

# Impacts of Energy Legislation on Organisational Motivation: a Case Study

## Abstract

In an attempt to reduce operational energy use in non-domestic buildings and mitigate climate change, the UK government has introduced the Energy Savings Opportunity Scheme (ESOS) legislation to motivate large organisations to implement energy efficiency (EE) measures. However, there is evidence showing that an organisation's behaviour with regards to EE measures doesn't follow rational cost minimisation, demonstrating potential ESOS weakness. A case study research was undertaken to assess whether ESOS can lead to EE measures deployment despite different overarching agendas. A generic qualitative approach was used to assess the change within the organisation; auto-ethnomethodology was used to assess the change within its facility manager (FM). The results demonstrate that the energy audit delivered through an agenda of cost-minimisation was weak in creating organisational behaviour change. However, the ESOS audit along with the research process lead to a mind-set change of the FM, resetting an overarching agenda from cost-minimisation to co-evolution between a building and its occupants, further empowering the FM to facilitate behavioural change within the whole organisation. These findings suggest that the success of EE policies can increase, if policies shift from understanding end-users as passive to pro-active and capable of shaping better outcomes for themselves and their organisations.

**Key words:** facility management, organisational change, energy efficiency, energy legislation

## 1. Introduction

Climate change and the need for the reduction of carbon emissions were formally recognised by governments in the Kyoto Protocol in 1998 (UN, 1998). However, in both developed and developing countries, energy use is increasing ever more rapidly (EEA, 2015; EIA, 2013). Energy use in the European Union (EU) service sector increased by 36% between 1990 and 2012 predominantly due to increased use of electrical equipment (EEA, 2015) and this trend shows no signs of slowing down (EIA, 2012). As there is now a recognition that around 60% of today's buildings will still exist in 2050

(Carbon Trust, 2009) it is clear that better management of the existing stock has a significant role to play in reducing energy consumption (Moffatt and Kohler, 2008).

Using evidence such as that by Geller et al. (2006) on the reduction of energy in OECD countries through energy efficiency (EE) measures, the EU has directed legislation to focus on EE in order to reduce energy consumption without also reducing economic output. The EU's main overarching legislation regarding EE is the Directive on the Energy Performance of Buildings (EPBD) and the most recent Energy Efficiency Directive (EED), (European Commission, 2013). The EU adopted EED in 2012 in reaction to the fact that EU Member States were not on track to reduce primary energy consumption by 20% by 2020, (EEA, 2013). The EED's main aim is to further promote EE measures across both demand and supply sectors whilst recognising global financial constraints. The UK government has implemented some of the requirements of the EED through legislation called the Energy Savings Opportunity Scheme (ESOS), which mandates large businesses in the UK to undertake comprehensive assessments of energy use and EE at least once every four years unless they have fully certified to ISO 50001 (Environment Agency, 2015). The main point of ESOS goes beyond simple legislative compliance. It is instead seen as a vehicle to inform large organisations about the EE of their assets and, through that, motivate them to implement EE measures to reduce energy consumption. It is nowadays possible to achieve significant reductions in energy use through EE improvements, which are technically possible and economically feasible. According to the Carbon Trust, organisations can, through EE measures, typically achieve a 20% reduction in their annual energy bills which scaled at national level can bring £1.6b net profit, (Carbon Trust, 2016).

Energy audits provide detailed information on energy use as well as energy saving potential. An energy audit should evaluate thermal characteristics of the building and its services (heating, ventilation and/or air-conditioning systems, lighting systems, domestic hot water, etc.), the appliances in use and equally build in users' activities and energy saving potential. As they are supposed to provide context specific information on actual energy consumption, they are seen as a powerful energy management tool. Energy audits have indeed been instrumental in advancing EE and several examples of successful policies based on energy audits can be found in (EEA, 2013). However, the same European Environmental Agency technical report points out that although the link between

implementing energy audit and achieving energy savings exists, the existing evidence is less clear about the extent energy audits can trigger sustained changes in occupant behaviour, (EEA, 2013).

There is significant empirical literature suggesting that organisational behaviour often does not follow rational cost minimisation and that even cost-effective EE measures are being implemented surprisingly slowly (Fleiter, Gruber, Eichhammer and Worrell, 2012) leading to an EE gap — a gap between economically/ technically achievable potential and the actual level of EE (Sorrell, Mallett and Nye, 2011, Mallaburn, 2016). Mallaburn (2016) argues that the EED is another example of EE related policy focusing on removing barriers whilst there is evidence that these types of policies do not deliver their full potential. Drawing upon the body of existing research findings, Mallaburn (2016) argues that the reason for these policies can be the underlying assumption that organisations behave rationally once the barriers are removed. However, investment decisions are not a binary yes/no process but a rather context dependent nuanced process with several phases and many actors involved all operating in different, local to organisation, contexts (Cooremans, 2012). Within organisational systems, EE related investment decisions will not be considered in isolation, but compared to other investment opportunities.

It is therefore questionable how efficient ESOS legislation could be in delivering the desired outcomes.

This study will investigate the effects of the ESOS legislation within a unique organisation operating different commercial activities and where the lead author of this paper works as the facility manager. The organisation in question has 607 full time equivalent employees of which 247 are permanent members of staff. The organisation operates in the light manufacturing, retail, printing, warehousing and hire sectors for garments and photographic services covering almost all types of the most common activities as per VOA definition. The organisation also undertakes redevelopment work in the commercial building sector. The case study questions whether ESOS will be a sufficient motivator for organisations to implement EE measures and whether something could be done to increase the chance of desired behavioural change. The full details of this research project are available in (Roberts, 2015).

## **2. Conceptualising energy efficiency policies and organisation behaviour change: Theoretical position**

Energy efficiency policies are specific policies that could be narrowed down to a different policy focus, depending on the overarching agenda behind the policy. For instance, Whilite et al (2000, p. 112) makes a historical overview of how “DSM [demand side management] translated energy “conservation” into “efficiency,” and “efficiency” into “least cost source of energy supply,” forcing a narrow policy focus on the marginal costs of small improvements in devices”. Similarly, one of the objectives behind ESOS legislation — ensuring that organisational economic output is not reduced, thus, supporting economic growth of an organisation — had influenced the focus of the policy that has eventually narrowed down to an idea of cost optimisation.

In her work Meadows (1999) analyses complex systems (such as an organisation) and the leverage points that could trigger change in such systems. She identifies nine leverage points, which she puts into a framework in ascending order depending on the ability of a certain lever to deliver a significant behavioural change within a system — the higher the order of a lever, the more change within a system could be achieved by triggering it, see Table 1. A legislative requirement such as ESOS comes fourth on the framework — a lever associated with rules of the system. An overarching agenda behind a specific policy, such as ensuring that the economic output of an organisation is not reduced, comes the highest on the framework — a lever associated with the mind-set and a paradigm change. In line with the logic behind this framework, it is possible to suggest that a different level of behavioural change could be achieved with the same rules of the system, such as ESOS legislation, if realised under different mind-sets or paradigms.

Insert Table 1

The Institute of Mechanical Engineers introduced a basic framework to guide energy policy, which presents activities that could help reduce energy consumption (IMechE, 2003). Those activities are presented in an ascending order depending on the strength of their potential impact in achieving energy reductions. In the framework, behaviour change is given a higher priority than implementation

of EE alone. In line with Meadows' framework that prioritisation might be understood as the following — if the mind-set of an organisation does not support the desired behavioural change, any potential savings that could have been achieved through implementation of the EE measures might not be realised and a take-back effect might occur whereby organisations use the money saved through implementing EE measures on other energy consuming products (Barrett, Lowe, Oreszczyn and Steadman, 2008). From that perspective, ensuring adequate behavioural change is paramount for ensuring the success of technological change, i.e. ensuring that potential reductions achieved via technological change are not diminished by the take-back effect (Masoso and Grobler, 2010). Building upon the findings in (Janda and Parag, 2013), one can argue that if a change in organisation is to happen, its socio-technical system needs to be re-shaped rather than just re-engineering its technical system.

Policy makers often see individuals as passive recipients of legislation and use top-down legislative approaches to ensure behavioural change — an approach, a successful applicability of which in a complex situation has been questioned in academic literature (Janda and Parag, 2013). Simply put, a rigid top-down policy might not be successful as it might not be flexible enough to account for different aims and interests of an organisation. There is a lack of information regarding the UK non-domestic building and organisational structure, which is certainly complex and highly varied, making managing energy policies in the UK non-domestic sector into a 'wicked' problem (Rittel and Webber, 1973) according to (Janda, Bottrill and Layberry, 2014). It is, however, obvious that this variation in organisational structure is a reflection of a variance in aims, interests and needs of different organisations. A rigid agenda of cost minimisation associated with organisational energy use will generally be one of the smaller overheads so there is often little incentive for senior management to get behind energy reduction efforts. As a result, evidence show that organisations behaviour with regards to EE measures does not follow rational cost minimisation (Fleiter et al., 2012) showing a potential weakness of the ESOS legislation. ,

Another approach for societal and behavioural change that is widely discussed in academic literature is a bottom-up approach, where individual agents are seen as having a full capacity to deliver desired behavioural change (Janda and Parag, 2013). However, significant behaviour change on an individual

level with regards to energy use is difficult to achieve in the office environment. Unlike at home, employees have limited knowledge of how much energy is being used and share resources so may feel that conservation is out of their hands (Carrico and Riemer, 2011).

If ESOS is to be successful policy and fully deliver on its estimated saving potential, its implementation at organisational level must at least trigger both EE investments and behavioural changes within the organisation. Janda and Parag (2013) argues that rather than top-down a middle-out approach has the potential to encourage behavioural change. They identify building professionals as one particular kind of middle which combines the advantages of top-down and bottom-up approaches to trigger behavioural change and act as agents in delivering and promoting infrastructural changes. (Janda and Parag, 2013). Within the built environment profession, facility managers are possibly the profession which has the closest insight into actual performance of the existing building stock, its users, business and financial boundaries in which they operate. CEN standard EN 15221-1:2006, (CEN, 2006) defines facility management as “Integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities.” It is theorised in this paper that a facility manager could represent this middle point, who could trigger behavioural change within an organisation.

## **2.1 Research objectives**

The aim of the study is to understand whether ESOS will be a sufficient motivator for organisations to implement EE measures. In line with a theoretical position of the paper, specific research objectives are narrowed down to the following:

- Understand If ESOS, through being mandatory, can be a sufficient motivator for implementation of EE measures under an overarching agenda of cost-minimisation
- Understand if it is possible for an organisation to shape its own agenda, within which ESOS would be more effective in delivering change as compared to the agenda of cost-minimisation
- Understand if the facility manager is capable of taking a middle-out position within an organisation and therefore be in a position to trigger behavioural change within an organisation in respect to EE measures

### 3 Research Design

Epistemological position of this research is towards the objectivist end of the continuum, as the focus is on identifying replicable pattern of objective reality. At the same time, one of the Researchers, who is the FM within the organisation, acknowledges her role as an active participant in shaping that objective reality, also acknowledges that the external reality will be perceived and understood from the perspective of the researcher, which will inevitably shape the direction of the study (Daly, 2007; Saunders, 2012).

There are two main methodological approaches adopted in the study. A change in an organisation (managers) is evaluated within generic qualitative methodology. A change that occurred in mind-set of a Researcher/ FM herself is evaluated with Ethnomethodology: the researcher is in a position of immersion and self-reflexion within the case seeking to understand the organisations processes and beliefs, (Francis and Hestor, 2004; Garfinkel, 1992) The choice of Epistemology reflects a need to link objective reality with a subjective interpretation of it, allowing for systematic interpretation of the conscious experience of the Researcher, who is immersed in organisational life and is herself part of that culture. Primarily the focus in this study will be on ideas, cultures and believes of a Researcher, who is both a subject and a participant of an organisational culture (Daly, 2007).

The aim of the study is to get deep insights of a phenomenon rather than quantitatively establish a repetitive pattern. A case study format is best suited for achieving deeper insights of the topic within its context, wider applicability of which could later be tested quantitatively with other methods. Neither an experiment nor a survey would have been able to provide insights into why any behaviour change occurred and so would not have been useful for the purpose of the study. The case study format will provide a much fuller understanding of the implications of ESOS within both an unusual and revelatory case (Donald R.C. and Schindler P.S., 2011; Yin R.K., 2014). For the purpose of this research the Case Study is defined as;

*A research method that involves investigating one or a small number of social entities or situations about which data are collected using multiple sources of data and developing a holistic description through an iterative research process, Easton (2010 p. 119).*

The “Case” is a large organisation trading in the SIC codes 14131 - Manufacture of other men's outerwear sectors, 74201 – Portrait photographic activities, 14132 – Manufacture of other women's outerwear, 14190 – Manufacture of other wearing apparel and accessories, and 47710 – Retail sale of clothing in specialised stores. The organisation is *unusual* as it occupies a niche market and includes retail, offices, light manufacturing, warehouse and printing operating out of 14 individual sites across the UK. The organisation should also allow for a *reveatory* case study as this is the maiden year for the ESOS legislation. It will look at the whole organisation whilst undertaking embedded analysis at site level. The main sources of evidence used as shown in Figure 1 will be; archival records, interviews and participant observation (Yin R.K., 2014).

The Researcher has been working within the organisation for six years and occupies the facility manager role, reporting to the chairman and taking responsibility for group wide efforts relating to energy and EE measures. The Researcher has full access to all documents, archival records and recorded data and was able to undertake significant direct observation of the process predominantly from head office but with regular field trips to the other sites. The Researcher will be a participant in constructing the data and will work collaboratively with the organisation as a change-agent (Selener, 1998) to bring about organisational change.

As part of the data collection, two sets of employees were interviewed: directors as they are the ultimate decision makers within the organisation and senior managers (SM) as they are responsible for all undertakings and lower level decisions at their own sites. The Researcher also undertook a self-interviewing process.

### **Figure 1 – Sources of Evidence**

The interviews were not recorded as there was a strong reluctance by SM to talk openly about the business whilst being recorded. The use of a recording device would therefore have skewed the interviewee responses and distorted the results. To ensure construct validity each interviewee was asked to confirm the typed notes of the interviewer after each interview.

### **3.1 – Establishing a baseline attitude towards ESOS and EE within the organisation**

Interviews were used to assess the baseline knowledge and mind-set of key personnel within the organisation regarding EE. Semi-structured interviews were undertaken with the directors, SM and by the Researcher of their own views in advance of the audits. The interviews assessed the interviewee's personal views on energy in the wider context of the sustainability agenda, their knowledge of environmental practices within the organisation, their knowledge about relevant environmental regulations and whether the organisation had any environmental accreditation. Their knowledge of ESOS was attained by providing each interviewee with set information regarding the legislation's aims and what the organisation has to do to comply. Existing EE measures at interviewee's particular sites were also discussed and they were asked to list all energy uses within their site. Depending on the site, the interviews lasted between 20 minutes and 1 hour.

Further analysis was undertaken using historical data including: capital expenditure requests for EE upgrades and their approval/rejection rates; analysis of how efficient equipment purchased in the 3 last years was in comparison to other available options and; the energy used by each site against a number of different metrics such as size of site and turnover. The metrics used allowed some sites to be benchmarked against each other thus highlighting under- and over-performing sites.

### **3.2 Evaluating a change that occurred in the mind-set of the organisation as a result of ESOS implementation**

In order to assess whether ESOS changed attitudes towards EE within the organisation, the directors, SM and the Researcher/FM were interviewed for a second time three weeks after the ESOS report was distributed. These interviews focused on the effects of ESOS on behaviour change. All interviewees were asked whether ESOS had improved their knowledge of available EE measures and whether this had been due to the content and/or format of the report. They were asked which metrics were most useful and if any additional metrics would have further added to their knowledge. Finally they were asked how regularly they would like feedback of this kind. The directors were asked what influence the cost of the ESOS audit had on their decisions regarding implementing the EE measures recommended and whether they would undertake future energy audits if the legislative requirements

changed. The appetite for implementing the stronger options for future compliance, such as ISO 50001 or an in-house auditor, was attained to see if the rule change had led to any non-mandatory changes. To ascertain if a mind-set change had taken place within the organisation all interviewees were questioned on how beneficial they thought the audit had been to the organisation and whether they planned to implement any of the measures or provide a budget for implementing EE measures.

Each interviewee's general attitude towards the report and EE was assessed by the interviewer against the first round of interviews. Reaction to the ESOS report in terms of number of questions asked during discussions with the researcher along with the number of own ideas proliferated for additional EE measures were also used to see if a mind-set change had taken place. Observations were made by the researcher during a walk round of each site during the interviews regarding any initial implementation of the no cost / low cost options presented in the ESOS report such as whether computers and/or lighting not in use were turned off.

### **3.3 Assessing a change in a mind-set of a Facilities Manager / Researcher**

A process of self-reflection before and after the ESOS audit was undertaken by the Researcher who, as explained before, works as FM with the organisation to decide if a mind-set change had occurred throughout this process. Within this self-reflection, assessment of their own approach to energy management before and after was made along with an assessment of the amount of time and resource they dedicated to it. Their intentions to implement any of the recommendations, the number of additional ideas they developed and the feedback they created for both SM and the directors were used as indicators of any changes within their mind-set.

To ascertain if the Researcher/ FM is capable of having a middle-out position and could have the power to create a paradigm change in the organisation, the directors and SM answered questions relating to the FM's role and responsibilities within the organisation. The directors were questioned as to whether they would empower the FM to make such changes through allocation of a budget and support at a senior level. SM was asked who they thought should have the responsibility for EE within the organisation and who would actually implement measures both at their own sites and across the organization.

## **4. Results**

### **4.1 Baseline analysis**

The current attitudes of SM to environmental protection and EE were positive both in terms of reducing costs and towards helping the environment. The attitudes among directors were more mixed with most agreeing that energy reduction was positive from a financial perspective but with less concern about its effect on the environment. There was an equal split between the directors that knew the energy consumption of the organisation and those that didn't. In contrast, a clear majority of SM did not know the energy consumption at their sites demonstrating a knowledge gap (Meadows' lever point 5). The overview of the responses is presented in Tables 2 and 3.

Insert Table 2

Insert Table 3

Within the retail sites there was considerable scope to implement EE measures, however, as one of the directors commented maintaining the “aesthetics” of the stores had to take priority over the implementation of EE measures. This attitude resulted in lighting upgrades being particularly more expensive compared to solutions driven solely by EE.

Overall, the baseline analyses demonstrated that the organisation was positive to the ideas of EE and energy conservation but lacking a group strategy and culture of energy conservation. The FM also had a positive attitude towards the environment and energy reduction before they started this research. They knew the energy consumption of the organisation but were not actively doing anything with that knowledge or trying to implement any EE measures beyond favouring LED lighting in the retail units. The FM was sceptical about the benefits possible from the ESOS legislation as they believed it may just be a box-ticking exercise.

### **4.2 Effects of ESOS on a behaviour and mind-set change**

#### *4.2.1 Changes in organisational behaviour*

The attitude to the benefits of the ESOS report remained positive after its distribution. There was a consensus from both directors and SM that measures would be implemented. Directors stated that anything with a pay-back of less than 3 years would be implemented; anything with 3-5 years investigated and with 5 years plus put on hold and reviewed periodically. One director stated ease of implementation as an additional factor in deciding. A number of suggested measures within the ESOS's audit report had pay-back periods which raised concern as being too optimistic. As a result of these concerns, the FM (Researcher) was asked to undertake further analysis which is still ongoing. The Financial Director was the least positive preferring EE measures to be implemented during end of life replacements. They did however state that if there were other business reasons they would not object but that would be the decision of the other directors.

All of the four directors interviewed stated that the cost of the report had no effect on their decisions regarding implementation making this incentive factor void. Due to the Royal Warrants held by the organisation some level of auditing would have been done anyway. All directors thought that it was too soon to make decisions about other routes to compliance such as ISO 50001 and it was felt that the organisation is too small to train a staff member to become a lead assessor.

Five of the twelve SMs interviewed stated that the report had not changed the priority they gave to EE because EE was already very high on their agenda. Of the four directors, three said that the ESOS process had increased the priority of EE though it was already rising due to increased pressures from customers and other regulatory requirements. The remaining director is the board representative for the environment who already had EE as a priority so the ESOS process was unlikely to raise it further. The results obtained therefore provide mixed responses as to whether the report itself improved attitudes to EE.

The organisation had not undertaken an energy audit of this nature before the legislative requirement showing that ESOS had changed the rules of the system. The four year cycle between compliance periods was cited as making it difficult to ascertain what would be the best route of action for future compliance until closer to the next compliance date. It was clear that the cost of the audit was not significant enough to motivate the directors to implement any EE measures. The directors were open

to repeating the audit without the legislative requirement if a tangible business benefit could be shown from this experience. This demonstrates a potential for ESOS to create permanent behaviour change.

All interviewees stated that the ESOS energy audit report format was both clear and useful and that they were aware of most of the issues identified in the report though it highlighted the potential for cost savings. The directors knew about most of the proposed EE measures through previous discussion with the FM before the ESOS legislation came into force. SM was surprised to discover how much energy was being used on their sites revealing a knowledge gap in energy use if not EE.

Subsequently all SM asked for quarterly reports on energy usage and copies of the bills to be sent to them. Different metrics were requested by different SMs such as hours of operation for retail sites.

The EE measures in the ESOS report were relatively vague and not site specific. The uniqueness of the organisation and some of its processes made finding an auditor with the full relevant experience difficult and the knowledge gaps of the auditor chosen were evident. As there is no format specified for the report from the Environment Agency, there is no way to know if one of the other, more expensive, audits would have been able to fill this knowledge gap.

Whilst the ESOS report did not add to already existing knowledge regarding the available EE measures, in combination with the subsequent work done by the FM it did fill the knowledge gap of SM and directors with regards to the energy consumption and its costs.

The increased level of knowledge regarding the energy usage has changed behaviour to some degree at all sites showing that feedback in this format did have an effect on behaviour change. To ensure this effect is long-term, the format of the feedback and the interaction between the FM and SM will change to reflect individual site-specific performance and measures, therefore keeping it fresh and distinctive and thus reinforcing the impact it has.

At site level, all SMs came up with at least one measure of their own to improve EE at their site in addition to those proposed in the audit report. The SMs with the higher energy usage came up with the most measures for their sites. The additionally proposed EE measures were an even mix between

ideas related to behaviour change, such as putting less water in the kettle and opening windows rather than using A/C, and those related to building improvements such as sealing windows to reduce draughts, replacing immersion heaters with point of use heaters and upgrading controls for heating and cooling.

It is not clear whether the increased responsiveness to EE measures and energy reduction by SM is due to the meetings the FM held with the SMs to discuss the report rather than from the report itself. For example, SM at one of the Production sites stated they had read the report but could not remember any of it and had not prepared for the meeting with the FM. As the meeting progressed their interest in the topic however developed and their positivity to it increased with them creating a number of possible options.

Undertaking this research project in conjunction with the process of compiling the ESOS report has increased the level of confidence of the FM, which together with the FM's enthusiasm resulted in a redistribution of responsibilities regarding EE measures to the FM. All directors stated the FM would be responsible for implementing EE measures with SM answering either to them or to the FM on the outcomes. All SMs and directors stated that EE was part of the FM role. Directors stated this was in conjunction with the environmental team. SMs stated that EE was a SM responsibility but as the FM has an overview of the whole organisation they were best positioned to provide metrics and prompt SMs at regular intervals. The Operations Director stated that the FM is best suited to advise on the usefulness of other compliance mechanisms such as ISO 50001 to the organization. A number of SMs stated that having one person responsible across the organisation allowed "joined-up thinking".

The meetings with the FM, in addition to the report, are likely to have had an impact on the views of SM that EE and energy reduction was now a new priority at the organisational level and thus that SM should also make it a priority. Either way this changed the shared sense of social order within the organisation and the unwritten rules regarding how energy was managed.

The FM, during the ESOS implementation and this research project, became more proactive and created a behaviour change in the SMs and directors who started to exhibit energy saving behaviours.

One director was shocked by the expenditure on energy and therefore immediately changed their behaviour by no longer turning on all of the lights in the office on arrival. In fact this behaviour change by one senior person led to all members of staff in that section changing theirs and only turning on lights when needed. This was achieved without any verbal interchange and demonstrates the power of behaviour change through example which then established a new normative behaviours within that site.

Before the report the FM had a number of long standing capital expenditure, CAPEX, requests in place for EE measures. Since the report, these have been signed-off demonstrating a change in directors behaviour. However, no further additional resources or budget has been allocated with more information being requested instead.

The report has brought EE measures to all of the interviewee's attention and increased the priority of reducing energy usage within the organisation. Nevertheless, a business case in terms of income generation is still almost the only way EE measures are prioritised. For instance, nearly all SMs and directors talked about the cost savings the ESOS report could generate, but only 2 SMs mentioned the environmental benefit the report could lead to. At the same time the Operations Director demonstrated an openness to stronger compliance measures but only if supported by a business case. The organisation did not change its goals following the ESOS audit but did show signs of the beginning of a culture change. How this would permeate through the organisation is as yet unknown.

#### *4.2.2 Change of a mind-set*

##### *The FM (Researcher)*

The FM already had a positive attitude towards EE and had engaged with directors on how to reduce energy consumption within the organisation. She was studying a Master course related to sustainability through personal choice. Through a process of self-reflection about herself and her role, the FM has seen the beginning of a mind-set change in herself. The process of completing the ESOS report and the research process, rather than the ESOS report itself, has created this change. The FM

was already concerned with energy reduction and EE but had remained focused on simply analysing data for individual sites rather than analysing the impact at organisational level. She had looked only at technical EE measures and had not made any efforts to create behaviour change within the organisation, remaining at level 2 in the energy hierarchy (Institution of Mechanical Engineers, 2003). This was partly due to a lack of confidence on her part and feeling that she needed to be mandated by the directors. The ESOS process gave her the mandate needed to work at strategic level along with the tools to support her.

When comparing FM self-interviews before and after the ESOS process it is clear that the views of the FM about the organisation and its attitude to EE and potential to change have altered. This has been both through the evidence gathering process and in conjunction with the organisations views and attitudes actually changing throughout the process. There has been a co-evolutionary development between the FM internally and the FM and interviewees which has been beneficial to the organisation. The research process has made the FM, SM and directors examine the ways they do things and try to explain or justify them when presented with reasons for change. The self-reflection process created in all of the interviewees shows the effect it can have on an organisation. Being asked to explain and think about the behavioural norms and culture at their own work places at different time points interspersed with an increase in knowledge has effected both researcher and researched.

The FM is now much more positive about driving EE measures within the organisation and taking a lead generally. The language used within two sets of interviews (before and after) clearly displayed an increase in confidence. During the second phase of interviews, the FM/researcher was more direct and stopped using phrases such as “kind of”, “urmm, on some things” and “I suppose”. Instead, in the post-ESOS interviews, phrases such as “I will”, “there was” and “I’m going to” showing positivity, confidence and enthusiasm were used. Her mind-set has started to change, her priorities have changed, she has a mandate to change the rules of the system and has changed those rules and her knowledge has increased. The FM is now in a considerably better position to act as the link between the building occupants, the building and its ecological system and enable SM to become stewards of the behavioural change process within the organisation.

## *Organisation*

ESOS and the research process has created a behaviour change within both the researcher/FM, and the organisation. However, a paradigm change has not occurred within the organisation as financial savings are still being cited as the most influential motivator by SMs and directors.

The ESOS report falls into the category of existing assessment tools criticised by du Plessis and Cole (2011) for simplifying the context and processes of the systems they are trying to evaluate as it only focuses on simple metrics such as energy use and carbon emissions. ESOS focuses on creating buildings that “cause less harm” rather than moving buildings towards a regenerative position (Plaut et al., 2012, p.121).

A mind-set/paradigm change generally requires a crisis or a leap in knowledge making previously held beliefs impossible to maintain (Daly, 2007). This has potentially occurred within the FM, but this has not occurred in the SMs and directors yet. Du Plessis and Cole (2011) argue that to shift the paradigm requires a change in mind-set initially, followed by changes to the other levers cited by Meadows (1999) specifically in the goals of the system and the values of the system. The FM, through having control of the goals of the system (lever 3) and changing these goals (lever 2), supporting the process with energy usage information (lever 5) and incentives (lever 4), such as the continued attainment of a Royal Warrant, used the lever points already shown to be effective to change the culture and behavioural norms of the organisation and potentially create a paradigm change. This could take the organisation from their current position in the degenerative sphere to at least a sustainable position if not into the regenerative state (Plaut et al., 2012).

## **6. Discussion and Conclusions**

This Case Study has investigated the effects of the new legislative requirement, ESOS, on an unique organisation offering the potential to look at the effects of energy audits in the varied environments of retail, production, printing, light manufacturing and warehousing. The Case Study was conducted by researcher working within the organisation which meant the results and subsequent discussion can

provide in-depth insight into both the organisation and the researcher that would not have been otherwise available.

The results demonstrate that indeed different mind-sets behind the same system rule: ESOS legislation, can deliver different results in behavioural change. The wider implication of this can be that policies should not have a top-down approach assuming users are passive agents. Instead, policy makers should try to understand users limitations and potential sources of motivation empowering them to realise their own personal goals and objectives and adapt their own vision within the remits of the legislation.

From the point of Meadows' framework, the results suggest that the ESOS legislation, auditing process and process of research itself has activated several levers of change. Specifically, it created a new rule in the system (lever 4), which resulted in an increase of information flow (lever 5) and, thus, behaviour change. The FM was able to activate more levers of change through the process of completing the ESOS report and this research process, than through the ESOS report only. Firstly, the mind-set (lever 1) of the FM has started to change to an understanding of a need to transit from treating an environment as a resource to a way of operating that could be mutually beneficial to both — the organisation and the ecological sphere it resides in. Such understanding achieved through individual and collective self-reflection resulted in a change of goals (lever 2) within the FM, but also within some SM and directors. The confidence gained through the research and the process of completing the ESOS report allowed the FM to influence the redistribution of the power inside the organisation with more power regarding EE decisions being allocated to the FM.

Whether the FM can move the organisation towards the concept of co-evolution and a regenerative position cannot be assessed in the time scale available for this case study. However, the initial signs of change displayed by both directors and SM give some cause for optimism and the ability to change. This ability will be significantly dependent on the directors continuing to mandate the FM to create such change and the FM's continued mind-set change and motivation to work with all the relevant stake holders to deliver such change.

This was a single case case-study whose primary contribution is to the organisation. The broader relevance, to the UK government's goal of reducing energy use through EE, is that it has demonstrated that through engagement with stakeholders and by producing relevant and specific information behaviour change can be achieved. Through targeting key enablers, such as FM's mind-set, changes can be made which could lead to paradigm changes. A change in FM's mind-set, in its turn, can be achieved through a process of research and self-reflection facilitated in higher education, suggesting that a focus on education has a potential to deliver more substantial change than enforcement of legislation alone. This can be of particular wider importance as the Case Study also demonstrated that FM's can be a successful middle-out agent for delivering EE legislation.

The case study was conducted during the maiden year of the legislation making the research revelatory. At the time of writing there were no other case studies available on ESOS implementation. It therefore supports the existing theory adding to the existing knowledge base. Finally, there are a number of recommendations based on this case-study to be made which can further improve the legislation.

1. A mandatory requirement for organisations to show improvement either as a requirement for an overall energy reduction by turnover or sq/m etc., or as evidence of an organisational change such as the recruitment of an energy manager or energy responsibilities within job descriptions. This would increase the likelihood that organisations actually implement the cost saving measures and therefore follow rational cost minimisation behaviour.
2. The qualification threshold should be reduced with requirements implemented in steps. All organisations should be asked to report their yearly energy usage within their annual accounts. With the recommendations aspect remaining only for larger organisations. Reporting energy usage in this way would increase the importance of energy consumption within most organisations due to the potential impact on their brand. This type of reporting to motivate organisations to improve can be seen in another new piece of government legislation the Modern Slavery Act 2015.
3. Improve the quality of lead assessors and the recommendations they submit. It is not helpful if the lead assessor does not have full knowledge of all of the equipment and makes recommendations that are sometimes inaccurate and often too vague to be of any use.

4. Reduce the time gap between the reporting cycles. If the reporting cycles were made shorter, possibly every two years, there would be more incentive to invest internally or take up another qualification route such as ISO 50001. With a cycle of 4 years the more cost effective measure for smaller organisations is to appoint a lead assessor each time and allow the momentum created by the report lapse between cycles.

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