

Carbon management plan update 2013/14

Management Summary

This document is the 2013-14 annual revision of the College's 2010 – 2020 Carbon Management Plan.

An update on progress and a vision of how future targets will be achieved are contained within. The scope of the benchmarked CMP includes all scope 1 and 2 emissions where the University is financially responsible, including embedded space. Since 2012/13, scope 3 emissions are included as follows: waste, water, business flights, business travel (surface), student commute, staff commute.

The KCL carbon footprint has been restated for all years in order to account for material changes to the conversion factors provided by Defra for company reporting purposes.¹ The 2005/06 baseline for Scope 1 & 2 emissions is 53,402 tCO₂e. We aim to reduce emissions during the 2019/20 financial year to 30,439 tCO₂e, representing a 43% reduction on the original baseline. This represents an average annual carbon reduction target of 3.1% over the 14 years.

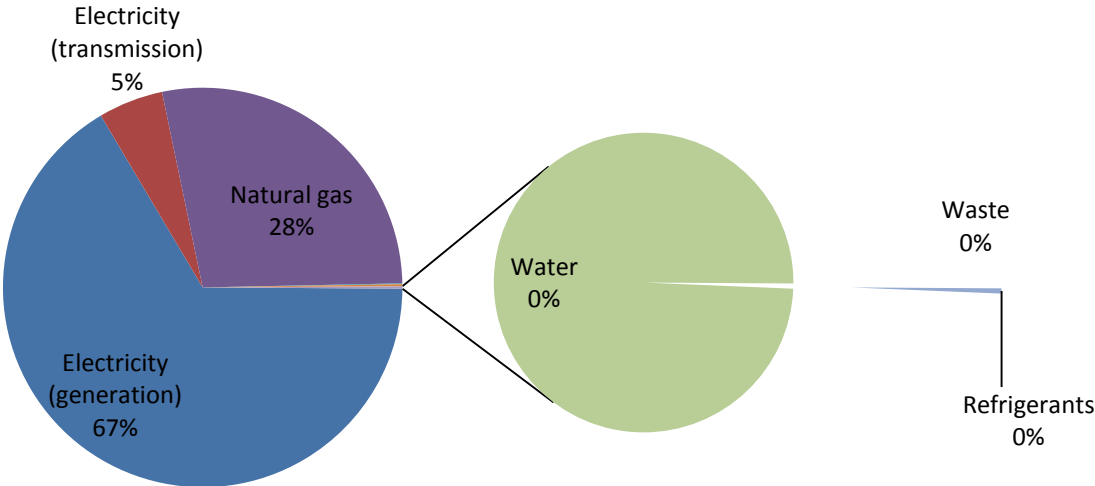
During 2008/09 a new baseline was set to accommodate Scope 3 emissions in the carbon footprint. This baseline has also been re-evaluated in light of the Defra changes. The 2008/09 baseline has been set at 41,521 tCO₂e, including 5,306 tCO₂e scope 3 emissions.

Scope 1&2 carbon emissions for 2013/14 were 37,858 tCO₂e. Scope 3 emissions account for 11,587 tCO₂e.

Carbon reduction is a fundamental part of the £2,000,000 reduction program currently underway in E&F. 'Energy spend to save' will form a key part of this strategy. Internal funding is available to progress energy saving opportunities. KCL will supplement this internal funding with new and existing Salix loans. Further funding opportunities are actively sought.

¹ http://www.ukconversionfactorscarbonsmart.co.uk/documents/28_05_14%20What's%20new%20-%202013.pdf

Chart 1: Carbon Breakdown (tCO₂e)



Carbon Progress Update

The original KCL hefce carbon baseline was set in 2005/06. Following changes to Defra emission factors, a revised 2005/06 baseline has been set at 53,402 tCO₂e. This baseline was updated in 2008/09 to reflect the changing requirements of carbon reporting, including the addition of Scope 3 emissions. Table 1: 2008/09 baseline carbon emissions, details the breakdown of this renewed baseline. Table 1 lists the baseline for Scope 3 emissions at KCL.

Table 1: 2008/09 baseline carbon emissions

Source	tCO ₂ e	
	2008/09	2013/14
Energy in Buildings (Electricity)	23,018	24,869
Energy in Buildings (Gas)	10,802	12,960
Energy in Buildings (Oil)	2,395	0
Waste to Landfill	10	98
Water	133	60
Business Flights	1,315	3,829
Business travel (surface)	301	72
Student Commute	2,398	4,811
Staff Commute	1,149	2,708
Total	41,521	49,407

The carbon management plan is supported by the University’s Energy and Carbon Management Policy: goo.gl/AOsYiV. The policy outlines the commitment to proactively manage our carbon emissions and is signed and supported by the Principal.

Progress towards the target stalled in 2012-13: many original projects were completed; there was a lack of wider university engagement, including IT and procurement; and, a lack of dedicated resources was identified. Since 2013, a new team has been established with 8 full time staff. This includes the Energy and Deputy Energy Manager. The Energy Manger is responsible for the delivery of the Carbon Management Plan. Other team members support skilfully in areas such as project management and behaviour change. They contribute actively to carbon reduction via waste management and broader sustainability activities. The Energy Manager reports to the new Head of Sustainability who in turn reports to the Director of Real Estate Management who truly champions carbon reduction across the entire college, including Estates and Facilities.

Progress on carbon reduction is a standing agenda item on campus operations team fortnightly agendas. A new hard services team structure has been put into place to facilitate identification and delivery of carbon reduction projects. The new team has a track record of delivering carbon management at higher education and private organisations, including University of Reading, University of Greenwich, Pfizer and HSBC.

Behavioural change plays a key role in the carbon strategy at KCL. This includes active participation in NUS led projects, including Green Impact Awards and Blackout Campaign. The program is managed by the sustainability team, substantiated by the direct experience of the Energy Manager who has published research on the subject: Yearley, T., et al. (2013) Reducing Building Electricity Use By Increasing Occupant Perceived Control.

KCL has a strong track record of utilising carbon reduction funding. Having received £250k during the first revolving green fund program (RGF1) the KCL Salix fund has been recycled three times, with over £750k projects implemented since 2007. KCL has also received non-recycled Salix loans and successfully implemented associated projects. Projects completed in 2013/14 can be viewed in Table 2: 2013/14 Salix projects.

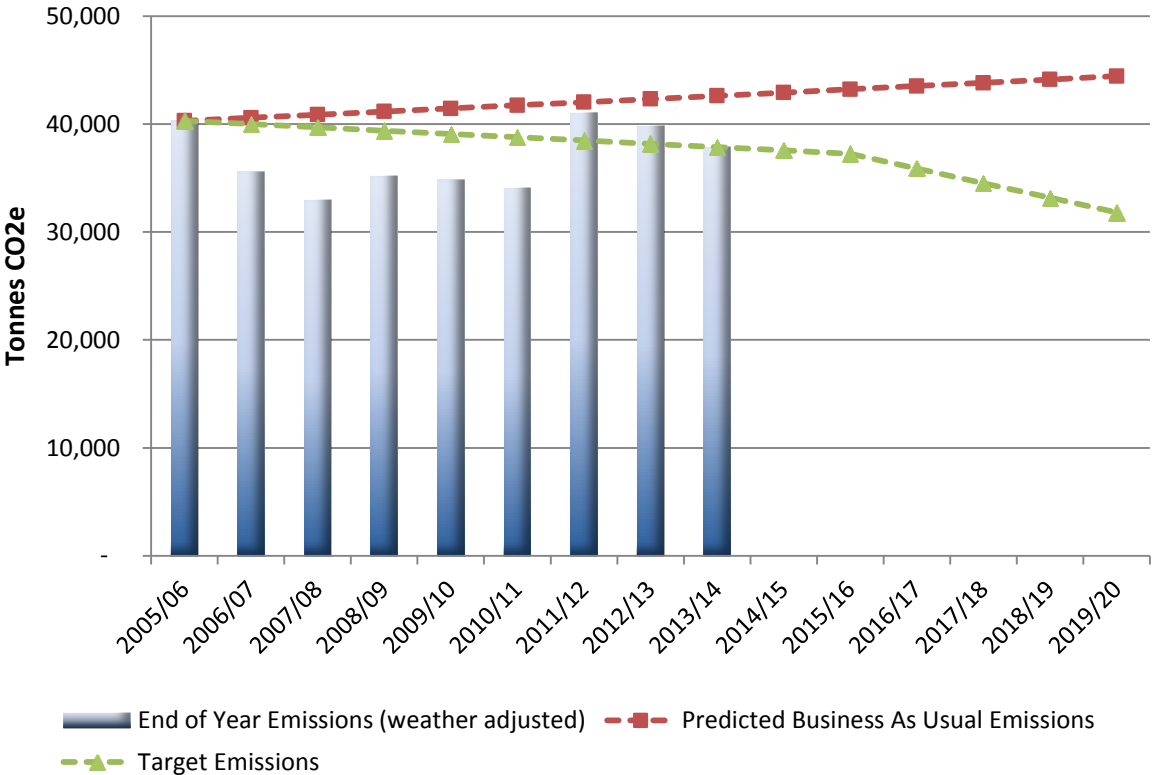
Scope 1&2 emissions currently account for 77% of total emissions.

Table 2: 2013/14 Salix projects

Project description	Project Cost	Annual tCO ₂ e saving
Replacement of Hodgkin Building corridor lighting with LED units	£40,728	39.21
Replacement of Macadam Building corridor lighting with LED units	£2,259	4.82
Replacement of Hodgkin Building central staircase with LED units	£14,440	16.74
258 research freezers fitted with Savawatt controls in the Hodgkin Building and Britannia House	£12,688	28.64
Additional controls fitted to research freezers on Guy's Campus	£4,068	9.12
Harris Lecture Theatre lighting replaced by dimmable LED units and PIR absence detection	£8,062	6.51
Wellcome building – replacement of 88 fluorescent light fittings with 60 LEDs and installation of controls	£19,584	20.94
All lighting in the Anatomy Lecture Theatre replaced lights with LED units	£6,776	5.46
King's Building Safra lecture theatre CO2 sensors	£3,310	3.93

Beyond Salix/ RGF funded projects, KCL has internal targets to save £2million from Estates & Facilities operational expenditure by the end of the 2015/16 academic year. 'Spend to save' carbon reduction, and behaviour change initiatives form part of this project, in addition to Salix/RGF funded opportunities.

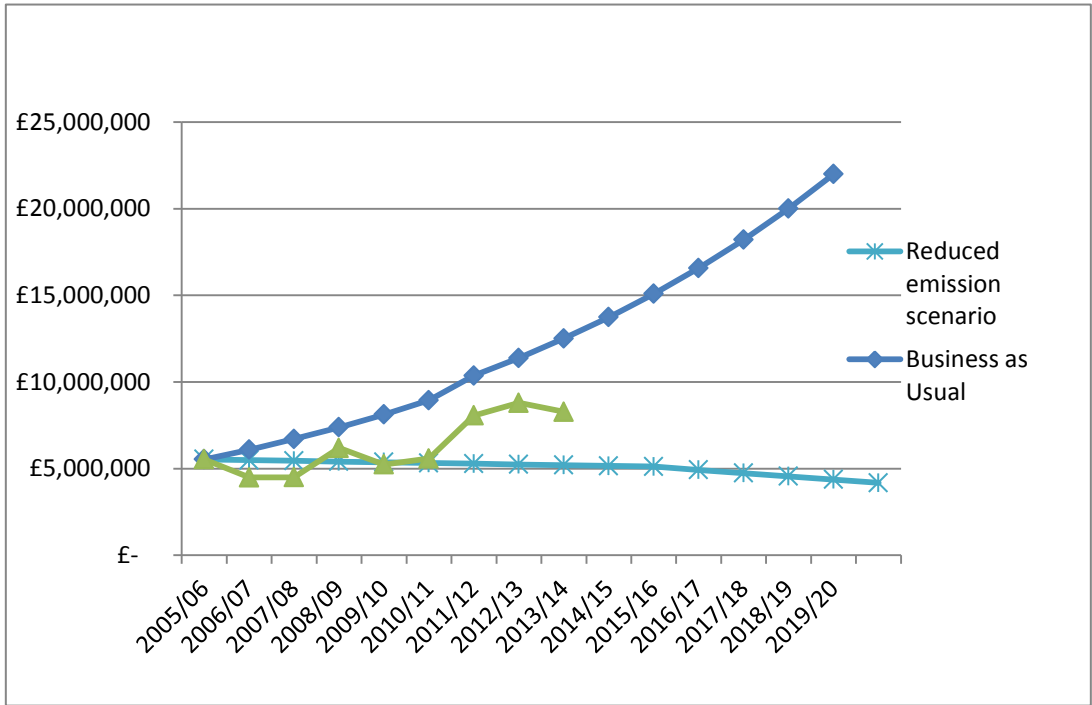
Chart 2: Progress against Scope 1&2 carbon targets



Business case and financing

In addition to the carbon reduction associated with the KCL carbon management plan, significant cost savings are predicted. If we were to continue using energy on a business as usual basis, we would expect utility costs to exceed £22,000,000 by 2019/20. Since 2005/06 KCL has saved £20,355,857 against the business as usual scenario.

Chart 3: Energy costs, business as usual versus target scenario versus actual



KCL future expenditure on carbon management is based on a combination of external and internal funding. Currently, KCL has a £250,000 Salix revolving green fund. In September 2014, KCL applied for a further £750,000 revolving green fund from Salix and will learn whether this was successful in January 2015. In addition to the Salix funding, internal capital funds are available for projects with a simple payback period of fewer than three years. For projects over three year payback period, an individual business case must be submitted.

KCL is currently on target to reduce carbon emissions in line with the targets set. In order to achieve this, continued funding will be required to 2019/20. Including the funding provided externally, an annual project expenditure of £1,000,000 is required. This level of funding will exceed the requirements at the current level of carbon payback per pound. In the future it is expected that the carbon reduction per pound will reduce leading to the requirement for the greater funding.

Water efficiency

Water has a relatively low carbon coefficient when compared to fossil fuels such as natural gas and electricity. As can be seen in

Chart 1: Carbon **Breakdown (tCO₂e)**, it represents 0.1% of total emissions. It is therefore necessary to associate separate targets with water to ensure the necessary focus is placed on reducing the use of this natural resource. KCL have committed to reducing water consumption by 5% by 2015/16 against the 2013/14 consumption levels. This is normalised against the sum of headcount staff and students.

The water related carbon emission deadline of 2013/14 is 59.9tCO₂e. A 5% reduction on this baseline would equate to 3 tCO₂e reduction.

Carbon and water projects 2014/15

Table 3: 2014/15 carbon and water projects includes details of projects approved for completion in 2014/15. This list will continue to develop throughout the year.

Table 3: 2014/15 carbon and water projects

Project description	Project Cost	Annual tCO₂e saving
JBC lighting upgrade - lighting controls upgrades	£257,600.00	174.9
Britannia House External and W/C lighting upgrade - replacement of existing lighting with LED - installation of lighting controls	£38,304.00	39.7

JBC Mechanical efficiency		
- Replacement of existing Gas Fired Hot Water Heaters with New HE Type		
- Installation of VAV Dampers and Controls for Laboratory Ventilation Night Set Back		
- Installation of VAV Dampers and Controls for Laboratory Ventilation Night Set Back	£129,920.00	201.6
- JBC Fume cupboard heat recovery system		
- Rebalancing and modification to JBC ventilation system flow rates		
- Rebalancing and modification to JBC ventilation system flow rates		
Strand Campus heating and lighting		
- HVAC occupancy controls		
- Boiler controls		
- Maughan Library - LG63 Lighting		
- Insulate existing CT-VT & Copper HWS main riser pipework ion the Strand building	£279,165.97	230.5
- Change existing lighting for LED and addition of lighting management		
- Maughan Library lighting controls		
Philosophy low temperature hot water upgrade		
- HVAC occupancy controls	£6,581.83	14.4
- Boiler controls		
Residential hand dryer efficiency upgrade		
- Replacement of existing hand dryers with low energy alternatives	£33,600.00	42.8

In addition to the carbon and water projects, which are designed to make tangible improvements to the operations on campus, the University has identified carbon management opportunities to improve working practices within the organisation. These include:

- Improving the recharging process
- Maintaining legal compliance with energy legislation
- Consolidating data management procedures
- Developing a carbon communications strategy
- Managing utility finances efficiently

Assumptions

The KCL Sustainability Team has undergone a fundamental review and update during 2013/14. A review of the working and reporting practices relating to carbon management is currently underway. Information is currently being refined and this report represents the best available data at the time of writing. As a result of this, some assumptions have been made when calculating emissions in this report. These assumptions are outlined here:

- Unknown fuel type entries in subjective code 'K30' is allocated on the assumption that fuel use is split 50:50 for diesel and petrol.
- No f-gases are lost as a result of maintenance on research refrigeration equipment.
- For 2013/14, only f-gas emissions between 01/04/14 are recorded.
- Mileage allowance is set at £0.45 per mile.
- Where historic data is not recorded, the oldest year available is used to back fill historic data.
- Heathrow is the closest meteorological station with data going as far back as required.