Goldsmiths
UNIVERSITY OF LONDON

Goldsmiths Carbon Management Plan

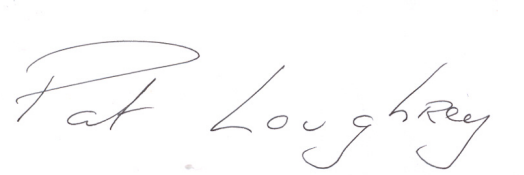
Approved by Council 30 November 2010

Foreword from the Warden – Patrick Loughrey

Goldsmiths has always sought to play its part in improving the local community and environment. To this end I am proud to support the new Goldsmiths Carbon Management Plan with its ambitious and challenging targets for carbon reduction.

Focussing attention and resources on our campus in order to enhance the student experience is one of my key priorities. It is gratifying the energy reduction measures proposed in this plan complement this.

With the continuing engagement of colleagues, students and supporters, I'm confident we can put this plan into practice so that Goldsmiths maintains its status as an institution that takes its environmental responsibilities seriously



Patrick Loughrey
Warden

1. Executive Summary

The purpose of this plan is to set ambitious, but achievable carbon reduction targets for Goldsmiths, University Of London (Goldsmiths). This plan will also indicate how Goldsmiths intends to achieve these targets across our scope 1 and scope 2 emissions.[1]
HEFCE has committed to carbon reduction figures in line with requirements from central government, and this plan shows Goldsmiths' support for HEFCE in attaining these targets.

This plan is an update to, and improvement on, our previous carbon management plan, the Higher Education Carbon Management Plan which was written in conjunction with the Carbon Trust, which had a target of 15% reduction over 3 years from 2006-07.
This update is being made in line the following extract from the HEFCE document outlining their carbon reduction expectations (HEFCE, 2010/01):
"33. The higher education sector in England has agreed to commit to meet the government targets for carbon emission reductions in scopes 1 and 2 of 34 per cent by 2020 and 80 per cent by 2050 against a 1990 baseline. This is equivalent to a reduction of 0.623 $MtCO_2$ by 2020 and 1.465 $MtCO_2$ by 2050 against 1990 levels. A 2005 baseline is also used for reporting against UK targets. Against a 2005 baseline, this is equivalent to a reduction of 48 per cent by 2020 and 84 per cent by 2050."

In the academic year 2005-06, Goldsmiths' scope 1 and 2 emissions were 6,354[2] tonnes of CO_2. If Goldsmiths were to follow the HEFCE requirements, by 2012 these should have reduced to 5083 tonnes of CO_2, by 2017 down to 4130 tonnes of CO_2 and by 2020, Goldsmiths' carbon emissions should be reduced to 3304 tonnes of CO_2.
However, the campus as at 2005, was not particularly energy efficient. Therefore, if practical, Goldsmiths aims to reduce its carbon emissions by 50% by 2020. This is an ambitious target of 3177 tonnes of CO_2. This will be achieved through a mixture of making the buildings more energy efficient and installing low carbon energy sources of power generation on campus.

The Goldsmiths' approach to carbon management will primarily be about carbon reduction, but will also keep financial savings in mind when evaluating the various schemes.
The follow on from this is that, with reduced carbon emissions, there will also be a reduction in financial expenditure on gas and electricity, and that has an obvious benefit to Goldsmiths. However, to achieve a reduction in carbon emissions, money will need to be spent on various initiatives, schemes and projects.

This updated Carbon Management Plan (CMP) will draw upon the existing Carbon Trust Higher Education Carbon Management Programme and bring it into line with the requirements from HEFCE to reduce the higher education sector carbon emissions.

2. Introduction

2.1. Goldsmiths' Background

Founded in 1891, Goldsmiths has been part of London University since 1904 and a full College of the University of London with its own distinctive role as an independent university institution, since 1988. The Goldsmiths campus is located in New Cross in south-east London within the Borough of Lewisham and currently has around 6700 full-time equivalent (FTE) students. Students are supported by 924 FTE staff.

[1] Scope 1 & 2 emissions are as defined by HEFCE document 2010/02
[2] Emissions data from: Carbon baselines for individual HEI in England 2010 by SQWconsulting

The campus comprises of some 91 buildings ranging from three Grade II listed buildings (Richard Hoggart Building, Deptford Town Hall and Laurie Grove Baths) to recent modern developments along with mixture of 1960s buildings and small Victorian houses (49) converted into offices. Total non-residential space is 58,236m^2 GIA on a site of 6.5ha. The buildings are mainly offices and studios, although there are some specialist areas such as science laboratories, workshops etc. All six residential buildings are either located within walking distance of the College in New Cross, or close by; the furthest is located at Brockley approx 2 miles distance from the main campus. Total residential space 24,852m^2 GIA

There are separate playing fields located at Loring Sports Ground of 8.5ha in Sidcup, which is approximately 20 miles from the main campus; along with associated buildings totalling 1,060m^2 GIA.

Goldsmiths has faced, and is continuing to face, increased energy bills due to rising energy prices, increases in student numbers and increasing consumption due to staff expectations for greater warmth in the winter and cooling in the summer, which need to be managed.

2.2. Goldsmiths Emissions Background

In the past, Goldsmiths has not had carbon emissions control high enough on the list of priorities. This has resulted in several issues: there being limited reliable recording of emissions, with many of the utility bills being un-challenged estimated bills, and transport fuel not recorded; energy efficiency plans being drawn up without a full and thorough knowledge of the campus and its technological challenges; unsuitable energy using building services installed. Goldsmiths has recently moved energy efficiency high on the list of priorities by: creating a ring-fenced budget for energy reduction measures; engaging the assistance of the Carbon Trust to draw up the first Higher Education Carbon Management Programme; creation and appointment of an Energy & Environmental Manager; updating the Environmental and Sustainability Policy Statement; creation of the Environmental & Sustainability Sub-Committee as well as numerous other smaller projects around campus.

The carbon emissions baseline for 2005 of 3654 t/CO_2 provided by SQWconsulting is based on the Estates Management Statistics (EMS) and SQW estimating the transport emissions. In the past, and up to now, the EMS data has been based on estimated gas and electricity bills for around 50% of the estate, so cannot be completely relied upon. Notwithstanding, the 50% reduction in carbon emissions by 2020 Goldsmiths is aiming for, will be against the 2005 baseline provided by SQWConsulting.

3. Overview of Strategy

There are several approaches being investigated and undertaken to reduce carbon emissions at Goldsmiths, among them are:

- the reduction of energy consumption by replacing old and in-efficient products such as complete lighting systems and heating control systems with leaner, greener systems
- air conditioning system inspections will be undertaken in line with legal requirements, and the recommendations will be implemented where definite carbon savings can be realised
- repairs to the fabric of the buildings including carrying out window repairs and replacements
- upgrading of insulation to building fabric and building services

- installation of a central combined heat and power plant to provide heating for the entire campus
- installation of a campus-wide district heating system to allow the removal of the many small and in-efficient local boilers
- installation of photovoltaic cells
- installation of solar hot water
- detailed monitoring of electrical and gas consumption
- recording of transport fuel use, and finding ways to improve fleet efficiency.
- including education for sustainable development within the curriculum for all courses
- creating behaviour change through education, training and awareness raising

The above schemes are being investigated to provide not just a financial saving, but primarily a carbon saving as higher education must be seen to be leading the way in carbon reductions.

The amount of money needed to carry out all schemes listed in Section 7 comes to around £1.5m, and will reduce the carbon emissions at Goldsmiths by approximately 34%.
This is excluding the larger schemes being considered such as installing combined heat and power, a district heating system, photovoltaic installations and computer systems power management. These additional schemes require complex and professional costing, including the associated carbon reduction benefits they would bring to Goldsmiths. These larger schemes will make up the 15% of carbon reductions needed to bring Goldsmiths to its overall 50% emissions reduction target.

4. Approach To Carbon Reduction And Fit With Strategic Objectives

The Goldsmiths approach to carbon management will primarily be about carbon reduction, and the wider benefits that will bring. Financial savings have also been borne in mind when evaluating the various schemes. Where large carbon savings can be realised, but there is a long monetary payback, these schemes will not be dismissed, but will be carefully considered for their carbon reductions. As an example, one plan is to change a buildings domestic hot water supply from 18 electric hot water heaters to a solar system with gas-fired boilers providing the top-up heat needed. Initial investigations show a 10+ year basic financial payback. However, carbon savings could amount to 8 t/CO_2 per year.
Goldsmiths believes that this is the better, holistic, sustainable and more environmentally friendly approach to take than purely a financial driven option. Goldsmiths will also look beyond the traditional bounds of conventional technologies in trying to reduce carbon emissions. Where new and up-coming opportunities or technologies present themselves, it is felt that these should not be dismissed out of hand, but warrant further investigation in line the Goldsmiths ethos of challenging conventional thinking. Goldsmiths also believes that scope 3 emissions cannot be neglected, and while no targets are set within this version of the carbon management plan, scope 3 emissions will be targeted ahead of any official setting of reductions by HEFCE.

Goldsmiths is committed to reducing its environmental impact as stated in the publically available Environmental and Sustainability Policy Statement. Beyond this, Goldsmiths is working on its Masterplan document which also states a high level of commitment to reducing the environmental impacts from its activities, as well as enhancing the local community. Improvements to the local community include: the new Goldsmiths Biodiversity Action Plan; working in partnership with the London Wildlife Trust; working with the local community including local businesses, schools, colleges and Lewisham Council.

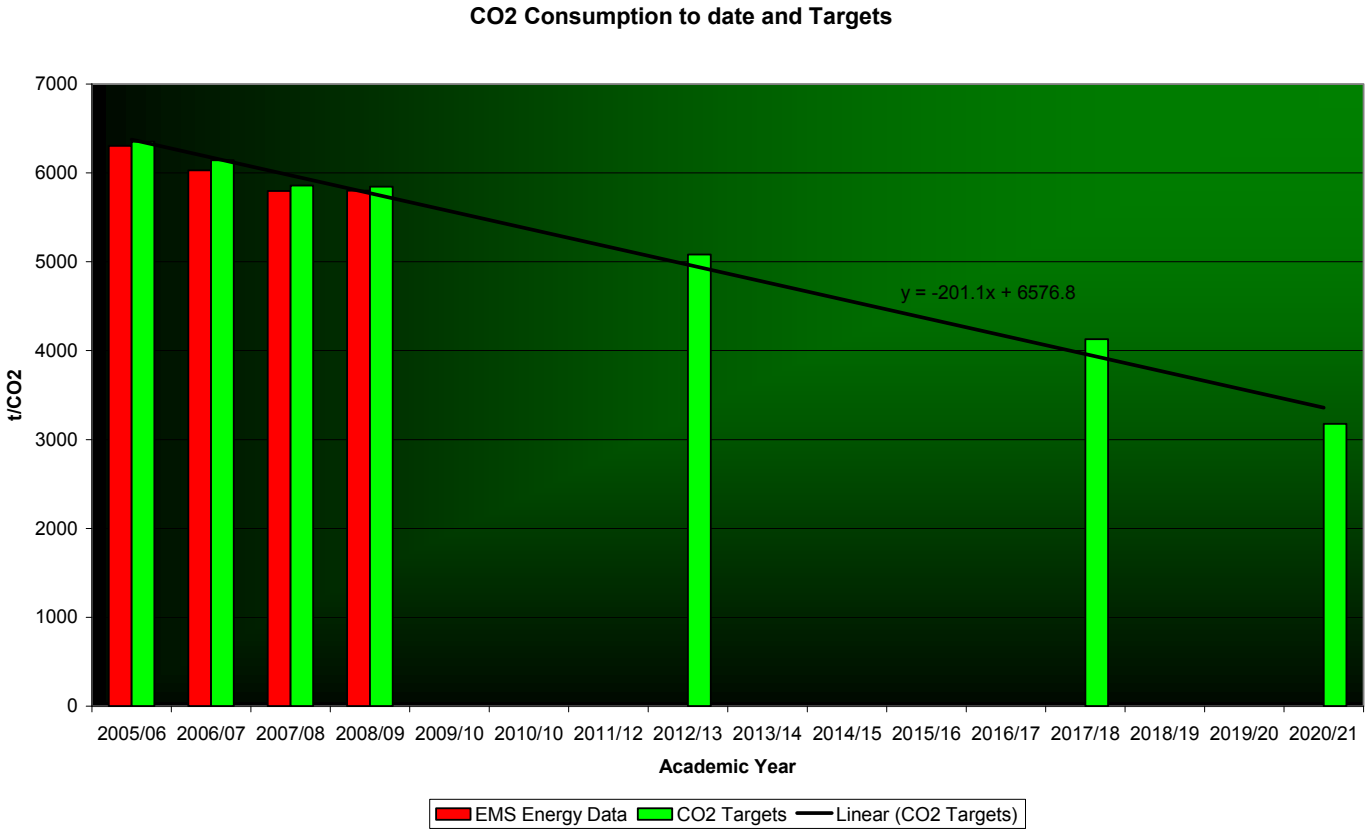
5. Carbon Emissions Data

Historically there has been no one central person in overall charge of gathering utility data with which to compile carbon emissions figures. Utility bills from electricity, gas and water have partly been estimated for the bulk of the campus, which, with around 90 buildings, has lead to a great margin of error in the previous years of EMS data gathering. In addition, transport fuel has not been recorded. With the recent appointment of an Energy & Environmental Manager, Goldsmiths is now getting a better understanding of carbon emissions produced, as well as a constructive methodology of how these can be reduced.

The data below, and graph overleaf, shows the amount of kWh of gas and kWh of electricity used each year from academic year 2005. These are then converted into tonnes of CO_2 using the average from the two calendar years concerned, e.g. 7 months of 2005 plus 5 months of 2006, and these are using the latest figures available from DEFRA as at Aug 2010.

Academic Year	kWh Electricity	CO_2 Electricity	kWh Gas	CO_2 Gas	Combined t/CO_2 Emissions
2005/6	5664287	3058	17581953	3250	6308*
2006/7	5568940	3074	16364409	3025	6099
2007/8	5851783	3174	14284336	2640	5814
2008/9	5697677	3073	14769128	2730	5803

*There is small discrepancy between the calculated CO_2 emission for 2005/6 based on the EMS figures and the CO_2 figure provided by SQWconsulting of 6354t/CO_2. This is attributable to the inclusion by SQWconsulting of an estimate of transport related emissions.



Graph showing CO_2 emissions to date (red bars) and the targets set by HEFCE and Goldsmiths (green bars).

To get a better record of carbon emissions an automatic metering reading (AMR) system has been installed to capture gas and electricity consumption. While not capturing all sources of consumption at present, the AMR will be extended to cover more and more areas in the coming years. Meanwhile, staff have been trained in how to provide accurate meter readings once a month to allow for a better understanding of the energy consumption, and therefore carbon emissions at Goldsmiths.

6. Assessment Against Baseline And Targets

6.1. Baseline

The baseline CO_2 figures for scope 1 and 2 provided for Goldsmiths by HEFCE via SQWconsulting do not tie-in with the EMS data provided by Goldsmiths of 5801tCO_2. This is due to the EMS figures for that year using a very low electricity conversion factor of 0.422, and for the non-inclusion by Goldsmiths of transport related emissions.
Notwithstanding, the SQW figures are going to be used for the purposes of this plan.
These are 6354 t/CO_2 for scope 1 and 2 emitted by Goldsmiths in the academic year 2005/6.

6.2. Targets

Goldsmiths acknowledges that the targets set by HEFCE are sector wide. With that in mind an ambitious target of a 50% reduction by 2020 (2% greater than the requirements) has been agreed by Goldsmiths for scope 1 and 2 emissions against the 2005 baseline. This is creating a target of 3177t/CO_2. Interim targets are not going to be set over and above the HEFCE requirements of 20% by 2012 and 35 % by 2017, but if these figures set by HEFCE can be improved upon by Goldsmiths, then this would be seen as an added advantage.

The basis for Goldsmiths choosing the ambitious target of 50% is that at 2005, the campus was not particularly energy efficient, and had not previously been able to become so. With new staff, funding, incentives from HEFCE and a robust carbon management plan, the 50% target looks to be a realistic, if ambitious, aim.

7. Financial And Carbon Options Evaluation

The table on the following pages is based upon inspections of every building on the Goldsmiths campus. The suggestions are fairly broad, but applicable to the building concerned. Carbon savings, estimated costs and estimated payback periods are based on best estimates, and do not take into account associated additional costs such as professional fees, major building works, planning permissions or other associated on-costs.

In the table below, the column entitled “Est. Carbon Saving (%)” is to show what the typical energy savings are from that particular technology. The next column “Est. of existing contribution of carbon to the building” is to show how much of the carbon from that technology is applicable to that particular building. The column “Percent of building carbon saved” is simply the previous two columns multiplied together to show how much carbon saving overall can hope to be achieved for that building, using that technology. At the bottom of this column for each building is a summation of the expected total carbon savings based on applying all the changes listed.

Suggested Work On Building

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Richard Hoggart Building (inc Student Union, George Wood Theatre)						
All main areas						
1) Replace lighting	40	30	12	60 – 100	3 - 5	M
2) Thermostatic Radiator Valves (TRVs)	30	40	12	3	1	H
3) Draught stripping doors	15	< 1	< 1	1	2	H
4) Air Conditioning (AC) Inspections	UQ*	< 10	UQ*	FOC	0	H
5) Fan inspections	UQ*	< 10	UQ*	FOC	0	M
6) Pipework lagging upgrades	15	40	6	5	3	H
7) Valve jackets	15	40	6	5	3	M
8) Building Management System Upgrade	10 - 15	UQ*	UQ*	50 – 70	UQ*	M
9) Window replacement / repair	10 – 20	25	2 - 5	100	15 – 20	M
TOTALS			**39 - 42**	**234 - 284**		
Loafers						
1) Draught-strip doors to outside	15	< 1	< 1	.1	3	H
2) Replace all downlights with good LEDs	70	60	42	.5	2	H
3) Label bins for recycling	UQ*	UQ*	UQ*	FOC	0	H
4) Stop producing receipts for every transaction	UQ*	UQ*	UQ*	FOC	0	H
5) Smoke free the courtyard	n/a	n/a	n/a	FOC	0	H
TOTALS			**43**	**.6**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Toilets						
1) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
2) Rainwater harvesting where possible	UQ*	UQ*	UQ*	10	2	M
3) Upgrade lighting incl PIR / photocell light fittings	50	70 – 80	21 – 24	.2	2	H
4) Hand dryer replacements	50	20 – 30	10 – 15	2	1 – 2	H
TOTAL CARBON SAVED			**31 - 39**	**14.2**		
Students Union						
1) Sub-meter and charge them for their own elec & gas	UQ*	UQ*	UQ*	5	n/a	H
2) Lighting review for all areas	30 – 50	50	15 – 25	FOC	0	M
3) Extractor fan review to all areas	10 – 20	< 10	1 – 2	FOC	0	M
4) AC Inspection	UQ*	< 10	UQ*	FOC	0	H
7) Replace hand dryers	40	< 5	2	1	2	M
TOTAL CARBON SAVED			**18 - 29**	**6**		
Resource Cleaners Office & Mess Room						
1) TRVs	30	40	12	.1	1	H
2) Replace T8 lighting	50	30	15	.5	3	M
3) Window repairs	20	30	6	.5	10	M
TOTAL CARBON SAVED			**33**	**1.1**		
Media Research Lab & Psychology Post Grad Research						

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
1) Replace / modify lighting from T8 to T5, inc daylight linked	50	40	20	1	4	M
2) TRVs	30	40	12	.5	1	H
3) Check AC and rads interlock to prevent simultaneous htg + clg	10 - 15	UQ*	UQ*	FOC	0	M
4) Repairs to doors and windows	20	25	5	1	10	M
5) Draught stripping	20	10	2	.1	1	M
TOTAL CARBON SAVED			**39**	**2.6**		
Education Building						
1) Replace lighting	50	50	25	25	3	H
2) TRVs	30	40	12	1.3	1	H
3) AC Inspection	UQ*	< 10		FOC	0	H
4) Pipework Insulation	10	40	4	5	3	M
TOTAL CARBON SAVED			**41**	**26.3**		
Warmington Tower						
1) Replace lighting	50	40 – 50	20 – 25	15	4	H
2) Replace / resize water tanks	UQ*	UQ*	UQ*	5 - 10	UQ*	M
3) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
4) Wind turbine / wind speed & direction logging	n/a	UQ*	UQ*	.2	n/a	M
TOTAL CARBON SAVED			**20 - 25**	**22.2 – 27.2**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Rutherford Building						
1) AC Inspection	UQ*	10 - 20	UQ*	FOC	0	H
2) Air handling Unit (AHU) Inspection	UQ*	15 – 20	UQ*	.2	1	H
Variable Speed Drives (VSD)	20 - 40	10	2 – 4	2	2	M
3) Replace / upgrade lighting to relevant areas	50	20 – 25	10 – 12	20	4	H
4) Photocell for lights adjacent to windows and at top of stairwell	30	10	3	.3	5	M
5) Check on/off control of extract fan above copier areas.	50	< 10	5	FOC	0	H
6) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
7) Replace hand dryers	40	< 5	2	1	3	M
TOTAL CARBON SAVED			**22 - 26**	**25.5**		
Library						
1) Replace / upgrade lighting inc PIR lighting for ground floor, WCs and lobby (ensure PIRs are sensibly located)	50	40	20	30	3	H
2) Solar shading	UQ*	UQ*	UQ*	5	5 – 10	H
3) Brise Soleil	UQ*	UQ*	UQ*	10 – 15	15	L
4) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
5) Replace hand dryers	40	< 1	1	2	3	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
6) Pipework Insulation upgrade in boiler room	10 - 15	10	1	1	3	M
7) AHU Inspection	10	15 - 20	1 – 2	1	1	H
VSDs	20 - 40	30	6 - 12	6 – 8	2	M
TOTAL CARBON SAVED			**29 - 36**	**57 – 62**		
Reprographics						
1) Replace lighting	50	10	5	1	2 – 3	H
2) Repairs to windows	25	30	7	5	10	M
3) TRVs	30	30	9	.4	1	H
TOTAL CARBON SAVED			**21**	**6.4**		
Music Practice Rooms (Portacabin adj RHB & college green)						
1) Check timers on heating controls	10 – 50	< 10	1 – 5	FOC	0	M
2) Put “lights off” notices above light switches	30	20	6	FOC	0	H
3) Check temperature settings on heaters	10 - 50	20	2 – 10	FOC	0	M
TOTAL CARBON SAVED			**9 – 21**	**0**		
Whitehead Building						
1) Replace / upgrade lighting	50	30	15	30	4 – 5	H
2) TRVs	30	20	6	.9	1	H
3) Draught stripping	10	< 10	1	.1	3	M
4) AC Inspection	UQ*	30	UQ*	FOC		H
5) AHU Inspection	UQ*	15	UQ*	.2	1	M
VSD	UQ*	<10	UQ*	2	2	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
6) Power Factor Correction	TBC	TBC	TBC	TBC	TBC	M
7) Rainwater harvesting for ground floor WCs?	UQ*	UQ*	UQ*	2	2	M
8) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
9) PV on suitable roof areas					10 – 15	L
10) Replace hand dryers	40	1	1	2	3 - 4	M
TOTAL CARBON SAVED			**23**	**37.2**		
Psychology Bungalow						
1) TRVs	30	30	9	.1	1	H
2) Replace lighting	50	40	20	.5	3	H
3) Repair / replace windows with double glazed	30	20	6	2	10	M
4) Insulate ceiling space	25	30	7	2	5	M
5) Insulate walls	20	30	6	5 – 10	10 – 15	L
TOTAL CARBON SAVED			**48**	**9.6 – 14.6**		
Lockwood Building						
1) Lighting upgrade / replacement	50	40	20	20	3 - 4	M
2) Install skylights in TV Studio areas	30	10	3	10	10	L
3) TRVs	30	40	12	1	1	H
5) AC Inspection	UQ*	30	UQ*	FOC	0	H
6) Install double glazing	25	25	6	30	15	M
7) Replace hand dryers	40	1	1	3	3	M
TOTAL CARBON SAVED			**42**	**63**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Barriedale A (Studio A)						
1) Repairs to windows & secondary glazing	25	10	2	5 – 10	10	M
2) Replace / upgrade lighting	50 – 60	40	20 – 24	10	3	H
3) Cleaning / replacement of skylights	20	< 1	1	.5	2	M
4) Pipework insulation upgrades	10 – 15	10	1	2	3	M
5) VSDs on heating pumps	10 – 30	< 10	1 – 3	2	2	M
6) Timer control of AHUs serving woodworkshop	30	10 – 15	3 - 4	.5	1	H
7) Boiler optimisation controls	15	10 – 15	1 – 2	2	2 - 3	H
TOTAL CARBON SAVED			**29 - 37**	**22 - 27**		
Barriedale B						
1) Replace all lighting to include daylight sensors on the 1st floor	50 – 60	80	40 – 48	20	2 – 3	H
2) Upgrade pipework insulation	20	10	2	1	3	M
3) Ensure BMS timer settings are correct	10	10	1	FOC	0	H
4) Rainwater harvesting for WC	UQ*		UQ*	1	1	M
5) Variable Speed Drives on pumps	10 – 20	10	1 – 2	1	1 – 3	M
6) Boiler optimisation controls	15	10	1	2	2	H
TOTAL CARBON SAVED			**45 - 54**	**25**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Barriedale C (Media Research Building)						
1) AC Inspection	UQ*	30 – 35	UQ*	FOC	0	H
2) Re-set timer control on AC	10 – 15	< 10	1	FOC	0	H
3) Replace T8 lighting with T5	50	< 5	2	.3	5	H
4) Clean out AHU	UQ*	UQ*	UQ*	FOC	0	H
5) Display simple user controls above AC controllers	10 – 20	10	1 – 2	FOC	0	H
6) Adjust AC set point on all AC	10 – 20	10	1 - 2	FOC	0	H
7) Get AC units fully overhauled	15 – 20	30	4 – 6	1	2 – 3	M
8) PIR lighting in WCs, Kitchens and corridors	30	20	6	.5	2 – 4	H
9) Isolate Rads in rooms with AC	UQ*	UQ*	UQ*	FOC	0	M
10) Variable Speed Drives on pumps	20 – 25	< 10	2	2	2	M
11) Replace R22 split system in room 25, 1st floor	15	< 10	1	3	5	H
12) AHU Inspection	UQ*	UQ*	UQ*	.2	1	H
VSDs	20 – 40	10 – 15	2 – 6	2	2	M
13) PIR control for the AC in each room	30 – 40	20 – 30	6 – 12	2	3 – 5	M
14) Boiler optimisation controls	15	10	1	2	2	H
15) Replace hand dryers	40	1	1	1	2 - 3	M
TOTAL CARBON SAVED			**28 - 42**	**14**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Barriedale E						
1) Replace all lighting with T5 versions	50	40	20	5	5	H
2) Power Factor Correction	TBC	TBC	TBC	TBC	TBC	M
3) Rainwater harvesting	UQ*	UQ*	UQ*	1	2	M
4) Pipework insulation needed	30	30	9	1	1	M
TOTAL CARBON SAVED			**29**	**7**		
Lockwood Annexe 5 (Hut F)						
1) Replace lighting	50	60	30	7	3	H
2) TRVs	30	40	12	.3	1	H
3) Install roof insulation	30	15	4	2	1	H
4) Install wall insulation	30	15	4	5	4	M
5) Pipework Insulation	15	15	2	1	3	M
6) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
7) PIR on urinal cisterns	UQ*	UQ*	UQ*	.2	1	M
8) Install gas meter to measure savings	UQ*	UQ*	UQ*	1	n/a	H
9) Replace hand dryers	40	1	1	1	3	M
TOTAL CARBON SAVED			**53**	**19.5**		
17 to 31 St James						
1) Replace / upgrade lighting	50	30	15	20	5	H
2) TRVs	30	15	4	1	1	H
3) Draught stripping	15	< 10	1	.5	2 - 3	H
4) AC Inspections	UQ*	20	UQ*	FOC	0	H

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
5) AC Controllers in rooms with AC	20	15	3	1	1 - 2	H
6) Loft Insulation to 17/19	20	< 10	2	.3	5	M
7) Window replacements	25 - 30	15	3 – 4	50	10 - 15	M
8) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
9) Rainwater harvesting	UQ*	UQ*	UQ*	3	2	M
10) Pipework Insulation	15	10	1	1	2	M
TOTAL CARBON SAVED			**29 - 30**	**78.8**		
St James Annexe						
1) TRVs	30	40	12	.5	1	H
2) T8 to T5 conversion fittings	40	50	20	2	2	M
No other options have been considered for this building due to pending demolition within the next few years						
TOTAL CARBON SAVED			**32**	**2.5**		
286 New Cross Road						
1) TRVs	30	40	12	.1	1	H
2) T8 to T5 conversion fittings	40	50	20	.1	2	M
No other options have been considered for this building due to pending demolition within the next few years						
TOTAL CARBON SAVED			**32**	**.2**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
288 New Cross Road						
1) Lighting upgrades / replacements	50	40	20	5	3	H
2) TRVs	30	40	12	.15	1	H
3) Window repairs	20	20	4	3	5 - 10	M
4) Skylight repairs & double glazing	30	30	9	5 - 10	5 - 10	H
5) Boiler optimisation controls	10 - 15	5 - 10	1	2	2	H
6) Pipework Insulation	15	10	1	.5	2 - 3	M
7) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
8) Loft / roof insulation	20	10	2	1 - 5	15	M
TOTAL CARBON SAVED			**47**	**18.65 – 27.65**		
Deptford Town Hall						
1) Window repair / replacement	20	20	4	10 - 40	15	M
2) Lighting upgrade / replacement	50	40	20	15	5	H
3) AC Inspection	UQ*	10	UQ*	FOC	0	H
4) AHU Inspection	UQ*	< 10	UQ*	.2	1	H
VSDs	20 - 40	10	2 – 4	2	2	M
5) Rainwater harvesting	UQ*	UQ*	UQ*	2	2	M
6) TRVs	30	40	12	1	1 – 2	H
7) Draught stripping doors	15	< 10	1	.5	2 – 3	H
8) Pipework Insulation	15	10	1	1	2 - 3	M
9) Replace hand dryers	40	1	1	1	2 - 3	M
TOTAL CARBON SAVED			**41 - 45**	**32.7 – 62.7**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Laurie Grove Baths						
1) Rainwater harvesting	UQ*	UQ*	UQ*	2 – 3	2 – 3	M
2) Well re-instigation	UQ*	UQ*	UQ*	TBC	TBC	M
3) Lighting replacement – inc daylight sensors in baths	50	50	25	10 – 15	4	H
4) Window repair / replacement	20	15	3	10	10	M
5) Skylight double glazing	35	30	10	10	< 10	M
6) Loft insulation	25	10	2	.5	1	H
7) Draught stripping doors	15	10	1	.5	2 – 3	H
8) Pipework Insulation	15	10	1	1	2 – 3	M
9) Replace hand dryers	40	1	1	1	2 - 3	M
TOTAL CARBON SAVED			**43**	**35 - 41**		
Laurie Grove & Dixon Road Houses						
1) Loft insulation	25	15	3	8	1	H
2) Window repair / replacement	20	15	3	30	10	H
3) Draught stripping	15	10	1	.5	2	H
4) Rainwater harvesting	UQ*	UQ*	UQ*	5	2 – 3	M
5) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
6) Lighting upgrade / replacement, including PIR in kitchens WCs etc	50	30	15	15	5	H

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
7) Boiler timer controls	10 - 20	< 10	1 – 2	.2	2 – 5	H
8) Pipework Insulation	15	10	1	.1	2 - 3	M
TOTAL CARBON SAVED			**24 - 25**	**60.6**		
Ben Pimlott Building						
1) Replace existing DHW system	50 - 60	20	10 – 12	30	10	H
2) Install additional PIR sensors for movement and daylight	30	20	6	6	4 – 5	H
3) Re-programme lighting controls	10	< 10	1	FOC	0	H
4) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
5) Replace hand dryers	20	10	2	4	2 - 3	M
TOTAL CARBON SAVED			**19 - 21**	**42**		
41, 43 & 47 Lewisham Way						
1) Upgrade / replace lighting	50	35	17	5	3	H
2) Upgrade / install pipework insulation	10	10	1	.1	5	L
3) Double glazing to all windows	30	25	7	40	10 - 15	H
4) Loft insulation	25	20	5	2 - 3	5	M
5) TRVs	30	25	7	1	1	H
6) Cavity wall insulation	25	15	3	2	3	M
7) Fit timers to WC lobby electric panels heaters	10	< 10	1	.05	2	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
8) Draught strip doors	10	< 10	1	.02	1	H
TOTAL CARBON SAVED			**42**	**50.17 – 51.17**		
30 to 40 Lewisham Way						
1) Upgrade / replace lighting	50	30	15	7 – 10	3	H
2) Upgrade / install pipework insulation	10	10	1	.3	5	L
3) Double glazing to relevant windows	30	< 10	3	30	10 - 15	H
4) Upgrade loft insulation	25	10	2	2 - 3	5	M
5) TRVs	30	20	6	1	1	H
6) Cavity wall insulation	25	20	5	4	3 - 5	M
7) Draught strip doors	10	< 10	1	.02	1	H
8) Remove radiator covers	10	10	1	FOC	n/a	H
9) Fit door closer to rear entrance to 32 LW	10	< 10	1	.1	2 - 3	H
10) Fit timers / controls to numerous extract fans	5 - 10	10	1 – 5	.2	3 – 5	M
11) AC Inspection	UQ*	10	UQ*	FOC	UQ*	H
12) Fit tamper-proof thermostat in stair lobby	10	30	3	.05	1	H
TOTAL CARBON SAVED			**39 - 44**	**44.57 – 48.57**		
302 to 314 New Cross Road						
1) Excluded due to complete refurbishment / rebuild required						

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
St James Halls						
1) TRVs in used areas	30	20	6	.5	1	H
2) T8 to T5 conversion fittings	50	30	15	.5	2	M
No other options have been considered for this building due to pending demolition within the next few years						
TOTAL CARBON SAVED			**21**	**1**		
Loring Halls						
1) Sub-meter each flat / room	UQ*	UQ*	UQ*	10	UQ*	L
2) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
3) Window repairs to make them all fit properly, including vandal proof restrictors	20	25	5	10 - 15	5 – 10	H
4) Loft insulation	20	15	3	3	2 - 5	H
TOTAL CARBON SAVED			**8**	**25 - 30**		
Batavia Mews						
1) Replace kitchen lighting	50	5	2	1	3	H
2) TRVs	30	40	12	1.6	1	H
3) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
4) Upgrade external floodlighting to LED	60	< 5	3	2	3	M
TOTAL CARBON SAVED			**17**	**6.6**		

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
Dean House						
1) PIR communal and flat lobby lighting	30	10	3	2	2	H
2) TRVs	30	25	7	1.3	1	H
3) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
4) Pipework insulation	30	10	3	4	2	H
5) Consider having one boiler for heating, and one for hot water for whole building	30	40	12	20	5	M
6) Solar hot water	40	20	8	30	10	M
7) Sub meter each flat / room	UQ*	UQ*	UQ*	5 - 10	UQ*	M
TOTAL CARBON SAVED			**33**	**64.3**		
Surrey House						
Main House						
1) Replace lighting in the lower ground classroom	50	10	5	2	2	M
2) Install solar hot water system for upper kitchens	50	5	2.5	3	5 - 10	M
3) Upgrade loft insulation	20	10	2	.5	2	M
4) Move heating thermostats away from un-occupied spaces	10	10	1	.5	5	M
Main Halls						
1) Reduce number of bathroom/shower room extract fans and fit humidistats	50	15	7.5	2	2	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
2) Rationalise and reduce number of light fittings in kitchen	50	10	5	2	2	H
3) Install PIR/photocell on communal area lighting	30	20	6	2	3	M
Halls Annexe						
1) Upgrade loft insulation	10	15	1.5	.5	2	M
2) Pipework Insulation	15	15	2	1	1	H
3) Install PIR/photocell on communal area lighting	30	20	6	2	3	M
Whole Of Surrey House						
1) TRVs to relevant areas	30	30	9	3	1	H
2) Replace all GLS lamps with Compact Florescent (CFL)	70	20	14	.1	1	H
3) Install double glazing (exc annexe)	30	30	9	100	15	M
4) Install variable speed drives on pumps	15	15	2	2	2	M
TOTAL CARBON SAVED			72	120.6		
Chesterman House						
1) Pipework insulation	40	30	12	5	2	H
2) TRVs	30	30	9	1.2	1	H
3) Fill holes in wall/roof junction	10	15	1	2	3	M
4) Insulate ceilings	20	15	3	2	2 - 3	M
5) Lighting changes to kitchens	50	10	5	3	3	H

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
6) Draught strip doors	10	10	1	.2	5	M
7) PIR communal and flat lobby lighting	30	10	3	2	2	H
6) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	2	1	M
7) Solar hot water	40	40	16	50	10 – 15	M
8) Sub meter each flat / room	UQ*	UQ*	UQ*	5 - 10	UQ*	M
TOTAL CARBON SAVED			**48**	**72.4 – 77.4**		
Raymont Halls						
Raymont						
1) Install photocell to top floor communal lighting	30	5	1	.2	2	M
2) Replace boilers	20	40	8	30	3	M
3) Install PIR/photocell in kitchens for lighting	30	10	3	1	2	H
4) Install humidstats to control kitchen fans	10	10	1	1	5	L
5) Fit VSDs to pumps	15	15	2	2	3	M
Edgecombe Hall						
1) Install double glazing	25	20	5	20	10	H
2) Install loft insulation	25	10	2	.5	5	M
3) Pipework insulation	15	10	1	1	3	M
4) Upgrade lighting in communal areas	50	10	5	2	3	H
5) Install double glazing in kitchen	25	5	1	5	10	M
6) Install TRVS in dining room	30	1	1	.1	4	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
7) Turn off PCs when not in use	20	5	1	FOC	0	H
8) Replace GLS with CFL	70	2	1	.1	1	H
9) PIR/photocell in ground floor toilets	30	2	1	.1	2	M
Manse Hall						
1) Install double glazing	25	20	5	20	10	H
2) Install loft insulation	25	10	2	.5	5	M
3) Pipework insulation	15	10	1	1	3	M
4) Upgrade lighting in communal areas	50	10	5	2	3	H
5) Replace GLS with CFL	70	2	1	.1	1	H
TOTAL CARBON SAVED			47	86.6		
Chaplaincy Service						
1) Replace lighting inc PIR	50	50	25	.2	1	H
2) Change exterior ltg controls to photocell / timeclock	50	50	25	.3	1	H
3) TRVs	30	50	15	.05	1	H
TOTAL CARBON SAVED			**65**	**.55**		
Loring Sports Ground						
1) Replace / upgrade remaining lighting, including exterior lights, and replacing GLS lamps	50	60	30	1	3	M

Building Name	Est. Carbon Saving (%)	Est. of existing contribu-tion of carbon to this building	Percent of building carbon saved	Est. Cost (£) (,000)	Est. Payback (Years)	Priority (High, Med, Low)
2) Thermostatic heating controls for pavilion	30	40	12	.2	2	M
3) DHW on time clock rather than 24/7	30	40	12	1	1	H
4) Secondary glazing for changing rooms	20	20	4	5	10	M
5) Install suitable double glazing to flats	25	20	4	10	10 - 15	M
6) Cavity wall insulation to flats / male changing room	20	20	4	1	2	M
7) Replace cisterns with smaller capacity & dual flush	UQ*	UQ*	UQ*	1	3	M
TOTAL CARBON SAVED			**66**	**19.2**		
Average Savings Across Campus			**35% to 37%**	**£1.35M to £1.48M**		
Campus Wide						
1) District Heating Network	TBC	TBC	TBC	TBC	TBC	H
2) PV on RHB, BPB, LW, WHB, NAB	TBC	TBC	TBC	100 – 200	10 – 15	L
3) PC Power management	30 - 40	< 5 - 30	12	TBC	1 – 5	H
4) Printers – removal of desk-top and change all to multi-function devices	UQ*	UQ*	UQ*	TBC	TBC	H
5) Reduce heating set point to 20°C	10	40	4	FOC	0	H
6) Increase cooling set point to 24°C	10	10	1	FOC	0	H

*UQ = Unquantifiable savings due to complexity of calculations

Energy Breakdown for building:

Energy Use	**Approx % of total energy use¬**
Heating	35 - 45%
Lighting	25 - 35%
ICT	15%
Pumps, fans, AHUs etc	5%
A/C	1 – 10%

¬ The percentage varies depending on the building and its use.

8. Implementation Plans

To show its commitment to reducing the environmental impact of Goldsmiths, an amount of circa £400,000 was set aside as a ring-fenced budget for environmental improvement works. This amount was decided upon based on the initial Higher Education Carbon Management Programme drawn up by the Carbon Trust. Some of this money has been used already in implementing some of the original suggestions, such as a trial of thermostatic radiator valves, valve insulation jackets, a start at automatic meter reading and an attempt at lighting modifications. While there is still money left in this ring-fenced budget, it is acknowledged it will run out. However, when more funding is required, then additional funding will be made available on a case by case basis.

One of the roles of the Energy & Environmental Manager has been to fully investigate all buildings on campus for the purposes of this report, with a view to identifying priority savings. There are several items that have already been implemented as part of this, and the previous plan. The implementation of the thermostatic radiator valves across campus has now been actioned following the trial building proving successful. This project will be completed across all 90 buildings by the end of the summer 2011.

Another project identified in this plan, and now implemented is to upgrade / install loft insulation to the many houses owned by Goldsmiths. This has happened using a sustainable material called Warmcell, which is recycled newspaper. The next project for implementation is the upgrading / replacing of all light fittings across campus. This will start with a trial in three buildings to prove the effectiveness of the changes. Once these are proven, changes will be made across campus.

Within the first two years of this plan, various “quick wins” will be implemented. This will include such things as draught stripping doors and windows, installing secondary glazing in North facing areas, replacing heating timers to enable better control, pipework insulation, variable speed drives, boiler optimisation controls, air conditioning inspections including implementing report recommendations and computer power management changes. For more complex and expensive works, these will require more input from other members of estates staff, including seeking additional funds or outside funding where relevant. This is not say the larger schemes will be ignored, but due to the potential high costs involved, these will naturally take longer to implement.

Another part of the implementation of the carbon management plan is to get a proper understanding of the amount of carbon currently emitted by Goldsmiths. As already covered, the EMS figures have historically not been accurate. As a way to provide better EMS and therefore carbon figures, manual reads have been taken of every single fiscal water, gas and electricity meter at the end of the academic year. This exercise will be repeated at the end of the next academic year, and so on until the meter readings are all automated. The fitting of automatic meter readings has already been started at Goldsmiths, but with around 180 meters to be read, this is not a financially or practically viable solution at this time.

In addition to making physical changes to the Goldsmiths estate, there are other low or no-cost options such as management systems and plans, and cultural changes that can be implemented to help reduce carbon emissions. Such systems include: building upon the existing Carbon Champions Network; ensuring all staff and students are aware of the energy and financial implications of their actions; developing and implementing relevant policies such as sustainable construction, sustainable procurement and green transport plans; further improvement in space utilisation; using inter-departmental league tables to promote energy savings; implementing a building temperature policy.

While some of the above opportunities fall outside the Scope 1 and 2 emissions, they are still items that need to be addressed by Goldsmiths to reduce its environmental impact. Further measures also include: increasing rainwater harvesting; increasing recycling rates; further integration of sustainability in the learning and teaching of courses; reducing printed papers and circulars.

9. Governance & Progress Monitoring

This plan has Senior Management Team and Council approval as this plan forms an important part of Goldsmiths' commitment to reducing its environmental impact.

Progress on the previous carbon management plan has been reported regularly to the Goldsmiths Environmental and Sustainability Sub-Committee, a group which reports into the Estates Committee. The Estates Committee reports directly to Council, including the Warden. This new Carbon Management Plan will also be reported on in the same way.