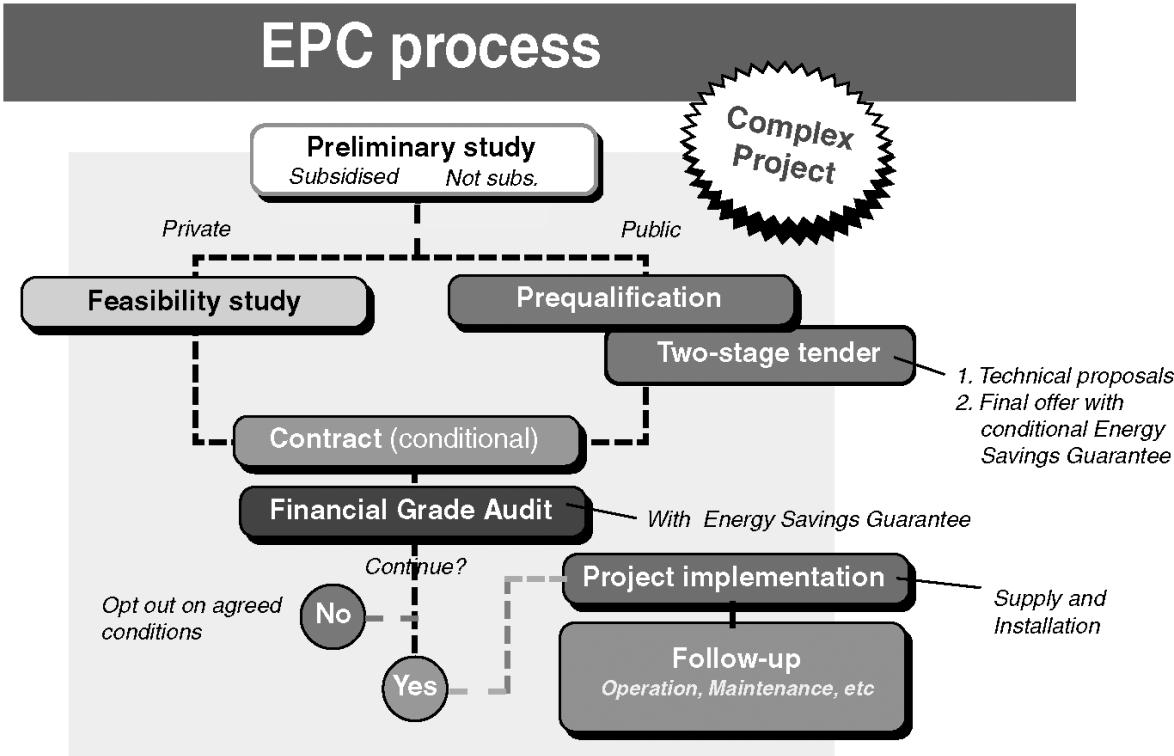


Figure 5. Suggested EPC Process Principles

Actions

Based on the barriers identified, cases and lessons learned submitted in the Country Reports, actions have been suggested.

In an overview, [Figure 6](#), problems, short-term actions and long-term results have been illustrated. The problems and actions are within the areas: Credibility and Trust, Process and Procurement, Contracts, Financing, Measurement and Verification, and Market. The role of public organisations is crucial for raising credibility, establishing procedures for procurement and contracts and for initiating a major increase of the market.

Problems	Short term actions	Long term results
1. Credibility and Trust	Information SAVE, Best Practice Creation of networks Demo projects World EPC Conference "Success stories"	World EPC network established "ISO 18000" Energy management Accreditation Intern. ESCO Association
2. Process & Procurement	Network of skills created Energy Agency, FEMP Clarification of rules Guidelines Alt. with energy audits and feasibility study Prequalification & two-stage tender Conditional Award of Contract	Different alternatives for initiation of EPC-projects accepted by all stakeholders Both Owner, Energy Agency and EPC-initiated
3. Contracts	Public Property Owners establish national standards as FEMP in USA EC, WTO	"FIDIC" Energy perform. contract conditions finalised Manuals (web & printed) for EPC-projects generally available
4. Financing	Bank awareness Local government allowed to enter multiyearcontracts EBRD & World Bank National economic incentives Government guarantees Warranty formulations Insurance arrangements	White and Green Certificates Trading an accepted mechanism for Climate Actions EPC Performance Bonds established
5. Measurement & Verification	Analysis of existing protocols Pilot projects Simple benchmark-alternatives Yearly measuring	Simplified benchmarking and repeated measuring routines established
6. Market <i>Only limited in most countries but increased interest</i>	Start of breakthrough for EPC in many OECD-countries Public bodies launch EPC comp. – both large projects & parts of smaller	EPC-solutions have penetrated OECD.countries and are increasing in transition & developing countries

Figure 6. Introduction and diffusion of EPC: Problems – Actions – Results

The EC SAVE Study, earlier mentioned, suggested the development of guidelines for public organisations in their decision-making process. Pilot projects would contribute valuable experiences for formulation of benchmarks and management advice.

The process and contract contents have also been outlined (Leutgöb et al, 2000).

The European Commission has taken actions in the communication on the implementation of the first phase of the European Climate Change Programme with initiatives and proposals for directives, such as:

- Proposal for a Framework Directive for Minimum Efficiency Requirements for End-Use Equipment.
- Proposal for a Directive on Linking Project-based Mechanisms including JI (Joint Implementation) and CDM (Clean Development Mechanism) to EC Emissions Trading Scheme.
- Proposal for a Directive on Energy Demand Management.
- Initiatives on increased energy-efficient public procurement.

The new Proposal for a Directive of the European Parliament and of the Council on the Promotion by Energy Suppliers of End-Use Efficiency includes among others new services and programmes, energy audits, EPC, TPF and other market-based financial initiatives.

It is now important for all parties to come together and agree on priority actions in order to create conditions for a major breakthrough for EPC arrangements.

During a suggested continuation of Task X “Performance Contracting”, some areas would be further studied in depth. Meanwhile, the countries will proceed with national actions and demonstration projects. More lessons learned will be formulated if the work is to be continued.

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