Vice-Chancellor's Foreword

The full implications of climate change are not certain, but according to the Fifth Assessment Report of the United Nations' Intergovernmental Panel on Climate Change[1], there can be no doubt that the climate system is warming. The report confirms that atmospheric concentrations of carbon dioxide have increased to unprecedented levels in the last 800,000 years, and by 40% since pre-industrial times, primarily from fossil fuel and land use change emissions. The report states that human influence on the climate system is clear.

The Paris Agreement negotiated in December 2015[2], set out commitments from 195 countries to take action with the objective of limiting further global warming and working to achieve reductions. The Higher Education sector is well placed to lead carbon reduction and contribute to these efforts, not just through our own management of our resources but through education and research, and as leaders in our community.

Bournemouth University has championed the need for sustainable development and continues to work towards securing a sustainable future, using our fusion of education, research and professional practice. It is important that we act as a role model in managing our own resources, and since the adoption of our Carbon Management Plan in 2010, we have made good progress in reducing the environmental impact of our operations through better energy efficiency and other environmental actions. But there is further to go to reduce our carbon footprint, especially as we continue to grow. Our new buildings will meet demanding environmental standards, and this plan sets out a range of actions that we will take over the next 5 years across all our activities.

We need the BU community (our staff, students and other stakeholders) to engage with this activity to make it happen. I look forward to working with you to ensure that we make our contribution to a sustainable future for everyone.

Professor John Vinney
Vice-Chancellor

[1]Climate Change 2013, The Physical Science Basis, Working Group 1 contribution, New York 2013, Ed: Stocker et al, Cambridge University Press, http://www.ipcc.ch/report/ar5/wg1/

[2] Adopted under the United Nations Framework Convention on Climate Change in December 2015 https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

Carbon Management Plan (2016 – 2020)

1. Background

Bournemouth University recognises that climate change is one of the greatest challenges facing society today. The vast majority of scientists and informed observers accept that evidence shows the Earth is warming and that human activity is making a significant contribution to this.

The UK is the first country in the world to have a long-term framework to cut carbon emissions. The Climate Change Act 2008 set out a legally-binding national target to cut greenhouse gas emissions by at least 34 per cent by 2020, and by at least 80 per cent by 2050 (against a 1990 baseline). In 2015, the Paris agreement required developed and developing countries to set targets to limit their emissions to levels which would see warming of 2°C, with an aspiration of limiting warming to 1.5°C.

HEFCE outlined ambitious sector-level targets, which are in line with national targets but left individual institutions to set their own targets. In 2010, BU published its first Carbon Management Plan (The Plan) following the Higher Education Carbon Management Programme, which set out an organisation-wide strategy for managing carbon emissions to 2015.

BU recognises the importance of reducing its environmental impact and the strategic plan (2013 – 2018) includes a top level commitment to continue to develop, maintain and monitor a credible carbon management plan that will drive our emissions down.

The target was to reduce carbon emissions by 30% by 2015/16 compared to a 2005/06 baseline. In 2015/16, emissions were 16.7% below the baseline, primarily due to an overall 3% reduction in total energy use and a decrease in the UK's grid electricity carbon conversion factor (this reduced from 0.54kg/kWh to 0.50 kg/kWh).

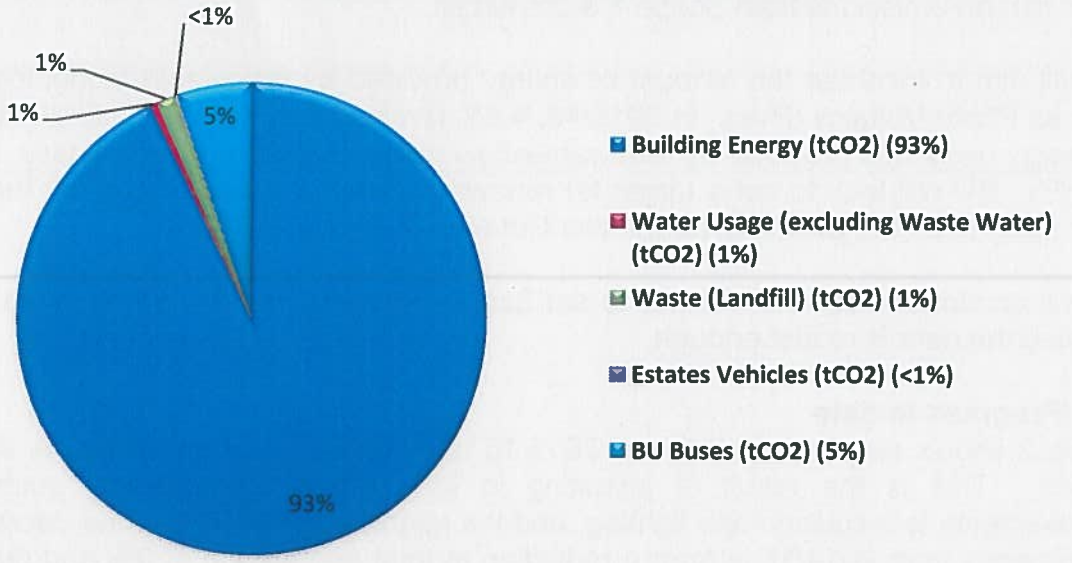
BU did not meet this 30% reduction target due to the growth in its estate (the size of the estate has increased 23% from 2005/6 to 2015/16) and this updated Plan provides a framework to drive progress towards an ambitious absolute 40% reduction target by 2020/21 (based on a 2005/06 baseline).

The Plan forms part of BU's certified Environmental Management System (EMS).

2. Baseline

The 2005/06 baseline of 8,275 tonnes carbon emissions was based on emissions from gas, electricity and water (utilities), the University's fleet transport, Bus for BU buses on designated routes, and waste sent to landfill (See Figure 1). The majority (93%) of the baseline figure comes from heating, cooling and powering our estate.

Figure 1 Breakdown of baseline carbon emissions, 2005/06



3. CMP Scope

The CMP covers the direct (Scopes 1 & 2) and indirect (Scope 3) carbon emissions from all activities at BU's three campuses and BU operated halls of residence. The definitions of Scopes 1, 2 and 3 are shown in Appendix A.

Electricity accounts for about two thirds of energy use and over 80% of the carbon and costs (See Table 1).

Table 1 Energy use, utilities cost and Greenhouse gas Emissions split

	Energy use (kWh p.a.)	Utilities Cost Split (£ p.a.)	Greenhouse Gas Emissions Split (tCO2e p.a.)
Grid Electricity	62.1%	84.4%	82.2%
Natural Gas	35.6%	14.9%	17.8%
Biomass	2.3%	0.7%	-

Note: Biomass is 'outside of scopes' for greenhouse gas reporting.

This Plan focuses on reducing energy use (Scopes 1 & 2), particularly electricity use and also outlines how indirect emissions (Scope 3), from water use, waste, procurement and transport will be minimised.

4. Targets

BU will reduce carbon emissions by 40% (in absolute terms) by the end of the 2020/21 academic year, compared to the baseline year of 2005/6.

Progress will also be measured using metrics, such as emissions per staff and student numbers (FTE); gross internal floor area (m2) and turnover (£M) to show the impact of our growth on carbon emissions.

BU will also develop targets for electricity and gas reduction to support the drive to lower carbon emissions from Scope 1 & 2 sources.

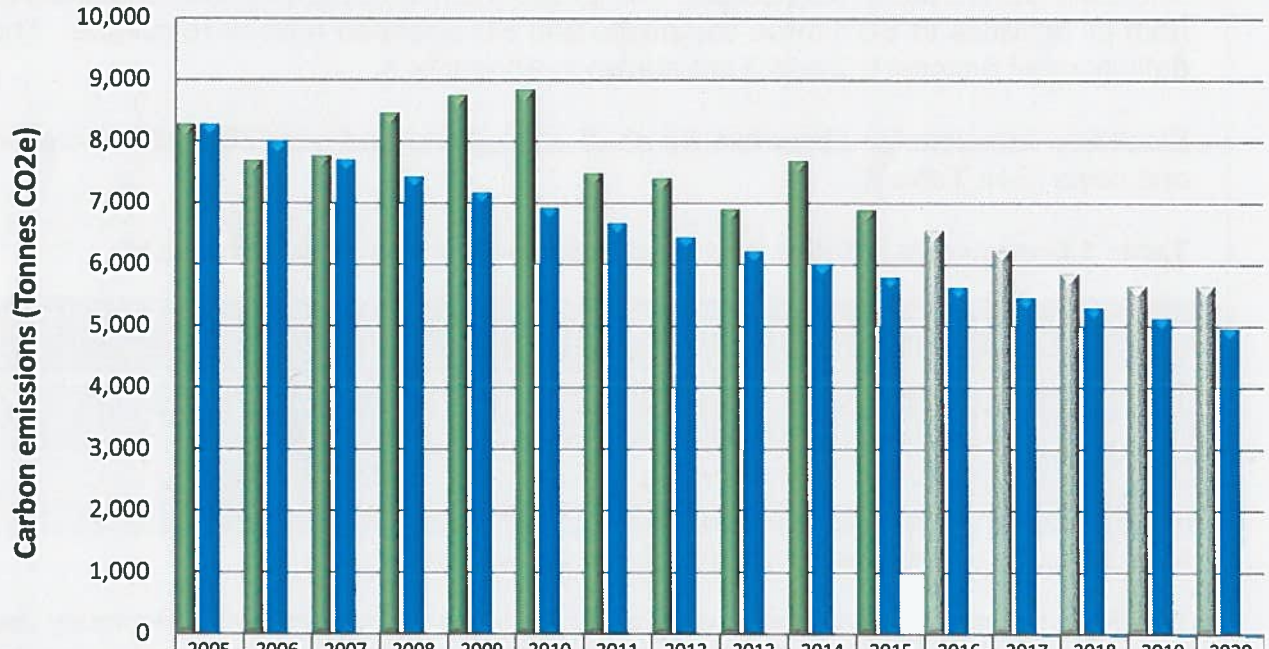
BU will aim to increase the amount of energy provided by renewable technologies, such as Photo Voltaics (PVs). In 2015/16, 4.8% (an increase from 2.9% in 2014/15) of energy used was provided by renewables/low carbon technologies (biomass, PVs & CHP). BU will look to set a target for renewable energy generation in the future, particularly once the provision for the two Gateway Buildings is known.

BU will continue to review whether to set Scope 3 targets and will do so when it is satisfied the data is robust enough.

5. Progress to date

Figure 2 shows carbon emissions in 2015/16 have declined by about 16.7% since 2005/6. This is the result of investing in low carbon technologies, such as improvements to insulation and lighting, and the upgrade to the BMS. The decrease in emissions from 2014/15 is from a reduction in total energy use of 3% and due to the decrease in the UK grid electricity carbon conversion factors.

Figure 2 Actual and predicted carbon emissions from 2005/06 to 2020/21



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total CO2 Emissions	8,275	7,689	7,768	8,470	8,755	8,849	7,483	7,402	6,905	7,690	6,896	6,562	6,246	5,855	5,656	5,656
Target Emissions	8275	7983	7701	7431	7170	6918	6677	6444	6219	6003	5795	5629	5463	5297	5131	4965
% change from base year	0	-7.1	-6.1	2.4	5.8	6.9	-9.6	-10.6	-16.6	-7.1	-16.7	-20.7	-24.5	-29.2	-31.6	-31.6

The 2005/06 to 2015/16 data are actual carbon emissions. The 2016/17 to 2020/21 data are predicted carbon emissions based on the Estates Development Framework (new builds and divestment from buildings) and planned carbon management projects (as of October 2016). The 2020/21, 40% carbon reduction target is represented by the blue column and section 7 covers closing the gap from -31.6% to -40%.

6. Planned Programme of Projects

i) **Building a more efficient estate**

The Sustainable Buildings strategy of Mean – Lean – Green sets out the design philosophy of buildings that need little energy input and energy is used efficiently, before providing low carbon energy solutions to meet the residual energy demand. BU is also committed to commission new buildings so they operate as efficiently as possible.

It is estimated that changes to the estate, as set out in the Estates Development Framework (EDF), should help reduce emissions by about 19% compared to the baseline (See Figure 2). This will be achieved through the new Gateway buildings meeting the Building Research Establishment Environment Assessment Methodology (BREEAM) 'Excellent' standard and EPC 'A' criteria, as a minimum and divesting in old, inefficient buildings. These changes are estimated to deliver a saving of nearly 1,000 tonnes of carbon.

The Energy Centre/district heating scheme for TC was expected to deliver significant operational and carbon savings, but unfortunately the project did not represent good value for money. The estimated investment of £6.1M in the energy centre/district heating scheme might deliver a £135k per annum saving, providing a simple pay back of 45 years. The carbon saving would be about 370 tonnes per annum, delivering a 4.5% saving against the baseline.

However, it is vital a significant amount of the EDF funding (£11M) identified for this project is invested in other low carbon infrastructure projects to ensure BU continues to make progress in cutting carbon emissions.

ii) **Other technological measures**

Energy Conservation Measures (ECMs)

BU will seek opportunities to implement energy and water efficiency schemes. These will be identified through building audits and learning from others. Investment in ECMs of £1.15M is estimated to deliver a saving of just over 480 tonnes of carbon (See Appendix B). An annual programme of ECMs will be identified and implemented. Funding will be primarily through the CMP budget or the Revolving Green Fund (see below).

IT

Improving data centre cooling, raising data centre and communication hub temperature set points, and implementing power management software will deliver energy and carbon savings (2.2% against 2005/06 baseline). The projected investment and carbon savings are shown in Appendix B.

Soft landings/Building Optimisation

The commissioning and optimisation of new buildings could deliver 1.1% carbon saving by ensuring the heating, cooling and ventilation strategies are operated efficiently (See Appendix B).

High Voltage Network Optimisation at Talbot Campus

The Talbot Campus is powered by the University's own 11kV network. The network consists of 5 transformers that deliver low voltage to all buildings. Replacing the transformers with new high efficient units with integrated voltage optimisation will deliver energy and carbon savings (3.1% against 2005/06 baseline). See Appendix B for projected investment and carbon savings.

7. How will we close the remaining gap?

The programme of projects identified should deliver a 31.6% reduction in carbon emissions compared to the baseline. Preliminary studies have identified two large scale renewable energy projects that would close the gap to achieve the overall 40% reduction target (See Appendix C). A medium scale wind turbine at Talbot Campus could deliver a 3.2% reduction in carbon emissions and installing solar car ports to our existing and planned car parks could deliver a 6% saving against the 2005/06 baseline.

BU will continue to look for opportunities that may present themselves with developments and advances in energy efficiencies and renewable technologies.

Appendix C provides an overview of the large scale renewable projects that could be implemented.

8. Opportunities for further improvement

The following activities will help mitigate any increases in emissions as a result of changes in business and operational activities. The risks and opportunities associated with these areas of work are identified in Appendix D, including estimated cost and carbon savings where known.

Further work will focus on tackling energy emissions (Scope 1 & 2) as these form the majority of carbon emissions.

i) Further Estate development

BU will continue to investigate improvements to its estate both in terms of delivering quality of teaching and research space and minimising energy consumption. The breakdown of energy use by building in 2020/21 is shown in Appendix E and shows where opportunities may exist for cutting carbon.

BU will also investigate the cost/benefit of achieving BREEAM Outstanding and a Display Energy Certificate (DEC) 'A' certificate for new builds.

ii) Building refurbishment

BU also continues to invest in refurbishing its current estate and the Estates Design Guide provides guidance to contractors on the standards expected for incorporating low carbon solutions, such as LEDs. BU is trialling the use of the SKA[3] rating tool, which is an environmental assessment method, benchmark and standard for non-domestic fit-outs, for the Poole House refurbishment project to see if it can help deliver more sustainable outcomes.

iii) Renewables

[3] http://www.rics.org/uk/knowledge/ska-rating-/

BU has invested in renewable energy and water technologies and will continue to seek opportunities to implement such technologies across the estate.

A feasibility study into installing PVs on various building's roofs concluded the payback was too long due to the investment needed to strengthen and/or repair the roofs. However, any roof replacement project will include installing PVs. In addition, BU will investigate the feasibility of installing PVs or solar thermal panels on the Student Village roofs and other relevant areas, such as the bus interchange.

iv) **IT services**
BU will continue to invest in energy efficient hardware and seek better software operational solutions to reduce energy use.

v) **Building maintenance**
The Maintenance Services team will continue to complete preventative and reactive maintenance works to maintain the estate and energy and water efficiency is a major focus for these works, particularly for mechanical and electrical services. Maintaining air conditioning/refrigeration units should also reduce the loss of refrigerant gases which have high greenhouse gas potential and account for the Scope 1 fugitive emissions (See Appendix A).

The Building Management System (BMS) will continue to be used to maximise energy efficiency of building services, whilst providing a suitable work environment for staff and students. The BMS will also be used to direct the planned preventative maintenance programme to ensure equipment, such as pumps, are regularly serviced and so operate efficiently.

vi) **Fleet upgrade**
BU will continue to review the provision of fleet vehicles and aim to upgrade them to low carbon emission vehicles, such as electric vehicles. The carbon emissions from fleet fuel consumption are reported annually as part of the baseline as they are Scope 1 emissions (See Appendix A).

vii) **Data analysis, investigation and reporting**
The Automatic Monitoring and Reporting (AMR) system will provide energy and water trend data that will be used to identify opportunities for reducing utility use. The data will also be used to report the savings delivered by specific projects.

viii) **Staff and student awareness and engagement**
The majority of energy and water efficiency measures are based on technological solutions. But staff and students clearly have a vital role to play if these solutions are to be effective. People are motivated to take action or change their behaviour by many factors and understanding what these are and how to meet them is key to gaining their support and commitment to help minimise their impact on the environment.

An annual plan will set out a targeted awareness and engagement programme to inform staff and students about the choices they can make so they can adopt

more sustainable habits, whether switching off equipment or choosing to take the bus.

ix) **Tackling Scope 3 emissions**
BUs approach is to manage these topic areas to minimise their environmental impact and in the majority of cases this will also deliver carbon savings. However, carbon emissions associated with business travel are likely to be the exception and BU recognises there is a conflict between its international aspirations and increasing carbon emissions.

The following Table 2 outlines BU's approach to managing scope 3 activities:

Table 2 Scope 3 Management Action

Scope 3	Management action
Water & wastewater	Continue to use the AMR, BMS and Utility bills to identify trends and opportunities to reduce water use. Continue to maintain water systems and quickly rectify problems, such as leaks. Continue to invest in water efficient systems, such as low flush toilets and rainwater harvesting.
Waste	The Sustainable Procurement and Waste Management operational control procedures set out how staff and students need to re-think their purchasing decisions and learn how best to dispose of any waste.
Procurement	The Sustainable Procurement and Waste Management operational control procedures outline how Procurement and SUBU will continue to buy better and consider the whole life cost of products, including their embedded carbon.
Transport – Commuting	The BU Travel Plan outlines measures to reduce single car occupancy and encourage staff and students to use more sustainable modes of transport, which produce lower carbon emissions.
Transport – Business travel	BU's Business Travel Policy requires staff to follow the hierarchy of travel choices, from not travelling, by for example using technology, before choosing less environmentally harmful travel modes.

x) **Identifying other infrastructure improvements**
BU will continue to use a variety of sources of information, such as the Energy Institute, Environmental Association for Universities and Colleges (EAUC), webinars, seminars and literature, to identify new technologies and/or ways of working to deliver carbon savings. For example, investigating a boiler replacement programme to increase heating efficiency and provide more comfortable working conditions for staff and students.

9. How will we make this happen?

i) **Governance**

The Sustainability Strategy Group (SSG) is responsible for overseeing progress with the Plan and will report annually to the University Leadership Team (ULT) and the Board. The Sustainability Team is responsible for the day to day management of the Plan and will work with all staff, students and key stakeholders to implement it.

ii) **People**

BU's Senior Management leadership, commitment and support for this Plan will lead the way to drive environmental improvements and ensure sufficient resources are available to implement this Plan.

The success of this Plan also relies on all staff and students recognising their activities can have a negative impact on the environment and they have a responsibility to help deliver the carbon savings identified in the Plan.

The CMP Programme Manager will request support for the annual programme from SSG and when secured, will present business cases to the Estates and/or IT Development Board to access funds. The CMP Programme Manager will oversee the implementation of the programme, working principally with Estates, IT and Procurement to manage the delivery of individual projects.

BU will continue to utilise staff expertise in teaching and research to help underpin the Plan. Student projects provide win-win opportunities for investigating real world solutions to cutting carbon emissions. These will contribute to a greater sharing of understanding and knowledge and so help BU not only address its own carbon impact but also its wider role in creating a low carbon society.

BU will continue to share ideas with others and learn what works to cut carbon emissions.

iii) **Finance**

Funding is available to implement the planned carbon saving measures on an invest to save basis, such that projects deliver good financial savings from reducing electricity and gas consumption and associated carbon taxes. However, it is recognised spending this amount of money will be challenging by 2020 given the need to develop and deliver projects delivering good financial and carbon savings in this timescale and so some may be invested elsewhere.

BU will continue to use the Revolving Green Fund (RGF) (minimum £80k per annum) to invest in energy efficient equipment, such as LEDs and Uninterruptable Power Supplies (UPSs), where the payback is less than 5 years.

BU will continue to seek other sources of funding to help support its low carbon ambitions.

iv) **Strategic integration**

BU will continue to integrate and embed carbon reduction into the culture and practices across the institution. The Plan will form part of the next strategy post 2018.

v) **Risk management**
BU recognises there is a risk of not achieving the carbon reduction target, particularly given the projected increases in the estate and student population. However, BUs strategic commitment, provision of resources and the implementation of this Plan represent the best approach to continuing to make progress with reducing carbon emissions.

vi) **Policy framework**
BU has established a comprehensive policy and process framework to deliver sustainable outcomes (See Table 3). The EMS provides the umbrella for driving carbon reductions through continual improvement and ensuring compliance with legal and other requirements.

Table 3 BU Policy and process framework

Topic	Scope	Primary Responsibility	Policy/Procedure/Plan	Action(s)
Energy	1 & 2	CMP Programme Manager	▪ Design Guide ▪ Sustainable Buildings Policy and guidance ▪ Energy and Water Operational Control Procedure	▪ Implement Utility Review ▪ Implement Heating & Cooling guide ▪ Implement ISO 50,001
Fugitive emissions	1	Maintenance Services Manager	Control of Gases in relation to Air Conditioning and Refrigeration Equipment	▪ Annual PPM to ensure equipment maintained. ▪ Five yearly energy efficiency review (due in 2019).
Fleet vehicles	1	Travel Plan Co-ordinator	Travel Plan	Replace diesel for low carbon alternatives (Hybrid & Electric Vehicles)
Water	3	CMP Programme Manager	▪ Design Guide ▪ Sustainable Buildings Policy and guidance	▪ Trial of 1.5l flush toilets. ▪ Rainwater

			▪ Energy and Water Operational Control Procedure	harvesting savings
Waste	3	Estates	Waste Management Procedure & Estates Instructions	Roll-out food waste recycling and implement Sustainable Procurement Policy commitments
Procurement	3	Head of Procurement	Sustainable Procurement Policy	Implement Sustainable Procurement Policy commitments
Transport - commuting	3	Travel Plan Co-ordinator	Travel Plan	
Transport - business	3	Head of Procurement	Business Travel Policy	

BU will also develop a climate change adaptation plan to address the potential impacts of climate change on our operations and infrastructure, such as the increased risk of flooding from more intensive rainfall events.

vii) **Benchmarking performance**

BU will continue to contribute to benchmarking activities, such as the University League and Green Scorecard, to demonstrate progress and learn from good practice in the sector.

10. How will we know how we are doing?

BU recognises it is essential to measure its activities, so it can effectively manage them. Monitoring and targeting systems are established to collect, analyse and report energy, water, waste, procurement and transport data (See Table 4).

Table 4 Carbon data and reporting

Scope 1, 2 & 3	Data Source	Carbon Reporting
Energy and water use	AMR/BMS and utility bills	Data reported annually (EMR)
Fleet vehicles	Fuel receipts	Data reported annually (EMR)
Fugitive emissions	Contractor provides data on the amount of refrigerant gas used to top up air conditioning equipment	-
Waste	Weight data from contractors	Landfill data reported annually (EMR)
Procurement	▪ Monthly spend data ▪ Annual carbon emissions from SUPC	Data reported annually (EMR)
Transport – Commuting	Staff and student travel surveys every two years	-
Transport - Business	BU's Travel Management Company handle the majority (80%) of business travel.	Data provided quarterly

BU will continue to review the quality of scope 3 carbon emissions data and decide whether or not, to publish the data and set baseline and targets.

BU will continue to invest in data management systems, in particular energy and water data collation, analysis and reporting.

Carbon emissions will be reported to the Estates Senior Management Team on at least a quarterly basis and annually to SSG.

The Plan is subject to internal and external audit as part of the EMS.

11. Plan Review

The Plan will be annually reviewed by SSG, together with an action plan detailing the projects completed and identify those to be implemented in the short term (up to 3yrs) for approval.

An annual progress report will also be submitted to SSG for approval, prior to presentation to ULT and the Board.

Appendix A: Carbon scope definitions

Scope	Direct/Indirect emissions	Source of Emissions
1	Direct	Emissions associated with sources that are owned or controlled by BU. Examples include gas consumption, fleet vehicle fuel use and fugitive emissions from air conditioning equipment
2	Direct	Emissions from the generation of purchased electricity
3	Indirect	Emissions from BU activities that occur from sources not owned or controlled by BU, such as water supply and disposal, procurement, waste and transport.

Appendix B: Carbon management planned and potential projects, including accumulative carbon savings

Approved In Principle Projects	Estimated Capex	% Carbon Saving against baseline
Energy Conservation Measures	£1,145,200	5.8%
IT Cooling	£60,900	2.2%
Soft Landings/Building Optimisation	£364,000	1.1%
HV Infrastructure Upgrade	£500,000	3.1%
Estate Development [1]	£930,000	18.9%
Sub Total	£3,000,100	31.6%
Potential Projects	**Estimated Capex**	**% Carbon Saving against baseline**
Wind Turbine at Talbot Campus	£750,000	3.2%
Solar Car Ports	£1,765,000	6.0%
Sub Total	£2,515,000	9.2%
TOTAL	£5,515,100	40.3%

Note: Detailed energy and cost information will be provided in the Business Cases for the projects.

[1] Modelled estates portfolio in 2020/21 (see Appendix E for building breakdown).

Appendix C: Potential Renewable Energy Projects

Following an assessment of our current estate and knowledge of future developments, two potential projects have been identified that could potentially fill the 9% gap. All of which are financially viable.

Wind turbine @ Talbot Campus.

We have received indicative costs and potential savings for installing a 225kW wind turbine at Talbot Campus. The turbine spine could be 30 or 40m high, with a 30m rotor diameter (e.g. highest point either 45m or 55m). The wind speed at TC is good and the turbine could produce approximately 10% of the campus power. See Figures 1 & 2 for example photos.

Risks:

- Planning
- Suitable Location (Leased or own land; location of future developments)

Benefits:

- Low maintenance
- Financially viable
- Trusted technology
- Certainty of benefits (wind speeds)
- Possible linkages to Digital Village

Figure 1 Example 225kW Turbine

Figure 2 - Example 225kW Turbine in construction

Solar Car Ports

Following a detailed analysis of current and future car parks, there is potential to install solar car ports over current car parks. Figure 3 below details the car parks identified and the potential savings possible.

Car Park	Spaces	kW per space	kWp	Estimated annual kWh	Annual Carbon Saving (tonnes)	Cost @ £2.5k/space
Lansdowne Campus						
Studland House sunken car park	11	2	22	18,000	8	£27,500
TOFS/Studland House Rear	31	2	62	50,000	22	£77,500
BFGB	114	2	228	150,000	67	£285,000
Talbot Campus						
Visitor Car Park (Include in design?)	12	2	24	19,000	9	£30,000
Car Park E	51	2	102	80,000	36	£127,500
Car Park F	40	2	80	65,000	29	£100,000
Car Park G	59	2	118	95,000	43	£147,500
Car Park H	215	2	430	350,000	157	£537,500
Car Park H Expansion	157	2	314	250,000	112	£392,500
Vehicle Hire Car Park	16	2	32	25,000	11	£40,000

Total	550	1412	1,102,000	495	£1,765,000

Figure 3 - Potential Solar Car Port Car Parks Opportunities

Risks:

- Planning
- Possible Reduction in Car Park Spaces
- Locations (Leased or own land, location of future developments)

Benefits:

- Low maintenance
- Financially viable
- Trusted technology
- Certainty of benefits (solar irradiation)

Figures 4 to 5 below provide photos and illustrations of potential Solar Car Ports.

Figure 4 Example Single Bay

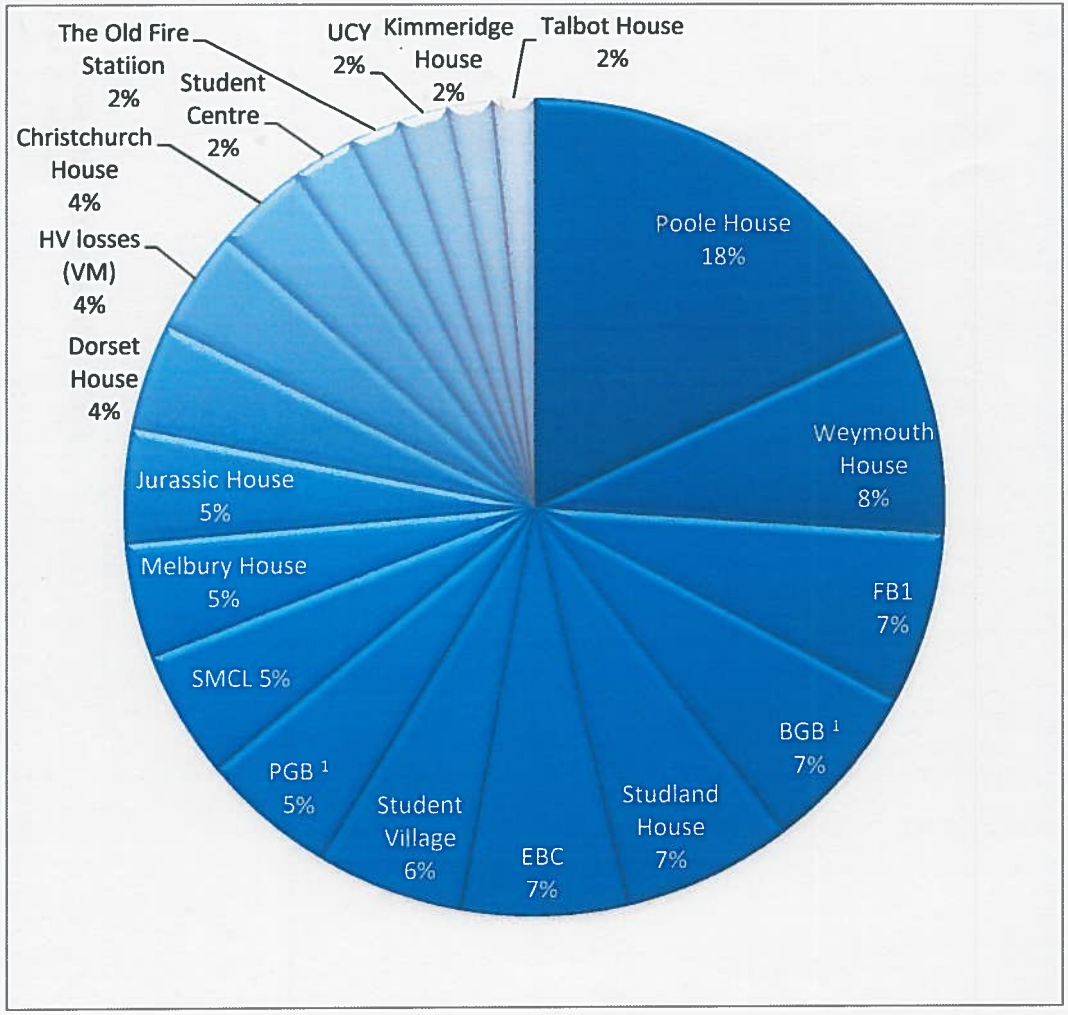
Figure 5 Example Single Bay

Appendix D: Further Improvement - Opportunities & Risks

	Opportunities	Risks	Estimated Saving	% Carbon Saving against baseline	Estimated Capital Cost
i) Further Estate development	Bring forward the exit from MH (due in 2020/21 and annual carbon emissions of 265 tonnes)	MH move does not occur in reporting year. Plus any carbon savings would be offset against increased energy use in remainder of LC estate from staff move	Moving out of MH and transfer of staff to SH, potential saving of circa 150 tonnes	2%	None
	BREEAM 'Outstanding'/DEC A	Programme and internal resources	Not Quantified	-	Not Quantified
ii) Building refurbishment/ Boiler upgrade	Lighting upgrades as standard	Minor works projects provide relatively little opportunity for significant energy savings	Minimal	-	RGF funded
	Boiler replacement programme (Upgrade TC Boilers and SH and TOFS)	Sufficient resources to manage boiler programme	50 tonnes	0.5%	£1m +
iii) Renewables	PVs installed when replace roofs. Maintenance team trained on installing PVs (will reduce costs) SC PVs provide up to 13% of building electricity	No business case for smaller arrays without roof replacement Government withdrawal of renewable subsidies Only one FIT payment available for TC	92 tonnes	1%	£1.7m

	225kW Wind Turbine at TC	Planning permission	268 tonnes	3.2%	£750k +
	Solar Car Ports	Planning permission required. Risk to losing car park spaces. Only one FIT payment available for TC.	495 tonnes	6%	£1.8m
iv) IT services	Contract for desktop PCs/laptops specify highest energy rating Pc Power Mgt – more aggressive shut down times.	Already specifying highest energy rating so may not see much of a reduction. Increase in staff will see an increase in Pc use	Minimal	-	None
v) Building maintenance	PPM programme can save up to 30% of energy use through maintaining efficient equipment	Established PPM is already delivering savings	Not Quantified	-	None
vi) Fleet upgrade	Swap out vehicles to low or zero carbon emissions as leases renewed	Relatively small increase in electricity use and carbon emissions for EVs	Minimal	-	None
vii) Energy management system	Implementing ISO50,001 could deliver up to 11% carbon savings (ref Sheffield Hallam case study)	Sufficient resources and/or conflicting priorities to implement the system	Not Quantified	-	No capital expenditure, revenue budget and staff resources required
viii) Staff and student awareness & engagement	Effective engagement could deliver up to 10% energy savings (Carbon Trust)	Savings achieved in year so will need to run effective programme every year to guarantee savings in 2020/21. Sufficient revenue funds available to support broader range of initiatives	Minimal benefits as most carbon projects have tried to remove user interaction.	-	No capital expenditure, revenue budget and staff resources required

Appendix E: Building Carbon emissions for electricity and gas (weather corrected), 2020/21



Building	Total tCO2e	%	Cuml. %
Poole House	1,137	17.9	17.9
Weymouth House	517	8.1	26.0
FB1	431	6.8	32.8
BGB [1]	429	6.8	39.6
Studland House	426	6.7	46.3
EBC	416	6.6	52.9
Student Village	369	5.8	58.7
PGB [1]	341	5.4	64.1
Sir Michael Cobham library	319	5.0	69.1
Melbury House	289	4.6	73.6
Jurassic House	287	4.5	78.2
Dorset House & OA & LT	268	4.2	82.4
HV losses (VM)	262	4.1	86.5
Christchurch House	229	3.6	90.1
Student Centre	158	2.5	92.6
The Old Fire Station	126	2.0	94.6
UCY	125	2.0	96.6
Kimmeridge House	111	1.7	98.3
Talbot House	105	1.7	100.0
	6,345	100.0	

[1] Pre Design estimates provided by consultants.