



Energy Efficiency Services
Market development
Energy and energy service companies

Task 2.1: Status and development of the energy efficiency service business in 18 EU countries

Change Best: Promoting the development of an energy efficiency service (EES) market – Good practice examples of changes in energy service business, strategies, and supportive policies and measures in the course of the implementation of Directive 2006/32/EC on Energy End-Use Efficiency and Energy Services.

A project supported by the Intelligent Energy Europe Programme of the European Commission (IEE/08/434/SI2.528383).

A main objective of the Directive 2006/32/EC on energy end-use efficiency and energy services (ESD) is to stimulate the market for energy services and for the delivery of other energy efficiency improvement measures to final consumers. In order to achieve this objective, the ESD gives a special role to energy distributors, distribution system operators and retail energy sales companies. On the other hand, there are different types of "pure" energy service companies (ESCOs) in the market ready to expand their business in the field of energy efficiency services (EES).

Against this background, it is important to know, how and to which extent the EES market could be further developed, what are appropriate business strategies and promising services not only for "advanced" companies but also for "beginners", what is a policy framework suitable to stimulate market development and to overcome existing barriers, and which role energy companies developing towards sustainable ESCOs could play.

The main objectives of ChangeBest are:

- to assist energy companies and ESCOs in entering the B2B and B2C market for EES,
- to contribute to the development of the EES market as part of the implementation of the ESD,
- to demonstrate good practice in implementing the ESD.

In order to achieve the objectives specified, the project work will consist of:

- empirical analysis of the EES market and the respective economic and policy framework in the course of the implementation of the ESD,
- exchange of experiences, national workshops and a European conference,
- a large bundle of promising EES business cases and strategies implemented in "field tests",
- communication and dissemination activities, and
- induced further action and networking by energy (service) companies.

Milano, 29 April 2010

Project Partner	Country
Wuppertal Institute for Climate, Environment, Energy	Germany
e7 Energie Markt Analyse GmbH	Austria
SEVEn	Czech Republic
ESB - Energy Saving Bureau	Estonia
ARMINES	France
EDF – Electricity of France	France
ASEW -	Germany
ULUND - Lund University	Sweden
HELESCO S.A.	Greece
eERG - Politecnico di Milano - Energy Department	Italy
Ekodoma	Latvia
ISR – University of Coimbra	Portugal
ECN - Energy research Centre of the Netherlands	The Netherlands
BSREC - Black Sea Regional Energy Centre	Bulgaria
Energy Piano	Denmark
REACM - Regional Energy Agency of Central Macedonia	Greece
KISE - Krakow Institute for Sustainable Energy	Poland
CESYS - Center for Energy Systems	Slovakia
IJS - Jozef Stefan Institute – Energy Efficiency Centre	Slovenia
ESCAN, S.A.	Spain

Project coordinator:

Wolfgang Irrek

Wuppertal Institute for Climate, Environment, and Energy
Döppersberg 19
42103 Wuppertal, Germany
E-mail: wolfgang.irrek@wupperinst.org

Author:

Nicola Labanca

Company name: eERG – Politecnico di Milano – Dipartimento di Energia
Address: Via Lambruschini n. 4, 20156 Milano, Italy
E-mail: nicola.labanca@polimi.it

The authors are solely responsible for this publication. It does not represent the opinion of the European Community and the European Community is not responsible for any use that might be made of data appearing therein. Access to and use of the contents in this publication is at the user's own risk. Damage and warranty claims arising from missing or incorrect data are excluded. The authors bear no responsibility or liability for damage of any kind, also for indirect or consequential damages resulting from access to or use of this publication.

Table of content

Executive summary -----	5
1 Introduction -----	8
<i>1.1 The energy efficiency service and associated terminologies: definitions</i> -----	9
1.1.1 Energy services and energy efficiency services -----	9
1.1.2 ESCOs, energy companies and EES providers -----	10
2 Brief overview of the EES markets and their market players -----	12
<i>2.1 EES market situation in the countries considered</i> -----	12
<i>2.2 Number and types of EES providers</i> -----	16
<i>2.3 (Potential) competitors and (potential) partners in the EES markets</i> -----	24
3 Analysis of market segments and opportunities for Energy Companies and ESCOs -----	29
<i>3.1 Existing EES market offer sector by sector</i> -----	29
<i>3.2 Positioning of Energy Companies and ESCOs in the different demand sectors</i> -----	36
<i>3.3 Positioning of energy companies and ESCOs in the EES product value chain</i> -----	39
<i>3.4 Analysis of potential needs for EES in the different demand sectors</i> -----	44
3.4.1 Potential needs for EES by country and sector/customer group-----	44
3.4.2 Technology/ fields of application for new and promising EES-----	46
<i>3.5 Energy Efficiency Service financing and contracts</i> -----	50
<i>3.6 Most commonly adopted and promising marketing strategies</i> -----	57
4 EES product and business strategy good practice examples -----	64
5 References -----	73

Executive summary

A cross-country analysis of the energy efficiency business in the 18 countries and regions participating in the ChangeBest project has been performed based on the 18 country reports on the EES markets in these countries and regions as produced by the project consortium.

The main objective of this analysis has been highlighting similarities and differences in the national EES markets considered and providing EES product and business strategy good practice examples to be possibly used to develop promising market strategies, innovative EES and specific business cases to be tested during the ChangeBest project implementation. This objective has been achieved first of all by making a qualitative comparison of the different national framework conditions (e.g. national legislations, status of the national economies, degree of energy market liberalisation, energy prices, etc.) and of the EES provider types existing in each country. Then the possible relationships that have or can be established among the EES market players acting in the various countries, the existing EES market offer for the various customer groups and the positioning of ESCOs and energy companies in the different demand sectors and in the EES product value chain have been compared. Finally, the potentialities for new and promising EES, the EES financing typologies mainly used and the most commonly adopted EES market strategies in each country have been illustrated. A summary of the 41 EES product and business strategy good practice examples described in the country reports is provided in the last report section.

The analysis performed indicates a significant heterogeneity among the various national EES markets because of the markedly different national framework conditions and the different history of these markets. Clearly, the different national framework conditions and the different history of these markets also determine a different EES market development status, different EES providers acting on these markets, different relationships among these providers and different needs in terms of energy policy instruments or commercial initiatives that may be undertaken to foster EES market development in the various countries.

Whereas the country analyses performed depict the EES markets existing in Germany, Denmark and Flanders as *well developed*, these analyses seem to indicate a *moderately developed* EES market in France, Italy, Sweden, the Netherlands, Czech Republic and Austria. On the other hand the EES market is described as *not well developed (or emerging)* in Portugal, Spain, Latvia, Slovakia, Slovenia and as *at a very preliminary development stage* in Estonia, Poland, Bulgaria and Greece. Concerning the existing EES offer for the various demand sectors and customer groups, data and information provided by the country analyses indicate that local administrations, industry and hospitals are the customer groups for which a better developed EES market seems to exist in the geographical area covered by the 18 countries, whereas the EES markets in public housing, the retail and the residential sectors are averagely ranked at the lowest development stage. The EES

market for ESCOs appears in general as more developed than the EES market generated by energy companies in all demand sectors, excepting the residential one where the energy company EES market seems to be more developed on average. The same data and information give also the impression that the ESCO activity level has achieved a higher development stage with respect to the energy companies' one particularly in the sectors of health/hospitals, public housing, industry and universities. Concerning technologies and fields of application for EES, energy efficiency improvement measures addressing building envelope insulation and heating systems, outdoor and indoor lighting, renewable energy (e.g. biomass and solar) technologies are the sector cross-cutting technologies mostly indicated in the country reports as typically addressed for the provision of EES. Concerning the positioning of EES providers in the EES product value chain¹, the identification of measures and their implementation are obviously the EES value chain stages which EES providers mostly focus on in the geographical area covered, whereas financing and saving measurement and verification are the value chain stages less frequently considered by these providers. The country analyses performed also confirm that energy companies are typically more involved in awareness raising activities than ESCOs, whereas on average ESCOs are much more focused than energy companies on all the other value chain stages (notably on energy saving measurement and verification and on optimisation of technical operation).

In general a potential for new and promising EES has been highlighted for all the main sectors/customer groups in all the countries considered, notably for EES related to the building sector. The present document provides a short description of those EES depicted as the most promising in the various countries.

Concerning EES provider financing, the most common financing and contract typologies adopted in the various countries are illustrated in this report. This overview indicates that EES provider financing and third party financing is now a common practice in several countries. Nevertheless the various financing opportunities offered are typically guaranteed by the borrower's private assets and the risks for energy efficiency projects are rarely transferred to EES providers or to other financing bodies. Energy Performance Contracts (EPCs) are still rare in several countries. One problem with EPCs concerns the guaranteed performance that should be provided by EES companies. This often demands reliable monitoring of energy savings achieved, for which comprehensive and therefore costly and time consuming measurement protocols need to be set up. Another typical problem that emerged with EPCs are the risks that EES companies are running associated with accounts receivables. Since the payments to be received from EES customers have the risk of default, a special

¹ The very heterogeneous shapes of EES products can be categorised into the consecutive stages of a "value chain" of EES products. Such stages are: awareness raising, information and energy advice, identification of measures, technical planning, financing and subsidies, implementation (operation, supervision), optimisation of technical operation, saving measurement and verification.

'guarantee fund' raised by the government could typically be a way to reduce this risk.

Finally, the various marketing strategies adopted by EES providers in the countries analysed have resulted to depend mainly on the *national framework conditions*, the *EES market development status* (as e.g. marketing strategies adopted in well developed EES markets are markedly different from marketing strategies applied in EES markets that are in a preliminary stage of development), the *EES provider internal framework conditions* (as e.g. larger EES provider company structure and market approach will be typically different from smaller EES provider ones', as well as EES providers whose core business is energy supply will approach the EES market in a different way with respect to EES providers whose business is concentrated on EES), the *different characteristics of the various customer groups* (as e.g. large and very energy intensive enterprises may require to be approached by EES providers in a different way with respect to e.g. small and not very energy intensive enterprises). A short overview of the main market strategies that may be adopted by different EES provider types for different customer groups is provided in this report.

1 Introduction

This project report presents the outcomes of a cross-country analysis covering the 18 EU countries and regions represented in green in the figure below.



Figure 1: Countries and regions covered by the cross-country analysis

The analysis performed is based on the information contained in the reports produced by the project consortium on the energy efficiency service business existing in each of these countries. The main analysis objective is highlighting similarities and differences in the national EES markets considered and to provide EES product and business strategy good practice examples to be possibly used to develop promising market strategies, innovative EES and specific business cases to be tested under the project Work Package 4. A detailed overview of the EES markets in each of the countries considered can be found in the country reports and is hence out of the scopes of the study presented here. The main research questions answered by this comparative study are: which are the main similarities and differences among the various countries in terms of EES market development status and in terms of types of EES providers acting on the national markets? Which are the relations between ESCOs and energy companies and their relations with other competitors or (potential) partners in the EES markets? Which are the sectors where

a well developed EES market offer do exist and which are the sectors where a potential for new and promising EES can be identified? Which is the positioning of energy companies and ESCOs in the different EES demand sectors and in the value chain of EES products? How are EES mainly financed in the various countries considered? Which are the most commonly adopted and promising EES market strategies in these countries? Answers to these questions have been formulated in the different report sections in such a way they may as much as possible represent useful and practical inputs for the other project work packages and the field tests to be performed during project implementation. The relation between EES market development and the most important policy instruments possibly implemented at the national and EU level as well as the existing economic incentives and barriers to EES market development have not been analysed in this report as these topics are the subject of other two project reports (i.e. task 2.3 and task 2.4 analysis reports).

1.1 The energy efficiency service and associated terminologies: definitions

1.1.1 Energy services and energy efficiency services

In order to carry out this analysis, it is important to have a clear definition of what is meant by an “energy service” and an “energy efficiency service” (EES).

As indicated in ESD an energy service shall be “the physical benefit, utility or good derived from a combination of energy with energy efficient technology and/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 lead to verifiable and measurable or estimable energy efficiency improvement and/or primary energy savings”. This definition on the one hand ties in with the term of “energy efficiency improvement measure”; on the other hand it addresses the different shapes of energy services, which can be understood as an outcome of an active combination of end-use energy, energy-using technology and/or some service elements.

The definition adopted in the framework of the ChangeBest project for “energy efficiency services” sticks instead to the one proposed by the CEN/CENELEC Sector Forum Energy Management (SFEM) Working Group on Terminology on Energy Management and Energy Efficiency which defines as energy efficiency service only the “agreed task or tasks designed to lead to an energy efficiency improvement and other agreed performance criteria”². The CEN/CENELEC definition includes additional requirements which establish that the EES shall include energy audit as well as identification, selection and implementation of actions and verification. Moreover a documented description of the proposed or agreed framework for the

² See the Document CEN/CLC/TF 189 N. 096 of September 24, 2009

actions and the follow-up procedure shall be provided and the improvement of energy efficiency shall be measured and verified over a contractually defined period of time through contractually agreed methods (cf. prEN 15900, which will probably come into force in autumn 2010).

Given the main objective of the analysis performed (i.e. providing a cross-country overview of the various EES market situations in the geographical region covered), given the usually low development status of the existing markets of EES which comply with the above mentioned EES definition, considering that all the *partial activities* connected to these EES which may be accomplished in a country always represent an important factor and pre-requisite for the future development of a proper EES market and consequently represent a fundamental object of investigation, the development status of the national markets of these *partial services connected to EES* (i.e. services which do not necessarily include an energy audit or the implementation of an energy efficiency improvement action or the measurement and verification of the savings achieved through this action³) has often been the starting point and the subject of this comparative analysis. Partial services connected to EES are hence briefly referred as EES in this report for the sake of simplicity, whereas whenever fully implemented EES (i.e. EES which include audit, energy efficiency action implementation and measurement and verification of energy savings) are addressed, this is explicitly indicated in the report.

1.1.2 ESCOs, energy companies and EES providers

Although the definition of *energy service company* (ESCO) adopted under the ESD⁴ is closely related to Energy Performance Contracts (EPCs), we will use a quite wider definition and ESCOs will be identified in this report with "any entity that delivers EES and in doing so takes some kind of financial risk and meets some defined energy efficiency performance criteria".

Energy companies will be *energy distributors, distribution system operators* and *retail energy sales companies* as defined in the ESD.

According to this directive an *energy distributor* is "a natural or legal person responsible for transporting energy with a view to its delivery to final customers and to distribution stations that sell energy to final customers". The ESD establishes that this definition excludes *gas distribution system operators*, which have to be identified with any "natural or legal person responsible for operating, ensuring the maintenance

³ In the framework of the ChangeBest project partial services connected to EES are intended as those services that just include parts or components of the EES value chain but are nevertheless designed to directly or indirectly lead to an energy efficiency improvement.

⁴ The ESD defines an ESCO as "a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user's facility or premises, and accepts some degree of financial risk in so doing. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria".

of and, if necessary, developing the distribution system of electricity or natural gas in a given area and, where applicable, its interconnections with other systems, and for ensuring the long term ability of the system to meet reasonable demands for the distribution of electricity or natural gas". Finally, a *retail energy sales company* is defined in the ESD as " a natural or legal person that sells energy to final customers"

In this report energy companies (i.e. energy distributors, distribution system operators and retail energy sales companies) and ESCOs will be considered as EES providers in so far as they deliver EES.

2 Brief overview of the EES markets and their market players

2.1 EES market situation in the countries considered

The general EES market situation in each of the countries analysed is outlined in this section. For each country the EES market development status is briefly described based on the information available in the related country reports. Where possible the main market drivers have been described in order to provide a very general picture about the existing market situation. These short descriptions of the existing national markets aim at providing the main elements for the interpretation of the more detailed information provided in the next report sections about the EES offer available in these markets, about their main stakeholders and about the existing potentialities for a further EES market development in each country.

The **German** EES market is one of the oldest and most established in Europe. It emerged in the early 1990s and experienced a constant expansion since then. Several national framework conditions supported and support the development of the EES market. Currently, policies and measures within the German National Energy Efficiency Action Plan as well as of the German Integrated Energy and Climate Plan stimulate activities to increase energy efficiency. Next to political framework conditions, rising energy prices have been beneficial for EES measures. However, all these conditions are not sufficiently supporting the development of a broader EES market and there is a need for some additional instruments to overcome existing barriers and obstacles.

Also in **Denmark** EES started being offered long time ago; indeed Danish utilities have performed energy audits and energy efficiency services within the regulation from the Danish Energy Authority for more than 30 years. A wide portfolio of initiatives have been developed which has led to substantial decrease in energy consumption in most sectors. The industrial sector has been in focus all 30 years while other sectors have been in and out of focus. The introduction of the competitive electricity market with unbundling of the vertically integrated electric companies has surely stimulated the EES market development in this country. However the important part of the Danish supportive EES framework seems to be represented by the EES obligations for the electricity grid companies and the Electricity Saving Trust established in 1996.

In **Sweden** the development of the EES market has gone through a series of phases after some pioneering activities in the late 70's. The main drivers behind the current, post year 2000, phase of EES market expansion have been: increasing energy prices, a supporting policy environment, and societal concerns for climate change. The parallel progress of information and communication technologies has also facilitated the market development. The ESCOs have driven the market and created more business opportunities for themselves; it has been them, not the customers, that have taken initiatives for contracting. Though the pioneering stage of EPC has

been passed by now, this could indicate that the market so far has been undeveloped in terms of customer demand.

In **The Netherlands** the supply of EES has historically been either a private activity, i.e. consultants assisting large energy consumers on energy (cost) savings, or a public activity of agencies, public energy distribution companies and social housing corporations assisting small(er) consumers on savings. This was embedded in an array of voluntary agreements between government and the major actors in the field of energy efficiency. There was hardly any room left for the companies specialised in delivering EES in a commercial way and the EES market is still in a take-up phase.

In the **Flemish region** of Belgium the public sector (in particular the governmental ESCO and some piloting cities) is clearly taking the lead in the supply of advanced EES, such as energy performance contracts. In this region, energy distribution companies play a major role in the EES market by subsidising energy saving actions in order to comply with their annual energy saving obligations and their EES offer is very well developed for almost all customer categories, notably for local administrations.

In **Austria** municipalities and – most important – the federal state created a steady demand for EPC through EPC tenders for their own building stock and for street lighting. In spite of this market push from public authorities the EPC market is still comparably limited. The utilities have entered the playing field of EES only as a consequence of the ESD as the federal authorities decided to engage the utilities in target achievement via “voluntary agreements”. However it is also true that utilities wish to include a “service element” into their portfolio in order to improve their competitive position.

In **France** the EES market cannot be considered as mature even if the EES offered e.g. by heating and cooling operators, facility managers and maintainers, building energy management system providers, energy suppliers with partners and subsidiaries involved in the white certificate scheme is varied and mature especially in the private sector. The penetration rates are still small. The State is promoting favourable policies but they have not yet resulted in a well developed EES market.

In **Italy** the first types of energy performance contracts appeared in the early 80's. Since then, the national and European political agendas have placed increasing emphasis on energy efficiency, leading to the introduction of new types of contracts, new players in the market for EES and new energy policy instruments supposed to foster EES market development. In this country, the market for energy efficiency services has developed following a uneven pattern because energy service providers have always privileged large project-sizes as they are more profitable, thereby leaving out large potentials of energy savings existing in smaller realities such as small and medium companies, or households. As of 2005 more than one thousand companies entered the existing white certificate system as auto-certified ESCOs and almost two hundred of them got more than 70% of the white certificates totally issued so far for the energy efficiency projects implemented.

In the **Czech Republic** the EES market can be described as moderately developed. The number of projects implemented is not low considering the rather small dimensions of this country. The main driver stimulating the EES market development in the Czech Republic is not the state, but the energy services companies (ESCOs) and companies that assist their customers in choosing the best energy services provider. Indeed there are practically no measures or political instruments implemented which directly focus on the support of this market.

In **Portugal** the EES market is not well developed, and the market for EES is emerging only now, mainly driven by the obligations established by legislation. In particular the ongoing activities are related to mandatory audits and action plans for industry, the EU Directive on Energy Performance of Buildings (EPBD) and the ESD. Greenhouse gas emissions taxes penalising the most polluting installations are stimulating the EES market by promoting the development of clean technologies. Energy prices as well as competition are other factors motivating especially large industries towards energy efficiency. Only EES related to co-generation have been fully developing since some years because of an attractive feed-in tariff mechanism in place.

In **Spain** the EES market is made of various company types. National as well as local private and public ESCOs constitute this market. The first ESCOs appeared in Spain only after 2000 and provided municipalities and hospitals with EES. Energy optimization plans started being performed mostly at public buildings and at some industries since the 80s and several policy measures on energy efficiency have been developing since the 70's with the institution of the national energy agency "Centro de Estudios de la Energia". However the present EES market size is estimated to be small with respect to existing potentialities.

In **Latvia** the EES market started about 15 years ago, when the first projects on energy efficiency were implemented in the framework of international and European funded programmes. However, only in the last 3-4 years the interest in energy efficiency and in the use of renewable energy sources has considerably grown. EES in Latvia are not well developed and in general the national framework conditions are not sufficient for sustaining a real market transformation. In the last year the main driver stimulating the EES market has been the availability of European structural funds for energy efficiency projects. An additional driver has been the availability of funding from the Ministry of Environment in the framework of the Climate Change policy.

In **Slovakia** the EES market size is at present very small and limited in relation to market players and EES provided; only a few energy consulting companies are indeed active in this market by offering a limited range of EES. No incentives dedicated to ESCO activity are in place in this country. Today, drivers for EES market development are mainly high energy price, state support for specific market sectors and various programmes to promote RES by EU structural funds.

In **Slovenia** the EES market is rather undeveloped and made of a few ESCOs and energy companies mainly operating in schools, multi-apartment buildings and industries. A significant growth of the ESS market is expected in the next years

thanks to EU structural funds, some new regulations taking into account energy efficiency (e.g. new building codes) and special provisions in the Energy Act (e.g. mandatory EES for the energy companies⁵).

In **Estonia** the EES market is poorly developed. There is no common understanding of the nature of EES and the principles of their provision, no relevant contracts have been developed between potential EES providers and energy end-users, the functioning of energy efficiency services has not been tested in practice, nor has any assessment been carried out in terms of achievable energy and economic savings. Support for EES providers is very limited and only unique and outstanding projects receive funding.

In **Bulgaria**, the EES market is in its initial stage of development. The national policy does not hinder the provision of EES, but at the same time does not provide substantial support. The market started its development around year 2000 when the first EES contracts with some Bulgarian municipalities were stipulated. Before that, only a couple of demonstration projects were financed by EU and extra EU countries in the late 1990s. A significant EES market growth is expected in the public sector in the short term.

In **Greece** the EES market is at a very preliminary stage. There are several companies providing energy efficiency services which however do not operate according to ESCOs practices. The deficiency of EES business is blamed on the absence of a positive legal and institutional environment for the initiation and viability of EES provider operation. This includes the lack of clear, straightforward and supportive procurement procedures, and the absence of contractual and administrative guidance for the selection, control and repayment of energy services.

In **Poland** the EES market is at best in an embryonic stage. The national framework conditions in which the EES market is developing is not conducive to its growth. The low energy prices and the high fraction of households income spent for energy consumption represent a barrier to cost-effective energy efficiency investments both for the energy end-user and the EES provider. External subsidies are hence highly needed to stimulate EES market development in this country.

The country analyses performed and documented in the various country reports allow to roughly classify either as *well developed*, or *moderately developed*, or *not well developed (or emerging)*, or *at a very preliminary development stage* each of the national EES markets above mentioned. The figure below indicates which countries may be considered as falling under each of these categories. The very rough classification proposed is based on the qualitative as well as quantitative evaluations available in the country reports about the number and type of existing EES providers, the national EES market size and the existing potentialities' exploitation level in each

⁵ A small tax is charged by February 1st 2010 for all types of energy and fuels (electricity, gas, oil, etc.). Funds collected will be "returned" to energy end users through EES provided by energy distributors and distribution systems operators. However the supporting legal framework for the implementation of this measure has not yet been established and it is not yet predictable which EES energy companies will focus on.

country. Such classification would like to provide a rough indication about the activity level in the field of EES in the various countries as determined by the existing energy policy instruments (e.g. subsidies, energy saving obligations, etc.), the commercial initiative of EES providers and other national framework conditions. As such it does not exclusively refer to the presence of consolidated and competitive *business models* to deliver significant EES activities.

EES market development status in the countries considered

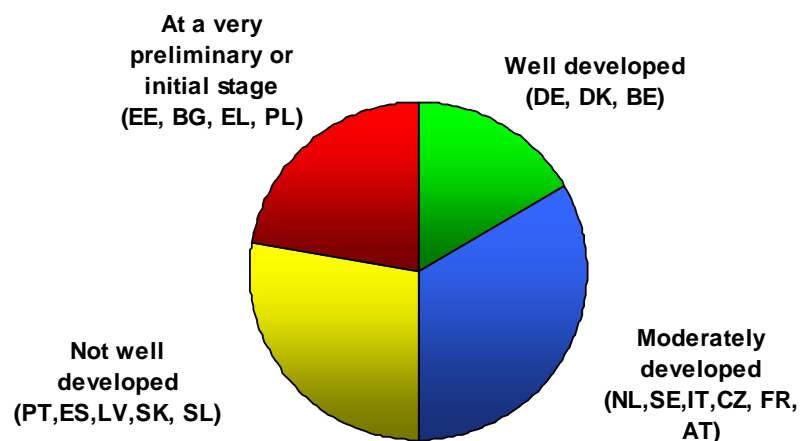


Figure 2: EES market development status in the countries analysed

2.2 Number and types of EES providers

The use and understanding of terminology is crucial when estimating number and types of companies providing EES. Some studies tend to regard energy performance contracting (EPC) as the most important discriminating factor to establish whether a given company should be considered as an EES provider or not (Vine 2005). Other assume that EES being the company core business is another essential prerequisite in order to define a company as an EES provider⁶. In our study we are mainly concerned with highlighting differences and similarities among the countries

⁶ See for example the country report produced by Boonekamp, P. and Vethman, P. under the ChangeBest WP2.1.

considered in relation to EES provision and we have to take into account that the studies so far performed do not always allow distinguishing among the various company categories that might be defined when analysing the existing offer of EES. On the other hand we have to notice that important stimuli to EES market development come also from companies whose core business is not represented by energy efficiency services or companies not usually employing EPC for EES provision and that these company types are hence worthy to be considered in our analysis. For these reasons the overview presented under this section could not always distinguish between e.g. company types mainly operating by EPCs and same company types providing EES without stipulating EPCs, as could not always distinguish between e.g. energy service providers offering EES as their core business and energy service providers offering EES only in combination with other (energy) services. The EES provider being an energy company subsidiary or not is another important characterizing aspect that could not always be considered in the overview presented. When it comes to ESCOs, the definition reported in chapter 1 was considered. Due to the reasons and difficulties above expressed it has not been possible to report the information available for the various countries according to a *same* detail level as it has not been possible in general to illustrate each country situation in the relation to *all* the EES provider types that in principle might operate in the EES market.

That being stated, the national analyses performed indicate marked differences in terms of number and typology of EES providers active in the countries where a well developed EES market exists (i.e. Germany, Denmark, Belgium). Numbers related to **Germany** in particular are quite impressive. In this country about 500 ESCOs and more than 800 energy retail companies offer different kinds of EES together with multinationals and their subsidiaries, as well as regional and cooperative energy companies. Also several energy agencies and NGOs are not only carrying out energy efficiency programmes and campaigns, but offer EES that are fully or at least partly paid by the user. Next to these types of EES providers, there are about 3,200 energy consultant offices organised in associations, several manufacturers of energy efficiency technology offering EES, close to 1,000,000 installers of different crafts offering different kinds of EES, as well as architects and planners whose services could be called EES. In **Denmark** ESCOs seem to play a less important role with respect to energy companies⁷ when comparing the Danish with the German EES market situation. Indeed only 6-8 private ESCOs (half of which established by energy distributors) are active in this country, while the rest of the EES market is made by 90 electricity distributors, 450 district heating utilities, 4 natural gas distributors, 3 NGOs, around 100 consulting engineering or installation companies and the Electricity Saving Trust⁸. In the **Flemish region of Belgium**, energy suppliers only have a

⁷ This might be due, among others, to the fact that the ESCO business is very new in Denmark.

⁸ However it must be mentioned that in general a higher number of companies belonging to a given EES provider category is not necessarily an index of a higher activity level by this category.

limited role in the EES market whereas energy distribution companies play a major role in this same market. The energy distribution companies have obligations concerning EES services to all sectors, e.g. supplying of subsidies for energy saving measures, such as roof insulation, etc. for households and SMEs. Local municipalities are important shareholders in the energy distribution companies and in the frame of this intensive contact, energy distribution companies sometimes play a role of 'ESCO' for municipalities.

Concerning countries with a moderately developed EES market (i.e. the Netherlands, Sweden, Italy, France, Austria and Czech Republic) the market research performed shows that about 50 EES providers deliver energy efficiency as their core business in **the Netherlands**. They are almost all private companies⁹, varying from small to rather large companies and being independent companies or subsidiaries of (large) multinational companies. Some of these multinationals are energy companies, but most of them are companies involved in construction or engineering. Dutch energy companies are hardly involved in the EES market. In **Sweden** a recent market survey identified at least 27 companies that, to various degrees, are engaged in the provision of energy efficiency services by EPCs. While some are doing large amount of business, others are about to start up business units for EES. The types of EES providers, ranging from local and regional to multinational companies, can be divided into the following categories: (1) building controls, automation and control manufacturers, (2) companies within facility management and operation companies, (3) consulting firms, (4) energy companies. Moreover 350 companies are accredited for energy counseling according to the national decree for the implementation of the Directive 2002/91/EC in Sweden and are hence supposed to be active in the EES market. In **Italy** the only quantitative indication about EES providers comes from the annual evaluation reports of the Italian tradable white certificate (TWC) scheme that register a marked increase in the number of companies providing integrated services (i.e. technical planning, implementation, operation and maintenance) for the realisation and possible management of any intervention¹⁰ including EES certified by the TWC system regulator in the period 2005-2009¹¹. Whereas the number of these "ESCOs" was around 200 as of April 2009, the number of electricity and gas distributors somehow involved in the in the EES market because of the energy saving obligation¹² may be assumed to be around 80 as of May 2009. In Italy the large ESCOs have been commonly created by energy suppliers that have wanted to offer additional services to their standard package in view of new developments of the fuel markets (for instance the switch from gas oil to gas for heating purposes) and

⁹ In the Netherlands all ESCOs delivering EES as their core business are privately owned (i.e. there are no public ESCOs).

¹⁰ This is the ESCO definition presently adopted under the Italian TWC.

¹¹ Companies simply accredited as ESCOs according to the definition adopted under the Italian TWC were 1342 as of April 2009.

¹² Obligated electricity and gas distributors may implement certified energy efficiency projects by themselves or buy white certificates on the TWC market in order to comply with their energy saving obligation.

most of the aforementioned 200 ESCOs are actually heating service providers and hence non “pure” EES providers. About one half out of these companies are actually ESCOs according to the ChangeBest definition in the opinion of one of the Italian experts interviewed to perform the country analysis related to Italy. Finally, it is worth mentioning that there exists in Italy a national network grouping all local energy agencies¹³. Such energy agencies represent EES providers often quite active in raising awareness about energy efficiency and energy efficiency opportunities. In **France** about 250 of the facility management and operation companies federated under FEDENE provide EES by EPCs, although this market sector is dominated by two companies (i.e. Dalkia and Cofely). A long list of professionals and installers is involved together with the obliged energy suppliers in the provision of the EES certified under the existing TWC and some consultants participate in the TWC market by aggregating white certificates from different projects and selling these certificates to obliged actors. Moreover some big international companies selling building energy management systems (BEMS) to control and operate equipments and manage the energy flux of a site by using automation and communication technologies started offering EPCs. These new players anticipate the mass installation of smart meters and associated EES that are likely to represent an important part of the French EES market in the future. In the **Czech Republic** there are about 10 EES providers offering EPCs, a couple of multinational companies financing EES, other three companies providing energy efficient facility management and operation and dozens of retail energy sale companies providing EES in addition to energy supply. In Austria almost every utility is providing EES for their clients, and many banks started with EES activities combined with specialised credit lines. Some construction companies and building centres also offer EES. And finally, there is a well-developed ESCO scene for different contracting types. Energy Performance Contracting is dominated by 7 players, with many other players which only infrequently engage in EPC projects.

As far as countries with a not well developed EES market does are concerned (i.e. Portugal, Spain, Latvia, Slovakia and Slovenia), about 10-15 EES providers are currently active in **Portugal** overall. These providers are represented by a few ESCOs (both private and public-private joint ventures), the retail energy sale companies operating in Portugal providing EES in addition to the energy sold, companies specialized in project financing and energy consulting companies mostly dealing with building energy certification. In **Spain** about 12-14 ESCOs provide EES although there is neither a legal framework, nor an official register referring to ESCOs operating in the EES market. These include the national energy agency, one energy distributor subsidiary, a few companies focused on energy efficient equipment installation and building maintenance and operation, a few companies supplying heating from biomass. ESCOs are both national or multinational companies. Energy companies operating in Spain typically limit their EES related activity to information and awareness raising campaigns, although some of them may finance the

¹³ This network is called ReNAEL and was created in 1999 following the European SAVE initiative.

implementation of energy efficiency projects. In **Latvia** EES providers are typically services companies, which implement and organise energy efficiency projects in addition to their usual activities. These are for example installation and maintenance companies of heat and electricity systems, often affiliated with sales of equipment. However in most of the cases, these companies base their business plans on energy delivery or sales of equipment rather than on the achievable energy savings. Only few companies act as ESCO and provide risk management and guarantee on energy savings. Latvian energy companies do not provide EES except information campaigns on EES in very few cases. In **Slovakia** the number of EES providers is below 5. They are private national or multinational companies and their EES activity is mostly limited to energy consulting and energy auditing. Energy companies typically monitor the EES market but do not participate in it. In **Slovenia** 3-5 companies might be considered as EES providers. They are mainly private companies. Some activity in the EES market is also registered by the big energy companies operating in this country.

Finally, concerning countries where the EES market is still at a very preliminary or initial stage (i.e. Estonia, Bulgaria, Greece and Poland), in **Estonia** there are around 120 specialised companies that supply basic energy efficiency consultancy services as energy auditing and energy certification in the framework of a governmental subsidy scheme, several engineering companies offering also passive house solutions and modelling of energy efficient heating systems. Lack of ESCOs might be explained by the relative smallness of the demand side market and the lack of industrial players willing to invest heavily on performance contracting. ESCOs are the only EES providers existing in **Bulgaria**. The energy companies are generally not interested in EES. The number of companies that offer EES is large (possibly more than 100), but the number of companies that have realised projects as ESCOs is much lower. There are only 4 companies that are well-known with their successfully realised projects and all of these companies are private. In **Greece**, up to date the energy market is operated by a significant number of EES provider companies which however do not undertake any financial risk in providing their products or services. Two companies are operating as ESCOs, while two big utility companies and one transmission system operator perform occasional activities related to awareness raising on EES. As of 2005 nearly 15 private ESCOs were active in **Poland**. However 11 out of these companies are registered as ESCO but they are not using the ESCO typical schemes. They typically offer their EE products in BOOT¹⁴ form or just lease them. The situation may change if the proper definition of ESCO will appear in the Polish legislation. There are no public ESCOs in Poland, however public-private cooperation involving ESCOs is slowly being developed. Independent specialists and analytical companies which have proved experience in the restructuring of the Polish energy sector and in the modernisation in the industrial sector play a significant role

¹⁴ This contract (Build-Own-Operate-Transfer), may involve an EES provider designing, building, financing, owning, and operating the equipment for a defined period of time and then transferring its ownership to the client. These are long term supply contracts where the service charges include capital and operating costs recovery as well as project profit.

in the EES market. NGOs provide many initiatives mostly to raise the awareness of society about energy efficiency.

The table below summarizes the information collected about the number and type of EES providers existing in the various countries. As already mentioned the information reported for the different countries is not homogeneous and the quantitative indications reported in the table are restricted in some cases to EES providers for which EES represent the core business (see for example the Netherlands) or offering specific EES (e.g. EES supplied by EPCs). It might also have happened that information related to particular EES provider types playing a minor role in a given national EES market has not been provided in the country reports used as source of information. Data reported in this table have hence to be considered as a very rough indication about the actual EES market situation in the various countries, also because this market situation can change rapidly and alter the number and types of market players acting therein. Finally it should be noticed that ESCOs may in general play the role of other EES provider categories or vice versa (e.g. part of the ESCOs business may be represented by facility management and operation companies' business or vice versa). Therefore a same company may have been counted twice in the table below.

Table 1a: Number and types of EES providers in the countries considered – Part 1

EES provider typologies	DE	DK	BE (Flanders)	SE	NL	AT	FR	IT	CZ	PT	ES	LV	SK
Restrictions for the information provided			Mainly EPC providers	Mainly EPC providers	Full EES as core business		EPC providers		EPC providers				
ESCOs	About 500 (10-15 EPC)	6-8	20-30	12-15	8 (assume financial risk)	About 70 (17 EPC)	Tens	About 100	About 10	Few ESCOs offering only EES	12-14	Few ESCOs assuming financial risk	Less than 5
Retail energy sale companies	>800	About 450	1	9			About 50 TWC system obliged parties and subsidiaries	Hundreds of operators	Dozens of energy supply companies offering EES without EPCs	4	About 3-4		
Energy distributors		94	2			At least 4		About 80 as of May 2009					
Energy/governmental agencies and NGOs (e.g. publicly financed advice centres)	Several	4	1		1			Network of local energy agencies					11
Associations of EES providers	2					At least 1		3					
Manufacturers of energy efficient technology	Several			6								Some	
Consulting engineering, installation companies, facility management and operation companies or other technical organisations	About 1,000,000	About 100	Several hundreds	About ten	10 (assume financial risk)	At least 3	About 300	hundreds	5	Several companies dealing with building energy certification	About 5	Some	Some
Other			2 banks	350 companies accredited for energy counseling	2 companies owned by energy companies assuming financial risk	At least 4 banks and 3 construction companies	Banks, consultants aggregating TWCs			Some companies specialised in project financing			

Table 1b: Number and types of EES providers in the countries considered – Part 2

EES provider typologies	SL	EE	BG	EL	PL
Restrictions for the information provided					
ESCOs	3-5		4-10	2	4
Retail energy sale companies	few big energy companies	1		2	
Energy distributors				1	
Energy/governmental agencies and NGOs (e.g. publicly financed advice centres)				1	Some
Associations of EES providers					
Manufacturers of energy efficient technology				Some	
Consulting engineering, installation companies, facility management and operation companies or other technical organisations	45 energy auditors	About 120		Few hundreds	About 10
Other					

2.3 (Potential) competitors and (potential) partners in the EES markets

Companies from different sectors already address parts of the market demand for energy efficiency services. However, these potential competitors can also be gained as potential partners. Moreover the presence of any workable competition between the different market actors (e.g. energy suppliers, ESCOs, installation contractors, energy consultants) may serve or may have served to develop the EES market in some sectors. This section aims at providing a short overview of the typical market relationships that may be established among the various market actors involved in EES provision and about the main factors determining or influencing these relationships.

Competition and partnerships in the EES markets may be determined by various external (e.g. national legislation, energy market liberalisation status, etc.) and internal (e.g. EES provider organisation, know-how, business volume, market strategy, etc.) framework conditions. In general the size of the EES providers and the implementation of subsidy, economic incentive or energy saving obligation schemes are mentioned as the most relevant determinants of competition and partnerships in the EES national markets. One of the main problem related to the presence of subsidies and other economic incentives for EES regards the creation of a level playing field and the different impact that economic incentives may have on different market actors. For example, while there may be rebates for energy audits in small and medium enterprises (SMEs), these rebates may not be available for energy consultants employed by energy companies. Another example are energy audits offered by some energy agencies for free, while independent energy consultants have to demand money for their service offered. Another example is represented by economic incentives promoting one specific technology and penalising other technologies or determining unpleasant side effects¹⁵. With regard to the relation between larger and smaller market actors all larger EES providers usually work together with helpers for the on-site implementation. Moreover, while larger EES providers can offer complex system solutions, small EES providers often just offer partial solutions. Therefore, while larger EES providers may mostly co-operate with smaller EES providers, there is some competition among smaller EES providers. The size of EES market actors is often related to the fact that EES provision is or is not the EES provider core business. For example, the so-called non pure ESCOs whose core business may be represented by energy (service) supply are typically endowed with greater financial resources with respect to pure ESCOs and, also because of their higher lobby capacities, they are more likely to win the tenders for EES provision in the public sector. At the same time these companies may not have the

¹⁵ An example may be represented by the existing economic incentives to PV panels in Italy. In this context a piece of land gains more value if used for the implementation of photovoltaic panels rather than if exploited for agricultural purposes; this leads land owners to rent their best (in terms of solar exposure) lands for the development of the photovoltaic sector, leaving their worst lands for agriculture.

required building capacity or the adequate know-how to implement EES and may decide to establish partnerships with experts and equipment suppliers acting on the EES market. ESCOs in particular are likely to be more prepared for the new energy paradigm which will focus on small smart grids, integrating very efficient decentralized generation of energy and renewable energy production. In this respect collaboration between independent ESCOs and energy companies or the establishment of energy company subsidiaries specialised in this sector will be important to allow energy companies retaining their customers.

In general the relations established among EES market actors depend on the specific nature of these actors¹⁶.

Energy Agencies are typically set up to implement energy efficiency policy by management of R&D programs, organising voluntary agreements for sectors or branches, execution of subsidy schemes, running information centres, disseminate good practice examples, measurement and monitoring protocols, etc. Some of these activities focus on end-users directly, but at a general level, e.g. information on saving options and subsidies. Most activities focus on the level between end-users and policy, e.g. setting up agreements with branch organisations. In general there is no overlap in the activities between the energy agency and EES providers. Instead, they could complement each other, e.g. if the energy agency informs energy consumers about EES providers, implements protocols for EES, or incorporates EES in R&D programs and pilot projects.

For energy companies a distinction must be made between production, network and retail companies. Presently the **production companies** focus on large scale production where EES providers do not play a role. The same holds for the **network companies** (i.e. energy distributors and distribution system operators) which do not focus on energy savings at their users. However, if these companies would get a savings target as e.g. part of a White Certificate Scheme (WCS) this situation might change. In that case network companies could rely on EES providers to realise savings or could decide to establish subsidiaries for complying with their energy saving obligation. Nevertheless it is also possible that they realise savings themselves and thus compete with EES providers. For **energy retail sales companies** the relation with EES is very dependent on their position in the field of energy efficiency policy. Also energy retail sale companies may be obliged to achieve given energy saving targets under e.g. a white certificate scheme. When realising their promised energy savings they could collaborate with ESCOs to do the job. But they can also realise energy savings by setting up a subsidiary unit dedicated to energy savings at their customer's place. In case of energy retail sale companies this choice may allow strengthening relations with their customers also by establishing long term contracts but may determine some competition with stand-alone ESCOs. However these type of activities are limited at the moment and there are no clear

¹⁶ Most of the text below has been taken from the country report produced for the Netherlands under the ChangeBest project WP2.1, as this report provides an exhaustive overview about the possible competition and partnership relations that can be generally observed in most of the countries analysed.

signals from the EES market about competition problems. For the future there is still much uncertainty about the role of energy retail companies as to EES because of their motivation to increase turnover by selling energy (cf. the WP2.4 report for a more detailed analysis of their motivation and incentives).

Social Housing Corporations also may participate in the agreements on energy savings with the government. Due to their scale they are able to organise the implementation of saving measures themselves. This does not constitute in general competition with EES providers as these companies do not focus on individual renters of dwellings. On the contrary, housing corporations may hire EES providers to realise energy savings, especially in their existing multi-family dwellings and in their new dwellings.

The **construction sector** consists of project developers, architects, investors, building companies, facility managers and installers of energy using systems. These actors can influence the EES market for new dwellings and buildings, make use of EES providers or compete with them. Project developers are potential partners of EES providers as they are in the position to hire an EES provider to realise more energy savings. Some architects have specialised in energy efficient buildings and thus compete with EES providers. Investors can ask for energy efficient buildings and thus indirectly support EES providers. Building companies have knowledge on state-of-the-art saving measures for the building shell. But few of them have specialized in advanced shell options, thus creating room for EES. However, not many EES providers focus on shell measures, thereby limiting possibilities for partnership. Facility managers usually do not focus much on energy efficiency yet.

Installers represent a special group in the construction sector as they take care of the supply of heat, cold and lighting, which generally are the focus of EES. Many EES providers originate from the installation sector and some installers are incorporated in EES companies as subsidiaries who technically realise EES. Some (larger) installers are even the “mother” of ESCOs and other EES companies. In practice installers are subcontractor of the EES company, doing the technical realisation. Installers could also be the EES partner of an energy company, in the role of being the existing “home” installer for the energy customer.

Energy consultants/auditors/engineers play an important role in the EES market especially in those countries where this market relies on regulations related to building energy certification and/or energy audits or in general on energy policies incentivizing EE measure implementation in the building sector and industry. These market actors may represent important partners for large EES providers having the financial means to invest on specific EES but not having the necessary know-how and expertise for their implementation.

Municipalities can play different roles as to energy efficiency. They can apply higher standards for newly build dwellings, opt for district heating or renewable options behind the meter. They can adopt environmental permits to stimulate energy efficiency in companies. They can start their own savings program for municipal buildings or for public lighting. They may be important shareholders in the energy distribution companies and stimulate these companies to play a role of EES provider.

Finally, they can also start activities in local transportation. In all cases they need other actors to realise the energy savings. This will either stimulate the demand for EES or directly involve an EES provider.

EE equipment manufacturers may decide to provide third party financing for installation, maintenance or operation of their equipments. They are also usually in close contact and collaborate with EES providers installing their solutions.

Branch organisations represent all kind of enterprises, from butchers to chemical industry. Because of their close contact with, and understanding of their companies they could play a role in getting energy savings realised. If they also give information on (trustworthy) EES providers they could stimulate the EES market. There are also branch organisations (associations) of EES providers in several countries that aim at supporting their members in the development of the EES business and influencing the development of favourable framework conditions for their members.

Competition can be expected regarding the potential market, but the existing market for EES providers has in general its limits with respect to competition due to the usually limited number of EES providers operating in many of the countries analysed. The table below summarizes the relation types that may be established between EES providers and the other main players in the EES market.

Table 2: Relation types established between EES providers and the other EES market players

	Support	Partnership	Competition
Energy agencies	Protocols, info on EES	R&D	Subsidies on EES
Energy companies			
- Energy production	None	None	None
- Network companies	None	WCS obligation	WCS obligation
- Energy retail companies	Info on energy savings	EES offered to customers	EES subsidiary
Housing corporations	Standards on new dwellings	Multi-family renovation	None
Construction			
- Project developers	None	Advanced developers	None
- Architects	None	None	If specialized
- Investors	Strict demands	None	None
- Building companies	None	None	None
- Installation	None	Owned or subcontracted	If specialized
Energy consultants/auditors /engineers	None	Provide large EES providers with know-how and expertise on specific EES	Whereas a well developed EES market exists
Municipalities	Permit demands	Projects, own buildings	None
EE equipment manufacturers	Info on EES	EES providers installing EE equipments	None
Branch organisations	Info on trust-worthy EES	None	?

3 Analysis of market segments and opportunities for Energy Companies and ESCOs

3.1 Existing EES market offer sector by sector

The country analyses performed aimed, among others, to analyse the existing EES market offer for the various customer categories. Primary and secondary schools, universities, local administrations, hospitals and public housing have been considered as possible main customer categories in the institutional sector, whereas hospitals, offices and retailers, industry and residential buildings have been considered as possible main customer categories in the private sector. These customer categories have been generally indicated as “sectors” in the country reports and in the present overview, although this might be somehow confusing as “sectors” in energy statistics are usually the five sectors of industry, residential, commercial, public/service and agriculture. The existing EES market offer for each of these sectors is briefly described in this section.

Due to the high transaction costs the EES offer for the *residential* sector is usually very limited despite the rather high energy saving potential typically existing. In general information campaigns and free of charge energy advices on EES may be offered by energy agencies and governmental programmes. Multi-apartment buildings represent most of the EES business in this sector. Some level of activity is registered by energy companies in some countries that may provide households with EES in order to increase customer loyalty or to comply with their energy saving obligation (e.g. in **Italy, France, Flanders**). Also other EES providers result quite active especially in countries with a long tradition on public subsidies in the housing sector (e.g. Austria). Energy saving obligations, tax rebates and other economic incentives represent in general an important stimulus to provide EES in this sector.

The EES market seems to be rather well developed in the *industry* sector in **Germany**¹⁷, **Denmark, Portugal, France** and the **Flanders** if compared with the EES market activity level existing in other sectors in the same countries. Also in **Czech Republic, Slovenia** and **Poland** the EES market offer to industry has developed to a certain extent and significant efforts to stimulate EES implementation in this sector are being made also in **Greece**. CHP often represents the main technology addressed by EES providers, in particular in the paper industry. Existing regulations and covenants as well as the existence of a critical mass to contact energy specialists are important market drivers in this sector and also an eco-friendly

¹⁷ Due to highly specialised applications, the industry sector is more a niche market within the energy supply and energy performance contracting market in Germany. In this, EES providers offer contracting measures beyond energy and heat supply contracting, e.g. supply of cold for industrial processes or compressed air.

profile is of high interest for the industry customers. The general problem in industry is that it is very vertically fragmented and it is therefore very problematic to implement integrated management strategies.

An EES market offer is emerging for *hotels, offices, retailers and the commercial sector in general*. Commercial services represent a large EES provider customer group in **the Netherlands** and a promising EES market activity level in this sector is being registered in **Portugal, Spain, Flanders, France** while a very high energy saving potential exists in **Latvia** because of the impressive growth registered in the construction of new and rather inefficient new buildings during the last 4-5 years. Lighting, CHP, large heat and cold storage systems are the most frequent EES fields of application. The fashion shifts often give opportunities for EES activity in shopping centres, whereas hotels are often “shined up” which gives possibilities for EES and smart control. The EPBD and its application in national regulations is increasingly influencing the adoption of EES in this sector in general.

Public housing represents a well developed EES market in **Germany** and a certain level of activity is also registered in **Denmark** and **Flanders**. In general this sector is poorly addressed in the geographical area covered by this analysis although a large potential for EES typically exists. The principal/agent barrier with split incentives sometimes appears in this sector since investments are done by the owner while the yearly costs are paid by the customers.

Hospitals represent a well developed EES market sector in Germany, Denmark, Sweden, Flanders, Italy, Czech Republic, Portugal. Competition on EES provision for hospitals is high in **Germany**, while throughout restructuring of the hospital sector will generate a lot of EES business in the next years in **Denmark**. Hospitals developed an active energy policy during the last years in **Flanders** whereas important subsidy schemes as well as model contracts and guidelines for EPC projects implementation have been developed and adopted in **Sweden**. Some level of activity is also registered in **Spain, Bulgaria, Poland**, whereas the existing EES potential does not seem to have been much exploited in the other countries considered.

The EES market sector addressing *local administrations* (e.g. municipalities, provinces, regions, etc.) is well developed in Germany, Denmark, Flanders, Sweden, Czech Republic, Austria, Bulgaria and Latvia. In **Germany** support for energy performance contracting in the public building sector is given by a number of standard contracts and several guidelines. In **Denmark** local administrations represent the core business of ESCOs sometimes addressing this sector in joint-venture projects with energy companies. In the **Flemish region of Belgium** local municipalities are important shareholders in the energy distribution companies that sometimes play a role of 'ESCO' for municipalities given also the energy saving obligation distribution companies have to comply with. Furthermore, the majority of the offices of the Flemish government are audited and are followed up via an energy monitoring system. The majority of EES projects were carried out in the local administration and state administration sectors in **Czech Republic** during the last years. In this country the inclusion of EPC, as a form of EES supplier's loan, into the act regulating the state assets' renovation in 2000 has represented a turning point.

Public buildings (schools, universities, administrations, etc.) are well-covered with energy performance contracting on the federal level in **Austria**. Some Austrian regions intend to make own EPC campaigns following the example of the Federal Building Administration. In **Bulgaria** mandatory energy audits in the public sector, the relatively large size of EES projects in this sector and the availability of EU funds for the public sector have been the main drivers for EES market development. In this sector the lack of experience on public private partnership is often a barrier to EES. Usually public procurement rules do not suit well the concept of energy performance contracting and decisions on tender procurements are commonly based on the initial investment costs as opposed to project performance and project life-cycle costs and benefit analysis (Bertoldi et al. 2007). However the use of an ESCO involves a significant decrease of responsibility for the public administration compared to a situation where public entities would directly manage an energy efficiency improvement measure, and then there is a high degree of appreciation for such type of intervention by the citizens.

A moderately well developed EES market in the sectors of *primary and secondary schools as well as universities* does exist in Germany, Denmark, Flanders, Austria and Sweden¹⁸. The last year energy audits were performed in most of the **Flemish** primary and secondary school thanks to subsidies provided by the energy distribution companies and the Ministry of Education. In general Flemish universities have a professionally organised technical department with one energy co-ordinator focused on energy services. A high energy saving potential does typically exist in this sector, especially at universities. Usually incentives to energy efficiency are split in primary and secondary schools because school managers do not receive energy bills and therefore are not keen to reduce energy consumption as their first priority. Also, primary and secondary schools have a smaller load factor since they may be closed every afternoon, every Sunday and for three months every summer. This is not the case for universities that in fact requests more energy efficiency interventions compared to the former; since they do not typically belong to municipal and local governments, universities are more aware of their energy consumption and expenses.

A summary about the EES market development status in various sectors in the countries analysed is provided in the table 2. The EES market for ESCOs and energy companies is depicted either as *very well developed*, or *well developed*, or *emerging*, or *not well developed* or *not existent* in each of the sectors/customer groups considered in this analysis according to the qualitative information provided by the country reports. The data reported in this table indicate that the EES market status is on average between *not well developed* and *emerging* in the geographical area covered by the cross-country analysis. Local administrations, industry and hospitals are the customer groups for which a better developed EES market seems to exist in this area, whereas the EES markets in public housing, the retail and the residential sectors are ranked at the lowest development stage on average. The EES market for

¹⁸ In Sweden primary and secondary schools in particular seem to be a demand sector where the EES offer by ESCOs is well developed.

ESCOs appears in general as more developed than the EES market for energy companies in all sectors, excepting the residential one where the energy company EES market seems to be more developed. Data reported in the table give the impression that the ESCO activity level has achieved a higher development stage with respect to the energy companies' one particularly in the sectors of health/hospitals, public housing, industry and universities.

		Sectors	
Institutional Sector	A	Primary and secondary schools	
	B	Universities	
	C	Local administrations (municipalities, provinces, regions)	
	D	Health/Hospitals	
	E	Public housing	
Private sector	F	Hotels/hospitality	
	G	Office, commercial	
	H	Retail	
	I	Industry	
	L	Residential	
	M	Transport	

Table 2: EES market development status by sector and by EES provider in the countries considered

Legenda	
Table content	Meaning
1	very well developed
2	well developed
3	emerging
4	not well developed
5	not existent
empty	unknown
ES	ESCOs
EC	Energy Companies

Sectors	DE		DK		BE		SE		NL		AT		FR		IT		CZ		PT		ES		LV		SK		SL		EE		BG		EL		PL			
	ES ¹	EC	ES	EC	ES ²	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC				
A	2	2	3	1	3	2	2	4	4	5	2	5	4	3	4		2	5	3-4	3-4	5	4	3	5	3	3	3	5	3	5	2	5	5	4	3	5		
B	2	4	3	2	3	2	4	4	3-4	5	3	5	4	3	3-4		3	5	3-4	3-4	4	4	4	5	3	3	4	5	3	5	4	5	5	5	4	5		
C	2	2	2	2	3	1	2	4	3	5	1	5	4	3	3-4	2-3	3	4	3-4	3-4	3	3	2-3	4	3	3	3	5	2	5	2	5	4	4	3	5		
D	2	2	2	2	3	2	2	4	3	5	4	5	3-4	3	2	2	2	4	3	3	3		4	4	4	4	3	5	5	5	2-3	5	5	4	3	5		
E	2	2	4	3	3	2	3	4	3	5	4	3	3-4	3	4		4	4	5	5	3		3-4	5	4	4	3	5	5	5	3	5	5	5	3	5		
F	2	2		2	3	2	4	4	4	5	3	3	2-3	2	2		4	4	2-3	2-3	3		4	4	4	3	3	5	5	5	3	5	4	4	4	5		
G	4	4		2	3	2	3	4	4	5	3	3	2-3	2	4		4	4	2-3	2-3	4		4	4	3	3	3	5	3	5	4	5	5	5	4	5		
H	4	4		2	3	2	3	4	4	5	3	3	1-2	2	4		5	5	2-3	2-3	4		4	4	4	4	3	5	3	5	4	5	5	5	4	5		
I	2	2		1	2	3	3	4	4	5	3	3	2	2	2	4	3	3	2-3	2-3	3	3	3-4	3-4	3	3	2	3	3	5	3	5	3	3	3	3		
L	4	2		2	5	2	4-5	4-5	3	5	4	3	3-4	1	3	3	5	5	5	5			3	5	3	3	3	3	2	5	4	5	5	5	5	3	5	
M									4																										5	5		

¹ Not including totally public EES providers like public energy agencies or NGOs

² Focus on EPC-contracts

The table 3 below summarizes the main sector cross-cutting technologies and fields of application for EES considered in the countries analysed. In case the country analyses have highlighted a different preference degree for the various sector cross-cutting technologies and fields of application where EES providers have decided to develop their EES business, such different preference degree is indicated in table 3 by using a different numbers of Xs (i.e. “XXX” for *much more frequently preferred*, “XX” for *more frequently preferred* and “X” for *less frequently preferred technologies and fields of applications*). These three different preference degrees possibly reported in this table serve to highlight the possible differences *in a same country* and do *not* reflect the different preference degree for a given technology or field of application in *different* countries.¹⁹ The table shows that energy efficiency improvement measures addressing building envelope insulation and heating systems, outdoor and indoor lighting, renewable energy (e.g. biomass and solar) technologies are the sector cross-cutting technologies and fields of application mostly indicated in the country reports as typically addressed for the provision of EES.

¹⁹ For example the preference degree for heating systems in Denmark is “XXX” to indicate that this field of application is “much more frequently preferred” by Danish EES providers with respect to building insulation measure (for which the preference degree is “X”) in Denmark and *not* to indicate that heating systems are “much more frequently preferred” EES providers in Denmark than e.g. by EES providers in Spain (whose preference degree for heating systems is “X”).

Table 3 : Main sector cross-cutting technologies and fields of application for the EES provided in the countries analysed

Country	Cross cutting technologies														Processes			
	Building envelope insulation	heating system (incl. DH), hot water system	air conditioning	ventilation	water saving	external lighting/public lighting	lighting indoor	building automation and control systems	user behaviour/staff training	Pumps	electrical motors/inverters	heat and cold storage	waste heat recovery	CHP	Renewable energy sources	industrial process optimisation	industrial cooling	compressed air
DE	XX	XX	XX	XX		XX	XX			X	X				XX		XX	XX
DK	X	XXX	XX	XX		XX	XX			X	XXX				XX	XXX	XX	XXX
BE	X	X				X	X		X					X	X			
SE	X	XX		XX	X	X	X	XX	XX				XX					
NL	X						X	X		XX		XX		XX	X			
AT	XX	XX				X	X		XX						X			
FR	XX	XXX	X	X		X	X	X	X	XX	XX			X	X			
IT	X	XX	XX		X	XXX	X	X			X			XXX	XXX	X		
CZ	XX	XX				XX	XX								XX	XX		
PT		XX	X	X		X	X				X			XXX	XXX	X		
ES		X	X	X		X	X											
LV	X	XX				X												
SK	X	X													X			
SL	X	X				X	X			X				X	X			
EE	X	X	X	X														
BG	X	X					X	X					X		X			
EL	X	X	X										XX	XX				
PL	XX	XX	X	X		XX	X		X						XX			X

In case the country analyses have highlighted a different preference degree for the various sector cross-cutting technologies and fields of application where EES providers have decided to develop their EES business, this different preference degree is indicated in table 3 by using a different number of Xs (i.e. "XXX" for *much more frequently preferred*, "XX" for *more frequently preferred* and "X" for *less frequently preferred technologies and fields of application*)

3.2 Positioning of Energy Companies and ESCOs in the different demand sectors

The positioning of energy companies and ESCOs in the different demand sectors/customer groups as resulting from the information available in the country reports is briefly analysed under this section. The overview performed indicates that energy companies offering EES generally aim at supplying large EES projects implemented in the public sector²⁰, industry, hospitals, whereas smaller projects are offered especially by retail energy sale companies or energy distributors in order to increase customers' loyalty or to comply with a possible energy saving obligation in place in the country where they operate. Concerning ESCOs, energy service companies being energy company subsidiaries or having energy (service) supply as their core business seem to typically focus on larger EES projects, whereas ESCOs having EES supply as their core business or ESCOs focused on energy efficient equipment supply and installation as well as on facility operation and maintenance, seem to typically address also medium-size and small projects.

This is for example what happens in **Germany** where energy companies and larger ESCOs (some of them being energy company subsidiaries) prefer to implement larger projects in *industry, commerce, hospitals*, whereas the smaller ESCOs often focus on heat delivery services (heat supply contracting) in the *residential, commercial and public sector* and several energy companies not having yet developed EES for large customers offer EES to stimulate smaller customers' loyalty.

In **Denmark** the industrial sector has represented energy company business during more than 30 years and a further energy company focus area is represented by municipalities. On the other hand, the ESCO business is very new in Denmark and ESCOs provide mainly heating and building control and related energy service to *non-residential public* and sometimes also *private buildings*. ESCOs and energy companies are usually in competition although ESCOs can benefit from joint venture with energy companies that can bring in their fields of expertise and offer subsidies.

In **Flanders** ESCOs supplying EPCs are mainly active in *municipalities, in buildings of the federal government* and the *heavy industry* whereas all other ESCOs are basically active in *all sectors*. The energy distribution companies are active in *all sectors* with a special focus on *municipalities*, as municipalities are a shareholder in these energy distribution companies.

In **Sweden** EPC in the institutional sector (including *primary and secondary schools, universities, hospitals, local administrations, public housing*) is the success story of the EES market development. All of the institutional sector types have been involved in EPCs during the last years. The EES market dominators are ESCOs mainly

²⁰ Despite its potential for larger and more profitable profits, the public sector may not always be preferred by EES providers because of possible unstable financing conditions (also due to shifting regulation from the government) and complex bureaucracy and decision processes.

dealing with building control and automation, but also facility management and operation companies and consulting firms play an important role in this market. Energy companies have a subordinate position in the provisions of EES, although local/regional exceptions exist where municipal energy companies provide EES, like function agreements, primarily to municipal property companies. Some activity is registered in the *industry sector*, especially in SMEs, whereas the residential sector is ignored by EES providers. Currently there are no apparent relations between ESCOs (especially EPC providers) and energy companies in Sweden.

In the **Netherlands** there are indications that independent ESCOs having EES as their core business target their activities more on *public buildings* because of lower risks and fewer financing problems. These ESCOs are notably involved in larger heat and cold storage projects, whereas a few ESCOs being energy company subsidiaries and delivering EES as core business have some *industrial projects*, but they are few and concentrated in facility energy use. Both are *not* involved in small energy consumers, such as *SME* and *households*. This is more the field of the EES providers not delivering EES as core business. In the Netherlands energy retail companies themselves do not provide EES.²¹

In **Austria** energy distributors are mainly active in the household sector with information and advice on EES which is also offered to their business clients together with individuation of energy saving measures on a consultancy basis. These EES providers also offer EPCs to municipalities (notably for street lighting). Whereas large construction companies are particularly active in providing facility management and EES for private non residential buildings, this sectors is less addressed by classical ESCOs which instead are more active on public non-residential buildings because of a constant demand for EPCs also due to the so-called Federal Contracting Initiative²² undertaken in this country.

In **France** ESCOs operate in all EES market sectors. In particular ESCOs represented by heating and cooling operators, facility managers and maintainers are active in all sectors (especially in hotels, in the office and commercial, retail and industry sectors), whereas building energy management system (BEMS) providers operate mainly in hotels, in the office, commercial and retail sectors. ESCOs providing guarantee on top of engineering activities focus in particular on hospitals, public housing, hotels, office, commercial and residential sectors. Energy companies under the white certificate obligation, their subsidiaries and a handful of other companies involved in the white certificate market are particularly active in the *private sector* with a special focus on the *residential* one.

In **Italy** pure ESCOs delivering EES as core business are likely to be more active in the private sector (in particular the *industrial* and *commercial sectors*) while non pure ESCOs favour the *public sector* for the provision of EES. This derives from the fact

²¹ In 2005 a proposal for a White Certificate System, with obligations for energy companies, was strongly opposed by the retail companies.

²² See the WP2.1 report on the energy efficiency service business in Austria for more information on this initiative.

that large companies (commonly non pure ESCOs) hold greater chances of winning tender procurements from local and national governments, while they face difficulties in customizing and rendering profitable the implementation of small and medium projects of energy efficiency. This situation underlines the need for small independent ESCOs to specialise their market offer and invest in research and development so as to differentiate from large non pure ESCOs and thus gain stronger competitive advantage in the EES market private sector as the potential for EES is particular higher in this sector. Concerning energy companies, energy distributors and retail energy companies concentrate EES provision in the *local administration* and *hospitality* sectors whereas a certain EES activity level, although not well developed, by these market actors is registered in the *industrial* and *residential* sectors.

In the **Czech Republic** ESCOs prefer to implement projects within the *public sector*. Nevertheless a certain number of ESCOs mostly established as part of a predominant foreign company and focusing their activity on energy supply and energy efficient equipment installation supply EES to the *industrial sector* and large *public buildings*. Energy companies focus on the public sector (especially on *primary and secondary schools* and *hospitals*). Both ESCOs and energy companies often cooperate with independent consultants and consulting companies in order to produce the first estimates, or rather proposals for energy savings or efficient use of energy. These consultants are often approached by the public sector

In **Portugal** private ESCOs prefer to operate with *hotels* and *large industry*. These are usually ESCOs with financial capacity because they belong to or have agreements with finance institutions. Private small ESCO companies, having low financial capacity to invest, typically operate with *all sectors*. Public and public-private joint venture ESCOs are focusing their activity on the *local administration* sector and the *hospital/clinics sector*. In this country it is difficult to distinguish between energy distributors, distribution system operators and retail energy sales companies because the energy market is not still properly unbundled. Retail energy sales companies tend to prefer energy intensive customers like large and medium size *industry* and large *tertiary buildings* (shopping centres, hospitals/clinics), because the opportunities are higher and the return on investment is attractive, and also *local administration*. In Portugal energy companies typically subcontract the existing ESCOs to perform the services they are offering (e.g. energy audits). Despite the low prices of the services offered by the energy companies make the competition by ESCOs very difficult, more informed customers are conscious that the EESs provided by energy companies may be object of conflict of interest and prefer services offered by independent ESCO companies.

In **Spain** private ESCOs operate mainly at *local administrations*, *hospitals*, *hotels*, *industry* and for *public housing* whereas some activity related to EES by energy companies is registered at *local administrations* and *industry*.

The ESCO business and concept in **Latvia** is still not well developed. The sectors where there is more experience so far have been the *public sector* (with energy efficient street lighting projects mainly implemented), in the heat generation sector (with initiatives related to CHP and district heating) and more recently in the

residential building sector. Energy companies in Latvia are not active in the EES market and do not really supply energy efficiency services. They at most provide some technical consultation and information.

ESCOs (private) and energy company are basically active in the same EES market segments in **Slovakia** (i.e. *primary and secondary schools, universities, local administrations, office and commercial sectors, industry and residential*). Nevertheless energy companies (typically preferring to address the *industry* and residential sectors) seem to have limited capacities to enter the EES market and are very reluctant to collaborate with ESCOs.

In **Slovenia** it seems still quite difficult to position EES market actors in specific EES market sectors and it is also hard to attempt to depict the existing relations between ESCOs and energy companies as the whole situation on the ESS market looks very unpredictable and sometimes indecipherable.

In **Estonia** there are not ESCOs operating in the EES market. The largest electricity supplier in this country is offering to its clients energy audits and energy certificates, which are seen rather as part of marketing activities than as real EES.

In **Bulgaria** the energy companies have not shown any interest in EES and the only existing EES providers are ESCOs. These mostly provide EES for the institutional sector (in particular *primary and secondary schools, local administrations, hospitals*), although some EES related activity is registered in *public housing, hotels* and industry.

In **Greece** the few existing ESCOs have so far provided EES for *industry* (textile, cement, steel) and the *private tertiary sector* (e.g. hotels). This is due to the fact that high amounts of energy are consumed in these sectors and the potential for saving energy and money is very appealing. Energy companies are not specifically concerned with providing EES services, but rather seek to sale their product (power or natural gas).

In **Poland**, EES are relatively young and undeveloped solutions. EES for *local administrations* (EES related to street lighting and heating in particular) are preferred by ESCOs whereas energy companies which are offering EES are mainly interested in the *industrial sector* (in particular in relation to CHP).

The table 2 above provides, among others, indications about ESCO and energy company positioning in the various EES demand sectors in the countries analysed.

3.3 Positioning of energy companies and ESCOs in the EES product value chain

Although the list of potential EES products is very long – also due to the fact that very different market segments can be addressed – the graph below shows, that the very heterogeneous shapes of EES products can be categorised into consecutive stages of a “value chain” of EES products. Market entry and/or the further development of the EES market therefore goes hand in hand with the selection of one or more stages

in the value chain. From a strategic point of view the EES provider needs to define a “centre of gravity” of its activities in the EES market.

This section describes briefly in which stages of the EES product value chain (i.e. awareness raising, information and energy advice, identification of measures, technical planning, financing and subsidies, implementation (operation, supervision), optimisation of technical operation, saving measurement and verification) ESCOs and energy companies define their “centre of gravity” in the countries analysed.



Figure 2: EES product value chain stages

In general EES provider’s positioning in the EES product value chain clearly depends on the provider’s prevalent business. Whereas some company types may offer integrated services and cover the whole EES value chain, others may decide to focus on specific value chain stages. For example, energy companies are typically interested in raising the awareness and information on EES in order to increase customers’ loyalty, or may decide to provide EES that are higher in the EES value chain (e.g. identification of measures, EES implementation, etc.) in addition to the supply of energy because their core business of selling energy may benefit from this, although it is quite rare that energy companies provide integrated services covering the whole EES value chain. Private energy consultants or energy agencies may be interested in providing energy audits whereas metering experts may concentrate on the measurement and the verification of the energy savings yielded by the EES and leave EES implementation to other companies operating in this market. In general only large companies can offer integrated services whereas the smaller ones specialise in specific EES value chain stages. However, in case of integrated EES covering the whole EES value chain, the situation in which more experts from different company types are involved in the provision of EES seems to be the most frequent in the countries considered. The provision of these services may represent the result of fruitful collaborations between ESCOs and energy companies when e.g.

ESCOs supply energy in addition to EES or when ESCOs may rely on the well established relationships between energy companies and their customers to increase their sales.

The cross-country analysis performed indicates that ESCOs rarely concentrate on information and awareness raising on EES in the countries where they operate, whereas their activity related to EES financing is often just limited to the identification of third parties available to finance EES investments (i.e. they typically do not finance EES investments with internal funds). Moreover the provision of energy saving measurement and verification by ESCOs and energy companies is often a consequence of the stipulation of EPCs or the need to achieve some mandatory and measurable energy saving target (see e.g. the energy saving obligations for energy companies existing in Denmark, France, Flanders, Italy). Energy company activities related to EES are often limited to awareness raising and information on EES, with the exception of Germany, Denmark, Flanders and France, where these companies cover most of the EES value chain stages. Information and awareness raising activities may be performed by energy agencies (like e.g. in Portugal) which could be interesting partners for EES providers, both in the stage of information and awareness-raising, and in the saving measurement and verification stage, by introducing more credibility and transparency in the EES provided. In some countries (notably Austria) banks are active on information and advice on EES which represent part of their marketing activity related to the credit lines they offer for EES. The provision of energy supply in combination with EES by energy companies seems to be a common practice in countries where a well developed EES market exists (e.g. in Denmark, Germany, Flanders), whereas in the countries where the EES market is still in a preliminary development stage (e.g. Slovakia, Poland) this service combination is rare or not provided at all.

The table below summarises the positioning in the EES product value chain by ESCOs and energy companies in the countries analysed, by indicating which value chain stages are typically preferred by ESCOs and energy companies in each country. The three different preference degrees (i.e. “more preferred”, “less preferred” and “usually not provided”) reported in this table serve to compare the preference degree for the various value chain stages by a given EES provider type (i.e. ESCO or energy company) in a given country and *not* to compare the preference degree for the various value chain stages by different EES provider types or in different countries²³. Data in the table indicate that the identification of measures and their implementation are obviously the EES value chain stages which EES providers mostly focus on in the geographical area covered, whereas financing and saving measurement and verification are the value chain stages less frequently considered. These data also confirm that energy companies are typically more involved in

²³ For example the preference degree for the EES value chain stage related to *awareness raising* by energy companies in Germany is “XX” to indicate that *awareness raising* is “more preferred” by energy companies in Germany with respect to *saving verification and measurement* (for which the preference degree is “X”) and *not* to indicate that *awareness raising* is “more preferred” by German energy companies than by Italian energy companies (whose preference degree is “X”).

awareness raising activities than ESCOs, whereas on average ESCOs are much more focused than energy companies on all the other value chain stages (notably on energy saving measurement and verification and on optimisation of technical operation).

Table 4: ESCO and Energy Company positioning in the EES product value chain

Legenda: XX = more preferred; X = less preferred; empty = usually not provided
 ES = ESCOs; EC = Energy Companies

Country	DE		DK		BE		SE		NL		AT		FR		IT		CZ		PT		ES		LV		SK		SL		EE		BG		EL		PL			
EES provider type	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC	ES	EC		
restrictions for the information provide																	EPC only	EPC only																	EPC only			
Awareness raising		XX	XX ⁷	XX			XX	XX	XX				XX		XX	X	X	X	X	XX			XX	X	XX	XX	XX	X	X			X		X	X	X		
Information and energy advice		XX		X			XX	XX	X				XX	XX	XX	X	X	X	X	XX			XX		X	XX	X	X	X	X		X	X		X		XX	
Identification of measures	XX	XX	XX	XX	XX	XX	XX	X	XX			X	X	XX	XX	XX		XX	XX	XX	XX	XX		XX		X	X	XX	X			X		X		X		
Technical planning	XX	XX	XX	XX	XX	XX	XX	X	XX			X	X	X		XX		XX	XX	XX	XX			X		X	X	XX	X			X		X		X		
Financing and subsidies	XX	XX	XX ⁴	XX	XX	XX	X		XX			X	X	X	XX			X		X ⁴					XX		X	X	X	X			X		XX		X	
Implementation (operation and supervision)	XX	XX	XX	X	XX		XX	X	XX			X	X	XX	XX	XX		XX	XX	XX	XX	XX		XX		X	X	X	X			XX		X		X	X	
Optimisation of technical operation	XX	XX	XX	X	XX	X	XX	X	XX			X	X	XX		X		XX		XX				XX				X	X			X		X		X		
Saving measurement and verification	X	X	XX	X	XX	X	XX ⁵		XX ⁵			X	X	XX	X ⁶	X		XX		XX				X				X	X			X		X		X		

¹ Not including totally public EES providers like public energy agencies or NGOs
² Focus on EPC-contracts
³ The 'Energy companies' meant here are the energy distribution companies
⁴ mainly TPF
⁵ Realised by independent third parties
⁶ ex-ante estimates
⁷ marketing

3.4 Analysis of potential needs for EES in the different demand sectors

The potential for *new and promising EES*²⁴ in each of the sectors/customer groups aforementioned has been analysed in the country reports. This section provides a short overview of the most interesting sectors, technologies and fields of application for possible EES and describes where possible existing or future external and internal framework conditions that may allow exploiting existing potentials for EES in each country. The level of detail and the amount of information provided reflect those achieved in the country reports and will hence vary from country to country without being necessarily proportional to the existing EES market potential in the various countries. First, the situation in the main customer groups/sectors will be analysed and then the most promising technologies and field of applications for new EES will be briefly described for each country.

3.4.1 Potential needs for EES by country and sector/customer group

In general a potential for new and promising EES has been highlighted for all the main sectors/customer groups in all the countries considered. This section will focus only on those countries for which particularly high potentials for EES in some specific sectors have been highlighted in the country reports.

A large potential for energy efficiency is generally highlighted for the *building sector* in **Germany**. This also includes residential buildings of the housing industry, although this sector is quite difficult to be addressed due to high transaction costs. A high potential for EES is also signalled for *SMEs in industry* in this country.

In **Denmark** ESCOs primary see new and promising EES potential within *local administration* (by integrating more services with their core business of heating supply and building control) and *hospitals* which represent huge projects with a large potential, whereas the energy companies are already quite active within all sectors.

In the **Flemish region of Belgium** the highest potential is in the *tertiary sector*, because, compared to the residential sector, it has important advantages of scale

²⁴ The new and promising EESs product could be either:

- Promising EESs that have been developed already but not fully implemented in a given country. Examples might be energy performance contracting for lighting, compressed air or cold.
- EESs that have been already implemented partly, but will only be successful if they are designed in specific manner. The re-designed EES will be the new promising product. Examples might be heat delivery service / heat contracting and advanced metering combined with further EESs.
- New promising EESs that have not been thought of yet in the EES market and science.

and, compared to the industrial sector, where EPC is a relatively common practice, it has higher market potential.

In **the Netherlands** a large potential market for EES are *new (non-residential) buildings* or commercial real estate in general. Currently EES providers participate in large scale renovation of some central government buildings. For local government like municipalities, this could become a direction to follow.

In the **Czech Republic** the obligation to carry out energy audits of *public and private property facilities* exceeding a given annual consumption threshold²⁵ creates an important potential for EES.

In **Austria** there is a certain potential for promising EES in *hospitals* which typically do not seek energy efficiency services. In this country EES are not very widespread also in the *private non residential sector* (office, commercial, retail, industrial buildings, hotels, etc.) where more and more property developers demand sustainability certificates for newly constructed buildings, also paying for external energy efficiency advice in architecture competitions.

In **France** the *built environment* represents an important potential for EES because of the very promising applications of building energy management systems and home automation devices and because of the existing high economic saving potential that can be exploited in this country also thanks to the various energy policy instruments addressing this sector (notably the white certificate scheme).

In **Italy** all market development potential lies in the *private sector*. Except for industry where some of the potential is already under exploitation, all other private sectors are practically virgin. The larger potential lies in particular in the *services offered to SMEs* that by definition require small and medium-sized projects. In this section of the market, competition is close to non-existent as the number of ESCOs is very limited compared to market demand and utility companies are hardly participating in it. As ready-made services typically offered by large companies for large projects are not easily adaptable to smaller project sizes, EES customization has strategic and competitive importance in this sector.

In **Portugal** innovative and differentiated EESs are expected for the *residential sector, for public buildings and for public lighting*.

In **Spain** the sectors with high potential demand for EES are *hospitals/health, national and local administrations* and the *residential* sector mainly. However for the development of new services some pre-conditions should be fulfilled: the development of the legal framework in the Spanish regions, the establishment of special financing lines and the definition of a business model. New information campaigns about new energy efficiency services are also judged necessary.

²⁵ Act no. 406/2000 Coll, on Energy Management; public property facilities exceeding the consumption of 1500 GJ/year and private facilities exceeding the consumption of 35,000 GJ/year (companies and individuals)

A potential for new and promising EES exists in *all sectors* in **Latvia**, whereas the most promising sectors in **Slovakia** are *industry* and the *residential sector*.

In **Slovenia** there is a need for new EES especially in the *residential, industry, commercial and public building sectors*.

In **Bulgaria** high potential for new and promising EES exists especially for *residential buildings, universities, industrial enterprises and hotels*. However the legal framework at the moment is not stimulating EES in any private sector.

In **Greece** the *industrial sector* has the greatest potential for new and promising EES. In addition, a great potential lies in the public sector (*local administrations, public hospitals, universities, etc.*) since many public/municipal buildings are in urgent need of EES. However bureaucracy and lack of funding represent an important barrier to EES implementation in this sector.

In **Poland** *primary and secondary schools, local administrations* (municipalities, provinces, regions), *health/hospitals, offices, the commercial and the industrial sector* in general have huge needs and potential for EES.

3.4.2 Technology/ fields of application for new and promising EES

A brief overview of the technologies and fields of application for new and promising EES is provided under this section. This overview does not cover all the 18 countries and regions as the information available in the country reports did not always achieve the necessary detail level.

In **Germany** energy efficient domestic appliance (e.g. refrigerators, freezers, dishwasher, washing machines), efficient lighting, electricity substitution (fuel-switching for space and water heating, cooking and cooling), heat optimisation, hydraulic adjustments, high efficient circulation pumps, thermal insulation following the low-energy house standard and renewal of edificial heating systems are judged as interesting fields of application for new and promising EES in the *residential sector*. Nevertheless the potential for EES in the residential sector currently is limited, mainly due to the landlord-tenant-dilemma and the fragmentation of this sector. Therefore, standardised products that can be offered on a mass market would have to be developed. Saving of fuel for process heat, efficient pumps, energy efficient model installation and optimised setting of engines and systems for ventilation and air conditioning, energy efficient process cooling and production of compressed air, heat recovery and efficient lighting are seen as promising EES fields of application in *industry*. However EES for industry often require specific know-how, technical equipment, good partnerships with suppliers and/or installers and setting up business cases needs thorough preparation. One risk for EES providers with long-term contracting projects in the industry sector is that there is a possibility that the customer becomes insolvent. Energy efficient model installation and optimised setting of systems for ventilation and air conditioning, reduced standby electricity consumption in ICT and TV's, efficient cooling of groceries through ready-to-use efficient refrigerators, electricity substitution (e.g. fuel-switching for space and water

heating, cooking and cooling), heat recovery and energy efficient lighting look promising fields of application in the *public, commercial and service* sectors.

In **Denmark** heat pumps combined with sun heating, industrial water heating, schools and education buildings in general, process optimization, energy efficient boilers and more efficient compressed air system in industry, solar heating panels, solar cells, bio mass, bio gas and wind mills, renovation of lighting related to the new EU regulation on lighting sources represent overall interesting technologies and fields of application for new and promising EES.

For **Sweden** electrical motors, office equipments, lighting in all sectors (and in offices in particular), pumps and fans are indicated as interesting fields of application for new and promising EES at the technology level, whereas optimization of compressed air systems, heating or cooling processes seem to have an interesting EES potential at the process level in the *industry* sector.

In **the Netherlands** EES consisting of a combination of energy savings and improvement of the indoor air quality like EES combining savings on energy use for heating and introduction of cooling at hot days²⁶ are seen as new and promising EES for *older existing dwellings* owned by the occupant. Potential for EES is judged considerable also in relation to insulation measures, heating and cooling installations and lighting equipment for *existing smaller buildings*. Also replacement of electricity using devices represent a potential for EES (in particular a promising EES could be coupled to existing practices in the commercial sector, e.g. the periodically refurbishment of shops, in combination with installing the most efficient lighting and devices). Another interesting field of application might be the management of daily energy usage in companies. However contrary to the one time decision on investment in energy efficient devices, management of daily energy use asks for a continuous effort. Despite this EES is high in the value chain of EES, indicating more complexity and relatively high costs for the EES provider, new ICT solutions, tailored to specific situations, could probably provide a cost-effective EES. Finally it is worth noticing that in the Netherlands no examples are known of EES companies involved in energy-efficient street lighting.

In **Czech Republic** the act on energy management that stipulates the obligation to carry out energy audits for public property and for private property exceeding certain energy consumption or production determines a very high market potential for energy consulting that includes auditing of energy production, consumption and use, and possibly also energy labelling. EES services including the implementation of measures recommended by the audit can become a part of a larger package, which might cover complex needs of the customer and lead to energy management outsourcing. Another new opportunity for EES that may be used in the future is the usage of the renewable energy resources. Increased funding for renewable sources is expected to continue increasing opportunities within this field in the following years. Finally another interesting field of activity, although not properly representing an

²⁶ seasonal exchange of heat and cold with the ground water, using heat pumps (called WKO in Dutch)

energy efficiency activity, is the emerging service of measuring energy consumption for peak load management.

In **France** the recent appearance of public-private partnerships (PPP) is changing the investment funding context. These special contractual arrangements should in effect allow performance targets to be introduced into invitations to tender, particularly with regard to defining the level of energy consumption to be attained. PPP contracts are global administrative contracts by which a local authority or a public establishment associates a third party with the funding, design, production, conversion, operation or maintenance of public equipment, or with the funding and management of services²⁷. Smart grid technology for the residential sector and building energy management systems for the built environment in general are important and promising technologies and fields of application for EES in this country.

In **Italy** technologies and fields of application for new and promising EES are represented by electrical motors/inverters, insulation and other measures in the construction sector, appliances in the domestic sectors, residential air conditioning, air conditioning and automation of continuous processes in industry and agriculture, co-generation and tri-generation in the civil, industry and agriculture sectors, lighting in all sectors, home and building automation, ICT and propulsion systems in the transport sector. Sport centres (with and without swimming pools) are typically considered as having large potential for EES provided by ESCOs as well. A problem related to EES in Italy is that the country has invested a lot on demand but not on the supply side; there have not been any investments in R&D or industry/company incentives to foster the production of energy efficient technologies. This has brought the supply side to be underdeveloped with respect to other European countries²⁸. In this way all large energy efficiency investments are entrusted to large foreign companies and most of the money invested in demand goes abroad without producing in-country economic returns.

In **Portugal** new EES are possible for *local administrations* with the creation of local ESCOs through private-public partnerships, which will manage the park of public buildings and public lighting. A current trend for *hotels* is the combined use of renewable energies and energy efficient technologies to create zero carbon solutions. In the residential sector, particularly in social housing, a potential for EES is represented by solutions for the community, like solar hot water production and solar electricity production (own generation facilities). These types of solutions are more feasible if designed in the building before construction during the project phase, and can be applied to condominiums, or with the integration of these consumers in smart grids and by enabling end-users to both buy and sell energy to the public grid.

²⁷ This type of contract is not a public contract or the delegation of a public service, but represents a new category of public contract that has a specific award procedure, even though there are numerous similarities with the delegation of a public service.

²⁸ For instance, Italy is doing well exploiting renewable energy sources but it does not produce renewable energy technologies for such exploitation (as opposed to Denmark with wind power technology or Germany with photovoltaic technology).

In **Spain** the opportunities for EES providers are mainly represented by the replacement of old heating and cooling systems by efficient ones, district heating, efficient street lighting and efficient indoor lighting, fuels' substitution, cogeneration and renewable energies in buildings and industries.

In **Latvia** energy performance contracting for the implementation of a full set of energy efficiency measures aiming to the reduction of heat and electricity demand is basically a promising scheme to be used in *primary and secondary schools*. Alternatively EPC only on lighting could be as well a promising scheme to be implemented in this sector. Energy delivery contracting, dealing with the operation of power generation plant is a promising scheme for *local administrations*. Regarding street lighting, an EPC clearly distinguishing the part of the project investment dealing with energy efficiency from the part of the project investment dealing with road and pedestrian path refurbishment is also a promising scheme for *local administrations*. EPCs addressing energy management in offices and in general in the *commercial and retail sectors* are also promising. "Energy partnership contracts"²⁹ between *industrial* enterprises and ESCOs represent an interesting potential for EES. In the *industry sector*, in particular among SMEs, the diffusion of energy management systems including energy consumption monitoring and energy saving benchmarking is particularly promising. Finally the adoption of EPC for the installation of efficient heating systems based on the guarantee of an agreed comfort level (e.g. room temperature) and the guarantee that the costs for heating will not be higher than the adjusted costs (adjusted for the current energy tariffs and weather conditions) agreed in a baseline study³⁰ represent an EES extremely innovative for the *residential sector* in Latvia.

In **Slovakia** the retrofitting of about 400 000 apartments mostly built between 1971 and 1983 as well as the retrofitting of tertiary and public sector buildings not fulfilling the energy efficiency standards indicated in the act No. 555/2005 on energy efficiency of buildings represent an important potential for EES.

In **Slovenia** technologies and fields of application for new and promising EES are represented by the insulation of building envelope and advanced metering in multi-apartment buildings in the *residential sector*. EPC for lighting system, compressed air production and energy efficient boilers are an interesting potential for EES in the *industry and commercial sectors*. EPC for lighting systems and energy efficient building refurbishment is also promising in the *public sector*.

In **Greece** EES related to heat delivery and contracting in the *industry sector* represent the highest potential. Also the *residential sector* seems to be promising for the implementation of advanced metering systems, once the legislation implementing

²⁹ By this contract an ESCO has established a new company where the shareholders are both the industrial enterprise and the ESCO. This new company takes over the energy management of the industrial enterprise both in terms of energy delivery and energy performance. The savings and investments are shared in function of the shareholder agreement of the new company.

³⁰ All ESCO income would be generated by the energy savings.

the EPBD at the national level will be in force. Due to the small project size in the household sector, the financing will be probably provided by the customers/clients which poses an additional obstacle when it comes to comparing related costs. Lately there has been an increasing interest in installing RES systems for power generation and energy savings both in the tertiary sector as well as households

In **Poland** space heating, domestic hot water heating by solar water heaters, indoor lighting and the rapidly increasing stock of home appliances and electronic equipment represent a potential for new and promising EES. A massive conversion of space heating in rural areas from (predominant) coal to biomass may represent a very interesting business opportunity for EES providers. However it is worth mentioning that so far domestic companies acting according to an ESCO or ESCO-like formula prefer investing in local administration ventures (particularly in street lighting and heating improvements), while - due to significant transaction and monitoring costs - they are rather reluctant to participate in residential sector individual projects.

3.5 Energy Efficiency Service financing and contracts

This section illustrates how EES are mainly financed in the countries participating in the ChangeBest project and which contracts are typically stipulated for their implementation based on the information collected in the country reports. The overview proposed distinguishes among three main financing typologies^{31,32}:

- **EES provider financing:** refers to financing with internal funds of the EES provider (i.e. the EES provider is the borrower) and may involve use of its own capital or funding through other debt or lease instruments.
- **Energy user/customer financing:** usually involves financing with internal funds of the energy user/customer backed or not by an energy saving guarantee provided by the EES provider (for instance an university can use its endowment fund to finance an energy project in which the energy savings are guaranteed by an EES provider). Energy-user/customer financing may also be associated with borrowing in the case when the energy-user/customer as a direct borrower has to provide a guarantee (collateral) to finance the institution.
- **Third-party financing (TPF)** refers solely to debt financing. As its name suggests, project financing comes from a third party, e.g. a finance institution

³¹ For more information about this financing typologies see “Energy Service Companies in Europe”, Status report 2005, Paolo Bertoldi and Silvia Rezessy, European Commission DG JRC, Institute for Environmental Sustainability, Renewable Energies Unit

³² Alternatively, the following three financing typologies from the customers' perspective might be considered: (1) self financing; (2) debt financing; (3) third party financing. See “Comparison of Different Finance Options for Energy Services”, by Bleyl, J.W., Suer, M., available at

<http://www.leadsm.org/ViewTask.aspx?ID=16&Task=16&Sort=0#ancPublications3>

and not from internal funds of EES provider or of the customer. The finance institution may either assume the rights to the energy savings or may take a security interest in the project equipment. There are two conceptually different TPF arrangements; the key difference between them is which party borrows the money: the EES provider or the customer:

- The first option is that the EES provider borrows the financial resources necessary for project implementation.
- The second option is that the energy user/customer takes a loan from a finance institution backed by an energy savings guarantee agreement with the EES provider showing that the energy savings achieved will certainly cover the debt repayment.

Subsidies and tax deductions by national governments can be seen as a specific financing instrument, because they lower the net investment needed and will be mentioned whereas they represent a substantial part of the EES business financing.

The contracts typically stipulated to finance and implement EESs are also described by distinguishing among **supply contracting** (focused on the supply of a set of energy services mainly via outsourcing the energy supply), **energy performance contracting** (where the EES providers use the stream of income from the cost savings to repay the costs of the project, including the costs of the investment) and **other contracting types** (e.g. leasing, Build-Own-Operate-Transfer – BOOT-contracts³³, chauffage³⁴, etc.).

Clearly, financing typologies and contracts stipulated to implement EES depend on the various national framework conditions as well as on the type and characteristics of the provider and the energy end-user respectively supplying and demanding EES.

In **Germany** it is common practice that the contracting company takes care of the financing. In case of large projects significant financing may be necessary and often contracting companies are forced to take out a loan for a specific larger project. However, energy companies – particularly larger ones – usually have sufficient financial options available to pre-finance the EES business and its extension. In contrast to capital market instruments used by larger energy companies, standard financing of municipal energy companies is mixed financing by own capital and

³³ These contracts (Build-Own-Operate-Transfer) may involve an EES provider designing, building, financing, owning, and operating the equipment for a defined period of time and then transferring its ownership to the client. These are long term supply contracts where the service charges include capital and operating costs recovery as well as project profit.

³⁴ The EES provider takes over complete responsibility for the provision of an agreed set of energy services. This arrangement is an extreme form of energy management outsourcing. Where the EES market is competitive, the EES provider also takes over responsibility for fuel/electricity purchasing. The fee paid by the client is calculated on the basis of its existing energy bill minus a percentage saving so that the client is guaranteed immediate savings. The more efficient is the EES provider, the greater its earnings. Chauffage contracts give the strongest incentives to EES providers to provide effective and efficient services.

regular and/or project financing by (local) banks via credits. Concerning contracts stipulated for EES provision, most companies offer energy supply contracting that may include energy efficiency improvements and the number of companies offering energy performance contracting is limited (around 50 companies). The most common type of EPC contracting used is shared savings. A new trend in Germany regarding contracting is the development of partial financing models, with own contributions by the client or including public subsidy programmes.

EESs are mainly financed in **Denmark** by energy user/customer financing, or third-party financing where the energy user/customer takes a loan from a finance institution. In a few cases, mixed EES provider and customer financing might appear. Utilities under the energy saving obligation typically provide subsidies for the implementation without any energy saving guarantee. The contracts are either supply contracting (often used by utilities) or EPC (typically used by ESCOs). The EPC contracts are typically guaranteed savings contracts.

In **Flanders** energy user/customer financing is without any doubt the most important way of financing EES (especially in the building sector). EES provider financing is relatively new and is until now mainly focused on supply contracting (e.g. supplying steam, heat, etc. at a certain unit price) or on the energy performance contracting of clearly delimited installations. Note that until now, energy distribution companies realise only to a very limited extent pre-financing of EES. Indeed, they stimulate EES not so much via loans but via 'energy premiums' that are a sort of subsidy that cover a part of the cost of the energy saving measure. They recover the costs for these premiums via special energy distribution taxes on the distributed energy. TPF is in most cases integrated in an EPC in Flanders.

In **Sweden** some EPC providers can offer financing solutions, either through their internal financing division or through arranging with a third party financing institution. However, such offers are rarely asked for by EPC customers. Most customers and especially the institutional/public sector prefer to finance investments through a combination of internal funds and loan uptake. The credit terms that they receive will often outdo terms given by EPC providers. Customer financing is the predominant method and customers often state the benefit of separating the financing methodology from the energy saving guarantee. From the customer perspective TPF arrangements are perceived to be associated with complications.

In the **Netherlands** financing of energy efficiency projects can be done either by the EES company itself or by the energy customer, and either using internal funds (shareholders' equity or other) or by issuing debt (third party financing). Most of the EES companies apply all financing combinations. Whether the investments are made by the EES company or the energy customer depends on whatever financing construction suits best the demands of the energy customer. A majority of the EES companies state to offer financing and use a mix of debt and equity financing. The use of energy performance contracts is not common practice in the Netherlands.

In **Austria** customer financing is the preferred financing form by both energy utilities and ESCOs, although EES provider financing and third party financing are also commonly used, as well as all forms mixing these types (especially for larger

refurbishment projects including common renovation and EES parts). Regarding contract types, a large variety exists either. Supply contracts are used frequently to finance energy supply infrastructure (particularly biomass heating) and EPCs are used to implement energy efficiency improvement measures in existing buildings. Most of the EPCs are based on the guaranteed savings model. It may happen that EPCs are replaced by operation and maintenance contracts upon expiration to maintain continuity. Leasing contracts are also common for building technology installations.

In **France** direct customer financing is the most commonly used financing typology for EES provided by energy companies to all customer groups, although these companies make some use of TPF in the residential sector. In this country customer financing is also the financing typology mainly employed in case of EES provided by ESCOs in the institutional sector (local administrations, hospitals, etc.), whereas EES offered to the private sector (hotels, offices, commercial, retail and industry sectors mainly) are often financed with ESCO internal funds. EPC is a quite common practice in France.

In **Italy** EES provider financing as well as TPF (especially in the public sector) is quite common among ESCOs. These EES providers (especially the big ones) also apply project financing schemes³⁵. The Italian EES market has so far received a significant support from tax deductions, subsidised loans, feed-in tariff mechanisms and (to a lesser extent) the white certificate scheme currently in place. An innovative financial scheme for families, natural persons owning homes and condominiums (very common in Italy) introduced to implement energy efficiency measures and services is represented by the so-called “Mutuo a-profitto”³⁶. In practice it consists in an interest free bank loan for which the interests are paid by local administrations and financial institutions, thus activating a co-funding mechanism by the banking system and the public administration. EPCs are not widely used across the Italian territory. This is because there are barriers to third party financing which is essential for projects where available funds (of the EES provider) are not sufficient to cover the whole initial investment. In general EPCs tend to be used on small energy efficiency projects, especially by ESCOs and in the public sector, whereas utility companies are more likely to use contracts more similar to a traditional supply contracting (for the sale of electricity and heating). About 50% of the EPCs are stipulated with guaranteed savings in this country.

In the **Czech Republic** financing the EES by the EES provider’s own means is fairly common (especially in case the EES provider being an ESCO), particularly in the public sector, where the public institution rating is high enough to allow the provider to access a loan. Energy user/customer financing is used in cases when a significant initial investment exceeding the loan possibilities of the provider is required, and yet

³⁵ A project financing scheme is intended here as a long term financial operation that consists in using a newly constituted company, so-called Special Purpose Company, that serves to maintain projects assets separate from those of the proponents of the investment initiative (called “promoters”).

³⁶ This term could be literally translated as “Profit Mortgage”.

the customer has his own fairly good structure of financing and/or has the possibility to deploy his own financial capital. In this case, the price for the service, including the reward for financing, is usually lower than in the case of EES provider financing. Some ESCOs choose to sell the outstanding debt to a third party (usually banking/finance entity). Most of the EPC stipulated in the Czech Republic are shared savings, although the competition on the EPC market is not abundant and the truth is that some suppliers often misrepresent a simple equipment delivery or a contract of energy supply to be an EPC.

In **Portugal** ESCOs prefer energy user/customer financing typology. TPF with the EES provider borrowing the financial resources necessary for project implementation is rare, but can be found. The energy companies prefer to invest directly since they normally have strong financial resources available from their residential and corporate business activity. The most frequent contracts stipulated to finance EESs in Portugal are the supply contracting and BOOT contract. The Energy performance contracts are still rare in Portugal and can be established based on guaranteed savings or shared savings, according to the risks accepted by the customer.

In **Spain** the EES financing is partly provided by the energy efficiency service company in most of the implemented projects. The medium industry and some tertiary sectors utilise the customer financing typology with credit loans from banks. TPF is used by national companies as installer companies in many projects. EPC and energy supply contracting are used for large investments in industries and public buildings. Only a few ESCOs can provide EPC.

TPF is the most common form of project financing in **Latvia**. In this country bank credit in the form of loans ranks among the most common form of external financing. Bank loans may be provided for even relatively small projects. The main reasons for this has been the development of a solid private and public banking system needed for the development of the Latvian economy after 1990. Several foreign banks, in particular from the Scandinavian countries and Germany opened local branches in Latvia and provided the market with a solid and reliable banking system. Banks require very high level of guarantees for TPF to ESCO, given the general lack of experience and the very few implemented projects by ESCOs in Latvia. On the other hand, ESCOs are typically working with TPF with the smallest possible level of equity. Some companies have considered the idea to set up a financing department for facilitating the sales of their equipment. The scheme would work on similar bases as a leasing agreement, but without any third part in the middle. Energy companies are making use of TPF, but their experience is mainly based on project financing for their core business. For large projects they typically receive support from international and European banks.

In **Slovakia** the simplest and most important source of finance is equity financing (full or partial) by project investor/project owner which is applied in almost every project. The next most important source of finance is customer debt financing with loan and leasing being the most typical form of debt financing. Grants, subsidies and subsidized loans are another popular method of financing EES. However they are

difficult to get as they are frequently linked with lobbyist procedures and with other political aspects. Concerning contracts, few companies (notably multinational companies) started with EPC.

In **Slovenia** EES are mainly financed through TPF where commercial banks usually cover most of the project costs. Most of the contracts are in the form of EPC (in case of ESCOs) and/or supply contracting (in case of energy companies being the EES providers). However (big) energy companies deliver their EES (as a support or secondary activity) through energy selling mainly by using their own financial capacities. EPCs stipulated in Slovenia are both guaranteed savings and shared savings contracts.

In **Estonia** the most important EES financing source has been so far represented by the state investment support. In general EES provider financing is not a common practice, whereas energy user/customer financing is on the contrary very common (most of the housing associations are financing their renovations through renovation funds collected and also industrial companies are investing for EES through their own budgets). TPF is also very common in housing associations if resources from renovation funds are not sufficient. EPC is not common and contracting types stipulated are mostly represented by leasing contracts.

In **Bulgaria** EES provider financing and TPF (with the EES provider borrowing EES investment funds in particular) are equally used. TPF comes mainly from commercial banks and by the energy saving fund established by Enemona (the largest ESCO in the country). In this latter case the funds are used to purchase receivables from EPCs carried out by Enemona, the fund's majority shareholder. Energy customer financing represents a promising financing typology in the public sector. The contracts typically stipulated to finance EESs are EPCs with guaranteed savings.

In **Greece** energy user financing and financing by banks are typically used, whereas EES providers do not generally finance EES. ESCOs are trying to combine EES provider financing with customer financing and TPF. The main obstacle is represented by high bank interest rates which make energy efficiency projects unprofitable in many cases.

In **Poland** EES provider financing with provider internal funds is rare. The most frequent financing typology is energy user/customer financing, which is very seldom backed by an energy saving guarantee by the EES provider. TPF has been quite popular, especially in case of EES investments undertaken by local administrations (especially for street lighting). In general EPC is not yet a common practice in Poland.

The table below illustrates in which countries the EES provider financing represents a common practice and in which countries the identification of EES financing sources remains mostly under customer responsibility. This table may serve to get a rough indication about the countries where the EES providers play an important role in EES financing.

Table 5: Role played by EES providers and customers in EES financing

	Financing typologies mainly used	
	Customer financing	EES provider financing
DE		X
DK	X	
BE	X	
SE	X	
NL	X	X
AT	X	
FR	X	X
IT		X
CZ		X
PT	X	
ES	X	X
LV	X	
SK		X
SL		X
EE	X	
BG		X
EL	X	
PL	X	

The overview performed highlighted that a quite common problem with EES financing may be represented by the fact that large companies involved in EES implementation have a tendency to work with the international financial market, while small companies go to local bank directors who offer them traditional loans. The problem is that the loans offered are generally short-term loans which hence do not cover the entire investment payback period for an energy efficiency project, therefore often a new loan from a new bank is necessary to cover the first loan. This explains the industry's dependence on the banking system. This problem of course occurs seldom in the tertiary sector as there is more limited business risk – hospitals, train stations, schools, etc. can not close down. One problem with banks is collateral: the loans they offer are generally guaranteed by the borrower's private assets rather than by project results. As far as EPC is concerned, the overview indicates that EPC may come with several problems. One problem concerns the guaranteed performance that should be provided by EES companies. This demands reliable monitoring of energy savings achieved, for which comprehensive and therefore costly and time consuming measurement protocols need to be set up. Another problem that emerged are the risks that EES companies are running associated with accounts receivables. Since the payments to be received from EES customers have the risk of default, a special 'guarantee fund' raised by the government could be a way to reduce this risk for EES companies.

Concerning the EPC concept as introduced by the ESD, an important point relates to its interpretation by EES market players. Conceptually and formally, this concept should be understood as the establishment of a joint venture for the achievement of a

common goal, rather than as a service agreement (whereby a service is provided in exchange of a previously agreed fee – like the other types of contracts applied in the past). From such a viewpoint, the parties involved into the contractual agreement, aim to achieve energy savings, measured e.g. in KWh, together, as a common objective, for which one party invests capital resources and the other invests technological and human resources, both of which will be repaid by sharing the economic savings (avoided costs) derived from the realization of the common goal. Such an approach creates a win-win situation where all parties involved gain from the investments made on energy efficiency improvement. While service agreements are such that the client aims to save money on his energy bills (therefore his goal is an economic one) and the provider aims to sell and be paid for the provision of a service (also an economic goal), energy performance contracts are based on a common objective of the parties, an economic and technical one (as savings are determined in energy volume). Unfortunately this concept is often misunderstood by most market players when stipulating EPC.

3.6 Most commonly adopted and promising marketing strategies

The various marketing strategies adopted in the countries analysed have resulted to depend mainly on the *national framework conditions* (as e.g. national economy status, energy market situation, energy prices, possible energy policies stimulating the EES market in place), the *EES market development status* (as e.g. marketing strategies adopted in well developed EES markets are markedly different from marketing strategies applied in EES markets that are in a preliminary stage of development), the *EES provider internal framework conditions* (as e.g. larger EES provider company structure and market approach will be typically different from smaller EES provider ones', as well as EES providers whose core business is energy supply will approach the EES market in a different way with respect to EES providers whose business is concentrated on EES), the *different characteristics of the various customer groups* (as e.g. large and very energy intensive enterprises may require to be approached by EES providers in a different way with respect to e.g. small and not very energy intensive enterprises) .

Concerning the *national framework conditions* and the *EES market development status* possibly existing in a given country, the degree of energy markets' liberalization has typically an important impact on the EES market approach by energy companies and ESCOs. In countries like **Portugal**, where the energy market is considered as "far from being liberalized", the typically well established energy companies are usually poorly interested in customer loyalty issues and in the possibility of strengthening their relationships with their customers by offering EES. On the other hand, the few existing ESCOs bring to the market new, more efficient technology at better prices, and are capable of supplying EES with higher quality and higher sustainability. The level of the energy prices is another important national framework condition in close relation to existing EES market opportunities. In **Poland** the low level of the energy prices and the high fraction of household income spent for

energy supply makes government support and incentives to EES highly necessary for EES market development. In countries like Poland possible incentive campaigns need to be accompanied with large scale information campaigns that make clear supported EES profitability and benefits. Information and awareness raising may be pursued also by advisory centres operated by energy companies or EES providers in general³⁷. Energy prices have proven determinant for EES market development and the adoption of suitable EES market strategies also in **Czech Republic** where a proper EES market could develop only when the energy price was sufficiently high with respect to the price of energy efficient technologies. In countries with a quite well developed EES market (e.g. Germany, Denmark, Flanders) the main marketing strategies adopted seem to consist in direct marketing (e.g. by account managers), dissemination of success stories and information through the media and the company websites (especially for the residential and industry sectors). Personal contact, knowledge and presentation of possibilities for financing and financial services, are also important added values for marketing strategies addressing the public and industry sectors. In these countries initiatives to better structuring the EES market may represent an important driver for market development. For example in **Flanders** a federation of Belgian players in the EPC/TPF market was established to provide information and education on EPC, to create good practice contracts and to create an EPC control and evaluation organisation. In general the example given by the state, by applying the existing legislation on EES to its buildings and the implementation of pilot projects in several areas, in particular for innovative technologies whose economic feasibility is still difficult, are deemed important factors for the creation of favourable national framework conditions for the development of the EES market.

Concerning *EES provider internal framework conditions* there are in general two main variables defining the strategic structure of the EES market:

- being part of a multi-utility group or multinational company active in the energy sector which guarantees greater visibility, a large consumer base and financial resources;
- being a pure ESCO approaching the energy efficiency service market.

These two variables typically separate the market into two corresponding strategic groups. The first group is typically composed of companies coming from the engineering sector (facility management, installation and maintenance of thermal and refrigerating plants, etc.), that usually manage directly the construction and/or sale of new plants (an activity that is not necessarily offered by ESCOs) and are able to finance large energy efficiency projects because of their parent company's resources. The second group typically offers an "integrated service" that starts from energy audits and energy advice and ends with the management and maintenance of new plants and equipments, determining the achievement of energy use

³⁷ These market instruments are in general highly needed wherever economic incentives represent an important part of the EES business, like e.g. in Flanders where energy utilities subsidize specific EES because of the energy saving obligation in place.

rationalization and energy savings. Normally these companies are more recent and small or medium sized. The market strategy adopted by the first group derives among others from its higher lobbying capacity and the greater experience in public tenders, which are important factors to overcome existing competitors addressing EES for the public sector. On the other hand large EES providers may not have adequate building capacity or the adequate know-how to implement EES whereas smaller EES providers may have the necessary technical skills to supply the whole EES product value chain and to better fulfil customer needs by providing customized service³⁸. This scenario often determines the conditions for a profitable collaboration between the above mentioned two company groups. In case larger companies are energy companies, the smaller and more skilled energy services companies may act between energy companies and their customers, by negotiating with energy companies the best supply conditions, and offering an integrated solution (EES and energy supply). This would be a win-win situation for all agents: skilled ESCOs would offer better quality services and energy companies would increase their market share and would retain their customers with less commercial effort. On the other side, customers would benefit from a better service: supply of energy and more customized energy end-use efficiency services.

Concerning the different market strategies that might be needed to address the various *customer groups*, some good practice examples and marketing rationales might be illustrated according to the following customer segmentation³⁹:

- a) *small and not very energy intense enterprise*
- b) *small and very energy intense enterprise*
- c) *not very energy intense medium sized enterprise*
- d) *energy intensive medium sized enterprise*
- e) *large not very energy intense enterprise*
- f) *large and very energy intense enterprise*

A small and not very energy intense enterprise might be for example a barbershop with few employees whose energy usage is limited to usual lighting and heating. Therefore approaching of this enterprise type should be arranged for example via industry associations and by sending it information materials on energy efficient light

³⁸ Concerning the supply of customized EES, an interesting example may be represented by an initiative undertaken by a small ESCO in Flanders. This ESCO has developed an EES for non residential building heating systems that has proved very effective in terms of achieved energy savings. This EES consists in a simple audit of the heating plant control system, the offering of a no-cure-no-pay contract to the client and the installation of an internet based follow-up of the heating control.

³⁹ The text below describing the good practice examples for the different customer groups has been mainly taken by the report on the EES business in Estonia as produced in the framework of the ChangeBest project.

bulbs, efficient room ventilation techniques and heating systems. It is not advisable to try to “sell” to this enterprise type energy efficiency services as energy audits, monitoring equipment or technology refurbishment. It is foreseen that the investment spent for individual client approach is not rewarding enough given the probably poor result achievable.

A small and very energy intense enterprise might be a venture where only few people are employed, but whose segment of activity is rather oriented towards production than servicing. For example the named type of enterprise may have a production line of wood processing. The classical wood processing enterprise has different basic technology steps as drying, milling, edging and detail finalization. Each step requires its own energy efficient solution - thermal energy delivery for drying a raw material and for heating buildings; electricity for electrical drives/motors, lighting, ventilation and air conditioning. Although the features described here might be similar for bigger enterprises, the differentiation between small and big enterprises does not lie in the description of the technology processes, but rather in the administrative and financial strength of a company possibly allowing to overlook the energy intensity of its technology. The administrative strength is usually a crucial point in responding the assistance offer by EES suppliers. Small enterprises usually do not have available manpower to react on offers that envisage to create some additional revenue after a usually not very clearly defined time period and require investments at first instance. Small companies tend to work on the edge of their performance where all operational intensity is attributed towards keeping the work process without interruptions. Therefore, when the offer for raising the efficiency of technology may cost additional investments and delay in delivering the goods to the market due to technology change, the managers of the plant shall rather keep all energy efficiency offers on hold. Still, approaching small and very energy intense enterprises and making the offer for raising the energy efficiency of the plant is not impossible. The approach should be more tailored, accompanied with incentive schemes and free of charge consultation services in order to deliver more costly refurbishment services. The offer for technology change must come alongside with an investment facilitation offer that might include assistance for bond underwriting procedure, equity placement and other financial means. All in all, the named enterprise sector tends to be one of the most challenging segment for EES as the need for real actions are very easily identified if administrative barriers are overcome.

A not very energy intense medium sized enterprise can be described as an office building or a hotel or a hospital for example. It is rather a service sector enterprise than an industrial company. Therefore the addressing of the named service sector enterprise must be also tuned to its activity customs and involve an as much as possible exact description of its energy usage and possible leakage areas. Basically the main energy usage by this company type comes from building facilities – heating, cooling, ventilation, lighting, small office appliances and transportation. It might happen that one sub sector is more relevant than another – therefore a detailed scrutiny of company specifics is a must before approaching this company type with a service offer. Take for example a big international 5 star hotel that is offering to its customers a complimentary airport pick-up. This hotel might have on its balance

sheet higher costs for transportation than for heating. Therefore a possible approaching letter should offer to analyse its vehicle fleet or route map and after that other services of relevance. Also benchmarking service is important. If similar building types are having totally different consumption figures, it is useful to point to the very fact and to try to persuade the building managers to look more closely at consumption figures by sub-sectors. In order to offer a benchmarking service, it is good to have access to some type of consumption data via utility or via online monitoring. As this enterprise type is usually labour intensive, the access to data should not be very complicated. Local administrations and public buildings in general may be considered as having the same characteristics (with respect to the EES that might be provided) of most of the private enterprises falling under this company category. Nevertheless the strategy needed to approach local administrations might be completely different due to the public procurement rules typically applied in this sector.

An energy intensive medium sized enterprise is rather a medium sized local industry acting on the secondary market and producing sub-products for a specific industrial sector – e.g. a windows manufacturer working for a construction industry or a welding company working for a steel industry. As subcontractors of a bigger industrial sector, they tend to have a local management capable to solve efficiency questions on a local level. This gives an edge for offering EES when approaching the named enterprise type. For this company type the market efficiency is crucial. This company type thinks in terms of economies of scale, in the added value that characterizes a production process where an increase in the output units causes a decrease in the long run average cost of each unit. The optimization of the process flow, the minimization of unit costs and the technological reliability are a key factor for the named enterprise type to be more efficient at winning subcontracts on the national and international arena. By current practice of energy efficiency servicing it is seen that these enterprises are more willing to respond to EES offers, but on the other hand higher quality demand and efficiency estimations may put heavier pressure on the service provider. As in small energy intense enterprises, the tailor made solutions are a must and financial arbitration might bring additional revenues to both parties.

A large not very energy intense enterprise might be the head-quarter of an international company or a national branch of a multinational company. These company types are very difficult to approach as the identification of key persons in a multinational administration system is rather complicated. Usually the policy making departments of such companies are well informed about European level policies, i.e. energy efficiency policies and top-down approach or implementation of justified measures are very likely to be well known.

In general a suitable market strategy should be developed not only to create new business opportunities and contacts with potential customers, but also to ensure a successful EES implementation once preliminary contacts with potential customers have been established, regardless the particular customer group that is being addressed. Suitable and successful strategies should be indeed developed for each of the steps leading to EES implementation from the preliminary analysis to the

conclusion of the activities planned. The following table provides an exemplary list of the main implementation steps for an integrated EES that from the preliminary project analysis ranges to energy saving measurement and verification and indicates the main failure and success factors that should be taken into account for each step while developing a suitable market strategy for this EES.

Table 6: Exemplary list of the main implementation steps for an integrated EES and related failure and success factors⁴⁰.

EES implementation steps	Success and failure factors
Preliminary project analysis	The quality of the preliminary analysis is crucial for the development of the project, although a trade off between the costs borne to perform the preliminary analysis, the existing chances to actually implement the project and the project profitability should be taken into account.
Elaboration of the commercial proposal	If this proposal is not clear there is a risk to not implement even a good project. Presenting possibilities for financing and financial services may be an added value.
Negotiation of the proposal, evaluation	To create a good partnership relation with the customer is important to gain his confidence.
Proposal approval/ contract	If previous stages succeed the risks have been minimized
Investment	Guaranteeing that the investment is appropriate and is applied to achieve the objectives established is important.
Inspections and audits	This step is important to determine the existing economic saving potential.
Technical planning	Expertise and know-how are fundamental during this phase to ensure project success
Implementation (optimisation of technical operation, supervision)	Guaranteeing the management of the system by using qualified staff and by assuring a good and transparent communication among the involved parties.
Saving measurement and verification	A very important step in selling the service is knowing how to guarantee the customer an accurate estimate / measure of the forecasted savings achievable under the contract (especially for EPCs), including all assessments required for the applied tariff calculation.
Conclusion of the project/term of the contract	A good result will give a good advertisement to the action. Moreover post-installation communication and control – to be close to the client during the entire period of the operation – is very important for optimization of the result of the activity and could help to increase the scope of the cooperation even after project termination.

⁴⁰ Information in this table have been extrapolated from the report on the EES business in Portugal as produced in the framework of the ChangeBest project.

4 EES product and business strategy good practice examples

At least three EES products representing good practice examples have been documented in most of the country reports used as information basis for the present cross-country analysis. These examples relate both to B2B⁴¹ EES products and to B2C⁴² EES products. For each good practice example the adoption of a specific EES product has been described and justified based on EES provider specific business environment in the country reports. For example the specific EES provider background for adopting, adapting and marketing the specific EES, its expected business benefits, the options considered (e.g. target groups; region addressed) and some quantitative consideration about expected costs, expected changes and risks have been possibly illustrated. When describing the case studies it has been explained why they can be considered as good practice examples and which are the typical mistakes avoided when implementing them. Conditions for good practice replication in other countries have also been possibly mentioned. Finally possible references for further information about the good practice examples considered have been indicated. The table below reports the summary information about the 44 good practice examples documented in the country reports. Information on EES product value chain stages addressed and EES financing typologies adopted in the examples have been indexed in this table as follows:

EES product value chain stages:

- 1) awareness raising,
- 2) information and energy advice,
- 3) identification of measures,
- 4) technical planning,
- 5) financing and subsidies,
- 6) implementation (operation, supervision),
- 7) optimisation of technical operation,
- 8) saving measurement and verification..

EES financing typologies

⁴¹ B2B stands for **B**usiness to **B**usiness and means a contract between two companies (e.g.: housing companies, municipality (public buildings), crafts enterprises, Retail industry, property developer rising up a settlement, etc.)

⁴² B2C stands for **B**usiness to **C**ustomer and means a contract between a company (e.g. EES provider) and a private person (e.g.: tenants, private single house owners, private owners of small multifamily houses, buyers of prefabricated single houses, etc.)

- 1) EES provider financing,
- 2) energy user/customer financing,
- 3) Third-party financing:
 - a) the EES provider borrows the financial resources necessary for project implementation
 - b) energy user/customer takes a loan from a finance institution backed by an energy savings guarantee agreement with the EES provider showing that the energy savings achieved will certainly cover the debt repayment.

Table 7: Summary information about the 41 business strategy good practice examples documented in the country reports.

	Country	EES provider	Sector(s) addressed	Technology/field of application	EES value chain stages	EES financing typology	EES Contract type	EES type
1	DE	Private public multi-service company	Residential sector, housing industry, industry, commerce and public authorities	Space and domestic water heating	1-8	1	Energy supply contracting	B2C
2	DE	Private public energy company	Bakeries	Heat supply and energy management	1-6	1	BOOT	B2B
3	DE	Building technology multinational company	Public buildings, hospitals, swimming pools, universities, industry	Systems and services for building automation	1-8	1	Share of energy savings	B2B
4	DE	Private public energy company	Industry, SME	Compressed air	3-8	1	Compressed air supply contracting	B2B
5	DK	Energy company	Hotel, holiday centre	Solar heating, heat pumps, bio-full pillars, energy management system, wind mill	3-8	2	EES consultancy	B2B
6	DK	ESCO	Municipality public buildings	Insulation, new burners, ventilation lighting, education	3-8	3b	ESCO	B2B
7	DK	Energy company	Retail: Clothing shop	LED, air conditioning, maintenance	3-8	2	Basic EES support	B2B
8	BE	Public ESCO	Federal government buildings	Insulation, HVAC, ICT	1-8	1,2	EPC	B2B
9	SE	Private ESCOs	Public sector	HVAC, education	1-8	2	EPC	B2B
10	SE	Energy company	Institutional and private sector (including residential)	User friendly interface giving feedback on electricity and heating demand.	1	n.a.	n.a.	B2B, B2C

11	NL	Anonymous	Built environment and Industry	CHP, energy management, process steam, insulation, lighting	1-8	1	Outsourcing (supply) contracts	B2B
12	AT	Energy Distributor	Residential	Electric appliances	1,2,3	2	n.a.	B2B
13	AT	Energy Distributor	Residential	Heating systems	5	1,2	n.a.	B2B
14	AT	Banks	Residential	Refurbishment	1,2,5	3	n.a.	B2B
15	AT	Various ESCO types	Public buildings	Refurbishment, installation of various EE technologies	3-8	1,2,3	EPC	B2B
16	FR	Private ESCO	Non residential buildings	HVAC system optimisation	1-8	n.a.	n.a.	B2B
17	FR	Private ESCOs	Local administration	Street lighting	3-4-6-7-8	2	energy supply contract and shared savings	B2B
18	FR	Retail energy sale company	Commercial, industrial and residential sectors	Project management services under the TWC	1-5	1-2-3	n.a.	B2B, B2C
19	IT	Energy agency	Primary and secondary schools	Energy management, training and information, efficient heating and lighting	2-3-4-6-8	1	Shared savings	B2B
20	IT	ESCOs	Municipality	lighting, public transport, electricity provision, building insulation	2-8	1+EU funding	n.a.	B2B
21	IT	Energy company	Residential, transport	Communication and awareness raising	1,8	1	n.a.	B2C
22	CZ	Private ESCO	National theatre	waste heat utilization, boilers, frequency converter, lighting, energy management	1-8	1	shared savings contract	B2B
23	CZ	Private ESCO	Hospital	boilers, heating system, energy management	1-8	1	shared savings contract	B2B
24	CZ	Private ESCO	Hospital	boilers, heating systems, energy management	2, 3, 4, 5, 6, 7, 8	1	shared savings contract	B2B
25	PT	ESCO	Hotel + Hospital	CHP	n.a.	1	EPC- Shared savings contract	B2B
26	PT	ESCO	Office, commercial	Lighting	1-8	2	EPC- Shared savings contract	B2B

27	PT	Energy Consulting Company	Restaurants, residential homes for elderly people, schools	Boilers for water heating	1-7	1 (80%)+ 2 (20%)	EPC- Shared savings contract	B2B, B2C
28	ES	ESCO	Industry	Industrial process	3	1	To be defined	B2B
29	ES	ESCO	Hospital	heating and air conditioning	4	1	Administrative contract for energy efficiency service provision	B2B
30	ES	ESCO	Residential	Biomass heating system	6	1	Chauffage with shared savings	B2C
31	LV	Private ESCO	Local administrations (municipalities, provinces, regions)	Public lighting	5,6,8	3	EPC	B2B
32	LV	Private ESCO	Industry	CHP, EE buildings, process integration and energy management	1-8	1,2,3	Shareholder agreement	B2B
33	LV	Private ESCO	Residential	Building envelope, space heating system and DHW.	1-8	2, 3	EPC	B2C
34	SK	Multinational ESCO	General Municipality	HVAC, Heat, Lighting, maintenance	1-8	3b	EPC	B2B
35	SK	Multinational ESCO	Office buildings, industry buildings	HVAC, Heat, lighting	1-8	3b	EPC	B2B
36	SK	Private ESCO	Administration buildings	HVAC, Heat, Hot water	1-8	1	n.a.	B2B
37	SL	Private ESCO	Public sector	Street lighting	1-8	3a	EPC	B2B
38	SL	Private ESCO	Public sector	Air conditioning and pool-water treatment	1-8	3a	EPC	B2B
39	SL	Private ESCO	Private sector	Indoor lighting	1-8	3a	EPC	B2B
40	BG	Private ESCO	Schools and administrative buildings	Fuel switch (light fuel oil substitution with natural gas or biomass)	1-8	1	EPC	B2B
41	BG	Private ESCO	SMEs and multifamily residential building	biomass heating plant installation	1,2,3,4, 5,6,7	1+government support	Energy supply contract	B2B, B2C
42	EL	ESCO	Industry	Solar Thermal System	1-8	3b	EPC	B2B
43	EL	ESCO	Industry	Solar Thermal System	1-8	3b	EPC	B2B
44	EL	ESCO	Industry	CHP	1-8	3b	EPC	B2B

The descriptions of the examples provided in the country reports have been scanned in order to assess what makes these examples best practice examples, which criteria have been adopted to select them by the experts having realised the country analyses, which are the examples most frequently mentioned, which are the most advanced best practice examples highlighted by these analyses. While doing so it

has been taken into account that the different national framework conditions have surely had an important role in the selection performed by the experts and that what may be considered as an advanced best practice example in a country might hence represent an already common practice in another country where the EES market is more developed.

Concerning the selection criteria adopted by the experts having performed the country analyses and the factors making the selected examples best practice examples, the scan performed indicates that the following main aspects have been given higher priority while selecting these examples:

- The example has stimulated activities and collaboration by a large number of different EES market actors (e.g. EE equipment installers and manufacturers, EES providers, public authorities, building companies, energy end-users, etc.).
- The example has raised awareness on EES and highly contributed to training and information of public administration technical staff.
- The example allowed exploiting existing high economic energy saving potentials with short pay back times.
- Risk management and guarantees offered about the energy savings to be achieved made the EES particularly attractive and interesting for the customers.
- The EES financing mechanism adopted has been particularly innovative in the country considered.
- The service is provided by an energy company and serves to increase customer loyalty while incentivising EES implementation and raising awareness about EES.
- The example represented an opportunity to advertise CO₂ neutrality while adopting advanced energy management standards and guidelines for efficient design of buildings.
- The example combines relevant reductions in energy consumption with improved comfort.
- The example might lead to complex planning services to optimise renewable energy supply for buildings, industrial sites, whole dwellings, cities, etc..

All in all the most frequently mentioned and most interesting best practice examples described in the country reports seem to concern EESs related to street lighting, EE improvement measures for public buildings, hotels and hospitals, indoor lighting for private non residential buildings and industry processes.

A brief summary of five best practice examples described in these reports is provided in the text below. These five examples have been selected because they have been judged as particularly relevant in the countries where they have been implemented. However it might be worthy mentioning that the high innovation degree conveyed by

these examples has not necessarily represented a criterion adopted for their selection by the country analyses' authors (see indeed the list of the main adopted selection criteria reported in the text above) and that the innovation brought by the realisation of these best practice examples remains in any case to be assessed against the national framework conditions, the EES market status in the countries where they have been implemented and the specific situation of the companies having implemented them.

1) *Halogen spots substitution with LED lamps in a Danish shop.*

Although its service elements are likely to not be very relevant, this example has been selected because of the large economic saving potential represented by replacing all the halogen lighting in retail, hotels, restaurants, households, because LED applications are not yet very widespread in the EU countries, because of the EES extra benefits for the indoor climate and the lighting system maintenance (especially in shops) and because of the very short EES investment payback time.

The Danish Clothing shop Grønfeldt was using 100 halogen spots in the shop with a lot of inconvenience due to heating from the halogen spots and the frequent shifting of burned out halogen spots. After direct contact from the shop, a local EES provider and a lighting manufacturer provided a LED solution whereby all 100 halogen spots were directly replaced by LED spots (without change of luminaire) with a much lower wattage. Important yearly savings have been generated primary due to less lighting consumption but also due to lower air conditioning consumption and less maintenance costs since the LED lamp lifetime is at least 10 times longer than the halogen lifetime. The investment payback time has been less than a year.

2) *EES provision by an energy company under energy saving obligation*

This example has been selected because of its potentially high replicability in countries where (large) energy distributors or retail energy sale companies are obliged to comply with energy saving obligations (e.g. white certificate schemes), because of the networking activities necessary for the supply of this specific EES, because it may significantly contribute to raise awareness on EES opportunities among energy end-users, because it seems to represent a very effective way to address the mass market and, finally, because it may serve for energy companies to increase their customers' loyalty.

In France the energy saving measures rewarded with white certificates toward both commercial and industrial sectors are mainly implemented through partnerships/contracts with EE equipment manufacturers. The retail energy sale company EDF decided to comply with its energy saving obligations by, among others, (1) supporting commercial/industrial users in selecting the best energy saving

measures (through basic diagnose by phone or through site visiting by experts if more complex measures are needed), (2) by bringing these users into touch with partners for the implementation of the identified energy saving measures. EDF is rewarded for this activity by the white certificates generated thanks to the implementation of the identified energy saving measures.

In the residential sector, the scheme is quite similar. However, because of this mass market, households are brought into touch with partners (a large list of labelled professionals or installers across France) only after they have performed an energy audit. In order to finance certain investments, households can sign specific loans with a dedicated subsidiary/partner of the obliged energy supplier. As an incentive, households can possibly benefit from an economic support provided by the obliged energy supplier.

3) CO₂ neutrality and efficient energy management in a holiday centre.

This example has been selected because of the existing synergies between energy efficiency and the commercial benefits deriving from advertising a green image.

The Danish Skallerup Klit Holiday Centre started in 1948 with 263 holiday houses and a large central building including a swimming hall complex, bowling hall, restaurant, shop, administration and other activities. It is visited yearly by about 300,000 guests. Skallerup Klit started cooperation with an EES provider in 2001 with the goal of converting the holiday centre to become CO₂ neutral. The CO₂ neutrality is an integrated part of the holiday product the customers are buying and may serve as inspiration in their own homes. Skallerup Klit became the first Danish holiday centre certificated under the new energy management standard DS2403. The centre has a contract with the Danish Energy Authority (DEA) on energy efficiency. Due to this contract, every change of a building and/or a new building has to be made with use of tools included in the DEA guidelines for energy efficient design of buildings. The holiday centre heating system has been changed to use of 480 m² solar heating in summer, heat pumps in around 163 holiday houses and a burner using bio-fuel pillars for heating the 11,000 m² swimming hall and wellness centre in the winter. The remaining 100 holiday houses receive electricity supply from a hydro power plant. The lighting systems have been redesigned with architectural care to create atmosphere and obtain 20% savings compared to before.

4) Partnership between industry and ESCOs

This best practice has been selected because it represents an example of project financing which may be an effective instrument to stimulate large investments for EES. Project Financing is a long-term financial operation which consists in the creation of a new venture called Special Purpose Company (SPC) in order to finance

a given project, while keeping the SPC's assets separate from those of the companies fostering the new project (so called promoters). The SPC is financed by promoters' equities (typically representing the minor part of the company capital) and by bonds usually provided by banks. This particular financial operation allows to better keep under control the project development while hedging the promoters against the risks of project failure.

In Latvia an initiative similar to project financing has been undertaken by a local ESCO called Energonams and an industrial company. Energonams and this industrial enterprise have established a third company named KER (Latvian acronym for Climate Energy Solutions) whose shareholders are represented by Energonams and the industrial enterprise themselves. KER has started a pilot project to take in concession the operation and maintenance of the energy system of one site of the industrial enterprise, in particular the boiler house for steam generation. An energy delivery contract between KER and the industrial site has been concluded. KER has started with the implementation of basic measures, in particular by acting at the level of information and energy advice, identification of measures, technical planning, optimization of technical operation. In the first year of operation the company has achieved a profit of 370000Euro. In the next stage the company will implement a fuel switch project. KER is now in negotiation for taking in concession power generation of a second site of the industrial enterprise.

5) Awareness raising and information on EES by banks

These examples have been selected because they represent a quite infrequent case in which banks seem to have realised the business opportunity represented by investments on EES.

In Austria many of the banks offer special credit lines for the energy improvement of homes. Mostly, these credit lines are combined with awareness raising, information and advice activities. Hereunder are the examples:

- The BAWAG Energy Billion is a credit line for energy efficiency refurbishment of residential buildings combined with public subsidies, an online quick-check, energy consulting, and the issuing of energy certificates.
- Raiffeisen offers a special credit line for small energy efficiency measures, with easy administrative procedures. For larger renovation measures, another special credit line is offered with fixed interest rates, and a limited bonus of EUR 200. In rural regions of Austria, Raiffeisen offers Energy Advice Days within its bank offices. Here, two energy experts are available for one day, to answer questions of Raiffeisen clients. Raiffeisen was also involved in the development of the "passive house village" in Großschönau, where people can try out different types of passive houses for some days.
- In connection with its Climate Credit (a credit line specialised for energy saving measures in new construction and renovation of residential buildings),

Bank Austria provides an “environmental bonus” for buildings with good energy certificates. The bonus increases with energetic quality, from 200 EUR for a “C” certificate to 600 EUR for an “A++” energy certificate. The credit line can be combined with available state subsidies. The bank also provides an online energy certificate calculator, and cost-free evening seminars on energy efficiency improvement measures in residential buildings.

- The s Bausparkasse, a subsidiary of Erste Bank, operates a complex online tool for renovation measures of residential buildings. The tool calculates the energy demand of the buildings, suggests renovation measures that can lower this demand, calculates approximate investment costs for these measures and combines these with available credit lines and public subsidies. The online tool won the 2009 World Summit Award for the best e-content application in e-business and commerce (www.sanierungsscheck.at).

5 References

1. Adnot, J., Duplessis, B., Dupont M., Baudry, P., Osso, D., Fages, O., “Report on the EES business in France” produced in the framework of the WP2.1 of the ChangeBest project; 2010
2. Bertoldi, P., Boza-Kiss, B., Rezessy, S., “Latest Development of Energy Service Companies across Europe - A European ESCO Update –“, 2007, European Commission, DG JRC and Institute for Environment and Sustainability, Renewable Energies Unit
3. Bleyl, J.W., Suer, M., “Comparison of Different Finance Options for Energy Services”, , available at <http://www.ieadsm.org/ViewTask.aspx?ID=16&Task=16&Sort=0#ancPublications3>
4. Boonekamp, P., Vethman, P., “Report on the EES business in the Netherlands” produced in the framework of the WP2.1 of the ChangeBest project; 2010
5. Bunse, M., Irrek, W., Siraki K., Renner G., “Report on the EES business in Germany” produced in the framework of the WP2.1 of the ChangeBest project; 2010
6. Coolen, J., “Report on the EES business in the Flemish region of Belgium” produced in the framework of the WP2.1 of the ChangeBest project; 2010
7. Fonseca, P., De Almeida, A., “Report on the EES business in Portugal” produced in the framework of the WP2.1 of the ChangeBest project; 2010
8. Gula, A., Wajss, P., Hempel, A., Krawczyk, J., “Report on the EES business in Poland” produced in the framework of the WP2.1 of the ChangeBest project; 2010
9. Kofod, C, “Report on the EES business in Denmark” produced in the framework of the WP2.1 of the ChangeBest project; 2010
10. Konstantinou, K., Tsakiridou, I., Sarigiannis, I., , Polimeris, P. “Report on the EES business in Greece” produced in the framework of the WP2.1 of the ChangeBest project; 2010
11. Kranjčević, E., Merše, S., “Report on the EES business in Slovenia” produced in the framework of the WP2.1 of the ChangeBest project; 2010
12. Leutgöb, K., Varga, M., “Report on the EES business in Austria” produced in the framework of the WP2.1 of the ChangeBest project; 2010
13. Nikolaev, A., “Report on the EES business in Bulgaria” produced in the framework of the WP2.1 of the ChangeBest project; 2010
14. Puente Rivas, F., Puente, M., “Report on the EES business in Spain” produced in the framework of the WP2.1 of the ChangeBest project; 2010

15. Rochas, C., Blumberga, D., "Report on the EES business in Latvia" produced in the framework of the WP2.1 of the ChangeBest project; 2010
16. Sabbatucci, N., Labanca, N., "Report on the EES business in Italy" produced in the framework of the WP2.1 of the ChangeBest project; 2010
17. Sochor, V., Szomolányiová, J., "Report on the EES business in Czech Republic" produced in the framework of the WP2.1 of the ChangeBest project; 2010
18. Stenqvist, C., Nilsson, L., J., "Report on the EES business in Sweden" produced in the framework of the WP2.1 of the ChangeBest project; 2010
19. Tepp, J., "Report on the EES business in Estonia" produced in the framework of the WP2.1 of the ChangeBest project; 2010
20. Tomik, L., "Report on the EES business in Slovakia" produced in the framework of the WP2.1 of the ChangeBest project; 2010
21. Vine E. (2005). "An international survey of the energy service company (ESCO) industry." Energy Policy 33 (2005), 691-704