EESI – European Energy Service Initiative: Challenges and Chances for Energy Performance Contracting in Europe

Short Study
April 2010

Authors:
Susanne Berger
Moritz Schäfer
Abstract

According to the European Commission, more than 20% of EU’s energy consumption is wasted through inefficiency. A large part of the available energy saving potential lies within buildings. This potential can be effectively targeted using energy services and other energy end-use efficiency measures.

Market based instruments are very effective tools to tap large economic saving potentials. Energy Performance Contracting (EPC) is such a tool. In an EPC project, an Energy Service Company (ESCO) provides its know-how and financial resources to implement adequate energy efficiency measures and takes on the performance risk to ensure that the stipulated energy savings are achieved. The investment is refinanced through the savings achieved. Good practice examples such as the Berlin Energy Saving Partnership outline the advantages of EPC.

The European Energy Service Initiative (EESI) broadly promotes the implementation of EPC, contributing strongly to the establishment of effective energy service markets in Europe. Results from the current market analysis in selected European countries show the European market for EPC as very heterogeneous. Some countries have well developed markets with several large ESCOs acting in it. Other countries are at a very early stage of development while some can already be characterized as emerging markets.

This paper highlights the status quo of EPC in selected countries and discusses challenges for European market development and contains an overview about the chances of future perspectives of advanced EPC.

1. Energy efficiency in Europe

According to the European Commission, more than 20% of EU’s energy consumption is wasted through inefficiency. In times of rising energy prices and global climate change this waste of energy is economically, environmentally and socially unjustifiable. The growing energy import dependency, depletion of fossil fuels and the fear of energy shortages foster the need for a considerable increase in energy efficiency. Next to expansion of renewable energies, energy efficiency is the major key for a more sustainable energy supply in the future. An increase in energy efficiency leads to improvements in energy security and to the establishment of future-oriented markets for energy efficient products and technologies.

For this reason, the European Parliament and the Council adopted the Directive on Energy End-use Efficiency and Energy Services in 2006. One of the crucial points of the directive is the target of energy end-use reduction of 1% per year [1]. All member states were required to set up national energy efficiency action plans (NEEAP) to use as a strategy to reach saving targets. The directive sets energy saving targets for the Community of 9% until 2016. Parallel to the Directive, the EU published the Action Plan for Energy Efficiency which serves as the strategic framework for tapping energy saving potentials. Energy efficiency is clearly marked as the “key element in Community energy policy” [2]. The realization of energy saving potentials using energy services is a cost-efficient way to secure a more sustainable use of energy and reduce carbon emissions.

A large part of the available energy saving potential lies within buildings. Energy efficiency in buildings leads to budgetary savings and contributes to climate protection and security of energy supply. For the implementation of energy efficiency, various instruments can be applied. Market based instruments are a very effective tools to tap large economic saving potentials in public buildings and in industry. Energy Performance Contracting (EPC) is such a tool. In an EPC project, an Energy Service Company (ESCO) provides its know-how and financial resources to implement adequate energy efficiency measures and takes on the performance risk to ensure that the stipulated energy savings are achieved. The investment is refinanced through the savings achieved.
2. Energy Performance Contracting - cost-efficient energy savings

Energy Performance Contracting means operating (and financing) procedures for the provision of building-specific energy services. These procedures aim at saving energy and cutting costs by modernising and optimising necessary functions of building automation installations and entire buildings.

![Diagram of Energy Performance Contracting](image)

Fig. 1: Scheme of Energy Performance Contracting

Energy Performance contracting (also called energy saving contracting) as shown in Figure 1 deals with the optimisation across trades of automation installations in buildings and building operation by an ESCO in the form of a co-operation based on partnership. The aim is to achieve the guaranteed improvement of results in particular with regard to economic efficiency, energy saving, net asset value of the buildings and building conditioning. The main distinguishing feature is the financing of the investments via the guaranteed cost savings achieved through improved energy efficiency within the terms of the contract. Performance components of the ESCOs are financing, planning and installation of components for energy generation, distribution and usage as well as their operation and maintenance. Integration and training of the users are usually part of performance contracting. The remuneration for the services consists of a payment which is determined in dependence on the savings achieved. Fields of application are objects of existing buildings, the most favourable customer group in Europe is the public sector. Several buildings may be combined into a building pool.

3. Market overview and current situation of EPC in selected European countries

The European market for EPC is very heterogeneous. Some countries have well developed markets with several large ESCOs acting in it. Other countries are at a very early stage of development and some can be characterized as emerging markets.
3.1 Further developed European EPC markets

Within the diverse market situation for energy services, Germany and Austria are certainly the pioneers for Energy Performance Contracting in Europe. Both countries have high market standards and a constant market development with a relevant number of ESCOs acting on it. In the last years many successful EPC projects have been implemented.

Germany has a growing market for Energy Services and is one of the frontrunners for developing the European market for EPC. There are already high market standards and consistent market volume and growth for both primary types of contracting - Energy Performance Contracting and Energy Supply Contracting. There is an immense economic usable potential with about 1.4 million buildings or objects for Contracting, but only between 5 - 7 % is currently used. For the future the annual turnover is roughly estimated between €1.8 and €4.5 billion in 2010.

In the last 10-15 years EPC has become a popular tool Austria to optimise and modernise federal and municipal buildings. Since then, more than 1,000 buildings have been energy-optimised with this tool. Most of these contracts are still active and successful. One remarkable point, however, is that nearly all of these buildings belong to the public (federal and municipal) administration.

In Sweden some 50-60 municipalities out of 290 have carried out EPC projects. In addition, a number of county councils and regions have carried out EPC projects. A survey of some 20 public property owners who had used EPC found that the average saving achieved was 22% of energy end-use, although individual projects varied between 17% and 66%. Since only a small percentage of the total area of Swedish public property has been included in EPC, the potential is deemed great in the public sector.

The very ambitious French energy policy has been defined in a general environmental law called “Grenelle” including building refurbishments to achieve 38 % savings goal by 2020. Energy Performance Contracting is clearly quoted as a solution to implement. The Grenelle law gives ambitious energy performance objectives for building renovation, but the investment capacity of public bodies is poor and the amounts needed represent several billion Euros. Although the total number of companies offering EPC is around 500, the French market is characterised by a strong concentration of actors, with only three large ESCOs dominating the market. Energy performance contracting is difficult for public bodies, due to public contracting regulations. The “Grenelle” law asks to solve these difficulties, but other laws to change these regulations have to be enforced. This is a real opportunity to develop EPC, but support is needed for public bodies for these new procedures. Experimentation will help to give good practice examples.

The EPC market in the Czech Republic can be characterized as moderately developed in the sense that the ESCOs have a good knowledge and experience in carrying out EPC. Nevertheless, still the number of projects is not high and there are no rules for EPC implementation in the public sector (namely institutions run directly by the state). So far most projects have been realised in the public sector, more specifically in the education and health care facilities. The first EPC projects were carried out already in 1993. Since then, some 150 to 200 EPC projects have been already realized.

3.2 Less developed and emerging European EPC markets

The Norwegian EPC market is immature and small. There have been sporadic occasions of EPC or similar projects over the last 15 years. Various companies have offered versions of “energy saving with guaranteed results”, but the market response has not been high. Some pilot projects on outsourcing or result based contracts have been initiated through an EU/SAVE project, mainly in the private sector, but the contents differ from the EPC concept as defined by EESI. Low energy prices over the last few years and expected for the coming years result in low interest in energy efficiency measures, and the recent financial crisis has lead to less interest from the banking sector. Focus on climate both in media and in municipalities through Climate plans (not mandatory but strongly encouraged) however leads to focus on energy use in public buildings, where EPC can be a strong tool. The main barriers are lack of knowledge, time and trust in EPC. Establishment of EPC projects
is time demanding. Marketing of success stories and templates and training will counteract these, and funding for project establishment would be a strong positive force in developing the market.

The Romanian ESCO market is in an “embryonic state”, with few companies willing to enter the market. Currently there are two companies - one specialized in electricity and the other in thermal services - which qualify as private ESCOs that offer pure EPC solutions. In addition, there is one ESCO-type company chiefly working with CHP projects. In spite of efforts, the ESCO market has not been able to get off the ground because of a number of strong barriers. These are mainly the lack of knowledge and awareness and the lack of off-balance sheet solutions in the municipal sector. Furthermore, banks in Romania are still lacking the internal expertise to evaluate energy efficiency projects.

4. **Good practices**

The City of Berlin in partnership with Berlin Energy Agency (BEA) developed in 1996 the so called “Berlin Energy Saving Partnership” (ESP), which offers efficient refurbishment of public buildings with the pivotal advantage to release building owner of any investment costs. Due to releasing building owners from expenses and delivering savings immediately, ESPs are very successful. An Energy Service Company (ESCO), which is to be determined through tendering, finances and implements appropriate energy saving investments to achieve pre-defined energy and cost reductions. In their bids, ESCO’s put together their investments targeted at delivering specified energy savings and respective CO2-reductions.

Until today, 1,300 buildings shared on 24 EPC contracts have been upgraded, delivering CO2-reductions of nearly 68,000 t/a. With these investments total guaranteed cost savings of about € 11.3 m or 26% of usual energy costs (baseline) were realised. So far, ESCOs have invested about € 49 m to refurbish different hardware components. To this objective, so-called Energy Performance Contracts (EPC) are set up between building owners and ESCOs. In average, ESCOs applying for retrofit tenders agree to realise annual savings in energy costs of 26%. To achieve this target, different hardware components such as automatic control engineering systems, heating control systems, lighting systems, ventilation and air conditioning systems can be installed. A further service is consultancy on consumer behaviour. BEA also assists building owners and ESCOs to decide on terms of repayment to ESCOs. Average payback periods are 8 to 12 years.

In Berlin the first EPC contracts have expired and went for a re-tendering. With the experience of the first years EPC has developed to a sustainable and well-established model. With the realisation of successful projects and the presentation of good-practice examples EPC gains more and more attention and interest.

5. **Challenges for EPC**

A large part of the available energy savings potential that exists today lies within buildings. A large share of this potential can be effectively realised using energy services and other energy end-use efficiency measures. It was stated before that the cost effective energy savings potential in Europe is 20%. The market for energy services does not show the volume that could be expected based on the available potential.

The lack of information and deficits in know-how with respect to EPC are probably the biggest challenges. Many potential customers do not know or mistrust the advantages of EPC. Energy Performance Contracting has a degree of complexity to it that asks for a well-balanced agreement between the customer and the ESCO in order to become a win-win project. It asks for both technical and economic know-how and understanding. Often, interested potential customers do not have enough experience to develop adequate tender documents and specifications in order to get a best offer, or they do not have the staff capacity to do so. The complexity of EPC is often misjudged. The
integration of experienced consultants and project developers helps to avoid problems and uncertainties.

The experience of some EPC projects shows that support efforts of the customer were often estimated too low. In many projects several single adjustments were necessary. This is a crucial element for the acceptance of EPC projects within the institution. In general, external support by project consultants leads to fewer efforts for the customer and a more transparent view on project tasks. Energy agencies, other experts and mediators can support the building owners in the decision process to start with project preparation for EPC or other TPF model and to give support during preparation and implementation phase. Guidelines, standards, expert events and dissemination activities will support the further market penetration of energy services and the motivation of the building owners.

Connected to uncertainties, standardisation is an important element. Standards carry the potential to increase trust on all sides because they increase the procedural transparency. In addition, experience shows that tested standards do help in reducing transaction costs not only on side of the customers, but also for the ESCOs.

The long project durations and the internal settlement (running costs vs. investment costs) play a mayor role for the initiation of an EPC project in public institutions. Especially the management level opposes contract durations of more than five years. Investments in energy saving measures are always in competition with other investments. Some customers would appreciate a more flexible model.

A further aspect is the mere financial focus. Many municipalities perceive the EPC model only as a financing instrument. The measures of the ESCO that exceed the financing of installations and the optimisation of operation management - a major contractual service - are often disregarded. The energy saving guarantee is ignored by the customer assuming that self-realisation is more cost efficient. This assumption is the main reason for small and medium municipalities to decide against EPC projects. Due to bottlenecks in financing and a shortage of qualified personal an internal implementation of energy efficiency measures fails in most cases and saving targets are not met.

Probably the strongest driver for EPC lies in increasing energy prices and the resulting need for energy efficient modernisation. EPC is a low risk and cost efficient way for the refurbishment and optimisation of energy systems in buildings. Not only energy costs but also greenhouse gas emissions can be reduced. This is an important issue with regard to climate protection targets and the role model function of the public sector.

6. Advanced EPC: possible approaches for the extension of EPC

Although there are different development stages of classical EPC in Europe, especially countries with existing experiences in EPC start to develop advanced EPC to have a larger variety of the model for special customer needs.

EPC plus:
Many potential customers have the necessity to integrate building refurbishment measures. Within the classical EPC model measures in thermal insulation are basically excluded (too long payback periods due to high investment costs) and show the missing flexibility of the model. Buildings with a high demand for refurbishment are therefore in most cases not suitable for EPC. The reduction of heat demand of the building would lead to synergies with respect to the smaller dimensioning of technical installations (and hence less investment costs). The combination of building refurbishment and the modernisation of technical installations (EPC plus) leads to maximal energy savings and a short-term implementation of a larger package of refurbishment measures. The costs for the building refurbishment could be paid as building cost subsidy also in combination within public programs for building refurbishment.
Green EPC:
Beside energy efficiency the use of renewal energy sources is a main element of the EU’s climate protection package 2020. Currently just a very minor part of the measures realized by classical EPC, there is a customer need upcoming to have more REN measures realized within EPC projects. This development is also triggered by legislation such as Renewable Energy Heat Law (EEWärmeG) in Germany. Barriers to realize use of renewable energy in EPC are based on missing economic feasibility but also on missing links between existing subsidy schemes for REN use and the model EPC. Furthermore technical standards and realistic objectives for tenders have to be developed.

Another target that will be considered by the development of advanced EPC is a switch from final energy consumption as main basis of the performance guarantee to a guarantee on the reduction of primary energy consumption and environmental aspects, following the idea of EPC as a climate protection instrument.

EPC light:
Another model containing the main feature of EPC – the performance guarantee – is to combine the operation and energy management optimization of a building with guaranteed saving targets. Within this model no or just short investments in energy efficiency measure are realized. The focus is the operation of the building following the requirements of energy saving. Another part of this model is the integration of customers for energy saving by user motivation. EPC light is an adequate follow-up instrument for classical EPC avoiding growing energy use after the EPC contracts duration. It may also be the right model for new buildings with no investment needs but missing personnel and know-how for efficient energy use.

7. The EESI project
The European Energy Service Initiative (EESI) will broadly promote the implementation of EPC, thus contributing strongly to the establishment of effective energy service markets in Europe. EESI will make use of existing standards and tools for EPC and other energy services, which were developed and have been successfully tested in earlier European projects such as ClearContract and Eurocontract.

Local and regional capacity-building will be achieved through national online-help desks, frequent training events for local authorities, companies, and multipliers, as well as consultancy for applying and advancing EPC-standard procedures and instruments in concrete pilot projects. The promotional campaign will imply the integration of EPC issues in national trade fairs and the high-profile annual awarding events of the “European Energy Service Award”.

EESI will make a strong contribution to the further establishment and implementation of standardised EPC models in Europe. This will underline the potential of EPC as a prime instrument for the implementation of the Energy Service Directive, for the respective National Energy Efficiency Action Plans and for the further development of a European Energy Service Market.

The main target groups are representatives from public sector real estates and other decision makers in local administrations with respect to communal building stock. These are representatives from the Finance Department, Authorisation Department, Planning and Housing Department, Private real estate companies, and other public building users.

In accordance to the schedule of EESI, the key actors of the initiative are differentiated into three groups. The first group is composed of ESCOs, Energy Agencies, and Financial Institutions which are indispensable for an effective implementation of EPC projects. The second group of key actors are policy-makers on national and European policy level who will be addressed with regard to the policy recommendations derived from the national activities.

With regard to a wider dissemination and promotion of the project results the third group of key actors are possible multipliers such as Environmental and Climate Networks, National ESCO Associations, Energy Agencies, and Energy Consultants.
Expected Results:

- Intensive information and capacity building of local and regional decision makers for EPC
- Model documents for participating countries
- EPC help-desks in all partner countries
- Further development of the energy performance contracting scheme towards building envelope refurbishment
- Implementation of a quality standard for EPC projects
- Assistance of 24 EPC pilot projects, including 6 projects with advanced EPC standards
- CO₂ savings of 12,000 t per year

8. References
