A thesis submitted to the Department of Environmental Sciences and Policy of Central European University in part fulfillment of the Degree of Master of Science

Establishing ESCO in Macedonia:

Initial obstacles and development potential for Energy Service Companies

Vladimir ANASTASOV

July, 2007

Budapest

Notes on copyright and the ownership of intellectual property rights:

(1) Copyright in text of this thesis rests with the Author. Copies (by any process) either in full, or of extracts, may be made only in accordance with instructions given by the Author and lodged in the Central European University Library. Details may be obtained from the Librarian. This page must form part of any such copies made. Further copies (by any process) of copies made in accordance with such instructions may not be made without the permission (in writing) of the Author.

(2) The ownership of any intellectual property rights which may be described in this thesis is vested in the Central European University, subject to any prior agreement to the contrary, and may not be made available for use by third parties without the written permission of the University, which will prescribe the terms and conditions of any such agreement.

(3) For bibliographic and reference purposes this thesis should be referred to as:

Anastasov, V. 2007. *Establishing ESCO in Macedonia: Initial Obstacles and Development Potential for Energy Service Companies* Master of Science thesis, Department of Environmental Sciences and Policy, Central European University, Budapest.

Further information on the conditions under which disclosures and exploitation may take place is available from the Head of the Department of Environmental Sciences and Policy, Central European University.

Author's declaration

No portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

. . . . . .

Vladimir ANASTASOV

Table of Contents

List of Tables

List of Figures

List of Abbreviations

CiT	Country in Transition
DH	District Heating
EBRD	European Bank of Reconstruction and development
ECS	Energy Charter Secretariat
EE	Energy Efficiency
EPC	Energy Performance Contract
ESCO	Energy Service Company
ESPC	Energy Service Provider Company
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
HVAC	Heating, Ventilation, Air-Conditioning
M&V	Measurement and Verification
MEPSO	Macedonian Electric Power System Operator
MEPP	Ministry of Environment and Physical Planning
MoE	Ministry of Economy
O&M	Operation and Maintenance
PEEREA	Protocol on Energy Efficiency and Related Environmental Aspects
PPP	Purchasing Power Parity
RE	Renewable Energy
SEE	South East Europe
SMEs	Small and Medium Enterprises
TPF	Third Party Financing
TPP	Thermo Power Plant
USAID	United States Agency for International Development

Acknowledgements

I would like to express my gratitude to Mimi, Kate and Natasha for their support and help in writing this thesis. Special thanks to Kicho and Nena.

THE CENTRAL EUROPEAN UNIVERSITY

ABSTRACT OF THESIS submitted by:
Vladimir ANASTASOV
for the degree of Master of Science and entitled: Establishing ESCO in Macedonia: Initial Obstacles and Development Potential for Energy Service Companies
Month and Year of submission: July, 2007.

In 2005, the ESCO concept was introduced in the country, through the World Bank and the Global Environment Facility "Sustainable Energy Project" for Macedonia. After the analysis of energy efficiency demand and potential obstacles to the implementation of suitable improvements, this project suggested methods proven in other country projects, to be used: providing a grant for utility-based ESCO and organizing staff training. It aimed to demonstrate the profitability of energy efficiency and thus encourage the creation of other ESCOs that would enter the market. The overall situation suggested that the ESCO concept will be successful if financing problems due to the initial mistrust of commercial banks are overcome after the first projects sponsored by the WB/GEF grant. Macedonia had introduced new energy policies that emphasized the importance of efficient energy use, reflecting its international obligations under the Energy Charter Treaty, energy consumption was rising and had to be met with expensive imports, liberalization of the energy market was to be introduced, and the relatively high energy intensity reflected the need for new energy efficient equipment or different sorts of refurbishments in various energy consuming sectors. The grant was approved by the WB based on the project's suggestion. The actual startup of this utility-based ESCO came after the establishing of the privately owned Fonko ESCO, however, without any initial success for both ESCOs in signing energy performance contract with a client. This research examines some of the factors that have presented an obstacle to ESCO industry development. Looking over the activities of one utility-based ESCO and one private ESCO, the thesis research indicates that the main problem is not the financing but the institutional lack of commitment to the promotion of energy efficiency.

Keywords: ESCO, energy efficiency, energy performance contracting, market obstacles

Chapter I – Introduction, aim and objectives

1.1. Introduction

Mankind's achievements, ever so remarkable, have always been possible due to energy. These achievements are a display of societies' surplus and among other factors, depend heavily on the amount of energy available to societies (Issawi 1991). During the period from 1870 to 1970, the energy prices were declining steadily and so it was easier to produce energy at a declining price than to save the same energy at end-use point (Holdren 1987). Thus, the resulting energy intensity today, at the current energy prices and environmental issues, places a great strain on our societies': economic as well as environmental.

Energy efficiency encompasses all changes that result in decrease of energy use for producing a unit of economic activity or meeting energy requirements for a given level of comfort (Moisan *et al.* 1998). Today, from a societal point of view, it has become financially and environmentally more attractive than energy production and no energy policy can exclude energy efficiency measures. The significance of today's attitude towards energy comes from the fact that in most cases increasing energy efficiency is the fastest, cheapest, safest and cleanest energy source that can be found when lack of energy is seriously restraining economic development (Holdren 1987). According to an IEA analysis in 2004, energy efficiency is "the biggest fuel" (see Figure 1). Furthermore, major reduction in greenhouse gas production can be expected not from the increase in renewable energy supply, but the more efficient use of the current energy supply (Chandler and Patterson 2001).

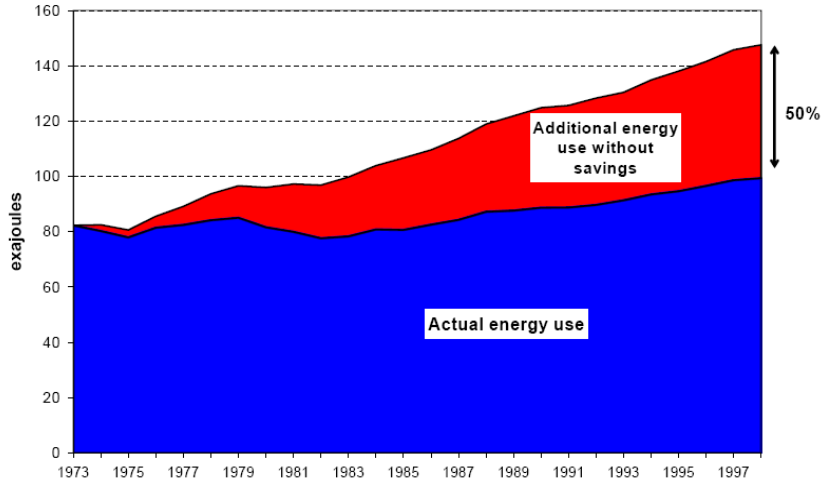

Figure 1: IEA-11[1] Energy Demand and Savings. Source: IEA 2004

However, energy efficiency measures are often not taken for various reasons: lack of know-how, limited capital, separation of benefit and investment, low cost-relevance of the consumed energy, legal and administrative obstacles etc. (Grubb 1990).

In overcoming some of these obstacles before the energy users, energy service companies (ESCOs) should play an important part. ESCOs are shortly defined as firms that provide integrated solutions for achieving energy cost reductions and whose payments are linked to the performance of the implemented solutions (Chabchoub 2004). Although the concept is more than 100 years old, it emerged in North America and moved to Western Europe after the energy crisis in the seventies (Bertoldi and Rezessy 2005, Chabchoub 2004). Creating energy efficiency (EE) markets and establishing ESCOs, and then supporting them in their pursuit of energy efficiency, in the above mentioned conditions is not a simple matter. It involves not only the ESCOs, but also stakeholders like financing institutions and clients, and they should be supported by incentives from the authorities - enabling the energy efficiency activities of the ESCOs.

[1] Australia, Denmark, Finland, France, Germany, Japan, Italy, Norway, Sweden, UK, US. Together these countries accounted for 83% of IEA total final energy consumption in 2000 (IEA 2004)

1.2. Aims and objectives

Macedonia's energy supply problems have recently, encouraged efforts to establish an ESCO market in the framework of a broader renewable energy and energy efficiency programme. Establishing an independent Energy Agency that will overlook the energy efficiency and renewable energy (EE/RE) projects, including ESCO development, is underway. Last year a grant was provided by the World Bank through the Global Environment Facility (GEF) of which US$0.8 million was earmarked for the development and start-up support of a utility based ESCO that will demonstrate the opportunities in the insufficiently developed market of energy efficiency. To date, there are two official ESCOs. Yet, they have not signed a single contract so far.

The primary aim of this research is to determine why, so far, the ESCOs are still not performing, even though one of them was planned and agreed almost two years ago by the World Bank and the Government of Macedonia as the owner of the utility company, i.e. the obstacles and conditions that have led to the later than planned start-up of ESCO industry in Macedonia and how serious those barriers are.

The second aim is to evaluate the ESCO potential in the light of the current situation. Both ESCOs have made either business plans, or some initial client contacts, that indicate the initial ESCO market and its size in Macedonia.

Research objectives are:

- investigate the planned and executed steps that have been taken so far either by the government, the international institutions or the parent companies in establishing and promoting ESCOs, with their results,

- investigate how successfully has the ESCO concept of work been adopted in both ESCOs,

- identify obstacles that have prevented timely execution of the planned activities or obstacles that are likely to do so in the future (if any), including the stake-holders' roles,

- recommend possible measures (by the ESCOs or the new Energy Agency) to speed up the process of establishing the ESCO concept in Macedonia.

1.3. Road map

Chapter II represents a literature overview of ESCO definition, project processes, potential clients of the ESCO industry, general barriers and enabling mechanisms for promoting the industry and development in the emerging ESCO markets of the Countries in Transition (EIT) and some regional countries. Chapter III presents the theoretical framework through which the development of the ESCO industry in Macedonia will be analyzed. Chapter IV describes the methodology used to gather and interpret the data selected for reaching the aims and objectives of this thesis research. Chapter V provides overview of the energy and EE capabilities, obligations, laws and institutions in Macedonia. Chapter VI deals with the research findings on the condition of the ESCO industry at the moment and the environment in which it operates. Chapter VII summarizes the current situation and provides recommendations for strengthening ESCOs' position and activities.

Chapter II - Literature Review

2.1. Definition of ESCO

Although there are specific definitions in every country, the general characteristics of Energy Service Companies (ESCOs) are providing energy services that include: services to final consumers involving energy audits; upgrade, addition or installation of energy efficient equipment (like new heating equipment in public buildings for example); building refurbishments; maintenance and operation; facility management and supply of energy,

including heat (Bertoldi and Rezessy 2005). The service can be provided to industrial, commercial, institutional, residential, public, municipal or other types of customers. ESCOs specialize in delivering energy efficient solutions for which the client does not have sufficient expertise to organize, implement and finance (Studebaker 2001).

Energy Service Provider Companies (ESPCs) also provide these services/advices for a fixed fee, selling their know-how and/or equipment, without taking any risk for underperformance of the energy efficiency measures (WEEA 1999). ESPCs responsibility to the client stops before the energy efficiency results are seen.

Bertoldi and Rezessy (2005) identify the difference between ESPCs and ESCOs in four main areas. Typically, ESCOs can finance these activities or assist in arranging financing with a savings guarantee (meaning lower energy costs while maintaining the level of energy service, of course). Furthermore, ESCOs have stronger incentives to provide energy efficient measures because their remuneration is directly tied to the energy savings that are achieved. The third distinction is the contract between the client and the ESCO – basically arranging the ESCO investment in the client's facilities in such a way that the energy efficiency performance has financial consequences for the ESCO. Finally, ESCO retains on-going operational role in measuring and verifying the savings over the financing term. Although ESCOs are not usually responsible for all the services (supply of energy for example or financing; see bellow: 2.2.4. Contracting models), they are still responsible for delivering the contracted energy savings to the client (Bertoldi 2003).

2.2. ESCO project process

The ESCO concept is new in Macedonia. However, the ESPC one is not and, as mentioned previously, there are differences with their *modus operandi.* The ESCOs' parent companies in Macedonia have substantial experience in energy consulting, system designs

with efficient energy equipment and energy supply. As of recently, their ESCOs started working and although they still have not signed an energy performance contract, they did gather some experience with the process of ESCO projects. The following literature review on the project process will summarize the specifics and experiences from different country cases that indicate, when compared, the level of development for the Macedonian ESCO industry. Comparisons and conclusions drawn from them will be presented in the chapter on research findings.

2.2.1. Energy audit and analysis

While energy consultancy delivers energy auditing as a final product, an ESCO considers it as a first step in the project implementation (Chabchoub 2004). After the first contact with the customer is established, on the initiative of the ESCO, the client or a public energy agency (Westling 2003), the next project involvement step would be the preliminary audit that will result in submitting a proposal to the client. If interested, the client will approve a detailed energy analysis and audit. Known as "investment grade audits", these analyses allow the ESCO to identify the energy savings that can be achieved and their investment value. The areas of analysis include: heating, ventilation and air-conditioning (HVAC), lighting, domestic hot water systems, controls, energy generation systems, etc (CEC 2000).

This is a very important step - first of all, because the ESCO's profit from the project will depend on how well the energy savings have been estimated. Second, the client gets a technical and financial idea about the possible project, which might or might not be attractive for implementation, depending on how economically attractive the suggested project is. Energy audits and analysis must determine the current energy consumption (base-line energy consumption) and where energy savings can be found. Records can reveal the energy consumption level that the client has, but in order to have a credible insight about the areas where energy can be saved, it is necessary to inspect the client's facilities.

As a mean for improving energy efficiency, many countries have energy audits subsidized under special programs ranging from 40 percent up to 100 percent, depending on the energy use of the business or community (Galitsky *et. al* 2004). However, this is not a particularly effective EE measure since the ESCOs are reluctant to accept energy audits that are not done by them prior to the project (Westling 2003). Investment grade audit, on which the whole project acceptance for the ESCO is actually founded, not only involves energy audit, but also predicts the future energy performance of the system or building by accounting for the risk assessment component. (Bertoldi and Rezessy 2005)

2.2.2. EE design and negotiations

Most of the ESCO activities revolve around a specific project for the client, identified as one that can bring the largest energy savings and therefore return the highest profit on the investment: replacement/refurbishment of heating systems, lighting system retrofit, upgrading the thermal envelope of a building, etc. (Chabchoub 2004). The detailed EE design and project specification supplied by the ESCO as a solution for energy savings - whether a new installation, refurbishment or a new, more energy efficient working process/procedure - must optimize the benefits from the financial and technical point of view. It should be noted though, that latest technologies are not the most attractive ones in energy performance contracting since EE measures can guarantee results only with proven solutions, if to avoid the risk of underperformance (Hansen 2003). Compliance of the solutions with technical and environmental regulations is also part of the ESCO supplied design. Negotiations on the technical issues between the client and the ESCO are necessary in order to assure satisfaction from the deal with both. EE measures are sometimes quite obvious, but even those often require a substantial amount of work. In this age of quick and easy fixes, ESCO contracting is neither quick nor easy: “The process is truly one where you get what you negotiated for.” (Studebaker 2001).

2.2.3. Financing models

As indicated above, ESCOs can assist in arranging the financing for the project measures necessary to improve the client's energy efficiency situation, thus offering a full service package. This is likely to contribute to the project implementation, which probably otherwise would not have been undertaken (Studebaker 2001). Integrated EE solutions are a great advantage offered by ESCOs. We can distinguish three types of energy efficiency project financing, outlined bellow.

First, financing can be generated from internal ESCO funds. Using ESCOs' equities to finance the project is undesirable from the company's point of view, since capital is tied down and makes the balance sheet of the ESCO "look like a bank and not a service company" (Bertoldi and Rezessy 2005).

The second possibility refers to financing by the client/energy-user's internal funds. The client can also be a direct borrower and backs up his loan request to his financing institution by the ESCO-given guarantee of energy savings (Bertoldi and Rezessy 2005). This is the preferred approach especially by small ESCOs that lack finances and loan capabilities.

The last option is the so-called "third party financing" (TPF). In this thesis, TPF will be used according to the North American definition: when an outside company invests in the client's energy savings, using them to pay for the investment (WEEA 1999). Either the ESCO or the client receives a loan from a financial institution, usually a bank. Based on the energy savings guarantee which is seen as a valid proof for low risk investment, lower interest rates are applied for the loan. When one of the EE project partners borrows to fund that project, his balance sheet gets affected and further borrowing becomes more difficult. However, if the installed equipment is the property of the financier and repaid through the energy bills (operational costs), the balance sheet of the customer and the ESCO is clear and their loan eligibility is intact (Bertoldi and Rezessy 2005).

2.2.4. Contracting models

Energy performance contracting can be regarded as an "established range of mechanisms for promoting the installation of energy-efficient building equipment and systems" (Westling 2003), and a direct link between the EE project and paying for performance. Several types of models for energy performance contracts can be identified (WEEA 1999), among which the most common are: shared savings, guaranteed savings and chauffage contracts.

Shared savings contract apportions the energy cost savings between the customer and the ESCO according to a prearranged formula (Chabchoub 2004), influenced by the duration of the contract, on the risks taken and cost of the project. ESCOs take both the performance and financial risk, since the customer takes over a portion of the performance risk and usually tries to avoid the additional credit risk (Bertoldi and Rezessy 2005). All the financing is therefore secured by the ESCO, usually from a financial institution, and appears on its balance sheet (Goldman *et al.* 2005).

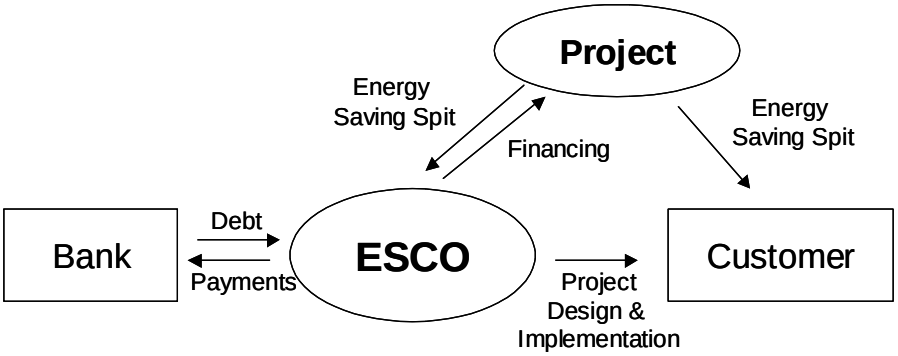

Figure 2: Shared savings. Source: Poole and Stoner 2003

The client has no direct obligation to repay the loan lender in that case and if it stops doing so towards the ESCO for whatever reason, the ESCO still has to continue paying back the debt to the lender. Typically, due to the increased risk taken, the ESCO will charge a higher price for the service provided and mainly seek EE projects with large clients that have a well-established credit history (Nexant 2002, Chabchoub 2004). Due to limited involvement

of the clients in the financing arrangements, they are much more inclined to this type of contract (Chabchoub 2004). In the US however, a shared savings contract is not the one ESCOs prefer, hence the lower number of shared savings contracts there (Goldman *et al.* 2005), in contrast to the EU where this type of contract is the most common (Bertoldi *et al.* 2006).

Aiming for lower project risks, ESCOs will try to sign a guaranteed savings contract which will guarantee only the performance of the energy efficiency measures i.e. energy saved. Thereby, the ESCOs are taking the complete risk of performance, shielding the client from it and are reluctant to participate in the financing of the project (Nexant 2002). This means that the client usually is directly financed by financial institutions that take over the financial risk (Bertoldi *et al.* 2006). Of course, this loan goes to the balance sheet of the client, affecting his ability for further loans. Nevertheless, the client is willing to assume the debt because of the guarantee provided by the ESCO (WEEA 1999).

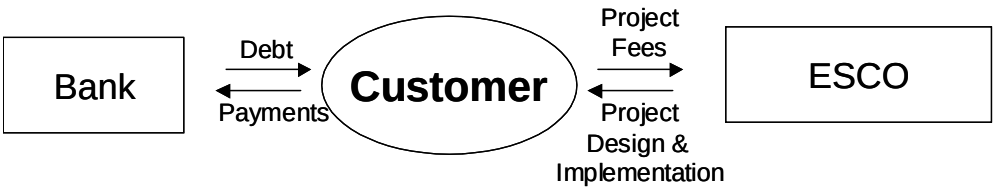

Figure 3: Guaranteed savings. Source: Poole and Stoner 2003

If the ESCO estimate of energy savings is lower than actual savings, the ESCO will have a higher remuneration; if the energy savings are lower than the predicted ones, the ESCO will pay back the difference to the client (Chabchoub 2004). This is the most popular type of contract in the US ESCO, industry while in the EU it is rarely used (Goldman *et al.* 2005, Bertoldi *et al.* 2006). It is considered that guaranteed savings contracts are not the most suitable to use when developing a new ESCO market because it requires a well-established

banking structure with sufficient experience in project financing and technical knowledge in order to understand the energy efficiency projects (Bertoldi *et al.* 2006).

Table 1: Comparison between Guaranteed and Shared Savings. Source: Poole and Stoner 2003

Option A: Guaranteed Savings	**Option B: Traditional Shared Savings Variant**
• ESCO carries only performance and design risk. • Client carries credit risk • Performance related to energy saved • Value of energy saved is guaranteed to meet debt service obligations down to a floor price. • Extensive M&V requirements and monitoring of base line	• ESCO carries both credit, design and performance risk. • Usually off client's balance sheet • Performance related to cost of energy saved • Value of payments to ESCO linked to energy price • Equipment may be leased

Chauffage contract implies energy service outsourcing. It assumes that the ESCO takes over complete responsibility for providing the client with an agreed set of end-energy uses like heating, lighting etc. on the basis of money-for-time-of-usage and usually, the contracts are long-term, lasting 20 to 30 years (WEEA 1999). The ESCO in this arrangement takes over full responsibility for energy purchasing while the customer also pays a 5-10 percent reduced energy bill directly to the ESCO (Bertoldi and Rezessy 2005). This contract gives a strong incentive to the ESCOs to provide services in an efficient way – the bigger the savings, the higher the profit for them (Chabchoub 2004). Chauffage contracts are common in Europe with its competitive energy supply markets (Chabchoub 2004, Bertoldi and Rezessy 2005).

2.2.5. Monitoring and verification

In order to achieve a satisfactory deal for both the client and the ESCO it is necessary to have a clear picture of the efficiency of the implemented EE solutions. Once the EE innovations are put in place, their metered effect is compared to the energy consumption baseline which was established during the energy audit. Monitoring and verification (M&V) are an extremely important part of the whole ESCO project process (WEEA 1999). In order

to secure finances for the EE project and at a lower cost, confidence is required that the EE measures will be sufficient to pay back the investment (IPMVPC 2001).

Therefore, introducing standardized protocols for M&V is very useful when developing and improving ESCO markets and as such, it is recommended by the Joint Research Centre of the European Commission (JRC). Since M&V does represent an additional cost burden on the client and more accurate M&V implies higher costs, it has been noted that in the US, and especially municipalities, universities, schools and hospitals, there is a trend of limiting the M&V process to a year or two. In that time it should be proven that the savings are in accordance with the predictions made by the ESCO (Hopper *et al.* 2005).

In the light of reducing greenhouse gas emissions as a global environmental goal and the emerging carbon markets, further diffusion of M&V techniques is expected (Vine 2005). The right for selling proven carbon credits can be agreed between the client and the ESCO, allowing for greater attractiveness of the EE project. Some experts (Cowan 2003) doubt though that carbon trading can have a significant impact on the EE project investment due to the low carbon price (which will eventually rise), clarity over carbon rights (unless the ESCO is utility based) and the fact that public projects in the spirit of environmental benefits are not likely to earn by selling their carbon rights.

2.3. Potential ESCO clients

Each of the Macedonian ESCOs has already targeted market segments, approaching some clients. As mentioned, so far, no contract has been signed. In this thesis, clients in Macedonia will be classified according to the existing general classification in the literature. The following part will review the client characteristics based on other country experiences with ESCO clients.

Typically, the potential ESCO clients have major energy consumption and related costs. Their interest in EE projects is due to the challenges they are facing: increased costs, aging infrastructure, reduced technical resources, competition for capital and all of that while under pressure to focus on core business or competencies (Fortescue 2003, Westling 2003).

Institutional clients such as governments and municipalities are usually considered the most attractive. Their property, such as administrative buildings and street lighting, being a major energy user, can provide great energy savings (Bertoldi 2003). While the ESCOs aim for the low financial risks targeting the institutional clients, the clients can benefit from the ESCOs expertise and especially from the possibility for private EE investments, thus removing the pressure from their budgets (Chabchoub 2004).

Industrial clients for ESCO projects are specific in the sense that although they have high energy consumption, the big players in this market probably have their own departments concerned with EE (Chabchoub 2004), leaving the small and medium industrial enterprises as more open to cooperation. However, along with the small and medium size companies, large industrial enterprises are also ESCO clients in many European countries (Bertoldi *et al.* 2006) and the projects usually involve Combined Heat and Power systems (CHPs), fuel conversion, variable speed motor controls etc.

The residential sector has a fairly large potential. For example, the average energy consumption in the EU residential sector is around 40 percent (COM 2006) and most of this energy (more than 50 percent) is used for heating. Projects that can be done in this market segment would be wall insulation, introducing highly efficient glazing, replacement or refurbishment of heating/hot water systems etc. Still, many ESCOs do not target this market sector due to complicated contracts with clients in the multi-residential market and small contracts on the individual residential market (Chabchoub 2004, Vine 2005).

As for the commercial ESCO markets, they are represented in big office buildings, hotels, shopping malls and other similar objects which have a high energy saving potential and whose owners lack technical skills to realize EE projects (Chabchoub 2004). According to Vine (2005), many ESCOs target 10 to 40 percent of their activities in this sector. The commercial sector is especially attractive for ESCOs in India, Japan and Mexico where they focused at least 50 percent of their activities (Vine 2005).

2.4. General barriers to a successful ESCO industry

ESCO activities deal with energy efficiency on the energy end-user, demand side. Depending on the energy user's market sector classification discussed above, as well as local conditions, we can expect different obstacles for the ESCOs to overcome. However, there are some general problems that can be identified and examined for the specific case of ESCO development in Macedonia.

2.4.1. Financial obstacles

The most significant barrier to a development of an ESCO industry is the lack of long-term reliable financing (Dreesen 2003). EE projects, done at the end-user side, are often perceived with hesitation by financial institutions as more risky than supply side projects like investments in power production or supply. Although EE projects have proven their high profitability potential, they are not yet treated equally with other investment projects (Painuly *et al.* 2003). Therefore, due to the uncertainties in energy cost saving and subsequently the ability of the ESCOs to pay back the loans, higher interest rates are applied (Bertoldi and Rezessy 2005, Mills 2003). Large numbers of EE projects are too small to attract the attention of financial institutions, like residential EE projects for example (Bertoldi and Rezessy 2005). Hence, the finances available for energy related projects usually go to the supply side and capacity expansion (Painuly *et al.* 2003). In-country financial institutions with experience in energy efficiency investments (through ESCOs) might be few in number or not very keen on

investing in something they are not acquainted with, lacking the awareness of the energy savings potential. In the words of Paolo Bertoldi: "The realities of EE project financing needs got in many cases lost somewhere between the enthusiasm for the dream of ESCO heaven and the fear of developing slightly new approaches." (Bertoldi 2003). A solution to the financing barriers is not easy to find, depending on the level of development of the local EE market. Often it is insufficient to motivate financing institutions to organize an EE lending infrastructure (Dreesen 2003). The steps taken in direction of stable financing sources for the Macedonian EE programs, including ESCOs, will be presented later in this thesis.

2.4.2. Governmental regulations and procedures

The Government of Macedonia can have a significant role in promoting ESCO activities. Lack of governmental support adds to this reluctance to invest, especially in the residential sector (Vine 2005). Governmental regulations such as high taxes on imported energy efficiency equipment, subsidized energy prices, as well as no obligatory or subsidized energy audits can result in raising the price of the EE project investment or make EE investments unattractive. Unclear policies on energy and finances, subjected to often changing (WEEA 1999), are also among the factors that have negative influence on EE investments. As indicated previously (*2.2.1. Energy audit and analysis*), even subsidized audits may turn out to be a barrier, since the estimated profit in the eyes of the ESCOs becomes smaller than the envisaged EE project risk (Westling 2003). The regulations might also limit the financial abilities of the municipalities and public universities, schools and hospitals. Procurement regulations for these clients might forbid contracting private companies such as ESCOs, might use different, for ESCOs unfavorable criteria to decide on the best offer or, might impose a maximum length of contract which can sometimes prove insufficient for EE measures to yield effect (Chabchoub 2004). Legal and regulatory frameworks could be a barrier to energy performance contracting through their incompatibility with energy efficiency investments.

2.4.3. Other obstacles

Even if financing is available and incentives for fostering EE are in place, there is no guarantee for the development of ESCO industry if general lack of awareness among clients and insufficient information on EE, its profitability and financing possibilities, exists (Westling 2003). The client's fear and disbelief that outside companies can deal with his energy problem in an adequate manner as well as personal and psychological barriers such as overlapping roles of the client company's energy manager and the ESCO, fear for the jobs of the employees and client's hesitation for acceptance of long-term contracting (Westling 2003) can prove to be a barrier for ESCO activities. The process of contracting might be time-consuming and with high transaction costs due to unclarities over the roles and responsibilities of the partners (Chabchoub 2004), making the energy savings less attractive for the client. Unfamiliarity with energy performance contracting in some areas (WEEA 1999) can lead to situations where the energy savings are not verified since the client has inconsistent energy consumption (Chabchoub 2004). For example, being on a capped budget that sufficed for unsatisfactory quality of service, the client starts spending more after the EE measures are undertaken since now the costs are lower. Ownership could prove to be a problem in residential markets. Tenants (paying energy bills) and apartment owners (paying the ESCO) are not equally interested in EE. Another obstacle for development of an ESCO market in a country could be the negative response by the utility companies because they fear decrease in incomes (Vine 2005). Also, in the case of countries such as Macedonia (developing or transitional), there could be a lack of either trained staff or good EE equipment and underdeveloped legal systems, unable to resolve disputes over contractual obligations that may arise thereby adding to the reluctance of cooperation on EE projects (Painuly *et al.* 2003).

2.5. ESCO enabling factors

Policy makers should have in mind that, although country-specific, there is a large margin for energy saving in all market sectors (Westling 2003). Since there is a general tendency for less energy dependent economies as well as the Kyoto protocol obligations for limiting greenhouse gas emissions, the EE promotion gains importance from a governmental point of view. As already stated, ESCOs are an important element in the pursuit of EE, yet the ESCO industry in many countries is in its infancy (Vine 2005). Promoting it means creating demand for energy performance contracting (EPC) and, by raising awareness, ensuring continuous demand. Several general mechanisms can bring the ESCO development closer to these aims and some of them have already been deployed in Macedonia as well.

2.5.1. ESCO Associations

Taking the overview of obstacles into account, one of the factors that could enhance the role of the ESCOs in a country would be more information. From that aspect, especially important is the forming of an ESCO Association that could assume the role of a center for dissemination of knowledge and best practices, organize cooperation with international ESCOs, provide information about available finances and inform interested parties about the ESCO concepts and possibilities. Although currently there is no ESCO Association in Macedonia, initially, some similar institution could be of great help. In order to promote the ESCO activities in the EU, the Joint Research Center of the European Commission has established a database of national ESCOs fulfilling the essential criteria for an ESCO (Bertoldi 2003). As shown in Table 2, several countries already have national ESCO Associations.

Table 2: ESCO Associations. Source: Vine 2005

Country	Name of ESCO Association	Since
Australia	Australian Energy Performance Contracting Association Limited (AEPCA)	1997
Brazil	Brazilian Association of ESCOs (ABESCO)	1997
Canada	Canadian Association of ESCOs (CAESCO) (defunct 2001)	1991
China	China Energy Management Company Association	2002
Cote d'Ivoire	Association of Enterprises of Energy Efficiency Services of Cote d'Ivoire	2001
Egypt	Egyptian Energy Service Business Association	1999
Italy	Association of Integrated Systems (AGESI) / Association of Italian ESCOs (AIESCO)	1999/2003
Japan	Japanese Association of ESCOs (JAESCO)	1999
S.Korea	Korean Association of ESCOs (KAESCO)	1999
S.Africa	Association of Energy Engineers, South African Chapter	2000
Switzerland	Swiss Contracting	1998
Ukraine	Ukrainian Association of ESCOs (AESCO)	1997
United Kingdom	Energy Systems Trade Association (ESTA)	1982
United States	National Association of Energy Service Companies (NAESCO)	1983

It is one of the few things that the ESCO industry can do for its own growth. Initially formed by a few members and growing over time, (Vine 2005) ESCO Associations benefit their members by being helpful in identifying the barriers for the ESCO industry and lobby or take actions for their removal. Working with policy-makers, it can be a very useful constituent in creating EE promotional actions as well as educating the financing institutions and clients on the importance and profitability of the EE projects.

An important aspect of these associations is their role in standardizing procedures and certifying ESCOs in the country. Certifying ESCOs can create an image of professionalism, thereby sending a signal to the interested clients (or financing institutions) that the EE project risks are minimal (Vine *at al.* 1998), even if certain EE projects will inevitably fail to deliver the energy savings that were planned. The association is ultimately a guarantee of the reliability and quality of service by its ESCO members. ESCOs that are not accredited, as they are not able to prove their capability in the industry, will not be considered by the client. The ESCO Associations can be responsible for the standardization of the EPCs. Standardized contracting might help prospective clients and financiers better understand the concept of EPC (Bertoldi 2003). Standard procedures for measurement and verifying can also be developed by these ESCO Associations with the aim of proving the efficiency of the EE project.

2.5.2. Governmental actions

The course of ESCO development in the US, Canada and S. Korea, indicates that successful promotion of ESCO activities in general should be accompanied by governmental support measures (Painuly *et al.* 2003). These might include transparent and sound energy pricing policies – encouraging people to think about energy efficiency by paying real costs. If for some reason the pricing is still not reflecting economic costs, transparency of tariff setting at least provides the EE project partners with a high degree of certainty over their future costs and obligations through the EPC lifetime (Chabchoub 2004).

The Macedonian Energy Agency is currently being formed and still has no General Manager, but it can be regarded as a significant governmental support of EE and ESCOs. One of the positive roles that governments through public Energy Agencies can share with the ESCO Associations is providing not only databases for energy efficiency financing and best-case projects, but also possible clients with large energy consumption and sufficient energy saving potential. Acting on their behalf, the government (through the Energy Agency) can undertake procurement of EE equipment installation and services, which is a positive experience for developing the ESCO industry from Germany and Austria (Bertoldi *et al.* 2006).

Also a positive experience from Germany and Austria and a crucial step in the ESCO industry development would be the opening of governmental facilities for ESCO projects (Bertoldi *et al.* 2006) – which will provide much needed initial market and necessary demonstration projects, building confidence in ESCOs (Westling 2003). Suggestions by Vine *et al.* (1998) were made, that initially a certain number of governmental buildings should be made available to ESCOs for performance contracting. The aim is to demonstrate the ESCOs' ability to successfully apply EE technologies as well as to demonstrate the effectiveness of EPC. In the process, areas of ESCO expertise should be developed. After this initial step, all

governmental buildings should be made available for ESCO projects. Joint-ventures with international, more experienced ESCOs in these demonstration projects can prove to be very helpful.

According to Bertoldi (2003), setting up efficiency standards and regulatory measures, like obligatory energy audits or exemption of ESCO projects from complicated procurement rules, could provide a better business environment for the ESCOs. Establishing an adequate legal system guaranteeing reliability of the contract systems is a precondition for developing countries. Governmental support can be valuable when developing the financing system for ESCO activities, sometimes with creating guarantee funds for the financial institutions that are starting with energy efficiency financing. Educating the financial sector, especially local commercial banks, is a way of enabling funds through energy efficiency financing window or creating other special financing procedures that have in mind the unique features of the specific energy efficiency project (Painuly *et al.* 2003, Evans 2000).

2.5.3. International funding mechanisms and programs

Having in mind that one of the biggest challenges that newly emerging ESCO industries and EE projects have to overcome is the financial one, it becomes clear that the financing opportunities for ESCOs have to be unlocked. Domestic financing institutions with lack of experience in EE project financing have to be convinced that it is a profitable business for them. Several international institutions have financing programs for EE projects that will demonstrate the profitability of EE.

Among these is the World Bank (WB), which lends to member country governments and has increased financing of EE projects through various programmes and co-financing with other agencies (Painuly *et al.* 2003). The WB Group has invested a total of $US 2.9 billion for over 140 EE projects in more than 50 countries, between 1990 and 2006 (WB 2006). The

approach that the WB has when financially supporting a national ESCO industry is the use of the EPC principle through utility-based ESCO providing seed activity (Benmessaoud 2003).

One of the financing mechanisms, where the WB is an implementing agency alongside with the United Nations Development Programme (UNDP) the United Nations Environment Programme (UNEP), is the Global Environment Facility (GEF). From its establishment in 1991 till 2005, GEF has invested US$ 553.44 millions in EE (GEF 2006a). As an important part in promoting EE, the GEF project portfolio includes country projects that finance ESCO creation (China, Brazil), promote them by providing financing (India, Hungary) or support the institutional and capacity building groundwork for establishing ESCOs once the EE market is mature (Lebanon, Thailand) (Martinot and McDoom 2000). The WB and GEF took the initiative for establishing utility based ESCO in Macedonia, and are its main financial supporters (GEF 2006b).

The European Bank for Reconstruction and Development (EBRD) targets EE projects in transition economies. Estimating their ESCO market at US$25 billion (WEEA 1999), through its Multi-Project Facility (MPF) programme, EBRD was almost in all cases the first to help establish private sector ESCOs, like in Lithuania, Poland, Slovakia, Hungary and Ukraine[2], in co-operation with Western companies (Chabchoub 2004, WEEA 1999). The EBRD normally does not finance projects that are below EUR 3 million. However, it can finance smaller ESCO projects through the EE Fund that it supports together with Dexia banking Group (Ligot 2003).

As a federal government institution, the United States Agency for International Development (USAID) is engaged in 20 energy alliances worldwide (SDP 2006). They have supported financially the development of ESCOs, municipal EE investments, EE loan

[2] State-owned ESCO with contracted operator for identifying projects and training staff that was to be privatized later on (Ligot 2003)

guarantees, energy audits as well as development of national energy efficiency strategies, action plans, laws and regulations etc (Weynand 2006). USAID has made noticeable impact on the development of ESCO market in Hungary, Bulgaria, Romania, etc. (Bertoldi *et al.* 2006). USAID had a large impact in the forming of the Ukrainian ESCO industry, helping it technically and financially (Evans 2003). In Macedonia, USAID has been very supportive of Fonko ESCO's efforts for penetrating the market (Zakov, pers.comm.). It has also financed the EE Strategy (GEF 2006b).

Other programmes that aim to promote ESCO activities include:

- EU PHARE, supporting capacity-building and creation of EE funds, some for example like in the Czech Republic and Slovenia, specifically aiming to introduce EPC and TPF concepts (Chabchoub 2004),

- International Finance Corporation (IFC - in the World Bank Group) has the Renewable Energy and Efficiency Fund, operating worldwide in developing countries and dedicated to investing in private sector EE (Painuly *et al.* 2003),

- The governments of Netherlands, Sweden, Denmark, Germany, Japan, and Canada, have special investment programmes on a bilateral level that support EE in developing countries (Painuly *et al.* 2003).

2.6. Regional and countries in transition (CiT) ESCO cases

According to the World Energy Assessment: Overview and Update 2004, the transitional economies are characterized with high energy intensity compared to the GDP level. This, WEA states, was a result of a tendency to subsidize energy prices and promote energy production rather than energy efficiency. Therefore, for a given level of energy service

requirements, primary energy reductions potential of more than 40 percent is estimated to be cost-effectively achieved within the next two decades (WEA 2004).

Whether in EU or near EU accession, signatories to agreements, protocols or charters, transitional economies have certain obligations that have to be met by them in addressing the high energy savings potential and this can make the difference for the success of their ESCO industries.

2.6.1. International commitments of the regional and countries in transition

In general, there are several directives and action plans in the EU for the EE measures to be taken by its member states. The contribution of the ESCOs and their role in the EE pursuit has been addressed in the Green Paper on Energy Efficiency (COM 2005). As for the new member countries, TPF is addressed in a number of EU documents which will guide the process of energy policy (Chabchoub 2004, Bertoldi and Rezessy 2005). The primary goal of the CiTs (especially SEE ones) being EU accession and their biggest efforts on this field mostly focused on harmonizing their legislative with the EU one, indicates the necessity of strengthening or establishing national ESCO industries. Macedonia has been granted the status of an EU country candidate. EU accession also poses a requirement for liberalization of their energy sectors in order to have a realistic energy price might bust their ESCO industry. Seeking to retain clients, the energy distribution companies will probably try offering additional services like EE, through partnerships with ESCOs (Chabchoub 2004).

The Energy Charter Treaty PEEREA (Protocol on Energy Efficiency and Related Environmental Aspects) pose obligations on signatories to introduce policies on EE, legal and regulatory frameworks promoting EE financing and encourage TPF (PEEREA 1994), that should promote ESCO activities.

Obligations undertaken with signing the Kyoto Protocol, do not deal explicitly with specific measures, such as promotion of ESCOs, but the GHG emissions reduction are to be best achieved in the energy sector. The national policies that aim for this should therefore favor the ESCOs' business environment. Macedonia has signed and ratified both the PEEREA and the Kyoto Protocol.

2.6.2. ESCO experiences in the SEE region and CiTs

In this section some of the regional and economies in transition countries' ESCO developing experiences will be briefly addressed based on similarities to the now emerging ESCO industry situation in Macedonia.

2.6.2.1. Croatia

According to the information provided by HEP-ESCO (HEP-ESCO 2007), The Energy Efficiency Project Croatia was initiated by the WB/GEF in collaboration with the Croatian electricity utility (HEP) and Croatian Reconstruction and Development Bank (HBOR). For the energy efficiency project that includes establishing ESCOs, WB/GEF donated EUR 11.5 million. The total value of the Project, with participation of domestic banks, is estimated at $US 40 million over a six-year period. Strong support in the legislation for energy efficiency projects was found through the Energy Act (2004) – defining energy efficiency as national interest, the Croatian Energy Development Strategy which is aimed at improving energy efficiency, Government-approved national energy efficiency programs, and by Environmental Protection and Energy Efficiency Fund (2003) - established to secure additional funding for projects. HEP ESCO was formed in September 2003 and currently manages more than 50 projects in the areas of public lighting, buildings, industry and energy supply systems. The projects are in various stages of development, execution or financing. As a case of successful ESCO establishing process (GEF 2006b), HEP-ESCO was invited to perform initial training for the Macedonian ESCO. Nevertheless, the municipal procurement regulations are a major

barrier to ESCO (Franjek 2006), no financing institution offers loans for ESCO projects (Bertoldi and Rezessy 2005) and except for this utility based ESCO, no other ESCO has yet appeared on the Croatian market.

2.6.2.2. Bulgaria

The Bulgarian ESCOs are facing problems of the limited financial capital of potential customers, and the unclear accounting treatment of energy efficiency contracts as well as TPF warranty requirements for timely payment of liabilities (Vine 2005). ESCOs are operating on a limited scale and primarily in the "safe" municipal sector, dealing with public lighting and schools (Bertoldi *et al.* 2006). Establishing the Bulgarian Energy Efficiency Fund is considered successful: it is managed by an international consultancy, Econoler International (Canada), in cooperation with the Center for Energy Efficiency EnEffect and Elana (both from Bulgaria), and provides not only lending, but also a guarantee mechanism (Doukov 2005).

2.6.2.3. Romania

In 1993 USAID started the process of forming ESCOs by selecting 20 small private companies for ESCO training (Bertoldi *et al.* 2006). The law requires energy efficiency programs for all companies above 1000 toe annual energy consumption and all municipalities with more than 20.000 inhabitants (Rotaru *et al*. 2003). To get around the suspicious Romanian banks, the Romanian government, the World Bank and GEF started in 2002, the Romanian Energy Efficiency Fund. At the same time EBRD/EU PHARE-funded credit line targeting the industrial sector failed due to a lack of interest and commitment to the project by the local bank partner that was without expertise and lacked strong incentives to develop a specialized business (GEF 2006b).

2.6.2.4. Hungary

The developments in the Hungarian ESCO industry can be described as the only CiT and regional success case (Bertoldi *et al.* 2006). With the first ESCOs emerging in the late '80s and early '90s, currently there are about 10 to 20 ESCOs predominantly targeting the municipal sector (80 percent) and the residential as well as the industrial sector with 10 percent each (Vine 2005, Ürge-Vorsatz *et al.* 2004). With the institutional reforms, the early privatization of the banking and the energy systems, and the international aid programmes for strengthening the EE sector in logical sequence (capacity building, subsidized loans, technical assistance and programme for project financing), the Hungarian ESCO industry developed as one of Europe's "premier league ESCO industries": better established in terms of longevity and more solidly based in terms of market maturity and competition than any other CiT (Bertoldi *et al.* 2006, Ürge-Vorsatz *et al.* 2004).

One of the innovative programmes for financing EE projects that supported the Hungarian ESCOs, developed by IFC and GEF, is the Hungarian Energy Efficiency Co-Finance Programme (HEECP) as a guarantee support scheme providing a 50 percent guarantee to banks that finance private ESCOs (Bertoldi *et al.* 2005). This provided a low-risk environment which allowed the financial institutions to learn about EPC and later on lend money independently on a commercial basis (Chabchoub 2004). Macedonia has planed establishing EE fund (Dimoska 2005b), but so far the lack finances prevented its creation (Dimitrov pers.comm.).

2.7. Literature review summary

The existing literature on ESCOs covers several examples on business modalities and actions for development and market consolidation. In it however, there is no mention of existing ESCOs in Macedonia, although they are an interesting case of private ESCO (Fonko ESCO) and a utility-based one (MT ESCO), starting in the same time and competing on the

infant EE market, thus providing a fairly realistic result on the obstacles that can be met in a transitional country. The literature review discovered no analysis of the overall situation for Macedonian ESCOs or factors that prevent them from performing according to their role for fostering EE. This thesis intends to indicate what are the measures and instruments that can be used in overcoming the identified barriers for the ESCO industry's development in Macedonia, having in mind the regional/country specifics. The fact that its emerging ESCO industry is among the first in the West Balkan region, should add to the existing experiences on ESCO development when such activities are planed for the regional countries in the future.

Chapter III – Theoretical framework

The general barriers to establishing a successful ESCO market in a country were previously presented (Chapter II, point 2.4.) and experts have suggested systematic actions in order to enable those markets. Despite existing differences between countries, the obstacles are similar in their nature and therefore in overcoming them, similar solutions have been reported. The theoretical framework for this thesis research is founded in these reported findings, serving as analytical basis for studying the ESCO development in Macedonia.

The expert findings (Painuly *et al.* 2003, Chabchoub 2004, Ürge-Vorsatz *et al.* 2004, Bertoldi and Rezessy 2005, Goldman *et al.* 2005, Lee *et al.* 2003, Vine 2005) indicate that the barriers for developing ESCO markets can be identified in the following areas:

First, lack of strong governmental support represented in regulations that stimulate procurement of EE equipment and financial incentives (taxes) for the clients to do so, adopting an EE action plan, providing the first market for ESCO projects in its facilities etc. Indirectly, economic instability and legal systems where contract law is not well established are among the obstacles for ESCO activities (Ürge-Vorsatz *et al.* 2004, Goldman *et al.* 2005).

Second, one country's ESCO market development can be hampered by lack of necessary funding for projects and staff training. Clearly demonstrated in the case of the Hungarian ESCO market development, international aid can be very helpful if properly arranged. However, international aid programmes are not indefinite and project financing and ESCO training has to be developed in-country (for example, EE revolving funds), if the long-term goal of strong and growing ESCO market is to be achieved, promoting EE in every market segment. Third is the low awareness and unavailable information on the ESCO concept, making it less trustworthy and credible to the clients, effectively limiting the ESCO market. Thus, ESCOs are not accepted as well-known and appreciated EE partners. Demonstration projects are very important from this aspect. Public Energy Agencies and ESCO Associations should augment the credibility of the ESCO business with standardized contracts, measurement and verification protocols and database of projects and certified ESCOs.

The WB/GEF initiated establishing ESCO in Poland and Croatia, as well as in Macedonia. Based on these and similar experiences and country cases, the WB/GEF expect certain developments in the Macedonian ESCO industry's early stages (GEF 2006b). First, the time-consuming trial and error method for adoption of a business model may be necessary. EPC and guaranteed savings with TPF, as a rigid business model, might not function initially. Second, as a utility-based ESCO with strong parent companies, like MT ESCO, might tend toward a monopoly situation, limiting the access of its present and future competition, to necessary financing. Third, equity capital and parallel financing programs are proven as useful in ESCO development. Fourth, being in a country without any experience of this kind, guidance from ESCO-oriented consultancy will be needed by Macedonian ESCOs.

These expectations and scenarios provide the theoretical framework for seeking the barriers and possible actions for establishing and supporting Macedonian ESCOs. The methodology that has been used for this thesis research is described in the following chapter.

It was constructed having in mind the research directions and areas derived from the theoretical framework.

Chapter IV - Methodology

The aim of the research is to determine the obstacles for the ESCO business in Macedonia as well as the factors that could improve the situation for them, making this a developmental type of study.

The first two ESCOs established in Macedonia, and so far the only ones, MT ESCO and Fonko ESCO are valuable instruments for measuring and identifying the obstacles, mechanisms and possibilities that arise when developing an ESCO framework and market. Therefore, most of the research attention was focused on the experiences with these companies.

4.1. Interviews

Concerning MT ESCO, which is a joint-venture between a private district heating company and the state-owned utility company MEPSO, qualitative methods such as interviews and archival research were used in this thesis research. The interviewees were selected according to their relevance and credibility, with specialized field of work and direct involvement or, as a second best choice due to the inaccessibility of the desired interviewee.

It was the aim to conduct interviews with the MT ESCO General Manager and with the General Manager of Toplifikacija (the private partner in the joint-venture), but since both of them indicated Mr. Stefanovski Zdravko as someone who is involved in the project from the very start two years ago, representing the interests of Toplifikacija in MT ESCO and more familiar with the subject, several interviews were instead conducted with him (that were also used as the basis for an interview with Mr. Gecevski Lazar, who represents the interests and

capital of MEPSO in MT ESCO) with open ended questions along the following lines on these subjects:

- What is the position and structure of MT ESCO DOO? (in order to find out the following: how does ESCO see it's role and magnitude in EE programs and projects, shareholders and the links with them, dependence on the shareholders, (non)existing links with other stakeholders - banks, funds, government and governmental agencies, municipalities, industries, individuals - and their nature if existing, staff positioning)
- What is the present capability to carry out projects? (expecting answers about know-how support from other ESCOs when working on a project, cooperation with the joint-venture partners, staff and their expertise, initial trainings for the staff, ,what type of contracts are/will be used with customers, what sort of financing is/will be aimed for or is likely to be predominantly used, how are the clients contacted and are there any interested clients, what is their reaction to feasibility studies and to the financial terms, what is the overall evaluated market potential by MT ESCO DOO at this moment)
- What are the problems and opportunities? (in order to identify obstacles that have so far prolonged/prevented the start-up of MT ESCO DOO from the aspect of the company itself, what is needed in their view to establish a stabile business for them and move forward in developing the Macedonian ESCO market, how are other ESCOs in Macedonia to affect their work, when are they expected and under what conditions, will other types of financing be available after GEF withdraws from Macedonian ESCO development process)

Mr. Sodic Slobodan, Assistant General Manager in MEPSO, was interviewed on the subject of MEPSO support for MT ESCO and other relevant information, such as the current electricity demand and supply, as well as future changes that are likely to occur:

- How was MT ESCO formed? (to clarify what investments were made, interests for doing so, interactions with the ESCO and the joint-venture partner as well as WB/GEF and HEP ESCO)
- What is expected in future of the MT ESCO? (to clarify further plans for supporting ESCO and what do they depend on, general prognosis for the success of the ESCO market)
- Why is MT ESCO starting later than planned? (answering whether the reasons were or still are serious issues and are they obstacle only for MT ESCO or in general for ESCO in Macedonia)

The interviews with Mr. Sodic and Mr. Gecevski were not recorded on their demand and field notes were used.

Fonko ESCO was contacted as a non-utility private ESCO to investigate the present position of other potential private SMEs in the ESCO market and their potential for strengthening the competitiveness. The open-end questions aimed at finding answers to whether we are talking about an ESCO, targeted market, planed financing of the projects, are there energy efficiency clients up to date or if not - estimates for start-up, competitiveness and prospects in the given framework. The interview was conducted with the Assistant Manager, Mrs. Zakov Andrijana.

Three more interviews were done in order to clarify the EE situation and attractiveness to potential clients. Prof. Dimitrov Kostadin (Professor at the Mechanical Faculty in Skopje and representative of the Macedonian Center for Energy Efficiency – MACEF), was asked open ended questions about the significance of ESCOs for Macedonia's EE efforts and their prospects. Prof. Serafimov Marko (Professor at the Mechanical Faculty in Skopje, involved in the standardization regulations in Macedonia) answered questions on Macedonia's EE efforts and which laws and standards define them, promoting ESCO activities. Mr. Iliev Valentin

(Owner of an industrial service company) answered open ended question about the Macedonian industrial sector interest for cooperation with ESCOs.

Other interviewees, who provided information on the general conditions in the legal system, required and were granted anonymity.

4.2. Document review

Review of regulations and policies by the government to support the introduction of ESCOs was done in order to describe the conditions in which the ESCOs are operating, highlighting the energy efficiency regulations and measures in official documents such as the National Strategy for Energy Efficiency till 2020, the Energy Law and municipal procurement regulations in Macedonia.

Some of the agreements/contracts were made available for the research - like the MEPSO-Toplifikacija contract for founding of MT ESCO, the MT ESCO Business Plan (with limitations on the use of its contents) or documents like the WB/GEF Project Document for Sustainable Energy Project in Macedonia. The other documents such as feasibility studies from MT ESCO were allowed for review, helping to describe the possible ESCO early-stage market success, but under very restrictive conditions due to their treatment of company secret.

The market penetration prospects, depending on the clients' interests and possibilities as well as the available financing for ESCO projects, were evaluated based on the interviews, MT ESCO's business plan and feasibility studies, and some of the recently conducted research specifically for Macedonia such as the WB/GEF Sustainable Energy Project.

4.3. Validity and limitations

There were no interviews conducted with governmental officials and policy-makers on the ESCO and EE promotional actions that are taken or planned. The Department of Energy

under the Ministry of Economy has a limited number of personnel that is difficult to get in contact with and did not want to participate in any form of interview on the topic. The Energy Agency was in the process of forming and therefore no credible interview was possible.

Prospective clients were not contacted directly, since none of the ESCOs was willing to provide contact information with them for the purposes of this research and insisted that the information, such as feasibility studies and negotiation informations, provided for the research, were sufficient.

The banking sector had not returned any relevant answer to the request for information concerning ESCO project financing and the research had to be conducted using other sources for describing the financing situation.

Some of the interviewees were available only for a limited time and it was not possible to create a comfortable atmosphere of trust, thereby leading to very broad answers about the mentioned problems.

It must be noted that the ESCO development situation in Macedonia is very dynamic at this moment and probably gaining pace. This research was done prior to finalization of some of the action and business plans, laws, regulations and negotiations that can make a very different future for the Macedonian ESCO industry.

4.4. Ethics

In conducting the research, effort was made for avoiding personal and professional biases. The work and opinions of interviewees were not commented with other interviewees. Respecting every interviewee's integrity, no business or other sensitive information was "traded" for obtaining other information. The aim of the thesis research was explained and

transparent to interviewees. Recording techniques were used only when explicitly allowed and no quotation is done without the interviewee's consent.

Chapter V – Energy and energy efficiency in Macedonia

5.1. Country introduction

- Republic of Macedonia is a small country in South East Europe with 25.713 km^2 and 2,026 million citizens (MEPP 2003) and it is landlocked, between Albania, Serbia, Bulgaria and Greece.

- Macedonia is a parliamentary democracy since the beginning of the 1990s and proclaimed it's independence in 1991, separating from the former Yugoslav Federation. Currently it has the status of country candidate for EU accession.

- The political and economic changes that started in the late '80s and early '90s, have caused significant shock to the national economy, and along with losing markets in former Yugoslavia and Eastern Europe, resulted in high inflation and unemployment rate, as well as fall in GDP and investments (MEPP 2003). The economy is moreover characterized with a consistent trade deficit of approximately 15 percent of the national GDP, somewhat compensated by transfers that include remittances from Macedonians working abroad (ECS 2006). Although Standard & Poor in 2005 raised the credit rating for Macedonia as a result of the increasing macroeconomic and political stability as well as the approaching EU accession, the expected foreign direct investments have yet to be realized (ECS 2006).

5.2. Energy production capacity and supply

Macedonia has limited conventional energy resources, the main being lignite coal and some hydro power, and to a lesser degree – biomass in the form of fuel wood. Together with the imported liquid fuels and natural gas, they form the basis of the Macedonian primary

energy supply (GEF 2006). The total consumption of energy is provided by 60 percent domestic production and 40 percent from import (PEEREA 2006).

Lignite coal, as a main domestic energy resource, provided 80 percent of the domestic electricity production before the winter 2006/2007 (Dimoska 2005b). The low-grade lignite has 6600 to 8000 kJ/kg heating value and is used in the largest thermo power plant, REK Bitola, with total power generation capacity of 660 MW and another thermo power plant, Oslomej, with 125 MW (ECS 2006). The known lignite reserves are estimated to last until 2015 – 2017 (MEPP 2003, GEF 2006) creating a situation of urgency. Despite the high oil prices that kept it on cold stand-by for nearly ten years (GEF 2006), the residual oil fueled Negotino power plant was activated late last year, since the price of electricity production there was lower than the offered price for importing electricity (Sodic, pers. comm.). The power of this TPP is 210 MW (ECS 2006).

Depending on the season, the hydro power accounts for 15 to 18 percent (MEPP 2003) of the annual electricity production, coming from six large hydro power plants and some small ones, with total net capacity of 540 MW (ECS 2006). In 2003, MEPP estimated that until 2020 several other hydro power plants will be built with total of 673 MW. As for the renewable energy resources, GEF (2006) describes them as "promising" without any further, more elaborate estimation. These sources include: small hydropower, geothermal, biomass and in the longer term wind energy.

Total installed capacity for electricity production is 1524 MW with annual production of around 6500 GWh (PEEREA 2006). In 2004, the total primary energy supply in Macedonia equaled 2696 ktoe, while the total final energy consumption was 1635 ktoe (IEA 2007).

5.3. Energy use in Macedonia

With limited investments in energy production, the energy import dependency of Macedonia is expected to rise mid-term (Dimoska 2005b). About 20 to 30 percent of the electricity supply is consistently imported (ECS 2006, GEF 2006). For example, in 2005, 1662 GWh of electricity (20,45 percent of total needs) were imported to fill in the gap between the demand and the supply from domestic production and the electricity import reached 2994 GWh (33,53 percent of the total needs) in the following year (PEEREA 2006). According to the Assistant General Manager of the state-owned MEPSO, the imported electricity was purchased for 70 EUR per MWh while sold to the electricity users for 29,6 EUR per MWh. For 2007, 86 million EUR will be spent on electricity imports, of which the main portion will be used for heating in the winter season. Although there is no detailed analysis of electricity consumption in MEPSO, the usual portion of electricity for that purpose in winter is 60 percent on average (Sodic pers. comm.). However, things on the Macedonian electricity market are changing. Until recently, once the price was fixed by the ERC, MEPSO had to fill in any shortages that might appear at often unfavorable costs. As of May 2007, the Macedonian Electric Power System Operator (MEPSO) is no longer obligated to provide electricity for the users in Macedonia, enforcing the obligation upon the industry itself to find and purchase on the market all the electricity that it might need for its activities, as long as it is available and acceptable for purchase.

As of January 2008, all of the necessary electricity will have to be purchased by the industry from abroad, since the electricity production in Macedonia will be directed first to other sectors such as the residential one and then, if available, offered to the industry. The plan was to implement the electricity market liberalization for the other sectors as well, when "conditions are suitable" (Sodic pers. comm.). Nonetheless, such electricity liberalization is

likely to start a trend of undertaking EE measures in all market sectors and is one of the preconditions for development of ESCO markets identified by Vine (2005).

Observing the TFEC in Macedonia, (Figure 4) it becomes obvious that the largest share, around 45 percent, is used in the building stock, residential as well as institutional and commercial. The Strategy for EE estimated higher consumption: 60 percent of the electricity supply for these combined sectors in 2003 (USAID 2003). Most part of the existing building stock in Macedonia is with small EE (Serafimov pers. comm.).

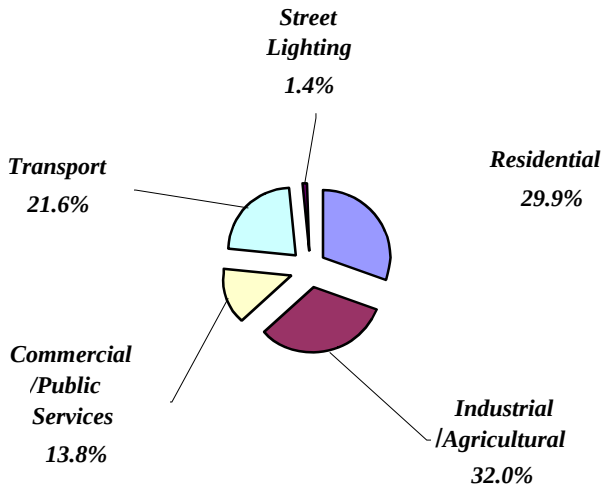

Figure 4: 2004 Total Final Energy Consumption in Macedonia[3] by sector. Source: IEA 2007, PEEREA 2006

Prof. Serafimov describes the Macedonian economy structure as "unfavorable" from the aspect of energy use, due to the existing heavy industry. The iron, nickel, copper, zinc, lead and other metal processing industries have a large portion of the energy price for their production incorporated in the final product price, varying between 40 and 60 percent of the products' market price, depending on the companies (Iliev, Sodic, Serafimov pers. comm.). The interviewees explain the situation that has occurred partially as a result of the decision to

[3] Depending on the source, there are considerable differences in the Macedonian TFEC by sector. The presented data is according to my personal experience gathered as the most credible one.

build significant heavy industries in Macedonia and partially because of the energy inefficient equipment that is being used. Hence the resulting energy intensity is as follows:

Table 3: Energy intensity in Macedonia. Source: IEA 2003

Country	Energy intensity in toe/000's US$ GDP	Energy intensity in toe/000's US$ PPP
Non-EU neighbors		
Albania	**0,52**	**0,16**
Bosnia and Herzegovina	**0,68**	**0,16**
Bulgaria	**1,49**	**0,38**
Croatia	**0,34**	**0,22**
Romania	**1,18**	**0,31**
Serbia and Montenegro	**0,50**	**0,26**
Turkey	**0,38**	**0,19**
MACEDONIA	***0,53***	***0,23***
EU countries		
Austria	**0,11**	**0,15**
France	**0,15**	**0,19**
Germany	**0,13**	**0,18**
Greece	**0,20**	**0,17**
Italy	**0,14**	**0,13**

As can be seen from the table above, Macedonia's energy intensity is in the usual limits when compared to its regional neighbors. However, the comparison with the selected EU countries indicates that all of the regional non-EU countries, including Macedonia, have a considerable energy savings potential (GEF 2006).

The energy saving potential that has been identified by market sectors in the National Strategy for EE is presented in the table below. Table 4 includes estimates on average energy savings per participant in separate sectors and different penetration rates for the EE measures and projects, resulting in tree scenarios with estimated total savings per sector per scenario. The estimates are based on the programmes that are suggested in the Strategy and depending on energy prices (higher the price, higher the penetration rate), EE marketing, EE expert training and other policies for enhancing EE (USAID 2003). These estimated energy savings can be considered as potential ESCO market.

Table 4: Estimated energy savings. Source: USAID 2003 [4]

Sector	Average	High penetration	Medium penetration	Low penetration
Residential				
Penetration rate %		25	20	15
Possible savings %	15	3,75	3,0	2,25
Commercial				
Penetration rate %		40	30	20
Possible savings %	10	4,0	3,0	2,0
Institutional				
Penetration rate %		50	40	30
Possible savings %	20	10,0	8,0	6,0
Street lighting				
Penetration rate %		40	30	20
Possible savings %	25	10,0	7,5	5,0
Industrial				
Penetration rate %		40	30	20
Possible savings %	10	4,0	3,0	2,0

5.4. Energy efficiency as a political issue

Since the '90s, the international community has defined EE as necessary in promoting environmental protection and economic growth (USAID 2003). Republic of Macedonia is a signatory of the Kyoto Protocol but since not listed as an Annex I country, has no obligations to decrease the emissions of CO_2 (USAID 2003). Nevertheless, having in mind that 70 percent of the GHG emissions (MEPP 2003) are attributed to the Macedonian energy sector and that EU is strongly supporting the Kyoto Protocol, EE can be considered as an important political issue. In fact, emission reductions are planned in the Strategy for EE (USAID 2003).

As are the European Communities, Macedonia is a signatory of the Energy Charter as well, and a contracting party to the Energy Charter Treaty and the Energy Charter PEEREA. According to the Articles: 3.2, 8.1 and 8.3, Macedonia is obliged to: introduce policies and

[4] Multiplying the average possible savings % (for example, 15%) with the penetration rate of the scenario (for example, 20%) will indicate the expected total energy savings in the indicated sector.

standards on EE, legal framework necessary for EE promotion, develop innovative approaches for financing EE measures, create database for EE and establish institutional infrastructure that will support the EE programs (PEEREA 1994). Macedonia has accepted as legally binding obligations to improve EE and the conditions for the transfer of EE technologies, practices and processes (Dimoska 2005a).

Since the signing of the Stabilization and Association Agreement with the EU in 2001, Macedonia took the obligation to enhance the EE (USAID 2003). In this very moment Macedonia has the status of country – candidate for membership in the EU which was granted in November 2005, without an ascertained date for beginning the membership negotiations. Currently the country has been working on adjustment and acceptance of the EU Legislative in each important sector, including energy (Dimitrov pers. comm.). Out of 25 EU Directives on energy, 14 are related to EE (Dimoska 2005a).

Furthermore, in 2007, Macedonia was the host-country of one of the regional state summits that had energy issues high on their agendas due to the rising energy needs and limited regional finances for meeting them.

Resulting from those and other obligations, the 2006-2008 Strategic Plan of the Ministry of Economy, which is in charge of the energy issues in the country, has adopted as one of its priority goals the "increasing of efficiency in production, supply and usage of energy" and formation of Department for Energy Efficiency (MoE 2006). The Plan holds no explicit support for the ESCO industry. However, EE is considered as one of the means for lowering the expected energy import dependency (Dimoska 2005b), and reducing the energy intensity is in fact listed in the PEEREA 2006 Regular Review as Macedonia's second policy objective priority. Next, the legal acts addressing EE will be presented.

5.5. Legal framework for support of EE and ESCOs

The Energy Law, adopted at the end of May 2006, has a special chapter on energy efficiency and renewable energies. The Law was approved by the European Commission and regarded to be in accordance with EU requirements. Considered as the main carrier of the energy policy, the Law defines local energy planning as an obligation. Municipalities have to prepare a 5-year Programme on EE, with allocated finances for it and yearly action plans. These have to be in accordance with the National Strategy for Enhancing EE and approved by the MoE. Among other things, the Law covers the following important aspects: defining the 10-year strategy for EE and appliance of renewable energy sources, and establishing Energy Agency (*Energy Law* 2006). While this Agency is established, but still not functional (Dimitrov pers. comm.), the Strategy for EE in Macedonia till 2020 was completed in 2003, based on a Program on Efficient Energy Use By 2020 adopted by the Government in 1999, and financed by USAID.

The Strategy for EE in Macedonia, adopted by the Parliament in 2004, defines legal and other measures for increasing EE and includes initiatives, possibilities and technical activities (USAID 2003). It foresees the following activities: founding Agency for EE (the Energy Agency will take its responsibilities), certification of the energy auditors, energy laws on buildings, completing regulations, standards and other acts, equipment standards, establishing EE Fund and developing ESCOs. Currently, a new, more adequate 10-year Strategy for enhancing EE that was required by the Energy Law is being prepared by an expert working group, involving an action plan on EE (Dimitrov pers. comm.). The plan was to be presented to the WB in late May 2007.

Other Laws involve EE as well. The Environmental Law was adopted in July 2005 and it clearly emphasizes the need for decreasing gas emissions, which create the green house effect (*Environment Law* 2005). Therefore, a rational use of energy sources is fully required, as well

as following the standards for environmental protection. Similarly, the Construction Law enacted in late 2005 holds requirements for efficient use of energy, by designing the HVAC systems in accordance with the local climatic conditions and using thermo insulation in the new buildings (*Construction Law* 2005). Currently, the Macedonian Institute for Standardization is working on the methodology that will define measurable parameters, stimulating EE of the buildings on the behalf of the existing Macedonian standards and legislative. The goal is to help the process of energy categorization of buildings, which the member countries of the EU started applying from 2006, with the Energy Performance of Buildings Directive – EPBD (Directive 2002/91/EC). The Directive foresees preparation of a methodology for energy classification of buildings and measures for improvement of their EE with economy viability.

Yet at present, a great number of tasks are being insufficiently defined. For example, there is lack of complete strategy in the sector for buildings, particularly their energy requirements and the importance for energy saving in the buildings' sector is not emphasized as a priority in the current strategy for EE. According to Prof. Serafimov, the current situation shows that the Laws addressing EE, if not outdated, lack the quantitative component. Many regulations and standards are yet to be prepared and enacted so that the EE is properly developed, one example of this being the allowed energy requirement per square meter. In some cases, the legislative changes due to the ongoing harmonization with the EU legislative were happening with such haste and intensity, without the appropriate public access to the new regulations, that apart from SMEs even state institutions have limited understanding of their obligations and therefore the changes are simply not being applied. The Institute for Standardization of Macedonia is facing difficulties concerning the harmonization of standards and accepting new ones, while the old ones are still being valued and national annexes of standards needed. Adding to this problem, the coordination and exchange of information among various institutions is not optimal (Serafimov pers. comm.).

The municipalities are dealing with the same problem. The Law on Local Self Government was adopted in 2002 and was to be successively enacted from July, 1st, 2005 until January, 2007. This Law provides conveying responsibilities from the Central Government to the Municipalities (*Local Self Government Law* 2002). Although obliged to do so, the Government has in most of the cases refused this on the basis of alleged low Municipalities' readiness for taking over the responsibilities (Dimitrov pers. comm.). This situation contains great difficulties for ESCO activities in the municipal sector.

5.6. Institutions partnering ESCOs in EE promotion

Apart from the Ministry of Economy under whose jurisdiction is the responsibility for the overall energy policy and hence EE, also involved in the EE issues is the Ministry of Environment and Physical Planning. It is worth mentioning that the Department of Energy responsible in the MoE for energy issues has small number of personnel (GEF 2006b). The main state bodies involved in EE are the Energy Regulatory Commission and the Energy Agency, overseen by the Department of Energy.

The 2003 Strategy for EE found as necessary the formation of Agency for Energy Efficiency which will coordinate the policy-making government bodies and the EE project participants, and take responsibility for managing the Strategy for EE. With the same intention but wider scope of responsibilities which included renewable energy promotion, the Energy Agency was established in 2005 by the Government (ECS 2006, GEF 2006). The Energy Law, in its article 126, defines the role of the Energy Agency as "supporting the MoE" in preparing a Realization Program of the Strategy for enhancing the EE. Furthermore, the Law obliges the Agency in "supporting the MoE" to prepare regulations on the new and on refurbishment of old buildings for achieving EE. The Energy Agency is to be responsible for the development and maintenance of an energy database for Macedonia (ECS 2006), which can be of great help in directing the efforts of the ESCO industry (Figure 5).

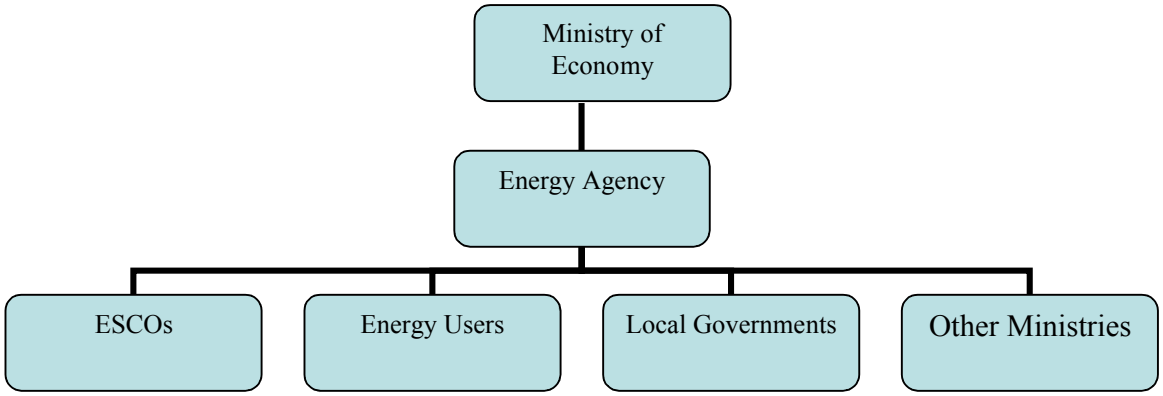

Figure 5: Energy Agency position. Source: USAID 2003

However, in May 2007, the Agency was still being equipped with personnel and not functional (Dimitrov pers. comm.). The operation of the Energy Agency will be managed by a Management Board of the Agency, comprising five members, and the work of the Agency will be managed by a director. The ESCO industry is not mentioned in the list of Energy Agency's detailed tasks (ECS 2006), but once on its feet, it will inevitably have to cooperate with the emerging ESCO industry in Macedonia if it is to promote methods for EE and secure successful implementation of the EE programs. The interests of the Macedonian ESCO industry and the Energy Agency are compatible and therefore, the ESCOs are expected to have a strong support from this Agency.

The Energy Regulatory Commission established in 2002, is an independent body from the Government and the interests of the industry (ECS 2006). According to the Energy Law, the ERC is comprised of five members, suggested by the Government and elected by the Parliament. ERC has the task of regulating the price of the energy like oil, gas and electricity, and energy services (district heating, for example). Among its energy regulatory responsibilities, the ERC is entitled to suggest and initiate changes in the existing or develop new Laws in the energy domain. Otherwise, it has no explicit role in supporting EE or ESCOs.

The NGO Macedonian Centre for Energy Efficiency (MACEF) is involved in capacity building for EE with municipal institutions and schools, offering energy audits and expert counseling on EE measures and action plans. Being actively involved on the field of EE, MACEF is also consulted in the process of designing energy policies on national level (Dimitrov pers. comm.). MACEF is one of the organizations that have supported Fonko ESCO, on an expertise level (Zakov pers.comm.).

Worth mentioning is also the Macedonian Energy Association (MEA) established in May 2005 and facilitated in the Macedonian Chamber of Commerce. MEA's members are companies that produce and maintain energy systems as well as the biggest energy consumers (PEEREA 2006). Although it is not very active, the latest development in the electricity sector might change this, enforcing the EE topic high on the agenda of MEA and probably making this association a valuable partner of the Macedonian ESCOs.

5.7. Summary of Macedonian EE factors and participants

According to Vine (2005), Macedonia fulfilled all the market preconditions that tend to create EE and ESCO services demand: it has validated its environmental concerns with international agreements and in-country laws, it is facing constrained energy supply, the economy is under the pressure of international competition, there are no subsidies on energy prices (PEEREA 2006) and the energy industry and supply are starting to be privatized (Sodic pers.comm.). Macedonia's transitional economy with limited energy production capacity make EE measures very attractive from an economic point of view. The high volatility of energy prices and the changes introduced in Macedonia are finally starting to create a demand for EE (Iliev pers. comm., Serafimov, pers.comm.). Institutions that can help ESCOs in their work are also established. Nonetheless, the most important ones, like MoE and the Energy Agency are significantly understaffed, and this trend will continue for some time accompanied with lack of finances for their activities (Dimitrov pers.comm.). As for the legal

framework, although generally good, it requires action plans and a lot of sub-laws and regulations quantitatively defining the necessity for EE measures.

Chapter VI – Research findings

6.1. ESCOs in Macedonia

Currently, there are two registered ESCOs in Macedonia. Both of them have started working recently, emerging from engineering companies. Their background though, indicates different possibilities and obstacles for establishment on the EE market.

6.1.1. MT ESCO

The forming of MT ESCO can be seen as a direct result of the 2003 Macedonian EE Strategy, suggesting the use of ESCOs for implementation of EE measures in governmental facilities, and especially the WB/GEF Sustainable Energy Project for Macedonia (USAID 2003, GEF 2006b). GEF secured US$0.8 million grant to support the development and startup of this utility-based ESCO in order "to help stimulate the market for energy services by providing turnkey and performance-based contracting for EE, and by demonstrating the financial performance of such projects using TPF for publicly-owned buildings" (GEF 2006b). In order to strengthen the project potential of this ESCO, MEPSO formed MT ESCO as a joint venture company together with Toplifikacija, privately-owned district heating company (Sodic pers.comm.). Formed as a state-owned DHC in 1965, and privatized in the '90s, Toplifikacija expanded its activities to electricity production and gasification. This company however, does not manufacture HVAC equipment, although it does represent a few well-known international manufacturers on the Macedonian market. It has great experience in thermal energy engineering and will provide large portion of the engineering know-how for the ESCO projects in addition to the technology and engineering services provided by MEPSO (Stefanovski pers. comm.).

Although formally registered in March 2007, the MT ESCO project was initiated at the beginning of 2005, with training provided by Ecoenergy and HEP ESCO to a selected group of people from MEPSO and Toplifikacija. MT ESCO currently has a staff of four, and according to the plan, will be enlarged as the project activities intensify, offering integrated solutions to its clients using performance contracting (Stefanovski pers.comm., Gecevski pers.comm.).

MT ESCO enjoys a favorable financing situation: in addition to the GEF provided grant, the joint venture partners are expected to donate US$0.5 million totaling US$1 million initial funds for energy audits and EE investments, and US$0.3 million for the services of the strategic partner guiding the initial MT ESCO activities (GEF 2006b, Sodic pers.comm.).

6.1.2. Fonko ESCO

Formed in 2006, under the umbrella of Fonko, a high efficient heating and cooling equipment manufacturer that provides design engineering services, Fonko ESCO now employs a staff of eleven (Zakov pers.comm.). It is regarded by Fonko as an important component in the business development strategy, having in mind the possibility to sell its equipment through Fonko ESCO. However, this ESCO has also failed to deliver an energy performance contract so far.

Finances for Fonko ESCO are not as easily attainable as for MT ESCO. No international aid program is involved in the efforts for establishing Fonko ESCO on the EE market, although USAID has some cooperation with the parent company, Fonko. Seeking finances for the projects of Fonko ESCO has therefore been diverted to foreign financial institutions (Zakov pers.comm.).

6.2. Capacity for ESCO project process application

6.2.1. Energy audit and analysis

Energy audit is not new in Macedonia. So far, the engineering companies have provided energy consultancy and sold their equipment, which is ESPC characteristics (WEEA 1999). This is particularly so in the case of Fonko, as an engineering company specialized in manufacturing and designing heating, ventilation and air-conditioning (HVAC) systems. One of their ESPC projects included refurbishment of a school building, in the frames of Primary Education Project (PEP) sponsored by USAID (Zakov pers. com.). Fonko ESCO staff performed walk-through audits and energy analysis, as well as designing the project solution (Zakov pers.comm.). According to the electricity consumption after this refurbishment under PEP of a school in the city of Veles, it can be concluded that Fonko ESCO has delivered a high-quality project (Sodic pers.comm.). Fonko ESCO has performed energy audits and analysis alone or partnering MACEF.

Toplifikacija can also be considered as an established ESPC having in mind decades of HVAC designing experience. MT ESCO used its experience in performing the first investment grade audit for a commercial client. This part of the project process is new in Macedonia (Stefanovski pers. comm.). On the basis of the energy audit and the performed investment grade audit for this commercial client, MT ESCO identified the potential for energy saving and prepared a project design. The simple payback time was estimated to be three years and the total investment €0.6 million. In the time when this research was conducted, negotiations with the client were underway. Ultimately, no firm conclusion can be drawn about the success of this step. The fact remains though, that the ESCOs in Macedonia are relatively well prepared to perform energy audits and investment grade audits as basis for an EPC. Furthermore, MT ESCO will be offered consultancy by Ecoenergy and HEP ESCO

while the necessary experience is gathered, and Fonko ESCO will probably have the same support from the Dutch Ecofys (Zakov pers.comm., Stefanovski pers.comm.).

6.2.2. Financing EE projects

In the 1970s, one of the three biggest banks in Macedonia, Stopanska Bank, used to approve or disapprove investment loans, among other criteria, based on the energy parameters of the investment (Iliev pers.comm.). This is no longer the case. EE loans are offered just as any other equipment investment loan would be, managing the risk with high collateralization, charging high interest rates, limiting the lending volume and focusing on short-term lending (GEF 2006b).

Problems with financing EE projects have been one of the reasons for WB/GEF involvement in the forming of MT ESCO. In the Sustainable Energy Project – Macedonia (2006), WB/GEF identify eight different EE projects in the residential, industrial, institutional/commercial and municipal sector, and all of them have faced different difficulties obtaining finances for the projects despite having attractive short pay-back periods. The lack of awareness and familiarity Macedonian banks have shown with EE investments is demonstrated by the fact that the Greek bank that owns Stopanska Bank, does have cheaper loans for EE investments in Greece, but the same business model is still not attractive to Stopanska Bank in Macedonia, hesitating for more than 6 months now to offer cheap loans even with the 50 percent loan guarantee offered by USAID (Zakov pers.comm.).

This situation has resulted in Fonko ESCO seeking finances from foreign financing institutions (Zakov pers.comm.). Fonko ESCO has managed to negotiate a €10 million credit "from abroad" with acceptable costs and at present, is trying to find a project that will guarantee high profits. The international aid though, has provided finances for EE projects, as we have seen in the case of WB/GEF grant for the establishment of MT ESCO. However, this company's business plan (2006) foresees 70-to-30 percent debt to equity ratio in the

ESCO sponsored projects, meaning that if by the time WB/GEF stop their support MT ESCO's activities have not persuaded the financing institutions in the advantages of EE investments, MT ESCO will very soon find it self in the same position as Fonko ESCO. In fact, MT ESCO's business plan (2006) does suggest that if problems occur with local financing, a loan can be made available through a foreign commercial bank that provides a consessionally priced debt for a loan to a public entity (if the Macedonian Government provides a sovereign guarantee), or a more expensive commercial loan (if the guarantee is offered by MEPSO or Toplifikacija only). Preliminary discussions already took place and confirmed this possibility.

As for governmental financial support of EE, it can be noted that since 2000 there have been no Budget financial sources allocated for EE activities and all the EE projects that were realized since then are through international cooperation (PEEREA 2006). The founding of the Energy Efficiency Fund written in the Energy Strategy as one of the capacity building activities has not yet happened due to lack of finances (Dimitrov pers.comm.).

6.2.3. Monitoring and verification

Lower cost finances for EE projects require confidence in the ability of EE measures to pay back the investment (IPMVPC 2001). Standardized protocols for M&V can be very useful when developing and improving ESCO markets, which is why they are recommended by the Joint Research Centre of the European Commission (JRC). Macedonia however, has no such standards at present (Serafimov pers.comm.).

As for the ability of the two ESCOs on the Macedonian market to prove the efficiency of their EE solutions implemented in the premises of the clients, it can be noted that MT ESCO has probably greater advantage in this area due to its far more experienced parent companies, dealing with measurement and regulation procedures for a much longer time than Fonko ESCO. Since 2003, for example, Toplifikacija is using a new remote Measurement and

Regulation System with its DH clients. It is regarded in Toplifikacija as reliable and it is to be used as a basis for the M&V procedure in any future MT ESCO projects (Stefanovski pers.comm.). The M&V protocol would be of special importance to MT ESCO whose business plan (2006) foresees substantial capitalization on the emerging international market for emissions reduction. On the other hand, Fonko ESCO acquired specialized software "from Norway" for energy analysis as well as M&V procedures (Zakov pers.comm.).

6.3. Current business opportunities and market size for ESCOs

The size of the ESCO market in Macedonia is not easy to estimate at the moment and no such analysis is available (Stefanovski pers.comm.). As one of the market size indicators though, the EE Strategy's estimated energy savings per sector with different scenarios can be used. Sustainable Energy Project – Macedonia from 2006, identifies eight EE projects in different market sectors with total investment of €2.5 million. The business plan of MT ESCO sets the following market share objectives by the end of the fiscal 2008: achieve annual revenues of about €400.000 in 2007 and 2008, earn a Return on Capital Invested in excess of 24 percent, and build a portfolio of qualified projects for development and implementation equal to €5 million in install costs with energy savings to €2 million per year. MT ESCO's projects that are currently being developed are estimated between €0.7 million and €1.1 million (Ecoenergy 2006). Fonko ESCO has no estimate on the potential size of the ESCO market.

The country's energy intensity indicate that reasonably large ESCO market does exist, and the Strategy for Energy Efficiency as well as the Sustainable Energy Project by WB/GEF do confirm this, but there are some limitations. In the present economic, legal and political situation in Macedonia, the biggest problem the ESCOs will face is finding trustworthy clients (Dimitrov pers.comm.). According to consulted legal experts, the Macedonian legal system is very slow and in cases of a legal dispute, years might pass before a final verdict is

issued. Therefore, any long-term project cooperation that involves substantial capital means careful selection of the business partners, often prolonging the negotiation time which in turn increases the project costs, enhancing the difficulties that ESCOs must cope with on the Macedonian market. This section will look into the possible clients, according to their attractiveness to the existing ESCOs in Macedonia.

6.3.1. Public/Institutional clients

As pointed by Bertoldi (2003), institutional clients such as governments and municipalities are usually considered the most attractive due to prospects of great energy savings on their property, such as administrative buildings and street lighting, often major energy users. On the other hand, institutional clients present ESCOs with projects that have low financial risks, and under pressure from their budgets, the clients can benefit from the ESCOs expertise and especially from the possibility for private EE investments (Chabchoub 2004).

Although governmental and municipal facilities are separate subjects in Macedonia, due to the ongoing decentralization, they still are considered as the primary target groups in the ESCO market with similar potential (Zakov pers.comm., Stefanovski pers. comm.). This market is not immune to legal disputes, but is regarded as more stable from that aspect (Stefanovski pers.comm.). It is noticeable that there is certain confusion about the rights and obligations that are being transferred from the state to the municipal authorities, depending on the dispute about the readiness of the local authorities to take over the responsibilities. But from the conducted interviews it seems that this is not the greatest problem at the moment.

According to Andrijana Zakov, Assistant Manager at Fonko ESCO, all municipal authorities are not aware of the importance of EE and rarely show any interest in the EE measures that might be implemented in their municipality, for example street lighting, due to the long contracting time after which the benefits can be enjoyed. In some cases, as the street

lighting case, the local authorities that are responsible for its functioning have no incentive to lower the energy consumption, since it is paid from the pockets of the citizens, although it may account for over 25 percent of total electricity cost in the city (Rezessy *et al.* 2006, Ecoenergy 2006). Nevertheless, the Strategy for Energy Efficiency (2003) places street lighting as Energy Agency's second priority, due to a positive cash flow in all of the scenarios presented in Table 4. A case study presented in the WB/GEF Sustainable Energy Project – Macedonia (2006) suggests simple payback time of 2.4 years and 3 million kWh electricity savings per year if 50.000 high-pressure mercury lamps are replaced with high-pressure sodium lamps in the street lighting system of Skopje.

If, however, the authorities are willing to proceed with the EE project proposed to or required by them, financial problems emerge. Only one out of 84 municipalities is not in debt and therefore able to acquire a commercial bank loan (Dimitrov pers.comm.). Adding to the financial inability of the municipalities is the ongoing dispute with the government about the property which is to be returned under the jurisdiction of the municipal authorities according to the decentralization process in Macedonia. In this moment, ESCOs will most probably have to assume larger portion of the project risk if any EE projects are to be implemented, assuring finances and signing shared savings contracts with clients that are not very creditworthy.

MT ESCO sees no problem with the municipal procurement regulations, since the procurement procedures are simplified in the case of EE measures and the same applies for the governmental facilities (Stefanovski pers.comm.). Therefore, schools and hospitals, whether under municipal or governmental jurisdiction, most of them with desperate need of EE improvements to their HVAC and lighting systems, as well as the building envelope, represent the primary market for the Macedonian ESCOs. For example, the Clinical Center

Skopje case study estimates that installation of a high-efficiency boiler will have a payback time of two years with 268 tons per year of fuel savings (GEF 2006b).

Both of ESCOs have contacted the municipal authorities and the Government in order to give a push to EE projects in public/institutional facilities and some of the contacts are expected to give positive results with EE projects in a bundle of public/institutional buildings. WB/GEF (2006b) estimates that over half of 1324 Macedonian elementary and secondary schools, and 40 of the country's general hospitals could be subjected to EE improvements. Fonko ESCO, backed with a €10 million loan at its disposal, recently had a meeting with the Government officials who found the idea of ESCO implemented EE improvements in the schools to be "interesting" and agreed to another meeting, this time with the Ministry of Education; the prospects though, are not very clear (Zakov, pers.comm).

So far, ESCOs have concentrated their efforts in negotiating projects on schools and hospitals. No other governmental properties have been planned for ESCO penetration. Despite the previously listed obligations taken by the Government (*5.4. Energy efficiency as a political issue*), a recent article in the Macedonian daily newspaper "Dnevnik", signed by the Vice Prime Minister Zoran Stavrevski (in charge of economic issues), titled *Energizing Macedonia*, states that the Government is planning enhanced energy production and new supply connections in order to "maintain Macedonia's energy sovereignty and become electricity exporter by 2012". In this article, EE is not mentioned, indicating that there is no firm belief in the capability of EE solutions to deliver noticeable results. Such plans, when a detailed analysis of potential energy savings is not performed, suggest lack of governmental support and commitment, and can add to the reluctance for investments in the EE shown by other conservative and risk-averse potential clients, as already reported by Vine (2005). Thus, the Macedonian ESCOs have an overall difficult business environment, but not much

different than the reported beginnings of ESCO industries in Japan and Korea (Painuly *et al.* 2003).

6.3.2. Commercial, industrial and residential clients

These types of clients are not considered as near-term ones in the market strategies of the Macedonian ESCOs. For example, the possibilities in the commercial sector are not studied deeply. There are some estimates, but no calculations, that more than 100 hotels in Macedonia could be candidates for EE improvements in the area of lighting, space conditioning and hot water (GEF 2006b). Nevertheless, as ESCOs are struggling for projects regardless of the market sector, it could likely provide the first EPC for the Macedonian ESCO industry. MT ESCO has performed an energy audit, investment grade audit and designed the technical solution for a group of three hotels (Stefanovski pers.comm.). What is now being negotiated is the client buyout of the project or signing an energy performance contract with MT ESCO. At the time this research took place, it was impossible to make an estimate about the prospects of continuing this ESCO project, although the simple payback time was calculated to be three years for an initial investment of €0.6 million in lighting and HVAC systems, building envelope upgrading, new windows and new, renewable energy systems for hot water.

The industrial clients have so far, not been seriously considered by the ESCOs in their market strategies (Stefanovski pers.comm., Zakov pers.comm.), although it is the first market segment that will be pressured for implementing EE measures with the liberalization of the electricity market, environmental constrains and for some of the industrial companies, inaccessibility to gas due to dispute between the Government and a private oil company about the ownership of the gas system (Iliev pers.comm.). There is some interest by the industry for ESCO type of projects, but the successful companies will tend to buyout the project due to, as of lately, large incomes that need to be reinvested (Iliev pers.comm.). Fuel conversion, boiler

retrofits and waste heat recovery are the type of projects where the ESCOs might succeed in opening this segment of the market since there is a demand for these services, as well as installing variable controls on electric motors, having in mind that they account for 75 percent of the industrial electricity use (GEF 2006b, Iliev pers.comm.).

The main features of the residential buildings in Macedonia are small EE and private ownership of almost all residential buildings, with approximately 70 percent of the dwellings being multi-residential and 30 percent as single-family homes (Ecoenergy 2006). There is no presence of any kind of Association of buildings' owners. The structure of the appliance of energy sources for heating in residential buildings is as follows: 74 percent of households use fuel wood, 16 percent of households use electricity, 8 percent of households are connected to the district heating systems, the natural gas is not used, with an exception of particular cases where a fluid-oil gas is being used for heating (Serafimov pers.comm.). The EE Strategy (2003) suggests that the Energy Agency holds the residential sector, as a large consumer of energy in the country with the largest saving potential, as its first priority, but it is unlikely that ESCOs will independently be involved in such projects, without some sort of backing from the local or central authorities. Due to high unemployment, the social conditions are unfavorable and hence, the residential sector is considered by the ESCOs in Macedonia to be least attractive for their activities as a result of the high initial costs for the project due to ownership of the buildings that need EE improvements and due to problems that the residents are expected to have with financing the project (Stefanovski pers.comm., Zakov pers. comm.). The adaptation of Energy Performance of Buildings Directive 2002/91/EC, whit the goal of preparing a methodology for energy classification of buildings and measures for improvement of their EE with economic viability, is underway in Macedonia (Serafimov pers.comm.). This adaptation might create a strong demand for ESCO services in this sector, despite the problems that are present at the moment.

6.4. International aid for ESCOs in Macedonia

As stated previously (*6.2.2. Financing EE projects*), all the major EE enhancing investments were made with international help. Apart from the WB/GEF and USAID as the biggest aid programs in Macedonia, there are not many others that are influencing to some extent the development of ESCO industry. Among the few are the Dutch Government and the EBRD.

So far the main focus of the international aid programs was the utility based MT ESCO. This company has been granted US$0.8 million for its start-up and initial project activities through the WB/GEF Sustainable Energy Project – Macedonia. The WB has considerable experience with such projects and has basically applied the same type of support for developing ESCO market as it has in Croatia with HEP ESCO. WB/GEF has organized the initial training for MT ESCO with the help of HEP ESCO and the Washington D.C.-based Ecoenergy (Stefanovski pers.comm.). Fonko ESCO as an entirely private company was not sponsored by the WB/GEF in the way the utility-based MT ESCO was, but they were given support by the USAID. This was carried out through cooperation with Fonko on the Primary Education Project, allowing Fonko ESCO's staff to perform walk through audits and energy analysis, as well as designing the project solution (Zakov pers.comm.), thus providing a pool of experience for this ESCO. USAID is setting up a commercial loan guarantee for EE projects under its Development Credit Authority, much in a similar way like it was set up in Bulgaria (Zakov pers.comm., GEF 2006b, Ecoenergy 2006).

The Dutch Government has expressed interest in coordinating the support to the educational system with USAID, concerning the plans to upgrade to upgrade the energy performance of schools' buildings (GEF 2006b). This could provide additional funds for energy audits and projects performed by the ESCOs in Macedonia. MT ESCO's business plan

also foresees the possibility for approaching the EBRD for project specific financing, through one of its parent companies.

6.5. Company specific obstacles

Other serious obstacles for the ESCO industry are also present at the moment. They are specific to each of the two ESCOs and overcoming them is very important in order to make the industry more active and competitive. One common problem though, is the company registration code that defines its line of business and determines how the company will be taxed and under whose jurisdiction its work will be. There is no special code for energy services, only for energy. ESCOs deal with both energy and financial issues, but can choose only one company registration code. Choosing "energy" as line of business will place them under the jurisdiction of ERC, which places ESCO projects under price regulation. The "finances" code is also unacceptable to the ESCOs (Stefanovski pers.comm.). Fonko ESCO functions as one of Fonko's departments.

6.5.1. MT ESCO related issues

No performance contract has been signed with a customer so far and at the moment this plan is in need of serious support from the parent companies, if its goals are to be accomplished.

Sustainable Energy Project – Macedonia (2006) identifies the risk of MEPSO not staying committed to develop the ESCO concept as "substantial". During the last two-and-a-half years this risk rating proved to be correct and was confirmed by the interviewees: Mr. Stefanovski, Mr. Gecevski and Mr. Sodic. They have confirmed that the halt in the forming of MT ESCO was caused by MEPSO, mainly because of the restructuring in the country's electricity system and political changes after Macedonia's parliamentary elections in 2006 that caused changes in the management of MEPSO, losing the initial momentum of

commitment to the forming MT ESCO. Until the moment this research took place, even the agreed offices of MT ESCO in the MEPSO headquarters building were not prepared.

Furthermore, according to legal experts asked about the signed contract between Toplifikacija and MEPSO as joint-venture partners in MT ESCO, the newly formed company has not been stabilized in regards to events in the parent companies that may lead to change in supportive politics toward MT ESCO, such as change of ownership or decision to quit the MT ESCO joint-venture. Another important issue is the procurement regulations. As a public company, MEPSO is obliged to certain procedures that also involve Government approval in case of procurement, which will complicate the work of MT ESCO if legal experts define it as public company. Since MEPSO is owner of 52 percent of MT ESCO, this is not unimaginable. If any exemptions are to be approved for MT ESCO's procurement procedures, it is not clear what will they cover. The joint venture partners have the option to provide MT ESCO with debt financing for project based activities, or, having strong credit ratings, provide loan guaranties to the commercial or development banks approached by MT ESCO for a loan (Ecoenergy 2006). The contract does not provide a mechanism that will regulate the share in loan guarantees that might be provided. Another legal concern in the development of MT ESCO is the relationship of the employees with the company given that all of them continue to be employed in their respective parent companies. In the case of MEPSO, this requires also a Governmental approval of the representative and due to possible delay in appointing a new one, can lead to complications, even serious halts, if the MEPSO-hired employees leave the post in MT ESCO.

The legal aspects of MT ESCO are unclear, making the company susceptible to even the slightest changes in commitment by the employees or the parent companies. Having in mind that this is the first time a public-private joint-venture partnership is formed in Macedonia, these problems are not unexpected, suggest the legal experts. On the other hand, they still

represent a serious threat to the success of MT ESCO on the EE market. According to Mr. Stefanovski, more detailed agreements are already being prepared to clarify the unresolved issues, but the communication between the stakeholders in MT ESCO is far from excellent.

Some EE experts in Macedonia presume that there is a conflict of interest with MT ESCO, resulting from the business activities of the joint-venture partners (selling heat and electricity). However, it can be expected, based on the Croatian case, that this is not likely to affect negatively the work of MT ESCO. The joint-venture partners also reject these allegations. MEPSO is already facing electricity shortages that have to be overcome with expensive imports and the liberalization of the electricity market is doubted to make any difference when electricity supply is insufficient in the region (Sodic pers.comm.). As for Toplifikacija, it is obligated to heat the homes of the clients at a minimum temperature of 20˚C. If its clients do not have a calorimeter installed (mainly old buildings), the ERC-set price cap for the service gives a strong incentive for Toplifikacija to lower the spending of heat energy for the minimal temperature (Stefanovski pers.comm.). In case the client has a calorimeter installed, the EE measures become his interest.

6.5.2. Fonko ESCO related issues

Not disturbed by the legal troubles that undermine the efforts of MT ESCO to get off the ground on the Macedonian EE market, Fonko ESCO is facing much different challenges. Emerging from an engineering department of a HVAC equipment manufacturer, they have a strong incentive to develop the ESCO business and use it as a market for Fonko's equipment (Dimitrov pers.comm.). Nevertheless, performance contracting is more than just new equipment which can provide as little as 20 percent of the energy savings, the other 80 percent resulting from EE practices of the operation and management personnel (Hansen 2003).

From the conducted interviews it can be concluded that Fonko ESCO's scope of possible EE projects is rather limited, mainly to the services that can be provided with Fonko's equipment and the experience gathered with installing Fonko's HVAC equipment on its clients' premises. This ESCO's business plan identifies institutional clients as the targeted EE market, offering services with street lighting, school and hospital EE refurbishments (Zakov pers. comm.). The later services include upgrades on the building envelope, windows, and HVAC equipment. Fonko is Macedonia's only heat pump manufacturer and therefore, Fonko ESCO has the incentive to use them in its EE projects. Calculations show that such projects may need high investment which will often require long contract time to turn profitable, and in turn drive away the investors (Serafimov pers.comm.). The limitation on project diversity and technical solutions is likely to enhance the negative effect of its business environment on the successful establishment of Fonko ESCO on the Macedonian EE market. This scenario though is expected to be reversed with the help of the Dutch "Ecofys", a far more experienced company in EE projects, partnering Fonko ESCO as of the near future (Zakov pers.comm.).

Chapter VII – Conclusions and recommendations

This chapter will present the conclusions drawn from the analysis of the research findings as well as outlined recommendations for establishing ESCOs in Macedonia. The aim of the research was to determine why, so far, the ESCOs are still not performing, and what is the ESCO potential at the moment.

7.1. Conclusions

Macedonia's EE market size might not be determined precisely, but from indicators such as the energy intensity per purchasing parity power, or the data presented in the Macedonian EE Strategy on possible energy savings per market, it clearly can provide more than sufficient work for the existing ESCOs. Previously mentioned conditions reported by Vine (2005),

which tend to create EE and ESCO services demand, have nominally been fulfilled in the Macedonian case, largely due to the expected EU accession.

Macedonia committed itself to environmentally sound practices and in that context, energy efficiency as well. International agreements signed by Macedonia, such as the Energy Charter Treaty and the Protocol on Energy Efficiency and Related Environmental Aspects, include obligations for introduction of policies and measures that will promote ESCOs and EE. Over the past two years while facing constrained energy supply, in-country laws addressing EE issues were modified or introduced, beginning to create a legal framework for ESCO activities, although a substantial portion of action plans, sub-laws and regulations quantitatively defining the necessity for EE measures is yet to be introduced or approved. Different standards that need to be introduced and will help the ESCO industry progress, such as M&V and O&M standards and procedures, are still waiting to be developed.

There is also the instability of energy prices and the changes introduced in Macedonia's energy sector to account for, in the assessment of the ESCO business environment. Energy is no longer cheap or certain for delivery by the state. As the research shows, the international aid programs have and still are influencing the ESCO industry, by directly providing the ESCOs with finances, training, software, demonstration projects and helping the formation of the Government energy policy. At the moment, international aid programs have actually invested quite a lot in promoting EE activities and ESCO development. All of these factors are positively influencing the development of the ESCO industry in Macedonia.

However, the two Macedonian ESCOs have not signed a single EPC so far, and in answering why this is so, it can be noted that somewhat different obstacles hinder their business efforts. While MT ESCO has the expertise and the finances sorted out, even additional guidance through their first projects from HEP ESCO and Ecoenergy, it is burdened with a joint-venture partner whose commitment at this moment is doubtful. Having

the chance for the perfect position of first-on-the-market ESCO, MT ESCO turned slow on actually capitalizing on it, although this is not directly MT ESCO's fault. Not only has the public-owned company MEPSO failed to demonstrate real dedication in this project, but the public/institutional sector was uninterested for this new way of business – MT ESCO found more serious clients in the commercial rather than the institutional sector, adding another argument in favor of the low governmental commitment to EE. Combined with the low awareness on a governmental level for the importance of EE, no finances allocated from the budget for EE promotion or projects, and the fact that the Energy Agency (an institution considered necessary by the Strategy for Energy Efficiency as well as the WB/GEF in order to strengthen the political, legal and institutional framework for EE and cooperate with ESCOs in their work) is not functional and is not likely to be so in the near term, we can conclude that the main impediment for the ESCO industry is the Governmental energy policy, concentrated on energy production rather than energy saving.

Another problem that the ESCOs are facing is the uncertainty of long-term contract in the current legal and economic situation. One of the reasons why MT ESCO focuses in its business plan on institutional clients is the fairly stronger guarantee that the contract will be respected by the client, no legal disputes will arise and most importantly, the client will not go out of business or go bankrupt. This is one of the ways to make sure that the hardly obtainable capital will not be lost due to circumstances beyond the project parameters.

Fonko ESCO has met other obstacles in its efforts to get established on the yet to be developed EE market in Macedonia. For this company, stable financing sources are the main issue. While the Macedonian commercial banks are not convinced that EE is a safe and profitable investment, the Government has also failed to establish the EE Fund set as a goal in the Strategy for EE. Not only does the lack of finances prevent Fonko ESCO to successfully carry out an EPC-based project, but it also prevents further training for its staff. However, it

seams that this ESCO is more determined to succeed on the market than MT ESCO: it negotiated expert help with the more experienced Dutch "Ecofys" and managed to obtain €10 million affordable credit from abroad, limiting the obstacles that need to be negotiated down to the Governmental will to allow EE projects on its premises, such as schools and hospitals. Furthermore, they did start series of talks with Government representatives as well as municipal authorities. So far, the same obstacle of low awareness and interest in the possibilities offered by improvements in EE, have taken the Fonko ESCO's efforts to a halt.

The expert findings on possible obstacles in developing ESCO industry in a country, presented in *Chapter II – Literature review* and shaping the *Chapter III – Theoretical Framework*, did indicate at the real issues and problems at the Macedonian ESCO market. As for the scenario that the WB/GEF have suggested in their 2006 Sustainable Energy Project – Macedonia, it can be noticed that after two and a half years, the trial-and-error method in developing a business model was not even once deployed, due to not having a client to negotiate EPC in the first place. The rest of the WB/GEF scenario is far from the current situation in the ESCO industry development: MT ESCO is having problems sorting out its internal issues, and is not capable of monopolizing neither the market, nor the financing sources.

7.2. Recommendations

The recommendations that emerge from the research are presented in this section.

- First, the establishing of the Energy Agency should be finished. The ESCO industry will benefit from this institution which can take on the responsibility to organize databases for potential clients, financing sources, and in the future – project database. This Agency could also take some other tasks, such as certification of ESCOs, making the public image of these companies and their line of business more appealing.

Coordinating the necessity for EE improvements in many public/institutional facilities with the efforts of the ESCOs for finding a client, would be a major benefit from this Agency.

- The Government should offer some of its premises that require EE improvements, perhaps through the Energy Agency, and except them from the public procurement regulations – creating an initial ESCO market and sending a signal to other energy consumers as well as financial institutions that EE is to play an important role in the following years.
- Standards for M&V have to be adopted, if not standard contracts at this moment, making the results of the EE improvements valid in the eyes of the client and the investor. This might prove to be the argument that will unlock low cost loans to ESCOs from commercial banks.
- ESCOs have to start serious cooperation with the Macedonian Energy Association where all the major energy consumers are participating as members. With a series of presentations for MEA, many potential customers can be attracted for an EPC. Some of them are creditworthy and stable businesses that can provide a more EE conscious market.
- Establish the EE Fund. This solution was successful in the case of Hungary and it showed results in Croatia and Bulgaria. Both ESCOs will need finances for their projects now as well as in the long run. Creating this fund is also another signal to the commercial banks to allow the ESCOs access to cheaper loans for EE projects.
- Adopt EE labeling. Labeling the equipment or the buildings according to their energy consumption with implications on taxes or market price, will open some market possibilities for the ESCOs, most probably in the commercial and industrial sector, and to a lesser extent, in the residential sector as well.

- MEPSO's role in MT ESCO and consequently on the whole ESCO market, is crucial. As a public owned company, a more serious incentive given from the Government to support this EE project might shorten the required time in MEPSO after the electricity market liberalization, for accepting the fact that additional services will help it retain its customers.

This research has concentrated on discovering why has the ESCO concept failed to perform until this day and estimate the size of the ESCO market in Macedonia. Due to some limitations not all the issues were covered in an adequate matter. Therefore, some suggestions are displayed bellow for further research:

- Research on the potential ESCO clients, whether contacted by the ESCOs or not, can reveal the client side of the EE improvement projects, pointing to more specific problems and obstacles from the ones shown in this research.
- Investigate how Macedonia's energy policy is directed with officials influencing the energy policies, which will lead to more in depth understanding of the country's ESCO industry prospects.
- Assess the structure and focus of the international aid programs concerned with EE and ESCO development in Macedonia.

In conclusion, the process of creating ESCO industry in Macedonia has started and although moving rather slowly, it can be seen that steps are taken in the right direction. Important issues on the subject of EE remain to be addressed, but even today conditions for EPC projects do exist and hopefully one of the ESCOs will manage to sign one by the end of this year. The full growth of the ESCO industry though, will probably have to wait for a few more years before it happens.

References:

1. Benmessaoud, R. 2003. Introducing ESCO's In Transition Economies: Experiences of The World Bank. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]
2. Bertoldi, P. 2003. How are EU ESCOs behaving and how to create a real ESCO market? In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]
3. Bertoldi, P., and Rezessy, S. 2005. *Energy Service Companies in Europe: Status report 2005*. Ispra: European Commission DG Joint Research Center
4. Bertoldi, P., Rezessy, S., and Vine, E. 2006. Energy service companies in European countries: Current status and a strategy to foster their development. *Energy Policy* 34: 1818-1832
5. California Energy Commission (CEC). 2000. *How to Hire an Energy Services Company Handbook.* Sacramento: California Energy Commission
6. Chabchoub, J. 2004. Principles of ESCO operation. *Balkan Energy Solutions Team* 11: 13-17
7. _____.2005. Country Summaries: The Environment for Energy Performance Contracting in Central Europe. *Balkan Energy Solutions Team* 16: 9-15
8. Chandler, P. L., and Patterson, D. J. 2001. Contemporary computer simulation techniques and results encountered in very high efficiency electric machine design for renewable energy applications. *Renewable energy* 22 (1-3): 143-150
9. Commission of the European Communities (COM). 2005. *Green Paper on Energy Efficiency or Doing More With Less*. Brussels: Commission of the European Communities
10. _____. 2006. *Communication from the Commission (2006)545. Action Plan for Energy Efficiency: Realising the Potential*. Brussels: Commission of the European Communities
11. *Construction Law*. 2005. *Official Gazette of the Republic of Macedonia* 51/05

12. Cowan, J. 2003. Lessons Learned in Canada about the ESCO Industry. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]

13. Dimoska, J. 2005a. Macedonian Legislation on Energy Efficiency. Presented at the Energy Regulatory Partnership Program, May 2005. Montpelier, Vermont. URL: http://www.narucpartnerships.org/Presentations/Macedonia/May05/ERC/ERC-%20Energy%20Efficiency%20Legislation%20in%20Macedonia-%20Julijana%20Dimoska%20eng.pdf [consulted 16 April 2007]

14. _____. 2005b. Energy Efficiency as Part of the Republic of Macedonia's Energy Policy. Presented at the Energy Regulatory Partnership Program, May 2005. Montpelier, Vermont.
URL:http://www.narucpartnerships.org/Presentations/Macedonia/May05/ERC/ERC-Energy%20Efficiency%20as%20a%20part%20of%20the%20Energy%20Policy%20in%20Macedonia-Julijana%20Dimoska%20eng.pdf [consulted 16 April 2007]

15. Doukov, D. 2005. The Bulgarian Energy Efficiency Fund now is operating. EnEffect. URL: http://www.eneffect.bg/go.idecs?i=514 [consulted 25.March 2007]

16. Dreesen, T.K. 2003. Overcoming ESCO barriers. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]

17. Ecoenergy. 2006. Business Plan for MT ESCO, LLC. Internal document. Available from MT ESCO, Skopje.

18. Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). 1994. Brussels: Energy Charter Secretariat

19. _____. 2006. *Republic of Macedonia: Regular Review 2006.* Brussels: Energy Charter Secretariat

20. Energy Charter Secretariat (ECS). 2006. *F.Y.R. Macedonia: In-Depth Review of the Investment Climate and Market Structure in the Energy Sector.* Brussels: Energy Charter Secretariat

21. *Energy Law.* 2006. *Official Gazette of the Republic of Macedonia* 63/06

22. *Environment Law.* 2005. *Official Gazette of the Republic of Macedonia* 53/05

23. Evans, M. 2000. Tapping the Potential for Energy Efficiency: The Role of ESCOs in the Czech Republic, Ukraine and Russia. URL:

http://citeseer.ist.psu.edu/cache/papers/cs/23905/http:zSzzSzwww.pnl.govzSzaisuzSzpubszSzaceee5.20.PDF/tapping-the-potential-for.pdf [consulted 26 March 2007]

24. Fortescue, W., 2003. RWE Solutions Partnership with Sainsbury's and Guinness Park Royal. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]

25. Franjek, J. 2006. Energy efficiency Project in Croatia. Presentation at the European ESCO conference in Prague, September 2006.

26. Galitsky, C., Price, L., Worrell, E. 2004. *Energy Efficiency Programs and Policies in the Industrial Sector in Industrialized Countries.* Berkley: University of California Berkeley

27. Global Environment Facility (GEF). 2006a. *GEF's Work on Global Climate Change*. URL: http://www.gefweb.org/projects/focal_areas/climate/documents/Insrt_3_GEFsWork.pdf [consulted on 29. May 2007]

28. _____. 2006b. *Former Yugoslav Republic of Macedonia: Sustainable Energy Project.* Washington D.C.: World Bank

29. Goldman, C. A., Hopper N. C., and Osborn J. G. 2005. Review of US ESCO industry market trends: an empirical analysis of project data. *Energy policy* 33: 387-405

30. Grubb, M. J., 1990. Communication: Energy efficiency and economic fallacies. *Energy Policy* 18 (8): 783-785

31. Hansen, S. 2003. Lessons learned around the world. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]

32. HEP-ESCO. 2007. URL: http://www.hep.hr/esco/en/aboutus/default.aspx [consulted 26. March 2007]

33. Holdren, J. P. 1987. Global Environmental Issues Related To Energy Supply: The Environmental Case For Increased Efficiency Of Energy Use. *Energy* 12 (10/11): 975-992

34. Hopper, N., Goldman, C., McWilliams, J., Birr, D., and McMordie Stoughton, K. 2005. *Public and Institutional Markets for ESCO Services: Comparing Programs, Practices and Performance.* Berkeley: University of California Berkeley.

35. International Energy Agency (IEA). 2004. *Oil, Crises & Climate Challenges: 30 Years of Energy Use in IEA Countries.* France: International Energy Agency

36. _____. 2007. *2004 Energy balances for Macedonia, TFYRO.* URL: http://www.iea.org/Textbase/stats/balancetable.asp?COUNTRY_CODE=MK [consulted: 16. April 2007]

37. International Performance Measurement & Verification Protocol Committee (IPMVPC). 2001. *International Performance Measurement & Verification Protocol: Concepts and Options for Determining Energy and Water Savings. Volume 1.* URL: http://www.eere.energy.gov/buildings/info/documents/pdfs/29564.pdf [consulted: 29. May 2007]

38. Issawi, C. 1991. Technology, Energy, and Civilization: Some Historical Observations. *International Journal of Middle East Studies* 23 (3): 281-289

39. Joint Research Centre of the European Commission (JRC).End-use energy efficiency. The Monitoring and verification. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 29 May 2007]

40. Lee, M.-K., Park, H., Noh, J., and Painuly, J.P. 2003. Promoting energy efficiency financing and ESCOs in developing countries: experiences from Korean ESCO business. *Journal of Cleaner Production* 11: 651-657

41. Ligot, J. 2003. Financing ESCOs in Transition Economies. In: Proceedings of the First European Conference on Energy Service Companies (ESCOs): "Creating the Market for the ESCOs Industry in Europe". Joint Research Centre of the European Commission. URL: http://re.jrc.ec.europa.eu/energyefficiency/index.htm [consulted 24 May 2007]

42. *Local Self Government Law.* 2002. *Official Gazette of the Republic of Macedonia* 05/02

43. Martinot, E., and McDoom, O. 2000. *Promoting Energy Efficiency and Renewable Energy: GEF Climate Change Projects and Impacts.* Washington DC: Global Environment Facility

44. Mills, E. 2003. Risk transfer via energy-savings insurance. *Energy Policy* 31: 273-281

45. Ministry of Economy of Republic of Macedonia (MoE). 2006. *Strategic Plan of the Ministry of Economy.* Skopje: Ministry of Economy

46. Ministry of Environment and Physical Planning of Republic of Macedonia (MEPP). 2003. *Macedonia's First National Communication Under The United Nations Framework Convention On Climate Change.* Skopje: Ministry of Environment and Physical Planning

47. Moisan, F., Bosseboeuf, D., Chateau, B., and Lapillonne, B. 1998. *Energy Efficiency Policies and Indicators.* London: World Energy Council

48. Nexant. 2002. Model ESCO performance contracts; Nepal. URL: http://www.sari-energy.org/ProjectReports/ModelESCOContractsNepal_ExecSum.pdf [consulted 14.April 2007]

49. Painuly, J.P., Park, H., Lee, M.-K., and Noh, J. 2003. Promoting energy efficiency financing and ESCOs in developing countries: mechanisms and barriers. *Journal of Cleaner Production* 11: 659-665

50. Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). 1994. *See* Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). 1994.

51. _____. 2006. *Republic of Macedonia: Regular Review 2006. See* Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. 2006. *Republic of Macedonia: Regular Review 2006*.

52. Rezessy, S., Dimitrov, K., Ürge-Vorsatz, D., and Baruch, S. 2006. Municipalities and energy efficiency in countries in transition: Review of factors that determine municipal involvement in the markets for energy services and energy efficient equipment, or how to augment the role of municipalities as market players. *Energy Policy* 34: 223-237

53. Rotaru, C., Stefanciuc, C., and Tantareanu, C. 2003. Electricity end-use efficiency in buildings in Romania. In: Berrutto, V. (Ed.) International Workshop on Electricity End-Use in Buildings in Candidate Countries

54. *Strategy for Energy Efficiency in Republic of Macedonia.* 2003. *See* United States Agency for International Development. *Strategy for Energy Efficiency of Republic of Macedonia: Executive Summary.* 2003.

55. Studebaker, J. M. 2001. *ESCO: Energy Service Company Handbook.* Tulsa: Penwell.

56. Sustainable Development Partnerships (SDP). 2006. Fact Sheet: U.S. Agency for International Development. URL: http://www.sdp.gov/sdp/pubs/65439.htm [consulted 6. May 2007]

57. Ürge-Vorsatz, Diana; Langlois, Pierre; and Rezessy, Silvia 2004. Why Hungary? Lessons learned from the success of the Hungarian ESCO industry. In *Proceeding of the American Council for Energy Efficient Economy 2004 Summer Study. American Council for an Energy-Efficient Economy,* Washington, D.C.

58. United States Agency for International Development (USAID). 2003. *Strategy for Energy Efficiency of Republic of Macedonia: Executive Summary.* Washington DC: United States Agency for International Development

59. Vine, E., Murakoshi, C., and Nakagami, H. 1998. International ESCO Business Opportunities and Challenges: A Japanese Case Study. *Energy* 23 (6): 439-447

60. Vine, E. 2005. An international survey of the energy service company (ESCO) industry. *Energy Policy* 33: 691-704.

61. Westling, H. 2003. *Performance contracting: Summary Report. Task X within the IEA DSM Implementing Agreement.* Paris: International Energy Agency

62. Weynand, G. 2006. Energy Efficiency at USAID. Presented at Energy Efficiency Investment Forum. URL: http://www.eeinvestmentforum.org/images/Weynand_session_7.pdf [consulted 7. April 2007]

63. World Bank (WB). 2006. *Right on Target: Progress on Renewable Energy and Energy Efficiency in 2005/2006.* URL: http://siteresources.worldbank.org/EXTENERGY/Resources/336805-1157034157861/reEEbrochure.pdf [consulted on 29. May 2007]

64. World Energy Assessment (WEA). 2004. *Overview 2004 Update.* New York: United Nations Development Programme

65. World Energy Efficiency Association (WEEA). 1999. *Briefing paper on Energy Service Companies with directory of active companies*. Washington, D.C.: World Energy Efficiency Association

Personal Communications

Dimitrov, Kostadin. Professor of Thermal Engineering, Mechanical Faculty in Skopje. Head of the Macedonian Energy Efficiency Center, MACEF. Formal interview. Skopje, 30 April 2007.

Gecevski, Lazar. MEPSO representative in MT ESCO. Formal interview. Skopje, 7 May 2007.

Iliev, Valentin. Director of Valid Engineering. Former Manager of Development of the "Rudnici i Zelezarnica" industrial enterprise for metallurgy. Formal interview. Skopje, 4 May 2007

Serafimov, Marko. Professor of Thermal Engineering, Mechanical Faculty in Skopje. Associate of the Standardization Institute of Republic of Macedonia. Formal interview. Skopje, 30 April 2007.

.

Sodic, Slobodan. Assistant General Manager, MEPSO. Formal interview. Skopje, 7 May 2007.

Stefanovski, Zdravko. Mechanical engineer, Toplifikacija. Representative of Toplifikacija in MT ESCO. Formal interview. Skopje, 5 May 2007.

Zakov, Andrijana. Assistant Manager, Fonko ESCO. Formal interviews. Skopje, 11 May 2007 and 16 July 2007.