

ESCOs in the liberalised domestic UK energy markets - Barriers to establishing ESCOs and possibilities to overcome them in the UK energy markets

Andreas Biermann, Energy Saving Trust

1. SYNOPSIS

Energy services in the UK domestic markets still have to develop. To date, supply competition has focused on price. The reasons for this are varied.

2. ABSTRACT

Energy services are seen as a way for energy suppliers to break out of their unit-based sales model, by switching from selling a product to selling a service. In the process it is assumed that suppliers would become more interested in selling less electricity/energy, provided they can continue to generate sufficient returns.

It was hoped that the vertical disintegration, and introduction of supply competition would deliver on these expectations. But while energy suppliers have integrated their offerings to sell gas and electricity, they have not changed their approach to marketing which is predominantly undertaken on the basis of price. Levels of customer switching are still low. The restructuring of the industry has in fact become a barrier to energy services, because possibilities for integrated resource planning have disappeared.

The main barrier for energy services is that the price of energy has fallen, and that consumers expect this to continue. Although there appears to be little evidence that customers think in terms of payback, this is an issue for commercial development of energy services companies (ESCOs) because it affects the length of contract required. A few small-scale energy services approaches have met with some success. These were the ones led by energy suppliers, often involving a partner as a trusted go-between, who offered services at low initial cost and high convenience.

There are approaches that look promising to overcome the barriers to ESCOs, e.g. changes in the regulatory framework, consumer education, new technology, and market transformation through programmes like the Energy Efficiency Commitment (EEC).

3. INTRODUCTION

This paper presents observed barriers to entry for companies wanting to provide energy services to domestic consumers in the liberalised energy markets of the UK. All the views in the paper are those of the author, and do not necessarily reflect the views of the Energy Saving Trust (EST).

The paper is largely based on two papers/studies the EST was involved in, and feedback received at an ESCO seminar organised by the Energy Efficiency Partnership for Homes in London, in late November 2000. For the purpose of this paper, energy services are widely defined as services relating to the energy use of domestic consumers. They can but do not have to be charged through joined billing with the energy delivered. An ESCO is a company specifically set up to provide an energy service, either as a start-up, or as a subsidiary of an existing energy supplier. The EST's remit is currently restricted to the domestic sector, and although this may change in the near future, this paper will therefore not concern itself with ESCOs and energy services in the commercial and industrial markets.

4. FRAMEWORK

Electricity and gas are homogenous goods. Economic theory suggests that competition for homogenous goods will occur as pure price competition (called 'Bertrand competition'), in which the price charged to consumers is the marginal price of the last unit produced. Price cuts by one competitor will be met and maybe undercut, leading to a price war that may leave the industry in question with returns that will not suffice to keep all of the companies in business. The result will be concentration, failure of businesses, and subsequent price increases.¹

One way out of this price trap is to make the product different from the competitors', by introducing differentiating features². This could happen through adding features, e.g. through bundling sales of energy with bonus-points on a super-market allegiance scheme. Alternatively, the suppliers could fundamentally change the delivery mode, by moving to a service instead of product delivery approach.

Energy services are one way for suppliers to change the competitive framework by turning at least part of their business into an ESCO. ESCOs were initially defined by the EST as: [...] *a company providing a complete energy service, i.e. normally combining energy supply with the provision of measures concerned with its efficient use*. This definition has been widened so that more provisions of the service element, even when it excludes the delivery of energy can be supported in the EST programme. The ultimate aim of the EST's Energy Services Programme is twofold. One aim is to create a mass-market for domestic energy services that will not be based on government obligations, and the second is to establish niche markets for energy services, e.g. for local authority housing. The EST aims to provide within the framework of the programme research/support and monitoring, as well as accreditation and facilitation³.

5. LITERATURE REVIEW

Since the paper is supposed to contribute to the exchange of practical experiences, it focuses on the analysis of two reports that became available during the last half year, and in which the EST has been involved.

The papers are⁴ by Impetus Consulting, 'A review of the EST Energy Services Pilot Projects in the Domestic Sector' and by OXERA, 'Direct and Indirect Action to Encourage ESCOs'. In the former, Impetus is analysing a wide range of approaches to the delivery of energy services that were stimulated through the EST Energy Services Programme, and analyses the successes and failures. In the latter, the EST had asked OXERA, prior to the submission of the EST Energy Services Work Programme for the financial year 2001-2, to undertake a short project, trying to identify the particular barriers that energy services face, and how these could be overcome.

The two papers address the three main areas of concern for the future development of ESCOs:

- Real-life experiences with pilot ESCOs,
- Barriers to the establishment of ESCOs,
- Mechanisms to overcome these barriers.

The rest of the paper will deal with these three areas of concern.

6. EXPERIENCES WITH ESCOS

The Impetus report analysed the first experiences with the different approaches that can be used by companies to establish a business delivering energy services. First it is important to understand the possible motivations for an energy supplier to become involved in energy services delivery, instead of pursuing a unit-based sales approach. Energy services are a value-added activity, in which the customer would pay for the added value, generating new income streams for the supplier. Customer retention could also be increased. Energy services can also serve to leverage the brand, and provide horizontal and vertical integration, in which the savings achieved through

economies of scope and scale could be shared between customer and supplier. A final motivation would be the combination of the new product with other regulatory drivers to help the supplier achieve externally imposed goals, such as alleviating fuel poverty, promoting renewables and CHP or delivering carbon savings. Energy services provide an easy way for an energy supplier to achieve product differentiation, this is important as avenue for new entrants to distinguish their product or to achieve margin protection by incumbents to avoid the Bertrand-competition effect⁵.

Different types of funding for ESCOs are possible. The obvious and best solution for mass-market ESCO activity is funding by the customer, because it would realistically be the only long-term sustainable option. The Impetus report shows that start-up finance should come from the ESCO, and be recovered through a long-term contract, ideally through joint billing for energy services and energy delivered. In the industrial US market, Enron has been successful with this approach. Ofgem allows joint billing, also the energy and the service part of the bill have to be clearly distinguishable. This probably makes it necessary to remind customers in every bill how much the energy efficiency measures installed save them, to enable them to compare the performance of their supplier with others. For niche-market ESCO activities, and during the early stage of the market transformation funding from other sources could be used to kick-start the market, but is ultimately not sustainable due to the reliance on externally generated revenue.

A distinguishing feature of ESCOs is the relationship between customer and supplier. A direct relationship through a supplier owned or supplier-led ESCO would have the advantage of protecting and developing the knowledge base internally for the supplier. While this is potentially more risky and costly, it holds advantages for a supplier interested in providing home service solutions, e.g. insurance, telephone, or cable.

The alternative to this is an indirect relationship through an independent ESCO. This may be cheaper by achieving economies of scale, and less risky to the energy supplier, because the risk of financing energy efficiency measures is borne by the ESCO. The supplier loses the customer interface though.

A successful approach in the UK has been to involve partners, as opposed to a stand-alone ESCO. If the partnership ESCO is supplier-led, delivering the ESCO products solely to the supplier's own customers is possible, alternatively, the ESCO could offer to deliver the service for other suppliers too. While involving partners can get in the way of 'getting the job done', but the right partners can be crucial to success.

This is a quick overview of the dominant forms of ESCO activities that have been observed in the UK market. Impetus identifies as the most promising approach in terms of market reach the supplier-led⁶ ESCO, involving partners. A supplier-led ESCO is a company in which an energy supplier is taking the lead in developing the energy service programme, but works together in partnership with other organisations. These could be local authorities, housing associations or energy clubs, aiming to provide households with low-cost warmth, cooking and lighting. Nevertheless even this form suffers from a lack of demand in the current market conditions.

Creating the demand can be costly since it is not well understood what kind of marketing could attract customers to the ESCO idea, making experimentation necessary. It is also risky because success is not ensured, and suppliers at a time of shrinking margins and increasing competition may not be willing to undertake this investment. The government recognised this and provided incentives for ESCO activity through EESoP3 aimed at stimulating the market. Activity has been low so far, but there are signs that some suppliers are becoming more interested. To date it is unclear how incentives will be changed in EEC4 (cf. section "Barriers to entry / Supply" below).

The results of Impetus' analysis show that successful projects offered energy services at no upfront cost to the customer, and targeted their marketing instead of doing untargeted mail shots. The successful approaches also worked together with local authorities or housing associations as trusted go-betweens through affinity deals, in which e.g. a local authority would recommend the product to its tenants or local households. This does however restrict the total market reach to regionally based offerings, since not all local authorities or housing associations would be interested in participating in such partnerships.

7. BARRIERS TO ENTRY

Demand

ESCOs in a liberalised market are affected mainly by the dominant parameters of supply and demand. If customers do not demand energy services to be supplied, suppliers will not offer these, unless they have another incentive to develop and market the product. The EST hopes that EEC4 will provide such incentives, reinforced through a more generous calculation of carbon savings.

Currently, lack of demand is the fundamental barrier that any successful ESCO scheme has to overcome. The real impact of this barrier is mainly affected by the following parameters:

1. Direction of energy prices
2. Absolute level of energy prices (savings potential)
3. Extent of competition
4. Sophistication of consumers

Energy prices have fallen for a long period of time in the UK, and this has led to an expectation amongst those consumers who observe the market, that they will continue to do so. The absolute level of energy prices is consequently low, minimising the savings potential that customers can expect to achieve by signing up for energy services. Still, a considerable potential for cost-effective energy efficiency exists.

Competition is predominantly generated via price signals, which is unsustainable in the long run and will lead to a concentration in the market. This concentration can already be observed in other liberalised markets in Europe (e.g. Germany) where take-over activity in the energy suppliers markets has been high. Suppliers attempt to achieve economies of scale (only possible through mergers & acquisitions in a mature market) and scope, through increasing the number of customers they have access to, and through increasing the range of products they can offer. Centrica, which owns British Gas, the dominant gas supplier in the UK, has also created financial services, including a credit card and insurance operations, and acquired the AA, a motorist breakdown assistance organisation.

Following on from the price-based competition, consumers have not been able to gain an understanding of how the quality of the building fabric of their home, and the efficiency rating of their appliances is connected to their bill. There are no signals delivered to customers enabling them to understand this connection, or to learn how much they could save. Ironically, the marketing campaigns by now focus on the integrated, yearly fuel bill, to illustrate the possible savings to be made from switching, and most suppliers have online calculators that allow customers to find out how much they can save based on their actual consumption. While competition is focusing on the savings to be made from switching investment for energy efficiency will continue become less interesting in terms of payback times, and is less likely to be undertaken even by those customers understanding the issue.

Supply⁷

A linked and fundamental problem to the lack of demand is a lack of supply, stemming from the business model of energy suppliers and the amount of risk they are prepared to take. Electricity and gas have become 'pile 'em high, sell 'em cheap' markets, in which the lowest price dominates, leading to very good offerings for those customers actually interested in switching their suppliers and to price reductions for consumers who do not switch to ensure their loyalty. The UK domestic energy markets have become high-volume, low-margin markets.

This is being reinforced by an apparently risk-averse approach to marketing that assumes that there is only one way to sell energy. The problem for suppliers however may well be that they can not afford to take the risk of developing an ESCO business on a large scale or as the core of their business, since a failure of the supplier's ESCO could then threaten the viability of the parent company.

Regulation of retail supply

A further problem is Ofgem's approach to market liberalisation, which is mainly driven by its primary duty to ensure competition. This is colouring Ofgem's approach to innovation in product offering, and affects the possibility for suppliers to develop long-term customer relationships, because Ofgem currently insists on customers right to switch suppliers with a 28-day notice. While the 28-day rule is a barrier that could maybe be overcome through innovative product design, it is still a **perceived** barrier by the companies that are expected to develop the products. This perception then leads to disinterest in developing products.

This, together with having to rely on high-transaction cost debt-recovery procedures through the courts creates a serious problem for those suppliers that are interested in developing energy services⁸. Ofgem's approach to switching is particularly difficult to understand in the context of a financial governance system that allows e.g. mortgages to be locked in for a number of years, based on a relatively simple contract. It is difficult to understand why the same consumers that are credited with the wisdom to enter into such long-term contracts for substantial repayment commitments are not allowed to enter into long-term energy supply contracts for a yearly sum of money that is less than 10% of their mortgage debt repayments.

Division between Distribution network regulation and supply licensing

The vertical disintegration of distribution and supply, and the introduction of supply competition have removed the possibility of directly sending signals between customers and DNOs to encourage the customers to reduce demand at times of network constraint. This, coupled with the asset-based regulation of the DNOs acts as a barrier to the development of ESCOs aiming to provide DSM measures that could help avoid a reinforcement of the network.

8. MECHANISMS TO OVERCOME THE BARRIERS

A distribution network energy savings obligation

Distribution network operators (DNOs) in the UK deliver electricity from the high-voltage bulk transmission grid to customers, through low-voltage networks. During transmission and distribution, electricity is lost. Two-thirds of the losses occur in the distribution networks. The distribution losses cause about 1.8million tonnes of Carbon (mtC) emissions per year. Integrated resource planning could reduce these losses.

Ofgem continues to regulate the distribution network operators (DNOs), and will continue to do so, because these networks are viewed as natural monopolies. In the current price control, Ofgem has set a weak incentive to reduce losses. Following the Northern Ireland experience⁹, Ofgem could try to use the regulatory powers to set up energy service obligations within this section of the electricity network that will feed through into supply. The obvious point for this will be the 2004 price control review. During this review the current regulation has to be reviewed, to allow DNOs the revenue and charging structure changes necessary to accommodate large amounts of embedded generation, enabling the government to achieve the 10% renewables and 10 GWe¹⁰ CHP targets for 2010.

If simultaneously the incentive to reduce losses was strengthened, energy savings/peak shavings at least in congested areas of the network could be achieved through contracting out for energy services deliveries to an ESCO. The ESCO would focus on achieving energy savings/peak shaving through the use of e.g. modern control technology, like smart meters and the remote control of appliances. The savings and income generated within the system could be shared out between the parties involved, the household, the energy services company and the DNO. Making the carbon savings achieved under this system tradable within the UK Emissions Trading System could generate further income for the parties involved.

If DNOs were responsible for losses in financial terms, instead of just passing through electricity they would have a real incentive to reduce these, and could design their network improvement programme to achieve this goal. A possible way to structure this incentive would be to give DNOs a revenue allowance for losses under an RPI-X system, which sets out a distribution loss reduction programme over a period of a few years, reviewed through

yardstick competition. In order to avoid paying for losses, DNOs can procure a guaranteed reduction in demand in a particular area where the network needs to be reinforced, delivered e.g. through an ESCO. A DNO would be the right place to set this obligation, because the DNO knows the network and understands the development needs for the network better than outsiders. This makes it possible to achieve a way of saving energy that is overall highly efficient, because it carries additional benefits in terms of avoided investment. Ideally, the procurement of energy savings through such a mechanism would be achieved through an economically efficient way of allocating these savings, e.g. something comparable to a NFFO auction.

Regulating competitive markets presents a problem for a regulatory agency that has competition as its primary goal. Ofgem could therefore revisit the possibility of DSM through the DNOs by looking at the possibility of achieving economically efficient relief of network constraints through regulating the remaining monopoly elements of the electricity system, to achieve the following hierarchy of choices:

- Energy savings
- Procurement of low/non-carbon electricity (from embedded generation)¹¹
- Network reinforcement

This would ensure that over time, the UK electricity distribution network will come to support the efficient use of electricity, instead of the efficient distribution of electricity, as it currently does, while simultaneously opening up market possibilities for ESCOs.

Integrating ESCOs into the EEC framework

The UK Climate Change Strategy published last year sets out the expected saving through domestic energy efficiency to be 2.6 – 3.7 MtC from all schemes in 2010. Within that, the obligation on energy suppliers called Energy Efficiency Commitment (formerly Energy Efficiency Standards of Performance - EESoP) is probably the single most important measure. It sets energy suppliers individual targets for carbon abatement over a period of two (EESoP3 2000-2001) and three years (EEC4 2002-2005¹²). EEC4 will go out to statutory consultation in May 2001, and will formally be introduced in late summer 2001. The Department for Environment, Transport and the Regions (DETR) published a provisional conclusions paper in November 2000 and these are the basis for discussion between the parties involved in delivering the scheme and the government.

EEC4 is aiming for an average cost per customer of Euro5.76¹³/year for each fuel, electricity and gas. This amounts to a total cost of Euro736 million over the lifetime of EEC4. EEC4 is aiming for 36TWh of fuel-weighted energy benefits, excluding deadweight. This is equivalent to about 9.5% of electricity consumption in the UK in 2010¹⁴. Splitting the savings by fuel, about 58% would be generated by gas, and 34% by electricity.

For EESoP3 the cost was estimated to be Euro1.92/year per customer per fuel, and the total cost amounted to Euro176 million. The savings target was 11 TWh, 45% of those in electricity and 55% in gas.

Measures undertaken have to be evaluated by Ofgem (this work is undertaken on their behalf by the EST) and a range of possible measures is in place for energy suppliers to choose from, e.g. the installation of combined heat and power plants (CHP), compact fluorescent lightbulbs (CFL), cavity wall insulation.

The major change between EEC4 and EESoP3, compared to the predecessors EESoP 1 to 2 is that a target is set of MtC saved, instead of £/customer spent. This is intended to encourage energy suppliers to be creative and efficient in their spending on energy efficiency, because they will derive competitive advantage from lower spend on measures, if their competitors are not able to match their efficiency. The question we have to ask here is therefore: is this expectation realistic that more services (directly paid by the customer who benefits) instead of programmes (funded by the energy supplier and financed from revenues of all customers) will emerge? Are more energy services developing under EESoP3, will they under EEC4? If not, why, and what could be done to improve the incentives?

On one hand, this change towards setting a savings target encourages the goal of driving down the net-cost to the supplier, and introducing economically efficient ways for energy suppliers to achieve their carbon abatement targets. Developing energy services can be a way to reduce the net costs for the supplier, since they provide a direct revenue

from the customer (or other market partner) who benefits. On the other hand, the new approach may discourage the introduction of approaches less proven to achieve the targets. This could either be because they carry the risk of failure or higher transaction cost, or because significant upfront investment into the service is needed to, e.g. to develop and market a new energy efficiency service to customers. Consequently, measures where partners can be found to share part of the cost, and those with low transaction cost can be expected to benefit. An example for the former would be the installation of combined heat and power plant (CHP), for the latter it would be the handing out of compact fluorescent lamps (CFL) to customers.

Partnership activity is encouraged through accrediting the full carbon savings to the supplier involved in the partnership. Another encouragement for efficient delivery and involvement of ESCOs is that suppliers can fully outsource the EEC delivery to another company, while retaining responsibility for the target.

Under EESoP3, there is a 'gentleman's agreement' that suppliers will fund appliance-based measures, but whether this can be repeated with increased competition pressures and cost for EEC4 at three times higher savings targets is currently open. Also, EESoP3 reserves 0.1% of spend as an R&D allowance, to encourage research into new technologies. This money however is not easy to spend.

EESoP3 (but not yet EEC4) have a special clause for energy services, in order to encourage suppliers to develop these. The abatement target in EEC4 will also include a deadweight factor, to allow for the subtraction of measures that would have occurred anyway from the savings achieved.

Table 1: Deadweight in EEC4

Measure	CFL
Target installations 2001	48,000,000 CFL
Natural rate	18,000,000 CFL
EEC induced	32,000,000 CFL
Deadweight	18,000,000 kgC
EEC target	48,000,000 kgC

One suggestion from the EST for an encouragement of energy services delivery by suppliers, is to calculate energy savings from measures gross (ignoring deadweight) when delivered through an ESCO and net when delivered through other means.

This could have significant consequences, in that the energy suppliers would probably try to undertake most of the work through subsidiary ESCOs instead of through internal departments. This in turn could lead to these ESCOs becoming more proactive about their business, leading to long-term sustainable business models for ESCOs being developed. It would also open the possibility for energy suppliers to outsource their EEC target delivery to an independent ESCO or one run by another supplier, if these can deliver value for money better than the supplier itself or an internal ESCO could, e.g., through switching to services instead of programmes. This would however run contrary to the goal of integrating energy services as a mainstream activity within the energy suppliers.

A further possibility for ESCO activity to generate income in EEC4 is the intention by DETR to let *additional* savings over and above the EEC4 targets be traded into the carbon trading mechanism of the UK. ESCOs are further encouraged by the possibility to offer EEC measures to non-customers of a specific supplier.

One reason for the slow increase in the use of services instead of programmes may also be that the EEC is continuing to be focused on the fuel-poor, with 65% of the money to be spent on this particular group, for 50% of the accrued energy savings. Since these consumers mostly live in sub-standard housing, the scope for measures delivered through EEC is substantial. It may be more difficult to sell energy efficiency through paid services to the fuel poor however, which may explain that the suppliers continue to rely on assistance programmes.

Voluntary and mandatory obligations

The introduction of a voluntary scheme is another possibility of incentivising suppliers to develop ESCOs. On the face of it, this appears as a weak instrument, since it would rely on a voluntary commitment by the energy suppliers, and it is difficult to see why they should accept this. The experience with fuel poverty however suggests that political pressure and commitment can have an effect and concentrate companies' minds on issues seen as important by the government of the day, regardless of minor short-term revenue impacts. The two issues are hardly comparable though, and it is therefore doubtful whether this would be sustainable, and whether the cause of energy services can achieve the same status as that of fuel poverty.

Preferential tax treatment of energy services

The UK has a value-added tax rate of 17.5% on services. Fuel is being taxed at 5% VAT. If a customer switches from paying fuel directly to a service with integrated billing of energy efficiency measures and fuel received, the tax rate should be equal for the whole bill, since the constituent elements of the bill deliver a part of the same service, i.e. warmth, heat and light.

The UK taxes the sale of houses through stamp duty, applied at sales with a value >£60,000 at 1% at the time of sale. One suggestion by OXERA was to introduce a reduced rate of stamp duty to reward houses that have seen improvements to their energy ratings. There are some obvious problems with that, e.g. the treatment of already energy efficient homes, and whether the reduced stamp rate should apply at resale, but it is an idea worth thinking through.

Removing the 28-day rule

Ofgem could consider the removal of the 28-day rule that allows customers to switch suppliers at short notice. This would lead to a risk reduction for ESCOs, and help to make the internal business case for ESCO development within the suppliers. There is disagreement between Ofgem and suppliers about the impact of the 28-day rule, but even if it is only a **perceived** barrier on the part of the suppliers, it is a barrier nevertheless. This removal could be made dependent on the type of contract offered to the customer.

Technology driven ESCOs

The development of domestic CHP¹⁵ and the increase in large-scale residential CHP will offer a new possibility to create ESCOs basing their business around these, also delivering energy efficiency, gas and balance-electricity supply. The success of such offerings will depend on connection and metering agreements, and on the willingness of consumers to install dCHP or accept community heating. There is considerable potential to combine CHP/dCHP, essentially operating as a peak-shaver, to deliver DSM schemes in areas of network constraint. The Royal Commission for Environmental Pollution report envisages one future scenario with up to 2.4 million units of dCHP deployed by 2050¹⁶ and generally calls for a much better utilisation of waste heat from electricity generation, creating a large potential for ESCOs. Larger-scale CHP will play an important role in delivering not only the government targets for CHP generation, but can also be the core for geographically distinct energy services offerings¹⁷.

Strengthening customer demand for energy services

The basic problem behind the absence of demand-pull in the market is a lack of signals from which consumers could understand how their use of energy is connected with their bill, and how they can affect this. There are two approaches that could amend this change, one would be through technology, the other through education.

Advanced meters might be a way to deliver this understanding and the communication abilities needed to react to signals in a timely manner. Some studies have shown that there appears to be significant potential for savings (up to 10%), particularly where a dwelling is heated and cooled by electricity. The Department of Trade and Industry (DTI) has made up to £50 million available for research and development of advanced meters. Simple meters might be contrary to the idea of energy services though, because they contravene the idea of a bill independent of

consumption. Once this is established, a consumer no longer has any need to watch energy use. They can be helpful if integrated with smart appliances and remote controlling though.

The educational possibilities would include more sophisticated and targeted promotion of energy efficiency, and how energy services can help in achieving energy efficiency, maybe as part of an overall market transformation programme. Marketing is already focusing on the yearly bill, comparing these for potential savings for 'average' households. It is easy to imagine this approach being transformed to competition on the bill **and** energy services, but so far this has not happened. Further educational activities could focus on schools, to create an awareness in children which can reach back into their homes. Nutritional programmes have been successful in transferring knowledge of how to prepare good food through this avenue.

9. CONCLUSIONS

ESCOs in the UK will still need a long time to have a major impact in the supply markets. There are by now signs that some of the more innovative suppliers are taking a serious look at the possibilities that differentiation may hold for their competitiveness. It is possible that mass is needed to achieve the economies of scale and scope needed to offer real and attractive savings to the potential customers. The withdrawal of Scottish Power from the Home Services market however does not bode well for this development to happen¹⁸.

If the UK government is serious about achieving significant savings of carbon dioxide in the domestic sector at a low cost, it should encourage the regulatory and other changes needed to achieve the establishment of a different culture within the energy suppliers. They should be encouraged to move from delivering units at low margins to deliver services at high margins.

10. GLOSSARY

CCL	Climate Change Levy
CFL	Compact Fluorescent Lamp
CHP	Combined Heat and Power
DCHP	Domestic Combined Heat and Power (1-5kWe range)
DETR	Department of Environment Transport and the Regions
DNO	Distribution Network Operator
DSM	Demand Side Management (as part of integrated resource planning to alleviate network constraints)
DTI	Department of Trade and Industry
EEC	Energy Efficiency Commitment (obligation on suppliers to reduce carbon emissions)
EEP	Energy Efficiency Partnership for Homes (Co-operative effort by industry and government to achieve carbon savings, facilitated by the EST)
ESCO	Energy Services Company
EST	Energy Saving Trust
MtC	Million tonnes Carbon
NFFO	Non Fossil Fuel Obligation (direct support for nuclear and auction-system to support renewables)
Ofgem	Office for the Regulation of Gas and Electricity Markets (Mainland UK)
Ofreg	Office of the Regulator for Electricity and Gas (Northern Ireland)
RO	Renewables Obligation (proposed successor to NFFO on electricity suppliers)

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12. ENDNOTES

¹ A good example for this is the US airline industry in the early 1990s.

² In the airline industry, TWA when faced with bankruptcy undertook product differentiation by removing seats and increasing leg room for passengers.

³ Jones, Wade and Barton will provide further details on this.

⁴ Full references at the end of the paper

⁵ see 3. Framework for an explanation

⁶ Called 'utility-led' in the IMPETUS (2000) paper.

⁷ This paragraph will address suspected internal problems for energy services within the energy suppliers. I believe that these are important, and would warrant an organisational research project on energy services. The basis for this analysis is previous research undertaken as part of my PhD, and observations since my start at the EST.

⁸ Ofgem's argument that the supplier runs the same risk for debt from non-payment of the fuel bill is not coherent. The supplier can protect itself through use of pre-payment meters. Also, the amount of the fuel bill is presumably much lower than the amount invested in energy services measures.

⁹ In contrast to Ofgem’s approach, Ofreg, the regulator for Northern Ireland, has changed the incentives of the monopoly electricity supplier in Northern Ireland, Northern Ireland Electricity (NIE) to generate returns from reducing sales, instead of increasing them. This has taken ESCO activity closer to the core of NIE's business approach. Whether there are lessons to be learned from this experience in the wider UK context of competitive markets for supply is doubtful however, because of the monopoly situation of NIE.

¹⁰ Gigawatt electric

¹¹ Embedded generation in the context of the current debate in the UK is largely either renewable, or CHP.

¹² The scheme will run from April 2002 to April 2005

¹³ For the purposes of this paper, the conversion rate is £1 = Euro 1.6

¹⁴ according to DTI projections

¹⁵ Stirling engine or micro-turbine based 1-5kw range domestic CHP units will go into final testing and piloting during this year, and are expected to enter the market within the next two years.

¹⁶ This prediction is probably far too conservative.

¹⁷ Good examples in the UK for the innovative use of CHP are Woking Borough Council, and Southampton City Council

¹⁸ Utility Week, 2/3/1, ‘Home Truths’p16-7