Renewable Energy Select Committee – Topic Sheet

Reducing carbon emissions from the KCC Estate

KCC's Climate Change Select Committee report in 2006, noted the importance of leading by example on sustainability and setting 'ambitious targets for carbon reduction and renewable energy use'.

CRC Energy Efficiency Scheme

Following on from the Climate Change Act 2008, the CRC Energy Efficiency Scheme (formerly known as the Carbon Reduction Commitment) came into effect in April 2010. This mandatory scheme is designed to bring about an 80% reduction in greenhouse gas emissions by 2050 compared to the 1990 baseline, by incentivizing organisations to implement energy efficiency and other measures.

KCC is one of around 5,000 organisations who will have to monitor their CO_2 emissions, and purchase equivalent allowances on an annual basis. Performance will be measured in 'league table' style against different organisations including, for example, supermarkets. If KCC performs well, it will earn rewards, as money raised from selling allowances is recycled back to 'the winners'; if it fails to make CO_2 reductions, substantial penalties will result and the select committee has heard estimates for penalties in the range of £300,000 to £1.4 million.

KCC will benefit from a degree of protection from penalties initially through the achievement of the Carbon Trust Standard certification award which provides 'early action credits'.

Full details can be found at:
http://www.decc.gov.uk/media/viewfile.ashx?filepath=what%20we%20do/a%20low%20carbon%20uk/crc/1_20100406154137_e_@@_21934crcpdfawv9.pdf&filetype=4

National Performance Indicators (NPIs) NI185 and NI186

Carbon reduction is monitored through NPIs 185 and 186 on which the government expects local authorities to take the lead. NI185 relates to CO_2 emissions from local authority operations and NI186 to per capita CO_2 emissions in the local area.

For KCC NI185 mainly applies to the Children, Families and Education Directorate as 86% of the KCC estate comprises schools. Data on individual schools' energy performance[1] is required and those state schools (along with other public buildings) over 1000m2 are required to have Display Energy Certificates (DECs) giving energy efficiency information and carbon ratings A-G based on the amount of energy used, which must be updated every year. The original survey work to provide DEC data was carried out by KCC's Energy Management Team who

[1]DCSF (January 2010) Road to Zero Carbon: Final Report of the Zero Carbon Taskforce

achieved cost savings of £70,000 by becoming accredited assessors, avoiding the need to appoint external surveyors.

Communities Directorate decided in 2009 to input KCC information on properties, to the Enterprise spreadsheet and Property Group is now aiming to record all premises' running costs. DEC data and advisory reports (which contain energy data) are input as soon as they are made available. A proportion of this data has been received so far but data collation and format across all Directorates is not standardised, which is causing delays[2]. Whether a property has renewable energy technologies on site is not recorded and certain other data which may assist strategic energy management (such as Premises Energy Ratings) cannot be reported upon as they are recorded in documents attached to the main spreadsheet. There are currently unused energy-related spreadsheet fields. Data from schools can be directly input.

For NI186 Kent districts are part of the reporting framework, as is KCC but in addition KCC monitor and co-ordinate all the district submissions.

Revised National Statistics on Local and Regional CO_2 Emissions Estimates for 2005-2007 were published in November 2009. Total estimated per capita CO_2 emissions across the 12 Kent districts fell from 88.7t in 2005 to 82.3t in 2007, a drop of 7.22%. Emissions from KCC operations have risen by 10%.[3]

KCC Property Group:

- Manages KCC's land and property
- Sells surplus land and property
- Maintains existing buildings
- Makes sure KCC's buildings are accessible to the public
- Ensures construction projects are completed on time and within budget
- Offers professional advice and support[4]

Property Group provide information to schools via the kent.gov.uk website, from where the Blueprint Newsletter can be accessed, providing a range of property related information. The December 2008 edition of Blueprint provided information on Display Energy Certificates and advisory reports; the July 2008 edition provided comprehensive information on environmental options, including energy efficiency and renewable energy and is attached as Appendix 1. This information was provided before the current government incentives (Feed in Tariff and Renewable Heat Incentive) which would significantly alter pay-back times.

KCC Energy Management Team (TEMT) - Energy Efficiency work

A report produced in January 2009 by the Laser Group Energy Management Team: Towards a Low Carbon Kent - making a world of difference to energy

[2] Alan Nash, KCC Asset Database Development Manager
[3] UK Government building regulations indicate that distributed generation will reduce CO2 emissions by 0.568kg per kWh.
[4] Source: www. kent.gov.uk/property

saving, outlines the measures TEMT have taken to achieve energy efficiencies within the KCC estate using funding from a range of sources, but predominantly the £1 million Energy Loan Fund (with £240,000 additional funding from the Carbon Trust through Salix Finance). The full report is attached as Appendix 2.

Energy efficiency measures achieved through this work included:

- Lighting upgrades and automatic lighting controls
- Cavity wall and loft insulation
- Draught proofing
- Valve wraps and heating pipe work insulation
- Voltage reduction equipment
- Installation of heating zoning controls
- Boiler controls and education in how to use them
- Building Energy Management Systems (BEMS)

In Ramsgate one £125,000 scheme replaced tunnel lighting with low energy lighting, saving 40% on carbon emissions and it was later identified that the Chestfield Tunnel could benefit from a similar upgrade.

Energy efficiency courses were provided to non-teaching staff (such as caretakers and office managers) although this has since ended due to the cessation of funding.

External grant funding in excess of £500,000 was obtained for schools to enable them to install renewable technologies

Carbon Reduction and the KCC Estate - Schools

There is an aspiration from the Department of Children, Schools and Families (DCSF) for all schools to become sustainable schools by 2020 and achieve carbon neutrality but there is no mechanism to deliver the changes that are required in terms of increasing energy efficiency and installing renewable technologies[5] which have been most successful from the educational perspective and taught some valuable lessons including the importance of careful siting and installation.

Other Energy-related work within KCC

- An annual midsummer 'how low can you go' day has encouraged schools to make concerted energy saving efforts (in one case achieving 80% reduction

- The KCC Green Guardian network's 'Switch IT off' campaign, which rewards staff with a fair trade sweet for switching off IT equipment has reduced energy wastage by this means.

[5] Deborah Kapaj, Corporate Environmental Performance Co-ordinator, Environment, Highways & Waste Directorate

Eco Schools

Since the launch of the Sustainable Schools Framework in 2006 the *voluntary* Eco Schools programme has enabled Schools in over 43 countries to work towards gaining a Green Flag award for environmental excellence through incorporating sustainable practice and learning. The Eco Schools programme was highlighted in the Climate Change Select Committee Report in 2006 and has since shown itself to be a valuable educational tool which provides a focus on sustainability. The programme has been successful in Kent and the county is top of the Eco Schools Award league table, having achieved 18 Green Flags (the top award), 14 Silver and 20 Bronze. The first ever UK school to be awarded the Green Flag was Eastchurch Primary School, on Sheppey.

Schools taking part concentrate their efforts on sustainable measures grouped under nine different headings, one of which is energy. However, from Display Energy Certificate information Eco Schools, while achieving other measures of sustainability, may not always be the most energy efficient.

Website: http://www.eco-schools.org.uk/about

Schools biomass heating pilots

> *"The single biggest win in terms of **cost effective carbon saving** would be to replace all oil-fired boilers with more efficient heating systems and at the same time consider fuel-switching to, for example, biomass.*
>
> *It is recognised that many schools with oil-fired boilers tend to be in rural areas and are not able to connect to the gas grid, but are more likely to have biomass supplies nearby."*[6]

A comparison of Carbon Emissions from various heating fuels[7]

Fuel	**kg CO2/GJ = gigajoule = l billion joules heat**
Electricity	115
Coal	81
Oil	79
LPG & bottled gas	69
Mains gas	54
Wood	7 (allowing for transport)

There are currently 221 schools in Kent with oil-fired heating; 75 in East Kent, 60 in Mid Kent and 86 in West Kent. As an example, replacing oil heating with biomass heating would make approximately 50 points improvement in DEC Grade i.e. E to a C grade, or D to B Grade[8].

[6] Source: Road to Zero Carbon, final report of the DCSF Zero Carbon Taskforce, January 2010
[7] Data Source: Standard Assessment Procedure
[8] Source: Wood Fuel Heating in Kent Schools – report prepared by Andy Morgan, Head of Energy Management, KCC

An assessment was commissioned by KCC and LASER in 2007, and was carried out by Creative Environmental Networks (CEN), to investigate the potential for renewable energy in Kent Schools. Having examined energy data, in depth assessments were carried out on 45 schools and 22 were identified as being suitable for woodfuel heating; with the potential to reduce CO_2 emissions by 1800 tonnes each year. Other sites were found to be suitable for a range of renewable technologies.

Following on from this report, and with the co-operation of the schools concerned, biomass boilers were installed at two of the locations identified: Valley Park Community School in Maidstone and St Augustine's Catholic Primary School, Tunbridge Wells. The outcomes of this work have now been evaluated[9].

Key findings:

+ 90% reduction in carbon emissions
+ savings on fuel costs
+ local wood fuel supply chain development
+ local economic benefits

However, despite deep cuts in carbon emissions, the high capital costs impacted on carbon saving costs per tonne as compared with energy efficiency measures but factors which would make biomass more favourable as an option were identified as:

- Constant heat load
- Oil/gas price rises (coupled with stable wood fuel prices)
- New build scenarios particularly BSF where very low carbon emissions are stipulated
- The impact of the Renewable Heat Incentive

These are important factors to take into account in order to make this renewable technology as desirable from an economic standpoint as it is from a carbon reduction standpoint. The full report is attached as Appendix 3.

The Renewable Heat Incentive (RHI)

The RHI, which is currently being consulted upon, takes effect from April 2011 and, for biomass boilers installed after July 2009, will provide payments for systems up to 500kW, based on 'deemed' heat production at the following rates:

<45kW	9.1p per kWh
45-500 kW	6.5p per kWh

Systems over 500kW could be fitted with heat meters. In their written evidence to the select committee the Forestry Commission used the example of a 150kW

[9] Ibid

boiler producing 159,375 kWh of heat a year which would receive a RHI payment of £10,359. If changing from an oil-fired heating system, the payback time would be approximately 7 – 8 years. The RHI payments would last for 15 years. A press briefing on the RHI compiled by the Renewable Energy Association, is attached as Appendix 4.

Further examples of biomass boilers in Kent

Biomass boilers are in use at the Kent locations noted below.

Bedgebury
Betteshanger
Godington Park
Kent Highways Service Ashford Depot (KCC)
Kenward House
Maidstone Borough Council
Shorne Country Park (KCC)
Torry Hill Farm

The Kenward Trust benefitted in 2007 from a £5000 Member Grant from Maidstone[10] for its woodchip heating project.

KHS Ashford Depot has experienced difficulties obtaining the correct fuel for the boiler type installed, namely 8mm pellets as opposed to 6mm pellets. Hurried deliveries have, in addition caused excess 'dust' which has further affected boiler performance. The boiler runs smoothly on 8mm pellets.[11]

Examples of biomass boilers elsewhere

- A survey conducted for the Forestry Commission by the Renewable Energy Association identified that there are now 1960 biomass boilers in the UK. The 'Biomass Heat Boilers in England 2009' survey was based on information from installers and related to non-domestic biomass boilers.
- National Trust plan to install over 50 biomass boilers in their properties by 2015 using their own/local woodland resources.
- Mr Brazier has reported verbally to the select committee on practice in relation to biomass boilers and the wood fuel industry in Austria and a written report will follow .

Key lessons relating to renewables and the schools estate

- Schools require general maintenance and energy efficiency measures before it is worthwhile putting in renewable energy technologies. St Peters Church of England Primary School in Aylesford has demonstrated how to effectively reduce a school's carbon footprint. In the attached article (Appendix 5)[12], head teacher Simon Temple explains how the school is aiming for carbon neutrality

[10] Loic Flory, KCC Community Engagement Manager
[11] Further data will be available shortly on boiler performance at Ashford.
[12] www.teachingtimes.com: The Top 10 Tips for becoming a Carbon Neutral School

by reducing energy use, implementing energy efficiencies and then embarking upon installation of renewable energy technologies.

- Currently, when broken/old heating systems are replaced by KCC it is on a like for like basis. This means oil fired boilers are still being installed since the primary aim of maintenance *'is to keep schools safe, warm and operating*.'[13]

- The aims of carbon reduction are not a factor in maintenance choices; consultants who carry out work on schools on KCC's behalf are driven by cost.

- Schools are open for longer to meet their obligations under the extended services programme (currently the subject of a select committee review) and this as well as the DCSF Information Technology Strategy contributes to greater energy use in schools, impacting on DECC aims for carbon reduction.

- The Building Schools for the Future programme will, if it goes forward, inject £1.86 billion into Kent schools. The Academies programme is another potential source of funding for sustainability measures.

- If KCC provide capital for energy saving and efficiency projects in schools there is no ongoing benefit for KCC in terms of revenue benefits.

- Schools have the option of paying energy services companies (ESCos) to carry out improvements (with the latter benefiting from available incentives such a the Feed-in Tariff), and improvements are effectively 'free' due to repayments being set below the value of savings to be made.

- The Building Energy Efficiency Programme (BEEP) is an international initiative, currently being piloted in London for 42 Police, Fire, and 'Transport for London' buildings, where it is hoped 25% energy savings will be achieved – this potential funding source is being investigated by KCC's Greener Kent Manager.

Future programmes with potential to impact on KCC's energy profile

A number of other programmes and plans will impact on energy use within KCC and more widely in Kent. Transport-related activities and those related to business and domestic energy use will be explored in subsequent topic papers.

Evidence to the select committee

A range of written evidence has been received in relation to biomass heating and the development of the wood fuel industry in Kent. On 12th May additional information on this and other topics will be sought from witnesses in an oral evidence gathering session beginning at 1.30 p.m.

[13] Bruce Macquarrie, Capital Strategy Manager, KCC Children, Families & Education Directorate