

## A Review on ESCO's Challenges and Project Management as a Solving Tool

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### Article Info

#### Article history:

Received Jun 1, 2018

Revised Jul 10, 2018

Accepted Jul 25, 2018

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#### Keywords:

ESCO

EE

EEP

PM

CCTV

ESPC

M&V

HVAC

PJ

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### ABSTRACT

The Energy Service Industry is now declared as a new source of growth for Malaysian Economy, many key players like MAESCO, Suruhanjaya Tenaga Energy Commission, KeTTHA and relevant ministries are working very hard on energy saving respective researches. There is a room for much more improvement in order to apply energy saving projects according to Malaysian environment. So far the application of project management principles are very rare in energy saving projects or in Malaysia termed as ESCO (Energy Service Company). This gives a way to synchronise project management techniques with respective implementations of energy saving projects focusing Malaysian infrastructure. In this article a review is conducted on new ways, techniques and procedures of project management and its synchronization with engineering needs especially electrical power conservation and saving projects. Moreover, the proposed research will also indicate the advancement or replacement of present system along with some advantages over our old system. A complete review is done on the background of ESCO its importance in energy saving also the relevancy of project management along with its basic principles is discussed as to provide a solution for ESCO to overcome the challenges in South East Asia generally and in Malaysia specifically

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## 1. INTRODUCTION

Present age is known as the age of energy efficient or energy saving building concepts. Advanced engineering introduced many new technologies for this purpose as smart monitoring and controlling techniques. An energy service company or most commonly known as ESCO is a commercial or non-profit business providing a broad range of energy solutions which includes designing and implementation of energy savings projects, retrofitting, energy conservation techniques and models, energy infrastructure outsourcing power generation and energy supply, its services also include risk calculation and management. Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements like Initiation, Planning and Execution, Monitoring and Controlling and Closing.

## 2. BACKGROUND OF ESCO

The initiation of the energy services its self as a business can be attributed to the energy crisis of the late 1970s, as entrepreneurs developed ways to combat the rise in energy costs and energy usage handling the formation of early companies rooted in Texas USA [1]. Initially it only introduced a device to automate the operation of switching lights and other equipment to regulate energy usage. Energy Service Companies

(ESCOs) have started making their presence Malaysia toward the end of 90s and they were mainly involved in upholding technologies on how to save energy costs. Most of them only were technologies suppliers and using energy saving structures of their products as additional marketing strategy to persuade the market. Most of these technologies often brought by foreign promoters or companies who worked with their local partners to infiltrate the domestic markets. The energy efficiency market is growing in stature and maturity, but it is developing more rapidly than the ability of Malaysian market to properly evaluate and understand it. A particular priority is to improve our capability to measure the size, nature and impact of energy efficiency markets and the outcomes from investments made in them.

### **2.1. Esco and Building Management System**

Today is the modern era and there is an increasing demand of automation optimization controlling and monitoring of Electrical equipment used in industrial plants, residential and commercial building for this purpose two main approaches are used i.e. Building Management system or services from ESCO (Energy Saving Companies). Building Management system have been introduced to this world in 1970, initially it was started with very limited features but within time a lot of changes and modifications had been made, started with the controlling of power and lightening to heating and cooling of a building together with the alarm system as a further modification in order to provide maximum security. Intrusions can be easily monitored with the help of closed circuit television CCTV [2]. Building management system can be termed as an integral part of ESCO as well whereas ESCO is a non-profit business entity which is the provider of such services like retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management or a complete installation of energy saving project which may be inclusive of building management system. ESCO is not the only solution for energy saving but it's one of the most efficient and less expensive approach to do so.

### **2.2. Importance of ESCO for Energy Saving**

Started initially as consultancy, training providers and foreign technology suppliers ESCO established its foot print in energy saving sector but the presence since the beginning doesn't received a warm or smooth welcome because of various issues which be discussed in the later part of the paper .Despite of its struggling grounds the importance of ESCO cannot be denied or undervalued as in today's world of rising energy consumption, prices and high consciousness of energy conservation, many officialdoms are taking steps in reducing energy usage by means of more sustainable solutions during construction of new facilities. The governments are also initiating several programs at different levels offering certain incentives and promotional mechanisms.

Energy contracting which is also known as ESCO or Energy Service is a complete energy service concept to implement energy efficiency schemes or plans in production and building facilities according to minimized project cycle cost. An energy service company (ESCO) is a commercial or non-profit business providing a wide range of energy saving solutions such as designs and implementation of energy savings projects [3]. ESCOs are basically different from other energy efficiency improvement cycle, by the concept of performance- based contracting. The ESCO's payment is directly linked to the amount of energy saved both in in physical and pecuniary terms. ESCOs offer similar services as Energy Service Providing Companies (ESPCs). However, in contrast to them, ESCO guarantee the savings and their remuneration is linked to the projects performance which it's self-explain the importance of ESCO in current energy saving scenarios. ESCOs may also provide or arrange financing which no other scheme in this sector do so.

## **3. IMPORTANCE OF ESCO MALAYSIAN PERSPECTIVE**

Malaysia in a market of increasing consumer demand. As shown in Figure 1 that the demand and supply gap is keep on increasing and that increase is quite consistent along the years .Energy demand projected to increase from 2,000 PJ(2009) to 4,013 PJ(2030), average rate of 3.6% /year which itself very alarming and competitive [4]. Government and private sectors both are looking for the alternative energy source and saving techniques short term and long term measures that can be taken is through energy efficiency i.e. ESCO initiatives while working on exploration for new energy sources i.e. renewable and alternative energy [5], [8].

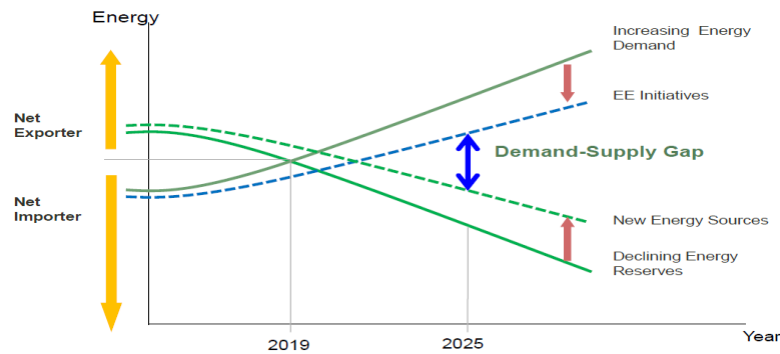


Figure 1. Demand and Supply Gap Malaysia

### 3.1. Problem and Challenges of ESCO in Malaysia

ESCO as a developing and implementing body of comprehensive Energy Efficiency Projects faces a number and variety of problems and challenges. As ESCOs offer performance-based contracts (i.e., contracts that tie the compensation of the ESCO to the energy savings generated by the project) as a significant part of their business so the very first challenge is the past work /saving of any project by that particular ESCO other than that there are more multi-level challenges which occurs pre initiation of the any ESCO project and sometime follow through the post initiation and implementation phase which as follows.

#### 3.1.1. ESCOs Credentials

The very first challenge that as ESCO face is to establish its footprint in terms of its expertise and deliverables. To ensure credentials, ESCOs must demonstrate the technical & managerial competencies to design & implement projects which are involving multiple technologies like Lighting, Motors & Drives, Heating & steam systems, HVAC Systems, Control Systems, Maximum and minimum Demand Controls, and Building Envelope Improvements at building/industrial facilities.

#### 3.1.2. Priority VS Business Environment

EEP's (Energy Efficiency projects) are usually views as infrastructure investment which is a hurdle for ESCO to penetrate for a business and also to play its role for energy saving as EEPs have low priority vs core business the business or project model that don't fix or replace until its broken is one of the key problem as well as challenge for ESCO to initiate an EE project.

#### 3.1.3. Energy Efficiency Awareness

One of the most vital issue or problem is that the consumer or the facility owner not convinced on actual cost savings claimed or achieved or aware of proven Measurement & Verification (M&V) methods to ensure sustainability of savings. This unsure attitude is time consuming challenge for ESCOS as the credit share is totally based on the Energy savings and it directly affect the profit margin of the particular ESCO and sometime also may lead to a legal dispute.

#### 3.1.4. EEP's Funding and Low Benefits

As ESCO concept is that it generates its own funds through the mean of banking loans, Ministerial funding's or direct investment for the implementation of the project which is time and efforts consuming as the procedures are too long or the base amount is too low which directly effects the credit capacity of the company and it also affect the quality of the project implementation may be phase wise or the whole implementation might be affected. On the other hand the benefits are too low on the expectation or radar scale of the both ESCO and the client if it is compared to the perceived operating complexities and the risks involved. The immaturity of the energy efficiency market is the core reason behind all this In common, the costs of project development are quite high and most small ESCOs find it difficult to finance project development costs. On top of that there is limited experience with successful ESCO projects and ESCOs have not yet developed good credibility with intensive energy users, policy makers and financial institutions. In Malaysia especially Banks and other funding providers are not fully aware and convinced about the concepts and risks factors in business models for ESCO.As in Malaysia still the financial institutes consider the Energy Efficiency Projects or Programs as High Risks and its directly affecting the related industries and sectors also.

### 3.1.5. Implementation Policy and Mechanisms Unclearness.

Lack of clear policy and mechanisms to implement big scale energy efficiency projects is also one of the main problems ESCO facing especially in Malaysia. The absence of a common and clear policy with targets to be achieved at the national level for energy efficiency is another big obstacle for ESCOs to grow. Both public and private sectors do not know on how much should be their contribution to achieve the national efficiency targets because simply there is no targets have been given or decided. Energy efficiency ingenuities with capital expenditures often implemented on project to project basis based on existing conventional business model i.e. purchasing mechanisms and procedures. The other issue in this model is that the foundation of these procedures is based on expenditure by the owner of the facilities/client and when the budget is not secured, projects implementation will have to wait for another budget to be approved or obtained [6-7].

All the above issues or factors left ESCOs with limited prospects to tap bigger investment potentials of energy efficiency projects and therefore they have to compete among the conventional technology providers and product suppliers to secure clients. As a support services providers in EE industry, ESCOs would not be able to grow further in this environment. This is because the ESCO's business model such as EPC is meant to get faster results, long term benefits and more risks taken by ESCOs for their solutions while the conventional business approach is mainly based on the most competitive or cheapest price to secure clients. Project Management as a saviour of ESCO can be proposed as the combined model offers much simplicity from the project initiation designing, development and implementation phases.

## 4. PROJECT MANAGEMENT AND ESCO

Project management involves planning and organization of a company's resources to design, initiate, develop and implement a specific task or project. It typically involves a one-time project rather than an ongoing activity, and resources managed include personnel, finances, technology and intellectual property project management also involves project planning, monitoring, and control Project planning includes definition of work specification, determination of quantity of work, and estimation of resources required. The concept of project management in which a large project may be broken down into several activities can be used as a helpful tool for EE Projects [6-7].

### 4.1. Useful Tools of Project management for ESCO

The definition of a project has suggested that there is a positioning towards higher and long-term targets. Important parameters within the targets will be return on investment, profitability, competition and market ability. Project Management draw a factors list for the implementation of a project from scratch to top those factors are also the keen interest of any EE Project implementation factors are as follows:

1. Realistic goal ( Projected /Calculated Energy Saving in terms of Units and billing )
2. Competition ( Other EE technology assessment according to the facility conditions )
3. Client satisfaction ( Client awareness about project initiation and tracking which leads towards the results )
4. Definite goal ( Clear Identification of ESCO operation need to be implemented e.g. retrofitting or only monitoring and controlling )
5. Profitability (Projected Profit Calculation and its tracking throughout the implementation process )
6. Third parties ( sub-contracting if needed and its impact on the total profit /savings )
7. Market availability (Availability research of Project material and resource supply before and during project implementation)
8. The implementation process (Decision of Stages /Phase of Implementation with ESCO and client consent )
9. The perceived value of the project (Total investment cost and saving will give the perceived value of the Project).

#### 4.1.1. ESCO Success and Failure and Project Management Principles

Project Management is a valuable discipline that allows ESCOs to meet their clients' goals/targets. Not only electrical construction management but also subcontractor management by using a consistent project implementation methodology the tracking of an EE project implementation can be made smooth which directly affects the total cost and energy savings [9].



Figure 2. ESCO Proposed Project Cycle

Project management itself is an enduring and iterative process or cycle as shown in Figure 2. The analytical principles of project management can be used throughout the project implementation, not just at the initial planning phase. Even on a project which is progressing satisfactorily, planning and estimating “to completion” is an essential component of managing the project. However, the resultant documentation must never be allowed to become an end in itself. Project management and control systems, planning and other documents, and procedures are no more than tools for achieving that particular project set objectives [10-11]. They prove their value only to the extent that they enable one to manage projects more successfully.

## 5. CONCLUSION

After the review of the current on going practices and exploration of the challenges and problems of ESCO it can be clearly established that For an Energy Efficiency project to be successfully implemented and operational there must, first, be an improved appreciation of the role of project management and its analytical principles within projects, and this role must be placed within the context of a wider project alongside other outside criteria and long-term expectations. The project manager or implementing ESCO must allow the client/facility owner to contribute actively in the planning and production phases and at the same time the project team involvement has to be extended into the utilisation phase. This would be accommodated properly in a project evaluation technique that examines not only the implementation processes but also the economic and financial performance will be improved as the projected and calculated saving of energy and cost must be up to or near to the client or facility owner’s expectation or demand. ESCO must always bear in mind that successful project management techniques will contribute to the achievement of projects, but project management will not stop a project from failing to succeed. The precise project will succeed almost without the success of project management, but a good and successful project management will enhance its success.

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