

## How can businesses best control their energy use? July 2010



By James Patterson, Associate Director at WSP Environment & Energy

The cost of energy to our businesses has risen enough to give our Facilities Managers and Financial Directors sweaty palms, especially in such cash constrained times. Consequently many businesses will be considering or running some form of energy efficiency programme. But, despite this, most are missing the obvious quick wins. And these quick wins can save serious cash.

Equally, many a Compliance Manager is so focussed on achieving compliance with legislation, such as the new Carbon Reduction Commitment Energy Efficiency Scheme, that compliance is all that is achieved. If we took measures just a little further we could achieve energy and emissions savings that will make a material impact to your business, as well as ensuring optimum performance in the CRC League Tables. A wise business would ensure their Finance Director, Compliance Manager and Facilities Managers are all talking.

So what things are being missed and how do you tackle them? How can businesses best control their energy use? Here's a simple 6-step plan...

### **Knowledge is power – collect the data**

'Tell me something I don't know' I hear you say. But in my experience, with so few businesses really understanding where all their energy, and money, is going, it's a message worth reinforcing. So the first step is to start to collect relevant data and then understand it.

So, what kind of data do we need?

- Get copies of electricity and gas bills (or meter readings) for the last year at least, preferably going back three years
- Record energy use by fuel type (electricity, gas or other fuels) in kWh
- If electricity is recorded separately by day and night, or other periods of the day or week, record each separately
- Make a record of the corresponding charges by tariff bands, i.e. daytime charges, night time charges, peak period charges, etc
- Separately record the costs of Climate Change Levy and any other charges, such as Maximum Demand, Availability Charges and any other standing charges.
- Understand your floor area/s and other influencing variables such as production data for industrial organisations, occupancy rates for office space or hotels, covers for catering firms etc
- Information on external weather patterns (commonly expressed as degree days)

This can be a time-consuming process but it simply has to be the starting place. Using a spreadsheet is simplest to start with, but further down the road you could choose to go more hi-tech and install Automated Meter Reading (AMR), smart meters or temporary electrical logging equipment.

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### Stream and understand your data

So, you have your data, now you need to understand it and profile it in a way that quickly enables action to be taken.

For example, a company looking at lots of commercial offices would be well advised to start by conducting some simple benchmarking by identifying KPIs such as kWh/m<sup>2</sup> used per building. Or if you want to use more sophisticated and/or recognised benchmarks then why not look at publicly available benchmarks such as those from the Carbon Trust or CIBSE.

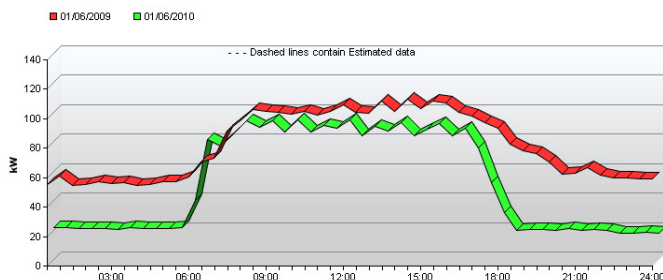
You can then rank buildings in order of increasing KPI to create a list of best and worst performing offices. This gives a ready indication of the best opportunities for easy wins by focussing on those worst performers first.

### Drilling down – get the detail

The biggest easy wins will come from taking a detailed look at the energy use of those poorly performing buildings. If looking at electricity, ideally you would have access to half hourly electricity data which you can get from your electricity supply company, provided your sites are fitted with half hourly (automatically recording) meters. If that isn't available then again it is well worth fitting smart meters, AMR equipment or temporary electrical logging equipment. Half hourly metering enables you to look at the usage profile for your site, and compare it to occupancy or usage patterns. This can be invaluable in helping you to optimise performance.

By drilling down into the data of one individual office for one of our clients, and looking at energy use across the day, we were able to identify that the air handling unit was running continuously, whereas the building was only occupied during normal office hours.. The control system was scheduled correctly, but a technical fault in the system meant that the plant was not being controlled. By identifying and rectifying this fault, the operating hours of the air handling unit were then matched to normal business hours, resulting in measureable savings of over £30,000/year to our client, with consequent emissions reductions of 113 tCO<sub>2</sub>/year. An obvious quick win achieved by simply looking at the data and taking action.

Fig 1.1 – Half hourly electricity profile data showing results before and after AHU control fault was rectified



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### Boots on the ground – get a site survey

If a saving like that can be achieved just by looking at data, imagine what could be achieved through a site survey! By selecting just your worst performing buildings for a site survey, the financial gains will be significant, even if you pay for an external expert to conduct the survey. So what should you look for?

- Be alert to control settings which are leading to excessive energy use, particularly high heating set points or low cooling set points - savings are approximately 10% per degree for heating and 2% - 3% per degree for cooling.
- Check time schedules of your plant – check that operating hours match business hours, and watch out for those operating continuously. For a typical office building, this means that energy use can be up to 60% more than is needed. This is more common than you would expect!
- Look for evidence of control issues such as staff complaints and use of portable electric heaters, and check for drafts and poor insulation. Sorting out basic control and building fabric problems can reap big rewards and improve staff satisfaction.

### Change behaviour

This is perhaps the most difficult step so far. Getting your staff to be aware of the issue and change their behaviour. You need to run a hard hitting energy awareness campaign with backing from senior management and line managers. When creating your campaigns be sure to think about moving them through four key stages;

1. Awareness – make them aware of the issues you need them to focus on
2. Interest – get their interest, explain why it is important and what is in it for them
3. Desire – incite them to wanting to do something, explain what it is they can do
4. Action – motivate them to take action by line manager and senior management reinforcement and consider rewarding positive behaviours

Get to the point, always try to think of the ‘what is in it for me’ message, and focus your efforts on those groups of staff who can make the biggest impact on reducing your energy use.

My firm runs a voluntary personal carbon tracking scheme for staff which was the first such scheme in the UK. On average those in the scheme (which we call PACT) reduce their emissions at home by 10% in the first year of joining. It encourages positive behaviours at home which we feel are brought into work.

### Think about low cost investment opportunities

Having actioned your obvious easy wins, it’s probably time to start thinking about low cost investments such as lighting controls, simple heating/cooling/ventilation controls, insulation and draft-proofing. These are all generally cheap and usually have excellent returns, with paybacks of less than one year.

This can then move you through to medium and high cost investments which would include more sophisticated controls on heating, air conditioning and ventilation plant, variable speed drives on fans and pumps, high efficiency motors, and replacement of lighting. These measures have higher costs but

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commensurately larger cost and carbon reduction potential over the longer term, and paybacks are still reasonable at 1 to 3 years.

You can also investigate whether generating your own clean energy on site is viable. The introduction of Feed-In-Tariffs has certainly given investment in small scale renewables a much more compelling business case.

Funding mechanisms worth considering are ring-fencing of savings, third party finance or interest free loans from organisations such as the Carbon Trust for SMEs or companies not affected by CRC.

### **What are you waiting for?**

For most, internal resource is tight and money is tighter. But there is money to be saved and it can be saved relatively easily and with little or no cost. So whilst cash is front of mind for all of us, try not to forget the tangible and intangible benefits of greening your business.

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