Latest developments of the ESCO industry across Europe

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Keywords
Energy Service Companies, ESCO, financing energy efficiency, Energy Performance Contracting, EPC, Europe, EU

Abstract
A pan-European survey of Energy Service Companies (ESCOs) carried out in 2006 pointed at significant changes in some national markets over the last few years. ESCO markets across Europe show a particular degree of diversity. Some countries have a consolidated market (Hungary), in others the market is still immature without significant change (Estonia, Portugal), is just taking off the ground (Greece, Ireland) or is undergoing expansion (Italy, Austria), even boom (Czech Republic).

The present paper reviews the status of the ESCO market on a country-by-country basis, building on the "Energy Service Companies in Europe – Status Report 2005", published by the European Commission DG Joint Research Center. The *ESCO Status Report 2005* gave an overview of the ESCO concept, and a synopsis of the state-of-the-art in the EU Member States and Candidate Countries. The present work aims at investigating the specific situation in each Member State of the enlarged European Union (EU27)[1] in greater depth, and adds a description of new Candidate Countries (Croatia and Turkey), and other European countries (Norway, Switzerland, non-EU South-Eastern Europe and the European part of the Commonwealth of Independent States), adding up to a review of 40 countries.

The paper provides an overview of national ESCO market indicators, such as the number of ESCOs, market size estimates, most common project types and preferred clients. Based on these, recent developments on the national ESCO markets are analyzed; the analysis sheds light on the drivers of change and specific barriers and factors behind the success for ESCO markets. Based on the findings of the survey, an analysis is made of the role and status of ESCOs, and recommendations are proposed on how to promote ESCO markets.

Introduction
Energy efficiency (EE) has a crucial role to play in low-carbon energy systems (BASE 2006, EC Research 2006) and bears major significance in battling the triple challenge of energy security, climate change and economic development stipulated as major EU objectives in the 2005 Green Paper on Energy Efficiency (EC DG TREN 2005) and the subsequent 2006 Action Plan (EC 2006) (Perrels et al. 2006, EC DG Research 2006, EC TREN 2006, UKACE 2000)[2]. According to the International Energy Agency (2006) the world is currently on an unsustainable energy path with increasing greenhouse-gas emissions, energy insecurity and risks of supply disruptions, while the EE sector is at the same time under-invested compared to its immense economic potential.

Energy Service Companies (ESCOs) have been long considered as a crucial instrument for delivering improved energy efficiency and contributing to potentially substantial energy

1. Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithiuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, the UK

2. The Energy Efficiency Action Plan (EC 2006) puts forward 20 % reduction potential of energy consumption for Europe by 2020.

savings in all sectors (public, private business, and lately residential), thus to both emission-reductions and economic growth around the world (see for instance Vine 2005, Rezessy et al. 2006 among many others). The definitions of an Energy Service Company vary significantly even within Europe. Numerous authors have called for a common definition, which is particularly essential especially in the light of relevant common EU-level legislation, but also for the certification of ESCOs in certain countries, such as Italy (e.g. Tomaselli pers. com.). In the light of these developments, the European Standardisation Body (CEN) is working on a CEN norm to overcome the problem of the unclear concept of ESCOs and to agree on the definition of an energy service company, and also to set standard quality criteria to identify high quality ESCO services. The definition used in this work is the one found in most of the studied countries, as well as in the *ESCO Status Report 2005* (EC DG JRC 2005). *ESCOs* offer business-based integrated energy services. As a result of the investment they put forward, they guarantee the savings (in monetary or physical terms) and/or provision of the same level of energy service at a reduced cost and typically (but not always) offer financing solutions for the project they implement or assistance in acquiring financing by the client. ESCOs' own remuneration is tied directly to the energy savings achieved, thus ESCOs assume a certain level of risks. ESCOs are also responsible for the measuring and verification of the savings during the financing period. In this report, we understand "ESCOs" as companies that meet the above characteristics ("real ESCOs"). In contrast, *Energy Service Provider Companies (ESPCs)* can be consulting engineers specialised in efficiency improvements, equipment manufacturers, energy suppliers or utilities that provide a service for a fixed fee or as added value to the supply of equipment or energy. 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).

The use of ESCOs is further acknowledged by the Directive on Energy End-use Efficiency and Energy Services (2006/32/EC) that was formally adopted in April 2006. The directive requires Member States to prepare national action plans to achieve 1% annual energy savings over nine years, starting in January 2008. The 1 % target is only indicative but the national action plans will need approval from the Commission and will be reviewed every three years. The directive advocates the promotion of ESCOs for achieving the savings.

This paper presents preliminary findings of research aimed at enhancing and supplementing existing knowledge on Energy Service Companies and energy service markets across Europe. The work presented here updates information in the "Energy Service Companies in Europe – Status Report 2005" – referred to herein after as "*ESCO Status Report 2005"* –, which was published by the European Commission DG Joint Research Center in 2005. The *ESCO Status Report 2005* gave an overview of the ESCO concept and key definitions, the development of energy service companies market in Europe, and a concise synopsis of the state-of-the-art in the European Union Member States (EU25) and the Candidate Countries as of early 2005[3]. The European ESCO Status Report is available at http://energyefficiency.jrc.cec.eu.int/pdf/ESCO%20report%20final%20revised%20v2.pdf.

The research illustrated here was focused on exploring details of the development of the ESCO industry during the last ca. 3 years (since the *ESCO Status Report 2005*) concerning basic information (size, sectoral and technology focus), applied innovative tools that assist ESCOs' successes in some countries, and key barriers and success factors as of 2004-2007. In addition to updating the information on ESCOs of the EU regions and Norway and Switzerland, countries rarely or never studied and presented have been included in the study, such as Eastern neighbouring countries of the EU (non-EU South-Eastern Europe (SEE) and the European part of the Commonwealth of Independent States (CIS)). The ESCO situation of most of these areas has not yet been presented in the literature, in spite of their strategic importance for energy savings and potential markets for current ESCOs. As a result, the research has been able to embrace 40 European countries.

The research was based on stakeholder interviews and wide-scale surveying of ESCOs, international and national ESCO experts and experts of related fields, academia, banks, and financial institutions. The field research on the EU25+Bulgaria and Romania [4] and Candidate Countries was carried out mainly between June-September 2006, and in December 2006 on Non-EU SEE and CIS. Over 90 informative answers were received or interviews made. This indicates that in general at least 1, but in the majority of the cases 3-5 answers are integrated for a single country report. Literature, reports, governmental archives, project documents, etc. were consulted to confirm the information gathered.

Description of the ESCO markets of the EU27+4[5]

The Energy Service Companies markets are extremely diverse in Europe. The first ESCOs appeared around 100 years ago (Bertoldi et al. 2006b) in France with integrated building heating services and the concept moved to North America, where they gained popularity. It was not until the 1990s that the ESCO industry and Energy Performance Contracting (EPC) started its Renaissance in many European countries. At the same time, the unique opportunity offered by complete restructuring of certain sectors of the economy (in particular banking and energy sectors) due to the transition was seized in countries in Central and Eastern Europe (CEE), and contributed to ESCO development in this region (Ürge-Vorsatz et al. 2004). Other CEE countries, with slower reforms, have lagged behind on the energy efficiency services scene. The review is started with the overview of basic characteristics and indicators of the ESCOs and national ESCO markets were assessed. It is true that some of the commonly used indicators (such as number of compa-

3. Romania, Bulgaria and Croatia formed part of the research in 2005, too.

4. At that time, Accession Countries.

5. Norway and Switzerland are discussed together with EU27 as "other Western countries" and Croatia and Turkey as "Candidate Countries".

nies) are vague and do not reflect clearly the development level of the market because of the impact of the size of the country, for example. Nevertheless, the combination of such indicators and narrative discussion were considered as most appropriate to understand the situation and be able to compare to earlier results.

BASIC INDICATORS OF ESCO DEVELOPMENT: NUMBER OF COMPANIES AND SIZE OF MARKETS

In the beginning of the 1990s only a few EPCs were initiated in Europe (Geissler et al. 2006), no standard documents, procedures were available, and no effective association existed to support the operation of the industry. As of 2006, this situation has changed, and the support for ESCOs has grown significantly. The EU market potential has been estimated to be at least 5-10 billion EUR per annum in the short term and 25 billion EUR in the long term (Bertoldi et al. 2006b, Geissler 2005), but the exact number of ESCOs in the whole European Union is unknown. Table 1 below summarises the basic characteristics of the individual national ESCO markets in the enlarged EU, other Western countries and new candidate countries.

Markets in Western Europe can be divided into two major groups. Many of the countries in Western Europe have consolidated EPC markets, which have largely reached a point of saturation thus not changing significantly (such as Germany, France, Norway). Others have a low level of ESCO activity due to the existence of other competing energy efficiency delivery tools, such as mandatory demand-side management, grants, voluntary schemes, etc. (for instance the Netherlands, Denmark, Switzerland).

The case of the New Member States (10+2) is more complicated. Malta and Cyprus are in the back row of the ESCO industry and these countries do not host any ESCOs as of 2006. Hungary and Czech Republic are in the fore-front of even the whole of Europe, however experts are doubtful about the Hungarian trends, and point out that a decline is being observed, while the ESCO market in the Czech Republic is definitely booming. Poland, Slovakia and Slovenia have seen significant efforts to increase their ESCO activity, though with limited success, while in Romania and Bulgaria some major well-known barriers still need to be removed and consequently an upward trend can be expected on the short to medium term.

TYPES OF ESCOS AND SPECIAL SOLUTIONS OFFERED BY ESCOS

Origins

ESCOs in different countries have various origins. The oldest ESCO-type model is of French origin, where integrated building heating service has been offered. This contractual arrangement, known as chauffage, still dominates the market in, for instance, France, Italy, and Spain, and they are important tools in the UK and Central Eastern Europe, though they do not guarantee the savings (they offer cost savings for their services), nevertheless their contribution to energy savings is substantial. ESCOs have been formed typically by utilities in several of the EU25 countries, through offering an extended service portfolio and/or establishing a daughter company. This is typical, for instance, of France, Sweden, Portugal, Estonia, Croatia. Such a setting often makes for a market consolidated around a few large players; how strong the market would be depends on the actual activity of the single or few such ESCOs. National energy agencies/centres may also start up a business-oriented ESCO activity (such as in Spain, Germany), in which case the market is strong, but with a potential to host other companies, too, because in this case the energy centre's main focus is to tackle the less profitable projects, and to help other businesses in the same field. In many of the markets of the New Member States (EU10+2), ESCOs emerged from engineering companies or were set up by professionals working in the energy and equipment industries before the transition (for instance in Hungary, Poland, Romania). The success of such a market hugely depends on the regulatory and financial framework of the particular country and on the capability of the small actors to manage the challenge – the diverging experiences in Hungary and Poland are an example. Similarly, it is also common that local auditing companies extend their services to offer ESCO solutions (Belgium, Finland, Hungary, Bulgaria).

Public ESCOs

The energy service markets of a few countries (Spain, Germany, Italy, Austria) are diversified and enlarged by the participation of "public ESCOs", which means that the energy agency acts as an ESCO and implements EPC in certain fields with social importance and large demonstration effects (EC DG JRC 2005). Public ESCOs typically accept higher risk or smaller profit than private companies thus opening an investment area that might otherwise be left out of touch. In certain countries, public ESCOs have been or are being established in order to enhance the market (Greece, Belgium, see also non-EU SEE and CIS sections); although such ESCOs have not become major players, their potential should be considered in augmenting energy savings.

The "Intracting model" or Public Internal Performance Contracting (PICO) was first applied in Germany in the public sector (Energie-Cités 2002, 2004). In the PICO model one department in the administration acts as an ESCO for another department; organizes, finances and implements energy efficiency improvements mostly through a fund made up of municipal money and using the existing know-how. This allows larger cost savings or on the other hand allows less profitable projects than involving a private ESCO aiming at larger profits. The German model of in-house ESCO solutions has started to spread among Italian, Austrian, French, Swedish and Polish public authorities (Irrek et al. 2005).

ESCO ASSOCIATION

An organization specifically established for the support and promotion of the ESCO market is considered as an indication of a developed ESCO situation (Vine 2005). Specialized ESCO associations are rare in the EU states, however, indeed several of the countries that are considered to have the most developed ESCO industries feature associations.

In Germany, there are several associations. Sixteen major cross-regional ESCOs formed the Bundesverband Privatwirtschaftlicher Energie-Contracting-Unternehmen e.V. (PECU). The Verband für Wärmelieferung (VfW, Association for Heat Supply) pulls together as many as 230 ESCO-type companies in Germany (many of these are not "real ESCOs") with about 23,000 projects and over 1 billion EUR combined turnover per

Table 1. Basic ESCO market indicators and explanation in the countries of the enlarged European Union and other Western Europe and Candidate Countries as of 2007

	First ESCO	Number of ESCOs earlier (reference year)	Number of ESCOs in 2006	Size of the EPC market/market potential	Change during last 1-3 years
EU15					
Austria	1998	0 (1998)	~20	~500M EUR investment potential in RUE projects	Fast development
Belgium	1990	4 (2002)	Few	n.d.	Slow increase in activity
Denmark	n.d.	n.d.	2	n.d.	No change
Finland	2000	4 (2002)	9	~5M EUR market value	EPC market is increasing slowly
France	Early 1900s	15 (2005)	3-4 large + many small companies	n.d.	Concentrated market, stable, but new entries by small companies
German	1990-95	500-1000	500 (but only 50 offer real EPC)	~2B EUR market volume	Rather stable
Greece	–	0 (2005)	0-3 (sporadic projects)	Almost 0	No significant change, expected to kick-start
Ireland	Around 2005-07	n.d.	11 (2005) of which 2 is real ESCO	50-110M EUR/year until 2020	Getting off the ground
Italy	Early 1980s	15-20 (2002)	~20 real ESCOs	n.d.	Increasing market
Luxemburg	n.d.	n.d.	n.d.	n.d.	n.d.
Netherlands	~2000	n.d.	few	almost none (Energy Management is common, EPC is not)	Stable
Portugal	n.d.	6 (2000)	7-8	~8M EUR market value	Slow increase
Spain	1987 (utilization of TPF)	~10 (2003)	10-15	n.d.	Slow increase
Sweden	1978	6-12 (2002)	4 major companies + small local ones	650M EUR EPC investment potential	After early failures, the market has experienced a great revival
UK	1984	20	20-24	860-940M EUR annual turnover	Decreasing
New Member States in 2004 (EU10)					
Czech R.	1993	3 (2002)	10-15	10-20 million EUR/year (market potential)	Boom
Cyprus	Not r.	0	0	0	No change
Estonia	1986	20 (2002)	1-2	1-3M EUR (in 2002)	New ESCO just started and expects others to pop up
Hungary	1991	10 (2002)	~30	150-200 million EUR	Shrinking (some expert opinion: consolidation)
Latvia	2001	–	2	n.d.	No important change
Lithuania	1998	3 (2002)	6	The market size is 125M EUR in the residential and public segment, and further 50M EUR in industry	Increasing (one new company in 2006)
Malta	Not r.	0	0	11M market potential	No change
Poland	1995	8	~5	27M EUR total value of ESCO projects	Stagnation
Slovakia	1994	10 (2003)	~30, but not all are real ESCOs	n.d. (total investment between 1994-2002 was 130M EUR)	Increasing and orientation is changing
Slovenia	2001	0 (2001)	Few	n.d.	No increase lately, but potential to pick up the market
New Member States in 2007 (EU2)					
Bulgaria	1995	12	1-3	n.d.	Increasing
Romania	n.d.	n.d.	2	n.d.	Increasing
Western countries outside of EU					
Norway	n.d.	7 (2002)	10-15	~30-40M EUR turnover	Consolidated, only change of actors, mergers, emergence
Switzerland	Not r.	0	0 (dominated by Energy Delivery Contracting still)	Not r.	No change
Candidate Countries					
Croatia	2003	0 (2002)	1-2	over 400M EUR (estimated potential)	Expected increase
Turkey	–	0	0	0	Expected take up

Notes: EPC=Energy Performance Contracting, M=million, B=billion, n.d.=no data, Not r = not relevant.

year (VfW n.d.). Some other countries have associations with the same functions: FG3E in France (500 members), ESTA in the UK (104 members, of which 11 are "real ESCOs"), AGESI in Italy (30 members, covering 90 % of the ESCO offerings in the public sector), and AMI in Spain. The European level association, the European Federation of Intelligent Energy Efficiency Services (EFIEES) was founded in May 2005. Associations also exist in non-EU European countries (for instance in Ukraine). Furthermore, it is common that ESCOs or companies that have the potential to become an ESCO are collected in an association of a related field (such as the CHP association in Hungary, Hellenic Association of Solar Industries in Greece, and several in Spain).

TYPES OF PROJECTS, SECTORAL FOCUS

The primary sectoral focus of ESCO activity in Europe in general has been the public sector and this has not changed drastically over the last years (Dietrich pers. com.). Nevertheless, the EPC market is definitely filtering into all the other sectors and there are countries where the public sector has been overtaken by industrial (France, Finland, Ireland) or even residential sector (Estonia, France, Norway). The main client sector(s) and technological focus of national ESCOs is indicated in Table 2. In most cases changes during our focus period (2004-2007) are also highlighted. There is also a trend that in countries where the ESCO market is rather developed, the "low-hanging fruits" have already been harvested, and the ESCO focus needs to adjust. There have been some innovative initiatives to overcome this challenge, such as pooling, combining with grants and other policy tools (such as White Certificates, quality labels, see below).

Barriers …

Due to space limitations and because the focus of the paper is not particularly on the discussion of barriers and enablers, in this section we highlight just a few of the most pertinent obstacles and some selected success factors that were quoted by interviewees and in most countries, while noting any country specificities.

The first and foremost underlined barrier in most countries is still (as in previous works such as Vine (2005), Bertoldi et al. (2006b)) the lack of information and understanding of the ESCO and EPC concept and the opportunities these can offer for potential clients. The information barrier can be systematically addressed by a dedicated organization – such as an ESCO association for in instance Germany, Italy or Energy Agencies for instance in Austria or Spain – which is assigned to raise awareness and disseminate reliable information about ESCOs. Nevertheless, in spite of their associations or agencies, the countries mentioned still feature huge untouched potential and even there information has spread to a limited extent (Waldmann and Goldmann pers. com.). Demonstration projects are also considered by almost all experts to be a successful means to spread the understanding of and trust in the EPC. Austria, Hungary, Italy (and Ukraine) are examples where demonstration projects have helped the spread of ESCOs in the country, while in Sweden, the Netherlands and Estonia a lack of demonstrable examples of successful EPC implementations is one of the major barriers. Sometimes demonstration projects have not directly led to a boom in EPC, for instance in Slovenia where the CLEARCONTRACT project imported German and Austrian experiences (Perpar pers. com.). In Sweden, in fact, failures of projects during the 1970s-1980s discouraged the market (Vine 2005); the same was the situation in Slovakia where early negative experience delayed the market.

Information and training, capacity building and development of trust is still necessary not only among potential clients but in the financial sector, because in many countries banks that could finance Third Party Financing schemes are too conservative, do not understand the EE business and do not perceive it as a sufficiently promising market niche. Thus they are either not willing to enter the EE market at all or rarely (for instance in the Netherlands, Poland) or only with very strict and extreme lending conditions (Slovakia). A few of the most paramount issues to increase openness for financing EE, include first and foremost, common ESCO-projects related terminologies and understanding of the concepts, procedures for considering and evaluating project risks and profitability instead of the current custom of evaluating creditworthiness of clients only (and subsequently traditional asset-based lending with only rarely cash flow based lending), and understanding the role of and acceptance of forfeiting.

Regulatory barriers are the second most common and long standing hurdle mentioned by the informants to this research that can seriously hinder the development of a national ESCO industry. Besides some isolated issues specific to certain countries, impeding public procurement rules and accounting problems are the most widespread. Procurement rules in the public sector often make bidding simplistic also in order to make it transparent and do not allow for specific requirements to be set and to give advantage to energetically beneficial offers over the "cheap" ones. Often separate tendering procedures may be required for project design and implementation. It is necessary to change related procedures in order to carry out green procurement, also in the form of EPC. In countries where there are only one or a few ESCOs, it might be impossible to close a call for tender because the minimum three bids will not be handed in (this is often the case for instance in Slovenia). Accounting for the ESCO projects poses another difficulty and limits ESCO activity in many, though not all countries. Romanian ESCOs have to account for the invested equipment on their own balance sheet even if they use TPF from banks, which shows on their debt-to-equity ratio and after 1-2 on-going projects limits their possibility to get further financing (Pop pers. com.). This situation prevails in most CEE countries. At the same time, in case of public clients, accounting the investment as a capital lease on the clients' balance sheet is not a solution because the level of debt is strictly regulated (usually around 20 % of the budget) in order to avoid public insolvency, and no differentiation is made between regular debt and ESCO investment (where the "debt" is paid back through the savings on energy and leads to further net savings).

There are however national ESCO markets where the level of development is low not primarily because of regulatory, financial or other barriers, but because there are other policy tools that provide means to a high-level achievement of energy efficiency, and compete with the ESCO as a means to it. Thus the ESCO markets of the Netherlands and Denmark have not

Table 2. Sectoral orientation of ESCOs and main clients in the countries of the enlarged European Union and other Western Europe and Candidate Countries as of 2007

	Main sector of ESCO activity	Technical focus
EU15		
Austria	Public buildings	Heating, cooling, lighting, water management
Belgium	Industry (outsourcing) and public sector, but break into residential sector	Relighting renovations, insulation, operation of energy services
Denmark	Brewery and lately buildings sectors	Industrial processes, eg. in brewery
Finland	Industry (paper, chemical industries and metallurgy)	Production processes and heat recovery
France	industrial outsourcing, offices, and residential sector (collective housing) traditionally, and hotels, hospitals, large buildings lately	Traditional implementation was integrated building heating service, which has been extended to CHP, production processes, etc., however main area is still operation services.
Germany	Public sector for real EPC, and tertiary and industrial sector if including Energy Supply Contracting	85% of projects is heating improvements
Greece	- (earlier trials: governmental buildings)	– (large RES potential)
Ireland	Industry	Production processes
Ital	Public sector is the main focus, with commercial and industrial coming up	Public lighting, combustion control, lighting control, co-generation and power factor mitigation
Luxemburg	n.d.	n.d.
Netherlands	Due to small size of ESCO activity, all sectors (residential, public and industrial) are only tapped	No special focus
Portugal	Traditionally industry, but lately large tertiary buildings, too	CHP, RES
Spain	Industrial, public and residential sectors are all attracted	Co-generation, solar-thermal applications
Sweden	Not clear because of embryonic stage, but in Southern Sweden: public sector, hospitals, households	Heat recovery systems, improvements of heating systems in general, improvements of ventilation and air conditioning systems
UK	Industry, private commercial, some public	Lighting, lighting control, HVAC plant replacement, decentralised boilers and controls, CHP
New Member States in 2004 (EU10)		
Czech R.	Healthcare sector, educational buildings, the military and other state owned sectors	Heat delivery regulation, piping, pipes insulation, boilers replacement, fuel switching, power factor management
Cyprus	Not relevant	Not relevant
Estonia	Residential is a new target, some municipal projects earlier	DH, complex building renovation, street lighting
Hungary	Public buildings (some residential activity is starting)	CHP, HVAC, automation
Latvia	Public sector	Public lighting and boiler upgrades
Lithuania	Residential and public buildings	Heat production, modernization of boilers in DH, utilization of biofuels
Malta	Not relevant	Not relevant
Poland	Public sector, inc. municipal buildings and universities, military bases, prisons	Heating systems (DH), public lighting, insulation. In a few cases, complex renovations
Slovakia	Municipal buildings, schools, banks, and hospitals, but orientation is changing towards industrial outsourcing and private tertiary investments	Building renovation, DH and public lighting
Slovenia	Municipal, expected client increase is in industry	School buildings, swimming pools, lighting
New Member States in 2007 (EU2)		
Romania	Municipal and industrial	District heating, lighting, industrial processes
Bulgaria	Public	n.d.
Western countries outside of EU		
Norway	Residential sector is largest in number of projects. Building sector is largest in turnover.	Heat recovery, HVAC systems, lighting, control-systems, heat-pumps and local heat production (HP, BIO-pellets, wood-pit)
Switzerland	Not relevant	Not relevant
Candidate Countries		
Croatia	educational buildings	public lighting, and lighting and system improvements, public lighting, co-generation, HVAC, steam-system recovery, insulation
Turkey	Not relevant	Not relevant

Notes: DH=district heating, HVAC=heating, ventilation and cooling system, CHP=combined heat and power, RES=renewable energy sources, n.d.=no data.

changed during the period our research has focused on (2004-2007), because energy efficiency has been promoted successfully through a range of instruments and measures. This indicates clearly that ESCOs are not the single possible solutions to carry out energy efficiency investments. Nevertheless, provided the right regulatory infrastructure is in place, there are certain energy solutions that could still attract new ESCO attention in these countries, too, such as social housing renovations (Krom pers. com.).

At the same time, there are examples of markets where potentially competing tools have been joined by the ESCO to help their activity (eg. ESCOs have been able to break into the residential market by connecting their service and the Panel Program). Typically in the CEE countries, the obstacle to ESCOs can be that the original ESCO concept needs to be adjusted and the energy service companies would need to tailor their offers more to the specific needs of the potential clients in these countries (Poland, Slovenia, Romania, Bulgaria and so on). In Poland for instance, experts have highlighted that engineering expertise and guarantee for savings (usual advantage of employing and ESCO) are not actually needed by potential clients due to the traditionally high expertise in engineering in industry and other organizations, even in the public sector, as a legacy of the socialist era. However financial solutions would be the primary objective for choosing a supplier similar to an ESCO (Aron pers. com., Johansen pers. com.). Traditional ESCOs come into the picture in countries where outsourcing is preferred (Belgium, France, nowadays Hungary), and when lack of expertise in energy in an organization makes it profitable to pay for the service (in Slovenia, where industries have been divided into smaller units during privatization and energy management stopped for the small units (Perpar pers. com.)).

VAT of energy services and equipment is another obstacle to the spread of EPC in many countries. It happens that energy bares a VAT rate half that of energy services and energy efficient equipment (for instance 10 % or lower vs. 20 % respectively). In such circumstances investing in energy savings means a loss of some benefits that could contribute to a lower payback time if it was at least balanced.

Financing EPC projects is not a major problem and this situation is highlighted by most of the experts for almost all countries. In most countries banks and the ESCOs themselves (and often clients) are open to funding energy saving projects. Many countries also enjoy funding from different International Financing Institutions (World Bank, UNDP, European Investment Bank, EBRD, and so on). Nevertheless, there are special cases (such as in Slovakia), where the budget would be possibly available from banks, but they are averse towards energy efficiency financing due to the high perceived risk and limited understanding of the projects (as has been discussed above in this paper). Experts have emphasized the need to improve access to financing for less attractive projects (small projects, investments with long pay-back periods, and so on) by introducing for instance pooling of projects, establishing powerful and unbiased international financing, such as guarantee schemes, training of the financial sector, and so on.

… and success factors

ESCO markets have been augmented by certain "enablers" in recent years and there are preliminary results of these factors. There are some countries that have started off or are launching the ESCO business more or less during our research period, 2004-2007 (Greece, Estonia, Slovenia, Romania), others have strengthened their markets (Austria has even become an EPC success story in the public sector; Spain). Some of the factors (demonstration projects, dissemination of information, supporting regulatory background, well-developed and informed financial sector, etc.) have already been discussed above. In this sector we point out a few innovative solutions that could be transferred to other countries to enhance the ESCO markets.

The pooling of small projects is well-known from previous literature. It was started in Germany and later applied in Austria, Slovenia and elsewhere too. The idea is that many renovation activities of public or residential buildings are too small to attract ESCO interest and the profit would be lost due to high transaction costs. By handling 10-20 similar buildings or sites together the net transaction cost is lower and the less profitable projects are balanced by the "better" ones.

The so-called "Intracting model" or Public Internal Performance Contracting (PICO), also originating from Germany, has been described above. This scheme overcomes barriers in the public sector of low profitability and procurement issues, therefore could be an essential tool in the CEE countries in particular.

White Certificates (or Energy Efficiency Certificates) have been advocated by some experts as a way to increase the attractiveness of energy efficiency investments by ESCOs due to the added value coming from the sale of certified savings (e.g. in Italy, where ESCOs can have their project certified) (di Lecce pers.com.). Similarly in France, where the White Certificates were introduced in 2006, a positive impact on the ESCO sector is expected by experts.

Tools assuring the clients about the quality and reliability of ESCO projects have been called for in the literature. Standard documents and procedures are rather common for some years now, which not only help the client but ease the start up of a project in general, especially in the public sector where energy service procurement expertise may be low. Certification of companies wishing to carry out EPC is rare as of 2006. Official lists of ESCOs are more commonly found (Estonia, Finland, UK, Italy), nevertheless these do not assure the quality of companies. Only in Austria a more advanced level of certification for ESCOs and ESCO services has been introduced (eva 2005). The Thermoprofit quality label initiated by the Graz Energy Agency linked to a series of standards to be met by enterprises and their projects. The clients are guaranteed reliable high quality proposals by ESCOs using the label. The label is issued by Graz Energy Agency and an independent commission, who assess the ESCO companies at regular intervals to confirm that they fit Thermoprofit standards (Graz Energy Agency 2003). The example has spread to other regions. The eco-label on the other hand denotes the compliance with standards of ESCO services (eva 2005).

Table 3. Basic indicators of the ESCO markets of non-EU South-East European countries as of 2007

non-EU SEE	First ESCO	Number of ESCOs/projects by 2006	Size of the EPC market/market potential	Main sector of ESCO activity, technical focus or activity to introduce the ESCO concept
Albania	Not r.	None	Not r.	ESCOs and TPF are specifically highlighted in the National Energy Strategy as useful tools to capturing energy efficiency potentials.
Bosnia-Herzegovina	n.d.	1 ESCO-like company and a few ESCO projects	n.d.	Small scale boiler biomass heating, mini heating systems, boiler exchanges, establishment of trigeneration plants.
Macedonia	2007	1 to be launched in March 2007	n.d.	To be in the attention: education buildings, hospitals, and public lighting
Serbia and Montenegro	Not r.	No ESCOs and no EPC	n.d., however energy intensity is 6 times higher than in EU15.	Focus on preparing business plans and disseminating the concept until now

Notes: Not r. = not relevant, n.d. = no data, TPF = Third Party Financing.

Table 4. Basic indicators of the ESCO markets of European CIS countries as of 2007

CIS	First ESCO	Number of ESCOs/projects by 2006	Size of the EPC market/ market potential	Main sector of ESCO activity, technical focus or activity to introduce the ESCO concept
Belarus	2005	1	Market size is 10M EUR by 2006, and further 50M EUR market annually	industrial systems, co-generation
Moldova	n.d.	few	n.d.	DH
Russia	1996, true kick-off expected within 1-2 years	small number of local ESCO-type companies, only few real ESCO projects	n.d.	HVAC, heating, automation, control systems, compressed air systems, DH (supply side)
Ukraine	1999	3 + some local, ESCO-type companies	n.d.	industrial sites, CHP, SMEs and municipal energy efficiency, municipal heating and lighting

Notes: Not r. = not relevant, n.d. = no data, DH = district heating, SME = small and medium sized enterprises.

New focus: non-EU SEE and CIS

NON-EU SOUTH-EAST EUROPE

The region[6] can be characterized as having rapidly growing economies as a result of reconstruction after the war period that has impacted some non-EU SEE countries seriously, directly or indirectly. This change is accompanied by quickly rising energy demands, combined with the originally low performance of energy intensity. The region is still a little turbid, as borders keep changing, though the separation of the Republic of Serbia 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 pronouncedly a priority in all non-EU SEE countries as a means to address environmental, economic and social problems, but ESCOs have not yet really set out in non-EU SEE. A few ESCO-type projects have been carried out, and International Financing Institutions (IFIs) are active in the area of rational energy systems. Table 3. shows basic information on the EPC markets of these countries. 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 (but not everywhere, for instance in Bosnia and Herzegovina, BiH). 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 (all countries), high interest rates and resistance and/or inability of the banking sector (BiH, Macedonia) and lack of demonstrable examples (especially Serbia, Macedonia, Albania). It has also been noted that data collection for baseline construction, monitoring systems and thus

6. We refer to the following countries: Serbia, Montenegro, Macedonia, Bosnia and Herzegovina and Albania.

statistics are lacking in some of the countries (for instance in BiH, (Chabchoub pers. com.)).[7]

COMMONWEALTH OF INDEPENDENT STATES - EUROPE

The European region of the CIS (Russia, Belarus, Ukraine and Moldova) is considered as a set of examples of a successful start of ESCO markets in transition economies in spite of the extreme obstacles. The countries of the CIS in Europe have also sustained a relatively long ESCO market-history, with the first Russian ESCOs dating back as far as 1996 (IFC 2004), although the ESCO markets have remained in embryonic state. These governments were left with highly inefficient economies, rising energy prices and declining economies after the disintegration of the Soviet Union. As a result their benefit from energy efficiency and potentially from ESCOs is much larger than that of the rest of the continent. Thus a boom in the ESCO industry may be expected after the basic environment becomes more supportive. To aid this process IFIs and international ESCOs have been particularly active, bringing energy efficiency projects and participating in ESCO establishment in the region. Table 4 gives an overview of basic information about the ESCOs in these countries. There have been a number of local ESCOs in Ukraine aided by USAID, which joined under the national Association of ESCOs, the AESCO (Evans 2000).

Conclusions, recommendations

In this paper, we have given an overview of the status and latest developments of the ESCO industries across European countries. It is evident that while significant changes have taken place in certain regions, other national markets are stable either on a high level, or in an embryonic state. Nevertheless, the untouched potential is still enormous and even in Germany, featuring the most developed ESCO market in Europe, only 9% of the energy efficiency potential has been realized until now (Sustainable Development Commission 2005).

Most important barriers to EPC are long standing and most have been highlighted in previous literature. As of 2006, however, the clearly most important issue in the EU considered by experts is the lack of understanding of the energy service and EPC concepts. At the same time, financial constrains that were long considered important are restricted to a need for improvement to better access to funds, but are still the most prevailing in non-EU countries, particularly in Non-EU SEE. Other obstacles include procurement and accounting rules, and a need for adjustment to the local needs on part of the ESCOs.

It is recommended that countries and the EU clarify and set out a regulatory framework which is explicitly supportive to the ESCO market, including rectifying energy prices, encouraging green procurement, enabling proper accounting for EPC. In addition demonstration projects, information centres and associations can largely increase the level of understanding among clients and financial organizations alike. It is vital that the public sector takes the lead and supports positive successful examples for further projects. This is also required by the Directive on Energy End-use Efficiency and Energy Services. Experts in almost all EU countries emphasized that the directive, together with the Energy Performance Directive may have a significant effect on kick-starting the development or deployment of ESCOs. Nevertheless, the success will largely depend on successful and stringent implementation at national level.

However, it must be highlighted that ESCOs are not the only way to accomplish energy saving objectives, as seen in the case of, for instance, the Netherlands and Denmark, and thus shall not be prioritized to other successful solutions. ESCO is not a "silver bullet", but one solution, which has proved to work with clients that might lack energy engineering skills, manpower or management time, capital funding, understanding of risk, and/or technology information.

7. 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 paper, the Republic of Serbia and the Republic of Montenegro are discussed together due to the lack of separate information from literature and experts.

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Personal communication

The authors would like to express special thanks to the following experts, whose specific information is used for the compilation of the tables and/or are referred to in the text:

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List of abbreviations

B	billion
CEE	Central-Eastern Europe
CEN	European Standardisation Body
CHP	combined heat and power
CIS	Commonwealth of Independent States
DH	district heating
EE	energy efficiency
EPC	Energy Performance Contracting
ESCO	Energy Service Company
ESPC	Energy Service Provider Company
EU	European Union
EU15	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, the UK
EU25	EU15 + EU10 (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithiuania, Malta, Poland, Slovenia, Slovakia (accessed the EU in 2004))
EU27	EU25 + Bulgaria and Romania (accessed the EU in 2007)
EUR	euro
HVAC	heating, ventilation and cooling system
M	million
RES	renewable energy sources
SEE	South-East Europe

Acknowledgements

The authors of the paper would like to thankfully acknowledge the contribution by altogether more than 90 national and international experts and ESCOs and all other respondents for their invaluable answers to our questionnaire and for the comments on the drafts of the Update Report.

Furthermore, the first author wishes to acknowledge the support and opportunity offered by the EU DG JRC for the internship that made this research possible.