MAKING ENERGY SERVICE COMPANIES (ESCOS) FUTURE FIT

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ABSTRACT

Energy service companies (ESCOs) are faced with a range of challenges and opportunities associated with the rapidly changing and flexible requirements of energy customers (end users) and rapid improvements in technologies associated with energy and ICT. These opportunities for innovation include better prediction of energy demand, transparency of data to the end user, flexible and time dependent energy pricing and a range of novel finance models. The liberalisation of energy markets across the world has leads to a very small price differential between suppliers on the unit cost of energy. Energy companies are therefore looking to add additional layers of value using service models borrowed from the manufacturing industry. This opens a range of new product and service offerings to energy markets and consumers and has implications for the overall efficiency, utility and price of energy provision.

1 INTRODUCTION

This paper describes four different examples of energy service companies currently operating in the UK and discusses the changes that the energy sector will face and opportunities for new service offerings for the future. Energy service companies (ESCOs) are defined as: A company that provides energy efficiency related and other value-added services and for which performance contracting is a core part of its energy-efficiency services business (Larsen, Goldman, and Satchwell 2012; Vine 2005). ESCOs are gaining popularity as energy end users find that they must invest heavily to meet ambitious sector or organisation specific carbon emission reduction targets and against consistently increasing and volatile energy prices. The types of ESCO and the services they offer are also becoming more complex and nuanced as the options for energy efficiency and onsite generation become cheaper against conventional energy provision.

The following sections describe the different business models available to ESCOs and then sets out some of the challenges and opportunities facing the energy sector in general over the coming decades.

2 ESCO BUSINESS MODELS

There are several business models commonly used to construct ESCOs, each suits different types of service provision and different types of end user. Different companies tend to focus on different service offerings given their history and capabilities. Larsen et al. (2012) split ESCO offerings into the categories of Guaranteed Savings and Shared Savings models. This definition is drawn from experience in the USA ESCO market and is found to be appropriate for ESCOs observed in the UK. However the literature regarding USA ESCOs tends to focus on projects that save energy through investments in more efficient equipment rather than companies that are providing a commoditised energy service or product such as heat, power or cooling. The distinction between guaranteed savings and shared savings remains useful for investigating trends and opportunities in the UK market.

Under the shared savings model the ESCO operates as a service provider between the customer and a financier. The ESCO holds responsibility for maintaining and operating the energy services equipment and holds a contract with the financier based on the asset value of the equipment and a separate contract with the customer that defines how savings associated with the energy services equipment will be shared between ESCO and customer. The ESCO will use its portion of the savings to repay the investment made by the financier as per the terms of the investment agreement. Under the guaranteed savings model the customer has two separate contracts, one with the financier which is a loan based on the estimated savings available from installing the energy service equipment, and another with the ESCO in which the ESCO guarantees that the equipment will make a cost saving sufficient to cover the loan repayments plus a fee to the ESCO. If the equipment underperforms the ESCO compensates the customer sufficiently to cover the loan repayments. In the guaranteed savings model the financier accepts the credit risk of the project and the ESCO commits that it has the techno-economic assessment accurate enough that it will have its fee covered (Okay and Akman 2010). In the shared savings model the ESCO makes its money through constantly ensuring the energy service equipment is operating optimally. The associated contracts will also specify the equipment owner at the end of any contract.

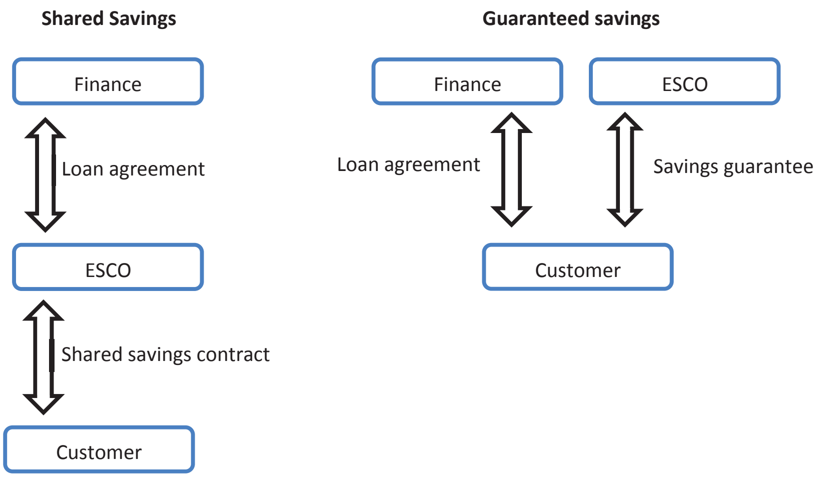

Figure 1: ESCO business models adapted from Larsen et al. (2012)

The advantages to the customer of engaging with an ESCO under either of these models are usually associated with savings on utility bills although some clients also engage with ESCOs because they have carbon savings targets to meet. ESCO's can enable customers to embark on projects that would have otherwise been too capital intensive and not have sufficient return on investment for the customer to accept. The ESCO also allows for several energy related projects to be bundled together allowing less attractive projects to be balanced against those with better returns on investment, the final combination of projects meeting the requirements of the customer and the ESCO contract. ESCO contracts are nearly always long-term (10-25 years). This is because the return on investment on energy efficiency technologies is often marginal under shorter term investment criteria.

Services regarding energy provision and energy efficiency are not always limited to the above models which involve commercial agreements being used to leverage finance where otherwise difficult. In addition to this set up there is a growing trend for energy suppliers to offer services in addition to offering units of energy. The UK market has led this type of service offering with its liberalised supply market and legislative requirements placed on suppliers. Services being offered in addition to the sale of kWh include energy efficiency measures such as loft or cavity wall insulation (where the supplier acts as a guaranteed savings ESCO) and services around smart-meter data which is increasingly available to smaller energy users. These offerings are immature in the market and remain largely legislation driven although suppliers do use them to compete and their deployment is impacting on end user experience and system efficiency (Balta-Ozkan et al. 2013; Clastres 2011; Gans, Alberini, and Longo 2013).

3 UK ESCO EXAMPLES

This section outlines several instances of ESCO's and describes their development, the business offering and the advantages for each party.

Cofely energy services is the UK's largest district heating provider. Cofely are a subsidiary of GDF Suez who provide the financial liquidity to underwrite large ESCO special purpose ventures and associated investments. Cofely describe their model as 'avoided costs', the case for the customer is a fix and usually a reduction in heating and electricity costs over a long term contract (20+ years). Cofely generally achieve this by making use of capital intensive co-generation (combined heat and power or CHP) equipment which tends to consist of a gas engine generating heat and electricity. By capturing the heat from the engine as well as the power these schemes are competitive with gas generated electricity from the national grid due to the efficiency increase. Typically Cofely guarantee savings of 5%-15% against conventional (grid electricity and natural gas) heat and power provision. The contract will include details such as sharing of profits, extensions to the network, reliability and penalties for failure to provide energy. Cofely have focused entirely on public sector, PFI and very large commercial customers recently providing district heating and cooling to the London Olympics site and expanding schemes in London, Paris, Leicester and Birmingham

E.On have been an early energy supplier to recognise that their traditional business of selling units of power purchased on the wholesale market through to consumers has limited opportunity to add value in a regulated and liberalised energy market. Whilst not abandoning their core business E.On have focused new investment on high value renewable electricity generation assets and branched into district heating schemes using CHP and biomass heating. Differently to Cofely E.On have focused on the new-build residential market and bundle the cost of installing pipework with the rest of the housing build cost (E.On 2014). E.On market their solution against savings to the housing developer for installing gas supply and boilers and on maximising space utilisation in the new buildings. This approach has faced criticism that it reduces choice for the end user as they are forced to accept energy through the district energy infrastructure which is owned by E.On and therefore cannot access the normal ofgem regulated energy consumer market, the model also relies on incentives currently available for renewable heat (DECC 2012).

Mitre is a well-established facilities management company offering a guaranteed savings service based around their expertise in energy efficiency equipment (Mitre IFM 2014)x. The company offers services for customers around both carbon and cost savings and uses the ESCO mechanism as a route to deploy its core business of managing building temperatures, energy use and installing and maintaining building services equipment. Honeywell energy services offer a very similar guaranteed savings model (Honeywell Energy Services 2014). Mitre have used their energy services offering to extend their existing integrated facilities management offering. The customer is therefore left to focus on core activities by effectively outsourcing the management of buildings, comfort heating and power, IT service and access.

Larsen et al. (2012) reviewed the US ESCO market in 2008 an identified 38 companies operating as ESCOs but also that half of the value in that market is captured by just 4 building equipment manufacturers. The market is also dominated by public and institutional customers. No similar empirical study exists for the UK ESCO market but anecdotal evidence from energy users and the ESCO providers above indicates a growing market for ESCOs focused around reliability, price security and carbon savings. The UK market remains limited to large, heat intensive users. Energy suppliers however have recognised that the manufacture and sale of units of energy is a fairly low value activity in a highly competitive market and are attempting to add features to their offering to gain competitive advantage showing the industry is starting to follow conventional manufacturing into the service industry under the definitions found in the servitization literature (Ward and Graves 2007; Baines et al. 2009; Oliva and Kallenberg 2003).

4 FUTURE CHANGES FOR ESCOS

This section describes how various innovations and changes in the energy sector may become opportunities or challenges for ESCOs in the coming years. Because ESCO contracts are generally long term these factors will mainly affect the development of new schemes which is where much of the value in an ESCO project is exchanged.

Changing energy costs and reductions in the capital cost of renewables introduce uncertainty into the structuring of new ESCO contracts. Usually this is overcome by pegging contracts and savings against the provision of heat or power through conventional sources but this is more difficult when zero fuel renewable energy schemes are proposed as they are capital intensive and essentially require both parties of the ESCO contract to hedge against future fossil fuel prices.

Some companies and municipalities have powerful non-price drivers for engaging with ESCO models, this is especially evident in the Eastern USA seaboard and areas of Japan where utilities are being required to commit to more stringent reliability and resilience conditions following storm damage. European decision makers meanwhile have continued to focus on the reduction of carbon emissions from energy provision through improved generation and demand efficiency. ESCOs can play an important part in delivering these non-capacity objectives. The reliability and resilience issue is particularly important for certain industries which have been traditional users of ESCOs (Hospitals, prisons, emergency services and IT) but to date no ESCO has successfully managed to package (and charge) for this type of added value service.

The expected growth of decentralised generation is a clear and growing market for ESCO models to be deployed. Co-generation in particular is competitive with a high density of heat demand, this is reflected in the rapid densification of urban areas in Northern Europe and USA city centres. Increasing the proportion of properties on ESCO run decentralised generation has great potential to remove strain from national energy infrastructure and could reduce the cost of grid upgrade into the future, a major expense for all electrified areas. Again this non-capacity service has not been properly valued but some studied on the monetary value of coupled solar and battery storage have very recently been published for the US market suggesting a generalizable methodology (Bradford and Hoskins 2013).

With improvements and cost reductions in IT and communications equipment the energy sector now generates massive amounts of real time data from smart-meters on consumer sites as well as at the transmission and distribution networks. This data has opened many new opportunities for more novel models for ESCOs based around the aggregation of demand and generation assets to better co-ordinate energy supply and demand. Examples of companies operating in this area in the UK are OpenEnergy who micro-manage demand by aggregating refrigeration capacity across large portfolios, Flextricity who aggregate backup generators across the country to generate at times of peak demand and NEST who have bundled a residential scale energy and buildings management system into a security and smoke alarm technology. All of the UK big six energy suppliers now also offer an analytical tool service to all customers previously only available to very large users.

Whilst technology and availability of information have opened opportunities for ESCOs to be more innovative in the services they offer and the routes they use to offer them, innovation is also available in the finance models being deployed. The most evident example of this has been the SubEdison solar deployment model in which the SubEdison developed a standard power purchase agreement for residential solar owners. The agreement provided a long-term reliable electricity purchase price of power generated from solar panels which was backed up by the company's own finance providers and removed many of the legislative and capital finance barriers to decentralised solar deployment. This model disrupted the market and led to market leading growth for SunEdison in the sector.

5 CONCLUSION

There are many challenges facing the energy sector over the coming years with pressures to increase reliability, decrease energy carbon content and always for the minimal cost. ESCOs have to date formed a small part of the response to these challenges, restricted from mainstream deployment by uncompetitive economics and stiff competition from conventional generation. However changes in energy generating technologies, their scale, their finance models and their sources of energy allow ESCOs to add layers of value to the transaction model and better meet the needs of customers. The changes in the market and technology should open up major opportunities for new ESCO models which demonstrate innovation in finance and technology.

Developments in understanding of the way other industries have added value to manufacturing processes through additional service offerings have a direct transfer to the energy manufacturing and supply industry. The power of ESCOs and their associated service based models could unlock an important resource of carbon savings and energy efficiency in the sector. ESCOs allow energy provision to be more customisable, bespoke and provide greater utility to customers who have requirements much more complex than covered by traditional cost differentiation capacity models. The ESCO market however is currently led by technology and innovation rather than being built on a solid understanding of customer requirements and added value the ESCO model is becoming a tool for discounting finance, by combining the industrial interest in ESCOs with knowledge from the service adoption literature a better performing sector can be developed.

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