ESCo market development: A role for Facilitators to play

Jan W. Bleyl
IEA DSM Task XVI c/o Energetic Solutions
Lendkai 29, 8020 Graz, Austria or Frankfurterstr. 12, 76344 Leopoldshafen, Germany
EnergeticSolutions@email.de

Nathalie Adilipour
Swedish Energy Agency
Kungsgatan 43, P.O. Box 310, SE-631 04 Eskilstuna, Sweden
Nathalie.Adilipour@energimyndigheten.se

Markus Bareit
Swiss Federal Office of Energy (SFOE)
3003 Bern, Switzerland
markus.bareit@bfe.admin.ch

Charles-Henri Bourgois and Johan Coolen, both
Factor4
Lange Winkelhaakstraat 26, 2060 Antwerpen, Belgium
Charles-Henri.Bourgois@factor4.be, johan.coolen@factor4.be

Ger Kempen
Escoplan
Binnenhof 62-b 1412 LC Naarden, The Netherlands
g.kempen@escoplan.nl

Kim, Kil-Hwan and Jang, Hye-Bin, both
Korea Energy Management Corporation
388, Poeun-Daero, Suji-Gu, Yongin-Si, Kyonggi-Do, 448-994, Republic of Korea
kimkh@kemco.or.kr, janghb@kemco.or.kr

Cho, Sung-Hwan
Jeonju University, Dep. of Mechanical and Automotive Engineering
1200 3-ga, Hyoja-dong Wansan-gu, Jeonja 560-759, Republic of Korea
shcho@jj.ac.kr

Lieven Vanstraelen
Fedesco Knowledgecenter
Royal Green House, Rue Royale 47, 1000 Bruxelles, Belgium
lvanstraelen@energinvest.be

Abstract

Energy-Contracting is a many times proven ‘delivery mechanism’ to implement demand side energy efficiency and (renewable) supply projects in buildings and industries. However market volume is behind expectations in comparison to market potential forecasts and its contribution towards energy policy goals.

There is plentiful empirical evidence (e.g. from public institutions putting out tenders for ESCos to bid on) and growing awareness among stakeholders, that successful energy service market development requires a strong commitment and a ‘driving position’ on the client side. In this paper we want to find out, what the challenges and barriers are on the client side of the energy service market, when setting out to procure energy services? Which know-how, procedures and organizational change processes are needed? And how can potential clients be enabled to do so?

The analyses reveals a need for a broad and interdisciplinary range of activities and know-how such as project development and communication skills, interdisciplinary feasibility studies, life cycle cost analyses, “make or buy” decisions, structuring of business and financing models, procurement specifications and procedures, legal advice and contracts up to quality assurance, measurement and verification (M&V) of the project performance.

As a solution, we have found that so called ‘Facilitators’, who mostly consult on behalf of a client, can play an important and enabling role and have successfully done so. Besides enabling project development, another important advantage of this buyer-led approach is to foster competition between ESCos, other EE suppliers but also financiers. Likewise important, the Facilitator approach provides a fair and level playing field for this competition. Another Facilitator role is to serve as an intermediary between clients and ESCos ‘(corporate) cultures’, interests and expectations in different phases of the project cycle.

However we also want to raise awareness among Facilitators and other stakeholders, that the identified organizational needs for change require approaches beyond economic rationale or environmental awareness. Instead psychological and organizational change processes need to be put on the agenda, even though this may be new territory for most energy efficiency professionals.

Project facilitation cost in the more developed facilitation markets turned out to be on average at about 3 % of the investment cost for the demand side measures, decreasing with project sizes. In a first approximation this is about one half order of magnitude below standard engineering cost. However this up-front investment often constitutes an obstacle for project development and we would like to raise the attention of policy makers to this opportunity to support market development. It was also repeatedly mentioned by clients and Facilitators, that through an intensive (but fair) competition between suppliers, the advantages achieved with regard to prices and quality outweigh the initial facilitation cost by far.

To our knowledge, the figure of the Facilitator is hardly mentioned in the literature. The goal of this paper is to create a scientific reference of the project and market Facilitator case for further discussions. Furthermore we want to demonstrate the added value of a wider application of Facilitators for ESCo market development and provide guidance for facilitation services and activities as well as policy recommendations.

Methodically, the research builds on an analyses of a typical energy services project life cycle, primarily from the perspective of a client, taking a ‘negotiated procedure’ as the procurement model. Existing ‘Facilitator’ services and activities were identified through interviews with ESCo clients, Facilitators and ESCos in six European countries and Korea. This was also the source for an economic analyses of project facilitation cost, which relies on empirical data from 32 “real world” projects. For the analyses of change processes, we refer to Kurt Lewin’s model of change and take a first approach to apply it to client organizations and its individuals who want to outsource demand side energy projects.

We believe the Facilitator approach will need to be multiplied and better funded to foster ESCo market development. It will also need to become a standard procedure in public and private sector administrations in order to support structuring and procuring of comprehensive energy service projects. This is particularly true, if the market is to develop from individual projects, led by highly motivated individuals, to mass roll-outs of comprehensive building refurbishment portfolios. Only then will the energy services industry be able to provide more significant contributions towards energy policy goals.

Introduction

The concept of Energy-Contracting - also variously referred to as ‘ESCO Services’, ‘Energy-Services (ES)’, ‘Energy Efficiency Services (EES)’, ‘Contract Energy Management (CEM)’ etc. - is a many times proven “delivery mechanism” to implement energy efficiency and (renewable) supply projects in buildings and industry. Even though market volume has increased in many European and other countries, e.g. in Germany by about 10%/a [VfW 2011], the current achievements are behind the expectations of energy policy goals and market studies, in particular for the Energy Performance Contracting (EPC) model.

In recent years awareness among stakeholders has risen, that successful ESCo market development is often driven by the client side, e.g. by public institutions putting out calls for proposals for ESCos to bid for. In fact, these processes were frequently enabled by so called “Facilitators”, which acted as independent intermediaries between ESCOs and their (potential) clients – mostly consulting on behalf of the client side. This perception of a buyer-led approach led us to focusing more on the client perspective on energy service markets when thinking of ways how to foster market development.

This view recently also appears to be reflected in the Horizontal Provisions of the European Union’s Energy Efficiency Directive, that “Member States shall support the proper functioning of the energy services market” by

"enabling independent market intermediaries to play a role in stimulating market development on the demand and supply sides." [2012/27/EU]. Also service providers, e.g. represented in the German ESCo association VfW acknowledge the role of energy agencies and independent consultants to support clients to develop ESCo projects and demand support to establish more project developers [VfW-AK ESC 2012].

The best known case in Europe for a client-driven ESCo market development is the "Energy Saving Partnership" in Berlin [SenStadt+BE 2002], but likewise estimable, other federal states in Germany such as Bremen [energiekonsens 2012], Hessen [Hessenenergie 2012], Niedersachsen [EA.NRW 2012] or the "Interkommunale Energiespar-Contracting (IKEC) in Baden-Württemberg [KEA 2012] have successfully developed and procured sometimes very innovative ESCo projects and programs. In Austria, the "Federal Contracting Campaign" has led to ESCo projects for some 550 buildings, bundled in 17 pools [BIG 2011, quoted after ESCo Outlook 2012]. On the federal state level the Upper Austrian "Energy-Contracting Program" has yielded 56 projects up to now [ESV 2011, quoted after ESCo Outlook 2012], and the Landesimmobilien-Gesellschaft mbH (LIG), the real-estate holding and management agency of the regional government of Styria is implementing an "Integrated Energy Contracting" Program [Bleyl 2011]. Other examples are the "RE:FIT" program in London [RE:FIT 2012] or the "EPEC" project in Sweden, which is a knowledge platform and has contributed to the development of the procurement process in energy performance contracting [EPEC, 2006]. This list does not claim to be comprehensive, but shall demonstrate the widespread diffusion of the client-led approach in Europe. However, despite the rather large number of proven cases (not all of them being invariably successful off course), the overall market development is behind expectations, e.g. in order to achieve 2020 energy saving goals.

The literature provides various indications for obstacles of energy efficiency technologies (e.g. [Marino et al. 2011], [Sorell 2007]). Often these are described in rather general terms as lack of "financing", "information", "know-how" or "resources" and others, which explain their rather slow market diffusion more or less well in our experience. Literature also offers some recommendations on how to overcome these barriers. However, we found very little documentation or analyses of the role of project and market Facilitators for ESCo market development in the literature [VfW-AK ESC 2012], [Bleyl, Seefeldt 2012]. The goal of this paper is to fill this gap and to

1. create a scientific reference of the project and market Facilitator case for further discussions,
2. demonstrate the added value for a wider application of Facilitators for ESCo market development and
3. provide guidance for facilitation services and activities as well as policy recommendations.

The underlying goal is to increase understanding of the opportunities and barriers of Energy-Contracting as a delivery mechanism for performance based energy efficiency and supply services in order to support ESCo market development and to increase its contribution to achieving energy policy goals.

The research questions can be summarized as follows: which know-how, procedures and organizational change processes are needed on the client side of the energy service market? And secondly, how can Facilitators enable (potential) clients to structure and outsource comprehensive demand side energy projects to ESCos?

This paper is structured as follows: We set out by describing the various interdisciplinary questions, challenges and tasks a potential ESCo client faces on the energy service market. We then give a detailed overview of typical activities Facilitators perform along the project life cycle to support clients. Here we differentiate between specific project facilitation and more general market facilitation activities. This is followed by economic analyses of project facilitation cost in relation to investment cost. Before summarizing and drawing conclusions, we also reflect the development of ESCo projects in public and private administrations against the need for organizational and psychological change management.

We do not cover in detail any specific facilitation topics such as selection of procurement procedures and ESCo models or life cycle cost analyses, nor any technical aspects of energy efficiency measures in this paper. Generally, we assume that the reader has a basic knowledge of the Energy-Contracting (EC) approach as well as comprehensive demand side energy projects in buildings and industry.

Methodology

Answers to the research questions are provided by drawing on different resources and methodologies. To identify know-how and processes needed to outsource comprehensive energy service projects, we have analyzed a typical energy services project life cycle, primarily from the perspective of a client. As a procurement model, we take a 'negotiated procedure', which is often applied in European public ESCo markets to select a best bidder. The analyses of 'Facilitator' services and activities for ESCo project and market development is based on interviews with existing ESCo clients, Facilitators and ESCos in six European countries and Korea. In each

country between three and five open interviews were conducted[1]. The guiding questions were 1. What kind of consultancy services are offered?, 2. What kind of organizations are involved? and 3. What kind of funding is used? The results are again structured along an energy service project life cycle. The Facilitator approach is applicable to both public and private sector clients and independent of a particular energy service business model (ESC or EPC).

The economic analyses of project facilitation cost relies on empirical data from 32 "real world" ESCo projects in different European countries and from South Korea, out of which 28 were based on an EPC business model, four IEC and one ESC project. In addition we had one aggregated data set from Switzerland for saving measures in some 2,300 companies in the context of CO_2 target aggreements. For the analyses of the change process we refer to Kurt Lewin's model of change [Lewin 1963] and take a first approach to apply it to change processes to enable client organizations and its individuals to outsource demand side energy projects.

The above analyses is supplemented by desktop research and practical experiences from members of 'Task XVI', the energy service task of the International Energy Agencies' Demand Side Management Implementing Agreement [IEA DSM Task XVI 2012] and from Germany.

Procuring Energy Services – a clients perspective

The goal of this section is to identify know-how, processes and skills needed to successfully outsource comprehensive energy service projects, primarily from the perspective of a (potential) client. To do so we follow a typical energy service project life cycle. On a timeline, four main phases are distinguished: 1. Project development, 2. Procurement, 3. Construction and 4. Service delivery and operation.

By way of example, the figure below summarizes the main process steps for clients and ESCos following a negotiated procurement procedure, which is often applied in European public ESCo markets to select a best bidder for comprehensive energy service projects.

Figure 1: Outsourcing energy projects: Overview of workflow (client and ESCo) and typical lead times

This approach is applicable to both basic energy service business models Energy Supply and Performance Contracting – in fact the selection of the business model should be part of the project development phase.

Based on the above work flow, the main, non-technical challenges a client needs to resolve in order to structure and procure comprehensive energy service packages are derived and can be summarized as follows:

1. Project development phase:

- During the project development phase, first of all the concrete project goals and resources available need to be established in consultation with the key stakeholders, which requires good communication skills. Also the facilities are identified and the scope of service and interfaces defined, typically based on an interdisciplinary feasibility study[2]. The client needs to take a basic 'make or buy' decision, weather to

[1] It should be noted that the evaluation method in the different countries were not standardized in every detail, wherefore different evaluation and interview techniques may have been applied. Consequently, the results obtained may not be directly comparable between all countries.

[2] This feasibility study does not need to be an (investment grade) audit, but should assess technical, economical, financial, legal and organizational project feasibility (an IGA should be done by the ESCos selected in our view).

outsource or not. In case of outsourcing, the ESCo business model (e.g. ESC or EPC) needs to be selected and adapted to the project. Last but not least project financing requires structuring, which necessitates budget arrangements and sourcing (opex, capex ...). All the above tasks require good social and interdisciplinary project management skills.

- In order to justify decisions for capital intensive measures with long pay-back periods, the economic appraisal requires a **life cycle cost evaluation**. This is still not common practice and tools or experience are not often readily available.
- **Financing** requires multi-year commitments and sourcing from capital as well as operational budgets. To do so in the public sector, budget law provisions and budgeting procedures need to be adapted.
- **Contractually**, ESCo contracts typically encompass a mixture of works, supply and services components with long contract terms, which may raise concerns of contract security and others.

Many of the above listed skills are actually needed in other phases of the project cycle as well, examples being economic life cycle cost appraisal for the assessment of the ESCo offers, the detailed structuring of the financing or the adaption of the contract model to the final project design and best bidder. Also communication and interdisciplinary project management skills are needed throughout the project cycle.

2. Procurement phase (2a – 2f in Figure 1):

- For the tender announcement, the selection of a procurement procedure requires an estimation of the project value and a decision on company qualification and selection criteria. For the proposal evaluation project specific award criteria are needed.
- Instead of procuring individual pieces of the project package, the entire project cycle is outsourced, typically to one general contractor. Corresponding to the comprehensive nature and outsourcing of financial, technical and operational project risks, typically negotiated or competitive dialogue **procurement procedures** are applied. In terms of public procurement legislation, this is justified, because "a prior and overall pricing is not possible, due to the nature or because of the risks associated with the delivery of the services."[3]
- **Tendering** is typically done using functional specifications which cover the entire project cycle (as opposed to detailed specifications for different trades and individual stages of the project cycle).

3. Construction: No particular tasks besides building owner representation and controlling

4. Service delivery and operation phase:

- **Measurement** & **verification** and quality assurance skills are needed to assess the deliverables of performance based energy services, in particular for savings achieved in EPC contracts (c.f. [IPMVP 2012] or other approaches). And even with professional M&V approaches, inaccuracy and a degree of insecurity of the savings achieved may still remain as [Waltz 2002] points out.

Other obstacles may arise from the split incentives between owners and tenants in rented buildings. Or if there is a (possible) change of facility ownership or utilization before the end of the contract term. Also limited trust in a long-term partnership over an entire contract term, e.g. if the ESCo is small, are sometimes mentioned.

Last but not least, an ESCo project involves various competencies and responsibilities in a client's organization across different departments and even within technical divisions. These different entities may or may not necessarily share the same interests. For example in Germany for a building belonging to the central government, there are seven departments involved: two ministries, four subordinate administrations (with responsibilities for the building and the usage of the building) and a federal institute (the owner of the building). Another example from Belgium is the maintenance team of a technical department, which has a multi-year plan established, that interferes with the outsourcing activities foreseen. More generally, often the integrated planning approach challenges the independent and established business activities of individual technical disciplines and their individual representatives.

To summarize, some of the above task and challenges may constitute significant obstacles for a potential client to procure comprehensive energy service packages, because they require know-how and experience, which is not readily available to customers who are used to operate their facilities "in-house". Moreover, project implementation commonly necessitates organizational and personal changes from established routines, procedures and personal relationships, which is often an overlooked but persistent obstacle. The latter topic is addressed later in a separate section

[3] BVergG 2006 § 30 (2) Austrian public procurement law (translation by authors)

We conclude that many potential clients will need internal or external support to solve some or all of the above tasks and challenges. This thesis is also supported by the fact that the above requirements and more generally energy efficiency are typically not core business activities of a client's organization. Also life cycle cost minimization processes, regulations and tools are often not in place and existing procurement processes are designed to buy individual components, not integrated package solutions. Not least, the task of contracting with an ESCo arises only once per project cycle of typically five to fifteen years (or even up to 30 years for building envelope refurbishments). Furthermore this thesis is supported by ample empirical evidence: Many successful EPC projects - as listed by example in the introduction - were in fact developed with external support from so called Facilitators. (c.f. [Bleyl, Seefeldt 2012])

Project (and market) Facilitators to enable clients

In this section we summarize activities and services to support and enable clients to outsource concrete demand side energy projects. Secondly, we describe more general activities for ESCo market development, like awareness raising, information platforms or lobbying. As a first result we propose to differentiate between project specific facilitation and more general market facilitation activities, to be labelled as 'Project' and 'Market Facilitators'. In this paper we put an emphasis on project facilitation but give at least an overview of typical market facilitation activities and actors as well.

The focus of the research was mainly to identify concrete facilitation activities performed but we also looked at types of organizations and examples as well as sources of funding. Standard technical project engineering tasks (e.g. HVAC engineering) are not seen as project facilitation activities and accordingly are excluded here.

Project Facilitator Services

What kind of consultancy services are offered by Project Facilitators to support their clients to structure projects in order to contract comprehensive energy services packages to ESCos? Here we summarize the results of a market survey by providing an overview of project specific facilitation activities (without describing these in much detail here). The results are categorized into 1. Typical services performed, 2. Types of organizations and examples as well as 3. Sources of funding. As in the previous section, the presentation of the project facilitation activities is structured along with the project life cycle as displayed in Figure 1.

1. Typical project facilitation activities along an energy service project life cycle

1. During the project development phase, a variety of different consultancy services are offered:

- Financial rough analyses of monetary saving potentials and net present value of future saving cash flows. Sometimes the analyses is based on an opportunity cost model. A financial approach was described as more successful with business managers, who are not interested in detailed technical solutions. This approach may be the bases for a decision to investigate project feasibility in more detail.
- Technical rough analyses: Appraisal of technical and economical performance indicators and benchmarking in order to achieve a first estimation of potentials. This approach is often used as a first step in communication with a clients technical managers.
- Technical-economical-ecological comparisons of different efficiency or supply measure options on the bases of a life cycle cost analyses, pay back times and other economic evaluations.
- Facilitation of "make or buy" decisions by comparing the pros and cons but also the requirements of outsourcing versus in-house implementations;
- Workshops with client's and their stakeholders, where 1. Opportunities, risks and requirements of ESCo models are presented and 2. The project specific goals and framework conditions as well as the components of the energy service package are defined. Another aspect of these workshops often is to enhance communication between different stakeholder groups and individuals to resolve possible conflicts of interest.
- (Technical) project pre-structuring and business model: Definition of project goals and framework; selection of facilities, scope of service and interfaces and in succession selection and adaption of ESCo business model.
- Financial pre-structuring: Selection and adaption of financial model in consideration of equity, third party contributions and assessing of subsidy programs.
- Interdisciplinary feasibility studies to assess technical, economical, financial, organizational and legal feasibility of an envisioned project. These often serve as the bases for a 'go or no-go decision' for a detailed project preparation and call for proposals

Across the different tasks, a Facilitator's job often is to facilitate communication between all stakeholders involved and to secure interdisciplinary project management up to continuous "hand holding" with a client. The project development phase ends with a basic decision to start the procurement process and with the allocation of resources or to end the project. Most of the above consultancy services are needed again in later phases of the project cycle, e.g. life cycle cost assessment for tender evaluation, technical and financial project structuring and fine-tuning of the contract model to the final project design and best bidder. And last but not least of course communication and project management.

2. Procurement phase. Basically Facilitators offer to manage the entire procurement process on behalf of a client. This typically encompasses activities such as:

- Selection of a procurement procedure based on an estimation of the project value, an analyses of the predominant nature (goods, supply or services?) of the contract to be signed and if the scope of service allows for a competition of technical and economic solutions.
- As derived from the project goals, the ESCo company qualification and selection criteria as well as the award criteria for the evaluation of the ESCo offers are defined.
- Drafting of the tender documents (ToR, specifications): For complex energy service projects, mostly functional specifications for the technical, economical, organizational, financial and legal requirements and framework conditions of the service package are used (this also includes baselines for EPC business models). Furthermore, the tender documents typically consist of a model contract, general comments on the award procedure and a proposal template.
- ESCo contract design: Legal advice; selection of model contracts; adaption to project and business model, incorporation of project specific contents and negotiation results after the best bidder selection. The final product is a contract ready to be signed by client and ESCo.
- In the case of a Negotiated or Competitive Dialogue Procedure, two to three rounds of negotiations are organized and conducted with the biddings ESCos. During this phase technical and financial project refining is achieved. After every round of negotiation, the proposals are evaluated to finally arrive at the best bidder.

Another service for ESCos and their clients is an independent ESCo offer appraisal. This service includes recommendation to financial institutions (FI) and a guarantee to clients to continue project operation in the case of an ESCo failure. It is offered by ESCo associations in Germany and Switzerland.

3. During the construction phase, Facilitators sometimes resume building owner representation and project management tasks for implementation supervision and commissioning. These services are often agreed in separate contracts.

4. During the service delivery phase, often (independent) **measurement and verification** by a third party are provided. This may include drafting of M&V plans and controlling; quality assurance. Also invoice verification and mediation between client and ESCo may be on the agenda. These tasks run continuously over the project term and are often agreed in separate contracts.

Figure 2 pictures the key tasks and relationship of Facilitators as intermediaries between clients and EE suppliers.

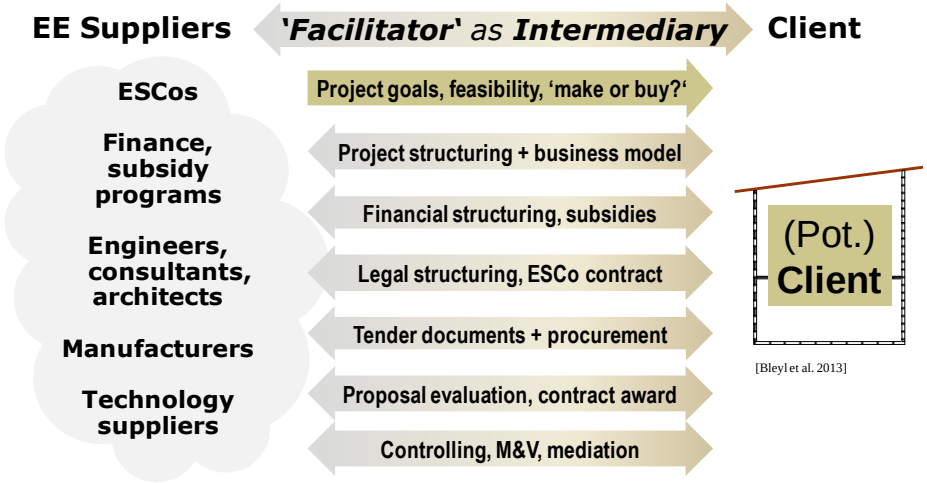

Figure 2: The Project 'Facilitator' enables and links client and suppliers as intermediary

Another important Facilitator role is to serve as an intermediary between clients and ESCos "cultures", interests and expectations in different phases of the project cycle. This mediation may encompass guidance to ESCos on energy related client needs and requirements either for specific projects or in general, information and exchange about innovative energy services models or cooperation opportunities. Sometimes also client's expectations towards ESCos and energy service models need a 'reality check' in order not to overburden the model. Or mediation may be needed to find consensus how to adapt energy cost baselines to changes in utilization of a building or plant utilization. Facilitators can also help to solve billing or M&V issues.

Other Facilitator tasks may be to serve as agents for change processes in client's organizations or to support individuals herewith (c.f. section "Psychological and Organizational Change Processes ...") and a transfer of ownership of the project to the client.

2. **Types of organizations and examples**: We have identified different types of energy agencies (EA) on regional (e.g. [BEA 2012], [GEA 2013], [KEA 2012], [energiekonsens 2012]...) and local levels (e.g. Heidelberg) which currently act as Facilitators. However only a small percentage of the 422 European EAs registered with ManagEnergy [ManagEnergy 2011] have active experience in ESCo project facilitation. National type EAs tend not to be involved in project specific facilitation activities, exceptions being for example the Fedesco knowledgecenter or the German Energy Agency dena. Also (mostly smaller) consultants such as energy efficiency advisories or energy audit companies as well as some legal advisors (e.g. Ernst&Young, Deloitte ...) offer at least the legal aspects of the facilitation process and work in cooperation with experienced energy service consultants.

3. **Funding for project facilitation** activities is mostly provided by the consulted clients, exceptionally also by ESCos. A number of countries and regions have subsidy programmes to support facilitation activities (e.g. in Korea for SMEs of up to EUR 10,000. The German 'Bundesstelle für Energieeffizienz' (BfEE) is currently considering to set up a Facilitation subsidy program). Subsidies for project facilitation were frequently quoted as a good means to overcome project development obstacles.

Market Facilitator Activities

In this paper we put a focus on project specific facilitation activities in order to enable concrete ESCo projects. However in order to distinguish from more general ESCo market development agendas, an overview of typical ESCo market facilitation activities is provided here. The results of the market survey is summarised and categorized into 1. Market facilitation activities, 2. Types of organizations and examples as well as 3. Sources of funding observed. On a time axis these activities are mostly in the forefront of concrete projects in order raise awareness and to provide information to potential market stakeholders but some more project specific activities like management of subsidies are located during project implementation phase.

1. **Market facilitation - sample activities**:
    - Documentation of good practice examples in different end-use sectors either on a searchable data bank or leaflets, e.g. [DECA 2013] [dena 2013], [EA.NRW 2012], [energiekonsens 2012], [KEA 2012],
    - Operation of a 'Contracting hotline', which offers information for facility owners, e.g. [dena 2013]
    - Information and promotion campaigns; organizing of seminars, workshops or conferences
    - Drafting of Energy-Contracting guidebooks, which are addressed to public administrations and other stakeholders to enable project development and implementation. Guidebooks typically contain a description of the different stages of the project life cycle, in particular advice on procurement issues, tender evaluation and sometimes also model contracts (e.g. [dena 2013], [EA.NRW 2012], [energiekonsens 2012], [KEA 2012], [IEA DSM Task XVI 2012]).
    - Provision of model contracts for different business models (cf. also guidebooks)
    - Initiation of ESCo associations e.g. BELESCo in Belgium; ESCoNetwerk in the Netherlands, [DECA 2013].
    - Operation of databanks of existing ESCos, e.g. [Contracting Portal 2013]
    - Supporting measurement and verification of savings know-how: Introduction and translation of the IPMVP protocol to a national framework and organizing of CMVP trainings (e.g. Austrian Energy Agency in 2012)
    - Facilitation of financing and management of subsidy programs: Access to capital, e.g. through low interest financing programs or management of tax incentive programs on behalf of government entities (e.g. KEMCo).

- In some countries, so called ‘Super ESCos’, which are meant to serve as Facilitators and aggregators on the demand side of the market and to facilitate financing have been initiated, e.g. FEDESCo in Belgium or EESL in India [Limaye 2011]
- Last but not least market facilitation activities may also encompass advisory opinions and lobbying for better policy frameworks for the ESCo market.

2. Types of organizations: We found mainly energy agencies on the national and regional levels, which provide market facilitation activities. But also associations of ESCos and EE industry (e.g. BELESCo, [DECA 2013]), communal energy and climate advisors, in dependent consultants (in the framework of funded projects) and federal ‘Super ESCos’ (e.g. Fedesco in Belgium, EESL in India) provide market facilitation services.

3. Funding sources (in decreasing order of relevance): Most market facilitation activities are funded from government money. Important contributions were also found from IEE funded projects. Membership fees of associations and seminar fees are further sources of funding. Generally we found budgets to be widely diverging and very much depending on the activities.

Project facilitation cost and funding

For the economic analyses we have compared empirical data on project Facilitator consultancy cost from some 32 “real world” different ESCo projects. These cost data were analyzed in relation to the investment cost and other relevant project indicators of the respective ESCo projects.

However costs of different projects may not be directly comparable, because they can be a function of project size, complexity of technology systems (e.g. heat only or electricity, water, steam …), data availability (who does ascertainment of basic energy data?) and on the scope of facilitation services performed (entire scope of services as described in the previous section or only parts of it?). Comparability between different countries may be limited by the fact, that the cost evaluations were made sparately by country, wherefore the methods applied can be somewhat distinct from one country to another.

Another problem was limitaitons in data availability in three countries: On grounds of data protection, no disaggregated data were available for Switzerland. There is an aggregated figure of some 2,300 companies, which have contracts with a Facilitator-like organization, that helps them reaching their CO_2 target aggreement (throug a reduction of CO_2-emissions and energy consumption) in order to get exempted from the CO_2-taxation on combustibles. The aggregated investments of the 2,300 companies are 125 Mio. CHF, whereof the Facilitator costs are around 6 percent. The facilitation cost in Sweden are estimations based on the available data. The costs are esimated by the Facilitators and they are not specific for a certain project. They probably vary from case to case. During the analyses it became clear, that in Korea ESCOs are acting as Facilitators for their own projects. Facilitation cost could not be declared seperately from labour and other project related cost, so we have decided to exclude the Korean values from the cost analyses.

Nevertheless, the data in the figure below provide some first indications of project facilitation cost in relation to investment cost. Comparability is best given within countries.

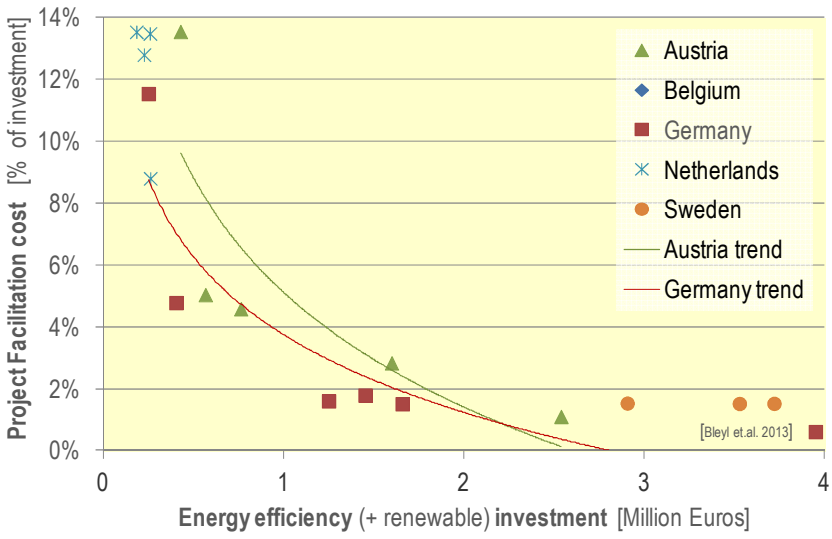

Figure 3: Project facilitation in relation to energy efficiency (and partly renewable) investment cost

In the more developed project facilitation markets in Austria, Germany and also parlty in Sweden, we found typical Facilitator cost to be on average at 3 % of EE investment (and in some projects renewable supply) cost, with a spread between 1 % and 14 %. In absolute numbers, average facilitation cost in Austria and Germany are comparable at 30 thousand Euros, ranging between 16 and 58 thousand Euros; whereas the average in Sweden is at about 60 thousand Euros. Facilitation costs also appear to have only little correlation with project sizes, which means the percentage value decreases for bigger projects. Cost for controlling of invoices, M&V or baseline adjustments during operation phase are typically not included, but are agreed on demand in separate contracts.

Exceptionally high cost values (which are outside of the range of plotted values in the figure above in order to improve the resolution of the main data field) were found in emerging ESCo markets in Belgium and the Netherlands (e.g. in Rotterdam) with values between 9 % and up to 60 % of the investment cost. These costs mainly reflect high shares of initial development expenditures, estimated at a factor of 3-10 times higher than compared to further down the learning curve.[4]

In terms of funding of facilitation cost, the following options could be observed: 1. Payments by client (similar to regular engineering or consultancy project fees); 2. Contract relationship with client but payment of facilitation cost by best bidder ESCo, which was announced already in the tender documentation. In some projects, a share of the remuneration was performance based, e.g. a percentage participation in the savings achieved.

With regard to subsidy schemes for facilitations cost, e.g. the German Federal Office for Energy Efficiency is currently discussing the following financing options for qualified Facilitators: 1. Subsidies for an initial consultancy to introduce EPC, 2. Subisidies for the implementation EPC projects and 3. Performance based incentive paynents to clients and ESCos for highly ambitious EPC projects [BfEE 2013, expert interviews, not published].

Organizational and psychological change management required

As presented in the ’clients perspective’ section of this paper, new approaches, interdisciplinary cooperations and know-how in a variety of areas are likely to be needed in a clients organization in order to structure and procure comprehensive energy service projects. From an organizational and psychological perspective, solving these tasks may require a substantial amount of change in comparison to established routines and responsibilities with typically several different organizational units being affected. On an individual level, resistance may occur because of anticipated loss of power or status, possible extra work or fear of individual failure to cope with innovations may be encountered. Currently, project developers act according to their best personal knowledge and communication skills, but usually without a methodical background for change processes. As a consequence, project development often relies on highly motivated individuals and has not yet become a standard procedure in most (public) administrations.

First of all, we want to raise awareness for these seldomly mentioned and often underestimated barriers to outsourcing of energy efficiency projects. And secondly, we propose to take a look at change management theory and set out to sketch its application to change processes for potential public and private clients to enable them to outsource comprehensive energy projects. In the latter regard, we do not claim to have ready-to-apply solutions, so this attempt should be seen as a first approach towards the problems identified.

Kurt Lewin’s model of change management, distinguishes three consecutive stages of a change process: 1. Un-freeze – 2. Change – 3. Re-freeze [Lewin 1963]. The theory focusses on individuals as the key to sucess. As mentioned beofore, change may threaten the balance of an organization and the psychological security of its members. To ’un-freeze’, the key to kick start a change process is showing why the current way of doing things cannot continue. It is recommended to understand the beliefs, values, attitudes and behaviors that define the organization and its members – and be prepared to challenge them. The prospect of change may put people off balance and can evoke strong reactions. According to the model, this (controlled) crisis is necessary. Without it, there is a lack of the clear motivation and participation, which is deemed necessary to change. As a result of this process, readiness to ’un-freeze’ has to emerge. The ‘Move’-phase describes the change process itself and in the goal of the ‘Re-freeze’-phase is to avoid relapse by creating a new balance and to anchor changes in the (corporate) culture [BdI 2009].

The following table summarizes the change process stages and its application to potential energy service clients.

[4] The same was true e.g. in the early development phase of the Berlin “Energy Saving Partnership” EPC program in the mid 1990s

Table 1 - Change management: Three stages and their application to energy service clients

Change theory stages	**Application to energy service clients:** **=> Proposal of process steps and guiding questions**
1. 'Un-freeze' in which readiness to change has to emerge and how to get into the 'Move' is defined	1. Explain and communicate, why change is needed? Driving forces may either be external (e.g. environmental policy goals or legislative mandates, new technologies, competition, market or societal change) or internal (mission statements, new management or employees, general restructering, reduction of costs or creative individuals, who are convinced of certain ideas). 2. Appointment of a change agent (internal or external), who coaches the process on the customer side (c.f. description of task profile and skill set below).
2. 'Move' in which the change process itsself is implemented	1. Who are the crucial stakeholders to initiate and maintain a change-process (it may help to distinguish four groups: Managers, experts, multiplicators and networkers). => classification of stahkeholders in terms of motivation and impact on the change process. Who might advocate, support or promote the project? Also decide whom not to engage. 2. Enhance communication between stakeholder groups and individuals to resolve conflicts 3. Detailed understanding of process steps for outsourcing (c.f. 'Procuring ES – a clients perspective' section). => Analyses of what ressources are missing? 4. Discussion of pros and cons of outsourcing versus in-house implementation for the organization 5. Analyses of opportunities and threats for the individuals through the outsourcing approach 6. Specification of new duties and responsibilities 7. An important step is an agreement on future ressources for the tasks and responsibilities As a result of stage 2, the organization and its members have been enabled to procure comprehensive energy service projects.
3. 'Re-freeze' Goal: creating a new balance to avoid relapse and to anchor changes in the (corporate) culture	1. Reflection of successes and failures => initatiate improvement processes 2. Documentation of new processes and routines => good practice, lessons learned 3. Exchange of experiences with colleagues and peers in other organizations

As a desired result of the change process, the clients organization is enabled to actively manage the requirements of comprehensive energy service projects. Its members have defined their new roles from managers of individual life cycle parts of a project to being client's representatives and supervisors in 'energy saving partnerships' and controllers of external energy service providers. Thus, they have become knowledgeable counterparts for ESCos. To sustain, the changes have become part of the corporate culture.

The tasks of a change agent may encompass: 1. Reflection of aspects conducive and detrimental to the implementation of change (What are the biggest risks for the process and how can they be met? What are the best methods to keep the process going? Who might be harmful for the project due to negative attitudes towards it (brakeman/opponents)?), 2. to offer support and orientation for initiator of change process and stakeholders, 3. Identification of stakeholders/ affected structures and processes, 4. Perception and observation of mood concerning change (motivation, resistance) and progress in the change process, 5. Creating acceptance by communicating a positive vision. To be successful, the change agent should have strong communication and active listening skills as well as social competences, a sensibility and understanding for different positions of target groups, be able to motivate, inspire and convince and be knowledgeable about the corporate culture and how to use it to implement change. [Re-Co 2013].

Tools for implementing changes are based on organization, information and communication. A successful change process usually requires a good mix of actions. The necessary depth of change is an outcome of the diagnosis. Possible actions are shown in the figure below.

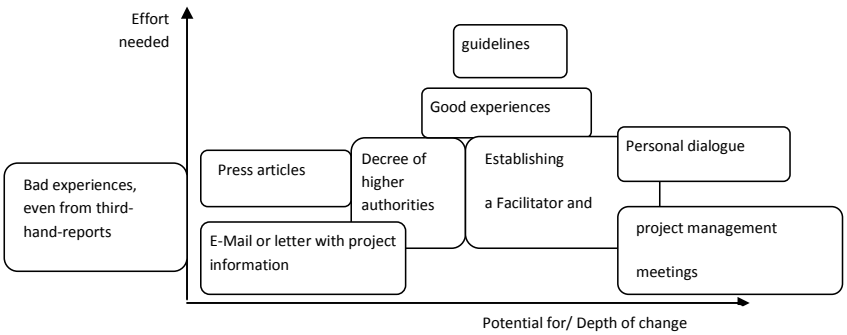

Figure 4: Actions for change in relation to effort and depth of change

To summarize, the change management model is an opportunity to better understand the structural challenges individuals and organizations face, when required to change established procedures. The change management model also offers a systematic and professional approach to overcome typical barriers and find new solutions. The chosen tools and actions should enable employees in (public) administration to choose EPC instead of the standard procurement processes. In doing so, communication and personal dialogue are the most important tools for change management. At the same time it should be mentioned, that further efforts and experiences to develop and apply this approach to EPC need to be made. Relevant research question are: What are the most promising tools to be used by Facilitators for accompanying the change-process and implementing energy services in the areas of organization, information and communication? What can be done to strengthen the driving forces and to „un-freeze“ in clients organization? Who to partner with? And how can experiences collected be spread in order to make EPC-procurement become standard-procedures in public bodies? What is the role of networks and Facilitators in this process?

Summary and conclusions

Market development in a (largely) non-regulated environment is ultimately determined by its (potential) client's decisions to buy or not to buy. Therefore this paper has taken a look at the ESCo market development, predominantly from a client's perspective, both public and private sector.

By their very nature, Energy-Contracting models constitute a significant degree of complexity: they offer solutions for an entire project or life cycle - from design, building, operation & maintenance, optimization, measurement and verification to disposal. And they integrate different technical trades as well as economical, financial, organizational and legal aspects of a project into one customized energy service package, respectively contract.

This integrated and multidimensional approach of performance based Energy-Contracting models opens up solutions for a number of obstacles in the way of energy efficiency projects, which are not achievable through standard planning instruments and procurement practices. Amongst others these opportunities encompass minimization of project cycle cost across the borders of capex and opex budgets, comprehensive planning and optimization across different technical disciplines and trades or performance and operation guarantees for an entire project cycle. In this regard energy services can be seen as a 'delivery mechanism' for energy efficiency and (renewable) supply projects (without discussing pros and cons of Energy-Contracting models or 'make or buy' decisions in this paper).

In return, this comprehensive approach has extensive implications and requirements for all parties involved but may particularly be a challenge for the client side. The need for change in comparison to established, standard procedures, which address only individual parts of the project life cycle, concerns a variety of areas along the project life cycle. Examples are developing and structuring of interdisciplinary projects across technical trades and departments, economic appraisal in terms of life cycle evaluations, multi-year financing arrangements across different capex and opex budgets, non-standard procurement procedures, contractual design of long-term energy service agreements or measurement and verification of the savings achieved.

Particularly from a clients perspective (but also for consultants and want-to-become ESCos as well as in the perception of energy policy makers), we found that these requirements often constitute substantial obstacles and challenges towards comprehensive energy service projects and thus Energy-Contracting market development. Solving most of the above issues requires special know-how and expertise, which is not often readily available in public institutions nor within most private sectors undertakings. We conclude that many clients will need support to enable them in solving the obstacles and challenges outlined above.

As a solution, we have found that Facilitators, who mostly act on behalf of a client, can play and important and enabling role and have successfully done so in different European and other Energy-Contracting markets. The Facilitators role is to consult to the client (and sometimes also the ESCo) and to provide the specific know-how and experience needed in order to surmount the energy services specific requirements outlined above. Additional Facilitator activities may encompass feasibility studies, selection of the best suited energy service business model (e.g. ESC, EPC or IEC), structuring of financing from different internal and external sources or subsidies, preparing tender documents, evaluating ESCo proposal as well as quality assurance and M&V on behalf of the client.

Besides enabling project development, another important advantage of the buyer-led approach is to foster competition amongst the supply side for particular projects. Likewise important the Facilitator approach provides a fair and level playing field for this competition between ESCos, other EE suppliers but also financiers.

Another Facilitator role is to serve as an intermediary between clients and ESCos '(corporate) cultures', interests and expectations in different phases of the project cycle. This mediation may encompass guidance to ESCos on client needs and requirements either for specific projects or more generally, information and exchange about innovative energy services model developments or cooperation opportunities. Sometimes also client's expectations towards ESCos and energy service models need a 'reality check' in order not to overburden the model. Or mediation may be needed to find consensus on how to adapt energy cost baselines to changes in utilization of a building or plant utilization. Facilitators can also provide independent advice how to solve billing or M&V controversies.

But even the best Facilitator will not be successful, if a client's organization and individuals are not enabled to meet the requirements and to become supportive and knowledgeable counterparts for comprehensive Energy-Contracting projects. We want to acknowledge the fact and raise awareness among Facilitators and other stakeholders, that the identified needs for change require approaches beyond economic rationale based on a 'homo oeconomicus' concept or environmental awareness. Instead psychological and organizational change processes need to be put on the agenda, even though this may be new territory for most energy efficiency professionals. A key task is to enable the members of the client organization to define their new role as clients representatives and supervisor in 'energy saving partnerships'.

Facilitation costs are up-front investments for project development and creating a level playing field for competition. In principle they are comparable to other up-front planning costs like fees for architects, engineers or other consultants. Even though more cost data would be needed for an in depth analyses, we found typical facilitation cost in the more developed project facilitation markets in Austria, Germany and Sweden to be 3 % of EE investment cost on average with a range between 1 % and 14 %. When comparing this cost to typical planning fees for engineers of - in first approximation - between 10 and 15% of the investment cost, the facilitation cost figures are notably lower - on average by about one half order of magnitude. It was also repeatedly mentioned by clients and Facilitators, that through an intensive (but fair) competition between suppliers, the advantages achieved with regard to prices and quality outweigh the initial facilitation cost by far.

However, at least initially, facilitation cost has to be borne by the clients. This up-front investment often constitutes an obstacle for market development and we would like to raise the attention of policy makers to this opportunity to support market development. Facilitation cost also appears to have only little correlation with project sizes, which means their percentage value decreases for bigger projects. On the other side of the coin, this means that facilitation cost for smaller investment projects can be prohibitively high. In this context, facilitation cost can also be viewed as transaction cost and thus can be used as an indication for minimum project sizes of Energy-Contracting projects (c.f. [Bleyl et al. 2009]).

These conclusions are supported by empirical evidence from a number of ESCo market examples in Europe. Here, Facilitators supported potential ESCo clients and thus have successfully contributed to ESCo market development by creating a demand pull through enabling energy service project development, which led to calls for proposals for ESCos to bid on.

Outlook

Furthermore the Facilitator approach requires more knowledgeable and professional players as also requested in article 18 of [2012/27/EU] and by some ESCo associations. Since the nature of Energy-Contracting is not only complex for clients but for Facilitators as well, project facilitation requires interdisciplinary training and experience in the various fields of EE and RE technologies, life cycle cost evaluation, procurement of comprehensive services, contract design and not the least communication skills to facilitate between the different parties involved. The curriculum should be application-oriented and can be deducted from the typical facilitation tasks to be accomplished. Ideally, Facilitators should have knowledge and understanding of both the demand and supply side of the market.

Clients will need to decide which parts of the facilitation know-how they want to build internally and for which topics they prefer to hire external consultants. This is again a 'make of buy' decision, which will depend on the time frame, the resources available and the foreseeable number of projects in a client's portfolio to be outsourced. Whether this training can be left to commercial seminar providers or would need another institutional set-up is open for discussion. Proof of training or a comparable certification of professional competence could be made mandatory if public subsidies are to be utilized.

In the context of change processes we would like to encourage more interdisciplinary cooperation and research between the traditionally technically or policy led energy efficiency community and behavioral economists and

change management professionals, e.g. with IEA DSM 'Task XXIV: Closing the loop - behaviour change in DSM: From theory to practice'.

It would also be interesting for future work to compare the buyer-led, facilitation approach to the more ESCo-led project development practice, which appears to be prevailing in Anglo-Saxon countries and other developing markets around the world, which have received technical assistance from mostly US-led assistance programs.

However despite the opportunities the Facilitator approach can enable, we should not lose sight of the fact, that some obstacles to EE can only be solved through legislative or regulatory changes, namely budgetary household regulations and respective accounting rules (e.g. for 'ring-fencing of savings') to permit signing and administrative implementation of long-term ESCo contracts in national, provincial or municipal public households but also in many private undertakings. Another prominent example, where legislative intervention is needed are the split incentives between landlord and tenants in the residential and commercial building sector.

The above issues will need to be addressed and the Facilitator approach multiplied, if the market is to develop from individual projects, led by highly motivated individuals, to mass roll-outs for comprehensive building refurbishment portfolios in order to provide more significant contributions of EE and more specifically the energy services sectors to our energy policy goals.

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