King's College London

Interim Carbon Management Plan

2020 - 2023

Contents

1. Management Summary

Climate change mitigation is one of the great challenges for modern society. The basic mechanics of climate change are well understood; the world is warming, much of the warming is due to human emissions of greenhouse gases and the changes are set to accelerate in the future, bringing many and varied impacts around the world.

The UK Government officially committed to take action when it introduced the Climate Change Act: 2008 with a target to cut carbon emissions of 80% by 2050 against 1990 levels with an interim target of 34% by 2020. The 2019 amendment increased this ambition to a 100% reduction by 2050. Since the 2008 CCA, the Government has adopted six legally binding Carbon Budgets, which place a restriction on the total amount of greenhouse gases the UK can emit over a 5-year period.

In this context of a global climate crisis and top-level commitments, King's College London set the ambitious target to be Net Zero Carbon by 2025, and is currently co-developing its holistic Climate Action Plan with students and staff. The present document is an interim plan created in 2020-21, and updated in 2021-22, to ensure carbon reduction continue to take place while the longer term Climate Action Plan is developed and approved. Following the introduction of the Public Sector Decarbonisation Scheme (PSDS) in September 2020, the university was awarded funding to facilitate energy reduction and heat decarbonisation across the estate. A requirement of the funding was the creation of a Heat Decarbonisation Plan (HDP). A radical rethink of the university's methodology was undertaken, and it was decided to create a Climate Action Plan, encompassing scope 1, 2 and 3, amalgamating work done by the King's Climate Action Network and the more technical aspects of the HDP. The university is aiming to publish this in 2022-23. As there is still a requirement for a CMP, this interim document aims to bridge the gap until the new plan is published.

For this interim CMP, the university intends to concentrate on the emissions from gas and oil used (scope 1) and electricity from the grid (scope 2) in all buildings managed by King's. While not operated by King's, we report on emissions from our embedded spaces in NHS Trusts and include them in our targets, and work with NHS Trusts to reduce our collective carbon emissions. We also acknowledge our significant scope 3 emissions, and report them both to HESA and in our own internal and external reporting. The forthcoming Climate Action Plan will set new baselines and further targets for scope 3 emissions.
HEFCE previously recommended that the HE sector aspires to a 43% reduction against the 2005/06 carbon baseline, which it estimated equates to a 34% reduction against 1990 baselines. In 2005/06 King's scope 1 and 2 carbon emissions were 52,389 tCO_2e; a 43% reduction in this figure would be 22,527 tCO_2e; giving a total emissions ceiling in 2020 of 29,862 tCO_2e. King's has exceeded these targets: by 2020, we had already reduced our scope 1 and 2 carbon emissions by 53% compared to our 2005/06 baseline.

In 2018/19 the university's overall scope 1, 2 and 3 emissions were 145,496 tCO2, and in 2019/20 they equalled 172,939 tCO2. The Net Zero Carbon by 2025 target will address all scope 1 and 2 emissions, as well as business travel and operational building emissions from scope 3. A decision on offsetting remaining emissions will be made as part of the Climate

Action Plan. The forthcoming Climate Action Plan will pave the way to achieve this ambition, including actions to reduce our scope 3 emissions.

2. Our net zero carbon vision

King's College London's mission is to make the world a better place. We do this through the impact of our research on solving global challenges; the impact of our education in creating graduates distinguished by their knowledge, wisdom, character, service ethic and global mindset; and through our engagement with the communities in which we are based and the wider world with an ethic of service to society. These principles underpin all our strategic objectives. Because the climate crisis has no place in our vision of a better world, we have to take responsibility and do our part in tackling it.

Our Climate Action Plan, which is being co-created with students and staff from across King's within the King's Climate Action Network, will set out our ambition for achieving this target, as well as maximising the positive impact we can have on climate action through our core activities of research, education and service.

This document sets out our plans to continue reducing carbon emissions until the publication of the Climate Action Plan in 2022-23.

2.1. Background to our 2020 - 2023 Carbon Management Plan

King's College London developed its first Carbon Management Plan (CMP) for 2006-2011 under the terms of the Higher Education Carbon Management Programme, sponsored by the Carbon Trust. The Carbon Management Plan set out the plan for implementing a strategic and operational approach for an energy related CO_2 emissions reduction programme, at all of the university's campuses. In the first Carbon Management Plan (CMP) eleven projects were identified, all of which were implemented. The target saving, through implementation of all identified projects, was 4,025 tonnes CO2 (tCO_2) per annum.

The UK Government's 2008 Climate Change Act (CCA) committed the UK Government to a long-term carbon reduction target of 80% by 2050 against 1990 levels; with an interim target of 34% by 2020. The 2019 amendment increased this ambition to a 100% reduction by 2050. In response to this challenge, the university submitted its second Carbon Management Plan (2010 – 2020) which informed and directed the actions to be undertaken by the university in reducing carbon dioxide (CO_2) emissions during 2010-2020. The Plan identified 17 projects, all of which have been carried out, leading to a target saving of 3,756tCO_2 per annum, which allowed a 53% carbon reduction by 2020 compared to the university's 2005/06 baseline, significantly exceeding the recommended 43% target.

Since the 2008 CCA, the Government has adopted six legally binding Carbon Budgets which place a restriction on the total amount of greenhouse gases the UK can emit over a 5-year period. In the sixth Carbon Budget (April 2021) the Government committed to net zero carbon by 2050, with the milestones of a 68% reduction by 2030, and 78% by 2035 compared to 1990 levels. The government is considering establishing a more ambitious and potentially mandatory emissions reduction target for the wider public and higher education

sectors, such as a 50% reduction by 2030 (BEIS, 2018). King's College London in response to the challenge is now developing its Climate Action Plan and submitting this interim Carbon Management Plan. This will inform and direct the actions taken by the university in reducing CO_2 emissions during 2020-23 while a more comprehensive and detailed action plan is being finalised.

3. Carbon target, sources and current emissions

3.1. Our carbon targets

In accordance with HEFCE guidance, King's initially concentrated on the reduction of emissions of greenhouse gases under its direct control (scopes 1 and 2). HEFCE have recommended a baseline year of 2005/06 for setting the carbon reduction targets for the Higher Education sector, based on research that indicated limited information was available for 1990, the baseline year for the UK Government's 34% carbon reduction commitment in CCA, 2008.

HEFCE have recommended that the HE sector aspires to a 43% reduction against the 2005/06 carbon baseline, which it has estimated equates to a 34% reduction against 1990 baselines. In 2005/06 King's actual scope 1 and 2 carbon emissions were 52,389 tCO_2, a 43% reduction in this figure would be 22,527 tCO_2; giving a total emissions target in 2020 of 29,862 tCO_2.

In line with CCA, 2008 (2019 amendment), we commit to reducing these emissions by 100% by 2050. Moreover, we have committed to become net zero by 2025 for our full scope 1 and 2 emissions, as well as business travel and operational building emissions from scope 3. Our priority will be emissions reduction, with offsetting to be used for unavoidable emissions. The Heat Decarbonisation Plan and Climate Action Plan currently in development will set out our reduction targets and measures, as well as milestones. The milestones proposed by the King's Climate Action Network are a reduction of emissions by 25% by 2025, and 50% by 2030.

For 2021 and 2022-23 we are aiming to further reduce our carbon emissions with aid of the Public Sector Decarbonisation Scheme (PSDS). King's have been awarded £1.7m which will be used on the following projects:

Project	**kWh**		**tCO_2**	
	Electricity	Gas	Electricity	Gas
Chiller Controls	80000	0	19	0
Replacement electric radiators	629548	0	147	0
Wolfson Wing BMS	1341384	281525	313	52
IQ Vision	1241384	12668629	289	2329
Maughan Library BMS	237147	128379	55	24
Total	3,529,463	13,078,533	768	2,381

3.2. Our carbon emission sources

The following sources of carbon emission form the basis of the measured carbon footprint for King's:

Source	Scope	Estimate or Actual
Electricity in buildings and sports grounds	2	Based mainly on actual readings, with any estimated readings being phased out using Automated Meter Reading (AMR).
Gas in buildings, diesel in generators	1	Based on actual readings.
Waste	3	Based on actual disposal information
Water	3	Based on actual metered measurement, or estimates where accurate data is not available
Business Flights	3	Based on data from our preferred travel provider, purchasing cards and expenses
Business travel (surface)	3	Based on data from our preferred travel provider, purchasing cards and expenses
Student Commute	3	Estimate from our travel survey
Staff Commute	3	Estimate from our travel survey
Supply chain	3	Based on estimates from the HESCET tool
Third party residences	3	Based on data from third party providers
Homeworking	3	Based on estimates of staff working from home

Note: We report on emissions from all buildings we occupy, including leased/rented spaces and embedded spaces. We work with our NHS Trust partners to reduce our collective carbon emissions.

3.3. Our current carbon emissions, 2020-21

In 2019/20, the most recent year for which data is available, King's emitted 321,075 tCO_2e as summarised in table 1 below.

Emissions are reported in tonnes CO_2e, and given as both location-based and market-based emissions. Location-based emissions assign the standard UK carbon conversion factor to all electricity emissions regardless of renewable energy purchasing. Market-based emissions assign a zero carbon value to renewable energy purchased through our energy provider or Power Purchase Agreements (PPA).

Scope	Emissions source	Location-based 2020/21emissions	Total location-based	Market-based 2020/21 emissions	Total market-based
1	Gas	10,221	Total scope 1: 10,263	10,221	Total scope 1: 10,263
1	Gas Oil	13		13	
1	Diesel (generators)	7		7	
1	Diesel (vehicles)	5		5	
1	Red diesel (vehicles)	10		10	
1	Petrol (vehicles)	1		1	
1	Fluorinated gas	6		6	
2	Electricity	13,262	Total scope 2: 15,666	5,298	Total scope 2: 7,702
2	Heat	2,404		2,404	
3	Supply Chain	287,236	Total scope 3: 295,146	287,236	Total scope 3: 294,441
3	Business Travel – air	415		415	
3	Business Travel – other	6		6	
3	Water supply and treatment	143		143	
3	Electricity transmission and distribution	1,174		469	
3	Waste management	18		18	
3	Third party residences	2,612		2,612	
3	Staff and student Commuting	553		553	
3	Homeworking	2,989		2,989	
	Total scopes 1, 2		**25,929**		**17,965**
	Total scopes 1, 2, 3		**321,075**		**312,406**

Table 1: Total CO_2e emissions 2020/21

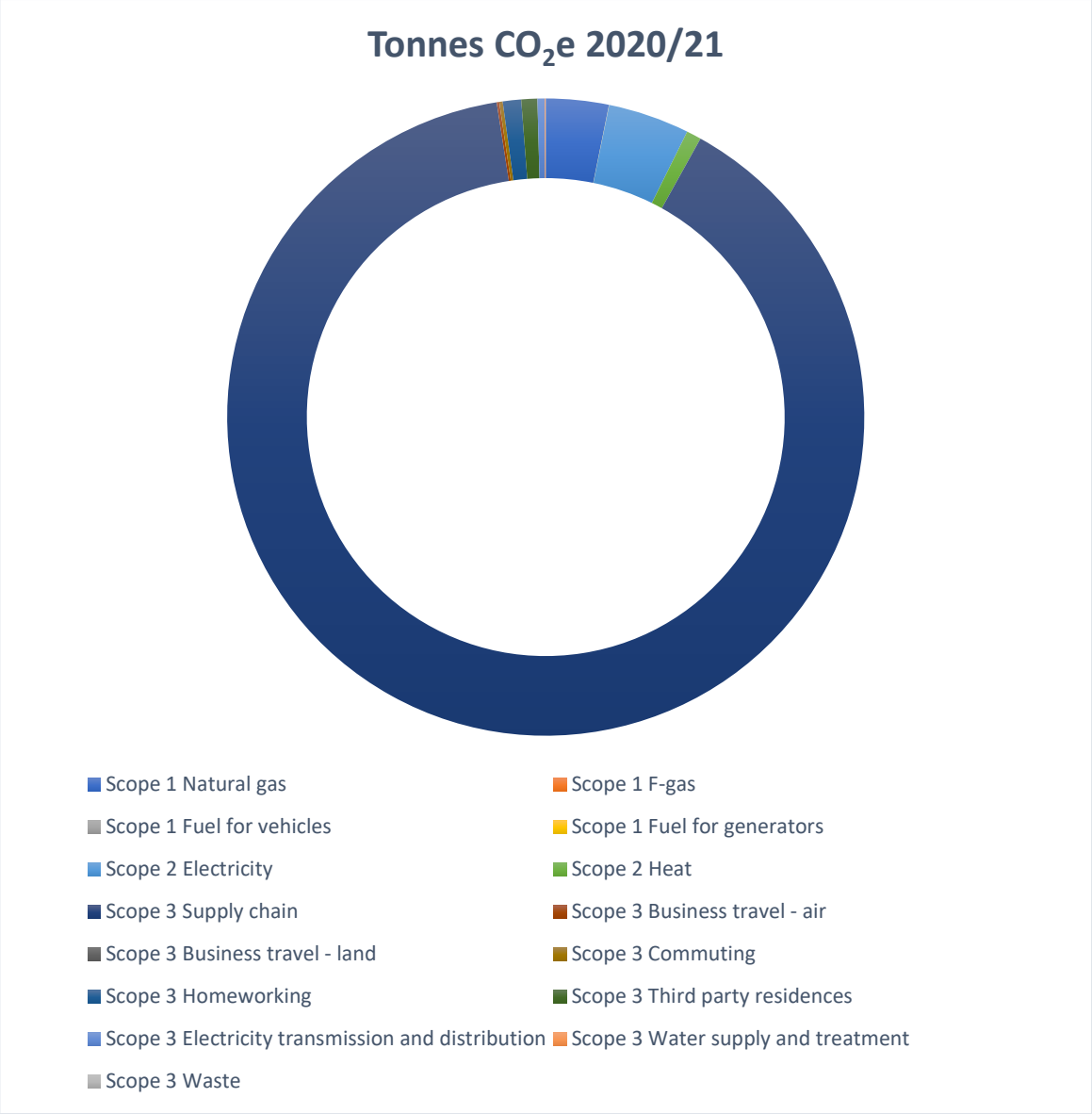

Figure 1: Total location-based CO_2e emissions in 2020/21

We also recognise the emissions impact of student travel at the start and end of term. While no accurate data on this is available at the moment, we estimate this to be approximately 40,000 tonnes of CO_2e per year.

As 2019/20 and 2020/21 have been irregular years due to the COVID-19 pandemic, our carbon emissions for 2018/19 have also been included below for reference. These will form the baseline for our future carbon reduction targets for scopes 1, 2 and 3.

Scope	Emissions source	Location-based 2018/19 emissions	Total location-based	Market-based 2018/19 emissions	Total market-based
1	Gas	10,544.83	Total scope 1: 10,837.3	10,544.83	Total scope 1: 10,837.3
1	Gas Oil	4.88		4.88	
1	Diesel (generators)	24.90		24.90	
1	Diesel (vehicles)	3.11		3.11	
1	Red diesel (vehicles)	24.31		24.31	
1	Petrol (vehicles)	0.38		0.38	
1	Fluorinated gas	234.89		234.89	
2	Electricity	18,098.23	Total scope 2: 20,044.40	6,969.86	Total scope 2: 8,916.03
2	Heat	1,946.17		1,946.17	
3	Supply Chain	106,808	Total scope 3: 126,840	106,808	Total scope 3: 125,895
3	Business Travel – air	6,849.13		6,849.13	
3	Business Travel – other	56.01		56.01	
3	Water supply and treatment	350.23		350.23	
3	Electricity transmission and distribution	1,537		592	
3	Waste management	48.68		48.68	
3	Third party residences	2,972.1		2,972.1	
3	Staff and student Commuting	8,218.69		8,218.69	
	Total scopes 1, 2		**30,881.71**		**19,753.34**
	Total scopes 1, 2, 3		**157,722**		**145,648**

Table 3 - Total CO_2e emissions 2018/19

4 Carbon governance at King's College London

4.1. Carbon responsibility and governance at King's College London

Every individual member of King's staff carries a responsibility for carbon management.

The Energy Risk Management Committee (ERMC) will action, monitor, review and report on carbon reduction activity. The ERMC reports to the Real Estate Operations Board.

Our carbon emissions are included in the university's Balanced Scorecard, which is reported to the university's Senior Management Team and College Council. The Directorate of Estates and Facilities has responsibility for implementing the low carbon agenda, across the areas of construction, energy, waste and water.

In the forthcoming Climate Action Plan, we will set out a governance structure for climate at King's, providing senior leadership and giving our students and staff the opportunity to actively shape and engage with our climate work.

4.2. Risk Management

The Risk of failure of the CMP fall into two main categories:

1. Risks that the Plan may fail to fully deliver due to poor projects design and/or management
2. Managing Risks that the plan may fail to fully deliver due to lack of support and/or funding.

4.2.1. Managing Risks that the Plan may fail to deliver due to poor design

Causes of poor design will be largely due to poor estimates of the effectiveness of measures, leading to a shortfall in the quantity of measures needed or their longevity.
This risk will be managed by

- Using nationally-agreed Carbon Trust or Salix tools for determining the likely effect of measure
- Regular review of the efficacy of installed measures, and expansion of our metering system to understand our performance in more detail.

4.2.2. Managing Risks that the plan may fail to deliver due to lack of support

The key risk that the carbon management plan might fail due to lack of support is if measures are "cherry-picked" to prioritise short payback times, and subsequent funding is refused for elements with longer paybacks.
Scrutiny of progress against CMP actions under the Governance structure will ensure that actions progress is timely.

Annual Progress review

We publicly report on our carbon reduction progress in our annual Environmental Sustainability Report, as well as in the university's Financial Statements. Regular progress reports on our carbon management will be discussed at ERMC and REOB.
The review will cover:

CO_2 savings against target
Lessons learnt and key actions to be taken to improve our performance

5. Our Carbon management activity and actions

5.1 Areas for Carbon reduction

King's College London wishes to position itself as a leader in preparing for the low carbon economy of the future. The King's community is passionate about tackling the climate emergency, and therefore we are developing a Climate Action Plan that represents the ambitions of our students and staff. While our previous CMP focused in particular on buildings emissions, our forthcoming Climate Action Plan will look at 13 key impact areas, defined by the Swedish Climate Framework for Higher Education Institutions.

Our 13 key impact areas:

- Energy consumption
- Property portfolio, new construction and rebuilding
- Business trips
- Commuting
- Waste management

- Purchasing and procurement of goods and services
- Investments
- Carbon sinks
- Education
- Research
- External engagement and societal impacts
- Students

Until the publication of the action plan, we will continue our work in the areas set out by the CMP 2010-2020:

Area	Approach	Responsible Leader
Building energy reduction	Operate efficiently Upgrade systems Improve space Efficiency	Director of Facilities Management (FM) Energy and Environment Manager Director of Space and MIS
Sustainable construction	Efficient new build Efficient Refurbishment	Director of Projects Director of Projects / FM
Travel reduction	Awareness and Feedback	Sustainability Team
Waste and water reduction	Reduce use	Sustainability Team
User action assistance	Awareness and Feedback	Energy Manager

Targets on key scope 3 emission sources are also set within the Environmental Management System, and reported on publicly in our annual Environmental Sustainability Report.
King's will also adopt, comply with, and seek to exceed carbon legislation which currently includes Energy Performance Certification and building Display Energy Certificates.

Reputational drivers towards carbon management include various league table positions and benchmarks, such as the Green League and Times Higher Education Impact Ranking. The university will monitor and seek to improve its position relative to its HE sector peers in these league tables to measure its improvement and relative performance.

5.2. Building energy reduction actions

The scope of buildings to be included in this plan are those building which are owned, leased and managed by the university, and may include 'embedded space' where appropriate, which is recorded in the Estates Management Statistics returns to HEFCE and reported as part of our emissions.

The university's 'embedded space' is located within NHS Trust buildings and forms part of their Carbon Management Plan. The university will work with Guy's and St Thomas' NHS

Foundation Trust, South London and Maudsley NHS Foundation Trust and Kings College London NHS Foundation Trust to reduce our collective carbon emissions.
To support the reduction of energy in running King's buildings and to deliver the university's Energy and Carbon Management Policy (see appendix D), the following actions will be implemented:

Environmental Management System -The university's Environmental Management System (EMS) is accredited to the ISO14001:2015 standard. We will continue to carry out regular internal audits across our campuses, and review our performance at regular EMS Management Review Meetings.

Re-appraisal of Building Energy Management in Highly-Serviced Areas - highly serviced laboratories, such as those in the Medical Schools, can use several times the energy of office space, giving them an importance in carbon management disproportionate to their size. In the first CMP 2005 -2011; auditing and reprogramming of Building Energy Management Systems (BEMS) to office and teaching areas was undertaken and this has shown that carbon emission reductions are achievable. The next phase is to extend the programme to Highly Serviced areas. We will continue to promote our Laboratory Efficiency Assessment Framework (LEAF) scheme, which supports lab users in embedding sustainability into their practices.

Green ICT – We will continue to work with the university's IT team to improve energy efficiency, and report on emissions from the procurement of ICT equipment as part of our supply chain emissions.

Monitoring and Targeting – We monitor energy and water data through SystemsLink, and aim to make further improvements to metering across the Estate.

Space Utilisation - management of the efficient use of space by monitoring statistical and operational ratios is to be undertaken and subsequent development of space management procedures

The proposed reduction targets for scope 1 and 2 emissions are 25% by 2025 and 50% by 2030, from a 2018-19 baseline. These targets will be finalised in our forthcoming Climate Action Plan.

5. 3 Sustainable Construction actions

To further support the reduction of energy in running King's buildings and reduce the environmental impact of construction, the university will use BREEAM at design and post construction on all projects over £1million, achieving a rating of at least "excellent" for new builds and extensions and at least "very good" for refurbishments. In addition, all large-scale fit-out projects should apply the King's Sustainability Guidelines and Checklist, or complete a SKA assessment.

5.4. Travel reduction actions

The university is located in central London and our students and staff travel mainly by public transport, bicycle or walking. The university has a limited number of car parking spaces and

these are mainly designated as either disabled spaces or contractor's vehicles. The university leases a limited fleet of vehicles to transport goods between campuses. These emit approximately 6 tonnes of CO_2e per year (2020/21).

King's will set out to

- promote the use of public transport to and between campuses
- promote cycling through the provision of more facilities
- promote video conferencing over travel

We have set a target to increase the number of bike parking spaces year on year to encourage cycling and reduce commuting emissions.
In addition, the university will take the following actions to support the reduction of carbon emissions due to travel:

1. Monitor and report on our business travel emissions, as well as set further reduction targets in our Climate Action Plan and develop an offsetting policy. A preliminary target to reduce air travel emissions by 10% per year from 2018-19 was recommended by the Sustainable Travel group in 2019-20, and this will be updated in the Climate Action Plan.
2. Enable staff to use more sustainable transport methods by allowing more expensive land-based travel over flights
3. Reduce the need for business travel by providing and encouraging alternative working practices, including video and tele-conferencing.
4. Replace university vehicles (excluding off-road vehicles used at sports grounds) with electric vehicles

5.5. Waste reduction actions

While waste is a small contributor to our overall carbon emissions, we recognise our responsibility to reduce waste and increase recycling rates. Our Environmental Sustainability Policy (2019) commits us to promoting responsible consumption, minimising the amount of waste produced and maximising reuse and recycling where generation of waste cannot be prevented.

Our Waste and Resources Management Policy was reviewed in 2020-21, and aims to:

- Reduce the amount of waste generated across the university, and integrating the principles of whole-life thinking and circular economy into operations and procurement decisions
- Follow the waste hierarchy of prevent, reduce, reuse, recycle, recovery, and disposal
- Eliminating disposable items where there is a clear case and viable alternative
- Providing training, engaging with academic staff to promote teaching and research into sustainable resource and waste management, and working with suppliers to reduce wate

We have a target to send no non-hazardous operational waste to landfill, and to recycle 70% of our waste in 2021-22. Our recycling target will increase to 75% by 2023-24. In addition to our recycling target, we have a target to reduce operational waste by 30% by 2023-24, which, as reducing emissions from waste correlates to reducing waste itself, will reduce waste emissions.

Our new Waste and Resources Strategy and Action Plan will be published in 2022-23, setting out our ambition to reduce waste and promote a circular economy.

5.6. Water reduction actions

King's can further reduce its carbon emissions by reducing its demand for and use of water. Demand will be managed through user engagement and we will focus on reducing water used by looking at using low water sanitary fittings and grey water reuse where possible.
We have set the target to reduce our water consumption (m3 per FTE) by 2% year-on-year from 2013 to 2020, and will continue to aim for this annually.

5.7. User action assistance actions

We will engage our building users in energy efficiency initiatives to further reduce our energy use. Schemes such as Sustainability Champions and LEAF, which involve over 500 members of staff, support this aim. We will also continue to offer our campuses as living labs for student projects, such as those carried out as part of the Department of Geography's 'Sustainability in Practice' module.

6. King's Carbon Projections

As stated in this document, King's were awarded £1.7m from the PSDS to carry out projects in line with the heat decarbonisation of the estate. We are also looking to replace the current fleet of diesel/petrol vehicles with electric vehicles, which will save another 3.49tCO2, although this will increase our Scope 2 emissions as we replace the power source from petrol/diesel to electricity.

6.1. Our 2021 Carbon forecast

The table below shows the baseline used for projections in our previous CMP, as well as the most recent reporting year for emissions (2020-21), and a forecast of emissions in 2021-22. This is based on preliminary data from the 2021-22 academic year, as well as estimates based on expected increases as more activities take place on campus again. A full breakdown of all emissions measured and reported on can be found in section 3.3.

Sources	tCO_2e 2008-09	tCO_2e 2010-11	tCO_2e 2020-21	Expected tCO_2e 2021-22
Energy in Buildings (Electricity)	31,378	32,139	13,626	15,626
Energy in Buildings (Gas)	11,181	8,528	10,221	10,388
Energy in Buildings (Heat)		3,244	2,404	1,766
Energy in Buildings (generators)	2,395	n/a	20	20
Waste to Landfill	10	9.5	18 (all disposal methods)	18 (all disposal methods)
Water	133	126.4	143	143
Business Flights	1,315	n/a	414	828
Business travel (surface)	301	n/a	6	12
Student Commute	2,398	n/a	553	1106
Staff Commute	1,149	n/a		
Total scope	50,260	45,365	25,929 (scopes 1 and 2)	27,836 (scopes 1 and 2)

Appendix A: Carbon Management Projects

A.1 Action Plan 2021 and beyond

The recommendations below are in order of priority with respect to energy management including whole life carbon saving using the Carbon Trust Marginal Abatement Cost Curve Tool.

Number	Recommendations	Estimated annual savings			Estimated cost (£)	Payback period (years)	Timescale	Project Manager
		(£)	tCO2	kWh				
1	IQ Vision BMS Upgrade	£834,486	2,016		519,200	0.62	January 2020 to March 2021	Technical Asset Manager (BMS)
2	Continue with the Installation of sub metering, especially in embedded spaces	77,000	80		200,000	2.6	Ongoing 6-12 months	Energy Manager
3	Install and monitor chiller secondary controls	5,567	6		16,500	1.22	March-April 2021	Energy Manager
4	Replace electric radiators at Stamford St Apartments	66,955	67		290,489	0.11	March-August 2021	Electrical Asset Manager
5	Bush House Roof PV	3,547	4.99		24,000		Autumn 2022	Energy Management Coordinator and Strand Campus Operations
6	LED Lighting Upgrade	880,000			2,700,000	3.6	Ongoing	Energy Manager
7	Electric Vehicle Charging Infrastructure				26,000	1.22	Ongoing	Energy Manager
8	Wolfson Wing CARD BMS	20,000	66		262,500		Ongoing	Technical Asset Manager (BMS)
7	Upgrade BMS in Maughan Library	27,000	49	365526	272,800		Ongoing	Technical Asset Manager (BMS) - this is part of an aggregated project with a payback of 6.34 years

A.2 Project plan for 2021 and beyond

Project 1 IQ Vision BMS Upgrade	
Description and notes	A project to upgrade the existing Trend 963 software to IQVision,
Financial and environmental	Project Investment: £ 519,200
	Emission Reduction: 2016 tonnes
	Costs Savings: £843,486
	Payback (years): 0.62
Benefits	This will enable the various BMS headends to migrate to a VLAN and Cloud storage and will also enable access from anywhere as opposed to the current onsite limitations
Resources	Project funding from Public Sector Decarbonisation Scheme 2020/21 Phase 1
Ownership and accountability	Project Manager: Barry Pinder Technical Asset Manager (BMS)
Ensuring success	Known key success factors Reduction in annual consumption and costs Better stakeholders working environment Principal risks None Main means of risk mitigation • N/a
Performance /	Energy and environmental awareness is part of the university's culture
Timing	January 2020 to March 2021
Sources of information	CTV032 Building Controls

	Project 2: Continue with the Installation of sub metering, especially in embedded spaces
Description and notes	Although most fiscal meters are now remotely read, there are embedded spaces that do not have discrete metering. Working with the relevant Trusts (GSTT and KCH) the aim is to accurate measure and monitor the consumption of KCL occupied spaces where practicable.
Financial and environmental	Project Investment: £ 200,000 Emission Reduction: 80 tonnes Costs Savings: £ 77,000 Payback (years): 2.6
Benefits	A reduction in costs, carbon emissions and maintenance
Resources	• Project costs to be identified Asset improvement budget allocated
Ownership and accountability	Project Leader: Julie Allen Energy Manager
Ensuring success	Known key success factors Reduction in annual consumption and costs Better stakeholders working environment Principal risks None Main means of risk mitigation • N/a
Performance / success measure	Success will be measured through reduction in energy consumption
Timing	• Ongoing, especially as new space coming online.
Sources of information and	GPG 251: Maintaining the Momentum, Sustaining Energy Management

Project 3	Install and monitor chiller secondary controls
Description and notes	Thermostats are incapable of achieving maximum efficiency for the cycles in air conditioning, heat pump and refrigeration systems. At start up, a cooling system produces a large temperature drop using little energy. As the temperature drops closer to its lowest setpoint, the system compressor uses more and more energy to produce that temperature drop. The Smartcool device is installed between the primary controller and the compressor, allowing it to intercept signals from one to the other. The device then determines when and for how long a compressor will run, helping the compressor operating cycle to run in its most efficient state. By helping the compressor run in this more efficient state, the Smartcool device reduces the total run time of the compressor. This in turn reduces the total electrical consumption of the compressor.
Financial and environmental	Project Investment: £ 16,500 Emission Reduction: 6 tonnes Costs Savings: £ 5,567
Benefits	A reduction in costs, carbon emissions and maintenance
Resources	Project funding from Public Sector Decarbonisation Scheme 2020/21 Phase 1
Ownership and accountability	Project Leader: Julie Allen Energy Manager
Ensuring success	Known key success factors Reduction in annual consumption and costs Better stakeholders working environment Principal risks None Main means of risk mitigation
Performance / success measure	Success will be measured through reduction in energy consumption
Timing	• March – April 2021

Project 4	Replace electric radiators at Stamford St Apartments
Description and notes	Although the heating at Stamford St Apartments (SSA) is 100% electrical, the existing radiators are due for replacement. The new radiators are 15% more efficient and have new functionality – aware of when windows and doors are opened and controllable via Bluetooth.
Financial and environmental	Project Investment: £ 290,489 Emission Reduction: 67 tonnes Costs Savings: £ 66,955 Payback (years): 0.11
Benefits	A reduction in costs, carbon emissions and maintenance
Resources	Project funding from Public Sector Decarbonisation Scheme 2020/21 Phase 1
Ownership and accountability	Project Leader: Gary Redman Electrical Asset Manager
Ensuring success	Known key success factors Reduction in annual consumption and costs Better stakeholders environment Principal risks None Main means of risk mitigation • N/a
Performance / success measure	Success will be measured through reduction in energy consumption
Timing	• March – August 2021

Project 5 Bush House Roof PV	
Description and notes	Install solar PV to the roof of Bush House Centre Block
Financial and environmental	Project Investment: £ 24,000
	Emission Reduction: 4.99 tonnes
	Costs Savings: £3,547
Benefits	Increased on-site generation of electricity in line with the Carbon Management Plan. Enhance the Student Experience. Increase and reinforce the current high quality of Bush House facilities.
Resources	Salix
Ownership and accountability	Project Manager: Kautuk Chaddha & Angeliki Karydi
Ensuring success	Ensure the scope is thorough so at tender stage we receive a realistic scope. Have a contractor appointed early Have the contractor appointed early, so enough surveys can be carried out before work commences.
Performance /	Energy and environmental awareness are part of the university's culture
Timing	Autumn 2022

	Project 6 LED Lighting upgrade
Description and notes	Replacement of halogen, CFL and fluorescent lighting with LED equivalents
Financial and environmental	Project Investment: £2.7m Costs Savings: £880,000 per annum Payback (years): 3.6
Benefits	A reduction in costs, carbon emissions and maintenance
Resources	Salix, Asset Improvement budget
Ownership and accountability	Project Leader: Energy Manager
Ensuring success	
Performance / success measure	Success will be measured through reduction in energy consumption
Timing	• Ongoing.
Sources of information and	GPG 251: Maintaining the Momentum, Sustaining Energy Management

Project 7 Electric Vehicle Charging Infrastructure	
Description and notes	• The procurement of EV charges in Guy's Campus, Strand Campus and the Sports grounds • The procurement of a fleet of electric vans for the Colleges internal operations
Financial and environmental	Project Investment: £26,000 for the chargers/ Electric Vans costs pending Emission Reduction: Costs Savings:
Benefits	Kings committed to have at least 75% of its directly controlled fleet to be zero/low emission vehicles by 2018/19. Being a civic University on the heart of London, switching to electric vans is a logical step not only to reach the College's carbon targets but also benefiting the community around us. -A case study based on King's current fleet (by the Kale collective), found that switching over to Electric vans will result in a 64% cut in emissions or approximately 1tonne of C02/year (8% reduction for each diesel van substituted).
Resources	Asset Improvement Budget
Ownership and accountability	Project Leader: Julie Allen Energy Manager
Ensuring success	
Performance / success measure	Completion of installation of charging infrastructure and successful migration to electric vans.
Timing	Ongoing

	Project 8 Wolfson Wing BMS
Description and notes	The BMS at Wolfson is obsolete and in need of complete replacement We will also commence balancing of the HVAC within the environment to ensue the plant operates efficiently
Financial and environmental	Project Investment: £262,500 Emission Reduction: 66 tonnes Costs Savings: £20,000
Benefits	Better environmental controls in a critical laboratory space, enhanced comfort for our colleagues, better energy management
Ownership and accountability	Project Leader: Barry Pinder Technical Asset Manager (BMS)
Ensuring success	
Performance / success measure	Improved environment, fewer complaints
Timing	Ongoing

Project 9 Maughan Library BMS	
Description and notes	The BMS at Maughan Library is obsolete and in need of complete replacement We will also commence balancing of the HVAC within the environment to ensure the plant operates efficiently
Financial and environmental	Project Investment: £272,800 Emission Reduction: 49 tonnes Costs Savings: £27,000
Benefits	Better environmental controls in a critical laboratory space, enhanced comfort for our colleagues, better energy management
Ownership and accountability	Project Leader: Barry Pinder Technical Asset Manager (BMS)
Ensuring success	
Performance / success measure	Improved environment, fewer complaints
Timing	Ongoing

Appendix B - Buildings Energy and Carbon Identified within the Scope of Carbon Management Plan

B1 Electricity

Report Period *12 Months Ending July 2020* **Tonnes CO2 per kWh** 0.00023314

Location	**Consumption** kWh	**Floor Area (m^2)**	**Energy PI (kWh/m2)**	**CO2 PI (kg/m2)**	**CO2 tonnes**
Franklin-Wilkins Building	6,552,656	41,528	158	37	1528
New Hunts House	5938448	17,514	339	79	1384
Henriette Raphael	2,249,112	5,323	423	99	524
Shepherds House	1,824,331	4,621	395	92	425
Hodgkins Building	784,506	13,923	56	13	183
Wolfson House	179,306	6,809	26	6	42
Greenwood Theatre	351,165	3,570	98	23	82
Strand Building	2,420,641	17,837	136	32	564
Institute of Psychiatry	2,107,388	13,509	156	36	491
Kings Building	2,065,006	22,048	94	22	481
Maughan Library	1,545,764	16,772	92	21	360
Great Dover Street Apartments	2,420,973	17,909	135	32	564
Stamford St Apts	1,594,063	13,860	115	27	372
SGDPR Centre	1,314,743	4,692	280	65	307
James Clerk Maxwell Bldg	945,623	10,028	94	22	220
Tower Wing	2,792,596	20,129	139	32	651
Macadam Building	288,059	5,326	54	13	67
Champion	870,790	18,892	46	11	203
FWB Waterloo Bridge wing	200,879	4,822	42	10	47
Addiction Sciences Building	138,184	1,947	71	17	32
Neurology	52,825	1,358	39	9	12
Chesham Building	70,028	2,156	32	8	16
Doyles House	45,258	710	64	15	11
St Thomas Campus	4,597,490	19,597	235	55	1072
170 Strand	53,627	984	54	13	13
Honor Oak Sports	119,184	977	122	28	28
Griffin Sports Ground	26,330	783	34	8	6

Philosophy Building	57,093	1,352	42	10	13
Southwark & Bermondsey Wing	2,363,035	6,352	372	87	551
19 Maunsel Street	3,840	100	35	8	1
CHP BUILDING	7623731	335	22757	5306	1777
BUSH HOUSE - SOUTH EAST WING	1968709	11,962	165	38	459
BUSH HOUSE - CENTRE BLOCK	1952738	15,656	125	29	455
BRITANNIA HOUSE	1361823	2,941	463	108	317
BOROUGH WING (GSTT Call it NGH & Cunliffe Lab)	1203378	4,695	256	60	281
VIRGINIA WOOLF BUILDING	938176	11,956	78	18	219
BUSH HOUSE - NORTH EAST WING	838536	2,643	169	26	195
CENTRE FOR NEUROIMAGING SCIENCES	715309	1,882	151	98	167
SOMERSET HOUSE EAST WING	458154	5,501	98	19	107
LAVINGTON STREET	446547	2,643	215	39	104
CANCER CENTRE	284010	1,220	216	35	66
BECKET HOUSE	275952	2,079	38	23	64
DENTAL INST. DENMARK HILL	265064	2,643	169	287	62
ACADEMIC NEUROSCIENCE CENTRE	263352	1,882	151	50	61
EAST WING, SURREY STREET	79076	669	94	22	15
UNIT 3B QUINTDOWN BUSINESS PARK	62757	792	74	17	14
BUSH HOUSE - MELBOURNE HOUSE	58586	400	118	28	11
39-41 SURREY ST (NORTH WING)	47190	996	45	11	10
NEW MALDEN	44916	2,552	17	4	10
WELLCOME TRUST CLINICAL RESEARCH FACILITY	42120	669	94	22	15
Total	62,903,067	367,988	29,471	7,170	14,659

B2: **Gas**

Report Period 12 Months Ending July 2020

Tonnes CO2 per kWh 0.00018421

Location	**Consumption kWh**	**GIA (m^2)**	**Energy PI (kWh/m2)**	**CO2 PI (CO2 kg/m2)**	**CO2 tonnes**
Franklin-Wilkins Building	8,304,980	41,528	200	37	1530
Kings Building	4,396,669	22,048	199	37	810
HODGKIN BUILDING DIRECT	3,576,250	13,923	257	47	659
New Hunts House DIRECT	3,477,463	17,514	199	37	641
SGDPR Centre	1,443,313	4,692	308	57	266
Weston Education Centre DIRECT	1,157,179	9,251	125	23	213
Maughan Library	1,134,202	16,772	68	12	209
Wolfson House	1,046,830	6,809	154	28	193
Strand Building	16,662	17,837	1	0	3
James Clerk Maxwell Bldg.	952,162	10,028	95	17	175
Institute of Psychiatry	2,636,264	13,509	195	36	486
Shepherds House	1,321,969	4,621	286	53	244
Champion	1,943,847	18,892	103	19	358
Addiction Sciences Building	142,410	1,947	73	13	26
Waterloo Bridge wing	410,092	4,822	85	16	76
Macadam Building	58,643	5,326	11	2	11
Neurology Building	147,354	1,358	109	20	27
New Malden Sports	152,752	996	153	28	28
Bush House Centre	2,654,543	15,656	170	31	489
Henry Wellcome building	103,080	1848	56	10	19
Britannia House	792,754	2,941	270	50	146

Griffin Sports Ground	100,136	783	128	24	18
CHP Building	2,027,042	335	6051	1115	373
James Black Building	2,959,080	8,092	366	67	545
David Goldberg Building IOP	45,503	1602	28	5	8
Maurice Wohl	2,660,195	9546	279	51	490
London Bridge Gym	22,194	1040	21	4	4
St Thomas Campus	5,567,059	19597	284	52	1026
Bush House SEW	960,009	11962	80	15	177
CNS	449,272	1699	264	49	83
127a Borough High St	2948	160	18	3	1
Borough Wing	39053	4695	8	2	7
Bush House NEW	337789	7586	45	8	62
Dental Inst	15183	215	71	13	3
Doyles House	85006	710	120	22	16
Henriette Raphael	65485	5323	12	2	12
Honor Oak Park	137512	977	141	26	25
Old Guys House	4426	920	5	1	1
Philosophy Building	250113	1352	185	34	46
Rayne Inst	203089	2993	68	12	37
Tower Wing	24438	20129	1	0	5
Virginia Woolf Building	332901	11956	28	5	61
19 Maunsel Street	970	100	10	2	0
Wolfson CARD	1361969	3532	386	71	251
Total	**53,435,890**	**347,622**	**11,716**	**2,156**	**9,860**

B3: **Heat**

Report Period 12 Months Ending July 2020

Tonnes CO2 per kWh 0.0000908

Location	**Consumption** kWh	**Floor Area (m^2)**	**Energy PI (kWh/m2)**	**CO2 PI (CO2 kg/m2)**	**CO2 tonnes**
ANC	25046	1220	21	0.19	0.23
Cancer Centre	27765	1882	22152.68	0.13	0.25
Greenwood Theatre	521500	3570	146	1.33	4.74
New Hunts House	2196758	17514	125	1.14	19.95
Old Guys House	982628	920	1068	9.70	8.92
Southwark & Bermondsey Wing	2603711	6352	410	3.72	23.64
Tower Wing	5180890	20129	257	2.34	47.04
Total	**11,538,298**	**51,587**	**223**	**19**	**105**

Appendix C: Carbon Management Matrix - Embedding

	POLICY	RESPONSIBILITY	DATA MANAGEMENT	COMMUNICATION & TRAINING	FINANCE & INVESTMENT	PROCUREMENT	MONITORING & EVALUATION
5 **BEST**	SMART Targets signed off Action plan contains clear goals & regular progress reviews Strategy launched internally & to community	CM is **full** -time responsibility of a **few** people CM integrated in responsibilities of **senior** managers VC support Part of **all** job descriptions	**Quarterly** collation of CO_2 emissions for all sources Data **externally** verified M&T in place for: o Buildings o Waste	All staff & students given formalised CM: o Induction o Training Plan o Communications CM matters **regularly** communicated to: o External community o Key partners	**Granular** & **effective** financing mechanisms for CM projects **Finance representation on CM Team** **Robust** task management mechanism **Ring-fenced fund** for carbon reduction initiatives	**Senior** purchasers consult & adhere to ICLEI's **Procura+** manual & principles Sustainability comprehensively integrated in **tendering** criteria Whole life costing Area-wide procurement	Senior management review CM process Core team regularly reviews CM progress Published externally on website Visible board level review
4	SMART Targets **developed but not** implemented	CM is **full** -time responsibility of an **individual** CM integrated in to responsibilities of department **managers**, not all staff	**Annual** collation of CO_2 emissions for: o Buildings o Transport o waste Data **internally** reviewed	All staff & students given CM: o **Induction** o Communications CM communicated to: o External community o Key partners	Regular financing for CM projects **Some** external financing **Sufficient** task management mechanism	Environmental demands incorporated in tendering Familiarity with **Procura+** **Joint procuring** between HEIs or with LAs.	**Core** team **regularly** reviews CM progress: o Actions o Profile & Targets o New opportunities quantification
3	**Draft** policy Climate Change **reference**	CM is **part** -time responsibility of a **few** people CM responsibility of department champions	**Collation** of CO_2 emissions for limited scope i.e. buildings only	**Environmental** / **energy** group(s) give ad hoc: o Training o Communications	**Ad hoc** financing for CM projects Limited task management No allocated resource	**Whole life** costing occasionally employed Some **pooling** of environmental expertise	CM team review aspects including: o **Policies / Strategies** o Targets o Action Plans
2	No policy Climate Change **aspiration**	CM is **part** -time responsibility of an **individual** No departmental champions	**No CO_2** emissions data compiled Energy data compiled on a regular basis	Regular poster/awareness campaigns **Staff & students** given ad hoc CM: o Communications	Ad hoc financing for CM **related** projects Limited task coordination **resources**	**Green** criteria occasionally considered Products considered in **isolation**	Ad hoc reviews of CM actions progress
1 **Worst**	No policy **No** Climate Change reference	No CM responsibility designation	Not compiled: o CO_2 emissions Estimated billing	No communication or training	No internal financing or funding for CM related projects	No Green consideration No life cycle costing	No CM monitoring

Appendix D: King's policy information

Ethical Investment Policy (2017)

https://www.kcl.ac.uk/governancezone/finance/ethical-investment

Energy and Carbon Management Policy (2016)

https://www.kcl.ac.uk/governancezone/estates/energy-and-carbon-management-policy

Environment and Sustainability Policy (2019)

https://www.kcl.ac.uk/governancezone/estates/environment-and-sustainability-policy

Fairtrade Policy (2021)

https://www.kcl.ac.uk/governancezone/estates/fairtrade-policy

Green Transport Policy (2006)

https://www.kcl.ac.uk/governancezone/estates/green-transport-policy

Travel Policy (2020)

https://www.kcl.ac.uk/governancezone/finance/travel-policy

Socially Responsible Procurement Policy (2019)

https://www.kcl.ac.uk/governancezone/finance/socially-responsible-procurement

Sustainable Food Policy (2021)

https://www.kcl.ac.uk/governancezone/estates/sustainable-food-policy

Waste Management Policy (2021)

https://www.kcl.ac.uk/governancezone/estates/waste-management-policy

Appendix E: King's other relevant reports and strategies

Carbon Management Plans – previous versions

https://www.kcl.ac.uk/aboutkings/strategy/sustainability/policies-strategies/carbon/carbon

Biodiversity Action Plan

https://www.kcl.ac.uk/aboutkings/strategy/pdfs--resources/2018-23-kcl-biodiversity-action-plan.pdf

Sustainability Reports

https://www.kcl.ac.uk/aboutkings/strategy/sustainability/policies-strategies/sustainability-report

Forthcoming:

Climate Action Strategy	Expected: 2022-23
Waste Strategy and Action Plan	Expected: 2022-23