

# **Carbon Management Plan**

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2015/16 Update

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### Introduction

King's College London aims to be exceptional in all that it does encompassing in its vision overcoming some of the world's great challenges. In recognition of its role in service to society and what is required to remain a world leading university, King's has made significant sustainability commitments, including being one of the initial signatories of the Paris Pledge for Action<sup>1</sup> on climate change which has committed King's to working to keep global temperature rise under 2 degrees and a commitment to be carbon free by 2025, by which time the net emissions from our use of fossil fuels will be zero.

In line with global carbon reduction targets and the UK university sector, King's has set a challenging absolute 43% carbon reduction target to be achieved by 2020 (from a 2005/06 baseline). So far, despite growth in staff and student numbers, we have consistently decoupled our growth as a university from our environmental impacts. These impressive reductions have been enabled, in part, by the introduction of LED lighting in many of our buildings, pioneering work in laboratory sustainability and significant increases in the amount of low-carbon energy we use to power our teaching and research.

King's Vision 2029 states that we "will continue to decrease the carbon intensity of our business as part of our commitment to reduce our emissions and strengthen society's ability to deal with the impacts of climate change".

### Management Summary

King's College London maintains a carbon management plan to guide the University's implementation of carbon reduction projects in line with the Energy and Carbon policy. This document is the 2015-16 annual revision of the University's 2010 – 2020 Carbon Management Plan.

King's carbon target is currently under review following the University's commitment to be carbon free by 2025.

King's is making progress, showing a 26% reduction against our baseline, however, significant work will required to meet the 2020 target

King's continues to invest in energy efficiency using Salix and ring fenced budgets for projects and has procedures for major projects and top-up funding.

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<sup>1</sup> This requires "taking concrete steps now... to reduce greenhouse gas emissions to a safe level and build resilience against those changes already occurring"; <http://www.kcl.ac.uk/newsevents/news/newsrecords/2015/December/Kings-signs-Paris-Pledge-for-Action.aspx>

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### Headline targets

Major Commitments	Summary of progress
2020 – HEFCE Target of an absolute reduction of 43% by 2020 against the 2005/06 baseline	<ul style="list-style-type: none"> <li>25.5% reduction</li> </ul>
2025 – King's Carbon Free	<ul style="list-style-type: none"> <li>New commitment to align with the Paris Agreement commitment will require zero emissions by 2030-2050 to achieve the 1.5 °C limit increase in global CO<sub>2</sub></li> </ul>
Scope	<p>1 &amp; 2 carbon emissions</p> <ul style="list-style-type: none"> <li>KCL owned buildings</li> <li>NHS Trust embedded space (except when utility charges are apportioned)</li> <li>University residences</li> </ul> <p>Scope 3 emissions</p> <ul style="list-style-type: none"> <li>Transport</li> <li>Waste</li> <li>Water</li> <li>Processes improving to account for additional sources</li> </ul>

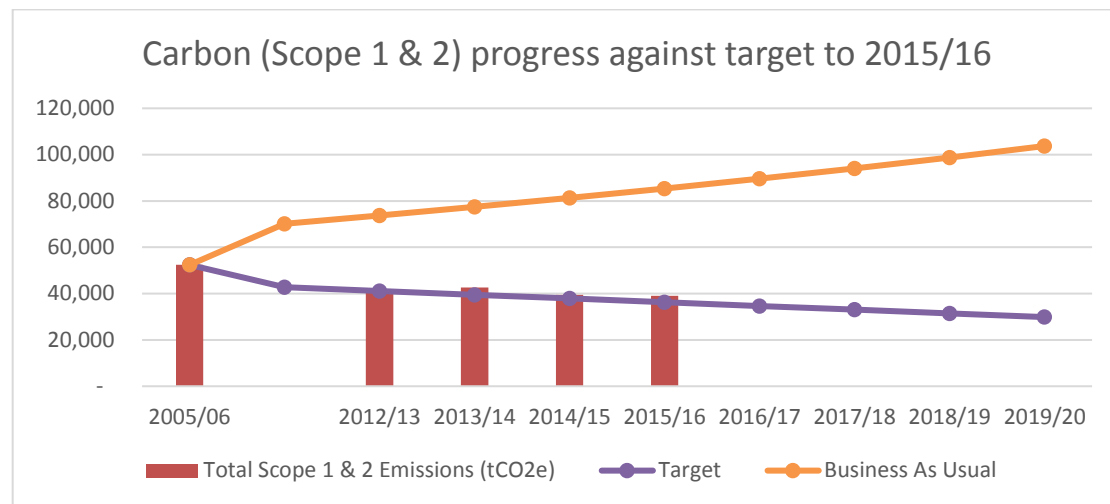
### Performance Review

	2005/6	2014/15	2015/16	Change on Baseline	Change from last year
<b>tCO<sub>2</sub> (scope 1&amp;2)</b>	52,389	39,416	39,013	-26%	-1%
<b>Total Staff (FTE)</b>	6,234	6,081	6,344	2%	4%
<b>Students (FTE)</b>	19,289	22,148	23,019	19%	4%
<b>Turnover (£000)</b>	387,951	684,225	738,286	90%	7%
<b>GIA (m<sup>2</sup>)</b>	407,093	408,123	420,640	3%	3%

Note: King's has rebased lined following a review of processes and improved data improving accounting for embedded spaces.

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### Performance Against Baseline



King's College London continues to make progress towards our 2020 target however, has made significant improvements against a business as usual scenario factoring the University's growth plans.

King's has revised the baseline as changes in methodologies, improvements in the accuracy, or discovery of previous errors have triggered a recalculation. This has been due to improvements in the GSTT data.

### Work Streams

This section provides a brief update on main projects by tranche showing overall contribution to the baseline, please see the annex below for full details of individual projects and costs.

Year	Tranche	t.CO2	Of Baseline	Cost
2015	Delivered	536	1.00%	590,364
2016	In Delivery	1,839	3.40%	4,396,602
2017	Pipeline	437	0.80%	170,429

### Capital Projects

The sustainable construction or refurbishment of buildings and infrastructure is fundamental to achieving King's vision for sustainability by driving a reduction in operational impacts including costs and carbon, whilst providing enriched teaching and learning facilities.

The University's aim is to originate, design, operate and maintain environmentally sustainable facilities. To achieve this, the University requires that design teams:

- Use sustainable design principles, integrate Passive Design and performance modelling
- Consider the whole life cost of the building/project

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- Contribute to achieving King's targets
- Achieve or exceed required BREEAM ratings

The sustainability team continue to work with capital projects to embed sustainability in works and address the challenge in transforming the Estate to net zero buildings.

## Investment

King's will continue make use of Salix funding in addition to a ring fenced budget for energy efficiency and carbon reduction projects. Further funding will be made available as requested via business case for major projects and programmes. Continued resource and effort is required to manage King's utilities and carbon reduction including surveys.

The 2014/15 Carbon Management Plan update outlined that an investment minimum of £11,500,000 at current costs would be required to meet the current target. This estimate remains on track.

## Sustainability

Warp It, the furniture and equipment re-use system at King's, has grown impressively. Since it was launched, over 300 users have helped to save over £50,000 in procurement costs and prevented over 8.5 tonnes of waste.

These examples – among many others – have resulted in King's achieving the ISO 14001 Standard across all our campuses for environmental management. A particularly impressive achievement given the size and complexity of our estate.

The PLUS Alliance has begun developing cross-border research into sustainability solutions and the world-leading work undertaken by the Environmental Research Group continues to inform the public policy response to the persistently high levels of Air Pollution in London and throughout the UK. King's hosted members of the Global Consortium for Sustainability Outcomes to discuss sustainability solutions to energy, water and waste. The meeting resulted in King's becoming part of a collective 'living lab' to test energy-saving solutions to hot water provision.

King's has also endorsed a new Socially Responsible Investment Policy following a holistic and considered review process involving student campaigners, academic staff and members of the Senior Executive Team. This new policy will see the university endowment gradually phase its investment out of companies involved in the extraction of fossil fuels and increase our investment into low-carbon and ethical funds. For further information, please see the statement by Chris Mottershead, Senior Vice President (Quality, Strategy and Innovation) on <https://www.kcl.ac.uk/newsevents/news/newsrecords/2017/03-March/Agreement-between-King's-management-and-Kings-College-Climate-Emergency.aspx>.

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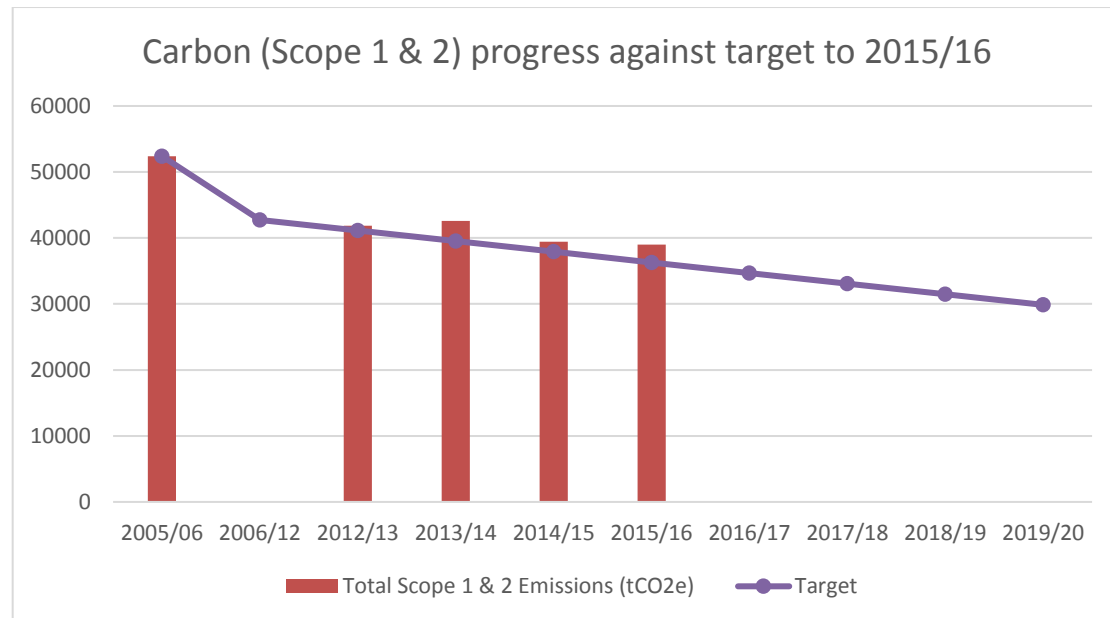
### Governance and Resources

King's College Energy team works within Estates & Facilities under Gordon White, Head of Asset Improvement. The Directorate is led by Nick O'Donnell MRICS MCIBSE IEng. The Real Estate Management and Capital Projects team meet the academic needs of the College and Estates strategy. This has a broad portfolio of responsibilities which range from security and daily cleaning and mail services, to small building projects and creating and sustaining a safe and healthy environment for our students and staff.

Energy Manager (Interim)	Ben Monson
Energy Coordinator	Karen Shaw
Research Efficiency Manager	Martin Farley
Research Efficiency Officer	Tytus Murphy
Email	energy@kcl.ac.uk

## Annex

### Performance to date 2015/16



### Projects

A continued focus will be required to build on the project register by way of site surveys and audits. This will strengthen the project pipeline, ensuring that we can meet our commitments to reduce carbon emission.

The tables below show energy/carbon reduction projects specifically designed for Salix.



## Salix Project List – Delivered 2015/16

Project Title	Salix Fund	Cost	Total Annual kWh Saved	Total Annual Cost Saved	Total Annual t.CO2 Savings	£/Tonne CO2 Saved	Payback
IOPPN Basement and external lighting	RGF 1	38,187	75,598	9,374	38	47	4.5
Britannia House external and circulation LEDs	RGF 1	33,603	73,774	8,927	40	57	4.3
Britannia House offices and laboratory LEDs	RGF 1	51,277	101,760	12,313	55	63	4.8
Drying Cabinets Part 1	RGF 1	20,159	40,040	4,404	20	79	4.9
JBC Lighting	RGF 4	262,374	325,425	39,376	175	175	6.7
Wolfson wing LED conversion	RGF 4	38,304	117,472	14,214	63	63	2.7
JCMB LED retrofit	RGF 4	31,264	54,576	6,822	29	29	4.9
JCMB Staircase LED lighting	RGF 4	10,649	21,791	2,724	12	12	4.6
Installation of Savacontrol voltage optimisation units	RGF 4	38,279	-	-	-	0	-
Drying Cabinet Exchange	RGF 4	56,073	102,960	12,870	55	55	4.4
Pipework Insulation	RGF 4	10,195	265,636	7,969	49	49	1.3
		<b>590,364</b>	<b>1,179,032</b>	<b>118,993</b>	<b>536</b>	<b>630</b>	<b>4.3</b>

## Salix Project List – In Delivery 2016/17

Project Title	Salix Fund	Cost	Total Annual kWh Saved	Total Annual Cost Saved	Total Annual t.CO2 Savings	£/Tonne CO2 Saved	Payback
Stamford Street Gym Lighting replacement basement & Ground floor - LED lighting	RGF 4	39,288	46,592	5,964	23	68	6.7
Strand Building staircase and lobby LED lighting -	RGF 4	84,786	106,537	13,637	53	64	6.2
Fume Cupboard VAV installation	RGF 4	10,940	39,100	5,005	20	54	2.2
Mew Malden LED	RGF 4	13,103	44,066	5,640	22	24	2.3
		<b>148,117</b>	<b>236,295</b>	<b>30,246</b>	<b>118</b>	<b>210</b>	<b>4.4</b>

\* Not all data available via Salix.

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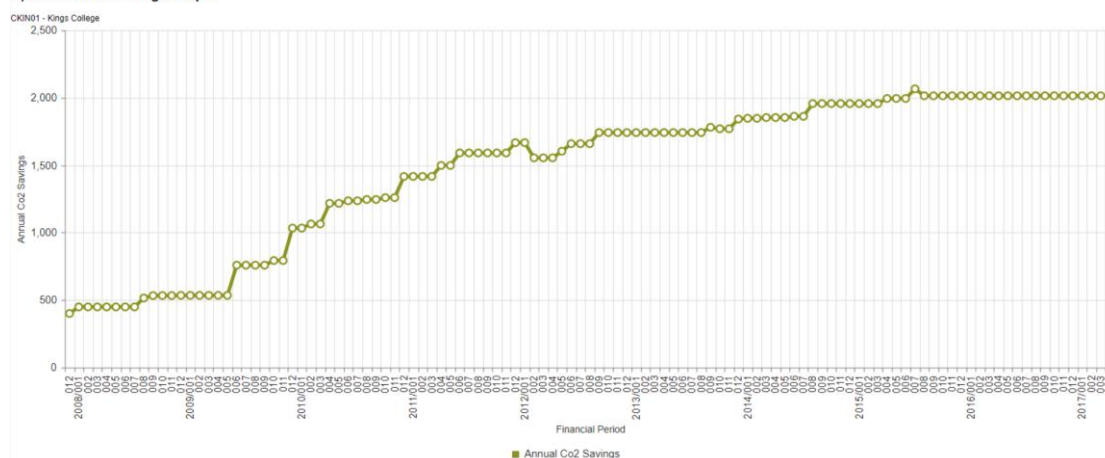
### Salix Project List – Pipeline 2017/18

Project Title	Salix Fund	Cost	Total Annual kWh Saved	Total Annual Cost Saved	Total Annual t.CO2 Savings	£/Tonne CO2 Saved	Payback
Strand Safra Lecture Theatre - LED conversion	RGF 1	38,000	55,717	7,243	27.88	55	5.2
Strand Basements - LED conversion	RGF 1	75,226	165,767	21,550	82.94	36	3.5
Shepherd's House; Academic Centre, 1st & 2nd floors - LED conversion	RGF 1	10,712	19,691	2,461	9.85	43	4.4
Hodgkin Building - LED conversion	RGF 1	46,491	173,632	21,704	86.88	21	2.1
	RGF 4						
		170,429	414,807	52,958	208	156	3.8

At time of release.

### Cumulative Carbon Savings – Salix Projects

H) Annual CO2 Savings Graph



### Maintenance with carbon impacts 2015/16

Maintenance projects delivered in 2015 with a potential impact energy efficiency and carbon emissions are being reassessed.

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### Maintenance with carbon impacts 2016/17

The following table outlines maintenance projects scheduled for delivery in 2016 that will impact energy efficiency and carbon emissions.

Project Title	Cost	Total Annual t.CO2 Savings
Boiler Replacement - Guy's, Doyle's House	19,614	3
Dichroic Unit Replacement - Strand, Chapel	-	17
Old Watch House Repairs	260,585	0
Hodgkin BSU Lighting Control	75,965	23
JCMB chiller life-cycle replacement	182,838	0
Strand Dual Duct Refurbishment	68,634	0
Lower dissection AHU	199,280	0
Hodgkin front rear HWS boiler	93,632	0
IOPPN Restaurant Refurb - Denmark Hill, IoPPN	810,000	0
Strand Sewage Pumps - Strand	86,400	0
JBC Steam Plant - Denmark Hill, JBC	254,850	0
Philosophy Bar refurbishment - Strand	47,100	0
Guy's Wolfson House BMS Integration	15,923	56
Guy's Hodgkin, BMS Upgrade	51,350	296
Rare books AHU - Strand, Maughan Library	82,314	0
Escape lighting install/replacement - Guys	-	0
Strand corridor lighting	-	44
	2,248,485	439

\* Not all costs data available.

\*\* Projects with 0 tonnes of carbon dioxide equivalent provide a carbon saving however, this is impossible to accurately assess/quantify.

### Bouygues EPV

King's College London has entered into an agreement with Bouygues who manage two of the main site buildings through a PFI agreement to significantly improve the energy efficiency of these buildings.

Target Carbon Emission Reductions: Minimum CO<sub>2</sub> saving of 1,282 t.CO<sub>2</sub> for the first annual assessment, 1,511 t.CO<sub>2</sub>, which is a saving of approximately 3% from King's baseline, for the following annual assessment and maintained annually until 2021.

Works to be expected to start in 2016/17 however, likely to roll into the 2017/18 academic year with the first annual assessment of savings expected in Dec-17.

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### Projects

- BMS Measures including:
  - BMS Enhancements & Improvements
  - Toilet Extract fans
  - Non Critical AHU Volumes
  - Add VSD's to pumps on heating/ cooling systems
  - Dynamic Set point rescheduling on Chillers
  - LonDec air compressor controls
- Boiler backend valves
- Pipework and valve insulation / Isocovers
- LED lighting and lighting control
- AHU Upgrades
- Smart Impulse Metering 5 year Opex including some AMR sub-metering

## **CMP Update**



### **Documentation and Approvals**

Web Version (Uncontrolled)

Author: Ben Monson Interim Energy Manager; August 2017

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