Commercial Buildings Special Working Group

Change Management Report 2010

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1. Introduction

Reducing energy use makes perfect business sense; it reduces costs, reduces green house gas emissions and improves company image. It also reduces exposure to volatile energy prices and helps with security of energy supply by reducing dependence on imported energy sources. So why is it often difficult to implement energy saving measures? Why do we not make simple changes to our organisational behaviour that would reduce the amount of energy we use? Companies in Ireland do not take advantage of a wide range of opportunities to improve their energy efficiency that appear to be cost-effective (O'Malley 2003). "Cost-effective" here means that such investments in energy efficiency would have a significantly better rate of return than the cost of capital.

This report investigates some of the reasons why it is often difficult to implement energy saving measures. It looks at two broad categories of potential savings; low cost items which are items with a payback of less than one year (often less than a month) involving changes to operational settings or maintenance changes and higher cost items which involve a degree of capital investment with a payback of greater than one year. In effect paybacks of less than one year can often be paid for out of operational expenses while longer than one year will require a capital investment.

In most organisations, savings of up to 20% of energy use (CarbonTrust 2007) can be readily achieved by managing their energy use and investing in energy saving measures.

Many organisations have no shortage of energy saving opportunities identified but have difficulty in implementing them.

This report has been prepared using background literature from a number of international energy agencies and on change management in general. Interviews were held with most members of the Special Working Group (SWG) to establish their experience and opinions.

2. Findings from member interviews

The findings are summarised here under three headings; context, barriers and drivers. 5 of the 6 members companies contributed to these findings. While this is a very small sample, it still presents interesting results.

While many of the replies were subjective, an attempt has been made to convert them to numerical results (perhaps subjectively!)

The average required payback of those members who responded to that question was 27 months.

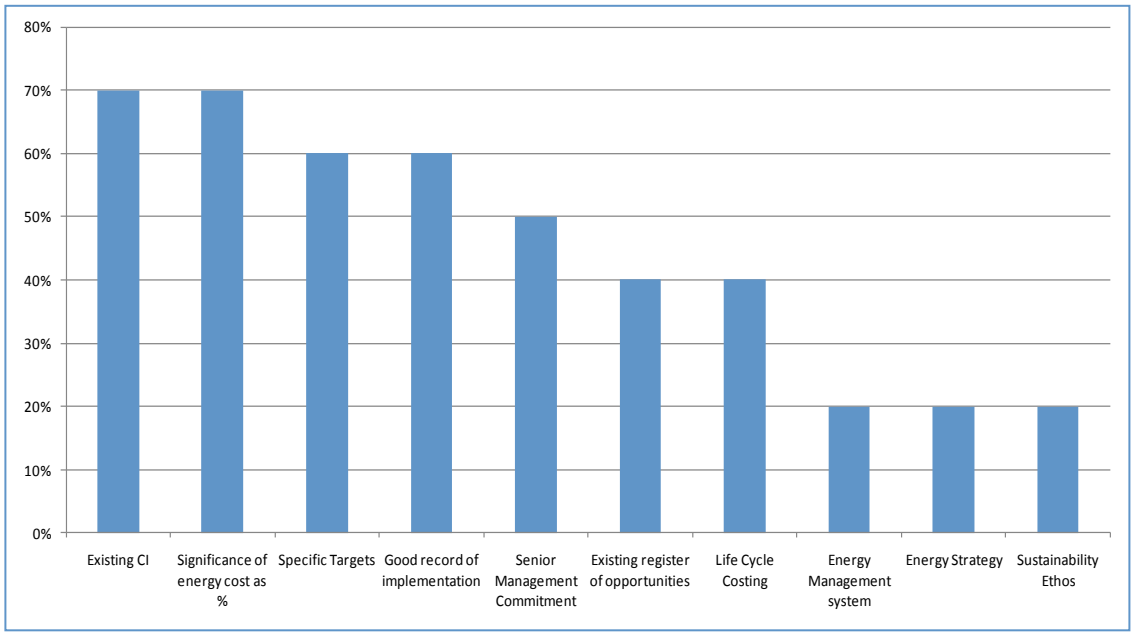

Figure 1 Organisational context results

The interesting points from the figure above is that the majority felt that energy costs are significant and that some form of continuous improvement is already in place. Most felt that they don't have a culture of sustainability or a strategic approach to energy management.

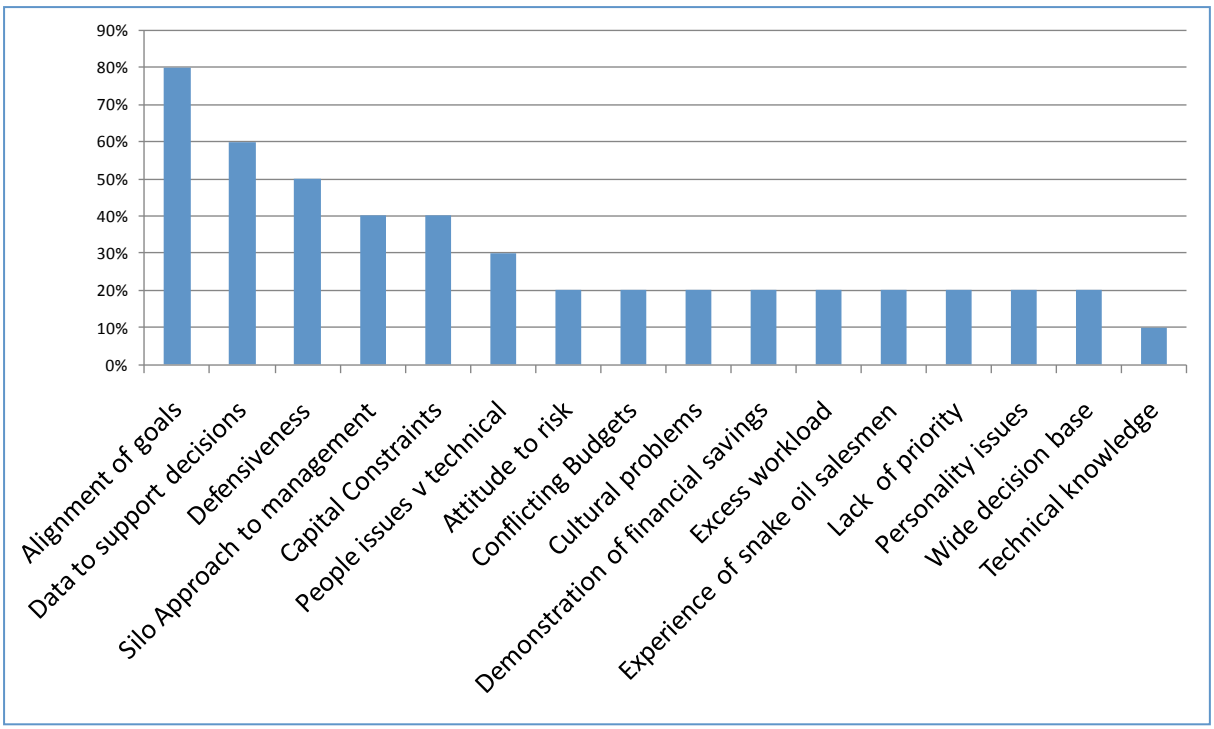

Figure 2 Perceived barriers to making energy savings

A number of the barriers listed above have similar roots and are appearing to be significant in a number of the member plants. Most significant is the group "alignment of goals" including silo approach to management and conflicting operational budgets. In order to allow energy saving measures to make better progress this issue needs to be addressed at the organisation level. It is also likely to be inhibiting other improvement measures in general outside of the energy management remit.

Another significant barrier is "data to support decisions". This is signifying that here is not enough numerical data to allow accurate calculation or estimation of savings potential. It is not necessary to have an elaborate M&T system to improve this situation. It is necessary for all organisations who want to reduce their energy usage in a sustainable way to know where their energy is being used and what is driving this usage. If a facility knows this they will usually be in a position to better estimate potential savings from any energy opportunity. This can often be achieved using portable measuring equipment and estimations made from there. Care is needed to compensate for seasonal and other changing drivers.

Defensiveness was also a common trait, whereby individuals may try to prevent a change from happening due to a personal perception they may have. Communication, training and awareness are required to reduce this barrier.

There was a mixed response to whether financial constraints are a real barrier. Many members indicated that it was but most felt that if the case was properly made and that organisations investment criteria were met then the funding would be made available.

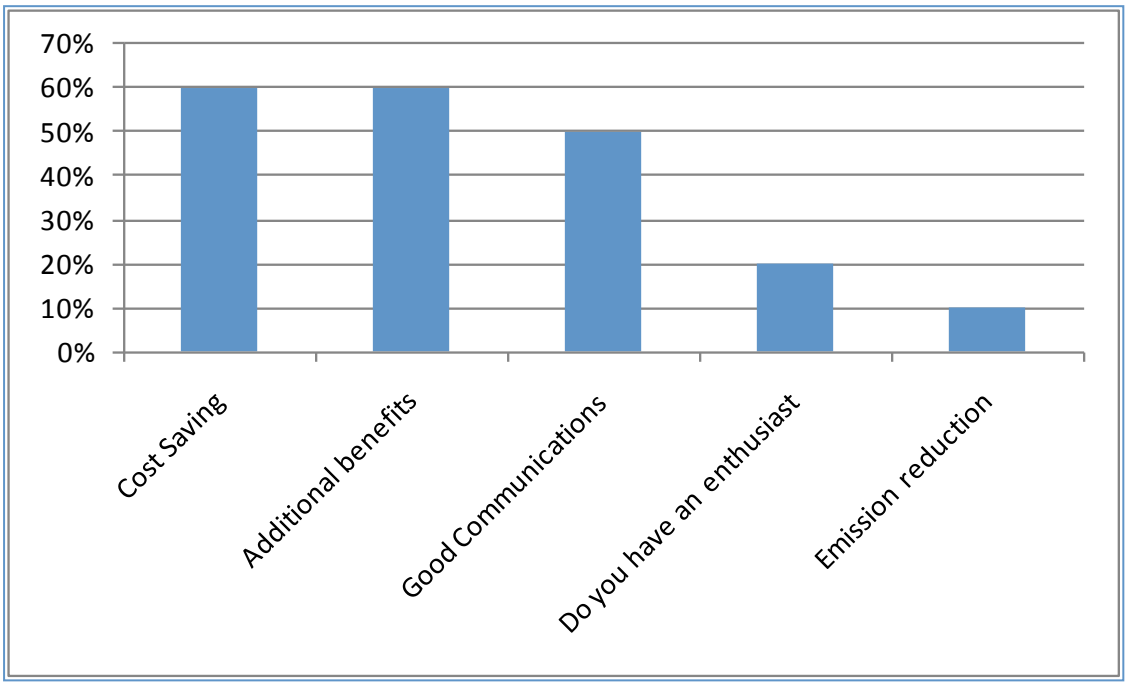

Figure 3 Drivers for success

The two most common drivers seen by the members are cost reduction and additional benefits that accrue from making energy savings. The first of these is fairly intuitive but possibly the second less so. Many felt (and this coincides strongly with the authors experience) that there are invariably other improvements resulting from improved energy performance. These typically include reduced noise levels, improved comfort levels including better control of temperature and reduced draughts.

It was somewhat surprising that there was an exceptionally low score for emission reduction or environmental issues. This is in significant contrast to industrial drivers.

Review of Current Change Management Practices

There was almost no evidence that any formal change management tools or methodologies are in use among the group in relation to changes specifically related to energy management or the implementation of energy opportunities. This is in a context where organisational change is very common among many of the group.

There is a feeling that many, though not all, of the organisations in the group regard the capital investment initiatives as being the main area of focus. There are some examples of low cost items being implemented (sometimes unsuccessfully) but they are much fewer than higher cost items.

Both categories need to be considered and if either should be given priority, the author believes it is the low cost items.

There was one very good approach to operational change management, whereby small changes were made as simple as possible in order to minimise the room for misunderstanding or miscommunication. It was felt that this was the basis for more success than some previous initiatives which had failed due to poor take up among users.

All felt that implemented capital projects were successful. This is a very typical response. None of us likes to admit that having spent the money the results were poor. The author has seen many cases of capital projects where little or no savings have been made, being declared successes.

3. Methodology

In order to have the best chance of successfully implementing energy saving opportunities, it is necessary to have a structured approach to managing your energy.

There are many cases of organisations implementing unsuccessful investments while ignoring viable opportunities. This is often due to an unstructured approach where perhaps selection of opportunities is based on the latest "fad" whether it is sold by a salesman, seen at an exhibition or similar.

Structured Approach

There are a number of alternatives on how to adopt a structured approach to energy management. For example it could be based on any of the following:

1. IS EN16001:2009 has replaced IS393:2005 as an energy management system standard and is suitable for larger organisations.
2. EnergyMap; (http://www.sei.ie/energymap/) which is designed for small and medium enterprises (SMEs).

Both of the above have similar approaches in that they both advocate the following basic steps:

1. Management commitment.
2. Identify how much energy you are using, where it is going and what is driving your consumption.
3. Focus on the significant energy users and develop savings opportunities, implementation plans including training of relevant personnel.
4. Establish objectives, targets and an action plan (both low and higher cost actions) to reduce your energy use.

5. Ensure that you have sufficient resources (financial, human and expertise) to implement your plan.
6. Implement the plan including change management, training and follow up.
7. Ensure that all significant equipment and systems are operated and maintained effectively and efficiently.
8. Monitor performance; check energy usage against targets, check that the system is functioning and review progress with senior management.

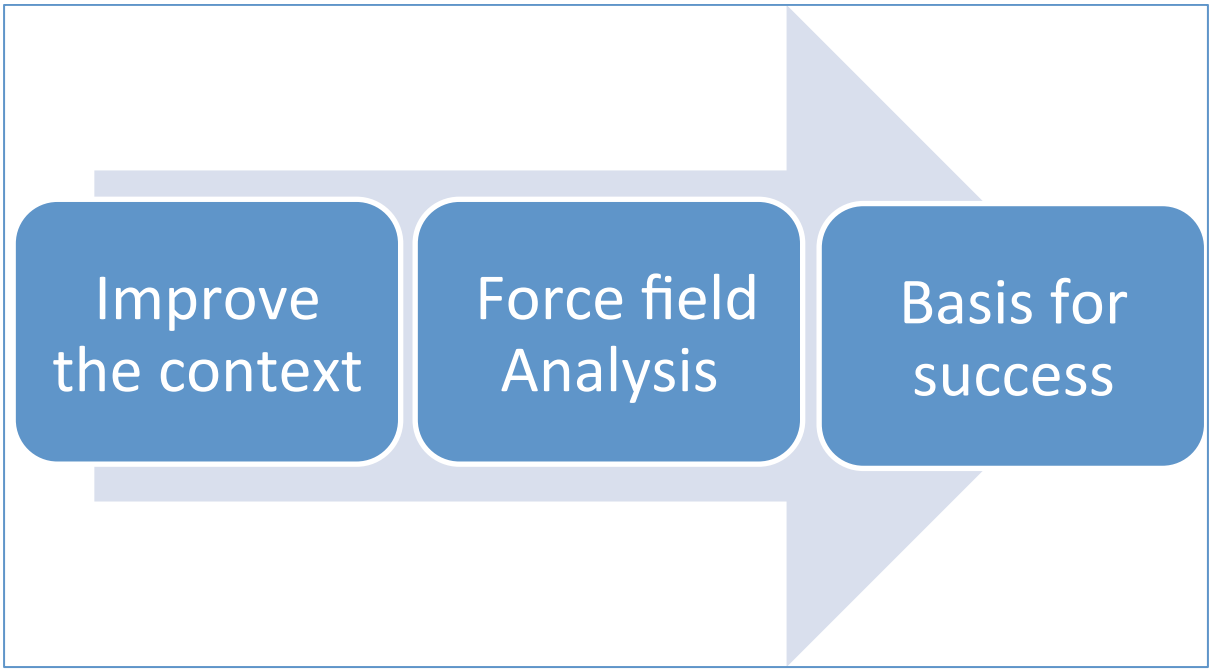

Figure 4 Change Management Process

Improving your context

In order to be successful and implement a structured approach requires a change management project. The level of effort required will depend on your organisations current culture and approach to improvement and change. One relatively simple method to improve your context and implement a structured energy management system such as IS EN16001:2009 or EnergyMap is to use Kotter's 8 step change model. The steps are outlined below. Detailed instructions are beyond the scope of this report. There was some feedback from the group suggesting that this model could be improved. The main point is that the steps suggested

1. **Create a sense of urgency**. The current economic climate should help as most organisations have a strong focus on cost reduction.
2. **Build support from key influencers**. This will involve canvassing relevant senior and other management for support to implement a system or programme for improvement.

3. **Create a vision of what can be achieved.** Show success stories from other organisations or demonstrate from statistics how much could potentially be saved. In some cases you may already have identified potential savings and these can be used as part of the vision. The vision should be aligned with the values of the organisation, i.e. in addition to cost savings, sustainability or environmental responsibility may be relevant. It was suggested that perhaps this should be the first step in the process. In any case the first 3 steps are interlinked in setting the tone and gaining support for the programme.
4. **Communicate the vision.** Communicate the general message of the programme to all relevant staff, in more detail to those who will be directly involved.
5. **Remove obstacles.** Increase training and communication to those who may not support the programme but who are in positions where their support is important.
6. **Create short term wins.** Nothing motivates more than success. Implement some of the easier items to make real savings which can be communicated to raise the profile and credibility of the programme.
7. **Build on the improvements.** Progress with a continuous improvement approach using the momentum gained from early success to further raise credibility with staff at all levels in the organisation.
8. **Anchor the change in your culture.** Ensure that the programme is fully accepted by relevant personnel and embedded in their day to day activities.

For further details on this topic see http://www.mindtools.com/pages/article/newPPM_82.htm

Note that a well documented and certified energy management system (EnMS) is often not enough to make actual energy savings. The approach outlined above will help to embed the EnMS in the day to day work of those affecting your energy use.

Getting opportunities implemented

A well proven tool in change management is forcefield analysis. It is based on analysing the drivers and barriers for and against any particular change in an organisation. It is very simple and can be diagrammed easily. Care is needed in not interpreting it as a "battle plan", where you want to overcome the forces pitted against you (the barriers) by increasing the drivers to a point where the change is driven through despite opposition. This often increases opposition. In order to have the best chance of success the barriers need to be analysed and reduced. This is most commonly achieved by communication, awareness and training.

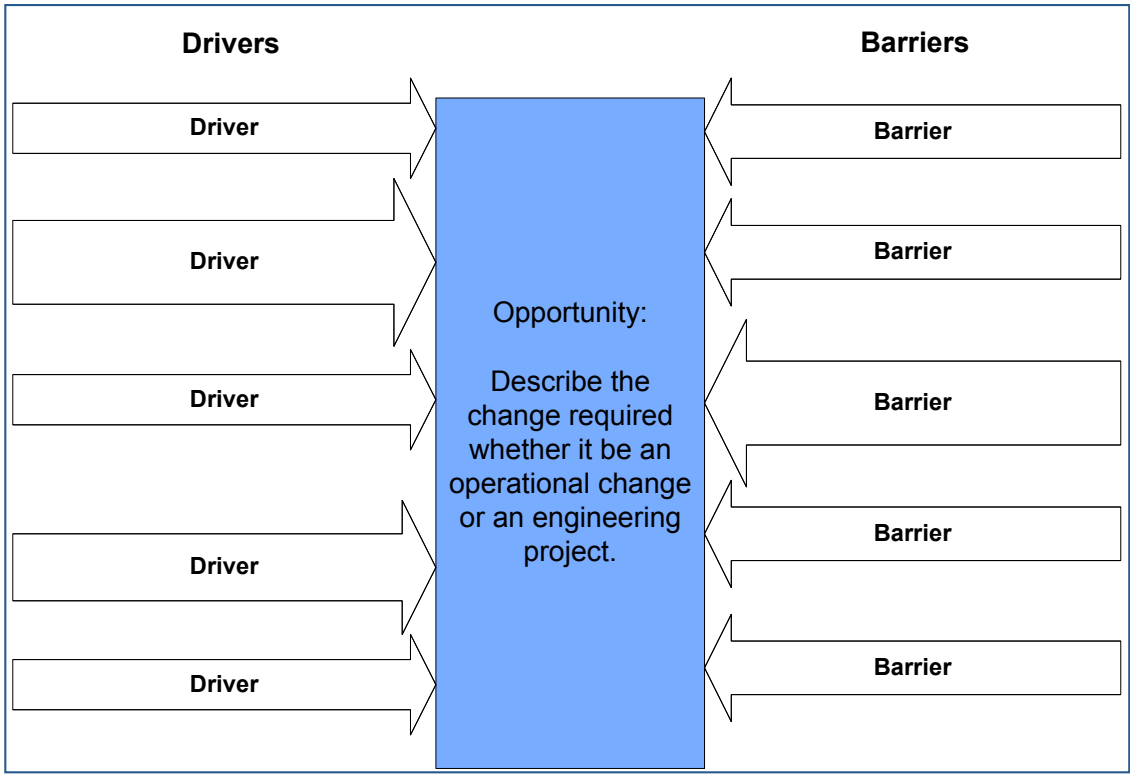

Figure 5 Generic Forcefield diagram (Lewin, 1951)

A diagram such as shown above can be very helpful in planning the implementation of an opportunity. The opportunity is described in the centre box and the drivers and barriers are listed on opposite sides. This does not have to be an exhaustive exercise but the small amount of time taken will help to identify a plan. The width of the arrows normally represents the strength of the respective driver or barrier.

Notes to consider:

1. Keep technical solutions as simple as possible and ensure that final users are fully trained in the change you are making. If they don't know how to use it, it will probably not be effective and will often not be used or will be bypassed.
2. Ensure that all stakeholders and those who are impacted by the change have an input into the process and that their concerns are addressed as far as possible.
3. Have a clear scope and specification of the change to be made. This may be an engineering specification including drawings, etc. or a description of an operational change.
4. Get formal approval for the change as required. This can be a simple go ahead for small changes or may require a lengthy approval process for large or complex changes. Where funding is required, you will need to make a business case for the change.

5. Use a project management type approach for large project implementation including change control as appropriate.

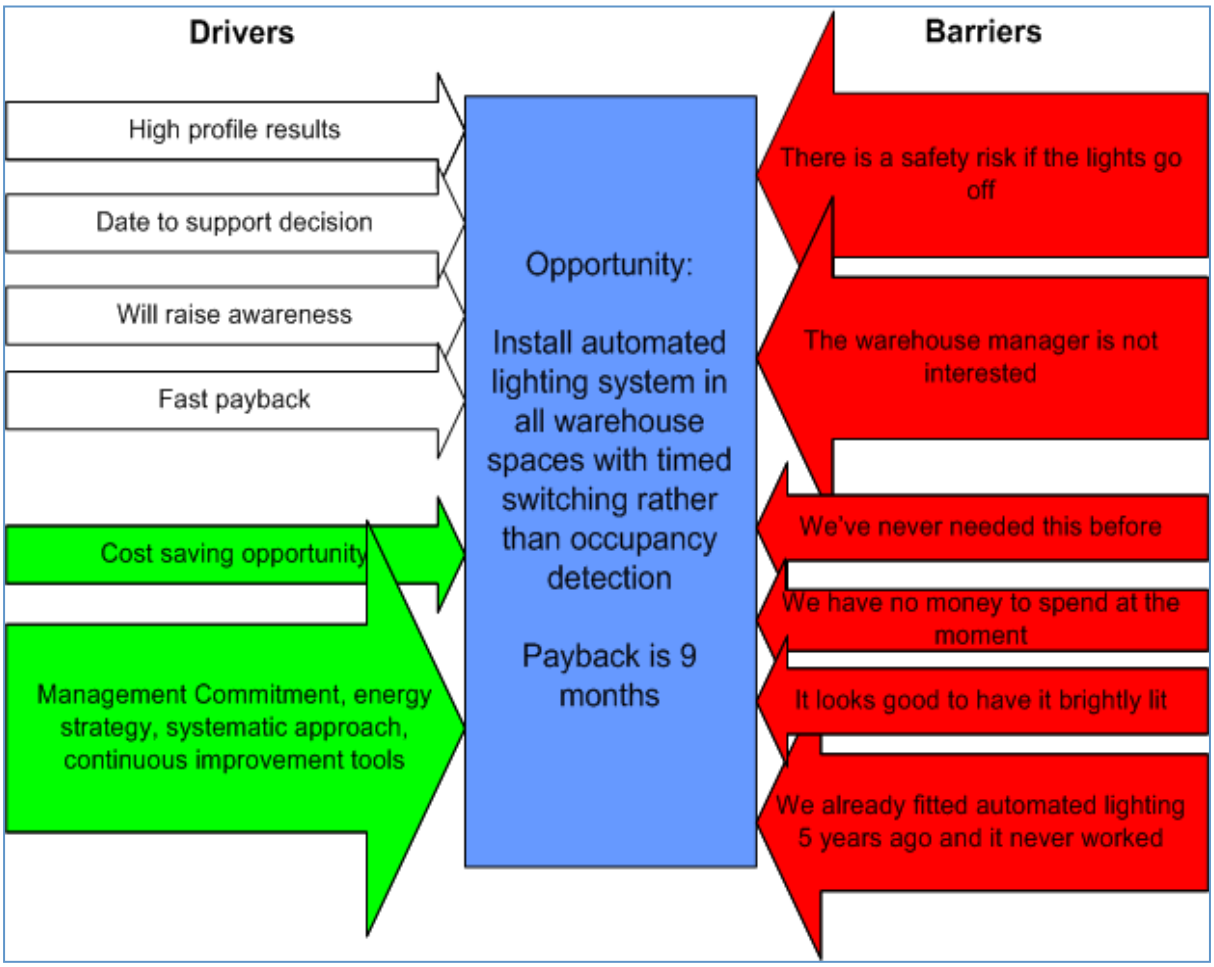

Figure 6 Warehouse lighting example

In the example above the contextual drivers are shown in green arrows and it is clear that the stronger the contextual or cultural drivers the better the chance of success.

4. Barriers

This section lists some typical barriers experienced in many organisations. It may be worth considering if and how each of them applies to your own situation or to specific change requirements.

1. Lack of real commitment to energy efficiency. It is not enough that the management "say" they are committed.

2. Senior management don't realise that energy savings are possible and often relatively simple to implement.
3. Energy is often seen as a fixed overhead which can't really be reduced.
4. Insufficient technical knowledge to confidently challenge current operations.
5. Risk aversion combined with a perception that making changes will cause problems (comfort, safety, quality or productivity). There will often be a degree of risk in volved in making a change. If the risk is of any significance it should be analysed and modifications made to reduce its potential impact to an acceptable level.
6. Poor communication of what can be achieved.
7. Poor communication of what is being implemented.
8. Poor understanding of where an organisations energy is being used and what is driving the use. Many organisations including some with advanced M&T systems do not know how much energy they are using, where they are using it and what is driving that use. Common drivers in commercial buildings are occupancy and weather. You need to know how the drivers influence your energy use.
9. Poor understanding of the real user requirement, e.g. room temperatures should not be 22°C in winter or light levels are often excessive for the requirements of the space.
10. Lack of resources; financial, technical expertise, change management techniques.
11. Difficulty in getting capital is often a result of higher requirements for energy saving opportunities for rates of return linked to perceived technical risk.
12. High tech systems which are not understood by operational people, e.g. M&T systems often don't realise their potential, complex BMSs often waste energy.
13. Commissioning of new systems is usually based on lowest cost and the commissioning company will not be given time to fully optimise energy saving technologies even if they understand how they are meant to operate.
14. Corporate budgeting processes often push facilities into defensive positions where they will try to resist reducing budgets even if savings are possible.
15. Natural resistance to change – a culture change is often required and this is not easy to achieve in an ad hoc manner.
16. Lack of focus or priority, e.g. energy manager does not have time to participate fully in an SWG initiative even though initial commitment was given.
17. Perception that energy efficiency requires a compromise (safety, comfort, quality, productivity)
18. Lack of sustained efforts, e.g. focus on energy management when prices are high or when high levels of wastage are perceived.
19. Middle management is overloaded and fails to act

20. Investments in energy efficiency are often seen as high risk in that the savings may be overestimated or not realisable.
21. There is no money to invest
22. Separate operational budgets, e.g. the maintenance department must pay for the change but they don't get the budgetary benefit of the energy saving.
23. Separate project budgets, i.e. the project budget holder is tasked with bringing in the project on budget and does not employ life cycle costing techniques to evaluating additional spending.
24. Unhelpful organisation culture or values.

5. Drivers

The following are some drivers that are typically found in high performing energy management programmes.

1. Companies where energy costs are relatively high typically enjoy more success.
2. Facilities where operating costs are central to their survival typically can make extraordinary savings in all areas of their operations including energy use.
3. Companies where energy costs have a large impact on profitability have good results.
4. Companies where the link between cost savings and profitability are fully realised by operational management have a better chance of success.
5. Companies with strong environmental culture have good results.
6. Companies where a senior member of management takes a personal interest in environmental or energy saving matters.
7. A strong committed individual is often found in organisations with successful energy saving performance.
8. Companies with a strategic approach to energy management
9. Companies with a systematic approach to energy management.

6. Examples of the application of changes in saving energy

The following are some anecdotal samples from the author's experience of working with organisations to help them reduce their energy use.

- One multi site organisation audited had an identical opportunity to reduce the condenser pressure in a refrigeration system with significant savings potential and no implementation cost other than changing the setpoints on a controller. In one facility the engineer considered the opportunity and any potential downside and made the adjustment during

the course of the first day of the audit. In his sister facility the engineer had not made the change 3 years later largely due to personal resistance to change.

- One company asked for an energy audit to be carried out 4 years after a previous audit had been completed. When asked how many of the findings of the previous audit had been implemented, it was discovered that none had, not even those with immediate paybacks. The objective appeared to be to have audit reports completed rather than make real savings. This is not an unusual experience.
- One organisation where I had difficulty finding any potential savings indicated that they had gotten a copy of a previous audit report from a sister facility and implemented all opportunities from that report that applied to their systems. This was a result of a single individual having a major personal commitment combined with aligned control over all technical budgets in the company.
- I have had a couple of experiences where organisations have made significant technical improvements even before the final issue of the audit reports. This is usually an indicator of a highly motived individual.
- The pharmaceutical industry is one which is highly regulated and typically very risk averse. I am working with one pharmaceutical company where cost is critical to their survival. They are thus highly motivated and make significant changes even to their production processes to reduce energy use and cost without compromising quality, safety or productivity.
- I know one data centre that operates at a room temperature of 16°C because that was how it was commissioned. Even though all the equipment in the room is rated up to 28°C, the operator refuses to make a change. The potential savings are of the order of 20% if the temperature set point were simply increased to 23°C or 23°C with increased comfort levels.

Impact of implemented initiatives

It seems very clear that success breeds success in this area. Those organisations which build up a track record of implementing and verifying the success of energy saving initiatives seem much more likely to continue to implement more. Some organisations have been successfully implementing continuous improvement initiatives in energy management for over 20 years and are still not running out of ideas or successes.

Organisations that do not have such a track record either by not implementing or by having completed projects fail are less likely to try again. This is probably due to increasing the strength of some of the barriers such as defensiveness, resistance to change and lack of credibility.

In some cases failure will be due to poor training and communication with operational staff and in others (2 members mentioned this) “snake oil salesmen” selling products which don’t actually make any energy savings in practice. These products damage the reputation of other products which may

have real benefits. Sometimes a perfectly good technology e.g. variable speed drives on pumps and fans fail to make any savings due to unsuitability for the specific application. Again this is often due to the salesperson's priority being to sell the product rather than having a good understanding of the details of the application.

7. Recommendations on further work on this topic

The scope and resources for this report were limited to this group of 6 companies. It is felt that the sample size is very small and that, while interesting results have been produced, some conclusions may be unduly subjective as a result.

The review of literature revealed that this area has received a considerable amount of focus and research. Much of this research has not been applied in practice. Most of the available documentation is of academic origin. There seems to have been less emphasis among the various national energy agencies and in energy management in practice.

The author believes that there is value in the following:

1. Examine the published work in more detail to identify where a more practical and energy specific methodology could be developed. The solution should be as simple as possible.
2. Expand the research to a broader sample of participants including both successful and less successful operations probably also including industrial organisations. Improve the questionnaire approach to highlight areas where there are contradictory responses, e.g. many respondents thought capital constraints is a significant barrier but most also said that if a good case is made for investment then capital will be made available.
3. Organise a workshop to discuss the findings and develop a scope for a more detailed approach.

The author believes that despite the large amount of research that has been carried out in the area there is little evidence of its impact on the approaches of most organisations in practice. This also applies to a number of organisations which are already certified to energy management systems.

There is an opportunity to develop some leading edge tools and methodologies in this area. It is felt that many of the other programmes of SEI would benefit from having a sound approach available to identify and limit the effects of the various barriers in play.

8. References

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