
Executive Summary

UEA has long been recognised for its leadership in environmental research and teaching. It is now striving to minimise energy consumption by developing an exemplary low carbon campus through its Carbon Reduction Plan (CRP), which delivers the Higher Education Funding Council for England (HEFCE) requirements for sector-wide reductions in CO₂ emissions.

Rationale for Carbon Reduction

There are two main drivers of carbon reduction at UEA. The first is to comply with our formal obligations by HEFCE which is for UEA to have a carbon reduction plan. HEFCE have linked future capital investment to having a carbon reduction plan and achieving the targets set within the plan. UEA is required to monitor and report its CO₂ emissions through legislation.¹ This requires UEA to take part in the European Union Emissions Trading Scheme and the UK CRC Energy Efficiency Scheme.² Failure to comply with these schemes will result in significant fines (over £1,500,000) and potentially prison for deliberate misreporting or fraud. For UEA, the cost of compliance with these legal obligations is expected to rise to £450,000 per annum by 2014-15 if CO₂ emissions remain the same. A second driver is the University's reputation as an environmentally responsible and progressive institution. UEA's CO₂ emissions are reported through campaigns such as the Green League which ranks the performance of all Higher Education Institutions and is published in Guardian annually. Performance in this league table will impact on the overall reputation of the University.

Carbon Reduction Targets

In 2010 UEA set a Headline Target of 35% reduction in direct CO₂ emissions by 2015 from a 1990 baseline. UEA is aiming to reduce its carbon footprint more quickly than the HE sector as a whole. A number of factors were taken into account when establishing UEA's carbon reduction target for UEA.

- The corporate plan 2008-12 stated UEA's goal to become an exemplar low carbon campus.
- HEFCE have stated the HE sector should be leading the UK's transition to a low carbon economy, with the sector at least achieving the UK targets.
- UK legislation states that UK will reduce its carbon footprint by 34% by 2020 compared to 1990 levels and 80% by 2050.
- The potential for reductions in emissions from energy savings and the construction of the Biomass plant.

The Headline Target covers emissions associated with electricity, gas, oil, fuel for fleet vehicles and refrigerant releases. Some 99% of emissions covered by the Headline Target in 2010-11 were building related emissions, of which 62% were from electricity, 33% from heat, 5% gas and oil. The remaining 1% is made up from refrigerant and fleet emissions.

There was a small decrease of 0.26% in CO₂ emissions from buildings in 2010/11. This is the first reduction in emissions from buildings in a number of years and was despite 2010/11 being one of the coldest winters on record and the first full year of occupation of the Thomas Paine Study Centre.

Our Carbon Reduction Programme of Work

A number of projects have been implemented in 2010-11 specifically to reduce CO₂ emissions, including a new Uninterruptable Power Supply UPS in Computer Suite 1 and insulation jackets on valves in plant room across campus. These have been funded through the Revolving Green Fund,

¹ The two schemes that require UEA to report CO₂ emissions are the EU Emissions Trading Scheme resulting from the implementation of Directive [2003/87/EC](#) of the European Parliament and the CRC Energy Efficiency Scheme, implemented through The CRC Energy Efficiency Scheme Order 2010 resulting from the implementation of part four of Climate Change Act 2008

² CRC used to stand for Carbon Reduction Commitment

which can only be used to fund projects that meet financial and carbon criteria set by Salix Finance.³ Salix Finance provided £350,000 and UEA £100,000 of the fund. A number of projects have been quantified to identify costs and carbon savings up to 2014/15. These projects fall into four categories: Completed; Planned – Funded; Planned – Unfunded; and Potential. The expected CO₂ savings from the completed, planned – funded and planned – unfunded projects are not currently sufficient to meet the Headline Target for CO₂ reduction. When persistence factors⁴ are applied there is a 12% gap to the target. This equates to a gap to target of just over 1,400 tonnes CO₂. For UEA to achieve the Headline Target more potential projects will need to be implemented.

Funding Requirements to Meet Targets

Salix Finance have worked with the Carbon Trust to establish a rule of thumb for estimating the cost of reducing CO₂ emissions - £500 per tonne CO₂ saved. The Revolving Green Fund Projects at UEA average £480 per tonne CO₂ saved. Based on £500 per tonne, the cost of the potential projects required to meet the target is likely to be £700,000. A breakdown of funding required to meet the Headline Target can be seen below.

It is proposed that a £1,350,000 fund be established to fund the Planned – unfunded projects and the Potential projects required to meet the Headline Target, based on the Revolving Green Fund model. This ensures that the projects funded through the new fund will achieve the carbon and financial savings required. The fund will also enable progress towards targets set for 2020 and beyond. The capital invested by UEA to establish this fund could be returned to UEA, if the fund is not required.

	Cost
Funds from existing Revolving Green Fund	-£115,000
Planned – Unfunded Projects	£765,000
Potential Projects to meet the headline target	£700,000
Biomass Phase II	£4,500,000
Total additional funds	£5,850,000

Future Options for Advancing Carbon Reduction at UEA

When the Biomass Gasification scheme was approved it was expected that the scheme would receive one Renewable Obligation Certificate (ROC)⁵ per MWh of electricity produced. However, if the scheme can produce high quality gas, it could be classed as advanced gasification and receive two ROC's per MWh. The expected income from the sale of two ROCs per MWh is £1million per year. It is proposed that income from the sale ROCs from electricity generated by phase 1 of the Biomass CHP plant will be used as followed:

- 1st ROC per MWh of electricity produced is sold and income available to the University
- 2nd ROC per MWh (if awarded) of electricity produced is sold and income available to Estates and Buildings division to improve the thermal performance of the existing building stock.

The largest project to be funded through the monies from the sale of the 2nd ROC would be double glazing the Teaching Wall. Once completed, this would produce annual savings of over £50,000. However, by replacing the 40-year-old windows, it would also make the building more pleasant for the both the staff and the students users and reducing the time spent by Estates dealing with problems.

³ Salix Finance is a not for profit limited company that provides grants and loans to public sector organisations to enable energy saving projects to be implemented. The fund works by loaning capital to a project. The energy savings from the projects are used to repay the loan and replenish the fund. Once the loan is repaid, savings are seen in the utility budget. The original £450,000 has now been invested and the fund has moved in to the revolving stage. Given the payback periods of the projects completed to date it is expected that the fund will be able to invest £115,000 in carbon reduction projects per annum.

⁴ To represent the reduction in performance over time of different technologies Salix use persistence factors.

⁵ ROC's are sold to larger electricity generators who have to have a certain amount of renewable electricity in their portfolio. It is a market driven price, but it tends to move around £50 per MWh