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Latest Development of Energy Service Companies across Europe

- A European ESCO Update -

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PREFACE

The present report is an update of the "Energy Service Companies in Europe – Status Report 2005" (the *European ESCO Status Report*), which was published by the European Commission DG Joint Research Center in 2005. The *European ESCO Status Report* gave an overview of the ESCO concept and key definitions, the development of the energy service companies market across Europe, and a concise synopsis of the state-of-the-art in the European Union Member States and the Candidate Countries in 2004. The *European ESCO Status Report* is available at http://energyefficiency.jrc.cec.eu.int/pdf/ESCO%20report%20final%20revised%20v2.pdf.

The aim of the present report (referred to herein as *ESCO Update Report*) is to update and expand the scope of the *European ESCO Status Report*, and in particular to investigate the specific situation in every country in more detail. To this end, the authors sketch the current status of national markets, and identify changes that have occurred during recent years, and especially since 2004. In addition, the reasons behind the changes (whether for better or worse) are investigated. Specific barriers are identified and potential interventions to increase energy efficiency investments and to exploit energy saving potentials through ESCOs across Europe are discussed.

The primary scope of the report is the enlarged European Union (EU-27), however special attention has been given to examining the ESCO markets in countries that have usually been ignored by research, and thus the report is the first of its kind to scrutinize almost every country in Europe. ESCO markets in Europe have been found to be at diverse stages of development. Certain countries (Germany, Italy) have large numbers of ESCOs, while in others only a few energy service companies have been established so far (Latvia, Romania, Denmark), or none at all (Albania, Serbia). In addition, some countries have a rather decreasing market (Hungary), while in others the ESCO industry is still just getting established (Estonia, Greece, Belarus) or is expanding (Italy, France). There are also countries where the first ESCOs are being set up during the preparation of the report (Greece, Macedonia).

This complexity indicates that the field is very turbid and rapidly changing and new information is arising day-by-day. With this report we hope to be able to catch an important moment of the development of the national markets.

This document does not represent the point of view of the European Commission. The interpretation and opinions contained in it are solely those of the authors.

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1 INTRODUCTION

Energy service companies (ESCOs) and energy performance contracting (EPC) are common tools to enhance the sustainable use of energy through promoting energy efficiency and renewable energy sources. ESCOs and EPC help to overcome financial constraints to investments and pay off initial costs through the energy cost savings coming from the reduced energy demand. ESCOs provide an opportunity to curb increasing energy demand and control CO_2 emissions while exploiting market benefits for customers by decreasing the energy costs of their clients and making profit for themselves. While ESCOs have been operational on a large scale since the late 1980s-early 1990s, the energy service market in the European Union (and in Europe) is far from utilizing its full potential, even in countries with a particularly developed ESCO sector.

The rationale behind this project was to update and expand the *European ESCO Status Report 2005* published by the European Commission DG Joint Research Center, and to complete the picture of current ESCO developments in European countries. The *Status Report* was primarily focused on the introduction of the ESCO industry in general and it presented a short overview of the ESCO markets of EU Member States and Candidate Countries at that time, focusing in detail on selected noteworthy markets. With the present report, the authors hope to provide to professionals, policy makers and other interested parties a supplement and update to the *European ESCO Status Report 2005*, with a spotlight on the peculiarities and special features of the ESCO industry in each and every one of the 27 EU Member States, the Candidate Countries (Croatia and Turkey) and other European countries (Norway, Switzerland, Non-EU South-East Europe and the Commonwealth of Independent States). An overview of altogether 40 countries is given in the report. This extensive geographical coverage is unique.

The authors found that information was often hard to access; therefore in case of certain countries the descriptions are less detailed than in others. It has also been found many times that comparison of ESCO markets is limited by the fact that the notion of "Energy Service Company" is understood differently from one country to another, and sometimes used differently by experts even in the same country. This indicates the importance of common definitions that capture the diversity of energy service market developments in different countries.

The problem with definitions has been highlighted at many forums and by numerous experts and business actors. The authors therefore welcome the Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on Energy End-use Efficiency and Energy Services (Energy Services Directive). The European Commission has been promoting EPC, ESCOs and TPF, through a number of direct and indirect Recommendations and Directives[1]. Nevertheless, the Energy Services Directive is a crucial step. Besides the basic role and vital function, it may customize the ESCO related terminology. Therefore, in this report, the following terms are used according to the Directive:

[1] For instance: Directive 93/76/EC, Directive 2002/91/EC, or Directive 2005/32/EC. For reviews see, for instance, Bertoldi et al (2003) and http://ec.europa.eu/energy/demand/legislation/end_use_en.htm.

⇒ **"energy service company" (ESCO)**: 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;

⇒ **"energy performance contracting"**: a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement;

⇒ **"third-party financing"**: a contractual arrangement involving a third party — in addition to the energy supplier and the beneficiary of the energy efficiency improvement measure — that provides the capital for that measure and charges the beneficiary a fee equivalent to a part of the energy savings achieved as a result of the energy efficiency improvement measure. That third party may or may not be an ESCO.

In addition, and in line with the *European ESCO Status Report 2005,* the following terms also need to be defined for the purpose of the present report:

⇒ In contrast to an ESCO, **"Energy Service Provider Companies" (ESPCs)** are natural or legal persons that provide a service for a fixed fee or as added value to the supply of equipment or energy. Often the full cost of energy services is recovered in the fee, and the ESPC does not assume any (technical or financial) risk in case of underperformance. ESPCs are paid a fee for their advice/service rather than being paid based on the results of their recommendations (WEEA 1999). Principally, projects implemented by ESPCs are related to primary energy conversion equipment (boilers, CHPs). In such projects the ESPC is unlikely to guarantee a reduction in the delivered energy consumption because it may have no control or on-going responsibility over the efficiency of secondary conversion equipment (such as radiators, motors, drives) and over the demand for final energy services (such as space heating, motive power and light) (Sorrell 2005); and

⇒ in contrast to EPC, **"Delivery Contracting"** (DC, also known as Supply Contracting or Energy Supply Contracting) is focused on the supply of a set of energy services (such as heating, lighting, motive power, etc.) mainly via outsourcing the energy supply. Chauffage, one of the most common contract types in Europe besides EPC, is a form of Delivery Contracting. In a chauffage arrangement the fee for the services is normally calculated based on the client's existing energy bill minus a certain level of (monetary) savings. Alternatively, the customer may pay a rate, for instance, per square meter (EC DG JRC 2005). The ESCO (or ESPC) may also take over the purchase of fuel and electricity.

⇒ The terms EPC and ESCO are not widespread in the UK (Sorrell pers.com.) and Ireland, and instead ESCO-type work is referred to as **Contract Energy Management (CEM)**, which means "the managing of some aspects of a client's energy use under a contract that transfers some of the risk from the client to the contractor (usually based on providing agreed 'service' levels)" (ESTA cited in Sorrell 2005).

For further terms and definitions used in the current report (related to financial schemes, contract models and project elements), please refer to the *European ESCO Status Report 2005*[2].

The rest of this report is organised as follows. Section 1.1 describes the methodology used for the preparation of the present report. Section 1.2 reviews some basic results of the *European ESCO Status Report 2005* on ESCOs in Europe and supplements them with further information about the overall European ESCO market. The main body of this report is Section 2, which presents the findings of the research carried out in 2006-2007. Every European country is presented in detail drawing up the story of ESCO market development, focusing on the timeframe 2004-2007, which is the period since the compilation of the *European ESCO Status Report 2005*. The final part, Section 3 makes a summary of data and information on the individual ESCO markets, and a list of common and most important barriers and success factors.

1.1 Methodology

The principal methodology of the research was based on stakeholder interviews and large-scale surveying of ESCOs, international and national ESCO experts and experts in related fields, academia, and financial institutions. Using the snow-ball technique, interviewees were asked for further contacts who were then also contacted. The questionnaire was based on the survey used in 2004-2005 for the *European ESCO Status Report 2005*, and emailed to potential informants. Detailed interviews were conducted personally and by the phone. The information thus gathered was placed in context and extended by document search, and thorough literature review. The list of interviews that were used for the compilation of the country reviews is indicated at the end of the report.

The field research on the EU-27 countries and new Candidate Countries was carried out mainly between June-October 2006, and during December 2006 on non-EU South-East Europe (SEE) and the Commonwealth of Independent States (CIS). Around 100 informative answers were received and interviews done. This indicates that in general at least 1, but in some cases 3-5 expert opinions are integrated for a single country report. Country reports have been verified by experts and company representatives. While the survey can be considered as very successful with a large amount of new information gathered, the authors encountered difficulties in collecting sufficiently detailed information in some countries, and results may therefore be biased. To overcome this handicap, literature, reports, governmental archives, and project documents were consulted to verify the information gathered. In spite of the extensive efforts of the authors to produce a correct overview of the situation, any comments, constructive critique or feedback is appreciated in order to be able to improve the information presented herein.

[2] Available at http://energyefficiency.jrc.cec.eu.int/pdf/ESCO%20report%20final%20revised%20v2.pdf.

1.2 ESCOs in the EU until 2005

The first companies offering services in the energy field and applying the ESCO concept appeared in Europe as long ago as the 1800s. The cradle of these so called "operators" or "managers" was France (Dupont and Adnot 2004). The concept moved to North America and boomed during the 20th century (EC DG JRC 2005).

EPC, energy services and companies offering integrated energy efficiency solutions started to spread throughout Europe in the 1980s again. A few success stories emerged. Germany is referred to as the largest and most advanced market, with France and the UK, Spain and Italy following close behind (Vine 2005, Bertoldi et al. 2006b). At the same time, ESCO markets kicked-off in Central and Eastern Europe, too (Urge-Vorsatz et al. 2004). In addition, there were countries where the ESCO industry emerged in a very short period at the onset of the 21st century. Austria and the Czech Republic became the new success stories by 2005. On the other hand, there were also some negative examples, where EPC failed and thrust back further ESCO development due to a lack of trust: this happened in Sweden, Slovakia, and Estonia (Forsberg et al. forthcoming, SEA 2003). Finally, a group of countries could be characterized by low level ESCO activity in 2005 due to the internal and external factors that had prevented development until then. This group should be further sub-divided into two. In Denmark, the Netherlands, and Lithuania energy efficiency has been a priority, but tools other than ESCOs have delivered it, indicating that ESCOs are only one of the possible set of tools to bring energy efficiency improvements. On the other hand Greece, Poland, Portugal, Ireland, Malta and Cyprus, and Romania and Bulgaria have been examples where large potential for energy savings exist, but still little or no energy efficiency activity has been undertaken by 2005.

The European market potential has been estimated to be at least 5-10 billion EUR per annum and 25 billion EUR in the long term in 2000 (Bertoldi et al. 2006b, Geissler 2005). Investing in energy efficiency with the help of ESCOs is in principle a particularly profitable business in any European country; however, actual profitability depends on many factors and can be curbed by a wide array of barriers. ESCOs are profit oriented businesses and should not be expected to intervene in areas that are too risky or do not offer profit.

The majority of projects developed by Energy Service Companies in Europe have been undertaken in the public sector (CRES 2005b), where the model of Public-Private-Partnership (PPP)[3] is one of the most effective tools to boost energy efficiency (Geissler et al. 2006). The most common technologies so far have been co-generation, public lighting, heating and cooling, ventilation and energy management systems (CRES 2005b).

[3] A Public-Private-Partnership (PPP) is a partnership between the public and private sector for the purpose of delivering a project or service, which was traditionally provided by the public sector. The PPP concept recognises that both the public sector and the private sector have certain advantages, relative to the other, in the performance of specific tasks.

The *European ESCO Status Report 2005* listed 9 major barriers in Europe:

- Low awareness, lack of information and/or trust and scepticism on the clients' side;
- Limited understanding of energy efficiency opportunities, EPC and TPF;
- Small project size and high transaction costs, which discourage ESCO business;
- High perceived technical and business risk;
- Legal and regulatory frameworks not compatible with energy efficiency investments, for instance non-supportive procurement rules;
- Limited understanding of measurement and verification protocols for assuring performance guarantees;
- Administrative hurdles, such as complicated procedures, high transaction costs, split incentives, and aversion to opt-out energy management tasks;
- Lack of motivation because energy costs are only a small fraction of total costs;
- Limited governmental support for EPC.

In order to overcome some or all of the above hurdles, the authors of the *European ESCO Status Report* suggested certain soft actions, including:

- Increasing dissemination of information about ESCO services and projects;
- Launching an accreditation system for ESCOs (proving the quality and reliability of services);
- Developing financing sources;
- Standardized saving measurement and verification;
- Ensuring that governments take the lead with measures in public buildings;
- Developing a Europe-wide TPF network.

The above barriers and enablers are explained (including details and examples) in the *European ESCO Status Report 2005*, in which additional literature can be found. The present *ESCO Update Report* looks at these and other barriers and success factors specific for every European country. Apart from country specific assessment, the conclusion of the present report provides a snapshot about the existence or withdrawal of the above common barriers and/or emergence of new ones.

2 THE EU ESCO MARKET: STATE OF ART AS OF 2006-2007

The present report builds on the national level because this approach was perceived to be most convenient and most informative. It is essential to look at the European Union as a complex but open, thus permeable market. Policy and decision makers need to know the specific situation and specific problems of their respective countries, even though there are numerous multinational companies (MNC) that are present in the ESCO activities of more than one country. The overall assessment of the market on the EU level is a Herculean task outside the scope of the present work. It is not possible to obtain or estimate reliable data on number of market players and size of the ESCO market in the EU. What is essential is to gain an understanding of the commonalities and shared problems that exist among countries. The present report summarises these and discusses issues of general importance to the extent that the national analyses allow.

Table 1. Summary of basic data of the EU-27 ESCO market

Number of ESCOs	The total number is unknown. Number of ESCOs range from 0 to 50 per country (0-1000 ESPCs)
Type of ESCOs	both public and private, many multi-national companies, most of which have heating and building control equipment retailer origin
ESCO association	Exists: EFIEES[4]
Size of the market (data from 2000 and for EU15)	€5-10 Bln/year
Change in recent years	Increased, diversified, ESCOs enter into new national markets
Most popular technologies	CHP, street lighting, heating

The next part of the *ESCO Update Report* introduces a detailed description and analysis of national ESCO markets. The country overviews have similar structures to help the reader navigate through the information, but are separate documents and function as complete reports. Occasional reference to other countries is made, however, in order to reveal commonalities and differences, and because one country's market is often strongly related to others'.

After setting the local context and providing information on the roots of Energy Service Companies, energy efficiency and saving in general, the country overviews start with basic data on the national ESCO market where available, including the number and type of ESCOs, most important clients and preferred technologies and investment areas. In general, the size of the ESCO market was very rarely known. Where figures exist, they are often from 3-10 years ago, which are not suitable for the purposes of this report. The potential of the EPC markets were more often found or estimated by experts and other interviewees contacted for this report. The most common financing mechanism and contract types are given, too.

[4] European Federation of Intelligent Energy Efficiency Services; http://www.efiees.org/.

Furthermore, the most important barriers and success factors are presented, with an indication of what needs to be done in order to successfully overcome the obstacles and enhance the ESCO markets. Finally, trends and the expected future of the ESCO industry are shown wherever available.
The results and some important basic data are summarized in tabular format at the end of each country report.
The order in which countries are presented does not indicate any prioritization or level of importance, but should be considered as a pure list of countries. The report first reviews countries of the EU15, followed by the countries that joined the European Union in 2004 (EU10) and that joined in 2007 (EU2). These reviews are complemented by overviews on countries that are not EU Member States (Norway, Switzerland, Croatia and Turkey, and the European part of CIS and Non-EU SEE).

2.1 EU-15 Member States

2.1.1 Mediterranean countries

Spain

The Spanish ESCO industry is rather complex, with various types of companies operating successfully. The market is composed of local private and public ESCOs, as well as large multinational companies (mainly French origin). For several years 10-15 main private companies were actively involved in energy services. Indeed as of 2006-2007 there is a steep growth in interest in building energy efficiency in Spain and ESCO activity has been growing. The underling reasons probably include the introduction of energy performance certificates for new buildings and the publication of the Technical Code of Buildings, which implements the EU Energy Performance of Buildings Directive (Directive 2002/91/EC). An estimation of the market size or the market potential of the ESCO industry does not exist.
The energy service market is diversified and enlarged by the participation of "public ESCOs"[5]: Many regional and local energy agencies, as well as the Institute for Diversification and Energy Saving (IDAE, the national energy agency) act as ESCOs. However, in some provinces ESCOs have not been established yet and EPC technologies are still little known or unknown (OPET[6] 2004a).
The Spanish ESCO Association, AMI[7], has 13 members, and aims to promote the EPC and the ESCO market in Spain, and to increase dissemination of information about EPC. AMI is a member of the EU ESCO Association, EFIEES.
The industrial sector has been increasingly interested in co-(tri)-generation investments recently and these technologies now account for the major share of the ESCO market.

[5] Public ESCOs exist in a few EU and other European countries (for instance, in Spain, Germany, Italy, Austria, Ukraine). Generally, but not always, these are energy agencies, which implement EPC in certain types of projects especially with social importance and large demonstration effects. Public ESCOs usually accept higher risk and/or smaller profitability than private companies thus opening an investment area that otherwise would be left untouched.
[6] European Network for the Promotion of Energy Technologies in the Building Sector
[7] Asociación Espanola de Empresas de Mantenimiento Integral de Edificios, Infraestructuras e Industrias; Spanish Association of Enterprises of Complex Maintenance of Buildings, Infrastructures and Industries; http://www.ami-asociacion.es/

New financing lines have been opened for new plants in the tertiary sector through ICO-IDEA[8] and in some Autonomous Communities[9]. Incentives and bonuses for high efficiency co-generation have been demonstrated in projects in the residential and commercial sectors, too (CogenChallenge 2006c).

The public buildings sector receives the most ESCO attention, especially in some provinces. In the building sector, the most important investment areas are solar thermal applications. The Plan of Promotion of Renewable Energies envisaged an installed surface of 4,800,000 m^2 for solar thermal power by 2010, which assumes a particularly rapid increase from the existing 700,000 m^2 in 2004 (ST-ESCO 2006b). This presupposes a boom in solar thermal installation of over 700,000 m^2/year, opening a large potential market segment for ESCOs. Background factors, such as local experience, European trends, high solar potential in Spain, parallel policies including the Action Plans of Energy Efficiency and Savings and Renewable Energies and the Technical Code of Buildings, support this goal.

Municipal bylaws regarding solar energy have become popular after IDAE published a model of Municipal Ordinance on Solar Energy for Thermal Uses in 2001 (MURE-Odyssee 2006b). By 2004, 18 municipalities had introduced such an ordinance. The laws encourage higher uptake of sustainable energy solutions (often through ESCOs) in the municipal sector and/or building sector. According to these laws, for instance, all new buildings and buildings under refurbishment are obliged to use solar energy to supply 60% of their hot water requirements (Pujol 2004, Martinez 2004).

The most popular contract model in Spain is the shared savings and the BOOT model[10]. Often the ESCO provides the necessary financial resources itself or acts as a mediator between the client and the financial institution. The French-type Chauffage contract is also used. IDEA has introduced model contracts available online which supports both the ESCOs and the clients with a reference document to use.

Specific barriers to ESCOs are found in all sectors in Spain. ESCO activity in the public sector is limited due to regulations that are not supportive of EPC, for instance, amortization accounting does not allow projects of the appropriate length. Public sector investment is limited by barriers such as split incentives[11] (IDAE n.d.). Changing the relevant regulation may increase the motivation to invest in longer term projects in the public sector. A major step forward would be if a standard Measurement and Verification Protocol was implemented and commonly used, which could reduce the perceived risk of errors in monitoring savings and build trust of financial organizations and clients, and which would be of real value to help properly evaluate the effectiveness of projects.

Governmental involvement in ESCO development is apparent at several levels. As described above, the ESCO sector is partially composed of local, regional and national energy agencies. Furthermore, in 2003 the Spanish government approved the Energy Efficiency and Saving Action Plan as well as the Renewable Energies Action Plan for the period 2004-2012, both of which include the support of energy service-based

[8] Instituto de Crédito Oficial (ICO) is a State-owned corporate entity attached to the Ministry of Economy and Finance through the Secretariat of State for the Economy. It has the status of the State's Financial Agency of Spain; www.ico.es.

[9] There are seventeen autonomous communities (comunidades autónomas), which incorporate 50 provinces.

[10] For definitions please see the *European ESCO Status Report 2005* (EC DG JRC 2005).

[11] For an explanation see the conclusions in section 3.

improvements in energy use. The Energy Efficiency and Saving Action Plan stresses that energy audits will be supported by the central budget to up to 75% of the total costs of the 276 prioritized energy audits (Ministerio de Industria, Turismo y Comercio and IDAE 2005a,b).

Table 2. Summary of basic data of the Spanish ESCO market

Number of ESCOs	Over 10 private companies, a few public ESCOs and a larger number of small ESCO-like companies
Type of ESCOs	both public and private, including 1-2 multi-national companies
ESCO association	Exists: AMI
Size of the market	not known
Change in recent years	increased
Most popular technologies	co-generation, street lighting, solar-thermal applications

Portugal

ESCO business activity in Portugal is dominated by 7-8 medium and large ventures and moving upwards only slowly. A few of these companies are large multinational ESCOs or daughter companies of the previously monopolistic electricity utility, EDP[12]. The number of larger ESCOs and the size of the market have hardly changed for several years (de Almeida et al. 2000, EC DG JRC 2005), however new companies do appear, and others leave the market or change their core business. There are also small ESCO-like consulting companies that are oriented towards auditing, preparation of plans for rationalization of energy, retrofitting energy efficient equipment, and similar ESCO services, as a result of old[13] and new[14] obligations associated with the rationalization of energy use.

In spite of the past stagnation of the market, the ESCO concept is recently gaining popularity. The importance of ESCOs is growing as attention is increasingly given to energy savings obligations. ESCO development is also supported by the complete electricity market opening in September 2006. It is expected that competition will induce the introduction of more added value services, especially in case of cogeneration.

Although exact numbers are not available on the size and potential of the market, ESCOs in Portugal are only targeting a fraction of the market saving potential. Even some typical "low-hanging" ESCO projects, such as municipal street lighting projects, have not yet been fully exploited. It is estimated that ca. 30% of municipal energy costs could be saved economically with a short pay back time (Estrela 2004).

[12] Electricidade de Portugal Group, the Portugal electricity business group, dealing with generation, transmission and distribution of electricity, as well as with services.

[13] Regulation of Energy Consumption Management (RGCE) of 1982 obliges private companies, industrial sites and public buildings that use over 1000 toe/year, or those that have high energy consuming equipment installed to undertake energy audits and prepare energy consumption rationalization plans that they have to fulfil.

[14] For instance, National Action Plan 2004, and building energy certificates.

ESCO customers are primarily large and medium sized industries and large tertiary buildings (shopping centers, hospitals, hotels). Most attention is given to CHP due to its simplicity, low risk and short pay-back time, combined with financial incentives (such as high feed-in tariffs) that are given to co-generation. Activity in relation to renewables (wind-energy) has started to emerge during the last few years. Multinational ESCOs also often implement heating and cooling solutions as part of facility management. The most popular contractual schemes are the shared savings model and Chauffage contracts.

The legal framework in Portugal has been supportive of energy efficiency and renewable energies, but not of ESCOs in particular. The CHP sector, which represented 12.2% of total national electricity production as of 2003, has benefited the most (COGENchallenge 2006b). In particular, the high feed-in tariffs for co-generation guaranteed for 15 years have served as an important incentive.

In parallel with the positive environment for the development of ESCOs, some significant barriers remain. Local and international financing institutions are eager to get involved in ESCO-type projects, and large ESCOs can also afford to finance projects from their own equity. Financing of ESCO projects through TPF is sometimes in competition with certain governmental support schemes and programs[15] to some extent, instead of complementing them.

In spite of the successful examples of TPF and EPC, financial barriers still exist. Return rates are considered insufficient by ESCOs for many potential projects, especially if compared to supply side investments. Transaction costs are regarded as too high, thus companies still go for projects that they consider more profitable than demand side intervention. In public building projects accounting rules may override the goal of rationalization of energy use. As in many other countries, running costs and investment costs are separated in the public sector budgets, and saving on operations does not compensate for the costs incurred in the investment budget. Split incentive is also a typical barrier in Portugal.

Tradition and slow uptake of new business solutions have also been reported as a hindrance to the ESCO concept's diffusion. Energy suppliers have long seen themselves as providers of energy *per se* and not of energy services (de Almeida et al. 2000). This situation is however changing and large suppliers are starting to offer energy services.

Building trust via disseminating information and best practices among potential clients is one of the most important factors that could facilitate the ESCO sector. As of today, the ESCOs active in Portugal deal only with customers who initiate the ESCO project themselves, while active marketing has been disregarded. Perceived uncertainty of profits of energy services seems to be another critical obstacle to ESCO investments. The EPC concept should be integrated into the legal framework: for instance, standard procedures for the planning, implementation and monitoring of a project can be beneficial, documents and guidelines can be developed, demonstration projects are needed, as well as targeted information dissemination by a neutral stakeholder. Direct financial incentives should be used as a support only. Finally, the potential role of the public sector in

[15] Examples: The E4 (Energy Efficiency and Endogenous Energies) program ran until the end of 2006 and provided financial support for new projects. The MAPE program encourages energy efficiency and promotes new energy sources in all sectors but the domestic sector, through grants and zero interest rate loans. The SIME support scheme also provides both grants and zero-interest rate loans for improving the competitiveness of a company, for instance through energy rationalization.

Portugal is enormous. It is the owner of most service sector buildings, whose energy optimization could serve as an important initiator and multiplier. It would demonstrate the feasibility of ESCOs on a large scale and in front of a large audience. In addition, it would be able to give a basic impulse for the industry, and would set a good example for other building owners.

Table 3. Summary of basic data of the Portuguese ESCO market

Number of ESCOs	ca. 7-8 + many small ESCO-type companies
Type of ESCOs	Private (local and 1-2 multinational) and some subsidiaries of EDP
ESCO Association	No
Size of the market	not known
Change in recent years	Stable, but probable increase
Most popular technologies	CHP, wind, HVAC

Italy

The Italian energy service industry has been active for over 20 years. In the past the ESCO market was stable, but not particularly large. The sector has changed in the last 2-3 years, when it was boosted as a result of governmental policies and as a consequence of market liberalization. While the number of ESCOs was put at 15 in 2003 (Capozza 2003), the number of registered ESCOs at the Autorità per l'Energia Elettrica e il Gas (AEEG)[16] was over 160 in 2005. However, ESCO experts claim that in spite of the spectacular registration-rate, the number of companies really offering ESCO services is not more than a few dozen companies, although the ESCO market has been increasing recently. The market is still dominated by large ESCOs, but small companies also have some ESCO services. Indeed, as of 2006, the number of authorized companies reduced to around 80 due to stricter requirements. Market size estimations vary in a wide range. Some experts estimate it to be ca. 60 million EUR, based on the average annual turnover of the companies associated with ASSOESCo[17], an ESCO association. This estimation is rather conservative because members of the association are small ventures. Others estimate the micro-CHP market, where ESCOs are active, to be about 300-500 million EUR, but there are experts who put this at only 160 million EUR.

In the early 1980s, the first ESPCs provided heat service to the public sector under Chauffage-type of contracts and sometimes using TPF. Cogeneration plants were commonly set up in hospitals (de Renzio 2003, EC DG JRC 2005). Cogeneration in hospitals has been regarded as one of the most important targets of ESCO investment ever since, because of the high saving potentials due to cooling (OPET 2004b). In 2006 only, 80 MW of CHP were installed in Italy through ESCOs, which required about 95 million EUR investment.

Italian ESCOs have developed from diverse origins (Capozza 2003), such as “ad hoc” independent companies, equipment suppliers, fuel and/or electricity suppliers, public energy agencies, PPP and joint ventures, and from ESCOs of French origin. The recent

[16] The Italian Regulatory Authority for Electricity and Gas (AEEG).
[17] Associanziaone Nazionale Societi Servizi Energetici, founded in July of 2005.

increase is due to the entrance of individual professionals and small specialized enterprises.
By tradition, ESCOs operate in the public sector. Other sectors have moved into focus recently, such as the commercial sector and industry (Ceresi 2005). The residential sector is also getting attention, where boiler upgrading, heat control measures, and small district heating installation for newly built dwellings and some small co-generation installations are being carried out by ESCOs.
Public ESCOs[18] are known in Italy, though they are rare. The PICO concept[19] was introduced in the form of case studies in the PICOLight project during 2004-2005. The participating authorities created a revolving fund to finance further energy saving measures from current savings (Irrek et al. 2005).
Technologies mostly covered by ESCO projects are public lighting, combustion control, heating boiler upgrade, co-generation and power factor mitigation. A common problem is that complex renovation projects, which would be economically more feasible, are rarely possible.
The current growth of the ESCO industry can be attributed to a complex set of legislative actions, changing market environment and international pressure.
One of the most important changes in the regulatory background is the obligation for gas and electricity distribution utilities to reach end-use energy saving targets (Bertoldi et al 2006a). By the end of the first period of the obligations (2005-2009), electricity and gas savings are expected to represent ca. 2% of total consumption (AEEG 2004), as a result of the so called twin EE Decrees of 2001 (de Renzio 2003). A saving goal of 156,000 toe was set for large distributors for 2005 (AEEG 2004). Trading is encouraged in order to reduce costs of energy conservation measures, while penalties for non-compliance have been envisaged, too (de Renzio 2003). This setting increases the market potential available for ESCOs.
Accreditation of ESCOs by AEEG started in November 2004. Accredited ESCOs are eligible for Energy Efficiency Certificates (White Certificates)[20]. Energy saving measures implemented by ESCOs must be certified by the Market Operator, which issues certificates at the request of the regulator AEEG after verification[21]. White Certificates acquired by ESCOs can be sold to distributors, who can cover their end-use energy conservation obligations as described above (AEEG 2005). Some ESCOs attribute much of the increase of the ESCO market to the introduction of the White Certificate scheme in January 2005. The energy efficiency policy mix that has been advantageous for the EPC market is complemented by the adoption of new building codes.
The Italian ESCOs often provide the financing themselves (Bertoldi et al 2006a). Commercial banks are still scarce and over-cautious about financing ESCO-projects (EC DG JRC 2005) and ESCOs have reported that only projects with especially beneficial parameters pass the banking criteria.

[18] For definition, see Spain on page 12.
[19] Public Internal Performance Contracting, for further information please see the German country report on page 28 or recent literature, such as Irrek et al. 2006.
[20] Distributors and their subsidiaries or associated companies are also eligible for White Certificates if they carry out energy conservation measures for the benefit of end-users.
[21] Most importantly against the Ministerial Decrees of 20 July 2004.

ESCOs still highlight important barriers and problems that they and the EPC concept have to face. One of the most significant obstacles is the demise of credibility of the participants of the ESCO market. On the one hand, as already described above, hundreds of companies have been claiming to be an ESCO because the accreditation was based on self-evaluation until recently, even if they have not been offering ESCO services. On the other hand, ESCOs do not trust clients because some industries and commercial clients may disappear during the contractual period (due to bankruptcy, translocation, change of activity, etc.). This situation is coupled with some uncertainty about the future legal environment. Moreover, the private sector is sceptical about the ESCO concept, and is suspicious about their own benefit from such an ESCO deal.

A major drawback to ESCOs in the public sector is that public sector regulations are not suitable for EPC. Tender procurements are traditionally price-based (based on initial investment cost) and energy performance (lifecycle costs) does not form the primary decision basis, which would be important for an ESCO project. Chauffage-type contracts are preferred. In this case, however, no energy saving guarantee per se is given and the savings are not monitored, although savings are normally realized.

The lack of interest from FIs should be overcome. So far, ESCOs have mostly implemented projects using their financial bases, but this limits the size of the ESCO market strongly. Banks should be informed, and encouraged to participate in third-party-financing.

An innovative suggestion has been drawn up by an Italian branch of an international ESCO: to carry out a successful energy saving measure in a bank building. Since the central issue of their project was mutual trust and good understanding between the client and the contractor, they suggest that every working relationship be built up through a small-scale project, such as a GreenLight Programme[22], which could serve as an introduction to further common business (Dietrich et al. 2004).

ESCOs in Italy have a representative association, AGESI[23] (formerly called ASSOCALOR), which embraces 30 companies and covers 90% of the ESCO offerings for the public sector (AGESI n.d.). The objectives of the Association are information dissemination, seeking and promoting technologies, and development of standards and means for successful integrated services. Another smaller association, the ASSOESCo, represents 23 small sized ESCOs.

[22] GreenLight is a voluntary pollution prevention initiative of the European Commission to reduce lighting energy use in the commercial sector. Further information: http://www.eu-greenlight.org/. A parallel programme of the European Commission is the GreenBuilding Programme: http://www.eu-greenbuilding.org/

[23] Associazione Imprese di Facility Management ed Energia; Association of Facility Management and Energy Services Companies.

Table 4. Summary of basic data of the Italian ESCO market

Number of ESCOs	a few dozen
Type of ESCOs	mainly private, many of which are multinational companies
ESCO association	AGESI, ASSOESCo
Size of the market	95M EUR investment by ESCOs for CHP only in 2006
Change in recent years	Increasing
Most popular technologies	CHP, public lighting, control

Greece

The EPC market in Greece has not moved forward in recent years, and as of 2006 it was still in its infancy. While the existence of a large energy conservation potential, principally in the services and the industrial sectors (CRES 2005a), the ESCO activity is still negligible (Aidonis and Markogiannakis 2006), and ESCO business in Greece has been restricted only to a few pilot EPC projects so far (CRES 2005a). Energy performance contracting has not deployed yet either in the public, or the private sector. Three companies attempted to act as ESCOs in the past (Aidonis and Markogiannakis 2006).

The sporadic EPC projects have been concerned with renewable energy technologies (mainly solar thermal systems and small hydro investments). Some upgrades have been done in lighting systems and in air conditioning. The ESCO-type projects in the past were commissioned by the government and concerned governmental buildings.

The lack of ESCO business is blamed on the absence of a positive legal and institutional environment for the initiation and viability of ESCO 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.

At the same time, end-use energy management is often weak, and little attention has been given to energy consumption and to possible savings. On-site expert personnel and the top management are usually disconnected, thus information about energy use matters does not reach the decision makers (CRES 2005a).

The remaining monopoly of the Public Power Corporation[24] is one of the important obstacles to the development of the ESCO sector, because the utility is not motivated to offer alternative services. Licenses for power generation from alternative sources have been issued since 2006, which is expected to boost ESCOs active in renewables and CHP. Nevertheless, the licensing procedure is not sufficiently streamlined and thus time-consuming, which is hampering fast and large-scale uptake of RES power generation. In 2005, only 3.4% of the total electricity generation was produced in CHP units (COGENchallenge 2005a). At the same time, support schemes have been introduced for CHP and RES, such as investment subsidies, leasing schemes, tax reductions and feed-in tariffs.

[24] Demotiki Epiheirisi Ilektrismou in Greek.

Moreover, considerable interest in financing energy efficiency and ESCO projects is present on the side of commercial banks, and similar institutions, such as insurance companies (Aidonis and Markoginnakis 2006). However, specific financial schemes, and procedures have not been developed due to the not yet active system (Aidonis and Markogiannakis 2006).

The government has already acknowledged this contradictory situation, and has recognized the opportunities offered by EPC, therefore capacity building has been started, pilot actions have been initiated, and legal formulas (such as a law on TPF) have been drawn up.

Legislative changes have taken place that are expected to foster ESCO activity. Law 3389 on Public Private Partnerships (PPPs) should help the public sector to overcome one of the long-standing barriers. Until recently it was prohibited to employ a private body to operate and manage the building energy services infrastructure of public establishments. The new law allows multi-year concession contracting for the installation, operation and maintenance of energy efficient equipment in buildings.

The finalization and adoption of a relevant legal framework and ending the monopoly of utilities are finally expected to contribute to the successful launch of energy service companies. These might be formed as subsidiaries of multinational companies, utility based ESCOs, small specialized companies, and also as public ESCOs.

Table 5. Summary of basic data of the Greek ESCO market

Number of ESCOs	0-3, sporadic TPF
Type of ESCOs	only projects
ESCO association	No
Size of the market	Negligible
Change in recent years	Starting
Most popular technologies	solar thermal, small hydro

2.1.2 The UK and Ireland

United Kingdom

In the UK energy service contracting dates back to 1984, when the first energy management company was established as the subsidiary of a large oil company. A number of engineering companies soon followed suit by offering financial and other value-added services (Sorrell 2005). There are currently around 20-24 significant ESCO market players in the United Kingdom active in the non-domestic sector. There is also some, though limited, activity in the domestic sector, mainly regarding district heating[25] (Sorrell 2005). There have been no new entrants lately, and the last few years could be described as a period of mergers and consolidation.

The UK has been seen as one of the most important ESCO leaders in Europe (for instance EC DG JRC 2005). However, between 2000 and 2004 a serious stagnation of investment was experienced partially due to the demise of CHP. The slow down of the market was also the result of the implementation of new electricity trading arrangements in 2002,

[25] District Heating and insulation is however done very effectively through Warm Front (earlier Home Energy Efficiency Scheme), which is a grant-funded programme for tackling fuel poverty.

with falling electricity prices, accompanied by rising gas prices. Many indigenous ESCO companies withdrew from the market, and the companies that remained were predominantly French, Danish or Swedish in origin (Bertoldi et al. 2006a). In the last 2 years reasonable growth in investment has occurred again as climate change and energy prices have become an issue for many organisations.

The annual turnover in the non-domestic sector is estimated by ESTA[26] to be around 860-940 million EUR compared to ca. 700 million EUR in 2001 (Sorrell 2005). This translates to an annual investment in energy efficient plant and systems of about 145 million EUR. According to calculations, ESCOs have captured circa 5% of the market potential so far (Sorrell 2005).

Traditionally the industrial sector represented the largest part of the clientele using heat supply contracts (chauffage). The balance is now much more evenly spread across the industrial and the commercial sectors, though still a little biased towards the private clients (Sorrell 2005). Growth of the ESCO market is the highest in the commercial sector, then in the public sector, and slowest in industry; the residential sector still accounts for a negligible part of ESCO activity.

The commercial sector is characterized by managing agents and other intermediaries who are starting to realise the need to be proactive in securing better energy performance. This has been significant in igniting the spread of ESCO investments in this sector. On the other hand, ESCO work in the industrial sector has been slowing down a little as a result of a lack of long-term security. It is hard (if not impossible) to guarantee that the site will be still working under comparable conditions (size, production) until the end of an ESCO contract, because manufacturing is often transferred abroad.

As of 2006, the main building services elements that are commonly implemented are lighting, lighting control, HVAC plant replacement, decentralised boilers and controls. More recently CHP is on the move, regaining position. The UK CHP market features both large-scale (for instance hospitals) and smaller-scale co-generation (such as leisure centres with pools). Automatic Monitoring and Targeting (aM&T) have been on the rise, too, lately, as an answer to the need for better measurement and management. In the public sector attention has been moving to biomass investments through ESCOs.

The general contracting scheme is called Contract Energy Management (CEM). The definitions usually found in Europe (and used in our reports) are not commonly used in the UK. CEM is very similar to a Chauffage contract, i.e. under a CEM an ESCO is managing some aspects of a client's energy use under a contract that transfers some of the (financial) risk from the client to the contractor (usually based on providing agreed 'service' levels) (ESTA cited in Sorrell 2005). The main element of CEM is that a significant percentage of the financial risk is transferred from the client to the ESCO that takes over responsibility for the management of energy (Sorrell 2005). CEM does not inherently include project financing, although in most cases it is also on offer.

There are no general model contracts like in Germany. There is an established practice of measuring performance against agreed Key Performance Indicators (KPIs), or using contracts with an open book approach, where all costs and profits are stated openly for all stakeholders. Generally, contracts allow the ESCO to take the risk on consumption, but for the client to take the main risk on the energy price.

[26] Energy Services and Technology Association

Certain obstacles to energy conservation are successfully being eliminated in the United Kingdom. The UK Government's willingness to lead Climate Change policies internationally (Hinnells 2006) has definitely been beneficial for the ESCO sector. The Energy Performance Certificates (according to the Energy performance of Buildings Directive 2002/91/EC), are regarded as among the most important measures that have been introduced in recent years and have helped the ESCOs significantly. Nevertheless, criticism is also pronounced. According to some experts, policies are sometimes interpreted in a rather weak manner and are delayed. This can lead to a lack of clear requirements for end users and a situation where the urgency of issues is not evident. In particular, the transposition of building regulations has been judged by some experts as not completely successful because requirements should have been stricter.

The most significant issue hindering the development of ESCO projects is the length of time and effort it takes to bring a project to fruition. For significant projects this is typically 2-3 years. As a result, contractors tend to be particularly careful and selective, and they engage in negotiations with potential customers only when the project is highly likely to be realized and offers sufficiently large saving potentials to be able to pay for the initiation costs later. Whilst there is a level of bureaucracy in the public sector that adds to this problem, the key issue is the lack of awareness and reluctance to believe the ESCO concept. Local authorities should replicate successful experience more. As stated before, the lack of long-term site security is a major barrier in the case of the industrial sector.

Experts do not see any major regulatory or legal barriers specifically regarding ESCOs and CEM, nor problems with financing. Financing good energy saving projects (with pay-back times below 3 years) is not a problem. ESCOs in the UK have good financial back-up. They have the financial capability themselves or through established banking routes to provide funding of up to five times the current market (an investment of 700M EUR) (Aldridge pers.com.).

Programs such as the Energy Efficiency Commitment (EEC) should be further promoted and supplemented with similar initiatives in the non-residential sector. The EEC is running between 2002 and 2011, in 3-year cycles. The first EEC (2002-2004) obliged all gas and electricity suppliers with 15,000 or more domestic customers to encourage and/or assist customers to take energy-efficiency measures in their homes, thus fulfilling "fuel-standardized energy benefits". During the EEC-1 86.8 TWh total delivered savings was achieved. In the next phase (2005-2008), only utilities with over 50,000 customers need to fulfil obligations, but a higher total value must be reached. The target is 130 TWh. Suppliers may assist their own customers or any domestic consumer in the UK.

Local authorities have plunged into creating ESCOs themselves. According to experts, however, in many cases this is unnecessary because the current market is capable of tackling more activity than at present.

Table 6. Summary of basic data of the British ESCO market

Number of ESCOs	20-24
Type of ESCOs	Public and private, mainly French, Danish and Swedish origin survive
ESCO association	Exists: ESTA
Size of the market	€860-940 M (annual turnover)
Change in recent years	After few years downward trend, increasing
Most popular technologies	lighting, lighting control, HVAC plant replacement, decentralised boilers and controls, CHP

Ireland

The Irish energy services industry is still in its infancy (ENVIROS 2005). The ESCO sector, as of 2007, is still underdeveloped. As a start an overview study that assessed the potential for energy service companies in the country as a means to catch energy efficiency improvement opportunities was commissioned by Sustainable Energy Ireland (SEI) (ENVIROS 2005).

In 2005, 11 companies were identified that could be classified as energy service providers (ESPCs), and two multinational companies were found to offer guarantee on their services in the form of EPC (ENVIROS 2005). The most typical (but still rare) motivation for potential clients is to outsource energy management to a specialized company, with or without the actual ESCO service and concept (Scott 2004). The most prevalent contract model in Ireland is the BOOT model (ENVIROS 2005). On the other hand, Irish ESPC companies do not often use EPC contracts, but prefer to work for a fixed service fee, and thus face little risk. This is not primarily due to the reluctance on the part of ESCOs to engage in financing, but rather the disinterest of the clients.

Irish ESCO-type companies can be categorized in three groups:

1. companies offering facility management, which comprises the management of the client's water and energy use, cleaning etc.,
2. companies offering contract energy management (CEM),
3. companies constructing and operating CHP.

The two latter categories take upon themselves the financial arrangements of the investments and the provision of the technical services for the energy management, too (Scott 2004).

Today the estimate for the potential ESCO industry market size is between 50-110 million EUR/year until 2020 (ENVIROS 2005). This calculation takes into account the 20% reduction potential of energy use in the EU, but considers hidden and missing costs, whereby reducing the potential. The authors of the report "*Assessment of the Potential for ESCOs in Ireland*" have applied various calculation methods in order to confirm the accuracy and came to a similar results[27] (ENVIROS 2005).

[27] Calculation 1.: By leveraging the UK government CO2 abatement cost models, the carbon marginal abatement cost (MAC) curves were created for energy efficiency technologies. At 20% market capture rate the ESCO market potential was 26-35 million EUR; Calculation 2.: Derivating from the EU ESCO market

A strong disincentive for ESCOs until recently was a result of forecasting errors of the electricity need in the 1970s, and the following excessive extension of electricity generation capacity (Gerald 2003). However, by the 2000s, this excess capacity eroded (Gerald 2003), opening a market niche for energy efficiency. In parallel, electricity market liberalization was completed in 2005 (Scott 2004) and gas market liberalisation will follow soon. On the one hand, with liberalization, the market has seen a decrease in energy price, which is not favourable for ESCO investments. On the other hand, with restructuring, efficient cogenerated electricity is favoured at the market, which is important for the development of ESCOs (Scott 2004), because CHP is one of the most attractive areas for ESCO involvement in Ireland (COGENchallenge 2006a, Scott 2004). In addition, investment funds at the Irish Energy Center[28] under the Energy Efficiency Investment Support Scheme were established (Scott 2004), and the government earmarked 5 million EUR for CHP and district heating programs (COGENchallenge 2006a).

The most important sector for ESCOs in Ireland is probably the industrial sector, however no appropriate survey exists and conclusions can only be approximated from case studies presented in different research documentation (Scott 2004, ENVIROS 2005). The companies that are (at least somewhat) involved in ESCO-type activities have reported that industry accounts for 50-80 % of their business, commercial sector for 10-30 % and the public sector for 10-20 % (Scott 2004). The ESCOs estimate that they usually achieve 10-20% savings, however exact data are not available because of the lack of baseline and lack of ex post monitoring.

The main barriers listed by informants to the survey carried out by ENVIROS (2005) include the lack of governmental regulations and targets, and a reluctance to outsource energy services partially because of concerns about redundancies in staff, and reluctance from potential ESCOs to take the risk of guaranteeing savings. Furthermore, most of the potential customers are not aware of the ESCO concept. While the EPC concept is well known by companies that have the capacity to become ESCOs, lack of appropriate expertise at banks, high transaction costs and the lengthy contractual arrangements still pose an obstacle to higher uptake of this market. These barriers need to be addressed as part of any program that aims at strengthening ESCOs.

Table 7. Summary of basic data of the Irish ESCO market

Number of ESCOs	2
Type of ESCOs	Multinational companies
ESCO association	No
Size of the market	€50-110M/year until 2020
Change in recent years	The market is getting off the ground
Most popular technologies	Industrial processes, CHP

potential, using GDP comparison, the market potential was between 50 and 100 million EUR; Calculation 3.: Derivating from the EU ESCO market potential, using energy expenditure comparison, the market potential was between 90 and 180 million EUR; and Calculation 4.: Checking against the market size based on 20% of Irish energy use, which is the commonly quoted energy efficiency improvement figure to be attained in the EU by 2020. This resulted in a market potential of 30-90 million EUR.

[28] today, Sustainable Energy Ireland

2.1.3 Central Europe

France

Energy services (public lighting, gas and electricity distribution, district heating) in the form of outsourcing public services in France dates back into the 19th century (Dupont and Adnot 2004). The success of these and other "delegated management" services (waste and water management, transport, telecommunication) financially strengthened the private companies involved in these businesses, thus creating the basis of the French ESCO model (Dupont and Adnot 2004). The French ESCO model developed through 6 lines[29]. Traditionally, the "contract of operation" model dominated the French ESCO market. It needs to be emphasised that the French market cannot be fully associated with the definitions usually applied elsewhere in Europe[30]. Originally it was based on the combined operation and maintenance contract of HVAC systems and differentiated four basic elements (ADEME 2006, Dupont and Adnot 2004):

- P1: purchasing of fuel;
- P2: daily operation;
- P3: complete and complex maintenance; and
- P4: funding for new (energy efficient) equipment

It was necessary to separate the 4 items in the public sector in order to be able to contract separate companies for the different tasks, to apply different VAT rates, and to be able to keep the elements separately in the bookkeeping, in keeping with the law (Dupont and Adnot 2004). For HVAC system operations, the so called "Chauffage contract" is a contract which includes operation without explicitly committing to carrying out energy efficiency investment. Under a Chauffage contract, the contractor ensures optimal operation of an already existing system and must provide an agreed comfort level (for instance temperature, humidity) at a lower cost for the client if conditions remain unchanged. The contractor can increase its profits by investing in more energy saving equipment or by procuring cheaper fuel, thus reducing the costs. These types of contracts in France are usually long-term and include the obligation to diagnose problems and identify needs for improvement in the system, and to carry out the investment. However, funding new energy efficiency equipment in the structure outlined in the bullet points above is not allowed in the public sector "as a rule with exception" (ADEME 2006, Dupont and Adnot 2004).

Clients in the private sector applied the above contract-type, but also started to be more flexible. The first formalized contract including TPF was signed in 1983. This was primarily designed for financing energy saving investments in order to overcome clients' aversion to high perceived risk of improvements that in reality were cost-effective, but not acknowledged as such by the clients (Dupont and Adnot 2004). This model did not particularly spread in France due to the strength of the traditional "contract of operation" model. In addition, ESCOs in France are large companies that have the financial means to finance projects if necessary, thus the role of banks is limited.

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[29] For a comprehensive overview on the development of the French ESCO sector, please see the European ESCO Status Report 2005 (EC DG JRC 2005), Dupont and Adnot (2004), and ADEME (2003).

[30] For details and exact description and definitions of the different types of ESCO contracts, please see the *European ESCO Status Report 2005* (EC DG JRC 2005).

As of 2006, 60% of the ESCO projects are financed by ESCOs themselves, 30% of the projects utilize TPF, while 10% of the projects are paid for by the clients. Grants and subsidies are available from the regional bodies of ADEME[31]. Furthermore, ADEME, in cooperation with the French development bank, created a Crediting System in Favour of Energy Management (FOGIME), which is a guarantee fund for loans for investments in sustainable energy and renewables in the private sector.

The French operators have 'exported' the Chauffage contract model to several other European countries, including Belgium, Italy, Spain, the UK, and Central-Eastern Europe.

The terms "energy service" and "energy service company", common in Europe, appeared only after the late 1990s thanks to the liberalization of energy markets and due to the development of the European Directive on Energy End-use Efficiency and Energy Services and the subsequent debates (ADEME 2006).

Due to the historical developments described above, traditionally clients of ESCOs were from the tertiary sector, and later from industry. As of 2006, experts report increasing focus on industrial and residential projects, while the public sector is still the primary client of facility management contracts.

Although the total number of companies offering Chauffage or EPC contracts is around 100, the French market is characterized by strong concentration of actors, with only three large ESCOs dominating the market. These companies are subsidiaries of main energy utilities, though working independently from them (ADEME 2006). Earlier they were referred to as "expolitant de chauffage" while they are more often called now SS2E or SSEE companies, meaning Energy Efficiency Service Companies.

Recently, new actors have been entering the market. The new actors have different roots, such as big installers who provide financing in addition to traditional HVAC services; (mainly multinational) equipment suppliers provide the EPC services found in other European countries, and local consultancies (ADEME 2006). Primary projects implemented by ESCOs are still HVAC system operations, public lighting, compressed air production and building, and CHP and facility management. French ESCOs mostly provide complex solutions, in contrast to ESCOs in other European countries.

Most of the ESCOs belong to an association, La Fédération Française des Entreprises Gestionnaires de services aux Equipements, à l'Energie et à l'Environnement (FG3E)[32], which has around 500 members. The annual turnover of the ESCO market is estimated by the ESCO association, FG3E, to be 3 billion EUR.

In spite of the long history, wide-scale activity, and significant development of the French ESCOs and the ESCO sector, there are a number of key barriers specific for different sectors. One of the most important legislative restrictions that impedes complex ESCO activity in the public sector was already mentioned above. Operation and particularly purchase of equipment in the public sector is not allowed to be designated to private entities, only in the scope of very special and formal public-private-partnership (PPP) agreements. It has long been claimed by ESCOs and the FG3E that the engagement of the private sector to provide complex solutions for the public sphere would be beneficial and

[31] Agence de l'Environnement et de la Maîtrise de l'Energie; the French Environment and Energy Management Agency ; http://www2.ademe.fr.

[32] French Federation of Companies Providing Services to Facilities, Energy and the Environment; for further information: www.fg3e.fr.

innovative solutions could appear as a result. Therefore the Government Order of 17 July 2004 on PPP has been greeted with high expectations of improving the situation. The Order creates the possibility to draw up PPP contracts where a concession scheme is not available and where traditional procurement contracts (marchés publics) cannot be implemented because of the legal restriction to have separate contracts for each phase of the design, construction and operation of a project. The new Order also allows the public sector to pay the private company's remuneration periodically during the project, and allows that payment is based on performance indicators previously set out in the contract (instead of being purely revenue based). In order to further increase the effectiveness of the new regulation, public accounting rules should also be revised and the separation of operation and investment budgets should be possible to overcome in case of ESCO projects, where it is very important that the savings in operation budgets could be used for investing in efficient equipment. In parallel, public procurement rules should be revised to allow for the inclusion of criteria on the effectiveness of the proposed energy efficiency measures.

The public sector should be required by law to improve its energy performance in order to increase energy savings significantly on the one hand, and to serve as a demonstration to the other sectors on the other hand. This should be defined as a mandatory requirement postulated by legislation.

The private sector normally pays primary attention to its core business. It has been found in France that without fiscal incentives, private companies and households do not engage in energy saving measures. The price of energy is still not high enough to encourage savings in these sectors (ADEME 2006). The promotion of energy efficiency and ESCOs as a tool for that purpose should be emphasized. Furthermore, the social housing sector (and in general, rented houses) need special treatment to overcome split incentives. It is proposed by the FG3E association that fiscal incentives (tax exemption, subsidies) could be useful to overcome this significant barrier.

A White Certificate system has just been introduced in France in 2006[33], and is expected to enhance energy efficiency services in the private sector, together with the recently rising energy prices, and accelerate the ESCO market. Therefore, recent legal developments are expected to further boost the French ESCO industry, which is still one of the most successful examples in Europe, although based on the peculiar, but long-established French ESCO model.

[33] Law number 2005-781 of 13 July 2005.

Table 8. Summary of basic data of the French ESCO market

Number of ESCOs	100, out of which 3 dominate the market
Type of ESCOs	The large ESCOs are subsidiaries of utilities, which extend their activity to many other European countries + large international equipment installers and suppliers + local consultancies
ESCO association	Exists: FG3E
Size of the market	Turnover is €3 Bln/year
Change in recent years	Increased, diversified, extending more and more to other countries
Most popular technologies	HVAC, street lighting, compressed air production systems, control systems, building management

Germany

The German ESCO market is often celebrated as the most established energy service industry in the European Union (Seefeldt 2003). It is among the oldest ESCO markets in Europe, emerging in the early 1990s (Vine 2005), and has experienced a constant expansion ever since. In spite of the early start, the continued increase in activity and the overall success of the German ESCOs, significant market possibilities still exist.

The overall number of ESCOs and ESCO-like companies is still estimated to be around 500 (Brand and Geissler 2003, EC DG JRC 2005). The majority of these companies offer energy supply contracting (particularly heat delivery services) and operations contracting. The number of companies offering services through Energy Performance Contracting is only a fraction of the total figure, around 50, and ESCOs with more than one reference EPC project are in the range of 20. Small and large local companies, including former municipal utilities and multinational companies, are active on the market. Furthermore, the four largest energy companies all have daughter companies carrying out various contracting activities, of which one is particularly active in the Energy Performance Contracting business.

There are two associations helping the ESCO sector via a range of activities. The newly established ESCO Forum represents the larger ESCOs[34]. The ESCO Forum is a recent merger of the former Bundesverband Privatwirtschaftlicher Energie-Contracting-Unternehmen e.V. (PECU)[35] and the Contracting Forum of the German Electrical and Electronic Manufacturers' Association (Zentralverband Elektrotechnik- und Elektronikindustrie e.V. - ZVEI)[36]. The ESCO Forum has 26 members (as of 6 February 2007). On the other hand, the Verband für Wärmelieferung (VfW)[37] is an association of

[34] http://www.zvei.de/index.php?id=3708&0=&type=1
[35] www.pecu.de
[36] www.zvei.de
[37] Association for Heat Supply, www.vfw.de.

mostly smaller heat delivery service suppliers. VfW has 230 members, of which 197 have contracting projects (data from 2005).
The total number of running ESCO contracts is estimated at 50,000. Flauger (2005) refers to market researchers estimating a total potential of 1.3 million projects in Germany.
In 2005, the total turnover of the members of VfW amounted to 1.04 billion EUR (including energy revenues). New investment amounted to 510 million EUR. 83% of the contracting activity was energy supply contracting (with 8,000 MW_{th} connected rating in total), 8% EPC, 5% management of technical equipment, and 4% pure third-party financing (E.ON 2006). According to other sources, the share of EPC in the market is around 15-20% (Geissler et al. 2006).
The EPC market in Germany has had a total investment value of 750 million EUR by 2006 (Geissler et al. 2006). The market potential is estimated to be about 2 billion EUR in the public sector alone (including energy turnover), which corresponds to an annual potential of "350 million EUR monetary savings volume from energy savings", according to Berliner Energieagentur GmbH (BerliNews 2005). The most common contract model is the guaranteed savings scheme, where both the customer and the ESCO benefit from the savings immediately from the first year. Excess savings are shared between the client and the ESCO following a previously agreed percentage.
The average pay-back time of ESCO projects is 5-15 years, with the municipal sector tending to longer projects because trust has been developed to a larger extent and outsourcing has become more common, whilst industry is still averse to long-term contracts, thus shorter contracts dominate, and the pay-back times are also shorter, around 3 years. Average savings of EPC contracts in Germany are in the range of 10 to 38% for 0.2 – 2,000 MWh/EPC contracts respectively (Kristof 2002).
In the beginning of the nineties, only a limited number of EPC projects were initiated, no standard documents were available, and doubts about the trustworthiness of ESCOs, their reliability and the correct value of contracts hindered the sector in Germany.
The establishment of the Energy Saving Partnership (ESP) in 1995 in Berlin is considered an important step in establishing the energy efficiency market in the public sector in Germany (Geissler et al. 2006). Under the ESP scheme buildings are bundled into pools in order to decrease transaction costs. 21 pools had been contracted by ESCOs by 2006, encompassing over 1300 buildings altogether. A notable number of EPC projects have been realised in Hessen, North-Rhine-Westfalia, and Bavaria, however there are less or no activities in other regions, such as Lower Saxony and in the Eastern Länder.
In the meantime, an additional scheme, called “Energy Saving Partnership Plus” (Figure 1.) is being set up, in order to embrace building and construction measures, including for instance heat insulation, and window replacement. This scheme is based on the existing one and expands its application by also including work on the building shell, instead of the typical focus on energy system improvements (equipment and control engineering). This comprehensive approach is expected to attract new customers from different sectors, such as industry, hospitals, offices, and in housing (Berliner Energieagentur GmbH 2006).

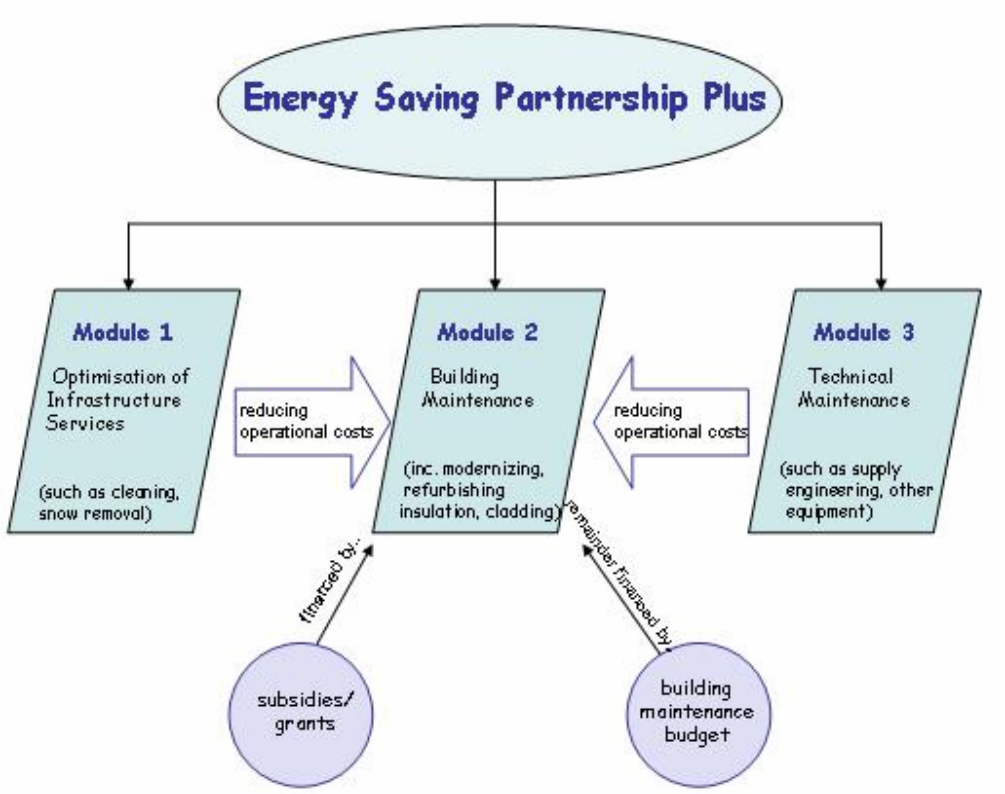

Figure 1. Energy Saving Partnership Plus scheme (based on Berliner Energieagentur GmbH 2006)

According to some experts the share of pure EPC is actually decreasing in Germany, but the integration of demand-side energy efficiency measures into supply-side oriented contracting is gaining importance. The provision of energy supply services is successful with private sector buildings. The ESCO market is projected to be further boosted by the expected expansion of co-generation.

The successful ESCO industry in Germany is the consequence of a mixture of favourable conditions, but it is mainly the result of local political support and individual drivers.

A large number of municipal projects, many of which are supported by the energy agencies, have a strong demonstration effect and act as multipliers among other sectors, most notably the commercial sector. Besides the large private ESCO sector, Germany is the homeland of the so-called "Intracting model" or Public Internal Performance Commitments (PICO) (Energie-Cités 2002, 2004). In the PICO model one department in the administration acts as a unit similar to an ESCO in function for another department. The ESCO department organizes, finances and implements energy efficiency improvements mostly through a fund made up of municipal money, and using existing know-how. This allows larger cost savings and less profitable projects, which would be ignored by a private ESCO (Irrek et al. 2005). However, these projects lack the energy savings guarantee, because there are no sanction mechanisms within a single organization (even though PICO includes saving targets). This can result in lower effectiveness of the investments. Nevertheless, this scheme increases activity for energy savings.

Furthermore, the development of energy prices since the liberalization of the electricity market is considered to be one of the most important triggers for the German ESCO

sector. As a result of liberalization, energy prices dropped significantly between 1999 and 2001, but at the same time energy taxes increased, and in the period 2002-2006 energy prices have almost doubled. Some ESCOs consider the energy taxes as one of the most effective political measures for energy efficiency.

Another vital step for the evolution of the ESCO industry was the establishment of standard procedures and documents such as model contracts, an energy performance retrofitting model and a standard procurement procedure as well as contracting guidelines by the federal states of Hessen and Berlin (Seefeldt 2003). Today, there are approximately 7 different model contracts.

The German government supports investments aiming at sustainable energy use and energy conservation through various financial and technical mechanisms, including research and development programs, loan/funding schemes, and incentive programs for renewable energy. Additionally non-governmental programs also exist (such as credit programs by eco-banks, for instance kWf, or boiler replacement by utilities), which complement ESCOs work in the residential sector (Brand and Geissler 2003).

Energy agencies at national, regional and local levels played and are still playing an important role as mediators between ESCOs and current as well as potential clients. Energy agencies have also taken on the role of carrying out energy efficiency monitoring and verification (Seefeldt 2003).

The former ESCO association, PECU, claimed that, as of 2004, ESCOs had not been able to attract industrial clients and certain barriers persist (PECU 2004). In 2006 there are indications that ESCO activity in the industrial sector is on the rise.

The main barriers to ESCOs in industry are the unwillingness of clients to engage in contracts with pay-back times longer than a few years, and the reluctance to use ESCOs when the core production process is affected. A serious problem for ESCO projects is the need to measure and verify savings, which requires a relation of trust between the ESCO and the client, and the client's willingness to co-operate with the ESCO is essential. To overcome some of these barriers, the Wuppertal Institute and its partners have developed a concept for a German "EnergySavingFund". One suggestion is to establish a guarantee scheme for ESCOs to overcome problems of insolvency of ESCO clients which have increased in recent years.

In the public sector certain legal conditions (budgetary and municipal law) could be improved, because they hamper the work of ESCOs today (Geissler et al. 2006). A neutral stance on how remuneration from savings should be accounted within the municipal budget is one essential point which needs a clear definition. Energy efficiency related public contracts are usually simply awarded to the lowest bid (upfront investment), and energy saving are not considered (lifecycle costs). PECU therefore requested that life-cycle costs of new equipment are taken into account (PECU 2006) in the public bidding process and that it becomes more transparent. Purely project based financing for Performance Contracting projects is believed to have the capacity to improve market uptake, but has not yet been in use. Several larger ESCOs are reluctant to bid for contracting projects in the public sector, because the tender specifications are often considered as being of low quality and unclear, or because of the small size of tenders and long and costly acquisition processes.

Delivery Contracting came to a halt in the residential sector because of legal uncertainties. According to a recent decision by the German Federal Court of Justice, the

costs for investments in such a project can only be imposed on the tenant's costs if this was stipulated originally in the hiring contract, or if all tenants agree to the investment. This is a step back for ESCO projects in this sector.
Nevertheless, the ESCO market in Germany continues to grow, with special increase in certain sectors, such as the hospital sector or industry, which are projected to grow by as much as 100-150% (Geissler et al. 2006).

Table 9. Summary of basic data of the German ESCO market

Number of ESCOs	500, of which about 50 ESCOs are using the EPC scheme
Type of ESCOs	Private and PPP, some MNC, many local or municipal companies
ESCO association	Exists, ESCO Forum and VfW
Size of the market	Market potential is € 2 Bln in the public sector alone
Change in recent years	The growth slowed down slightly; fewer pure EPC contracts, but increased integration of energy efficiency measures on the demand-side into supply-side oriented contracting
Most popular technologies	Heating, insulation, CHP is growing

Austria

Austria is another success story of the ESCO industry in Europe, and the particularly fast uptake is an exemplary case for the rest of the EU. Austria offers numerous interesting case studies with high replicability.
The ESCO market in Austria saw a rather late commencement. The level of the ESCO market was nearly zero in 1998. With a quick take-off in less than a decade (Geissler et al. 2006), Austria has become an ESCO market leader in Europe. As of 2006, there are around 30 ESCOs[38] in Austria, and the number is still increasing, though only ca. 5 companies cover 70-80% of the total market. ESCOs estimate there is a ca. 500 million EUR investment opportunity in economically feasible projects for the rationalization of energy use.
The general financing scheme in Austria has been the shared savings model. Bundling of similar projects following the example of Berlin (ESP)[39] has proven to be an important success factor. Increasing and guaranteeing the quality of projects is a priority, and for this reason standard documents (such as contract models) have been made available, and standardized project development has been introduced (E.V.A. 2005). Uniquely even among the developed ESCO industries, several quality labels have been set up for ESCOs and ESCO services (E.V.A. 2005). The Thermoprofit quality label initiated by the Graz

[38] The developmental stage of the market is shown by the relatively large variance of the number of ESCOs indicated in different literature sources. The number varies between 15 (E.V.A. 2005) and 20 (Mihatsch 2006) to 50 (Lutter pers.com.). The companies are clearly still building up capacities (E.V.A. 2005).
[39] See the German country review above on page 28.

Energy Agency was introduced to guarantee reliable high quality proposals by ESCOs using the label. The label is issued by Graz Energy Agency and an independent commission that assess the ESCO companies at regular intervals to confirm that they fit Thermoprofit standards (Graz Energy Agency 2003), and this example has spread to other regions. The so called eco-label, on the other hand, denotes the quality of ESCO services and the compliance with standards (E.V.A. 2005).

The great majority of the EPC contracts until now have been concluded in the public sector, in federal and municipal buildings (E.V.A. 2005), and the private sector is lagging behind. Between 1997 and 2005 over 1000 public buildings were optimized with the EPC tool. In 2004-2005 another huge federal program started with about 800 buildings (E.V.A. 2005). On average, ESCOs have been able to guarantee almost 20 % savings for 10 years in these contracts (Grim 2006). Improvements have been achieved on heating and cooling systems, lighting, and water management. Street lighting has been renovated widely, too. There are dedicated programs to increase energy efficiency in municipalities, such as the e5 programme under the national climate protection program[40].

In recent years, more and more effort is being given to increase the number of ESCO projects in the private service sector and to find out the reasons for the slow uptake of the ESCO model, in spite of the same or higher energy saving potentials as in the public buildings. Various programs[41] have tried to find and remove barriers in this sector. It has become clear that barriers are larger in the private sector both on the clients' and the contractors' side. The building owners and/or users still lack awareness about the benefits of energy efficiency and the opportunities offered by ESCOs (E.V.A. 2005), even though energy related costs constitute up to 50% of the operating costs in private service buildings (Grim 2006). Private buildings are often rented out, creating classical split incentives. Furthermore, energy related matters are seen as less important compared to core issues, and consequently private companies pay less attention to this area (E.V.A. 2005). It is perceived that decreasing energy demand does not add much to profitability. Finally, the private building owners are often hesitant to get involved in long-term contracts, and some are scared by previous bad experience (E.V.A. 2005).

A limited number of projects have been implemented in shopping centers, hotels, banks, churches, office buildings, and hospitals.

Renewable energy sources have started to get attention, too, during the last few years. Currently there are 3 million m^2 installed solar collectors in Austria (ST-ESCOs 2006). Graz (250,000 inhabitants) has an innovative district heating system, that integrates a 10,000 m^2 sized solar collector surface for supplying a 2500 MW thermal energy per year. This area is clearly growing, opening new fields for ESCOs (ST-ESCOs 2006).

The government has played a significant role in the sharp development of the ESCO sector in Austria. A number of incentives are available for investments for the rational use of energy (subsidies, soft loans, tax credits for residential buildings). The involvement of federal and municipal buildings to the extent described above is exemplary. Energy agencies have been very active, participating directly and indirectly in ESCO projects. Obligations have not been typical, but in a few regions audits are

[40] klima:aktiv

[41] such as the EUROCONTRACT (E.V.A. 2005) and ecofacility framed in the national climate protection program (klima:aktiv) (Grim 2006, Unterpertinger 2005).

obligatory in public buildings. Finally, ensuring quality and developing certification of ESCOs and ESCO businesses must be highlighted.

Table 10. Summary of basic data of the Austrian ESCO market

Number of ESCOs	~30
Type of ESCOs	Private and public
ESCO association	no
Size of the market	€500 M investment opportunity
Change in recent years	fast development and increase
Most popular technologies	Heating, cooling, lighting, water management

2.1.4 Benelux countries

Belgium

ESCO business started in Belgium in 1990 (Vine 2005). As of 2006, the number of companies that offer complex energy services in Belgium is increasing and the scope of ESCO activity is growing, yet this is not matched by an actual market expansion, in particular in financing services. To the knowledge of the authors, there is no estimation available about the size of the market today. The ESCO market is dominated by large multinational companies, offering facility and building management using the Chauffage model, while EPC is not yet wide-spread. In the tertiary building sector (large buildings) the market is similar to France.

The public sector (mainly sports halls and schools) has received much attention from ESCOs in Belgium, and the industrial sector was also targeted to a large extent. Willingness to outsource by large consumers has been an important driving force, in order to provide off-balance sheet solutions for energy efficiency investments.

The public sector has been targeted also by the government itself, through establishing a public ESCO, the FEDESCO. It was started with a 1.5 million EUR governmental grant from the Kyoto Fund and with additional 5 million EUR private funding (IEA 2005). The FEDESCO carries out energy audits, and provides pre-financing to carry out identified potential measures. The clients have to earmark the cost savings from energy efficiency interventions and reimburse FEDESCO (first-out contract).

A small part of the industry is currently initiating activities in the residential sector. It is the aim of smaller energy consultancies to complement auditing services with the sales and direct installation of energy efficient household equipment and lighting (de Groote 2006). Nevertheless, the residential sector is still a minor client for ESCOs.

Technologies targeted in the public and industrial sectors are lighting renovations, improvement of heating and cooling systems and control systems. As a result of low energy prices, the pay-back time of ESCO projects is long; even lighting projects have a PBT of 5-7 years, which can also explain the prevalence of complex facility management contracts.

Financing of ESCO investments is not a problem, and it is not a factor that limits development. Customer financing, ESCO-based funding and third party financing (mainly leasing) are all used in Belgium. ESCO-based funding is often preferred in order to limit participants and to have only one responsible partner for the entire project.

The federal and regional governments have taken important steps towards increasing energy efficiency, although not particularly to strengthen the ESCO market (IEA 2005). Besides transposing and implementing EU legislation, other measures, such as voluntary agreements, green certificates, public sector obligations have been aimed at increasing energy conservation in Belgium (IEA 2005). Flanders has been active for a long time in implementing energy efficiency measures in all sectors, while Wallonia started a little later.

The most important barrier to ESCO projects is low energy prices. In order to develop the EPC market in Belgium, complex political action would be useful, that could effectively combine an obligation to save energy, increasing energy prices, subsidies for energy-efficient investments, tax exemptions or other benefits – some of which already exist.

Table 11. Summary of basic data of the Belgian ESCO market

Number of ESCOs	~30
Type of ESCOs	PPP and private, many MNC and 1 public
ESCO association	No
Size of the market	n.a.
Change in recent years	increasing
Most popular technologies	public building refurbishment

The Netherlands

The Netherlands has been referred to as a successful country in energy efficiency, without significant energy service company activity (EC DG JRC 2005). Energy management is common but there is almost no energy performance contracting (Bertoldi et al. 2006b). There are only a few ESCOs active in the Netherlands, mostly MNCs similarly to the surrounding countries. The level of activity and the number of companies have not changed much in recent years. The market is small, although no exact market potential has been estimated. The last significant research on ESCOs was conducted in 1998, and an update is expected in 2007 by SenterNovem, which should be able to reveal recent developments and trends.

ESCOs could develop and add to the already large energy saving results but apparently awareness about this option is too low and the institutional framework is missing, which hamper the launch of activity.

In the case of the industrial sector, voluntary agreements have been successfully pushing energy efficiency improvements and industry has been implementing measures on its own, given that they possess the financial and technical means and in-house capacity. There has been, however, a market for specific consultancies to support these changes. Lately, voluntary agreements cover the tertiary building sector, too.

Energy efficiency improvements in the residential sector are supported by other means than ESCOs, including grants, and preferential loan rates. 80% of all rented houses are social houses, which are occupied by lower-income people at low rates. Improvements in the social housing could be potentially an important market for ESCOs, however as a result of governmental programs, this sector is rather overcapitalized and ESCOs are not able to compete for projects.

In the case of the public sector, the role for ESCOs has been limited because there is one organization responsible for the management and operation of all state owned buildings and another one for military sites, which are taking care of energy related investments and refurbishments on their own, and are not interested in employing an ESCO. These organizations themselves stand close to the ESCO definition, but without guarantees and traditional risk-sharing. Nevertheless, implementation of energy system improvements is supported with energy performance calculations.
Street-lighting and large buildings that are not state owned (hospitals) do make up a segment that is available and open for ESCO contracting. Complex projects often take place through joint ventures.
Since the energy efficiency market has been moving without ESCOs, potential clients have not seen positive examples and do not count on this solution for energy saving. It is evident that the ESCO is only one of the tools for increasing energy efficiency, and the Netherlands has been using other measures to become one of the leaders of energy use rationalization.

Table 12. Summary of basic data of the Dutch ESCO market

Number of ESCOs	very few
Type of ESCOs	MNC, often joint-ventures
ESCO association	No
Size of the market	n.a.
Change in recent years	Stable
Most popular technologies	Street lighting and large building renovations

Luxemburg

Specific information about the ESCO market in Luxembourg is scarce. The number of ESCOs present in Luxembourg is around 3-4, which include daughter companies of large multinational companies of French and German origin, but also one Luxembourgian company, too. Occasionally, ESCOs in the surrounding countries implement projects in the country.
Energy intensity in Luxembourg has decreased 2.5 times faster than the EU average between 1990-2004. To this end, lots of measures related to energy conservation and rational use of energy were introduced in order to support the achievement of Kyoto targets and other commitments. These measures include voluntary schemes with industry, with hospital associations and the banking sector, subsidies and fixed feed-in-tariffs for RES, and support for households and the public sector to implement energy efficiency with a maximum subsidy of 40% of audits carried out for the buildings (MURE-Odyssee 2006a). However, specific measures to support ESCOs have not been central in Luxembourg.

Table 13. Summary of basic data of the Luxembourgian ESCO market

Number of ESCOs	3-4
Type of ESCOs	local and multi-national companies
ESCO association	No
Size of the market	not known
Change in recent years	n.d.
Most popular technologies	n.d.

2.1.5 Nordic countries

Finland

The Finnish energy agency, Motiva[42], maintains a public list of ESCOs and an ESCO project database[43]. While there were three ESCOs identified in 2003 (EC DG JRC 2005), by 2007 the number of active ESCOs registered in the database of Motiva reached 9 (Motiva n.d.). Experts at Motiva are aware of a total of 11 companies that have implemented at least one ESCO project. 4-5 of these companies are actually actively participating in the sector, and only one ESCO company has circa 90% of the market share. There are 6 local ESCOs or subsidiaries of multinational companies, 2 local energy companies, and 3 other companies that have had several ESCO projects. The EPC business has been increasing lately, but not to the extent expected before[44].

Industries are the focal point for energy efficiency investments by ESCOs. Energy intensive industries, such as the paper, and chemical industries and metallurgy make use of ESCO-offered services increasingly. These industries are interested in energy savings because 15-20% of their costs are energy costs. Thus, production processes and heat recovery have been the most common ESCO project areas. The public sector has also been addressed widely. In regards to the numbers of projects, 50% have been carried out in this sector, though regarding the level of energy savings, the public sector accounts for only 10% of total savings resulting from ESCO projects. The public sector contracted ESCOs for HVAC system improvements in the most cases. Both shared savings and guaranteed savings contracting models are used in Finland.

No recent estimate of the size of the ESCO market is available in Finland. The latest information is for the period 1998-2004, when the annual savings through energy efficiency were roughly 95 million EUR/year, 5% of which was carried out by ESCOs (Hypponen 2006). At the same time, ESCOs estimate that by 2004 not more than 10% of the constantly growing industrial ESCO market potential had been captured.

The most important and successful push for energy efficiency in general and for ESCO contracting has been the Voluntary Energy Conservation Agreements between the industry and the Ministry of Trade and Industry introduced as long ago as 1997 (Hypponen 2006, Motiva 2005). There is an on-going auditing program supported by the

[42] Motiva Oy, www.motiva.fi

[43] http://www.motiva.fi/fi/toiminta/esco-toiminta/esco-hankerekisteri/esco-yrityksetsuomessa.html and http://www.motiva.fi/fi/toiminta/esco-toiminta/esco-hankerekisteri/

[44] It is reported in the *European ESCO Status Report 2005* (EC DG JRC 2005) that experts had predicted a doubling of the market from 2004 to 2005

government; but this has not created a large increase of ESCO activity because clients generally implement the suggested measures themselves.
Financing of energy efficiency investments has not been a problem in Finland, in spite of the limited activity by banks. Both clients and ESCOs have the capacity to obtain financing for the projects. However an increase of awareness in the financial sector about ESCO industry would be able to boost the market by increasing financial input and involving new ESCOs, clients and projects (Hypponen 2006).
Other driving forces are the increasing energy prices and environmental requirements, limited in-house energy expertise in the industry and sometimes limited budgets for refurbishment (Hypponen 2006).
The normal procurement process does not recognize EPC and standards for procuring ESCO services are needed. The new accounting system makes the bookkeeping of ESCO projects more complicated: according to the new IAS/IFRS[45] reporting, equipment must be shown in the client's own balance sheet and investment budgets, and booked as a financial lease. This way, an ESCO service is booked in the accounting in 3 parts: services, lease and interest. This is unfavourable for the ESCOs, which offer a complete service package and not equipment separately. More importantly – because the new equipment appears as clients' investment – decisions must be taken by the client according to their internal investment rules (Hypponen 2006). Earlier, the ESCO service could be handled simply in the income statement as a purchase of services.
Industries that have joined the voluntary agreement described above are eligible for 15-20% subsidy of the energy efficiency investment costs from the government (Hypponen 2006). Furthermore, the subsidies are peculiar in Finland since they are designed to help the ESCO industry by offering an additional 5 percentage points subsidy to clients if an ESCO is employed in the project.
It is important to note that a new niche has been discovered by ESCOs in Finland, namely material efficiency, which has an enormous saving potential (Hypponen 2006). So far, greater hesitance is experienced on part of the clients than in case of energy efficiency improvements, but ESCO-type scheme is expected to operate in this field, too (Hypponen 2006).

Table 14. Summary of basic data of the Finnish ESCO market

Number of ESCOs	9-11
Type of ESCOs	Independent ESCOs, local energy companies, MNC, consultancies
ESCO association	no
Size of the market	€ 220M investment 1998-2004
Change in recent years	Slowly, but increasing
Most popular technologies	Heat recovery, production processes, HVAC, new area: efficiency of recycling raw materials

[45] International Accounting Standards; http://www.iasplus.com/standard/standard.htm.

Sweden

The Swedish EPC market has been dormant until recently (Energikontor Sydost[46] 2005, Geissler et al. 2006). A quick growth has been observed during the last 2-3 years driven by the growing interest from potential customers (Forsberg et al. forthcoming). For a long time, a lack of experience, mistrust and legal ambiguities hindered the uptake of the benefits offered by ESCOs. Mistrust in ESCOs and EPC is a particularly important issue in Sweden. The mistrust developed because ESCO-type investments already took place as early as 1978 (Vine 2005); however, many of these failed, and did not present the anticipated savings result[47].

The number of ESCOs offering EPC in 2007 is around 12-15 (Forsberg et al. forthcoming), going up from around 5 in the last 2 years when two larger consultancy firms and one HVAC company started to develop ESCO-like services for small-scale projects. As of 2007, there are local market actors, control companies, building service companies and consultancy companies. Some of the EPC providers have extended their structure and formed special EPC branches (Forsberg et al. forthcoming).

According to expert estimates, in 2006 the turnover from projects employing EPC was around 50 million EUR (Forsberg et al. forthcoming). The market size in a broader sense, including all "Performance oriented" contracts (for instance boiler and heat pump retrofits) was twice as large, around 80-100 million EUR.

The energy saving potential through ESCOs in Sweden has been calculated at 15% of the present energy demand, and this suggests a 650 million EUR ESCO investment potential with a relatively short pay-back time (Geissler et al. 2006).

Clearly the most attractive and emerging sector that takes up ESCO projects is the public sector (municipal buildings, hospitals). In less than 5 years, 5% of the public building stock has been contracted by EPC (Forsberg et al. forthcoming). As of 2006, about 3 million m^2 in public buildings had been covered by an EPC and an additional two million m^2 was under preparation. The most crucial success factor for the uptake of ESCO projects by public bodies is a change in mindsets: ESCO companies have distanced themselves from pure outsourcing, and focused on implementation and operational partnerships instead.

Almost all projects that have been implemented lately have installed new or improved control systems. Large-scale air-handling refurbishment in combination with improved heat recovery accounts for the largest project investment values. An interesting development is that public bodies in 2005 also started to use the cost savings from EPC projects to finance RES installations.

The Swedish ESCO revival is believed to be the outcome of a complex mix of targeted strategic activities[48] (Forsberg et al. forthcoming). Key parts of the strategy have been ground studies and market studies, pilot projects and guidelines for procurement and model contracts, large scale and effective information dissemination and capacity

[46] Energy Agency of Southeast Sweden

[47] Details of the reasons of the failures of EPC in Sweden, first in the 1970-1980's, then again in the 1990's are provided in Forsberg et al. (forthcoming).

[48] Sweden has carried out a number of local initiatives and participated in international projects for the induction of the EPC market. For instance, local projects have been the Forum for energy services; EPEC; U.F.O.S. EU projects: EUROCONTRACT, PU Benefs; Interco-PPP; and international level activity: IEA DSM Task X (Forsberg et al. forthcoming).

building for multipliers, combined with personalized information dissemination to EPC buyers to provide answers to their preoccupation (Forsberg et al. forthcoming).
Nevertheless, in spite of the information dissemination and stakeholder meetings, interpretations still differ on some key issues (Geissler et al. 2006). Another problem is that trust towards ESCOs is still not fully restored, and in this regard, it would be beneficial to have clear "official" statements by the government and public bodies in support of TPF, EPC and ESCOs.
As of 2005, the financing of EPC was not well established by banks. Today there is at least one Nordic commercial bank provides TPF, also buying receivables/using forfeiting. Smaller projects are directly financed by ESCOs.
The Swedish example demonstrates that deliberate, well-designed dissemination of information, clarified regulatory environment, standardized, trustworthy documents and procedures, and successful show-cases can be of key importance for development. Nevertheless, the recipe is not valid for just any market, different markets have to overcome their own barriers using some of these measures and combined with others (Forsberg et al. forthcoming).

Table 15. Summary of basic data of the Swedish ESCO market

Number of ESCOs	12-15
Type of ESCOs	Local and MNC
ESCO association	No
Size of the market	~€50 M turnover in 2006
Change in recent years	Rapid uptake
Most popular technologies	Improved control systems, ventilation and heat recovery

Denmark

According to the Energy Division of the Danish Offshore Industry, less than 5 companies offer ESCO services in Denmark. The number of ESCOs has been rather constant over recent years, although companies enter and leave the market, which results in some small fluctuation. To the knowledge of the authors, the ESCO market size has not been evaluated lately, but ESCO experts estimate it to be around 5 million EUR per annum. Experts claim that the commercial market for ESCOs is more favourable in 2006 than it was in 2000 (DI and PSO 2006), as the market may experience a further expansion in the coming years, partially as a result of the governmental commitment to decrease final energy consumption by 1.7%/year by 2013, which is supported by the obligation on energy producers and distributors to document their obtained savings.
Until the early start of 2000s, efforts for energy savings and energy efficiency improvements were concentrated on the private sector (industrial sites) and remarkable results have been achieved in particular in the brewery sector, but as of 2006, the (public) building sector is receiving growing attention. The types of projects implemented by ESCOs so far in Denmark have been control system installation, ventilation and industrial process improvements.
According to the Danish Offshore Industry, financing of ESCO projects through banks has not deployed yet probably due to a lack of knowledge and experience of the financial

sector of the market perspectives of EPC. Clients have financed ESCO projects implemented to date.
There is a need to develop awareness and trust among potential clients through demonstrational projects and making standardized contracts and related documents available (DI and PSO 2006). Experts believe that one of the most important barriers to EPC is the lack of established standard monitoring and verification methods. Another major necessity that has been articulated by experts is to establish working networks where utility/grid companies, financial institutions and equipment suppliers can jointly develop organisational and financial models. Today, suppliers of energy saving equipment are often dependent on utilities in order to be able to measure baseline energy consumption and savings (DI and PSO 2006).
The Danish Offshore Industry believes that more effective and successful enforcement of the already existing EU level legislation for energy savings, such as the Buildings Directive (Directive 2002/91/EC), is also of major importance.

Table 16. Summary of basic data of the Danish ESCO market

Number of ESCOs	2-4
Type of ESCOs	Danish based MNC
ESCO association	No
Size of the market	€5 M/year
Change in recent years	no change
Most popular technologies	industrial processes, eg. in brewery, control systems, ventilation

2.2 New EU Member States 2004

2.2.1 Baltic Countries

Lithuania

Lithuania has a large level of power generation overcapacity and is a net exporter of electricity. Consequently the energy price used to be very low, and energy efficiency was a low priority area (COGENchallenge 2005b); however this has significantly changed. In addition, 100% of the natural gas is imported from the Russian Federation, the electricity market will be fully opened from 2007, and the Ignalina power plant is expected to be closed in 2009 (COGENchallenge 2005b), while the economy is steadily growing (GDP growth was 6.6% in 2004).
The first ESCO businesses and a business plan for an Energy Service Company were set up in the framework of the SAVE project "Energy Service Companies in Lithuania" in 2001-2003 (LEI n.d.b.). As of 2006, there were already six ESCOs or ESCO-type companies working in Lithuania. These were established mainly as subsidiaries of large foreign companies. The number of companies and the size of the market are slowly increasing. One new company started operating in 2006.
The ESCO market is concentrated on residential and public buildings, and to a limited extent on industrial investments. The estimation of the market size is around 125 million EUR for the residential and public segment, and a further 50 million EUR for industry.

Lithuanian ESCOs and ESPCs are primarily engaged in heat production and supply side energy management in the district heating sector, which includes the modernization of boilers in order to utilize biofuels and other local resources. Most projects were commissioned by municipalities and the public sector. The most popular contract scheme is the guaranteed savings model.

Both national and international banks are eager to be involved in financing ESCO projects. The development of the financial sector of Lithuania has been lagging behind other CEE countries, which has delayed their involvement in TPF until recently (LEI n.d.a.). There are also a number of forms of capital support from the state and municipalities, including investment subsidies, soft loans, interest subsidies, and loan guarantees.

There are many barriers hampering the exploitation of ESCO potential, one of the most important being the lack of information, and limited understanding of the importance and benefits of energy efficiency by authorities (potential clients). Furthermore, administrative hurdles persist, such as complicated procurement procedures. Decision on a tender winner is primarily based on the cost of the initial investment. Streamlined and rigorously implemented policies aimed at radical improvement of the energy efficiency in buildings and the industry could significantly increase the ESCO market.

In order to overcome the most important barriers, efforts would be needed at various levels. Governmental support for and promotion of energy performance contracting would be helpful. This could be in the form of supportive policies, and clarified procedural regulations. A concise national strategy for energy efficiency in line with necessary changes in the energy sector is needed. More promotion of "best energy efficiency practice" is seen as necessary for building up trust and an understanding of the ESCO concept.

Table 17. Summary of basic data of the Lithuanian ESCO market

Number of ESCOs	6
Type of ESCOs	MNC
ESCO association	No
Size of the market	€175 M
Change in recent years	Increase
Most popular technologies	Heating, DH, large boilers

Latvia

The first ESCO action was started in December 2001 with the renovation of the street lighting system and the application of efficient lighting technology in Tukums municipality within the ELI project[49] (Rochas 2004). As of 2006, there are two companies using EPC in Latvia. This number has not changed lately (Rochas 2004). Apart from this, there are several projects which include leasing of CHP and new boilers, and are often developed with some elements of EPC. Furthermore, over 40 companies have been identified that work with energy delivery contracts, which is still seen as more profitable than EPC (Ekodoma n.d.).

[49] More information about the ELI project and the municipal lighting refurbishment activities in Latvia can be found at: http://www.efficientlighting.net/FormerELI/latvia/overview_streetl.htm.

There is no information on the ESCO market size or the potential of energy efficiency investments. Until now, most projects have been realized in the public sector with public lighting and boiler improvements.
The public sector is not yet fully aware of the benefits of EPC and ESCOs. Pubic budgeting rules induce a lack of interest in energy cost saving anyway, because if a municipality saves money, it may loose all financial savings by getting a smaller allocation for subsequent years, depending on the calibration of the subsidy allocating formula in the country. This situation creates a "pressure" to spend the entire annual municipal budget in order to avoid being cut the following year. This situation is typical of a large number of other countries.
In general, the lack of belief and trust in demand-side energy efficiency is evident and it is crucial when decision makers are obliged to select among different measures to be taken. The small number of ESCO projects could not yet build the trust and provide enough success stories. In addition, a standard requirement for a tender is a minimum number of bids: it is impossible to conclude a tender when potential business actors are not interested.
Financial institutions in Latvia are open to EE investments: for instance 2 local banks even have staff trained on energy efficiency project management and the ESCO concept. Lately others banks are showing interest in this business, too. Therefore, it is not the problem with financing that limits the ESCO market in Latvia.
It is expected that the opening of the energy markets will facilitate the development of Energy Delivery Contracting, and hopefully EPC, too (Ekodoma n.d.). Public procurement procedures need revision to incorporate and support "green" procurement and the procurement law could directly introduce the concept of ESCOs to facilitate the market.

Table 18. Summary of basic data of the Latvian ESCO market

Number of ESCOs	2 + about 40 ESPCs
Type of ESCOs	2 companies focused on EPC, the others on delivery contracting
ESCO association	No
Size of the market	n.d.
Change in recent years	No change, but the environment has become better, thus consequent growth is expected
Most popular technologies	Public lighting and boiler improvement

Estonia

According to Estonian experts, ESCOs have not deployed yet in Estonia as of 2006-07. The ESCO market is limited to only a few transactions with an energy services nature. Until 2006, 2 companies (one local and a multinational) had been established, and even these do not perform ESCO activities as the main business area with primary activities oriented to other fields. No estimate of the market size and potential exists to the knowledge of the authors and the local respondents.

The few ESCO-type investments that have been realized took place in the public sector, aiming at the improvement of public lighting, control and automation systems. Boiler improvements are also common by the one multinational ESCO, but only on the supply side with the formula of Delivery Contracting.

Financial institutions would be interested in participating in TPF of energy efficiency investments, and strong competition has reduced interest rates, which can be a crucial benefit for EE through ESCOs.

One of the most important barriers to the ESCO market is the changing environment where they have to work. The legal system has been altered significantly since the restoration of independence, and still the laws are often amended. The unstable, still developing regulatory framework hinders the conclusion of long-term, technically complex agreements. Election cycle-based thinking and attitudes have also been an important impediment, inhibiting long-term contracts in the public sector.

Experts believe that the delayed appearance of ESCOs is also due to the limited knowledge and understanding of the concept and benefits. ESCOs are expected to get off the ground if information is disseminated effectively and widely and if standard contract formulas and procedures are developed and accepted.

Although ESCO activity has been low in Estonia, energy efficiency is a priority in all sectors. In fact, ESCO projects have not been active in domestic apartment block (which have huge saving potential) because they cannot compete with the high level of governmental support and the low interest rate loans that are available for households through which energy efficiency has been increased significantly in recent years.

In the public sector, many of the large municipalities are able to finance their own investments and therefore do not expect ESCO activity. Municipalities were obliged to apply for Structural Funds, which were also used for energy system improvements. On the other hand, municipalities often require energy audits by consulting companies.

Similarly, the industrial sector has the financial and technical capacity to carry out energy retrofits without ESCOs. Furthermore, this sector in Estonia is averse to outsourcing.

An ESCO that targets the residential sector is being set up during the preparation of this report. The ESCO integrates the governmental “energy saving loan” for households, the obligatory “renovation fund”, and further bank loan if required by the tenants. If a housing association decides to implement energy efficiency investments, the so called “renovation fund”, that all associations must establish and keep, will be the basis of financing. If this is not sufficient, the association is eligible for a low-rate preferential energy saving loan. It is obligatory to carry out a detailed energy audit to draw this loan. The ESCO carries out the audit and identifies energy efficiency measures and their costs. The housing association can consequently decide which measures to implement. The bank loan is given based on the guarantee given by the ESCO. Upon request insurance can be provided by an insurance company on the ESCO guarantee can be also involved for 2 years in order to avoid any financial risk. The scheme is expected to open up the residential sector for ESCO businesses, thus significantly increasing energy efficiency and living conditions in households.

Table 19. Summary of basic data of the Estonian ESCO market

Number of ESCOs	0-2 (few projects)
Type of ESCOs	One local and one MNC
ESCO association	no
Size of the market	not known
Change in recent years	stable
Most popular technologies	public lighting, but complex residential projects are expected to increase

2.2.2 New Member States in Central Europe

Hungary

The development of the Hungarian ESCO industry has been celebrated as a unique success story not only in Central Europe, but also across the EU (Urge-Vorsatz et al. 2004, EC DG JRC 2005). The ESCO industry in Hungary dates back to the early 90s. After 15 years the market is experiencing stagnation, and whether the exemplary success is continued is debated. The easy "cherry-picking" projects have already been exploited and the market is in need of revitalization, while the ESCO sector is undergoing a transformation process with some companies exiting or changing their core business away from energy service provision. Time will show whether this situation will strengthen the EPC market by consolidating it or will weaken and water it down by concentrating it in the hands of a few parties only.

Based on a registry of the Energy Center[50], there are about 30 ESCOs or ESCO-type companies in Hungary, but only about 5-6 companies cover 80% of the market. French ESCOs played a crucial role in the early development of the industry in Hungary; another important factor was strong local engineering expertise and interest in entering a new market for energy service provision. The ESCOs approximate a 150-200 million EUR market size, excluding large power plant investment opportunities.

Projects in the beginning were primarily focused on public lighting, co-generation and district heating system improvements. As of 2005, other technologies have been gaining an increasing importance, such as heating and hot water system interventions, industrial water and steam supply, air conditioning, automatization and RES (biomass) (Rodics 2005).

Most of the clients have always been in the municipal sector. This is partially due to the long-term security that this sector provides for ESCOs, and to the specific support programs (such as the UNDP/GEF Hungary Public Sector Energy Efficiency Project[51]

[50] Collected through the UNDP project implemented by the Energy Center (for the financial assistance of the energy audits and feasibility studies related to energy efficiency for municipalities) and completed by the authors.

[51] The Program aims at supporting municipalities in the starting steps of energy efficiency project development by funding feasibility studies and audits http://www.undp.hu/oss_eng/fooldale.htm.

and the Szemünk Fénye (Light of Our Eyes) program[52], the Phare co-financed twinning project, the German Carbon-Aid Fund) that target energy efficiency in this sector and that have increased the willingness to employ ESCOs. The involvement of ESCOs in the residential sector is also possible, although only through the combination with targeted state subsidies and/or subsidised loans (Panel Program and Panel Plus Program[53], Thermal insulation of apartments, Residential Energy Saving Grant). Certain strong barriers still restrict the expansion of residential projects. The industrial sector has been gaining more attention lately, and accordingly, more recent figures suggest that the distribution of ESCO projects is 30% in industry, 30% in district heating retrofits and development, and 30% in the municipal sector. Renewable energy investments have been started, although these have not gained a major role yet (Rodics 2005).

Projects had typical pay-back times of between 3-5 years during the 1990s (Urge-Vorsatz and Lazarova 2003). Today this figure is 5-7 years (Rodics 2005), which is actually one of the major challenges the ESCOs are facing: companies engaging in projects with longer PBTs have to be financially stronger and more stable than previously.

In parallel to the increasing timeframe of investments, international aid, which was previously very substantial in Hungary, is decreasing or coming to an end (for instance UNDP/GEF Hungary Public Sector Energy Efficiency Project). This – in principle – should not be a problem since they were intended to aid the development and the establishment of the sector.

Only a few main barriers are discussed below. Experts have repeatedly highlighted the problems caused by the lack of baseline data. Sites and buildings sometimes do not have detailed billing systems and pay average fees per month, not according to the real consumption. Thus, ESCOs are in a situation where they cannot prove the savings achieved appropriately using this information, or they would have to spend 1-2 years before the project begins on establishing the baseline information. In this situation, the energy saving potential (and whether an EPC project is feasible) could be evaluated only after 1-2 years already were spent on the case[54]. ESCOs must use different ways to estimate the savings. In addition to this, accepted M&V practices have not been widely introduced. Trust established between an ESCO and the client is needed for the remuneration of an ESCO project.

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[52] The program was initiated in 2005 by the Ministry of Education in order to increase energy efficiency and quality of lighting and heating in educational buildings. Further information is available at: http://www.szemunk.fenye.hu/index.html.

[53] The Panel Program was launched in 2001, open for housing associations living in block houses. The grant is open for renovation projects and for modernization of heating systems. In the scope of the grant 1/3 of the investments is financed by the national budget, 1/3 is given by the municipality and the residents have to pay only 1/3 of the costs. The Panel Plus Program is a low-interest rate loan for helping residents pay for the 33% of the refurbishment costs. It started in 2005. According to the Ministry of Regional Development until today 87000 apartments have been refurbished using 16.4 billion HUF (ca. 58 million EUR) financial support. Source: www.fejlesztes.gov.hu

[54] These circumstances are common in some other countries, where regular data collection is not general. The ESCOs need to find the proper way to evaluate their savings, and one way to do that is to collect data during a certain time to establish the baseline data themselves. However, this can increase transaction costs significantly, and ESCOs often use generalized values instead, which are however not as reliable.

Availability of financing can cause problems both in the municipal and residential sectors. The municipal borrowing is restricted by a cap on obligations creating debt[55]. Although, an ESCO project is not a traditional loan because the savings appear every year, in legislative terms there is no difference. It would be especially beneficial to impose different accounting rules on ESCO projects taking into consideration the repayment of the investment.

As in many other countries, most local authorities are still not informed about the opportunities ESCOs offer and are often suspicious to the financial schemes. In addition municipal authorities often feel uncomfortable about sharing the financial benefit of their project with a private company and as a result a project gets postponed or never implemented. Procurement difficulties (only cost-related criteria), fear of having redundancies also limit municipalities' willingness to engage in ESCO projects. The 4-year election-cycle-based decisions make it particularly difficult to plan in the long-term and conclude ESCO contracts that are longer than 3-4 years. Finally, split incentives with investment and operational expenses paid by different budget lines are still very significant, and have always been a major obstacle.

On the other hand, it must be highlighted that many positive examples have been seen, where personal commitment of energy managers at municipalities has been a significant catalyst for ESCO projects. Also, the importance of the UNDP/GEF Hungary Public Sector Energy Efficiency Project is usually highlighted, which has played an important role in the ESCO project development in this sector.

The residential sector could play a much bigger role in practically all CEE countries, especially with rational utilisation of new state support programs (see above). However, decision making and concluding a long-term contract is very hard in the case of a large block house, where the law requires the consensus of all apartment owners. Some projects (façade renovations) may be done with the agreement of only the concerned apartment owners, or renovations can be carried out only on the apartments which agree to it (and finance it), but this is not possible with for instance hot water, heating, or insulation renovations. Furthermore, ownership of certain objects (the water tubes, walls) is not clear (not stipulated in the housing association contract) and can cause a stalemate.

Some of the above barriers are found in the industrial sector, too. The lack of baseline data and the difficulty of defining the scope of the projects because of the complex structure of the plant systems is the most important.

Revision of problematic legislation (ownership-related issues) is therefore desirable, while proper enforcement of other existing laws (notably the obligation for renovation fund in the residential sector) could also help for stronger involvement of ESCOs in the residential sector.

Dissemination of information remains to be important. Although there is a growing understanding in the way ESCOs work and the benefits they deliver, the level of acceptance and trust is still considered as one of the major (if not the most important) impediments. Well-disseminated demonstration projects, establishment of an ESCO

[55] According to the Act on Local Governments (Act LXV of 1990), the limit is set at the annual target of the so-called adjusted own revenue, which represents 70% of the local government's own current revenue (such as local taxes, local fees, interest revenues, environmental fines and other specific revenues of the local government) reduced by short-term commitments (which include capital repayment, interest payment and lease fees) (Rezessy et al. 2006).

Association and finding ways of explaining the short and long term benefits for decision makers would serve the ESCO industry well.
Financing of ESCO projects by banks is not a problem. On the one hand, some (mainly multinational) ESCOs have sufficient financial means, and on the other hand third-party financing is a well accepted and widespread scheme. Banks are particularly open to participate in performance contracting.
Action should be taken to overcome the long-standing barriers to ESCO projects by finding ways to support the market itself and not individual companies or groups of companies. It is crucial that governmental action be based on a combination of appropriate legislation, regulation, monitoring and enforcement, and be combined with extensive and innovative information campaigns. In addition, authorities should play a demonstration role and an obligation of municipal and governmental buildings and/or the largest industries to effectuate energy saving measures would be a significant driving force.

Table 20. Summary of basic data of the Hungarian ESCO market

Number of ESCOs	30
Type of ESCOs	local and MNC
ESCO association	no
Size of the market	150-200 million EUR
Change in recent years	stable, maybe decreasing
Most popular technologies	CHP, HVAC, automation

Czech Republic

The Czech Republic is another ESCO frontrunner among the New EU Member States, even though the market is still considered as in its initial period (Zidek 2005). The EPC concept was unknown in the Czech Republic until 1993, yet in the next two years the country saw a rapid takeoff of ESCO activity with a 3 million EUR investment in public healthcare (Zeman and Dasek 2005). The first project was the renovation of the thermal energy handling system, of "Na Bulovce University Hospital" (Zidek 2005). Until 2001 the development was slow due to numerous barriers and obstacles, but in 2001 the Czech ESCO market reached a turning point because of important changes in legal circumstances (Zidek 2005). A new law was passed and energy audits were made obligatory for large consumers[56]. This decision has meant a strong push for energy efficiency investments. In 2004 the State Energy Policy was adopted, which highlights the role of energy efficiency. Accordingly the National Programme for Energy Effective Management was accepted, where EPC is recognized as one of the support mechanisms for energy saving (Zidek 2005).
According to the Czech ESCO database[57] managed by the Czech Energy Agency, there are currently 5 companies in the Czech Republic that are focused on providing services according to the EPC concept, and 2 other companies working as ESPCs. However,

[56] According to the Act No. 406/2000 Coll. on Energy Management consumers with a demand higher than 1500 GJ in the public sector, and for other consumers of more than 35000 GJ consumption are obliged to prepare energy audits of their premises.
[57] http://www.ceacr.cz/epc/

experts estimate that the number of ESCOs is higher than this, between 10 and 15 (based on the database of SEVEn[58]). This number is increasing. In 2005 alone two new companies were created for the provision of ESCO services. Besides, there are about a dozen companies providing long-term energy delivery contracts.
The potential of energy savings through EPC, which is economically attractive, is about 100 million EUR. Available estimations of the market potential vary slightly, but they are in the range of 10-20 million EUR/year[59]. Until now about 70 projects have been realized through EPC (Zidek 2005), but over 30% of these have been done by one ESCO.
The most effective tool to promote ESCOs in the Czech republic has been large scale awareness raising, where the ESCOs' own lobbying activity was deemed particularly valuable.
ESCOs' successes across sectors are varied. The healthcare sector is the primary focus for ESCOs, while educational buildings, military and other state owned sectors are appealing projects, too. Military refurbishment projects are complicated with special legal conditions, but the interest is high due to the high energy saving potential (Zeman and Dasek 2005). The ease of project implementation partially depends on the owner of the building. Middle sized cities are very active in working with ESCOs bundling tens of buildings into project pools. Apart from the public sector, the private sector (typically industry) is also on track regarding energy efficiency investments (EC DG JRC 2005, Zeman and Dasek 2005). The rough division between ESCO investment categories is shown in Figure 2.

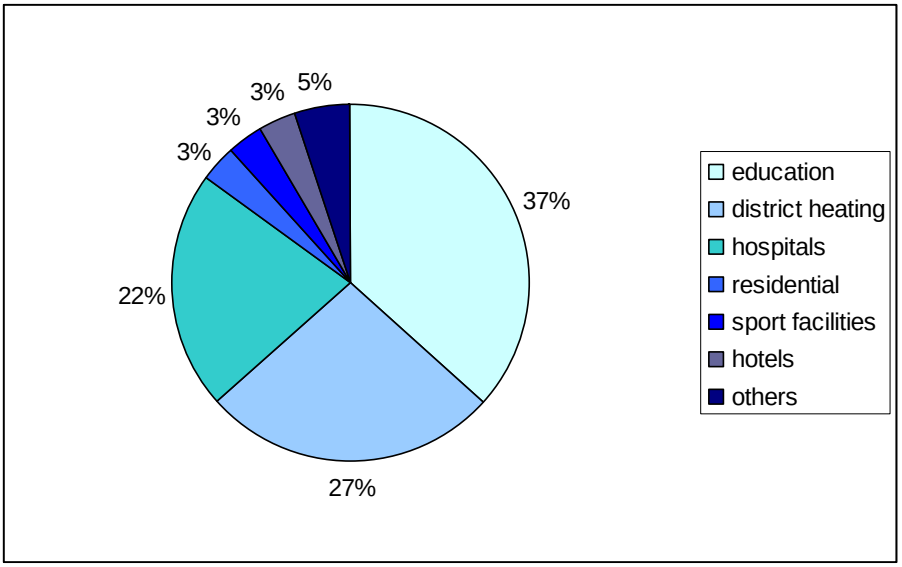

Figure 2. Distribution of EPC in investment categories, 1995-2005 (GreenMaxCapital Advisors for IFC, 2006 from Dasek pers.com.)

[58] www.svn.cz
[59] Helenova (pers.com.) approximates that the market size currently is only 2-5 million EUR, which will probably grow up to 7-10 million EUR in the future. Dasek predicts a similar size, putting the market of EPC projects in the public sector at around 10-15 million EUR/year (based on tenders until today, mainly in education, healthcare and public transport sectors), and at around 5-10 million EUR/year in the private sector (Dasek pers.com.).

The most common contracting form is the guaranteed savings, but as the market is diversifying and consolidating, contracts are individualized as a result of negotiating between the ESCO and the client. Financial institutions, including mostly local banks, are available and are ready to participate in TPF, but multinational ESCOs often use their own corporate financing. The International Financial Corporation is running its Commercialization Energy Efficiency Facility, providing loan guarantees for ESCOs and end-users. There is also limited governmental support for ESCOs thorough the Czech Energy Agency.

In the last few years, the role of EPC has been decreasing, while Energy Contracting schemes are more common with customers seeking a guaranteed in the price of energy supplied.

Despite some consolidation and a steady increase of the market in recent years, some barriers still exist. Scepticism by management towards energy efficiency investments and EPC still lingers (Zeman and Dasek 2005), as a result of earlier unclear definitions, confusing concepts and some failed contracts (Zeman 2005). Correct understanding of the benefits and conditions of ESCOs and EPC has grown, but prejudices against complex solutions remain strong. Increasing effective information dissemination, raising awareness and education related to energy efficiency is still essential to overcome this problem.

On the ESCOs side, companies are not (yet) ready to take projects with a long pay-back period. Typical projects are 4-6 years long, and the majority of ESCO investment interest is for heating equipment (heat delivery regulation, piping, pipes insulation, boilers replacement, fuel switching), or power factor management. However, most industrial end-users have already installed such equipment. On the other hand, insulation and other building renovation measures have a long-term pay-back period (more than 10 years) and therefore are excluded from the current scope of attention. It is considered too risky to invest in long contracts in the private sector because of the unpredictable financial future of potential clients. To a lesser extent, the same fear is present towards the public institutions. Governmental support for EPC in the public sector would be necessary thorough providing guarantees of long-term standing of potential clients. Nevertheless, longer projects are already starting to gain importance in the public sector, especially for street lighting and energy delivery.

Similarly to many NMSs, detailed, reliable information on present energy consumption and condition of buildings is lacking, which hinders the easy set up of energy efficiency targets. Attention has to be given to appropriate project implementation and especially monitoring and verification of savings.

Legislative barriers have largely been removed both in the public and private sector. Standardization of public tenders and verification of EPC contract evaluation procedures is vital (Zeman and Dasek 2005, Zeman 2005). The responses to calls for tenders often include both EPC and EC. However, public administration is usually unable to effectively compare these two different types of proposals, which causes confusion (Zeman 2005). Standardization of EPC project procedure would be particularly beneficial to avoid dissatisfaction, and unwillingness to start the process and to help ensure completion of successful projects.

The ESCO sector is moving in the right direction, and the country can already present success stories and areas of well-developed energy efficiency focus. However, there is

still room to develop, and some sectors with high saving potential have hardly been tapped (such as the military). The legislative background has become exemplary (obligatory audit) and has advanced the sector significantly, though with some important issues still open for change (procurement).

Table 21. Summary of basic data of the Czech ESCO market

Number of ESCOs	10-15
Type of ESCOs	local and MNC
ESCO association	no
Size of the market	€10-20 M/year
Change in recent years	increasing
Most popular technologies	heating

Slovakia

ESCO-type companies appeared early in Slovakia. Energy service companies starting in beginning of 1990s did not perform very well at the beginning, and 2003 could be considered as the real starting point (Murajda 2005). As of 2006, there are about 30 ESCOs and ESCO-type companies. The Energy Center Bratislava divided companies providing EPC into 4 categories according to their orientation and potential to offer ESCO services. Foreign companies offering a full range of solutions, including ESCO equity financing, are the most active and successful in the traditionally defined ESCO business. The second group comprises foreign based companies whose main profile is not energy efficiency service provision, but energy systems operation, such as district heating operators. These are not genuine ESCOs and most of them are Public-Private-Partnerships (PPP), in general in the form of joint ventures of private companies with municipalities. Local ESCOs in Slovakia are in the third group. They have their own capital, expertise and know-how, but are focused mainly on small energy systems where the costs of reconstruction are feasible with a limited budget. In many cases they apply the BOOT scheme. Finally, the fourth group includes potential ESCOs, energy system operators, equipment and engineering companies, which are not (yet) able to offer financial services due to their small equity size and the lack of good financing through banks (ECB n.d.a and n.d.b.).

ESCO clientele has until now included municipal buildings, schools, banks, and hospitals; while outsourcing in the industry, and private tertiary is more and more popular. ESCOs normally participate in building renovation, DH and public lighting projects (Murajda 2005).

Similar to other countries with formerly planned economies, the lack of data to construct baselines, subsidized energy prices, poor management/operation of buildings are common. At the same time 70% of the building stock is in need of renovation (Murajda 2005, Husarik 2004). Furthermore, ESCO contracting in the municipal sector is hard to carry out administratively because public spending requires tendering and comparison of at least 3 offers, while the number of companies able and willing to participate in the bidding may be lower (ECB n.d.b). Therefore, energy saving potentials are extremely high, but the need for certain legal, institutional and social adjustments is obvious.

The Slovak banking sector still has limited understanding of and experience with EE project financing, and thus perceives such projects as risky, which results in lending terms that may not be acceptable for ESCO project developers This limits ESCO activity to the large ESCOs that can financially support their own activity (ECB n.d.a.), and could limit the growth of the sector on the medium term.
ESCOs' opportunities are expected to grow, in line with the general energy conservation and energy efficiency requirements as the Governmental commitments have been emphasized in the 2005 National Energy Policy. This policy identified many tools promoting EE, such as minimal requirements for energy efficiency of new and large existing buildings as required by the EPBD, the introduction of regular controls of boilers and air conditioning systems of certain buildings, and the introduction of energy certification for buildings (as required by the EPBD) and so on (Murajda 2005).

Table 22. Summary of basic data of the Slovak ESCO market

Number of ESCOs	~30
Type of ESCOs	Local, but mainly joint ventures including MNC
ESCO association	no
Size of the market	n.d.
Change in recent years	Increasing, orientation changing
Most popular technologies	district heating, building renovation, public lighting

Poland

Experts agree that Energy Service Companies in the traditional meaning have not proved successful in Poland. Even today, there is a limited level of ESCO activity, with only a few (up to 5) specialized companies. ESCOs are typically subsidiaries of foreign companies. In addition, some energy utilities offer ESCO-type services since the market is being opened. The volume of ESCO contracts is around 10 million EUR/year.
Most EPC contracts have been concluded in the public sector, including municipal buildings and universities, military bases, and prisons. In a typical ESCO project heating systems (DH), public lighting, and buildings have been refurbished. In a few cases, complex renovations have also been carried out. In addition, housing cooperatives have been targeted, too.
Earlier ESCO failures have significantly hindered development, and ESCOs still have not been able to significantly enter the market. Experts believe that the main reason behind this is that the Polish market is not suitable for exactly what ESCOs offer.
First of all, clients are not interested in the EPC guarantee. The guarantee represents costs for clients (a service from the ESCO) that the facility owners/managers are not willing to pay for. Polish municipal and industrial sites have well-trained energy managers as a positive legacy from the previous planned economy system, indeed many other employees have an engineering background. These customers have the necessary in-house expertise the ESCO is trying to sell, and they do not require a guarantee because they understand the meaning of an audit, and can already make investment decisions based on that.

On the other hand, TPF could be attractive, but there are two major barriers to it. First, the ESCOs are not particularly interested in focusing purely on financing services because they do not have the appropriate capital basis. Although banks in Poland are interested in investing in energy efficiency, ESCOs without the appropriate capital basis are unable to get unlimited TPF through the bank (after 1-2 projects, which are still in the starting phase, banks are not willing to give more credit). Secondly, potential ESCO clients can attain a number of other sources of financing because the government has had a number of different schemes that were available for energy efficiency projects during the last 15 years. The biggest one is the National Fund for Environmental Protection and Water Management (NFOS), which operates in conjunction with Poland's Environmental Protection Bank. The NFOS provides investment support to – among others – energy saving projects at national, regional and municipal level[60]. Funding is available in the form of loans, joint funding, credits and project subsidies. There is also an ecological fund. There has been funding from the Structural and Cohesion Funds and EEA funds from the EU. These can finance as much as 75% of the EE investments. For blockhouses and some public buildings (schools, hospitals), the Thermo-Modernization Fund was established in 1998 that can finance up to 20% of the modernization investment[61]. An ESCO cannot compete with such strong funding.

In such circumstances, the essential parts of an ESCO solution are not needed (guarantee, engineering expertise), and are not available in an attractive format (financing). It is only the equipment supply that clients are interested in. Indeed, energy efficient equipment is sold through lots of consulting companies and equipment suppliers.

Finally, procurement rules create a "catch 21" situation for ESCOs. In the public sector it is obligatory to go through a tendering process. For potential energy efficiency investments the ESCO offers a free "walk-through" site visit to the potential municipal client, identifies potential savings and the appropriate extent of these savings. If the client agrees to the suggested measures, in principle the ESCO can be requested to make a more detailed audit, called an investment grade audit, which however is more costly, thus the ESCO cannot offer it for free. However in this case the municipality must open a call for tender, which has two consequences. First of all, the ESCO who did the first audit might lose the opportunity in which they invested. Secondly, the other ESCOs participating in the bid will already have a ready feasibility study from their potential competitors so they can propose a lower price and the municipality will have to choose the cheapest and not the "greenest" bid.

These and other barriers make the guarantee based and/or financing oriented ESCO business unsuitable for the Polish market.

[60] earmarked from the environmental taxes and penalties, and later the Structural Funds.

[61] The Thermo-Modernization Fund requires at least 20% own funding, and adds the rest of the investment for commercial loan, which is paid back from the savings. The loan repayment period is capped at 7 years. Timely repayment of 75% of the loan is rewarded by granting the remaining 25%.

Table 23. Summary of basic data of the Polish ESCO market

Number of ESCOs	Few (~5)
Type of ESCOs	Local, but mainly joint ventures including MNC
ESCO association	no
Size of the market	10 million EUR/year
Change in recent years	stagnation, maybe small growth
Most popular technologies	district heating, insulation, public lighting

Slovenia

The first ESCO contract for upgrading 14 municipal buildings using the Energy Saving Partnership model was concluded in Slovenia in November 2001 (Geissler 2004). The buildings were bundled together in order to reduce transaction costs. Indeed, it was found that ESCO-type projects had failed earlier in Slovenia because project sizes were too small, and transaction costs were thus large. Other barriers included public procurement rules, complicated administrative burdens, and lack of expertise and experience.

After the first project was implemented in 2001, the principal procedure was elaborated. In addition, it has been concluded that capacity building and establishing local contact points for assistance, especially for public projects, was essential for the development of the ESCO industry (Geissler 2004). However, it was not yet the real launch of the ESCO business in Slovenia

The Ministry of Finance has shown its support for EPC in Slovenia. While a law for the use of public budget has been issued, restricting the highest burden on the state budget to 60% of the total budget of goods, services and transfers to be carried over to the following accounting years, EPC contracts are an exception (Geissler et al. 2006).

Nevertheless, the ESCO business is not yet established in Slovenia. During the preparation of the present report a small Austrian-Slovene company is entering into the EPC market, and two energy companies have been planning the same.

The sectors attracted to EPC are primarily industry and the public sector. Industry has shown an interest in energy efficiency investments and solutions through ESCOs. So far 4 projects have been implemented in lighting in the steel industry, 2 of which were financed by the plants' own equity and two by the Eco Fund. Some small projects were also implemented in the public sector, mainly in primary schools and in one hospital, which were all financed by companies that acted as an ESCO. The main driving force in industry is that when the country separated from Yugoslavia industry was broken apart, and many small companies remained, mostly with no in-house energy management expertise. Thus solutions for outsourcing or external energy management are attractive.

On the other hand, the public sector was addressed by the successful pilot ESCO project mentioned above. Unfortunately no significant move has been seen since then. Scepticism on the side of potential clients is extremely large.

In summary, the ESCO market has not yet deployed in Slovenia, in spite of an early pilot initiative by German ESCOs, the large potential, and the need for outsourcing in industry.

Table 24. Summary of basic data of the Slovenian ESCO market

Number of ESCOs	1-2
Type of ESCOs	Local and 1 foreign
ESCO association	no
Size of the market	n.d.
Change in recent years	Stagnation, did not get off the ground
Most popular technologies	n.d.

2.2.3 Mediterranean New EU Member States

Malta

As yet there are no ESCOs on the Island of Malta, and the EPC concept has not taken root. Some companies are providing building management; and some examples of successful energy efficiency investments can be found in governmental buildings and in the brewery sector (Fsadni and Ghirlando 2004). The best technological opportunities are expected in water heating and HVAC of buildings. Efficiency improvements have been taken in desalination of sea-water (Fsadni and Ghirlando 2004).

During 2006-2007 the government has taken important steps to improve energy efficiency in Malta. The water tariff system has been revised, inducing large savings). Furthermore, grants have been introduced for the purchase of solar water heaters and photovoltaics, and financial incentives are given to consumers when buying energy-efficient appliances, which have been intended to raise awareness of the energy-efficient label on appliances.

At the same time, no significant coordination or uptake of the ESCO concept has so far taken place. The government could facilitate the market for ESCOs in particular by introducing relevant legislation, regulations and measures, which could be particularly beneficial for the country and would be in line with recent efforts for energy efficiency.

Table 25. Summary of basic data of the Maltese ESCO market

Number of ESCOs	0
Type of ESCOs	-
ESCO association	no
Size of the market	-
Change in recent years	No change
Most popular technologies	-

Cyprus

As of 2007, ESCOs have still not spread into Cyprus and no company is preparing yet either (Xichilos 2004), though there are a few energy advisors and consultant companies offering advice for energy savings in buildings and industry. Also some companies offer energy efficient technologies and energy management systems. At the same time, the huge potential of RES (solar) is acknowledged and the increase of renewable energy sources is considered to be a priority (Xichilos 2004).

Energy efficiency improvements could result in a 20-25% demand decrease, and some areas, such as CHP, and HVAC offer the largest opportunities (Xichilos 2004). Since the market is not yet developed only an expert estimation on the market potential is available, which is in the order of 2,000,000 EUR. A typical ESCO type project from the tertiary or industry sector is expected to be in the range of 15,000-130,000 EUR. The clients of future ESCOs are anticipated to be from the tertiary sector (hotels, public buildings, and office buildings) and industry (mainly food industry), and the investments are expected in waste heat recovery, insulation, solar thermal, frequency inverters for motors, power factor correction, energy management systems, and efficient lighting.
Governmental commitment for EE has been increasing during the last few years, which is manifested in the form of the available "Grant Scheme For Energy Conservation"; Promotion of the Utilization of RES; and the Action Plan for Energy Conservation in Buildings. Financial incentives include direct grants and feed-in tariffs. Further actions to promote energy efficiency and ESCOs are deemed essential. Currently, there is no national legislation regarding the development of energy services in conformity with the Energy Service Directive[62]. The lack of qualification, accreditation and certification schemes for energy service providers and energy auditors, complicated measurement and verification methodologies which are not harmonized among players, and the lack of competition on the electricity market are seen as major barriers. TPF of EE is strictly limited because banks are not willing to enter the EE financing field, due to limited understanding of energy efficiency. However, TPF exists for small scale RES investments, but energy performance contracting is perceived to be risky. Facilities owners are seeking fast pay-back periods and prefer investments in their core business, therefore interest in ESCOs is low. Significant effort and external assistance is seen as necessary by the Ministry of Commerce, Industry and Tourism (Xichilos 2004).

Table 26. Summary of basic data of the Cypress ESCO market

Number of ESCOs	0
Type of ESCOs	-
ESCO association	no
Size of the market	2 million EUR
Change in recent years	No change
Most popular technologies	-

2.3 New EU Member States 2007

Romania

The Romanian ESCO market is in an embryonic state, with few companies willing to enter the market. The Romanian Energy Efficiency Law (Law Number 199/2000) was passed in 2000, which puts forward a number of measures to support energy efficiency. International agencies (EBRD, USAID, World Bank/GEF and UNDP/GEF) have also been active in the development of energy efficiency financing. FREE, the Romanian

[62] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC.

Energy Efficiency Fund[63], was established by the World Bank and financed by the GEF and the Romanian Government to increase energy conservation activities and implement measures in the country. In spite of these efforts, the ESCO market has not been able to get off the ground because of a number of strong barriers.

Currently there are two companies – one specialized in electricity and the other in thermal services – which qualify as private ESCOs that offer pure EPC solutions. One of them was set up in 1996, thus becoming the first Romanian Energy Service Company, and it has 100% local Romanian ownership. The other ESCO was founded in 2004 as a Romanian-Canadian Joint Venture. These companies offer a wide range of services, including ESCO projects, auditing, equipment installation, operation and further engineering projects. In addition, there is one ESCO-type company chiefly working with CHP projects. There are a few MNC and regional ESCOs active in Romania offering Energy Supply Contracting. ESCOs also do boiler renovation and operation of residential district heating.

The UNDP/GEF Energy Efficiency Project was launched in 2005 as a collaboration of four partners: ARCE[64], UNOPS[65], UNDP and GEF. The program assists energy efficiency investment in various ways. First of all, technical assistance is offered to the public and private sector through feasibility studies. For the public sector a direct contribution to equipment purchase is also available of up to 20% of the investment, but not more than 50 000 Euro. Finally, the so called "deal building" brings together energy efficiency investors and financers and offers advise when needed. These support activities have been able to catalyze large-value energy efficiency projects – over 20 million USD investment so far and about 7 million USD in the pipeline (Racolta 2005).

Besides international financial institutions, local banks have started to move into the energy efficiency market, however they have not yet fully acknowledged the potentials lying in energy efficiency, they are not completely familiar with the ESCO concept, and it is not seen as part of the core target market. Banks still lack the internal expertise to evaluate energy efficiency projects. Thus, banks are not yet ready to finance energy efficiency projects based on the credibility of the investment and the prospects of the savings, but still use the traditional asset based financing, and evaluate the client's creditworthiness. Unfortunately, the concept of repaying from the savings cannot be realized yet as a consequence of the above.

In the municipal sector the lack of off-balance sheet solutions is the major obstacle. The municipality cannot take the investment of the energy efficiency equipment on its balance sheet because it would often override the maximum lease credit (given in percentage of total budget), while the ESCO investment is not a traditional loan, so it should be treated differently. The ESCO is also unable to claim the investment on its own balance sheet, because after a few projects no bank would lend to it. This problem also appears to a smaller or larger extent in many other European countries.

The industry is also a likely client of ESCOs and in fact some EPC is implemented here. Audits are obligatory above a certain size, and this should make the EPC market more active. However, penalties are so small that plants prefer to pay them than comply with

[63] www.free.org.ro; Fondul Roman Pentru Eficienta Energiei.
[64] Agentia Romana pentru Conservarea Energiei.
[65] UN Office for Project Services (executing agency).

this regulation. On the other hand, industries are also reluctant to give out data about their sites.
The domestic sector mainly offers investment opportunities in DH. A major obstacle is the large size of housing associations, where decision making is virtually impossible. The government plans to launch something similar to the Hungarian Panel Program[66].
Finally, one of the most important barriers, like in most countries, is the poor understanding of the concept. Clients often believe that an ESCO is just a type of bank.

Table 27. Summary of basic data of the Romanian ESCO market

Number of ESCOs	2 + some MNCs
Type of ESCOs	Local and subsidiaries of MNC
ESCO association	no
Size of the market	n.d.
Change in recent years	No significant change, barriers are too strong
Most popular technologies	DH, lighting, heating, industrial processes

Bulgaria

The energy service company market has still not been deployed in Bulgaria. Currently there are 1-3 ESCO companies offering guarantees on savings. This number has been largely steady for the last few years. Besides these, there are few more companies working in the field of energy efficiency offering investment repayment schemes for a period of 3-5 years, but their returns are not based on the generated savings. Furthermore there is a lot of activity in energy efficiency auditing and certification. The number of companies offering consultancy and auditing in energy efficiency is dynamically changing from year to year. Information on the current market size or even on market potential is unavailable. The economic potential for energy savings is believed to be especially high in Bulgaria. Energy intensity is twice that of the EU average, while electricity intensity is outstanding even in the region, 4 times higher than in Hungary or Turkey (Zachariev 2005). Saving potential is estimated to be up to 50% of the energy demand of the building stock, 40% of DH, and 30% in industry (Zachariev 2005).
ESCOs work primarily in the public sector (schools and other educational buildings), mostly contracted for improving heating systems. Small and medium sized industrial companies also tend to contract ESCOs for energy efficiency investment solutions. At the same time, ESCOs have not yet worked in governmental buildings, in the commercial sector, large industries and in households. Projects finance fuel switch, heating modernization, public lighting, and industrial processes, including mostly boiler and steam equipment modernization. Sometimes, municipal projects are bundled in order to increase profitability and decrease transaction costs. The most widely used contracting format is the shared savings model.
While the market has not taken it up, financing is not a problem; commercial banks are eager to lend for energy efficiency investments under the so called KIDSF[67] EBRD credit

[66] see above on page 45.
[67] Kozloduy International Decommissioning Support Fund

line to companies and municipalities. Since 2006 the Bulgarian Energy Efficiency Fund (BEEF) is operational, providing financing for ESCOs as well, but in 2006 only one ESCO applied. The BEEF offers three types of help: partial credit guarantee, joint crediting with commercial banks and technical assistance for project development. The use of partial credit guarantees in Bulgaria is supported by USAID through EBRD and the World Bank to increase the availability and access to credit for municipalities through a commercial bank. In 2005, the available loan was 15 million USD, 13% of which was used for energy infrastructure improvement, including ESCO investments (USAID 2005). The Facility for Municipal Energy Efficiency under the USAID is more than just financial help, as technical support is also provided for clients.

The level of energy prices – even if steadily growing over recent years and not that low when compared to other European countries on purchasing power parities basis – is still limiting the profitability of energy efficiency investments. It often happens that energy efficiency investments do not realize in real savings of energy, but rather in an increased comfort (at an unchanged cost). Juridical and institutional barriers limit the spread of energy service companies, though recently there has been a significant improvement in the legal and regulatory environment of municipalities (USAID 2005). There is a specific law on energy efficiency (Zachariev 2005). Nevertheless, there is still a legal ambiguity about the ownership transfer of equipment installed through ESCOs (Zachariev 2005), which is even complicated by, for instance, frequent changes in administrative structures. The lack of reliable baseline data increases transaction costs often to a level that can endanger profits and while there have been plenty of projects that can demonstrate the feasibility of the ESCO concept, understanding the idea is still lagging behind (Zachariev 2005). This is exacerbated by a lack of motivation on part of end-users to undertake EE improvements.

To overcome most of the barriers, it is crucial to drastically change people's thinking about the need for energy efficiency together with information dissemination on the opportunities opened up by ESCOs.

Table 28. Summary of basic data of the Bulgarian ESCO market

Number of ESCOs	1-3 (12)
Type of ESCOs	Local (energy utilities)
ESCO association	no
Size of the market	n.d.
Change in recent years	No significant change, still slow growth
Most popular technologies	Heating, fuel switch, public lighting, industrial process modernization

2.4 Candidate Countries

Croatia

There is only one Energy Service Company in Croatia offering EPC (Steko pers.com.), which was established in 2003, and is a recipient of financial support from the GEF and World Bank loans (Fanjek and Steko 2005). The estimated potential for energy savings in Croatia exceeds 400 million EUR. There are new companies that are attempting to enter

the market and have carried out several projects, and there are many energy efficiency provider companies that do not provide a guarantee. The total amount of ESCO investment has been increasing in the last few years.
So far 3 projects have been completed in the country; these have been focussed on public lighting and system improvements in educational buildings. More than 40 projects are in the preparation or implementation phase. These are focused on a number of technologies: public lighting, co-generation, HVAC, steam-system recovery, and insulation.
The sources of financing are various. Besides international aid and loans (World Bank, GEF), local financial institutions have proved to be interested, and the ESCO's own equity is being used for project implementation. There are further funds and programs in Croatia for energy efficiency, such as the Fund for Environmental Protection and Energy Efficiency (in the form of subsidies) and the UNDP program (grant for feasibility studies). The "first out" contract model has been used in past projects.
Since the ESCO that is working in Croatia is a state-owned company, primary attention is not on large profits, but on supporting national interests, mainly energy efficiency and environmental protection (Fanjek and Steko 2005). Therefore, the objectives of the company when it was set up were to develop capacity and know-how, find sustainable project financing mechanisms, and develop consumer demand (Fanjek and Steko 2005).
Some important barriers have been identified (Fanjek and Steko 2005). Consumers show a lack of interest in energy efficiency (Fanjek and Steko 2005), probably due to the little knowledge in the country about ESCO benefits and the concept in principle. The legislative framework is not particularly supportive of the ESCO concept. Secondary legislation on energy efficiency has not been developed, and the ESCO model is not recognized by the authorities as an individual business model. The result of this situation is that ESCOs cannot invoice their services as a package, and VAT must be paid for the equipment installed for the client, which may jeopardize the profits. Connecting CHP plants to the grid is also difficult. Similarly to many other countries, public procurement is complicated.
Education and awareness raising about the existence of the opportunity offered by ESCOs and more dedicated experts would be one of the most helpful measures for energy efficiency project development and implementation in Croatia.

Table 29. Summary of basic data of the Croat ESCO market

Number of ESCOs	1-(2)
Type of ESCOs	Public (established by WB)
ESCO association	no
Size of the market	n.d.
Change in recent years	has not deployed yet as expected
Most popular technologies	public lighting, co-generation, HVAC, steam-system recovery, insulation

Turkey

ESCOs have not yet appeared in Turkey as of 2007, although it is expected that in the near future some companies will be able to tap the large saving potential, especially in

RES installations and heat and cooling services. Whether this potential will be tapped by ESCOs providing EPC depends on creating appropriate conditions for the take-off of this business model. Demand side energy saving potential is estimated to be around 2.5 billion EUR/year, a large portion of which could be captured through ESCOs.
Turkey has passed an Energy Efficiency Law in February 2007 which stipulates the role of ESCOs, together with a number of supportive provisions, such as obligatory audits, building codes, obligation to employ energy managers, etc. (Caglar 2006, Saffet Bora 2007). The Law is considered very progressive and up-to-date, but the enactment took several years. A rapid uptake of energy efficiency by ESCOs (both locally established companies and MNCs) is expected by experts (Caglar 2006). Turkey plans to establish a coordinating body, according to the law, to execute, oversee and coordinate energy efficiency activities by the relevant organizations around the country. The Energy Efficiency Coordination Board will be also responsible for the authorization and quality verification of ESCOs.
However, long-term purchase agreements for gas and oil also limit the potential for EPC and energy savings. The most important barrier is probably the lack of information on the side of the clients about the possibility of investing in energy efficiency using the ESCO concept and its benefits. Furthermore, currently there are no companies offering this service at all (Caglar 2006).

Table 30. Summary of basic data of the Turkish ESCO market

Number of ESCOs	0
Type of ESCOs	-
ESCO association	no
Size of the market	-
Change in recent years	Expected to increase rapidly with the introduction of the new Energy Efficiency Law
Most popular technologies	-

2.5 Other European countries

2.5.1 Other Western Europe

Switzerland

Information on the level of the ESCO business in Switzerland is rather limited. There are 5-10 companies in the country that offer energy services. Some of these companies are subsidiaries of multinational ESCOs, and there are also local Swiss companies. Facility management, operation management, and energy and heating supply contracts dominate the market. Most of these are actually offered by leading electricity companies. There are no ESCOs offering EPC (PEEREA 2006b).
Around 100 so-called “Energy Contractors” form an association, Swisscontractor. These companies include many energy efficiency consultants, as well as companies that provide financing, engineering expertise, or facility management. The energy contracting market is facilitated by the existence of organizations whose mission is to give advice to market

actors and potential or actual clients (for instance Energho[68] and energy agencies such as S.A.F.E.[69] or EnAW[70]).
Companies offer solutions for heating and cooling systems, and install CHP, biomass and other renewable energy plants.

Table 31. Summary of basic data of the Swiss ESCO market

Number of ESCOs	5-10 ESPC
Type of ESCOs	Private + Energy Contractors
ESCO association	No (Swisscontractor is an association for "Energy Contractors")
Size of the market	Not known
Change in recent years	Not known
Most popular technologies	HVAC, CHP, RES

Norway

The ESCO industry in Norway is still at an early market stage (Norsk Enok og Energi AS 2005, Vegel 2006). The number of ESCOs is 10-15 as of year 2006, up from 7 companies identified in 2002 (NVE 2002). Nevertheless so far only a few contracts have been concluded and activity is moderate (Vegel 2006). According to experts the ESCO sector turnover is about 30-40 million EUR.
Usual clients include public and commercial buildings, which outstrip industrial and residential sectors in market value. In terms of numbers of projects, most are realized in the residential sector. Projects include complex refurbishment, control system installation, or HVAC and lighting system renovations in the buildings. ESCO projects cover heat recovery from HV systems, installation of heat-pumps, and realization of local alternative heat production.
Financing ESCO projects has not been a problem in Norway. ESCO financing is quite often set up by a bank loan given to the ESCO. EPC with TFP has proven to be the most suitable scheme in Norway.
There are however vital barriers. Public procurement procedures do not consider the benefits of an EPC other than economic factors. Also there are too few potential contractors (Norsk Enok og Energi AS 2005). This makes the decision difficult, which is finally not always for the best offer. There is an urgent need to redesign legislation on public budgeting, and add guidelines and standard documents. Another major problem is that the contracts used are not in line with the National Standards (NS/EN). Development of good national standards, as well as standards for setting the baseline of every project is of great importance. It should be possible to guarantee the quality of EPC projects with appropriate standards (Vegel 2006, Norsk Enok og Energi AS 2005).

[68] for the public sector www.energho.ch.
[69] dealing with electricity www.energy-efficiency.ch.
[70] for industry www.enaw.ch.

Table 32. Summary of basic data of the Norwegian ESCO market

Number of ESCOs	10-15
Type of ESCOs	Private, equipment suppliers, consultants, electric utilities and oil companies
ESCO association	No
Size of the market	€30-40 M (turnover)
Change in recent years	No change
Most popular technologies	control system, HVAC, lighting, heat recovery, heat-pumps, local alternative heat production

2.5.2 Other Eastern Europe

Commonwealth of Independent States

The European region of the Commonwealth of Independent States (CIS), which is dealt with in this report (including Russia, Belarus, Ukraine and Moldova), can be considered as a set of successful examples of ESCO penetration into transition economies in spite of the sometimes extreme obstacles. Energy Service Companies or ESCO-like companies have appeared in all of these countries[71], although the ESCO markets are in an embryonic state. These countries were left with highly inefficient economies, below-market priced but rising and socially burdensome energy costs, and collapsed industries after the fall of the Soviet Union. As a result, their benefit from increasing energy efficiency and potentially from ESCOs could be even larger than that of the rest of the continent. Thus an ESCO industry boom can be expected after some basic barriers, described below, are eased. To aid this process IFIs have been particularly active, bringing energy efficiency projects and participating in ESCO establishment in the region.

The most important common barriers to energy efficiency and energy efficiency services lie with the legacies of the former planned economic system. The legal systems have mostly been updated after the fall of the Soviet Union, but nevertheless many gaps and inconsistencies remain, such as the lack of clearly defined ownership statuses, ongoing privatization processes, coupled with the inability of the consumers and the energy providers to overcome energy arrears. Information that decision makers depend upon is insufficient, statistical data (especially historic data) is frequently lacking, and measurement of the effects of energy efficiency programs is thus difficult. Furthermore general awareness of the positive effect of energy efficiency and energy saving is very low. In fact, the attitudes are rather negative as other priorities take precedence (Chistyakova et al. 2006). This situation is often seen to end in a vicious circle, where the lack of financial (and other) resources that could be spent on upgrading energy systems causes higher risks and more finances needed to overcome urgent repairs (ASE n.d.a.). One of the biggest barriers is that "low" energy prices jeopardize the profitability of investing in energy efficient equipment.

[71] ESCO activity is restricted in Moldova to ESCO-like, rather consultancy companies. See the country overview below.

UkrESCO[72] was the first commercially viable ESCO in **Ukraine** and one of the first ones in the CIS region (EBRD 1998). It came into existence in 1998 based on a sovereign loan of USD 30 million from the EBRD and aided by a grant from the European Union's technical assistance program (TACIS) (Evans 2000). The first EPC contract was signed in 2000 between UkrESCO and Gostomel Glass Plant (Evans 2000). Before UkrESCO, ESCO-type companies had already existed in the country, however without the use of EPC and without providing guarantees and financial solutions (Evans 2000). Since then a few new companies have been established and a few existing ones have ventured into the energy efficiency business: in particular the Energy Alliance was started up in 2004, sponsored by the Western NIS Enterprise Fund and ESCO-Rivne was set up with UNDP support as a joint-stock public company (Olshanskaya 2006). Other similar companies can be described more as consultancies and do not coincide with the traditional ESCO definition due to limited access to capital. The exact number of such companies engaged in energy saving activities is unknown. There have been a number of local ESCOs aided by USAID, which joined under the national Association of ESCOs, AESCO (Evans 2000).

Among the three companies considered as traditional ESCOs, UkrESCO and ESCO-Rivne are publicly owned companies, but are expected to be privatized shortly, and the Energy Alliance was created as the first private ESCO in 2004. UkrESCO has been implementing projects using the TPF scheme with ESCO borrowing, however the BOOT concept is also known.

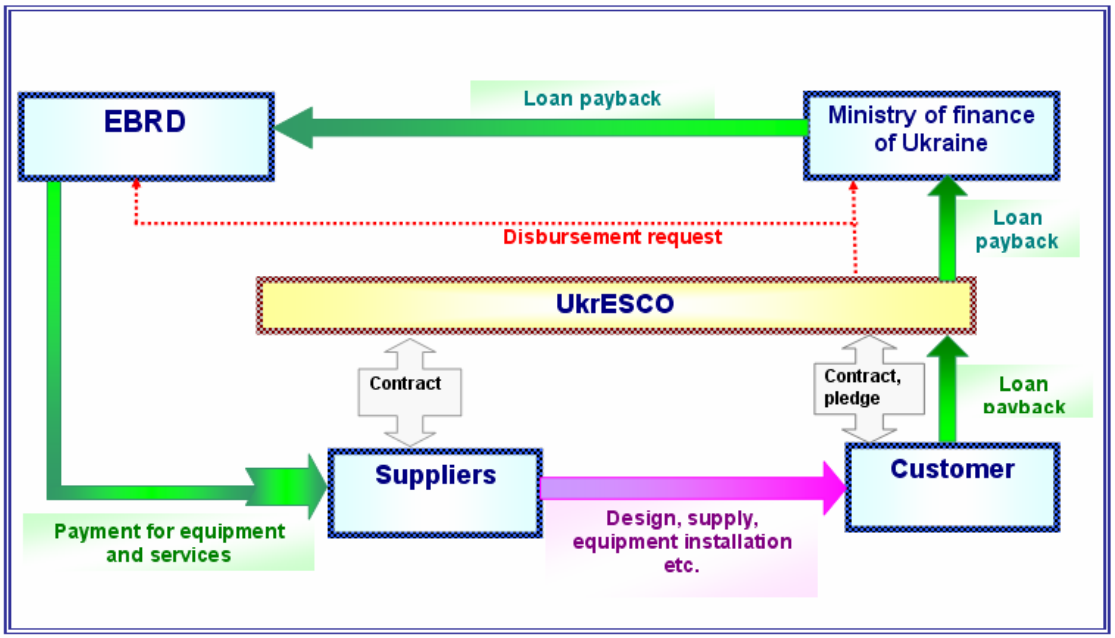

Figure 3. Financial scheme applied by UkrESCO.

The size of the Ukrainian ESCO market is unknown to the authors and the interviewed experts, and is not available in the literature. The market potential is large as a result of

[72] http://www.ukresco.com/index_e.html

the highly inefficient infrastructure inherited from the Soviet Union (PePs n.d.), in fact the energy intensity of Ukraine is one of the highest in the world.

The targets of ESCOs in Ukraine are typically industrial sites, SMEs and municipal energy efficiency. The Energy Alliance has been created to focus on leasing CHP engines to industrial clients. Most projects have taken place in machine building, chemical, glass, porcelain and pottery, food processing, construction, and power engineering industries, in agriculture, and with municipal heating and lighting.

The Ukrainian government has taken important steps to fight high energy intensity with the help of energy conservation by participating in UkrESCO, funding regional and local energy efficiency programs (Evans 2000), establishing key institutions, such as the State Committee for Energy Conservation for instance (UNDP n.d.), although with insufficient staffing and finances (Chistyakova et al. 2006).

According to experts, some of the barriers are the following: the ESCO market is hindered financially, because their own funds are insufficient to carry out many successful projects, except if they are financed from outside; and due to high interest rates on loan funds which hamper profitability. Legislative incentives, such as tax exemptions, are missing, while investments are perceived too risky for Ukrainian companies that are often in a difficult financial position. The lack of a liberalized energy market with market-driven prices is also seen as a basic limiting factor on the profitability of energy efficiency projects. Finally, information on ESCOs is very scarce and thus the concept is little if at all known.

There is a need for significant adjustments in policies in order to create a supportive ESCO market in Ukraine and to overcome, among others, the above barriers. Incentives for energy saving should be introduced, including tax privileges on profit from energy saving measures. In addition, the tariff system should be improved and restructured. The main aims must be to assist the creation of market competition in the sphere of energy generation and supply, and the development of an appropriate price policy. In the current situation Ukrainian ESCOs and their supporters need to concentrate on eliminating erroneous ideas about energy efficiency and launch wide-scale information campaigns about energy saving opportunities.

In the current circumstances, local banks are not particularly open to ESCO project financing because on the one hand they are willing to enter only short-term projects and on the other hand their interest rates are not suitable for energy saving projects. However, IFIs are very active and supportive of this sector, EBRD and the Western NIS Enterprise Fund provide direct financing to ESCOs, while many others, including UNDP and ASE[73] are active in information dissemination, capacity building, and ESCO partnership development.

[73] Alliance to Save Energy; www.ase.org.

Table 33. Summary of basic data of the Ukrainian ESCO market

Number of ESCOs	3, plus a few dozen of national and local ESCO-like consultancies
Type of ESCOs	both private and public
ESCO association	yes, AESCO
Size of the market	not known
Change in recent years	1 new ESCO aided by EBRD, and other local and international initiatives. ESCOs appear and disappear.
Most popular technologies	heat generation, cooling, compressed air production and distribution system

Russia has vast potentials of both RES (the economic potential is estimated at about 270 million tons of coal equivalent (EU-Russia Energy Dialogue Technology Centre 2004) and EE (IEA 2003). Legislation for energy saving has been growing since the late 1990s (Efremov et al. 2004) and activities in relation to energy conservation are slowly developing in Russia. Yet the continuing low level of EE in all aspects of energy generation, distribution and consumption, together with a harsh climate and energy intensive economy results in an energy intensity of 3-5 times higher than that of Western Europe (Ketting 2006). The Russian government recognizes the problem that while they aim at rapid economic growth and increased living standards more efficient production and use of energy is an important goal (Ketting 2006). According to the Russian Energy Strategy 2020, energy consumption in Russia could be lowered by 40% to 48% by 2020 through effective energy efficiency measures and structural change in the Russian economy. The ESCO concept, as a tool to that, is relatively new in the country and is not yet well known (Efremov et al. 2004).

In spite of the expected strong appetite for energy efficiency and its financing, the energy efficiency market has not deployed as yet. The barriers are often similar to other Economies in Transition in the region, mostly even more pronounced, and are discussed below. Nevertheless, the first ESCO-type companies date back to 1996 (Administration of Seversk 2006).

There are only a small number of local ESCO-type companies in Russia, which are not yet able to provide well-developed turn-key energy saving offers (Efremov et al. 2004) and they are concentrated around Moscow. Earlier a number of US- and European-based ESCO companies were identified to start up projects in Russia, however some unsuccessful stories discouraged further projects (Evans 2000). Experience shows that European and American models cannot simply be transposed, but need rigorous adaptation to the Russian circumstances (EU-Russia Energy Dialogue Technology Centre 2006).

Thus, ESCO companies that offer EPC guarantees have not yet been set up according to international experts (for instance Woellert and Ligot pers.com.). ESCO activity is restricted to several pilot projects, often initiated by foreign companies or implemented with the assistance of foreign investors and financial institutions. Nevertheless, the

breakthrough point is believed to be close, and some experts estimate that there has been a moderate growth in the ESCO-like market during the last 1-2 years.

The size of the market is unknown and none of the experts interviewed for the present report could estimate the current potential. It is probably due to the changing market conditions, and the changes in the ESCO industry, too. Besides the work done on introducing the ESCOs (by for instance Finnish companies under the FRESCO project[74]), concept dissemination and exchange of technology and know-how expertise (for instance under the EU-Russia Energy Dialogue Technology Centre), Russia has taken steps on a number of other platforms to increase energy efficiency.

According to the experience of ESCO projects to date, a pay-back time not longer than 6-7 years prevails. A study conducted by Enprima Ltd. in the framework of the FRESCO project analyzed the feasibility of potential projects in Russia, and found boiler automation upgrade, installation of new pre-furnace for utilization of bio-fuels, installation of new economizers, utilization of local boilers for DH systems, installation of Variable Speed Controlling systems for DH pumps, and automation of centralized compressed air production facility to be likely good projects for ESCOs (Enprima 2004).

There are very many and serious barriers to ESCOs in Russia, often embedded in the unstable environment for SMEs (Efremov et al. 2004) and the tradition of a centrally planned economic system. Low energy tariffs challenge incentives for energy conservation and an "energy wasting attitude" is inherited from the Soviet-system (Honkanen 2006)[75], while from a social point of view residential prices are too high compared to the household income. Bureaucratic and rather slow decision making process, and vague ownership issues make it hard to identify and start off ESCO projects (EU-Russia Energy Dialogue Technology Centre 2006, OECD 2006). Ensuring guarantees for pay-back would be essential because control over risks is a major problem at all levels. Guarantees could be established by international finance institutions or by guarantees of governments of Russian regions (EU-Russia Energy Dialogue Technology Centre 2006). A reliable system of energy tariffs whose changes are possible to foresee combined with the creation of realistic energy prices free from subsidies has been pushed by the international community, and Russia may see a change in this as a result of WTO accession (EU-Russia Energy Dialogue Technology Centre 2006). ESCOs in Russia would require appropriate, clear, complete and supportive legislation and predictable taxes (EU-Russia Energy Dialogue Technology Centre 2006). Awareness raising in regard to both energy saving and ESCOs as a tool needs to be a top priority. Banks should be approached and informed widely about the business opportunity offered by energy conservation financing (EU-Russia Energy Dialogue Technology Centre 2006). Financing for ESCO projects through IFIs is starting up, combined with technical assistance (Ligot 2006).

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[74] South-East Finland-Russia "FRESCO" project is an Interreg III A initiative, which aims at studying the possibilities and potential of ESCO business in Northwest Russia. Besides, the project targets at building the contact network for Finnish energy enterprises in the destination area, establishing co-operation strategy for promotion of optional energy source utilization and Finnish technology export, and finally the project prepared a model for ESCO business in Northwest Russia. (http://www2.et.lut.fi/fresco/index_eng.htm).

[75] There has been a hot debate whether energy prices are actually low. For instance Bashmakov explains that Russian energy prices seem low only if compared directly to Western European prices, but when compared together with labour costs, the ratio of energy spending is much higher than that in Western countries (Bashmakov 2000).

Though the Russian environment for ESCOs is less favourable than in many European countries, this is compensated by the enormous potential of "low hanging fruit" projects (EU-Russia Energy Dialogue Technology Centre 2006).

Table 34. Summary of basic data of the Russian ESCO market

Number of ESCOs	no precise number, probably between 4-15 ESCO-type and 100s of engineering, consulting companies
Type of ESCOs	private
ESCO association	no
Size of the market	not known, EE potential is 40-48% of current energy consumption
Change in recent years	ESCO market has been changing a lot, with first upheaval and decline in 1990s, and low interest and success in the last years, while an expected growth for the near future is seen
Most popular technologies	HVAC, heating, automation, control systems, compressed air systems, DH (supply side)

There is one ESCO company in **Belarus**, which started its operations in early 2005, and it is expected that upon successful project completion several others would follow suit, thus an expansion of the market is expected.

Since the ESCO market started recently, a market size estimate only covers one project that has been implemented so far, and which was a 10 million EUR investment. It is projected that in the short term 5 such projects can be implemented annually, making for a market worth 50 million EUR per year. However, the potential of the energy efficiency market for ESCOs is much larger. It is calculated that at least 20-25% of the current energy demand can be saved in the industrial and municipal sectors, though external finances will be necessary for this.

The existing ESCO project in Belarus implemented a co-generation plant in a large industry. According to market surveys, potential ESCOs are expecting to deal with boilers, heating control systems, compressed air systems, HVAC systems, steam distribution and electric load management mainly in private and public industries. The residential and tertiary sectors are not attracting ESCO interest at this point.

The first ESCO contract followed the UK Energy Management Contract model. In this, the ESCO executes a turn-key project, including the delivery, installation and operation of a CHP plant or other energy efficiency installation. The ESCO owns the installation during the timeframe of the project, and is selling the service (electricity and heat) at a lower price than the local supplier, but when the project ends, the installation is handed over to the client. This is also referred to as BOOT contract (EC DG JRC 2005). The ESCO project is financed from foreign bank loans through the ESCO, and a guarantee by a local bank or EU stakeholders is provided.

Local banks are not yet open to take part of the ESCO market, however foreign investors do finance the ESCO activities. Barriers to ESCO operations are numerous and essentially overcoming them would require changes at all levels. Nevertheless, it is a good sign that ESCOs have already appeared. The most significant barrier is the fixed rates for electricity and heating prices. CHP installations on the other hand do not have secured prices.

In the industrial sector the rigid and complicated accounting rules and taxation system results in immediate loss of the benefits from energy savings in the overall cashflow of the company, rather discouraging energy conservation. Institutional barriers in the industrial sector embrace the hierarchical system of the still largely state-owned industries when officials on several levels have to be fully informed and convinced about the benefits of an ESCO contract. In the public sector certain aspects of bureaucratic rules for procurement and tendering hinder the effectiveness of setting up an ESCO agreement. On the other hand, the banking sector is also limited and faces a number of barriers. Most potential ESCO projects are long term, while commercial bank loans are only available for up to 7 years, and the interest rate is relatively high.

In spite of the difficulties, positive changes can been seen. The interest rates mentioned above have been steadily going down lately, which can help ESCO projects to a great extent. At the same time, the Government's pricing policy has been introduced, according to which all energy tariffs include a component that is collected in an Energy Efficiency Fund which can be used for various energy saving measures (UNDP n.d.). Finally, the Government has been pronouncedly in favour of EE, and has created relevant institutions, and has already engaged in the 3rd National Energy saving Program since 1996 (UNDP n.d.). In May 2006 presidential Decree No 93 was passed, which endorsed a clear system for power transmission tariffs and charges, with which CHP projects implemented by ESCOs are eased.

It is suggested that to tackle the above obstacles still much political work needs to be done. Legal changes on a number of issues are necessary, such as regarding banks, which should be allowed to finance longer projects than 7 years. Also, the public sector procurement and tendering rules should be reconsidered to allow ESCO operation, and mechanisms should be developed that allow companies to monitor and verify energy savings and separate those from overall company cashflow. Successful pilot projects are expected to be able to demonstrate the feasibility of the ESCO concept for all stakeholders. Finally, the adoption of a model ESCO contract is strongly needed.

In summary, in spite of the legacies from Soviet times, difficulties in legal, administrative and ownership issues, ESCOs are starting to gain a foothold in Belarus, and a boom may be seen shortly.

Table 35. Summary of basic data of the Belarusian ESCO market

Number of ESCOs	1
Type of ESCOs	Private with mainly foreign shareholders
ESCO association	no
Size of the market	potential of around 20-25% of energy demand in industrial and public sector
Change in recent years	first ESCO was set up in 2005
Most popular technologies	industrial systems, CHP

Information on energy efficiency and ESCOs or their potential in **Moldova** is rather limited. The authors were informed that there are a few ESCO-type companies working in Moldova, and there has been activity in the energy efficiency field that points towards the probable emergence of an ESCO market in the country. However, ESCOs offering the classical EPC have not appeared yet.

Due to the economic recession, high debt levels, and out-dated institutional arrangements, both state and private decision-makers' attention is focussed on urgent priorities and pressing issues, rather than on energy efficiency (ASE n.d.a.). The opportunities energy conservation can offer are little understood.

Due to the economic crisis and slow transition to a market economy Moldova's development has been seriously endangered since the fall of the Soviet Union (ASE n.d.a.). In particular the energy sector has been deeply affected by the recession. Massive energy arrears characterize the energy system, and large industrial sites, as well as much of the residential sector have been disconnected from the energy supply and district heating systems due to non-payment and increasing prices. In many parts of the capital, Chisinau, the district heating system has simply been dismantled, and replaced by electric heaters or building-level gas boilers. This has resulted in both a local production that was created by necessity and an extremely inefficient supply system, which is now in poor condition (ASE n.d.a., USAID n.d.b.).

Measures on energy efficiency improvement are nevertheless being carried out on a commercial basis by both local and foreign firms and organizations. The work is prepaid by the customer and no guarantee on energy savings is involved. Most important investments include the installation of heat-meters, the installation of modern high-efficiency boilers in industrial sites, thermal insulation of buildings, including the exchange of windows and doors in public and residential buildings, and the application of new industrial high-efficiency technologies.

The most important barrier to energy efficiency investments is that they are still considered as luxury spendings that can be only afforded by wealthier countries. This is the result of the huge national budget share (20% of annual GDP) subject to cover natural disaster recovery (Chistyakova et al. 2006), partially related to the energy sector. The country has got into a vicious circle in the sense that some of the disasters could be avoided and debts could be repaid if energy demand levels were optimized, while the concentration of attention and funds on disaster mitigation limits the country's ability to improve energy efficiency. In spite of this situation, Moldova does have a particularly

progressive Law on Energy Conservation that was adopted in 2000, although unfortunately there is no real mechanism to provide for incentives for conservation that could make the Law effective (Surugiu n.d.). The relative instability of the economic situation at both macro and micro level affects potential ESCOs' trust and willingness to engage in a guaranteed long-term contract. The problems with bureaucracy are similar to those described in the case of Russia. It is interesting, however, that the Energy Strategy stipulates the need for promotion of ESCOs (PEEREA 2004).

International agencies have not been particularly active in Moldova, though USAID and the Alliance to Save Energy have done significant work in the energy conservation field. Activities include various tools (though not related to ESCOs), such as information dissemination and training of municipalities and housing associations, awareness raising through national broadcasts, newspaper articles, forums, trainings, study tours for stakeholders, giving technical assistance for DH Strategy and know-how sharing in reviewing energy legislation (PEEREA 2004). Information dissemination, not only on the concept but to increase trust is very important.

A Revolving Fund has been created, which partially serves to help the ESCOs' operation. Profit tax exemptions were also planned for ESCOs, however in the end this was not included in the legislation (PEEREA 2004).

To exhibit the best results of the energy efficiency measures and disseminate positive experiences, the MUNEE Network[76] conducted several demonstration projects in Moldova between 2001 and 2004. This can serve well for ESCO market development and to show the feasibility of ESCO projects.

Table 36. Summary of basic data of the Moldavian ESCO market

Number of ESCOs	few
Type of ESCOs	n.d.
ESCO association	no
Size of the market	n.d.
Change in recent years	ESCO as a tool stipulated in legislation
Most popular technologies	DH, installation of heat-meters, installation of high-efficiency boilers in industry, thermal insulation in public and residential buildings, new industrial high-efficient technologies

Non-EU South-East Europe

The region can be characterized by rapidy growing economies as a result of reconstruction after the war period that impacted most of the SEE countries seriously, directly or indirectly. This change is accompanied by rapidly rising energy demands, combined with an originally poor performance on energy intensity. The region is still a little turbid, as borders keep changing, though the separation of the Republic of Serbia

[76] Municipal Network for Energy Efficiency, supported by the USAID and managed by the Alliance to Save Energy

and the Republic of Montenegro is considered as the end of former Yugoslavia. The reconstruction is fortified by a strong emphasis on legislative modernization that also takes into consideration the harmonization with European Union Directives and International Agreements.
Energy efficiency is definitely a priority in all SEE countries as a means to address environmental, economic and social problems, though ESCOs have not yet really get going in SEE. A few ESCO type projects have been carried out, and IFIs are active in the area of rational energy systems. The World Bank is in the process of establishing one public ESCO in Macedonia, and ESCOs can be expected to add to the energy efficiency solutions tool-kit in the coming years. Legislative systems must be strengthened in most cases, while the institutional framework already involves a number of energy and energy efficiency agencies. The most important barriers to the kick-start of the ESCO market have been listed by local experts as low awareness and knowledge of the concept, high interest rates and lack of examples.

According to experts, the **Republic of Serbia** and the **Republic of Montenegro**[77] have not seen an active ESCO industry (Chabchoub 2005). There are only a few isolated actions related to private companies, and no EPC contract has been signed up to 2006 according to the knowledge of the authors.
Most activity has been oriented towards preparing business plans and disseminating the concept up to now (Chabchoub 2005). The most critical issue for the uptake of this sector is claimed to be wide-scale awareness raising and capacity building which are necessary to overcome the very primary hurdles to the ESCO sector foundation (Pavlovic 2005, Chabchoub 2005).
On the other hand, resembling the other Eastern European countries and even surpassing them, Serbia and Montenegro can be characterized as having extremely high energy intensity (6 times that of EU15 (Pavlovic 2005)), combined with low energy consumption per capita, which is however increasing steadily, due to the economic lag (SEENERGY n.d.). The war and economic crises resulted in the collapse of the energy supply systems and the decline of the industry. The countries saw serious blackouts of supply around 2000. The residential sector is responsible for 70% of the energy demand today, which is critically high and is a consequence of the above, not the high energy use of the people (ASE n.d.b.). Heating with electricity is typical. Energy prices were soaring in the beginning of the 2000s, putting people in economic difficulties, nevertheless prices are still subsidized. A strong focus on energy efficiency and rational use of energy is needed and is apparent on many other platforms in the countries (ASE n.d.b., SEENERGY n.d., Pavlovic 2005).
Important local changes have already occurred which can be supportive of a potentially emerging ESCO market. The New Energy Law of 2004 in Serbia foresees new responsibilities for municipalities: energy balancing, energy strategic planning and establishment of local energy markets (BISE 2005). Energy price liberalization has started, and an institutional framework has been created.

[77] As a result of the referendum held in Montenegro on 21 May 2006, the two entities separated as of 3 June 2006, and the Republic of Serbia and Montenegro became two countries. In this report they are discussed together because of the common development history, but highlighting any significant differences if necessary.

International financial institutions have shown great interest in financing energy efficiency after the war-period, setting the stage for ESCOs. The European Union helped the establishment of the Serbian Energy Efficiency Agency (SEEA) via the European Agency for Reconstruction (EAR) (Pavlovic 2005, Chabchoub 2005). The EU has been actively supporting and giving technical assistance to modernization projects and training of industrial personnel and municipalities about energy management systems (Pavlovic 2005), while the World Bank has launched the Serbian Energy Efficiency Project with 21 million USD (Pavlovic 2005). The World Bank support enabled investments to replace existing room and water heating facilities in clinical centers and social service facilities, thus supporting the promotion of energy efficiency efforts (Chabchoub 2005). USAID focused on awareness raising, and carried out a large-scale assistance effort designed to demonstrate the potential savings from energy efficiency projects in schools, hospitals and other buildings and to educate people about the inevitable rise in electricity prices (USAID n.d.c.). Furthermore, several bilateral agreements have been made, and international grants have been established for Serbia, for instance Norway is supporting energy efficiency improvements in the area by financial means (ca. 300,000 EUR annually), as well as by giving technical assistance.
As a result, numerous projects have been implemented. These have focused on refurbishment of municipal buildings, improvement of street lighting and DH, as well as RES. It is hoped that these efforts have prepared the ground for the introduction of energy service companies, after the concept precipitates to both clients and potential companies.

Table 37. Summary of basic data of the Serbian and Montenegrin ESCO market

Number of ESCOs	few ESCO oriented activities
Type of ESCOs	n.a.
ESCO Association	no
Size of the market	not known
Change in recent years	opening towards energy efficiency
Most popular technologies	n.a.

Bosnia and Herzegovina (BiH) is extensively decentralized and consists of two state-like entities, the Federation of BiH, and the Republika Srpska and District Brcko, and the Federation of BiH entity is further divided into regions (cantons). According to the Dayton Agreement in 1995, foreign, economic, and fiscal policy are dealt with by the central government, while internal affairs, including energy, belong to the Entities' governments (USAID n.d.a., E.V.A. n.d.a.). According to experts, the compound authority and political situation results in a lack of overarching energy strategy or policy (Chabchoub 2005). Regrettably, according to the MUNEE Network[78], energy decisions and directions in Bosnia and Herzegovina can be characterized to some extent by "unclear authority over energy issues", the need for a "long-term energy strategy on the state level", and the improvement of energy statistics (USAID n.d.a.).
Consequently, ESCO activity is limited, although not absolutely unknown. There are no ESCOs offering EPC in BiH (Prašović and Knežević 2005, Chabchoub 2005), though

[78] Municipal Network for Energy Efficiency, supported by the USAID and managed by the Alliance to Save Energy

there is at least one company using the ESCO concept in implementing a small scale boiler biomass heating project, and a number of other ESCO projects have taken place. ESCO projects range from installation of mini heating systems, through boiler exchanges to the establishment of tri-generation plants. The exemplar projects have involved guarantees on energy savings by an ESCO-type private company, and the simple pay-back time has been less than 5 years.

Besides the above mentioned strong structural barriers, including unclear authority, lack of data and legislation, training and information dissemination are strongly needed in order to raise awareness of the potential offered by energy efficiency, which can improve economic and environmental performance and their interplay (Sehovic 2005a, Chabchoub 2005). Traditional financing in developing countries, such as the national budget, international aid and programs, and leasing companies, is limited (Chabchoub 2005), thus third party financing scheme is considered as an appropriate means to seize energy saving opportunities (Sehovic 2005b).

First of all, in-depth analysis and research on the ESCO market potentials in BiH is badly needed in order to attract ESCOs from other countries as well as to communicate the rationale for setting up ESCO companies to the SMEs in BiH. In addition, state and local capacity and general awareness raising would be desirable, but also the banks should be encouraged towards financing (Sehovic 2005b). Capacity building of the municipal officials regarding the possibilities of ESCO financing could be especially effective, since a large amount of money is allocated for electricity and heating costs in public buildings. Demonstrational projects could be useful to bring these opportunities closer to both clients and financers. Finally, as already mentioned, establishment of overall energy efficiency legislation and the institutional framework is regarded as essential (Chabchoub 2005). Technical aid from more experienced countries in the form of project development and feasibility studies could have a multiplier effect.

Table 38. Summary of basic data of the Bosnian ESCO market

Number of ESCOs	1 ESCO-like company, and a few ESCO projects
Type of ESCOs	n.d.
ESCO Association	no
Size of the market	not known
Change in recent years	not known
Most popular technologies	CHP, heating systems, biomass

The **Republic of Macedonia**, independent since 1991, is in an economic transition with some setbacks and major economic, financial and social difficulties complemented with following economic growth and stabilization. Policy-making has been influenced by harmonization with European Union legislation, in order to prepare a possible accession to the EU (E.V.A. n.d.b.). A Programme on Efficient Energy Use in the Republic of Macedonia until 2020 was adopted in 1999, based on which a Strategy for Energy Efficiency until 2020 was developed by 2004 with the financial support of USAID (PEEREA 2006a, E.V.A. n.d.b.). Furthermore, the new Energy Law, incorporating a special chapter “Energy Efficiency and Renewable Energy” was passed in May 2006. Though the establishment of an Energy Efficiency Fund is stipulated in the Energy

Efficiency Strategy, it had not occurred by the end of 2006 and energy efficiency funding is not allocated from the national budget, but is based on international cooperation, including IBRD/GEF, USAID and EBRD and private European funding (PEEREA 2006a).

The state of the ESCO market in Macedonia is in an early embryonic phase. The potential for energy savings is significant in industry, which is dominated by the metal processing industry (E.V.A. n.d.b.), and in the municipal and residential sectors, especially in heating, where electric heating prevails. Energy intensity is 50% higher than in neighbouring countries (E.V.A. n.d.b.).

There is local interest in the ESCO business. As of 2006, there is one ESCO-type company working with heating units and heat pumps on geothermal energy, and this has a good service all over Macedonia. It is estimated that there are 2-3 national engineering companies with good technical skills and personnel, which would like to widen their services as ESCOs, nonetheless they seriously lack sufficient capital even for the transaction costs to get off the ground in this area. In addition, there is also interest from regional companies, in particular on the part of former Yugoslav countries, to get into the Macedonian energy efficiency market.

There are a number of important traditional barriers to energy efficiency investments and to the development of the ESCO sector, but the World Bank has identified financial restraints as the most urgent and effective to deal with in the case of Macedonia. In order to overcome this obstacle, the World Bank has a currently operational project in the country through the GEF, which supports the start of the ESCO market on the basis of 3 pillars. First of all, support is given to establish the market framework through technical assistance to develop and implement secondary legislation set out in the Energy Efficiency Strategy. Secondly, the World Bank (similarly to the system in Croatia) establishes a public utility-based ESCO under the umbrella of the Macedonian Market and Transmission System Operator (MEPSO), ELEM[79] and TOPLIFIKACIJA AD[80]. (PEEREA 2006a, GEF 2004). The ESCO will provide turnkey and performance-based contracting for energy efficiency, and will demonstrate the financial performance of such projects using third-party financing for publicly-owned buildings. The launch of the ESCO is expected by March 2007. Thirdly, the creation of the Sustainable Energy Financing Facility is designed to provide a loan guarantee facility and a debt fund, on a co-financing basis with commercial institutions and the Macedonian Bank for Development Promotion (MBDP) (PEEREA 2006a).

The resistance of the banking sector to getting involved in the energy efficiency business until now is being addressed by programs of the EBRD. For instance, in 2004 EBRD extended a syndicated loan of 20 million EUR to a Macedonian bank (EBRD n.d.).

Besides financial constraints and the low involvement of the banking sector, barriers are similar to other Central and South-Eastern countries. Procedural hindrances to procurement are experienced, and low awareness, lack of information, and trust in energy efficiency investment are also a major hindrance. On the other hand, energy is not as deeply subsidized as in other countries of the region.

[79] Macedonian Power Plants – 100% owned by the State

[80] District heating company, owner of the heat energy production (boiler houses) and manager of the district heating distribution pipelines in Skopje.

The new utility-based ESCO is planned to focus primarily on educational buildings and hospitals, with some attention to traditional start-off areas, such as public lighting.
Macedonia is in the introductory phase of the energy service company market, and given the local potential, interest and international help, the next two years should see the results of recent efforts.

Table 39. Summary of basic data of the Macedonian ESCO market

Number of ESCOs	1, and 1 is to be launched in 2007
Type of ESCOs	Private (the new one will be public)
ESCO Association	no
Size of the market	not known
Change in recent years	increased interest, expected take off from 2007
Most popular technologies	geothermal heat pumps, planned targets are educational buildings and hospitals

As of 2006, there are no companies dedicated to energy efficiency investments, nor have ESCO-type projects been implemented in **Albania**, based on local experts' reports.
The country has emphasized the priority of energy efficiency on a number of platforms though. Albania has been modernizing the national energy policy in order to harmonize with EU directives and international commitments, such as the Kyoto Protocol, the Energy Charter Treaty or for instance the South-East European Stability Pact (NSE 2005). The National Strategy for Energy adopted in 2005 is a comprehensive document that has a special chapter just dedicated to energy efficiency, which is regarded by the country as a priority (Fida 2005). The NSE also projects the investment need in energy efficiency, which is around 40 million USD including the residential, industrial and tertiary sectors by 2010 (NSE 2005).
Furthermore, the Energy Efficiency Law has also been created and passed, which has important implications for energy saving opportunities, and is establishing the ground for ESCOs, too. Energy investment-friendly measures in the Law include for instance an obligation to conduct energy audits for some consumers, the national evaluation of energy saving potentials, and the establishment of the Energy Efficiency Fund.
Raising awareness and information dissemination is also regarded as a priority area for dealing with increasing energy consumption, and the institutional framework is rather developed as of 2006. Albania has an Albanian-EU Energy Efficiency Centre (AEEC n.d.). Besides awareness raising, the Center has been carrying out international and national programs for energy conservation, has engaged in energy audits (AEEC n.d.), and may have the potential to serve as an ESCO.
Energy Service Companies and Third Party Financing are also specifically highlighted in the National Energy Strategy as useful tools for capturing energy efficiency potentials (NSE 2005). Nevertheless, Albania is still considered a few steps away from a successful ESCO launch by experts. Some of the remaining obstacles listed by experts are the further improvement of the legal and regulatory framework, the lack of appropriate and accessible financial resources and still low awareness. To overcome these to some extent, Regional Energy Offices in certain Albanian municipalities are being established as of

the end of 2006. These will have a profile for energy related data collection, assessment of energy saving potentials, energy efficiency promotion, and so on.

Table 40. Summary of basic data of the Albanian ESCO market

Number of ESCOs	none
Type of ESCOs	n.a.
ESCO Association	no
Size of the market	not known
Change in recent years	not known
Most popular technologies	n.a.

3 CONCLUSIONS

The Energy Service Companies market in the European Union and New Candidate States has been developing swiftly in the last two decades. ESCOs took off the ground in many countries as early as the beginning of the 90s. The current status of national ESCO industries shows noteworthy differences and their recent development paths have been diverse. A general observation is that the ESCO market across Europe is growing rapidly, even if it is stagnant or even slowly declining in some countries.

The European Union and some national governments have taken important steps to promote ESCO and EPC markets. Strategies include policy instruments, such as the Energy Service Directive[81], the Energy Performance of Buildings Directive[82] and the CHP Directive[83], programs such as the GreenLight[84], Motor Challenge and GreenBuilding[85] and a number of European projects[86] most of them supported by the IEE[87]. In addition to this, many national governments have placed the promotion of energy savings through ESCOs on their priority list, and introduced measures that are beneficial for ESCO businesses. Examples range from single measures (for instance establishment of one or more public ESCO) to complex targeted strategies (combining wide-scale information collection and dissemination, carrying out demonstration activities, capacity building, and developing guidelines and model contracts). The general trends of European ESCO markets are discussed below, followed by a short discussion on common barriers and selected enabling factors seen across the EU and the neighbouring countries.

3.1 Changes compared to the beginning of the millennium

Most of the ESCO markets have expanded since 2004-2005, when the *European ESCO Status Report*, the basis of the present Update report, was prepared. There are also some countries where the market has been remained stable. For instance, Germany, the UK, France and Spain have maintained their leading positions in the 'premier league' of ESCO countries (see European ESCO Status Report). At the same time, some countries have seen a spectacular increase in ESCO activity in the last few years: Sweden is an example in this respect. A focused and comprehensive strategy that was designed for the local circumstances has led to a significant market rise. This is especially impressive in the Swedish environment where lack of credibility in ESCOs plagued the market after earlier failures once at the end of 1970s, and then in the early 1990s. The Czech Republic has significantly strengthened the ESCO industry by concerted efforts on part of the government, agencies, the IFC and the industry itself. The introduction and enforcement

[81] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC.
[82] Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings
[83] Directive 2004/8/EC of the European Parliament and of the Council of 11 February 2004 on the promotion of cogeneration based on a useful heat demand in the internal energy market and amending Directive 92/42/EEC
[84] http://www.eu-greenlight.org/
[85] http://re.jrc.ec.europa.eu/energyefficiency/greenbuilding/index.htm
[86] such as the EUROCONTRACT, EuroWhiteCert, ST-ESCOs) project among others
[87] Intelligent Energy Europe Program; http://ec.europa.eu/energy/intelligent/index_en.html.

of obligatory audits have an important role in making the Czech ESCO market one of the European frontrunners. The effect of the introduction of a White Certificate scheme in some countries is debated, but it has been an important instrument to promote Italian ESCOs. A similar result is expected in France, and maybe the tool will become popular in other EU Member States, too. The White Certificates can increase the cost efficiency of project by allowing ESCOs to gain an additional revenue stream from selling verified and certified energy savings.

Other countries with strong and consolidated markets have seen no significant change during the last few years. The French market is dominated by a few actors and their role has not significantly altered, although there are new companies coming into the French market using EPC, and further changes can be expected. The Hungarian situation is more complex because by simply looking at the industry, it seems well-developed and even growing during the last years; however some ESCOs argue that the market is shrinking and ESCOs have to change their orientation and sometimes even their core activities in order to keep profits.

There are countries where the first ESCOs appeared in the last two years. Greece has been lagging behind other EU-15 countries, in spite of the significant saving potential, and it is hoped that a current EU project will be able to get the industry off the ground. ESCOs are progressing on the Estonian market, too. Meanwhile, some countries (Poland, Slovenia) do not seem to be getting into the ESCO business significantly in spite of various attempts, which could be because the traditional ESCO offer does not correspond to the market needs and peculiarities in these countries. There are also countries where ESCOs and EPC are unknown until today, and no change has been seen (Turkey, Malta, Cyprus).

Finally, there are a number of countries which have a very successful energy efficiency market, but without ESCO contribution (Denmark, the Netherlands, Lithuania). This clearly proves that ESCOs are a useful and very cost effective tool to achieve energy efficiency goals, but they are not the only available and possible solution. ESCOs offer the means to deliver infrastructure improvements to facilities that lack energy engineering skills, manpower or management time to deal with energy efficiency, capital funding or willingness to borrow for EE projects, understanding of risk in EE, and/or technology information.

In general, the ESCO concept is more developed and more spread, also thanks to the preparations related to the Energy Service Directive. Nevertheless, dissemination of information is still important and could further enlarge the market.

TPF has become an accepted tool, and the ESCO contracts are more and more suited to the needs of the clients, offering all or part of a complex energy saving investment. Model contracts are available in more countries than in 2005, which has been a major focus of many European-wide activities, EU projects.

Primarily in the CEE countries, the EPC scheme is being overtaken by more Energy Contracting and complex facility, operation management and heat and electricity supply contracts. The savings or performance guarantee is sometimes seen by the client as unnecessary and costly.

The public sector has been the most important customer of ESCOs, but the present research has shown that other sectors are overtaking in some countries. Interestingly, the residential sector is becoming attractive for ESCOs in some countries; this sector was

believed to be a difficult market for ESCOs before because of its complexity in decision making, small project sizes and large transaction costs. Apparently, ESCOs are able to deal with these problems, although, often the key to success lies in combining the ESCO guarantee with a national subsidy or other support program for domestic buildings.
The following table summarizes the basic characteristics and data of the EPC markets of the European Union Member States as discussed within the present report.

Table 41.a. Summary of basic data of the Energy Service Companies markets in the European Union Member States as of 2006-2007. Countries are listed following the order they appear in the present report.

Country	*Number of ESCOs*	*Market size/Market value*	*Main clients*
Spain	10-15 private companies + several public ESCOs	n.d.	Primary: public sector Secondary: industry
Portugal	7-8	~€8M (market value)[88]	Primary: large and medium sized industries Secondary: large tertiary buildings
Italy	Several dozen	~€95M (investment for CHP only)	Traditionally: public sector Secondary: commercial sector, industry Thirdly: residential sector
Greece	0-3 (sporadic projects)	~0	Project focus: governmental buildings
UK	20-24	~€860-940M (annual turnover)	Traditionally: industry Lately: Industry, commercial and public sectors
Ireland	2	~0; market potential: €50-110M/year until 2020	Primary: industry Secondary: commercial and public sector
France	3 major ESCOs + 100 small ones	€3Bln/year (turnover)	Traditionally: public sector and industry Lately: industry and residential sector
Germany	50	€2Bln (market potential)	Primary and traditional client: public buildings Secondary: private buildings Expected entry: industry, offices
Austria	~30	€500M investment opportunity	Primary: public buildings Expected uptake: private sector buildings

[88] Only includes the biggest company.

Table 41.b. Summary of basic data of the Energy Service Companies markets in the European Union Member States as of 2006-2007. (cont.)

Country	*Number of ESCOs*	*Market size/Market value*	*Main clients*
Belgium	~30	n.d.	Primary: public sector Secondary: industrial sites Expected uptake: residential sector
The Netherlands	very few	n.d.	Primary: public sector (lighting) Secondary: municipal (non-state-owned) buildings
Luxembourg	3-4	n.d.	n.d.
Finland	9-11	€220M (investment value between 1998 and 2004)	Primary: industrial sector
Sweden	~10	€40-60M (turnover)	Primary: public buildings
Denmark	2-4	€5M/year	Primary: industry and public sector buildings
Lithuania	6	€175M	Primary: residential and private buildings Secondary: industry
Latvia	2	n.d.	Primary: public sector
Estonia	0-2	n.d.	Expected uptake in the residential sector
Hungary	~30	€150-200M	Traditionally: public sector and public buildings Secondary: industry Lately: commercial and residential buildings
Czech Republic	10-15	€10-20M/year	Primary: healthcare sector + other public sectors
Slovakia	~10-30	n.d.	Primary: municipal and some commercial buildings Secondary: industry
Poland	~5	€10M/year	Primary: public sector Secondary: building cooperatives
Slovenia	1-2	n.d.	Primary: industry and public sector
Malta	0	0	-
Cyprus	0	0	-

Table 41.c. Summary of basic data of the Energy Service Companies markets in the European Union Member States as of 2006-2007. (cont.)

Country	*Number of ESCOs*	*Market size/Market value*	*Main clients*
Romania	2	n.d.	Primary: municipal sector and industry
Bulgaria	1-3	n.d.	Primary: public sector

Table 41.d. Summary of basic data of the Energy Service Companies markets in the regions dealt with in the present report as of 2006-2007.

Region	*Number of ESCOs (range)*	*Development of the market*	*Main clients*
EU15	0-50 (and even 1000 ESPC)	Many of the ESCO markets are very well developed, while some have no ESCOs at al, either because EE is targeted with different tools, or because ESCOs are setting foot currently.	Very diverse among countries. Industry and public sector are the most important clients in general
EU12	0-30	A few developed markets, 2 of whose development is close to that of EU15, while some markets have not even started.	Mostly the public sector is the main client, but the residential clients are gaining importance.
Candidate Countries	0-1	ESCOs have not yet set foot, although some start is seen.	Public sector if any
European CIS	1-5 ESCO (several dozen ESPC)	There is some ESCO activity at least in every country.	Primarily industry, while some projects for public clients, too.
Non-EU SEE	0-1	In some countries the market is setting up currently, while in others no or hardly any activity is seen.	Mainly the public sector is interested, but projects could be implemented well in industry and the residential sector, too.

3.2 Common barriers

Barriers to EPC and ESCOs have been discussed in the case of every country. A list of most common and most significant obstacles is given below. The development of the obstacles is also discussed, using the analysis in the *European ESCO Status Report 2005*:

1. The *European ESCO Status Report 2005* emphasized **low awareness and lack of information about the ESCO concept** as the most important barrier to the widespread use of the ESCO offer. The results of the analysis of the research in 2006-2007 indicate that this remains the most pressing obstacle to the ESCO market expansion across Europe. The most important barrier that hinders the evolution of ESCOs is believed to be that potential clients are not aware of this solution and/or are little interested because their attention is on their core business (private clients) or main mission (public bodies) and energy constitutes a small part of their expenses. Furthermore, large energy users usually have in-house expertise. Thus increasing awareness and dissemination of information about ESCOs still need significant attention even in countries with highly developed ESCO markets such as Germany, especially in the buildings sector and in case of SMEs.
2. **Trust and scepticism** on the clients' side in the ESCO offer is another long standing obstacle that has not changed significantly in most countries. This is often the result of limited understanding of energy efficiency opportunities, EPC and TPF. In the CEE countries this is particularly an issue because of over -suspiciousness in EPC offers on the side of some types of clients, who often suspect that there is a piece in the contract that will make the agreement unfavourable for them. Some of the clients are afraid that the guarantee would not function as expected.
3. **High perceived risk** of the ESCO investment goes along with the above barriers. Technical risk perception has not been highlighted by informants to the present research, and indeed, there are countries where even the guarantee constituting an essential part of an EPC is seen as unnecessary. For instance in Poland, ESCO projects are actually limited partially because clients with high technical expertise in energy management do not require a guarantee. On the other hand, business risk can be an important hindrance in several countries, especially if the ESCO industry has already failed in the past (Slovakia, Sweden).
4. Restricted levels of public sector investments were blamed on non-supportive **procurement rules**, and other legal and regulatory frameworks incompatible with energy efficiency investments in many countries. This problem has not been possible to solve in practically any of the countries in our focus, although there are a few countries with progressive public procurement system (for instance the Czech Republic, Slovakia and Germany, among others). Lack of **off-balance sheet solutions** is important in some CEE countries, too, but also in Germany. Pubic budgeting rules can also be an obstacle to ESCOs indirectly because these induce a lack of interest in energy cost saving. If a municipality saves money, it may loose all financial savings by getting a smaller allocation for subsequent years, depending on the calibration of the subsidy allocating formula in the country. There is a strong "pressure" on local decision makers to spend the annual municipal budget instead of saving on it, in order to avoid being cut the following year.

5. Lack of and limited understanding of established **measurement and verification protocols** for assuring performance was also discussed in the *European ESCO Status Report 2005.* The need to solve this issue was again highlighted by the interviewees in the present research. The development of a proper, neutral and reliable standard is believed to have the potential to significantly add to the success of the EPC market in almost all countries.
6. **Administrative hurdles and high transaction costs** limit willingness to participate, mainly in the public and residential sector. These not only limit the clients' interest, but also keep ESCOs away. Small project size was also highlighted in the *European ESCO Status Report 2005.* In certain countries these barriers are still serious, but many have started to pool projects, which decreases both risk and transaction costs.
7. On the other hand, **split incentives** are still extremely important in the building and the public sector. An example is the "renter-owner" division. The tenants pay the energy bills, but the landlord is responsible for renovations because he controls the property. Neither side has the incentive to invest in energy saving measures and equipment because the owner would have to bear the costs, while the savings would appear on the tenants' bills, and on the other hand, the tenant can never be sure whether he/she will use the property long enough to cover the pay-back time of the investment.
8. In many CEE countries there is a high level of **aversion to outsource energy** management tasks and allowing an outsider (the ESCO) to intervene in common practices and/or change equipment that the users are used to. In addition, the resistance is even higher when an intervention would affect the core business. In the industrial sector the client may be reserved in allowing the ESCOs in its processes and sometimes fear for data or patent protection may be the reason. In the public sector there is a fear of layoff if energy management is outsourced.
   On the other hand, in more developed countries, it is exactly the interest to outsource that may trigger the ESCO markets. The French market has actually been built on this interest from the clients, and the development of the British and Belgian industry is also based on this incentive. In the CEE region, Slovenia has seen similar changes and evolution of interest. As the industries have been cut into smaller units in Slovenia, the energy management knowledge is missing in most of the offspring companies, thus there is a significant need for contractors willing to take this task from the clients.
9. Problems with the **availability of financing** that matches the specifics of EE projects have been quoted in many countries, although the significance of this barrier has drastically decreased since 2004-2005. It has been highlighted in almost all countries that financing institutions are interested in participating in energy efficiency investments, however sometimes the financing solutions offered are not advantageous and high perceived risks often hinder the availability of good offers. One of the problems with financing is that banks often assess the creditworthiness of the client instead of the project itself, with which a lot of good projects are excluded from financing. Secondly, as a general rule, lending is asset-based, and not cash flow-based. In asset-based lending the bank requires a collateral (which can even be 200% of the value of the loan), however in an EE project there is often nothing that can serve as a collateral, so the client is required to offer some property to serve as a

collateral. In contrast, cash-flow based financing would be the appropriate solution for EE projects, where the bank would accept the stream of revenue coming from savings as a collateral. In addition, commercial financial institutions are only interested in the "low hanging", easy projects, thus limiting activity with longer projects and in some client segments (for instance in the residential sector).
In many markets large ESCOs dominate because they can afford to invest own equity. In such cases small ESCOs face difficulties to convince both the clients and the financial institutions to start up a different type of EPC contract and borrow from the financial markets. Forfeiting has become a tool to remedy the "lack of cash-flow" problems.

10. In the public sector ESCO projects may often have a difficult start if at all, because typically little attention is (possible to be) given to energy issues in local decision making, maybe because **other** "more important" **priorities often override** these, and little credit is given to the immense local co-benefits of energy efficiency. This might often be so in the private sector, too.

3.3 Success factors

The long history of ESCOs in certain countries is a result of the presence of various enabling factors and/or the ability of the market to overcome the most important barriers. As it has been shown in the present report, there are a few success stories emerging across Europe also currently that can be attributed to intended or unconscious facilitation of these markets.
In some countries, the ESCO market has been developed strategically (for instance in Austria, Sweden, and Germany), while in others some specific measures have been introduced or the environment became susceptible for this business (for instance in Spain, Czech Republic). Some of the most important individual factors are discussed below.
There are certain barriers that were significant in 2004-2005 (and are listed in the *European ESCO Status Report 2005)*, but which seem to have eroded at least to some extent.

1. **Energy prices** have been going up significantly in almost all countries as a result of increasing world energy prices, stricter environmental regulation, and/or the removal or rationalization of subsidies. This has significantly increased interest in energy efficiency and EPC, because energy use is more and more expensive and consumers are now forced to revise their energy spendings. High energy costs ensure the profitability of investing in energy saving for both the customer and the ESCO. It has been highlighted, for instance in Finland, that ESCOs work with industries whose energy costs represent a large share of their expenditures. Energy prices have been rising in almost all countries due to global market price increase and as a result of subsidy removal and/or rationalization especially in many CEE countries. Some ESCOs consider energy taxes as one of the most effective political measures for energy efficiency. (However, a sharp increase in the price of gas can have dramatic effect on CHP investments and decrease or erode its profitability).
2. **Governmental support** pointed at as an important missing factor in the *European ESCO Status Report 2005*, is more appreciative now for ESCOs. This may be partially due to increasing European-level attention and policies, such as the legislation (Energy Performance of Buildings Directive, Energy Services Directive)

and often also due to liberalization of the electricity market. Subsidies are peculiar, but very helpful of ESCOs in Finland, since they are designed to help the ESCO industry by offering an additional 5 percentage points subsidy besides the 15-20% subsidy of the energy efficiency investment costs.

3. **Liberalization** has unclear effect on the ESCO market. On the one hand, competition has pushed prices down (especially in case of electricity), thus decreasing the incentive to save energy. In Germany for instance, energy prices dropped significantly between 1999 and 2001 as a result of liberalization. On the other hand, competition induces new services offered by the energy utilities. In Portugal, as a result of market opening, the national energy supplier opened new business areas, including ESCO servicing. Among many others, the British energy facilities also offer energy services in order to attract more customers or keep old ones.
4. **Dissemination of information and capacity building** has been particularly successful in many countries if done effectively and for the appropriate audience. The case of Sweden and Austria has shown that introducing the ESCO concept and its basics to potential customers formed an essential part of their ESCO development strategy. The Czech market is another example of successful ESCO development largely because of the successes of information distribution. Much attention is paid to increasing trust, knowledge and understanding of the ESCO concept in South-East Europe where the ESCO industry is expected to grow rapidly in the coming years.
5. Some experts have been particularly favouring **standard documents** that help ESCO businesses by providing a template of the contract, or give a successful procedure protocol for carrying out parts or all of the ESCO operations. Templates and protocols are usually useful for embryonic markets and for building trust in the ESCO business in general, because these documents are produced by a neutral body, such as an energy agency or NGO.
6. **Small project sizes** were also important barriers to energy saving investments in 2004-2005. This is still an important issue, however on the one hand different solutions have been applied (such as pooling, obligatory audits, grants), and on the other hand rising energy prices improved the economics of previously snubbed projects.
7. **Accreditation** of ESCOs has been referred to as one of the most effective tools to increase trust in the quality of ESCO work, however not widely used. Austria is a unique and very successful example of this. Several quality labels have been set up for ESCOs and ESCO services. The Thermoprofit quality label guarantees reliable high quality proposals by ESCOs using the label, while the so called eco-label denotes the quality of ESCO services and the compliance with standards (E.V.A. 2005).
8. It has been repeatedly expressed in the country reports that financing is not a problem in general, however, some areas, such as the residential sector could not take up much energy efficiency investment because the transaction costs are too high for ESCOs. There are some countries across Europe, for instance Hungary and Estonia, where ESCOs have been able to combine their offers with **state funds** (Panel Program in Hungary) and make the sector an interesting area for investment.
9. Improving **legislation and supportive regulatory background** have been often emphasized to be especially important. The Directive 2006/32/EC of the European

Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services is probably one of the most important pillars for the promotion of the ESCO industry. It is a complex set of indications and obligations on how to increase energy efficiency through energy services. Besides further supporting the supply side of energy services, the Directive also aims at increasing incentives for the demand side. The role of the public sector in Member States is underlined. The public sector is requested to act as a role model for the private sector concerning energy efficiency measures such as energy services, investments, maintenance and management of other expenses related to energy-using equipment.

10. **Obligatory audits** have also been found effective to facilitate the ESCO markets. It is believed that the introduction of mandatory audits in the Czech Republic has been a keystone in the development of the Czech ESCO industry. However, in other cases, this connection is not seen. For instance, in Romania penalties are so small that plants prefer to pay them than comply with the regulation. Another reason for the failure of the mandatory audits can be if the industries are reluctant to give out data about their sites, because they are afraid that they get in the hands of their competitors.
11. The most important and successful push for energy efficiency and for ESCO contracting in Finland has been the **voluntary agreement** with the industry. Industries that have joined the voluntary agreement are eligible for 15-20% subsidy of the energy efficiency investment costs from the government.
12. **Energy Efficiency Certificates** (White Certificates)[89] are considered as a significant enabling factor for ESCOs, as proven by the Italian experience. Energy saving measures implemented by ESCOs must be certified and verified. White Certificates acquired by ESCOs can be sold to distributors, who can cover their end-use energy conservation obligations with these.
13. The growing success of ESCOs, i.e. companies delivering carbon savings for obliged parties and/or obliged nation states, is also largely due to the increased climate consciousness, the increasing level of obligations related to **Climate Change** Politics. Under the Kyoto Protocol, the European Union is committed to reducing GHG emissions by 8% between 2008 and 2012 relative to 1990 levels. In addition, the EU established obligations for its Member States towards more rational use of energy. For instance, the "RES-E Directive" (Directive 77/2001/EC) aims at increasing the share of green electricity (RES-E[90]) from 14% to 22.1% and to double the share of renewable energy in the total primary energy supply from 6% to 12% by 2010. In the beginning of 2007, the EU endorsed a unilateral plan to reduce GHG emissions by 20% by 2020 as a binding target regardless of international climate negotiations. To this aim, the total energy consumption should be decreased by 20% by 2020, compared to the projections. These targets increase the need for complex RUE solutions at project level, too.

While there is no "magic carpet" and a mixture of factors might work for the benefit of ESCOs in one country, the same mixture might not have a start up value for ESCOs in another country. Strategies to develop the energy efficiency markets must consider the

[89] Distributors and their subsidiaries or associated companies are also eligible for White Certificates if they carry out energy conservation measures for the benefit of end-users.
[90] Electricity produced from renewable energy sources

local circumstances and combine interventions most appropriate there. Even the most careful market development strategy might fail for unknown or unexpected reasons, for instance another issue, such as terrorism can draw attention away from energy savings. However, ESCOs are businesses – that is companies that need to make profit –, and therefore there is a primary need to combine entrepreneur sprit and understanding of risk. Nevertheless, as indicated above, there are several factors that have been able to significantly increase the ESCO industry across Europe.

3.4 New countries

The review of the national ESCO markets of countries that have previously been omitted from systematic ESCO research[91] is a special feature of the present report. These markets offer a large business opportunity for Energy Service Companies because of the highly inefficient economies, the significant amount of untapped potential, and in many cases quickly growing economies. Nevertheless, barriers are numerous and the establishment and penetration of ESCOs in these countries has been slow until today.

The ESCO markets of the European part of the Commonwealth of Independent States have a rather long history. The first ESCOs were set up already in the 1990s in Russia and Ukraine. Although the ESCO markets in the CIS cannot be regarded as particularly successful compared to some EU countries or the USA, their relatively high development must be acknowledged.

Countries of the Non-EU South-East Europe (SEE) region also show significant energy saving potential that could support a successful ESCO sector. ESCOs and EPC have no history yet in Non-EU South-East Europe, but rapid expansion and growth is expected. IFIs, ESCOs in other countries, energy efficient equipment suppliers and local companies are increasingly interested in starting up ESCO work there, and the World Bank is launching an ESCO in Macedonia in 2007.

Both the CIS and SEE countries feature inefficient industrial and buildings sectors. The energy saving potential is also large in their public sectors. Energy prices tend to be low and limit the profitability of an ESCO project, and thus lower the interest in ESCO business. However, prices are going up and economic growth forecasts indicate a large increase in energy demand, which could create a stable background for ESCO projects. Regulatory and legal barriers are significant, and sometimes the lack of a proper business environment is an important obstacle. Nevertheless, due to the EU-orientation of these countries, especially of SEE, it is possible that energy efficiency will be an increasingly important priority, further enhancing an ESCO friendly environment.

[91] Non-EU South-East Europe: Serbia and Montenegro, Bosnia and Herzegovina, Macedonia, and Albania; and European part of the Commonwealth of Independent States: Ukraine, Russia, Belarus, and Moldova.

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6 LIST OF ABBREVIATIONS

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie; the French Environment and Energy Management Agency
AEEG	Autorità per l'Energia Elettrica e il Gas; The Italian Regulatory Authority for Electricity and Gas
AGESI	Associazione Imprese di Facility Management ed Energia; Association of Facility Management and Energy Services Companies
aM&T	Automatic Monitoring and Targeting
AMI	Asociación Espanola de Empresas de Mantenimiento Integral de Edificios, Infraestructuras e Industrias; Spanish Association of Enterprises of Complex Maintenance of Buildings, Infrastructures and Industries
ARCE	Agentia Romana pentru Conservarea Energiei; Romanian Energy Conservation Agency
ASSOESCo	Associanziaone Nazionale Societi Servizi Energetici
BEEF	Bulgarian Energy Efficiency Fund
BiH	Bosnia and Herzegovina
CEM	Contract Energy Management
CHP	combined-heat-and-power
CIS	Commonwealth of Independent States
CO2	carbon-dioxide
CRES	Center for Renewable Energy Sources (Κέντρο Ανανεώσιμων Πηγών Ενέργειας, ΚΑΡΕ)
DH	district heating
EAR	European Agency for Reconstruction
EBRD	European Bank for Reconstruction and Development
EDP	Electricidade de Portugal, Portuguese Electricity Company
EE	energy efficiency
EFIEES	European Federation of Intelligent Energy Efficiency Services
EPBD	EU Directive on the Energy Performance of Buildings
EPC	Energy Performance Contracting
ESCO	Energy Service Company
ESCP	Energy Service Provider Companies
ESP	Energy Saving Partnership
ESTA	Energy Services and Technology Association
eva	Austrian Energy Agenvy
FG3E	La Fédération Française des Entreprises Gestionnaires de services aux Equipements, à l'Energie et à l'Environnement; French Federation of Companies Providing Services to Facilities, Energy and the Environmen
FOGIME	Crediting System in Favour of Energy Management
FREE	Romanian Energy Efficiency Fund
GEF	Global Environmental Fund
HVAC	Heating, Ventilation, and Air-Conditioning
IBRD	International Bank for Reconstruction and Development, see WB
ICO	Instituto de Crédito Oficial
IDEA	Instituto para la Diversificacion y Ahorro de la Energia; Institute for Diversification and Energy Saving, the Spanish National Energy Agency

IFI	international financial institution
KIDSF	Kozloduy International Decommissioning Support Fund (Bulgaria)
Ktoe	1000 tonne of oil equivalent
M&V	monitoring and verification
MNC	multinational company
MOTIVA	Finnish Energy Agency
NFOS	National Fund for Environmental Protection and Water Management (Poland)
OPET	European Network for the Promotion of Energy Technologies in the Building Sector
PBT	pay-back time
PECU	Bundesverband Privatwirtschaftlicher Energie-Contracting-Unternehmen
PePS	Promoting an Energy Efficient Public Sector (program)
PPP	Public-Private-Partnership
RES	renewable energy sources
RUE	rational use of energy
SEE	South-East Europe
SEEA	Serbian Energy Efficiency Agency
SEI	Sustainable Energy Ireland
SME	small and medium sized enterprises
SS2E, SSEE	Energy Efficiency Service Companies (France)
TPF	Third Party Financing
TACIS	European Union's technical assistance program
UkrESCO	Ukrainian ESCO
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
VfW	Verband für Wärmelieferung, Association for Heat Supply
WB	World Bank
ZVEI	Zentralverband Elektrotechnik- und Elektronikindustrie e.V.

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Abstract
The present report is an update of the “Energy Service Companies in Europe – Status Report 2005”, which was published by the European Commission DG Joint Research Center in 2005. The European ESCO Status Report gave an overview of the ESCO concept and key definitions, the development of the energy service companies market across Europe, and a concise synopsis of the state-of-the-art in the European Union Member States and the Candidate Countries in 2004.
The aim of the present report is to update and expand the scope of the Status Report 2005, and in particular to investigate the specific situation in every country in more detail. To this end, the authors sketch the current status of national markets, and identify changes that have occurred during recent years, and especially since 2004. In addition, the reasons behind the changes are investigated. Specific barriers are identified and potential interventions to increase energy efficiency investments and to exploit energy saving potentials through ESCOs across Europe are discussed.
The primary scope of the report is the enlarged European Union (EU-27), however special attention has been given to examining the ESCO markets in countries that have usually been ignored by research, and thus the report is the first of its kind to scrutinize almost every country in Europe.

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