

Cambridge Energy Forum – 28.06.06

## **Cambridge Energy Forum**

28<sup>th</sup> June 2006, Cambridge UK.

### **Speakers:**

Trevor Davies- CRed Programme Director

Dr Jason Palmer- Director of Cambridge Architectural Research Limited

Martin Kerslake- SOHN Associates

Dr Ed Colby- Chief Technology Officer, Sentec Limited

## **Energy, How We Can Use Less**

To date, the supply side of energy has been the subject of most of the discussions of the Cambridge Energy Forum. Their last talk redressed this balance by putting the demand side under the spotlight. Speakers were chosen to cover a variety of issues, including community involvement, behavioural changes by raising awareness of energy use through smart metering, carbon savings in buildings, and ways to implement energy efficiency through no-cost actions. Each of the speakers provided their own insights. Later the most relevant issues were debated in a forum of discussion with the audience.

CRed's Trevor Davies launched the event reporting impressive progress of their organisation, which has created a point of reference for a growing community committed to carbon reductions of over 400 organisations and 15,000 individuals. Through this they have saved over 75,000 tonnes of CO<sub>2</sub>, with 8% in the domestic sector despite this being one of the toughest markets to address. They have a variety of initiatives and tools which combine to deliver these results, including a pledge system to build community involvement, carbon auditing to improve the information regarding carbon use, and ways to evaluate and compare carbon saving techniques<sup>1</sup>. They have simplified their pathway for a low carbon future through a three step approach:

1. Don't waste energy
2. Switch to renewable energy
3. Offset the remainder

CRed are concerned with making carbon reduction understandable, and easy to address. They don't talk in terms of tonnes of carbon saved, but hot air balloons worth. We each generate on average five hot air balloons per year. They don't talk about turning down the heating, but putting on a jumper. But is there demand for low carbon solutions?

CRed worked with BroadSol, a solar photovoltaic company, to sign up 40 homes on to their solar programme, at a cost of £2k per household with a

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<sup>1</sup> They've just started a programme called Carbon Connections to evaluate new low carbon technologies and services, with funding of £5million.

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payback period of 12-15 years. They gave themselves one month to sign up the 40 households; they met this quota in a surprising 25 minutes.

Despite this apparent demand for low carbon technologies, CRed are always aware of reaching the less informed proportion of the population. One of their pilot schemes is the 'Energy Bus', which is a touring energy information facility. Another scheme is the promotion of Energy Action Days, which encourage individuals to perform low carbon actions for a day at no cost. Surprisingly when this was done at UEA Registry, they achieved a 30% reduction in energy usage (see graph).

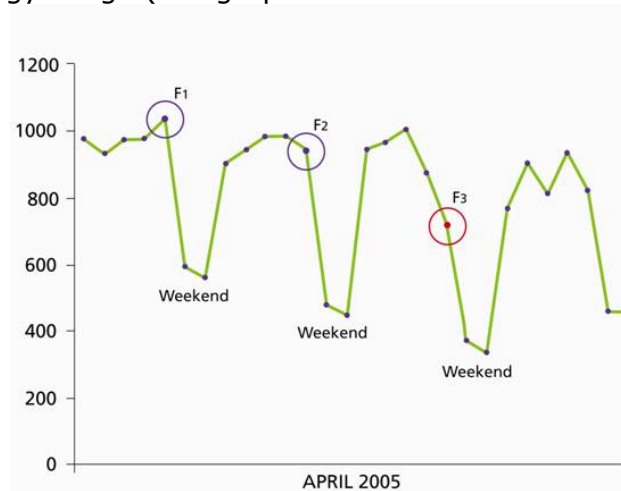


Figure 1 Energy Action Day results:  
F1 & F2 are normal Fridays, F3 is an Energy Action Day (CRed)

Jason Palmer, from Cambridge Architectural Research Limited, showed how regulation and innovative design can dramatically improve the sustainability of buildings, with a particular emphasis on schools. However, he also issued a warning: that designers can get carried away with sustainability rather than utility. A sustainable design does not equal sustainable use if the occupants are not informed or engaged with their building. For example, many buildings visited often have both heating and air-conditioning systems on simultaneously. Some buildings that have been designed to use natural lighting have been found operating with closed blinds and lights on. Further more, sustainability has to be matched appropriately to context. For example, while automated windows are one option to improve natural ventilation, they are expensive to replace as one school discovered after a football accidentally smashed a window.

Palmer talked about a variety of 'sustainable' schools, each using an assortment of technologies and at different costs. There are 34,000 primary and secondary schools in the U.K., with an annual energy spend c. £400m and c. 5 MtCO<sub>2</sub>/year. Oak Grove School is one of the most progressive in terms of low carbon design. It has been designed to emit 10kg CO<sub>2</sub> per m<sup>2</sup> per year, yet it uses about twice this in practice. Many of the schools

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discussed used microgeneration, though Palmer felt this to be over-valued in terms of carbon emissions compared to the other available technologies at similar costs.

Despite talk of building regulations and innovative sustainable designs for new buildings, Palmer also acknowledged that new buildings only made a small contribution to carbon savings compared to existing stock. New buildings only replace old buildings at a rate of about 1% a year.

Palmer concluded that a third of carbon emissions can be saved just through good practice, that energy modelling is crude and unreliable, and crucially that many new schools are too complex for occupants to manage. This also means that while Building Regulations have been revised to improve sustainability of new housing stock, these may not confer the carbon savings anticipated due to failure to teach occupants appropriate use.

The next speaker, Martin Kerslake, carried on the theme of putting sustainability into context if demand is to be stimulated. Martin Kerslake spent his formative years working in an oil company and where, amongst other roles, he procured the electricity for their own consumption. The company was one of the top-10 largest private buyers in the UK at the time. In that role, he introduced automatic monitoring across a portfolio of 1000 filling stations, refineries, depots, and pumping stations. He began as an "out-and-out cynic" but after two years later he was embarrassed to report a 25% reduction in utility cost. Martin went on to manage and direct small energy suppliers, and three years ago was asked to help reduce carbon consumption on the ground with both public and private organizations - where he has worked ever since. He now works for a public funded organization nicknamed the 'Bureau' at Leicester City Council.

While his job with the oil company had given him the money and authority to change energy use amongst employees who were told to expect change, his job with the Bureau has included none of those luxuries. They had limited money and authority, plus a public which was largely unaware of a carbon problem, yet alone possible solutions. Martin's biggest results came from water savings after installing water meters with radios to centralize data. These were then able to inform the Bureau whether there were water leaks, which when fixed saved pounds.

Martin illustrated a problem in training with reference to automated heating controllers. New devices will automatically bring a building up to temperature using a feedback system. These systems are controlled by a timer so the user can set the time at which the building needs to be occupied. In the winter, this might take a long time, in the summer, less time. A problem arises when such systems are installed and yet no-one thinks to train the caretaker. The system is then set to 7am, a reasonable time for the older systems to start to warm up the building. The new system instead fires-up at perhaps 6am so that the building is warm by 7am. Thus, not only is the

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additional cost of the new system wasted, the overall effect is for the new system to consume more energy than before.

Their other activities involved the public in no-cost actions. These were implemented by:

- Provide the information to influence day-to-day choices
- Understand, communicate, advocate
- Acknowledge competing priorities

Many of the activities which the Bureau have advocated have been tiny in terms of effort required for implementation e.g. putting a jumper on and reducing heating by 1-2 degrees. Together a collection of such activities can make a 10% carbon saving. Yet although these activities a small individually, they are also easily disrupted. Martin told of a cricket ground where a hose had been left on over night to prepare the pitch for a match the next day. Although the pitch only required 4 hours of water, circumstances were not as amenable. The pitch was in use till 3pm, and the caretaker went home at 4pm. After the Bureau calculated the £80 cost of this activity, action was prompted. Information enables understanding and action - to know what you use, and why.

This is where companies such as Sentec can have a pivotal role. Dr Ed Colby talked about the Smart Meters Sentec has developed with the aim of changing behaviour and the way we use energy. He started with a quick poll, by asking the audience who knew where their electricity and gas meters were. The majority of people did. He then asked if they knew how much their energy bills were, about half the group did not. He then asked if people knew how much energy their house was using at that moment, less than half a dozen people did from the full lecture theatre. Smart meters have the potential to inform people regarding their energy usage, in combination with smart communication techniques. For example if a smart meter was linked to a system which was able to give a house owner an energy fingerprint or CV of their house, then inefficiencies in the system could be identified and addressed.

Dr Ed Colby moved on to talk about the diffusion of Smart meters, and how different country specific regulatory frameworks affect this process. Two clear messages came through. Firstly that these different frameworks affected the supply chain which meant it was hard to evaluate who should pay for the meters. Secondly the meters were most effective *en masse*, but incentives to install meters were different for each country. Colby expressed his frustration in having to overcome these regulatory and market hurdles for a proven technology which could change behaviour at little cost.

After these talks the audience quenched their thirst in the buffet area and the forum discussion began. Returning to the theme of demand for low carbon technologies, some were clear that the availability of appropriate information was critical to changing behaviour. Others were more sceptical, suggesting regulations were the only way to stimulate demand for low carbon

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technologies. Yet the effectiveness of regulations was dependent on their enforcement. It was estimated that between 30-70% of new housing did not meet existing building regulations. In regard to information availability, it was commented that this needed to be transparent and readily available and understood. The speakers and audience also agreed that plenty of action was required to address rising carbon emissions, and that all those involved should work together rather than sending out conflicting messages. But getting a consensus in practice is difficult, with debate still raging over the costs and benefits of some technologies e.g. nuclear and biomass.

The talk finished with the Cambridge Energy Forum asking each of the speakers for one policy to reduce carbon emissions. Palmer said carbon trading for individuals; Davies said more cooperation between all organisations, both public and private. Kerslake wanted all cities to be forced to adopt monitoring of all their emissions, and Colby sought to replace VAT with an energy tax. The Cambridge Energy Forum reacted by asking whether energy costs were just too low for people to value changes in energy usage. It was agreed that raising the cost of energy would create demand for greater energy efficiency.

In the meantime, there are things we can do which require little effort and yet could stimulate changes in behaviour. We can each start with an Energy Action Day through support from organisations such as CRed. Then, when we are more informed, hopefully demand for low carbon technology will increase. As ever, there needs to be co-evolution between supply and demand, and technological implementation and education. The social implications of low carbon technologies and actions are critical for ensuring increased demand for such activities, and their appropriate use. We already know we can make 10% carbon reductions through no cost actions, let's act.

### ACTION NOW:

- Energy Action Day
- No Cost Actions
- Community Level Audit (how do you know what you can do until you know what you are doing?)

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