

Introduction and short summary

The 2009 HEAT conference at Cambridge, England, on Friday (4 December) saw friends meet, nourishing business relationships form, and heard a day of fascinating talks by a wide range of leading companies and academics trying to understand the strongest way forward towards healthy prosperity through doing, or if not directly, through business strategy, model and behaviour change. The topics centred on buildings: passive, high code level, smart, fast construction; energy efficiency and smart meters; generation, accumulation and storage, solar power, and carbon-negative materials for large scale buildings.

Morning Construction Session

HEAT on Friday (4 December) followed SHIFT (3 December), with a pair of morning sessions that contrasted sharply. The construction industry interacts strongly with government and intense regulation and faces huge industry conservativeness but huge and seemingly impossible-to-meet targets such as "13,000 carbon-neutral new builds a week from now until 2016". Nevertheless, the market both for retrofit and new builds would appear to be very large and relatively low in risk, given the resolute regulatory environment for change in this area.

Within a talk on innovative methods of construction, it was noted that a 28% increase in construction employment would happen between 2006 and 2012. There is a challenge for industry capacity, for skills, for quality of builds, and socially on affordability. Skills for the code level 6 required from 2013 in public housing and all housing from 2016, are different from the skills for code level 3 currently still in force privately (not for long). Meeting these challenges would mean high standards of design, resource efficiency, lowest possible emissions, new sustainable business models for long-lasting products, to add to those new skills and MMC. Solutions to these problems will involve bringing together or working together with pairs of stakeholders, such as government and industry; education & training and industry, and education & training and government.

Speakers from Carbon Lite Solutions, the carbon neutral MMC home provider, UEA, smartLIFE and Cambridge University joined the MP for Cambridge for the session and panel on construction.

Morning Smart Meter Session

The smart metering session displaying business strategies of enormous potential and interest, with entrepreneurial zeal, ingenuity and directness dominating a highly optimistic and positive session, led by Alertme, Green Energy Options and Sentec. By way of introduction, the speaker described three areas key to smart meter markets: policy, consumers, and utilities, and how that would lead to a range of energy services and products giving more consumer power, and a fragmented market. Within policy, feed-in-tariffs and cashback schemes within electrical and heat grids joined smart meter requirements. Consumers would become more energy (cost and environmentally) conscious, less loyal, and have complex needs. Utilities are faced with abject failure if they stick to the 'commodity position', do not convert revenue-from-use to revenue-from-less use-plus-services, and if they do not press forward aggressively with new infrastructure (smart grids). It was noted (source: NexGen 2008) that the global smart meter market in 2008 was valued at \$33 billion. Related home energy products noted were: microgeneration, energy storage, including electric vehicles, and smart appliances. The session looked forward to a tech revolution driven by 'consumer pull', consumers who had become motivated and enabled by the new means of seeing through their consumption and wanting to do something about it. These companies said they were about joint projects and providing leadership to these goals. They would use intelligence, inter-working, integration and interoperability. as they competed and co-operated. They felt that competition was healthy, yet co-operation was healthier in creating a massive market, first-mover advantage, and enabling focus and prioritisation of opportunities. Our high value manufacturing mantra of speed-to-

market, margin and reinvestment in innovation and marketing come to the fore without reference to the name!

Generation, Accumulation and Storage Session

The afternoon of the 3rd HEAT conference continued to develop the base built in the morning, with another fascinating session on generation and accumulation of energy through highly-insulated hot water storage tanks (e.g. Akvaterm) that can be fed by anything from solar thermal panels through various kinds of woodburner ("biomass") through to air source and ground source heat pumps. It was clear, excitingly in that session that the technologies on offer are now capable of enabling the average UK household to switch off the gas altogether, albeit with some capital investment in heat pump, accumulator tank and possibly woodstove and solar thermal panels. Combined with choosing a green supplier of electricity (if Green Energy were to prove rather than assert that their Deep Green tariff plan is genuinely green, then we could say there is one option in the UK, which is only marginally more expensive than standard electricity tariffs), this prospect means that households can move off fossil fuels and on to a very low carbon heat and electricity provision, in the here and now.

A talk from the Heat Pump Association noted that heat pumps take electricity in and convert it to heat at a coefficient of power of 4 or over. This would mean running a pump at, say, 2kW and generating 8kW of heat power out. The electricity, of course, could be clean. Heat pumps are more energy efficient than boilers. They do not require gas to flow through a grid. They require no special skills for installation and are durable and low-maintenance. Issues have been cost of equipment and noise. Both these are coming down. In particular, noise for latest model air source heat pumps has been reduced to some 40dB. Ground source heat pumps are quiet, but they are more expensive to install. Heat pumps are favoured within the Code for Sustainable Homes. An ROI analysis for all types of heat pump would be interesting to carry out. Certainly, it would seem quite positive under an RHI cashback tariff from 2011, but like solar PV installation, there is a capital cost, albeit considerably lower, to begin with. Watch this space!

In a talk on distributed generation, fuel cell technology and CHP, a speaker claimed that this system would be 80-90% efficient where the standard large-scale factories producing energy from fossil-fuels and converting to grid electricity, was only 35% efficient. Losses at the factory and in transmission are obviated but replaced presumably by any losses in the gas pipelines and losses in home-based burning and conversion via fuel cell. For the consumer, it would involve simply replacing a gas boiler with a similar-sized product that uses (bio)gas and converts this to heat and power. Clearly this would tend to lock us into gas, a cleaner fuel, but still a finite one which is a fossil fuel. However, it may be a useful stopgap on the way to ASHP, woodstoves and better insulated housing. An argument was presented: demand reduction for electricity owing to use of gas in fuel-cell CHP would enable marginal power plants (i.e. the dirtiest) to be decommissioned. This would mean the improvement in emissions claimed might last longer as the grid is decarbonised over the coming decades (see Cleanpower and Smart Grids Conference 24-25 June 2010).

Final Session

In the final session, the conference witnessed perhaps one the most sublime sets of three presentations and panel ever seen in the HVM Series of 14 Conferences since 2002!

A flexible, safe, efficient large-scale storage system technology that could solve the problems that remain for UK clean power in moving on to intermittent renewables in conjunction with a smart grid was described. Venture capitalists looked on as this already successful entrepreneur presented his business approach to this key problem.

Following this was an extremely well-balanced description, view and assessment of the now-agreed PV cashback scheme (Feed-In-Tariffs) for the UK, available from April 2010, which will bolster the solar PV market towards its targets as has happened in Germany. Lower panel prices, improving installation skills and supply chains coupled with the news gave a very

HEAT 2009 Summary by CIR Strategy

optimistic picture for solar in the UK. Feed-in-tariffs are rights to send back solar-generated electricity into the public grid system, and receive a premium tariff for doing so over a fixed period of time, such as 25 years (UK) or 20 years (France). CIR calculates with Cambridge real PV data, that the ROI for a 10m² system under proposed cashback or FIT scheme rules over 25 years will be around 4.5% a year. This is just below the lower hoped-for range expected by the government.

Finally, our keynote described a carbon negative cement technology company. This was an extremely well-argued talk, and gave a compelling description of what was described as an environmentally-friendly solution to a large problem in a large market that would ultimately require little or no behaviour change on the ground in construction.

"Delegates were forming nourishing business relationships as they learnt more about healthy prosperity and engaged in debate. We were delighted with the two conferences and the quality of both the speakers and the participating delegates and Q&A sessions that that combination led to. We feel our conferences deserve greater attention in the media, locally and abroad. We hope to expand upon the series so that more people can have the opportunity to take part and the discussions' results feed more strongly into the psyche of the population, business, academia as well as entrepreneurial circles and government," said conference director and CIR energy strategy director, Justin Hayward.

"We hope to see many of our guests back next summer, 24-25 June 2010, at Murray Edwards, for the 2-day conference on Smart Grids and Cleanpower, the 15th and 16th conference days in our HVM Series since 2002."

Final Comments

The feedback has been that the event was highly valuable and progress was made in learning about solutions to clean, smarter and greener buildings. There were opportunities for investors to meet high-tech companies and followups are promising there. CIR held a dinner at King's College for sponsors, speakers and partners before the conference, which also took in a number of similar participants from the SHIFT conference the previous day, thus bringing together those looking into sustainable buildings and transport integration.

The presence at the HEAT Conference of CEOs and other executives leading this sector was a force in influencing the route to low carbon infrastructure and buildings. Their leadership sent a strong signal that business is ready to work on practical solutions to shifting to the sustainable, low carbon economy. We look forward to welcoming you in Cambridge on 24-25 June 2010 for the 2nd Cleanpower & Smart Grids Conference Expos and to HEAT 2010 on Friday 3 December. These conferences are set to be the most exciting yet. We will address the question: "What is in clean power and smart grids for one and all?"

END OF EXECUTIVE SUMMARY OF HEAT 09