Bournemouth University

CECAP Appendices.

Version control

Rev.	Date	Description of change / purpose of issue	Authorised
01	09/11/20	Final version for Board approval	NFS

This document has been prepared in partnership with Hoare Lea.

Contents.

1. Introduction

This document contains the various appendices which supplement the main BU Climate and Ecological Crisis Action Plan (CECAP). It should be read in conjunction with the main CECAP to provide context to the information and data presented.

Appendix 1: United Nations Sustainable Development Goals (SDGs)

In 2015 all United Nations Member States adopted the 2030 Agenda for Sustainable Development. The heart of the agenda are the 17 SDGs which call all countries around the globe to urgent action. The SDGs take the broadest view of sustainability and recognise that all sustainability issues must be tackled collectively.

Climate change (the focus of SDG13) influences all the other SDG areas and, in the majority of cases, these effects are negative. Tackling climate change also presents a range of challenges across many areas - examples of the various challenges and impacts are set out below.

Table 1: SDGs and examples of related challenges and impacts of climate change.

1	End poverty in all its forms everywhere.	Climate change has a disproportionate impact on the poorest in society.
2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture.	Climate change will reduce food production (due to drought, wildfires etc.) and so will exacerbate issues.
3	Ensure healthy lives and promote well-being for all at all ages.	Climate change can cause mental wellbeing to be undermined through stress.
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.	Climate change can cause disruption to education – particularly for girls.
5	Achieve gender equality and empower all women and girls.	Climate change has a disproportionate impact on women (as home makers).
6	Ensure availability and sustainable management of water and sanitation for all.	Climate change exacerbates water scarcity.
7	Ensure access to affordable, reliable, sustainable and modern energy for all.	Addressing climate change through a move to renewable energy can bring a positive benefit.
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.	While approaches to tackling climate change might see reductions in activity in some areas (fossil fuel industries for example), it also presents significant new opportunities both for industry and for recognising non-traditional New green deal (move away from GDP as a measure of economic success).
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.	Mitigation and adaptation requires better buildings and the implementation of green and blue infrastructure.
10	Reduce inequality within and among countries.	Climate change increases the divide between the haves and have nots.
11	Make cities and human settlements inclusive, safe, resilient and sustainable.	Making cities sustainable will have a positive impact on climate change through actions such as reducing flying and reduced driving of cars.
12	Ensure sustainable consumption and production patterns.	Resource efficiency is a challenge which can be supported by efforts to tackle climate change

		and implementing circular economy principles.
13	Take urgent action to combat climate change and its impacts.	Take action to mitigate and adapt to climate change.
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.	Climate change causes issues such as acidification of the oceans and bleaching of corals.
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.	Climate change causes loss and compromise of habitats and associated biodiversity.
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.	Efforts to tackle climate change can be compromised by issues such as fake news which can lead to the effects of climate change persisting especially for those who are most impacted and least able to adapt.
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development.	Collective action is essential.

Appendix 2: PESTLE Analysis

We have conducted an initial PESTLE analysis of implementing the CECAP (or not) shown below.

Table 2: PESTLE analysis of CECAP implementation

Factor	Risks	Opportunities to
Political	– Being out of step with the sector, local authorities and UK government. – Failing to live up to our BU2025 value of Responsibility.	– Demonstrate sustainability leadership in tackling the crisis in line with our BU2025 values of Responsibility and Excellence.
Economic	– Achieving net zero is more costly than anticipated. – Lack of funds to support CECAP implementation. – Not adequately managing the financial risks of climate change.	– Potential to continue to benefit from the previously successful invest to save model through reductions in utility and related costs. – Invest to protect the business from climate shocks and stresses. – Mitigating the risks associated with a local and global move to a net zero future. – Potential to learn from and capitalise on positive financial impacts of Covid19.
Social	– Failure to attract and retain students and staff as not seen as tackling the crisis. – Failure to live up to our moral obligation to act on climate change and our BU2025 values of Responsibility and Inclusivity.	– Embed in education, research and professional practice to ensure students and staff can play their part in the crisis. – Improve health and wellbeing outcomes for staff and students through promoting connections with nature and learning from the positive impacts of changes in working practice brought about during the Covid19 pandemic.
Technological	– Waiting for a fix-all technology that doesn't arrive or arrives too late.	– Take advantage of technology that already exists. – Invest in IT services to support new ways of working. – Research opportunities around new technologies to help tackle the crisis.
Legal	– Non-complaint with the net zero Climate Change Act. – Being unprepared for future environmental legislation and regulation.	– Demonstrate legal compliance through robust risk management systems.
Environmental	– Do not do enough to mitigate climate change or adapt to the anticipated climatic shocks and stresses. – Lack of support for important flora and fauna leading to failure of local ecosystems.	– Reduce carbon emissions in line with net zero target and prepare the business and individuals for climatic shocks and stresses. – Support more biodiverse ecosystems and enhance ecosystem service provision.

The analysis illustrates both the risks and opportunities associated with the CECAP and suggests that taking action is the appropriate way to mitigate the risks and realise the opportunities.

Appendix 3: Ecosystem services

Humans rely, absolutely, on a functioning and healthy natural environment to provide us with a range of eco-system services shown below. These services are compromised by the climate and ecological crisis and therefore recognising their value is an essential part of our response.

Table 3: Ecosystem services

Provisioning services	Regulating services	Cultural services
Food Including seafood and game, crops, wild foods, and spices.	**Purification** Of water by microorganisms and air through photosynthesis.	**Aesthetic** To enhance the natural beauty of our surroundings.
Raw materials Including timber, skins, fuel wood, organic matter, fodder, and fertilizer.	**Waste decomposition and detoxification** Of water, air, soil and pollutants by microorganisms which break down waste and toxins.	**Spiritual** To support good mental health by providing a 'sense of place' and connection to nature.
Medicines Including dietary supplements, natural products for drug discovery and nanobodies.	**Crop pollination** Through the natural actions of invertebrates, birds and mammals.	**Personal growth** By informing local knowledge systems and educational values.
Energy Including hydropower and biomass.	**Climate regulation** Such as through flood mitigation or heat sink to mitigate the urban heat island effect.	**Leisure and fun** To provide varied spaces for relaxation and activity.

Appendix 4: Baseline and reporting

Baseline

As discussed in the main body of the CECAP, the new baseline year will be AY2018/19. The table below sets out the breakdown of the baseline.

Table 4: AY2018/19 emissions baseline breakdown

Emission source	Data	Emissions tCO_2e	% of baseline	Notes
Scope 1				
Mains gas	Energy, kWh	1,345.2	22.9%	
LPG	Fuel consumed. litres	69.3	1.2%	
Biomass (non-CO_2)	Energy, kWh	8.3	0.1%	
Fleet vehicles	Fuel consumed. litres	19.5	0.3%	
Fugitive emissions	Mass of refrigerant, kg	135.7	2.3%	
Scope 1 totals		**1,578.0**	26.8%	
Scope 2				
Grid electricity (Location based)	Energy, kWh	2,402.2	40.9%	
Scope 2 totals		**2,402.2**	40.9%	
Scope 1 and 2 total		**3,980.2**		
Intensity metrics	Gross area	92,798	$0.043tCO_2e/m^2$	
	Staff and student FTE	16,218	$0.245tCO_2e$/FTE	
Scope 3				
Bus fleet and hire vehicles	Fuel consumed. litres	391.0	6.6%	
Flights	Distance travelled, miles	1,426.4	24.3%	
Grey fleet	NA			Emission source not included due to poor data reliability.
Rail	Distance travelled, km	31.8	0.5%	
Water	Volume, m^3	11.3	0.2%	

		tCO_2e	baseline	
Waste water	Volume, m^3	27.0	0.5%	
Operational waste	Mass, tonnes	8.9	0.2%	
Construction waste	Mass, tonnes	3.3	0.1%	
Scope 3 totals		**1,899.7**	32.3%	
Total gross emissions - all scopes		**5,879.9**	100%	
Intensity metrics	Gross area	92,798	$0.06tCO_2e/m^2$	
	Staff and student FTE	16,218	$0.36tCO_2e$/FTE	
Outside of scopes		188.8		Biomass - woodchip

Scope 1 and 2 emissions

In general, reporting of scope 1 and 2 emissions is largely of good quality but with some specific issues occurring. Below are various data sources, identified issues, and recommendations for improving data capture and quality.

Table 5: Scope 1 and 2 emission sources review

Scope	Emission source	Issues	Recommendation / comment
1	**Gas**	Data generally good, however, flow rates in periods of low demand not recorded in several instances.	Recommend commissioning surveys to understand instances of missed data followed by the installation of bypass meters to ensure full consumption is recorded.
1	**LPG**	Reporting based on delivered rather than consumed volume.	This is typical for non-mains supplied fuels but the installation of a consumption meter would allow for more accurate data capture.
1	**Biomass (non-CO_2)**	Reporting based on heat produced rather than fuel consumed making conversion to tCO_2e inaccurate.	Recommend that kWh data would be adjusted for boiler efficiency and used to convert to tCO2e (tonnes could be used but this would also require an estimate of the weight impact of moisture content in the fuel).
1	**Fleet vehicles**	No issues	The recent move to collecting fuel volumes has significantly increased accuracy of reporting but there is still work to do to better capture monthly data from non-Estates fleet vehicles.
1	**Fugitive emissions**	Only one year of data available	The lack of historic data makes it difficult to assess accuracy, however, the very extensive installation of refrigerant plant across the University may mean that F-gas data is

			incomplete. Contractor to provide annual summary & database to be updated to include function to allow F-Gas loss report to be generated (autumn 2020)
2	**Grid electricity**	Generally good data from AMR system with some inconsistencies between site supply and total of sub-meters.	New AMR should improve data quality. Recommend continuation of close monitoring of AMR performance and early resolution of any identified issues.
		General comments	
		Meter relationships	We understand that metering schematics are currently being updated and this is to be encouraged so that a clear picture of the hierarchy of various meters can be easily understood and aggregations of consumption used to more accurately understand data gaps.
		Naming of meters is often misleading	In several instances the naming of meters on the AMR system is unhelpful and misleading. Recommend that all meter naming be reviewed as part of the optimisation of the new Axon AMR system so that it is clear whether meters are whole building / fiscal meters or sub-meters and, if they are sub-meters, what demands are being measured.

Scope 3 emissions

As part of developing the CMP, an initial Scope 3 baseline has been developed which includes the readily quantified emissions sources. The data underlying this baseline is more robust for some sources than others and reporting should be clear about the level of confidence associated with these various sources or explicitly state those emission sources which are knowingly excluded along with the reasons for exclusion.

Table 6: Scope 3 emission sources review

Scope	Emission source	Issue	Recommendation / comment
3	**BU Bus fleet**	No issues	The recent move to collecting fuel volumes has significantly increased accuracy of reporting. When commuting emissions are reported, caution will need to be exercised to prevent double counting emissions.
3	**Hire vehicles**	No issues	The recent move to collecting fuel volumes has significantly increased accuracy of reporting.
3	**Flights**	No issues for flights booked through travel provider but other bookings may be missed.	Although a very small number, there may be some flights that aren't booked through the travel management company and so will not be captured with the current system. Recommend mandating that all flights are to be booked

			through travel provider on the basis of coverage by group insurance policy, staff / student health, safety, and wellbeing, and enhanced data capture.
3	**Grey fleet**	Low confidence in data due to use of significant proxies and estimations	Currently, expenses data is used for reporting with inputs somewhat unreliable and in an inconsistent format. Recommend developing policy on grey fleet car use which includes defining appropriate expense claims process. This might also be used to encourage use of the Enterprise solution for grey fleet where lower impact vehicles could be specified.
3	**Rail**	No issues for journeys booked through travel provider but other bookings may be missed.	Walk up purchases of train tickets is potentially quite common which are not captured by the travel company reporting. Recommend mandating that all trips are to be booked through travel provider on the basis staff / student health, safety, and wellbeing, and enhanced data capture – some exceptions may need to be agreed such as emergency trips.
3	**Water**	Chapel Gate reporting is based on billing information with is likely to be inaccurate. Irrigation currently from unmetered supply.	Staff are unsure as to the location of the water meter so reporting is based on billing information with is likely to be inaccurate. Recommend locating and considering connection to AMR. We also recommend that the existing arrangement for irrigation at Chapel Gate be investigated to ensure water consumption on site is accurately reported.
3	**Waste water**	Unmetered	Waste water is typically reported as a fixed percentage of water supply as is the case for BU. This is a standard approach and reasonable although consideration should be given to installing waste water metering on new buildings.
3	**Operational waste**	No issues	Good operational waste data collected and reporting can be analysed in detail due to annual waste audit.
3	**Construction waste**	Mixed quality of data from contractors	Recommend developing requirement for waste data reporting of capital projects so that all projects report on a consistent basis.
3	**Procurement**	Emissions data not recorded or reported.	Procurement is both likely to be the most impactful area of emissions, and the most challenging to quantify. Most organisations do not report on procurement emissions but we make several recommendations to reduce procurement impact – refer to PC1 Procurement for details.

OOS	**Biomass**	Outside of Scopes CO_2 current not reported.	Ideally this CO_2 would be included in reporting.

Approach to reporting

As well as emissions sources, the organisational boundary should also be defined in terms of the assets and activities to be included. Emissions reporting guidance sets out several acceptable approaches to this issue – the following tables are reproduced from the environmental reporting guidelines published by Defra and set out the various options.

Table 7: Best practice emissions reporting approaches

			Financial control	**Operational control**
Group companies = parent company and subsidiaries	The investor controls the operation through its ability to direct the financial and operating policies of the operation with a view to gaining economic benefits. Typically, the investor holds more than 50% of the voting rights of the operation,	Equity share of the impact	100% of the impact	100 percent of the impact if operational control
Associates	The investor has significant influence over the financial and operating polices of the operation but does not have control. Typically, the investor holds less than 50% of the voting rights of the operation.	Equity share of the impact	0% of the impact	100 percent of impact if operational control 0 percent of the impact if no operational control
Joint ventures	A joint venture is defined as a *joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the arrangement.*	Equity share of the impact	Equity share of the impact	100 percent of the impact if operational control 0 percent of the impact if no operational control
Joint operations	A joined operation is defined as: *a joint arrangement whereby the parties that have joint control of the arrangement have rights to the assets and obligations for the liabilities relating to the arrangement.*	Equity share of the impact	Equity share of the impact	100 percent of the impact if operational control 0 percent of the impact if no

				operational control
Other equity investments	The investor does not have control, joint control or significant influence of the operation.	0% of the impact	0% of the impact	0% the impact
Franchises	A franchise is a separate legal entity usually not under the financial or operational control of the franchiser, and which give the franchise holder rights to sell a product or service. Where the franchiser holds and equity interest in the franchise, the treatments described above will apply.	0% of the impact – unless the franchiser holds an equity interest	0% of the impact – unless the franchiser holds an equity interest	100% share of the impact if the franchiser has operational control 0% of the impact if the franchiser does not have operational control

We have, to date, effectively applied the operational control approach which is a popular way to define the organisational boundary as it is relatively straight-forward and makes intuitive sense – i.e. if you have operational control of the emissions sources, it is reasonable that you should be responsible for those emissions. We will continue to use this approach to reporting.

While this approach is relatively simple, there are some complexities where leased assets are concerned, as the way these are treated can vary significantly. For most of BU's estate this is not an issue as the buildings are either owned or leased on a finance / capital lease (e.g. Fully Repairing and Insuring) and these are clearly within the boundary. Where lease arrangements differ from the FRI model, each case should be examined to determine whether it is to be included or excluded from the boundary. We have indicated below our current understanding of which buildings fall into this category and a recommended an approach to reporting in each case.

Table 8: Leased assets and recommendations regarding inclusion in the baseline

Site		Lease arrangement	Recommendation	Notes
Old Fire Station		Leased to SUBU	Include in reporting	Include as the understanding is that BU are responsible for bills and maintenance of the building
EBC		Leased building	Include in reporting	Include as BU are responsible for bills and maintenance of the building
St Mary's, Portsmouth		Space rented from NHS Trust	Include in reporting	Unless it can be demonstrated that BU has no operational control, this site should be included in reporting.
Any future additional leased space		All lease arrangements	Include in reporting	Combustion emissions reported as Scope 1, purchased electricity emissions reported as Scope 2

Best practice reporting principles

It is common for some emissions sources to be well understood and relatively easy to quantify (such as electricity consumption) and some to be much harder to understand with certainty (emissions associated with procurement for instance). It is important therefore that the basis on which any reporting is undertaken is clear so that stakeholders can make informed judgements regarding performance.

Best practice environmental reporting is characterised by the following principles[1]:

Table 9: Principles of environmental reporting

Principle	Description
Relevant	Ensure the data collected and reported appropriately reflects the environmental impacts of your organisation and serves the decision-making needs of all users.
Quantitative	KPIs need to be measurable. Targets can be set to reduce a particular impact. In this way the effectiveness of environmental policies and management systems can be evaluated and validated. Quantitative information should be accompanied by a narrative, explaining its purpose, impacts, and giving comparators where appropriate.
Accuracy	Seek to reduce uncertainties in your reported figures where practical. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information
Completeness	Quantify and report on all sources of environmental impact within the reporting boundary that you have defined. Disclose and justify any specific exclusions.
Consistent	Use consistent methodologies to allow for meaningful comparisons of environmental impact data over time. Document any changes to the data, changes in your organisational boundary, methods, or any other relevant factors.
Comparable	Report data using accepted KPIs rather than inventing your own. The narrative part of a report provides the opportunity to discuss any tensions between providing comparable data and reporting organisation specific KPIs. Use of accepted KPIs will aid benchmarking and will help users judge performance against peers.
Transparent	Essential to producing a credible report. Address all relevant issues in a factual and coherent manner, keeping a record of all assumptions, calculations, and methodologies used. The quantitative data will be greatly enhanced if accompanied by a description of how and why the data are collected. Report on any relevant assumptions and make appropriate references to methodologies and data sources used.

The intention will be to move towards these principles over time recognising that it is impractical to become fully compliant in one step but rather a managed process is likely to lead to a more embedded and robust approach and will better support ongoing compliance with ISO50001.

In January 2020, the OfS set out its expectations for a stricter emissions reporting regime[2].

Reporting renewable energy

[1] https://www.gov.uk/government/publications/environmental-reporting-guidelines-including-mandatory-greenhouse-gas-emissions-reporting-guidance

[2] https://www.officeforstudents.org.uk/media/7199663b-5f6c-49f7-b231-ec5cab2adb81/bd-2020-january-71-reducing-higher-education-carbon-emissions.pdf

Renewable energy generated on-site does not necessarily need to be reported separately as its benefit is seen in a reduction of electricity or gas derived from external sources, however, it may be useful and of interest to stakeholders to provide information in this area.

Guidance suggests that grid derived electricity is reporting using location-based emission factors – we have used annual average location based factors in the CECAP. In the future, it may be possible to utilise more detailed energy metering data and time specific (e.g. hour-by-hour) grid average emission factors to more accurately reflect the timing of consumption and the carbon-intensity of the grid. The emissions factors are already available, but our limitation is universally available and reliable data from our estate and the addition resource requirement to process the data.

As we currently purchase our electricity through a "green energy tariff", we could potentially adopt "dual reporting" where a market-based emissions figure is presented alongside the location-based figure (which must always be reported) so that we can reflect the reduced emission figure based on its purchase. We have not taken this approach in this version of the CECAP but, should the CECAP group decide it is beneficial in the future, we should also specify whether the renewable energy is additional, subsidised and supplied directly, including on-site generation, or through a third party. A similar "dual reporting" approach should be taken for biogas and biomethane (including "green gas").

EMR

The EMR requires a range of raw data points to be provided with emissions calculated by HESA. The way in which the output of this process is presented does not necessarily align to accepted best practice principles and is therefore unsuitable as a basis for other reporting.

BU will continue to provide the data for EMR, even while this reporting is voluntary. However, we recommend that it is not used as the basis for any onward reporting.

Annual Carbon Management and Sustainability Reports

The current annual CMP report presents emissions information against targets and all scopes as well as providing the underpinning utility and renewable energy data. This report is signed off by the SC, ULT and the Board.

The current Sustainability Annual Report presents information across the majority of environmental impacts and emission sources in clear and concise manner and is a useful source of information on BU's performance.

As these reports are currently developed voluntary, it is within the University's gift to present information in the way it sees fit. However, as the issue of the climate and ecological crisis continues to increase in importance and the demand for better quality reporting is also increasing, it is recommended to more closely align reporting with best practice.

Throughout these reports there are examples of best practice reporting but these are not consistently applied for all impact area (notwithstanding that applying all of the reporting principles is more difficult in some areas than others). For example, data should be presented both in absolute terms and normalised for appropriate factors (such as area, or staff / student numbers) and while this is done for some emission sources, such data is not presented consistently.

The approach to aligning with best practice should be to incrementally improve reporting each year (unless sufficient resource and data is available to make the move in a single year), and we recommend the following as first steps.

Table 10: Recommendations for initial improvements to emissions reporting.

Clearly state what's included in the baseline and current year reporting	Being clear about what emission sources are included in the overall emissions data is essential for users to understand why your emissions might have changed over time, and in comparing performance with other organisations.

Include a comment covering any known exclusions to reporting	Just as important as what is covered by reporting, is being transparent about what isn't covered. This should ideally include the reasoning around why any given emission source isn't (or cannot) be included (such as robustness of data, effort Vs impact, and so on), and whether work is underway or planned to incorporate it in future reporting.
Trend data	Present several recent years' data plus the fixed base year to allow users of the reporting to make straightforward comparisons of like for like data and assess performance.
Normalised data	Present intensity ratios / normalisation factors (such as kWh/m^2 or tCO_2e/Full Time Equivalent) data to allow comparison over time and comparison between organisations
Base year recalculation policy and materiality threshold	Although not to be included in actual reporting, an important supporting principle is that where a fixed base year is being used, a recalculation policy should be in place so that events which require a recalculation of the emissions baseline are clear. Typical triggers for recalculation might include: • Structural changes • Changes in calculation methodologies • Corrections of previous errors • Some divestments or acquisitions The base year shouldn't be recalculated for every event which might change emissions so a threshold over which the effect of a single change, or cumulative effect of several changes, would trigger recalculation should be determined.

Carbon management software

Given that good data management underpins a robust approach to reporting and that it can be complicated and a time-consuming process, it may be advantageous to use software specifically designed for the job. BU currently uses a number of spread sheets to manage environmental data and it is recommended to review this approach and consider whether it would be beneficial to consolidate these into one database. Lots of providers now offer such software; in this section we present a brief comparison of some of the available solutions.

It should be noted that it is still entirely possible to maintain an accurate and robust reporting system without using tools similar to those shown and we do not specifically endorse any of these, or any other, products.

- Carbon Trust footprint manager - https://www.carbontrust.com/resources/carbon-footprinting-software
- Greenstone sustainability software - https://www.greenstoneplus.com/about-us/sustainability-software
- Sphere carbon management reporting - https://sphera.com/sustainability-consulting/reporting/carbon-management-reporting/
- GreenIntellli carbon management reporting - http://greenintelli.com/carbon/

Table 11: Comparison of proprietary carbon management software tools

Scope 1 emissions?	Yes	Yes	Yes	Yes

Scope 2 emissions?	Yes	Yes	Yes	Yes
Scope 3 emissions?	Yes	Yes	Yes	Yes
Does it comply with the GHG Protocol?	Yes	Yes	Yes	Yes
Can it also cover water usage?	Yes	Yes	Yes	Yes
Can it also cover waste production?	Yes	Yes	Yes	Yes
Can it also cover energy usage?	Yes	Yes	No	Yes
Can it also cover transport?	No	Yes	No	No
Can It also cover community impacts?	No	No	No	Yes
Can it also cover air pollution?	No	Yes	Yes	No
Is it cloud based?	Yes	Yes	Yes	Yes
Can you benchmark data?	Yes	Yes	Unknown	No
Does it generate reports?	Yes	Yes	Yes	Yes
Does it provide support and guidance?	Yes	Yes	Yes	Yes
Does it allow target setting and tracking?	Yes	Yes	Yes	Yes
Does it provide recommendations to improve?	Yes	Yes	Yes	No

Appendix 5: Emissions reduction targets

Below we review previous carbon reduction targets, progress against them and set out the detail of our new net zero emissions target.

Previous targets and progress to date

We have made great progress since the first CMP was approved by our university board in January 2010; although the initial target of a 30% reduction in absolute emissions by the end of AY2015/16 was not met, we did meet the 40% reduction target by AY2020/21 two years early by achieving a 45% reduction by AY2018/19 despite significant changes to the estate and population.

This was achieved through the implementation of energy efficiency measures, high sustainability standards for new buildings, and behaviour change included in the previous CMPs as well as the decarbonisation of grid supplied electricity; refer to Appendix 12: Historic performance metrics, for charts showing historic performance.

We've reviewed all the measures suggested in the previous CMP and, although some were implemented in one form or another, some were found to be unviable, such as installing a wind turbine on Talbot Campus. While there may be some merit in revisiting these measures as the situation may have changed, this indicates that many of the best performing (in terms of emissions reductions and financial performance) have already been implemented. Of course, this is to be expected – the longer carbon is actively managed in an estate, the more any available measures tend to have a smaller impact for a higher price. This is notwithstanding the occasional arrival of new technologies, such as LEDs, which can have the ability to significantly reduce energy consumption and / or emissions.

However, there are still opportunities for some relatively low cost measures and it will become necessary – especially in the context of the net zero emissions target, to look for every opportunity to reduce emissions.

As part of implementing BU2025, we set a 50% emissions reduction target by 2025/26 against a 2005/06 baseline. We're on track to meet the target, and current forecasts suggest that we will achieve around a 62% reduction based on Business As Usual (BAU) activity (which means doing nothing more than we are currently doing to reduce emissions) and the continued decarbonisation of the national electricity grid – note that the previous baseline and chart below do not include all emissions sources included in the new baseline.

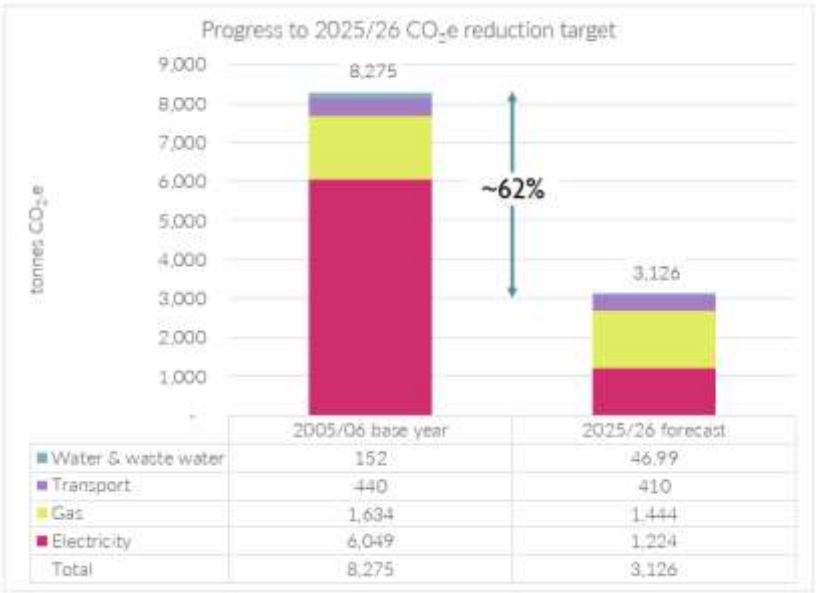


Figure 1: Anticipated performance against the 2025/26 emissions reduction target

Our net zero emissions target

ULT (October 2019) and the Board (February 2020) have approved in principle the adoption of a net zero target by 2030/31. However, it is important to be clear what is meant by this target.

What is "net zero emissions"?

While the term used is obviously less important than the result of the actions taken, and accepting that these terms have been given different meanings by different organisations at different times, we have carried out further work to allow us to clarify the target.

The proliferation of the term net zero as a way of defining carbon (often interchangeably used to mean just carbon dioxide or all greenhouse gases) reduction targets and the increasing debate on achieving the goals of the historic Paris Agreement has certainly increased awareness and, to some extent, action to address GHG emissions. It has not, however, resulted in a widely accepted definition of the term even though this, and similar terms, are defined in the scientific context.

Three terms have emerged in recent years which have been used flexibly outside the scientific community and often represent widely differing approaches attempting to reach a very similar goal. The most widely used terms are carbon neutrality (or net zero CO_2 emissions), net zero emissions, and climate neutrality – the principle difference between these terms is the scope of emissions to which they refer, which are defined by the IPCC as:

Table 12: Scientific definition of various carbon reduction terminology

Term	Emissions scope
Carbon neutrality (or net zero CO_2 emissions)	Carbon dioxide only
Net zero emissions	All greenhouse gases
Climate neutrality	All GHG emissions, regional or local biogeophysical effects of human activities, and, arguably, other radiative forcers (such as from aviation)

Additional to the above, the range of activities and sources covered differentiate the types target as shown in the diagram below[3].

[3] Adapted from the SBTI paper "Towards a science-based approach to climate neutrality in the corporate sector"

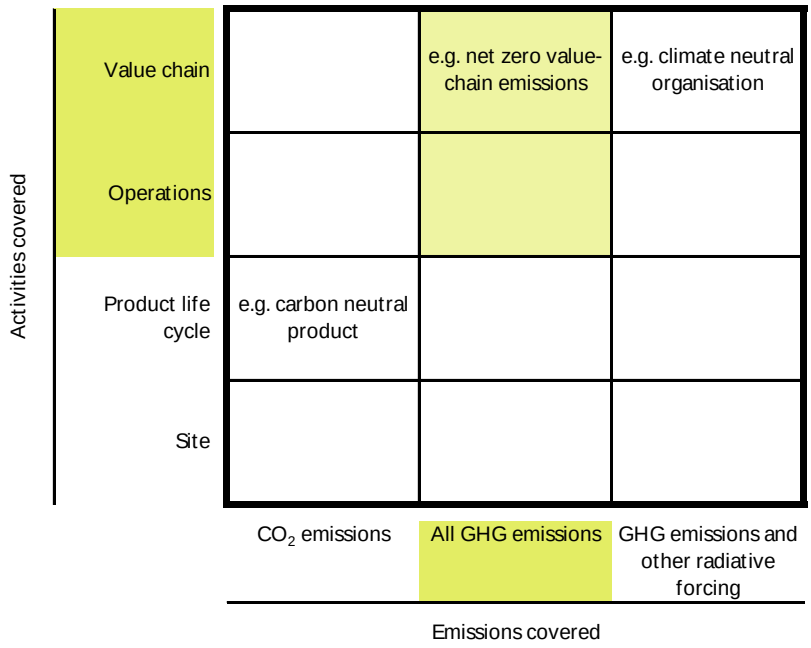


Figure 2: Comparison of the activities and emissions covered by various carbon reduction target definitions

Under our net zero target, the intention is to take into account all greenhouse gases (measured in tonnesCO_2e) and to include all emissions sources which we can, with a reasonable degree of accuracy, quantify (see Section 3 of the main report for a discussion of the baseline included in the target). Over time, as we gain more and better data, we may include additional emissions sources.

Applying this intention to the above (i.e. the highlighted cells in Figure 2, above), we can see that, along with many other organisations, we do not align entirely with any one definition, but we are closest to net zero emissions', and this term is used throughout.

This new target, as part of our response to the climate and ecological crisis, represents a step change in BU's level of ambition and is in line with the increased focus and understanding of the need for urgent and significant action to cut carbon emissions in order to limit the worst impacts of climate change.

Pathways limiting global warming to 1.5°C, with little or no overshoot, modelled by the IPCC (Intergovernmental Panel on Climate Change)[4] and other bodies, rely predominantly on decarbonisation – i.e. directly reducing the emissions associated with our activities with some additional carbon dioxide removal (CDR). In line with the accepted definition of net zero emissions, our approach will have two strands: decarbonisation, and offsetting, as discussed in the relevant sections in the main body of the CECAP.

Year on year target reductions

The following table shows the year on year reductions for each emissions scope as established using the SBTi tool. Note that as more complete data is gathered, especially for scope 3 emissions, the trajectory (and therefore targets) should be recalculated and updated.

[4] IPCC, 2018: Chapter 2 - Mitigation pathways compatible with 1.5°C in the context of sustainable development

Table 13: SBTi target trajectories, Scopes 1 to 3

Year	Scope 1		Scope 2		Scope 3		Total	
	tCO2e	%	tCO2e	%	tCO2e	%	tCO2e	%
2018/19	1,578		2,402		1,900		5,880	
2019/20	1,489	6%	2,269	6%	1,852	3%	5,610	5%
2020/21	1,402	11%	2,140	11%	1,805	5%	5,347	9%
2021/22	1,318	16%	2,017	16%	1,757	8%	5,092	13%
2022/23	1,236	22%	1,898	21%	1,710	10%	4,844	18%
2023/24	1,156	27%	1,784	26%	1,662	13%	4,603	22%
2024/25	1,079	32%	1,674	30%	1,615	15%	4,368	26%
2025/26	995	37%	1,538	36%	1,567	18%	4,100	30%
2026/27	913	42%	1,410	41%	1,520	20%	3,842	35%
2027/28	833	47%	1,288	46%	1,472	23%	3,593	39%
2028/29	756	52%	1,172	51%	1,425	25%	3,353	43%
2029/30	681	57%	1,061	56%	1,377	28%	3,120	47%
2030/31	654	59%	961	60%	1,330	30%	2,945	50%

Scope 1 and 2 emissions

The following settings have been used in v1.1 of the SBTi tool to derive the above trajectory:

Table 14: Scope 1 and 2 SBTi target tool settings

Item	Setting
Target setting method	Sectoral decarbonisation approach The Sectoral Decarbonization Approach (SDA) method was developed by CDP, WRI and WWF with the technical support of a consultancy partner.
SDA scenario	ETP B2DS This scenario is based on a “technology push” approach which results in global emissions consistent with a 50% chance of limiting average future temperature increases to 1.75°C. This is currently the only scenario available in the tool under the Sectoral Decarbonisation Approach.
SDA Sector	Buildings As the majority of BU emissions are from buildings, this is the most appropriate sector to apply.
Base year	2019
Target year	2031
Projected output measure	Target year output (Linear)

Item	Setting
Base year output	92,798m^2
Target year output	94,340m^2
Scope 1 emissions	1,578 tonnesCO_2e
Scope 2 emissions	2,402.2 tonnesCO_2e

Scope 3 emissions

While we have good data for some Scope 3 emission sources (such as flights), for others we have very little data useful for establishing emissions (such as for procurement). We have set a target reduction for the Scope 3 emission sources we can reasonably quantify now but must work to make the baseline more complete and accurate in this area.

We will explore ways to improve data gathering and understanding, such as utilising the GHG Protocol Scope 3 evaluator[5] which provides a means of establishing a more complete Scope 3 inventory that can help identify areas of focus.

The following settings have been used in v1.1 of the SBTi tool to derive the above trajectory:

Table 15: SBTi Scope 3 target tool settings

Item	Setting
Target setting method	Absolute contraction approach This approach assumes all uniform contraction of emissions across organisations.
Base year	2019
Target year	2031
Projected output measure	NA
Base year output	NA
Target year output (Linear)	NA
Scope 3 emissions	1,900 tonnesCO_2e

In order to align both Scope 1 and 2, and Scope 3 targets, we have selected the WB2C (well below 2^{o}C) scenario equating to a 30% reduction in Scope 3 emissions in the target year.

[5] https://ghgprotocol.org/scope-3-evaluator

Appendix 6: Recommendations

From the buildings we operate to the waste we produce, and from the food served on campus to academic travel; every aspect of BU life is also a source of carbon emissions. This suggests that any plan to reduce emissions should address all these aspects of our activity. However; the relative impact of some activities is much greater than others and warrant more focus, and some are so small that effort to reduce them could mean displacing more meaningful work. Also, while some of these sources are easy to measure (such as gas consumption), the magnitude of others (the carbon impact of procurement for example) are far harder to quantify. Further, some emissions sources are far more tangible than others (waste versus emissions from refrigerant leaks for instance) potentially making engaging people in efforts to reduce them more fruitful. Finally, the agency to be able to effect changes that result in emissions reductions is not entirely invested in the Sustainability Team who are responsible for carbon management, meaning the support of the entire BU community will be necessary to achieve our net zero emissions goal.

So, we can see that the most appropriate approach to reducing carbon emissions is not to try to tackle everything with the same level of effort (or at least not all at once), nor is it to only focus on the largest sources (although this is clearly important). The plan therefore presents a blended approach, led by the Sustainability Team, but seeking to mobilise a far greater cohort in efforts to tackle emissions, which sees recommendations across all aspects of BU life.

This appendix sets out a range of specific recommendations which will require focused action to implement. The recommendations are organised into the broad themes discussed earlier in the plan and summarised below, and sub-divided further where appropriate.

Table 16: Recommendation themes

Theme	Description
Governance	**This theme recognises that to meaningfully and robustly embed our response to the climate and ecological crisis, our governance structures must support the response across all aspects of BU life.**
Behaviour change	**This theme is focused on mobilising the entire BU community to support our response to the crisis.**
Education for Sustainable Development (ESD) and research	**This theme is focused on embedding the climate and ecological crisis and broader sustainability into our curricula and research.**
Adaptation and resilience	**Many of the recommendations which might have been included here have been embedded in other areas, although the issue of staff understanding the need to have their own response to climate and ecological challenges is highlighted by this theme.**
Capital works	**This theme focuses on the impact of major building projects but also considers how other large capital investments can support the climate and ecological crisis response.**
Existing buildings	**This theme focuses on reducing the amount of energy it takes to run our buildings by improving the efficiency of their systems and making sure we use the buildings as efficiently as possible.**
Renewables	**This theme looks at how we can maximise our generation of renewable energy on-site (especially through the use of photovoltaics) to decarbonise the energy we use and provide resilience in our energy system.**

Theme	Description
Transport	**This theme considers a range of ways to reduce the amount of business and commuting travel we do and to reduce the impact of essential travel using lower carbon transport modes and vehicles.**
Waste	**This theme focuses on both individual actions and supply chain engagement to reduce waste generation and improve recycling rates.**
Food	**This theme focuses on how we can reduce our impact through food offerings across BU.**
IT	**This theme focuses on reducing the energy demand of IT equipment and associated infrastructure and encouraging efficient use by looking at the provision of low energy IT equipment and infrastructure and adopting behaviour change techniques to reduce energy demand.**
Procurement	**This theme recognises the process that we will need to adopt to engage with our supply chain and understand the likely impact of the work they do, or products they supply, for BU.**
Reporting	**This theme focuses on improving our ability to act effectively through better data, target setting, and taking steps to align our reporting with best practice over time.**

Each recommendation includes a unique reference, title, indication of alignment with the CECAP objectives, and a discussion around rationale and implementation.

GO1 Governance

The overall intent of this group of recommendations is that the climate and ecological crisis and the BU response become directly relevant and tangible to every member of staff as the chances of successfully responding to the crisis will be immeasurably increased by the engagement and support of all staff across BU.

Distinct from the ongoing engagement of staff which appeals to their desire to support, changes in governance must be more prescriptive and require that processes and procedures take account of the crisis, decisions consider the relative benefits and disbenefits of different choices, and that there is individual accountability for impacts.

Ref	Title	Description	Supports objectives
GO1.1	Climate focus for BU2025 refresh	Ideally ensure that the next iteration of BU2025 is framed in the context of the climate and ecological crisis and BU's response to it. As a minimum ensure that the strategy acknowledges the CECAP as being of the highest importance. Potentially, the next iteration could also address more strategic issues such as the impact of internationalisation on the climate and ecological crisis and BUs response.	All
GO1.2	Review policy framework to ensure all policies respond to the crisis	Recommend that senior management embed the net zero vision / crisis in the policy framework for all activities and then commit to their implementation, even when facing challenges. A summary of relevant policies and details of owner, expiry date, and specific recommendations is included in Appendix 11.	All
GO1.3	Reappraise Departmental KPIs	Departmental KPIs are created at BU level and are thus common across all departments. The current set of departmental KPIs do not reflect the crisis and BUs response. The current board level KPIs (below) are more closely aligned (noting that the KPI for scope 1 and 2 emissions has already been met and so needs updating) but could be expanded. 1. 100% programme alignment with UNSDGs by 2025 2. 100% alignment of research with UNSDGs by 2025 3. Achieve Scope 1 & 2 emissions of 54 $kgCO_2e$ per m^2 by 2025 (note this has already been achieved (2018/19 – 44 $kgCO_2e$ scope 1 & 2 per m^2) While in the future it may be appropriate to develop more tailored metrics which recognise the specific context of individual departments, this recommendation highlights the need for an over-arching KPI (or KPIs) which focus on the crisis response. The KPI(s) should focus on supporting the role of the Sustainability Committee and the implementation of the CECAP as well as promoting the work of the Sustainability Academic Network in mobilising the academic community as part of the BU response.	1, 2, 4, 5

		An example of a KPI might be to increase the proportion of virtual conferences offered by BU and attended by BU staff and students (in lieu of, rather than in addition to, international travel) and the mode of travel used for UK conference attendance.	
GO1.4	Review, and amend as appropriate, the Academic Career Framework	This recommendation is to review the Academic Career Framework to ensure that it both supports the implementation of the CECAP (rather than works against it), and aligns particularly with SDGs 13, 14 and 15. The sorts of amendments suggested below may meet with some resistance but that it may be challenging shouldn't be a reason for not at least assessing the potential for change. An example of how the Framework might be amended focuses on its current support for attendance at multiple conferences each year (and, for the most senior staff, international conferences). One potential way to help support the CECAP would be to amend wording so that reference to virtual conferences is included, perhaps saying that there is a preference for virtual conferences, or, where multiple conferences are attended in a given year, that at least one should be virtual. Additionally, it would be useful for BU to effectively demonstrate to other institutions its commitment to the CECAP by requiring that all conferences organised by BU allow for delegate to attend virtually. In the longer term, it may be appropriate for the framework to recognise the strategic alignment of BU with the UNSDGs and consider the development of other metrics to measure academic success which are more closely aligned with the objectives of the SDGs.	1, 2, 4, 5
GO1.5	Make individuals explicitly responsible - adopt goal alignment	The intent of this recommendation is to ensure that the crisis is visible to all staff and that they have a flexible way of playing their part in the response. By creating this flexibility that allows staff to formally recognise both their impact and how they can support the response as part of their annual PDR, means meaningful action is far more likely. The recommendation is to require that every member of staff has at least one crisis response objective in their PDR and it is essential that these are cascaded from the most senior levels (i.e. the COO and VC). The ways in which individuals will be able to respond to cascaded objectives and support the response are likely to vary significantly and this recommendation should be supplemented by providing guidance to staff which includes examples of potential objectives to help people understand how the things they do can make a difference. It should also be recognised that some individuals may have specific responsibilities already through either our existing ISO14001	1, 4

		certification or the upcoming ISO50001 certification. It should also be recognised that, for some, the ability to take specific action may be very limited so care must be taken not to dilute the goal of this recommendation.	
GO1.6	Review existing controls on development and research funds	This recommendation focuses on the approvals mechanisms that are in place for the various funding sources available across BU, such as BU funding schemes, faculty level funding, and departmental funds. The controls that are already in place do not generally or universally include consideration of the ways in which the spending of approved funds will impact the environment. Existing mechanisms such as approvals by panels and risk assessment processes should be reviewed with a view to building in recognition of environmental impact and including it as a material consideration in the decision making process. It may be that this could be facilitated by amending existing approvals mechanisms (such as the Ethics Committee process for research projects) and a KPI could be developed to support this approach. It may be useful to engage with the Research Development and Support team to explore how they might help proposal writers and decision makers, and to explore ways to address any resourcing constraints through the CECAP. Over time, the crisis literacy programme outlined in elsewhere should mean that researchers can prepare this information by themselves, given appropriate information and tools (such as an RDS training module).	1, 2
GO1.7	Create a body to oversee the purchase of carbon offsets	The market for carbon offsets is developing rapidly and is a complex field where experience will need to be developed to ensure that BU are investing in the best possible schemes. The group could initially be the CMP group but extended to include representatives from Finance and Legal teams, and the student body. The group should be responsible for identifying the best suite of offsetting schemes to invest in, identifying and reporting the various co-benefits (in addition to carbon), and developing BUs approach to offsetting over time. They should also advise on the appropriate carbon price to be used in future years. See specific recommendations set out in Appendix 9: Offsetting.	1
GO1.8	Agree effective carbon price to inform offsetting strategy and project viability	In conjunction with the polluter pays principle, this recommendation establishes a meaningful fiscal incentive for encouraging informed choices as well as enhancing the viability of ECMs and other carbon reduction activities. There is a challenge to identifying the price but it seems sensible to start with a relatively low estimate of the cost of carbon and develop a mechanism for ratcheting up unit costs over time. The minimum potential price should be the lowest cost that 1tCO2e can be offset using a good quality scheme (currently	1

		around £6/tonne) with an upper limit being the BEIS non-ETS traded 2020 value of £69/tonne. Given that the upper limit may fail to gain support, we recommend using the closing price of the CRCEE scheme which was £19/tonneCO2e. This should be sufficiently high to encourage polluters to consider the impact of their activities and allow for flexibility in the delivery of carbon reduction schemes or the choice of offset scheme purchased.	
GO1.9	Adopt polluter pays principles for certain activities	Since the 1992 Rio Declaration, the polluter pays principle has been widely adopted for various pollutants, but its application to GHGs has been less widespread. Starting with activities that are simple to capture and measure (such as flights and some other business travel), we recommend introducing a polluter pays principle for CO2e. Over time other activities could be identified and added. Considering the flights as the first area of focus, this form of travel is presently an integral part of the landscape of research, collaboration, and dissemination in the higher education sector with international field studies and conferences attended as a matter of apparent necessity, supported by the current Academic Career Framework. Despite this entrenched behaviour there is a growing recognition that physical conference attendance, particularly where this means travelling by air, is problematic from an environmental impact perspective and, as other emissions sources are brought under better control, flights become an increasingly important part of the picture. The polluter pays principle could act as a key lever in changing behaviours in this area. Revenue from any payments made under this principle could usefully be treated as 'insetting' and used to fund direct emissions reduction or decarbonisation (e.g. installation of PVs, EV charging infrastructure). In order to ensure that all emissions are captured in this area, it will be necessary to engage with Finance and arrange a specific code for business travel to be implemented as currently a variety of codes are used across BU making it difficult to be sure if all journeys are captured. There may also need to be some communications activity so that all involved use the new coding appropriately which will also support the recent ULT paper which included direction that BU credit cards must not be used for travel but all bookings are to be made through the Selective (TMC) portal.	1, 2
GO1.10	Rename and extend the remit of the CMP Group and Sustainability Team to cover all emissions sources	Day to day management resides with the Sustainability Team and the Energy and Travel and Transport Managers will be responsible for implementing measures and reporting on progress to the CMP Group. We recommend renaming the CMP group to ‘CECAP Group’ and extending its remit such that it can respond across all emissions sources rather than a specific focus on utilities (gas, electricity, water, etc).	1, 3

GO1.11	Include relevant areas of the response in the TORs of all committees	As every aspect of BU life has an impact on the climate and ecological crisis, it follows that all committees should be tasked with considering the response as part of their activities according to how it relates to their particular responsibilities. This recommendation is to engage with each committee, prioritising based on likely crisis impact, and negotiate an update to their TORs.	1, 2, 7b
GO1.12	Implement a staff and student assembly	This would elevate scrutiny of the BU response to the crisis and support our being held to account to deliver against out CECAP objectives	1, 4
GO1.13	Ensure governance supports a reduction in the environmental impact of research	While research proposals will always include a discussion of the anticipated impact of the output of the work in the relevant field, there is not currently a recognition of the environmental impact of carrying out the research in the first place. While it is accepted that understanding whether the ultimate specific benefits outweigh the immediate environmental impact is probably a piece of research in itself, it does seem valid that departments and their researchers are required to reflect on the impact of their work and consider whether there are lower impact approaches to delivery.	1, 2
GO1.14	Ensure the climate and ecological crisis is included on BU risk register	As with most large organisations, BU maintains a corporate risk register which records all risks and opportunities which might affect our business. As the climate and ecological crisis presents a number of direct and associated risks (and opportunities) it should be explicitly included on the register to ensure visibility at the highest level, that it is considered alongside other corporate risks, and that appropriate planning is in place to mitigate risk and realise opportunities.	1, 7a

Behaviour change

BH1 Mobilise staff and students to support a net zero carbon BU

The active support of staff and students will greatly increase the chances of successfully responding to the crisis. This group of recommendations will focus on a continuation and enhancement of the excellent engagement activity through existing schemes such as Green Impact and Green Rewards, and new activities such as a programme of carbon literacy and the development of a Living Lab[6].

Ref	Title	Description	Supports objectives
BH1.1	CECAP Charter	The purpose of this recommendation is to clearly communicate to staff and students the BU vision for responding to the climate and ecological crisis through a CECAP charter which articulates our values in this area, asks	1, 2, 4

[6] See link for information on Living Labs: https://www.eauc.org.uk/eauc_living_labs_project

		that individuals acknowledge them, and confirms that they are expected to live up to the values as part of the BU community. While a new charter would need to be developed for staff, an addition could be made to the existing student charter in this respect.	
BH1.2	Develop and implement crisis literacy training	Crisis literacy focused training would help individuals recognise the impact of their decision making and actions. Importantly, this approach could be used to support other recommendations such as aligning programmes with SDGs 13, 14, and 15, and including an assessment of environmental impact in research proposals, as well as helping students identify opportunities for Living Lab projects. As an initial step, the recommendation is to work with the Organisational Development team to mandate this training, once developed, for all staff who are involved either in the development and delivery of programmes (e.g. unit and programme leads) and anyone who develops research proposals (e.g. RDS). Later, other staff could be included as further guidance is developed. Similar training could be available to students as an optional activity. In any literacy training that is developed, it will be important to provide realistic examples of the types of changes that individuals and teams can make (such as meeting virtually rather than travelling, carrying a reusable cup, making less impactful food choices, etc) and ideally an indication of relative impact.	1, 2, 4
BH1.3	Continue staff focused Green Rewards scheme and other behaviour change campaigns	This scheme rewards staff for taking positive sustainable behaviours and has proved successful at BU thus far – 55% of BU employees signed up in 2019/20 (156 new staff joined over the year), 77,365 actions were taken resulting in just over 77 tonnes of CO_2e being saved across all behaviour themes, including 75,100 miles actively travelled; 138, 347 miles travelled by public transport; and 355 kg of coffee cups diverted from landfill. The recommendation is to continue to invest in the development of Green Rewards to reward positive behaviours with a focus on changing habits and teams working collaboratively, thus supporting the development of a positive culture for change. In addition to the above, other behaviour change campaigns should continue to be delivered although, as with all behaviour change, longevity of specific programmes can be an issue so effectiveness should continue to be reviewed each year with new ideas being explored potentially with the involvement of academics to bring the latest behavioural insights to bear. The staff induction programme should be updated to include details about the crisis, BU's response and most critically	4

		what they can do to help.	
BH1.4	Continue Green Impact and other student focused behaviour change programmes	The Green Impact scheme rewards SUBU for taking action for the environment. SUBU run many campaigns throughout the year and they should be encouraged to include the crisis in these campaigns. Student Services in collaboration with the halls of residence run events/campaigns for students and it is recommended these should reflect the crisis. Student induction should include details about the Crisis, BU's response and most critically what they can do to help. SUBU should be encouraged to run events as net zero, including the annual fresher's fair and summer ball.	
BH1.5	Enhance and promote existing mechanisms to reward pro-environmental behaviour	BU already has in place mechanisms to recognise and reward excellence across its various activities – the honoraria, the Excellence in Education for Sustainable Development and the Vice Chancellor (VC) Awards are all examples of existing initiatives that could be leveraged to support the crisis response. By encouraging participation in the EESD award, working with ULT to agree modifications to the criteria for the Honoraria, and establishing opportunities in the VCs Award for supporting the crisis response, staff could be powerfully motivated to bring forward innovative ways of supporting the CECAP objectives. SUBU's annual awards should include criteria linked to the climate and ecological crisis.	4

BH2 Information and communications

Helping individuals understand how they contribute to climate change through their activities at BU can be very useful in helping to encourage them to support and partake in the response.

Ref	Title	Description	Supports objectives
BH2.1	Developing a baseline of scope 3 carbon emissions and setting a target for carbon reduction.	Initial baseline established as part of the new CECAP work and targets included for some Scope 3 elements. The baseline may change over time as a better understanding of some hard to quantify scope 3 emissions develops. This would also likely shift focus as emissions sources such as flights are considered and potentially increase the cost of offsetting (e.g. through a better understanding of procurement). Besides the benefit of complying more closely with the value chain aspect of achieving net zero emissions, scope 3 emissions sources are often more tangible to people than some others - waste and travel are two examples where people can feel very directly connected to the activities causing the impact.	4

BH2.2	Ongoing annual communication and engagement plan	This recommendation is to work with the Marketing and Communications team to develop and implement an annual communications plan to ensure broad awareness of the crisis and our response across BU and, equally importantly, to encourage pro-environmental behaviours (such as reducing resource use, more sustainable travel choices, and being mindful of energy waste). The plan for each year could also include a period of focus for different topic areas (perhaps 3 or 6 months at a time) so that communications could both be broad and advance a number of specific elements each year. An example for focus would be to continue to engage with the Organisational Development Team to include material in the staff induction process as noted in BH1.3. The plan could be used to signpost students and staff to guidance and resources to help them manage their impact and support BUs crisis response. One such tool is the EAUC Scotland Air travel justification tool.	4
BH2.3	Sustainability team to work with other departments and teams to engage students in the crisis response	The student body are broadly engaged with the issues of the climate and ecological crisis and sustainability and represent a potentially significant agent in supporting our response to the crisis. The recommendation here is the development of a student engagement programme for the crisis response in collaboration with SUBU and which builds on their existing work (such as Green Day events and the Sustainability Challenge) and potentially seeks to reward students for participation. Opportunities to work with others, such as the Faith and Reflection team should also be explored. Activity could take many forms and the programme should ideally link with the wider communications plan discussed elsewhere in the CECAP.	4

ES1 Education for Sustainable Development and research

Ensure the next generation of students understand the importance of the crisis and their role and responsibility in helping tackle it. Seek opportunities to enrich the curriculum and research programmes with real world case studies.

Ref	Title	Description	Supports objectives
ES1.1	Continue to align programmes with the SDGs and include the climate and ecological crisis in all levels of programmes in the indicative content of at least one unit per level by 2022/23	Although our research indicates that 91% of programmes align with the SDGs, what is also clear is that 'alignment' has a broad definition – in some cases it means that relevant SDGs are fully integrated and for others that the link is evident implicitly only and there is no active engagement with the SDGs. While the majority of teaching could be aligned, feedback has suggested that although staff know this can happen, they are unsure how to progress. The focus of this recommendation is to ensure the Sustainability Academic Network (SAN) are providing support	2

		to staff, identifying the need for, and where appropriate providing, more formal training (such as part of a crisis literacy programme and sustainability seminars), and sharing good practice through the community of practice. Discussions indicate that the level of engagement should be with Unit Leaders as they have visibility across multiple programmes and this would align the additional knowledge with those who have both responsibility for programmes and the agency to make changes as appropriate. The ESD aim is for all undergraduate and postgraduate students to be informed about the climate and ecological crisis in each year of their studies and so have the opportunity to learn about what they and society can do to mitigate and adapt to their changing world. All levels of programmes embed the climate and ecological crisis, defined as considering at least one of SDGs 13, 14 or 15, in the indicative content of at least one unit per level by 2022/23 and so engage staff and students in a conversation about the crisis. The SAN will review and build on this objective and develop and implement a robust method for capturing the evidence of this engagement and learning by 2021/22. Further co-creation of this aim is expected as the CECAP evolves and is implemented over the next 10 years. One way to collate and share best practice would be to further promote the Excellence in Education for Sustainable Development Award so that positive actions can be recognised. A potential way of further ensuring broad engagement with this initiative is to create a requirement in Brightspace where a specific response to how a programme aligns with the SDGs must be recorded. What is also needed is feedback from the students on their learning outcomes from learning about the Goals and the Crisis.	
ES1.2	Continue to align research with SDGs.	We know that over half our research projects already have some alignment with the SDGs and this recommendation is to continue to push forward with the ultimate aim of all research projects aligning with at least one SDG. There is now a requirement in place that all research proposals must say which SDGs they align with (e.g. through Intention to Bid forms). Data from these proposals should be gathered and analysed to understand the extent to which projects that are not aligned are being approved with discussions with the Research Development and Support team to see how the process can be strengthened so that that there is an expectation that projects will explicitly align with one of more SDG with the aim, ultimately, that projects	2

		which do not align are not taken forward.	
ES1.3	Review approvals process for new programmes	When new programmes are created, they go through a process of approvals before being offered to students. This recommendation suggests reviewing and amending as necessary these approvals processes, particularly at Faculty stage, so that all courses are required to recognise their alignment with specific SDGs (rather than a broad statement about SDGs generally so that they can be seen to 'own the goals' to which they are aligned), and that this is explicitly set out as part of promoting the course to prospective students and an indication of how these issues will be conveyed to students prior to approval.	1, 2
ES1.4	Develop a Living Labs programme to support the CECAP	A Living Lab programme can be a useful way of engaging staff and students in our response to the crisis and can lead to meaningful changes to both physical infrastructure and the way we do our work. The Living Lab could be structured and focused in various ways and this recommendation is for the SAN/ESD CoP to collaborate with SUBU to define a Living Lab programme and to maximise co-creation and co-learning opportunities for staff and students while building in flexibility to the way projects are identified, giving students the chance to bring forward their own ideas. The aim, as it relates to the CECAP, should be to provide opportunities for staff and students to enhance their crisis literacy, work on projects with meaningful outcomes, and to develop innovative responses to the crisis. It may be beneficial to refer to guidance on Living Labs published by the EAUC: https://www.eauc.org.uk/living_labs_opportunities_benefits_and_challeng	2, 4

AR1 Adaptation and resilience

Many of the recommendation which might have been included here have been embedded in other areas, although the issue of staff understanding the need to have their own response to climate challenges is highlighted below.

Ref	Title	Description	Supports objectives
AR1.1	Support staff to develop personal resilience plans	As part of the annual CECAP communication plan, provide guidance for staff and students to develop personal resilience plans (based on the Dorset Local Resilience Forum information (https://www.dorsetprepared.org.uk/) which will support them with issues such as working in extremes of hot weather.	7a

NB1 Capital projects

Most of measures in this theme would be facilitated by a revision to the Sustainable Construction Policy which is useful as that process does not require any capital investment although it will have implications for future works. The updating of the policy will however take time and it is worth noting that, although BU has paused the majority of new capital development works which are not currently on site, for projects in design, these recommendations present the opportunity to review the proposals more ambitiously with a view to moving closer to a net zero emissions outcome and indeed this may be necessitated to some degree by evolving legislation. Indeed BU's sustainable construction policy already sets outs our ambition to build better buildings and will need to be updated to reflect this change in standards.

For future building projects, we should adopt the UKGBC Net zero framework definition which will focus attention on both embodied and operational emissions. Contracts should include for embodied carbon to be assessed as part of design and as built embodied carbon offset as part of project delivery costs. As an illustration, Arne House was assessed during the project and the embodied carbon estimated as 3,481 tCO_2e. Based on current costs of good quality offsets, this would have added between £21,000 and £350,000 to the cost of the building. At the suggested initial internal price of carbon (£19/tCO_2e), the offset cost would have been £66,000. Note that the UKGBC framework is still being developed and guidance for considering renewable energy and offsetting (as well as end of life impact) are yet to be published and may have an impact on what would be considered an acceptable approach under the framework so this should be kept under review.

With the ongoing decarbonisation of the mains electricity supply from the grid making electricity less carbon intense than natural gas and to drive down operational emissions, we should review our approach to space heating and hot water in all new developments. We should prioritise the use of electricity as the primary fuel source for space heating and domestic hot water generation, only using gas where necessary for process functions (e.g. laboratory gas taps). New developments should also maximise the installation of renewables, such as PVs, and should design with this in mind.

We should also ensure that nature-based solutions are prioritised over hard-landscaped approaches in all possible cases and that each project contributes to a net gain in biodiversity. For example, the proposed Arne House includes a rain garden following liaison with SciTech academics and this type of approach should be standard practice in the future. All new buildings should also assess the risk of future climate change and ensure that they are resilient to climate shocks and stresses. Over time, other capital projects (such as major IT schemes or new research proposals) should include a climate change risk assessment to ensure impacts are appropriately considered and mitigated.

The way in which we consider project finances should also be reviewed and an approach which appropriately recognises the contribution of, for example, nature-based solutions to the lifetime cost and value of the building adopted.

Ref	Title	Description	Supports objectives
NB1.1	New builds that respond to the climate and ecological crisis	The recommendation is in two parts; first to create a focus on operational performance outcomes by adopting the UKGBC Net Zero Carbon Framework, and second, to require the production of a climate and ecological crisis risk assessment for all projects. To support the Net Zero target any new builds should adhere to the UKGBC NZC Framework definition. This will mean offsetting the cost of embodied carbon at the point of completing the building and, of course, any ongoing emissions annually as part of the broader offsetting strategy. The framework is being continually developed and will soon provide guidance on how renewable energy and offsetting	3, 5, 6, 7a

		plays a role in the net zero agenda. In order to understand both the embodied carbon and operation emissions and apply the framework, specific studies need to be undertaken during design and construction. BU already use the CIBSE TM54 methodology for operational emissions, but it is essential that all modelling influences design rather than simply reflecting it. This means that it must be carried out early enough to influence the outcome of the design stage in which it is completed rather than at the end when it acts more as a check than a design tool. Additionally, consider developing a BU specification for intelligent buildings to support optimisation of operational performance in a range of areas including utilisation, energy, carbon, etc. This could build on the work establishing a brief on the Arne House project already undertaken. The second strand is that all future capital projects should be required to produce a climate and ecological crisis risk assessment, including GHG emissions (operational and embodied) as a minimum, but other issues such as CC adaptation could be addressed as well. This element might initially focus on construction projects but could be applied to a broader range of projects over time. In this way, projects such as IT, procurement, or research proposals could be captured and required to consider their climate and ecological impact. As maturity around this issue continues to grow more controls could be added such that projects likely to have poor CC outcomes are required to improve or not be pursued. This recommendation should be facilitated by incorporating its key elements into the review of the Sustainable Construction Policy scheduled for later in 2020.	
NB1.2	Ensure budget setting reflects required project outcomes.	This recommendation seeks to prevent sustainability outcomes being seen as ‘additional’ and thus be prone to being watered down or removed during exercises to control overall budget. Ideally, this should be achieved by redefining the minimum performance standards required for new buildings, but there may still be occasions when elements of design are described as ‘additional’ cost, particularly as industry increases its understanding of how to deliver net zero buildings. Responding to the outcomes recommended in NB1.1 enabled through an update to the Sustainable Construction Policy (scheduled for late 2020), this recommendation is to develop formal guidance around budget setting and how to treat changes in budget through the project life. Specifically, this means that the sustainability outcomes for projects must be seen as compliance issues which are mandated for the project to be approved at each gateway - the guidance need not be extensive but should recognise that it is not	1, 3, 5, 6, 7a

		acceptable to derogate unless all other opportunities to reduce cost have been explored, including, for example, reducing the size of the building.	
NB1.3	Enhance effectiveness of minor works programme to address the climate and ecological crisis	Much good work is already carried out through our Minor Works programme, but the climate and ecological impact is not well understood or formally captured. This recommendation is to ensure there is an effective but not overly onerous process in place to guide decision making (i.e. so that impact is considered, and the least impactful option followed wherever possible) and which can provide a simple audit trail. This process should also be aligned to the ISO50001 approach currently being developed. Alongside this, as minor works are often delivered by term contracts through national frameworks, we will engage with procurement to explore the ability to influence how the frameworks are set up in the future.	1, 5, 6
NB1.4	Maximise the climate and ecological benefits of large scale refurbishments	Develop an approach to make sure the opportunities presented by large scale refurbishments are realised. Although there will be limits to the savings which can be technically and affordably achieved in existing buildings, opportunities should not be missed – a specific example is the retention of old, oversized and inefficient cooling plant due to the cost of removal or replacement, or because there may be a chance that it might be required later. The approach could, for instance, include a default position that old plant is removed (and that the cost of removal is a required element of the works) and the potential to retain it critically appraised. Potentially the BREEAM Refurbishment and Fit Out scheme, or selected parts of it, could also be used to focus attention on energy, carbon, and other sustainability issues which support the crisis response.	1, 5, 6

NB1.5	Prioritise nature-based solutions	Wherever possible, nature-based solutions to design issues such as controlling storm-water run-off should be prioritised, even where this requires additional funding. This can be justified by considering the eco-system services provided by, for example, SUDs systems which provide habitats for flora and fauna, visual interest and amenity for our staff, students and visitors and an opportunity to connect with nature. We are already starting to see this sort of approach being adopted (as in the Arne House proposals), but this recommendation is to formally set out expectations as part of the review to the Sustainable Construction Policy in late 2020 to enhance the existing biodiversity net-gain requirement.	3

Existing buildings

Uncertainty about the future of specific buildings is likely to curtail activity to reduce emissions in those cases as investments may not payback before significant changes or disposal of the building occur. This is a perennial problem in tackling emissions in an existing estate and can be addressed in several ways:

- Only invest in ECMs where payback is likely before any planned major changes. Although we can never be 100% certain about the future and plans do change, this is the approach which protects investments most robustly.
- Accept that some investments may not achieve a payback if changes occur before the anticipated date indicated by the payback calculations. This approach provides the most flexibility to invest in ECMs and also recognises that in order to make significant GHG savings, some investment without payback may be necessary (for example, paying for offsets). This approach also allows for changes in plans which see buildings operating without significant change for longer than originally planned – a very common occurrence in many instances. Finally, even if changes do occur early, the carbon savings up to that point will have been realised and that does have value.
- Protect payback periods. This is to say that once an investment is made (perhaps above a certain financial threshold), it is accepted that the building cannot be significantly changed until payback has been achieved (or at least the estimated payback period has expired). This approach means investments are protected, although it still offers no ongoing advantage in terms of prolonged carbon savings; this is only an issue if the changes implemented result in an increase in emissions.

EB1 Optimisation of existing building energy performance

Across the existing estate, there are a range of areas where building performance might be enhanced. This measure brings together these areas under an optimisation heading.

Ref	Title	Description	Supports objectives
EB1.1	Roll-out LED lighting to all BU buildings	Continue with the roll-out of LED lighting across the estate with a target that 95% of all light fittings are LED by July 2023. This programme is already well underway and includes projects currently identified and estimated by the Energy Team to equate to ~27tCO_2e saving per annum. The caveat to this is where specialist lighting is required and no LED alternative is available, hence a 95% rather than 100% target.	5

EB1.2	Continue with RGF projects as they are identified	In addition to LED lighting upgrades, projects such as replacing / enhancing insulation and upgrading water heaters tend to offer relatively small carbon savings but are also quite economical so paybacks are good. These projects should continue to be pursued for as long as they are available.	5
EB1.3	Carry out estate-wide energy focused BMS audit	Improvements in building controls can readily achieve savings in the region of 5 - 15% of energy consumption, often at relatively low costs in the order of £400 - £500 per tCO_2e. A programme of BMS upgrades is currently underway and an energy focused review should be undertaken as soon as possible. Note that it is not necessarily the case that works to all buildings must be complete before starting the reviews as it may be that the optimisation programme could follow behind upgrade work addressing each building as they are completed.	5
EB1.4	Optimisation of new Gateway buildings	The optimisation works are on-hold currently but should be commissioned as soon as substantive occupation is achieved and funds are available. This covers both the Poole and Bournemouth Gateway Buildings as work will be let as a single contract.	5
EB1.5	Poole House smoke vent compressor	The smoke vents in the Poole House atrium are currently driven by compressed air requiring the use of an air compressor. The compressor operates intermittently in order to maintain system pressure should the smoke vents be required whether they are operated or not. Compressed air systems are notoriously inefficient due to systems leaks and compressor losses. The recommendation is for this system to be replaced with an electrically driven alternative.	5
EB1.6	Fan and pump replacements, and control enhancements	Not all identified replacements and control enhancements in the previous CMP were carried out. Although this was mainly due to areas being reconfigured, there may be benefit in carrying out a review to see if opportunities for replacing pumps and fans, and / or enhancing controls (such as through the addition of VSDs) still exist.	5
EB1.7	Consider options to enhance PPM and reactive maintenance impact	Maintenance activity is already very good and the close liaison between teams should continue such that opportunities to support lower energy / carbon choices are identified and, where necessary and viable, cross-funded. However, this recommendation is to develop a more considered approach to maintenance which draws on other work such as condition reports, surveys, etc such that opportunities to improve climate and ecological outcomes can be identified. One approach may be to develop guidance for staff so that a hierarchy of responses to common PPM and reactive maintenance activity is worked through in each case. This process would also support the ISO50001 implementation.	5

EB1.8	Upgrade Talbot Campus transformers	This project focuses on reducing the energy losses associated with older, less efficient transformers. It has been planned for some time and should be implemented as soon as funds become available. One issue which has probably not been considered previously however is the potential increased demand should heating be switched to electricity in the future. This is likely to present significant additional demand on local electricity infrastructure so any upgrade to transformers should take this into account to avoid the need to upgrade again in the near future.	5

EB2 Transition all buildings to electrically derived heat (other than Poole House Biomass)

As a priority we should prepare to move away from natural gas a source of heat and focus on developing an approach to transitioning to electrically derived heat. Early work should involve identifying pilot projects to understand the challenges and how to overcome them, trialling technologies, and building skills and experience in the relevant Estates team.

As discussed above, moving away from natural gas is crucial to staying within GHG budgets. The cumulative emission impact of delaying a move away from gas is highly likely to result in overshoot and, if a net zero approach is adopted, significantly higher offsetting costs. A move away from natural gas could, theoretically, be achieved in various ways such as moving to a gas / hydrogen blended fuel or electrically derived heat. While a significant proportion of existing boiler plant can cope with an injection of around 30% hydrogen to the gaseous fuel mix, its availability is unknown and plans for hydrogen injection are only just emerging. Add to this the fact that hydrogen injection is not permitted by the gas utilities at present, except for officially sanctioned trials, and that hydrogen production is not currently derived in a low GHG way and it makes a poor choice at this time, particularly considering the urgency of action. However, given the recent programme of boiler plant upgrades and the fact that they will be in place for some time, it would be prudent to continue to monitor developments in this areas as hydrogen may become viable towards the end of the life span of this plant even if it is not before our 2030/31 target date.

We have modelled a measure which focuses on replacing local gas fired boiler plant with electrically driven heat pumps across the BU estate as this has several advantages:

Advantage	Description
Heat pump technology is available now	The technology to implement is available now with more manufacturers entering the market and more products becoming available.
Building by building approach provides flexibility	By taking a building by building approach, solutions can be tailored to individual situations and, should hydrogen become available before the rollout of heat pumps is complete, this could be considered and utilised where appropriate.
Cheaper technology swaps later	As new technology becomes available, the capital cost of technology swaps at building level is less costly than revising the technology in a centralised system.

It is important to also recognise the disadvantages of this approach.

Disadvantage	Description
Heat pump technology is	The temperature of the low temperature hot water is typically around

generally low temperature	45°C which presents issues for the generation of domestic hot water.
Plant life expectancy	Whilst ground source heat pumps have a slightly better operational life expectancy, air source heat pumps have a design life of around 15 years.
Maintenance expertise	Heat pump technology requires a different skill set to traditional boiler plant and this is more aligned to refrigeration engineers who may not understand the wider implications of the buildings heating systems.

To facilitate the move away from natural gas, the following projects are recommended:

Ref	Title	Description	Supports Objectives
EB2.1	Identify buildings to trial replacement of gas boilers with heat pumps	To support familiarisation with technology, understanding implementation challenges, etc, a series of feasibility studies should be undertaken to identify buildings most readily suited to a switch from gas to electricity driven heating with a view to implementing as soon as possible. Kimmeridge House is identified as a potential for switching to an ASHP solution in collaboration with a manufacturer to understand GHG (and cost) impact. In addition, the use of chemical dosing rather than pasteurisation as a means of controlling legionella risk should also be examined at the same time to inform future upgrades. An important consideration will be the timing of this work such that meaningful results can be obtained – the likely reduced occupancy over the 2020/21 heating season due to COVID19 is a key driver here. Where buildings are scheduled for boiler replacements in the next 5 years, these projects should be examined to see if there is sufficient benefit (on the basis of the Kimmeridge House findings) to bring forward replacement and move to an alternative to gas. In any event, new gas boilers should be avoided if at all possible as this would lock technology, and GHG emissions, in for the next 10 - 20 years unless plant replacement occurs before boiler plant is at the end of its design life which is not in itself a sustainable approach.	5
EB2.2	Identify opportunities to reduce space heating system temperatures in existing buildings	Heat from electricity is currently most efficiently delivered using heat pumps (air source or ground source) which operate a significantly lower temperature regime than traditional gas fired space heating systems. The potential to reduce system temperatures in existing building should be examined to understand the minimum requirements of the building during the coming heating season. This could be achieved through the implementation / adjustment of weather compensation controls or simply reducing temperatures (with due regard to installed plant) and allowing boiler plant to operate at these lower temperatures continuously rather than shutting down overnight. Working in combination with the BMS optimisation recommendation above, this recommendation seeks to	5

		understand the minimum operating temperatures for different buildings and how they might align with alternative heat sources.	
EB2.3	Monitor new technologies and seek opportunities to trial	The development of new technologies is likely to play a significant part in decarbonisation activity in the latter part of the period to the target year. Technologies such as hydrogen combustion, fuel cells, piezo electric generators should be monitored and opportunities to trial sought out so that carbon reduction and first mover advantage can be gained.	5
EB2.4	Replace dependence on LPG at Chapel Gate	As natural gas should not be seen as a go to solution for heat, the likely option is to use electrically driven technology as a replacement for LPG at Chapel Gate. However, this measure is likely to be closely associated with the redevelopment of the site so that is the point at which to consider implementation.	5

EB3 Enhance efficiency of cooling provision

Across the existing estate, a significant amount of cooling capacity is installed some of which is not optimum in terms of efficiency. This measure brings together several specific activities to improve the efficiency of cooling provision on Talbot Campus

Ref	Title	Description	Supports objectives
EB3.1	Optimising cooling provision at Talbot Campus	This recommendation focuses on reducing the number of locally installed and controlled cooling installations across Talbot Campus. The aim would be to remove existing split units and replace, where necessary, with more efficient more centralised systems. The extent of centralisation could vary and the recommendation is to undertake an initial feasibility study to examine the potential approaches and their relative merits. The feasibility study would need to ascertain potential savings offered by such a solution, the practical constraints, and how it could potentially link successfully to an associated heat network. This could assist with balancing energy demands and improving overall efficiencies. The option exists for separate heating and cooling pipework circuits within the ground served by a primary water to water heat pump installation and supplementary air source heat pumps to allow for any imbalance in load. In this instance each building would have a plate heat exchanger served by the LTHW and/or CHW loops. A simpler and more energy efficient solution might be to provide an ambient loop served by a mixture of ground source loops and an air source heat pump installation to maintain the loop temperature at the extremes. In this instance all buildings would have a water to water heat pump installation connected to the loop.	5

		Finally, more localised solutions, such as utilising rejected heat from Jurassic House to provide heat to adjacent buildings given the year round cooling demand could also be included in the study.	
EB3.2	IT cooling	This recommendation has several parts but the common goal of optimising cooling provision associated with specialist IT spaces. For data centres, implementation of hot / cold aisle containment (room based or chimney type). Depending on the requirements of the cooling equipment, it may be possible to use rejected heat elsewhere such as to pre-heat hot water in adjacent buildings. The existing cooling provision at the data centre does not take advantage of any direct free cooling solution – previous studies have suggested that local air quality may be an issue but a review to ensure no new approaches or technology should ideally be included in the development of cooling upgrade projects. Similarly, distributed server and comms rooms may also benefit from free-cooling where their location, air quality conditions, and appropriate technology exist. While those server and comms rooms under the control of central IT currently operate with set points of 23 – 24^{o}C, there are several faculty -controlled spaces where there may be room for optimisation of temperatures. Performance data from centrally controlled spaces would provide a basis for engagement with those responsible for these areas and support adjustments in set points where appropriate.	5

EB4 Maximise building utilisation

Ref	Title	Description	Supports objectives
EB4.1	Better monitoring of building utilisation.	The focus of this recommendation is to better understand the actual utilisation of our buildings as opposed to basing our understanding on the timetabled usage with a view to identifying where efficiencies might be possible. For example, this work could support a move to close down general space in certain buildings outside 'core hours' and consolidate the out of hours activity in a smaller number of our most efficient buildings. There may also be an opportunity to engage with academic staff to compress timetabling into core hours so that buildings are as occupied as possible during the day. This should build on the work already undertaken looking at the brief for intelligent building design on the Arne House	1, 5

		project and the opportunity to establish a feasibility study in the Fusion Building.	

EB5 Adopt active energy management principles across University

These measures depend on there being sufficient capacity within the energy management team to adopt the various practices recommended below. With the recent addition of a new post in the team, it is hoped that these measures, supported by the recently installed new AMR system can be implemented with current resourcing levels.

Ref	Title	Description	Supports objectives
EB5.1	Adopt active energy management principles.	This recommendation highlights actions to build on the work of installing the new Automatic Meter Reading (AMR) system, the BMS upgrade programme, and the implementation of ISO50001. These come together to provide the data to be analysed (via the AMR), the controls necessary to make changes in response to the data (through the upgraded BMS), and a rigorous approach to the processes required (ISO50001). This recommendation is to use Monitoring and Targeting techniques to establish likely energy demands for buildings and actively remedy excess consumption over time. One way to approach this could be to start with one or two key buildings to establish process and where good data for energy consumption and driving factor is available. Initial assumptions about a driving factor are likely to be required (for instance hours of operation) but these should ideally be replaced with measured data over time where available - the use of intelligent building data could potentially significantly enhance this analysis. The monitoring and targeting activity should ideally use CuSum (Cumulative Sum control chart) or similar analysis to establish forecasts of the likely best sustainable performance and the use of techniques such as overspend league tables provide a simple approach to identifying variances between expected and actual consumption.	5

EB6 Reduce water consumption

Water efficiency will continue to become a greater priority in future years both due to potential scarcity and the resultant increasing cost. These measures are aimed at reducing consumption across the estate.

Ref	Title	Description	Supports objectives
EB6.1	Rainwater harvesting	Examine opportunities for rainwater harvesting on existing buildings. While this could potentially be for use in the building, it could also support wider habitat creation initiatives where it is used for irrigation, in rain gardens, or in blue infrastructure on campus.	3, 5, 6

EB6.2	Greywater recycling	More complex and costly than rainwater harvesting, there may be a potential for greywater recycling opportunities. These should also be examined, particularly when buildings are undergoing major refurbishment works.	3, 5, 6
EB6.3	Purified water systems	Purified water systems in laboratories can often be misused with highly treated water being used for processes which don't require it. Additionally, some systems use regular flushing regimes to maintain water quality. We have a number of small, local units in our laboratories which are controlled by academics and this recommendation is to engage with them to understand the use of purified water to ensure it is appropriate, and also to examine the potential to influence the procurement of new, more efficiency units as and when they are purchased.	3, 5, 6
EB6.4	TC borehole feasibility study	There may be the potential to utilise water from an underground aquifer below Talbot Campus and so reduce potable water consumption for some applications. This recommendation focuses on an initial feasibility study to determine whether the aquifer is accessible and extraction is likely to be feasible.	3, 5, 6

EB7 Refrigerants

Ref	Title	Description	Supports objectives
EB7.1	Replacement of all refrigerants with low / zero GWP alternatives	Our current Design Guide requirement is to install air conditioning plant using refrigerants with a GWP of less than 1000. Other lower and zero GWP refrigerants are available and, over time, more are likely to come to market. This recommendation is to continue to monitor the availability of appropriate lower / zero GWP refrigerants that can be specified for new systems or those where they can be used to charge existing systems during routine maintenance and regasing. There are also a number of zero GWP refrigerants available and a wider target would be to move to the use of only zero GWP refrigerants by 2025/26, or sooner as the market allows.	5

NA1 Nature

Our response to the ecological element of the crisis is to be developed, but we include here a specific recommendation for action we can take now to start to address this issue.

Ref	Title	Description	Supports objectives
NA1.1	Update relevant	Update Biodiversity and Sustainable Construction Policies to	1, 3, 7a

	policies to include NBS	include commitment to implementing NBS on campus wherever possible to mitigate/adapt to CC impacts.	
NA1.2	Consider co-benefits of approach to offsetting	In developing our approach to offsetting, we should consider opportunities to realise co-benefits offered by NBS such that investment can have a broad positive impact on the climate and ecological crisis.	3
NA1.3	Identify opportunities to support nature	Existing buildings and infrastructure can provide valuable habitats for nature. By taking advantage of features such as sheltered overhangs, green spaces, and appropriate rooftops, opportunities to provide nesting and roosting sites for birds, mammals, and invertebrates as well as botanical habitats can be identified and implemented very cost effectively. This recommendation is to actively seek out these opportunities to provide habitats and also to ensure that such sites are appropriately maintained by implementing a habitat management plan for each campus so that where diversity and abundance is increased initially it is not compromised later through the degradation of the habitats. Additionally, we should seek opportunities locally to enhance NBS in partnership with others (e.g. promoting volunteering and awarding planting of trees as competition/Green Rewards prizes).	3, 4
NA1.4	Encourage staff and students to connect with nature	We should actively promote the benefits of spending time in nature for staff and student physical and mental health and wellbeing[7], and ensure that the BU Wellbeing Group promote spending time in nature as one of the strategies for staff and students dealing with mental health and wellbeing concerns.	4
NA1.5	Incorporate nature into education and research	While it may not always be possible, we should actively seek out opportunities to weave NBS into education and research to further the understanding of both our students and the wider community of our place in nature, our reliance on its health, and how we can enhance it.	

RE1 Renewables

The focus of this theme of recommendations is on photovoltaics as these are the most readily deployable means of generating electricity on-site. As these opportunities are exhausted, there is the potential for examining other renewables (e.g. wind turbines) on some of our sites, such as Chapel Gate.

Ref	Title	Description	Supports objectives

[7] https://www.gov.uk/government/news/marine-and-coastal-areas-linked-with-better-health-and-well-being

https://www.sciencedirect.com/science/article/abs/pii/S0272494418308557

RE1.1	Building mounted PV arrays	Although much of the most obvious PV installations have already been completed (or will be shortly), the CECAP requires that as many opportunities are taken as possible. A high-level review of the potentially appropriate roofs and facades of BU building indicates that there may be around 4,600m^2 of roof space and 770m^2 of façade to which PV could potentially be applied. Feasibility studies should be undertaken to further understand the likely cost / benefit of installations on the following buildings: – Christchurch House (roof) – Dorset House (roof and façade) – Student Centre (roof and façade)	5
RE1.2	Install solar canopies over appropriate car parking	Two potential opportunities to install solar canopies to existing open car parks have been identified: The main Chapel Gate car park and Car Park B on Talbot Campus. The Chapel Gate site represents the opportunity to install a significant amount of PV energy generation from solar canopies. There is currently a project scheduled to resurface the car park implying a reasonable level of certainty that the area will remain unchanged for some time. An additional opportunity to install a wind turbine on this site may also exist, although the proximity to the airport may restrict the height, and therefore capacity, of the turbine. Car Park B on Talbot Campus also presents an opportunity but there is a risk that the future redevelopment of Talbot House may shade some, or all, of the area. To mitigate this risk, a scheme could be developed where the fixing of the canopies to the ground could be done in such a way as to allow easy relocation with minimum disturbance to the car park surface. Feasibility studies should be undertaken to understand the likely cost / benefit of these two potential installations and the status of other car parks should be kept under review as lease arrangements on Talbot Campus may change in the future and make other locations potentially viable.	5
RE1.3	Examine the potential for battery storage technology associated with PV arrays	The use of battery storage can maximise the potential impact of PV arrays by making energy generated in low demand periods (e.g. over the weekend) available at times of higher demand. The use of such technologies can also put BU in a strong position as time of use tariffs come into play and should variable carbon intensity reporting be implemented in the future. The recommendation is to undertake a feasibility study to understand the potential for battery storage associated with on-site energy generation.	5

Transport

Since 2003, BU has had a travel plan and its implementation has facilitated significant movement towards utilising more sustainable modes of transport. We have released a refreshed Travel Plan every five years, the most recent of which covers the period 2019-2025 which aligns to the principles in BU2025 Strategic Vision, setting out new and updated measures to meet the overarching aim:

"To enable all campus users to travel as sustainably as possible to enhance staff and student experience and minimise both on and off campus environmental impacts of BU's operations, in alignment with BU2025 and Fusion principles."

One of the drivers for the new Travel Plan was to support the existing carbon reduction target of 50% by 2025/26 against the 2005/06 baseline, but it equally supports the new net zero emissions target set out in this CECAP. It contains a wide range of measures to support reductions in the amount of travelling we do and, where travel is necessary, a move to more sustainable modes. Not all those recommendations are reproduced here, rather we focus in this plan on those measures which are in addition, or where thinking / action has moved on since the travel plan was published.

When the travel plan was prepared, no-one could have foreseen the C19 pandemic or its impact on the amount and way we travel. Transport measures are a key priority for the next three years in order to take advantage of the learning gained from the C19 lockdown and several of the measures below reflect that particular focus.

TR1 Support the uptake of electric vehicles

Ref	Title	Description	Supports objectives
TR1.1	Reduce the impact of the BU bus fleet	A key opportunity to reduce transport related scope 3 emissions will be the contract renewal point for the bus fleet in 2026 and this recommendation has two strands: moving away from pure diesel fuelled vehicles and working with the provider to improve driving efficiency. We are already considering the feasibility of introducing fully electric vehicles in 2026. However, the capital cost of electric buses (around 2.5 times that of a Euro 6 diesel equivalent), the cost of charging infrastructure, and limited battery life and high replacement costs may be limiting factors. One way to balance this may be to accept a reduction in the revenue surplus generated by the bus operation (currently around £200,000 per year) to allow for the increased cost of operation and to support the installation of the charging infrastructure required for electric vehicles. Alternatively, hydrogen fuelled busses are a potential option but the full carbon cost of hydrogen production is still very high and this will need to be considered closer to the contract renewal date. The bus provider contract already includes a requirement for drivers to receive eco-driver training, but we will aim to strengthen this requirement through the provision of assurance that training has been undertaken, regular refresher training, and potentially, in vehicle systems to support efficient driving. These ideas will also be explored as part of the re-tender process.	5

TR1.2	Move to all electric vehicle fleet by 2025	Target for 100% of fleet to be EV by 2025/26 through procurement contract. Good progress has been made toward this target and we are on track to deliver across most of the BU vehicle fleet, including the provision of all-electric pool cars. An area where there is a more of a challenge is with larger commercial vehicles (large vans and mini-buses) as the costs of such vehicles is still prohibitively high in the current economic climate and the range is still limited which could be a problem for longer journeys. That said, trials of electric mini-buses have gone well and manufacturers are continually bringing more vehicles to market so, while we expect these vehicle types to follow on from cars and small vans, we still anticipate meeting the target date of 2025.	5
TR1.3	Implement staff salary sacrifice scheme for EVs	BU do not presently operate a staff car scheme but this recommendation proposes the creation of a scheme where those staff who have no choice but to drive to campus could lease an electric vehicle through salary sacrifice in the same way as a standard company car scheme. The key difference here is that there is an early adopter benefit likely to make this an attractive option to staff due to changes in tax regulations meaning no Benefit In Kind tax is payable in 2020/21 and reduced rates of 1% and 2% in 2021/22 and 2022/23 respectively. Implementation of the scheme would require sign off from the Finance and Resources Committee and is scheduled for discussion in autumn 2020.	4, 5

TR2 Reduce the impact of business travel

Ref	Title	Description	Supports objectives
TR2.1	Revise the Business Travel Policy and support with communications and guidance	This recommendation focuses on revising the Business Travel Policy to increase the focus on only travelling when necessary and selecting sustainable travel modes wherever possible. As well as a general revision, there are a number of specific areas where policy could be strengthened. The first is to significantly limit the number of domestic UK flights taken on BU business. Such flights are particularly damaging to the environment due to the high proportion of the total flight time spent taking off and landing which are the most impactful parts of the journey; they are also difficult to justify in many cases as far less impactful travel modes are very often available. While the policy should include provision for domestic flights to be taken in some circumstances, the conditions where this is acceptable must be very carefully considered (e.g. staff returning home from a UK business trip due to a family	1, 4, 5

		emergency) and the approvals process robustly applied. In addition, staff using their own vehicles for business travel ('grey fleet') brings several challenges; we have no ability to control the vehicles used on BU business so carbon emissions may well be higher than might otherwise be the case and capturing data to report carbon impact is problematic due to the way expenses are claimed. Enhancing the policy to maximise staff use of the Travel Direct tool provided by Enterprise such that they only use their own car in exceptional circumstances would mean that when cars are required for business travel they are sure to be low or ultra-low emissions and accurate mileage data will be captured, in turn allowing for more accurate reporting. We have included specific suggestions for enhancing the Business Travel Policy for this issue and more broadly in Appendix 11: Policy review, including an explicit reference to the polluter pays principle discussed in other recommendations. This recommendation also suggests that the publication of a revised Business Travel policy should be highlighted as part of the annual communications plan and potentially accompanied by suitable guidance and tools such as the EAUC Scotland Air travel justification tool which seeks to highlight the value and impact of business travel as well as alternatives.	
TR2.2	Provision of EcoDriver training	The way in which vehicles are driven has a significant impact on the energy consumed and thus the associated carbon emissions. The Travel Plan recommends using data analysis to highlight outliers but without significant data availability and processing this may not identify all instances of inefficient driving so the recommendation here suggests that completion of EcoDriver training become a pre-requisite for use of fleet vehicles and that this training is refreshed at regular intervals (suggest every three years).	4, 5
TR2.3	Introduce stop-start technology on new buses	Although the introduction of this technology had been scheduled for 2020/21, financial constraints mean that bus refits are now somewhat more limited. However, the recommendation still stands and should be implemented at the contract renewal point in 2026 (if an opportunity doesn't present itself sooner).	5
TR2.4	Refresh the BU bike share scheme	The Travel Plan includes recommendations in this area but work since the plan was published suggests that a refresh of the several schemes in this area would be beneficial. BU By bike: This scheme, provided in conjunction with a local bike shop, sees ~60-65 bikes loaned to students and staff for the academic year. Electric bike loan scheme: Under this initiative, staff can borrow an electric bike for a week to see how it works for their	4, 5

		commute to encourage uptake of sustainable commuting modes. Inter-campus ebike: Staff are able to borrow an electric bike to travel between campuses. Beryl Bikes : This bike share scheme is being actively promoted by BU and they are looking to introduce electric bikes to their fleet with BU having an electric bike located at each site. This recommendation focuses on continuing the initiatives above and also to refresh promotion of the schemes to increase uptake.	
TR2.5	Work with suppliers to only provide lower impact commercial hire vehicles	BU currently have two contracts in place for hire vehicles – one with the hire of commercial vehicles, and one for cars. A new contract is currently being arranged with Enterprise which will restrict available hire cars to low or ultra-low emissions vehicles which will achieve a subsequent reduction in emissions. Some constraints exist in the potential benefit of this measure for commercial vehicles, however. The use of electric vehicles (EVs) would provide the greatest emissions savings but they could not currently be used for anything other than quite short journeys due to range limitations and may meet with resistance from staff for the same reason. Hybrid vehicles would result in savings over conventional fossil fuel vehicles and are a viable alternative although there have previously been issues with the availability of such models in the UK so their exclusive use is unlikely to be able to be guaranteed in the short term. The recommendation is to continue to engage with the Procurement team and suppliers to understand what is possible both within the current contract (if anything), and what may be possible at the contract renewal point.	5
TR2.6	Provision of pool cars	In addition to requiring the use of hire vehicles for business travel as opposed to grey fleet (and linked to the Enterprise involvement in that work – see TR2.1), the provision of an LEV / ULEV pool car on both Talbot and Lansdowne Campuses would further make low emission choices more readily available to staff needing to use a car for business travel. As with the hire cars recommendation, this again supports more complete and accurate collection of mileage and emissions data. This recommendation is to pursue the provision of such vehicles and, where necessary, the supporting charging infrastructure.	5

TR3 Commuting

Data on the commuting habits of staff and students is currently collected through surveys for each group. Staff, response rates tend to be good (typically ~50%) and the questions asked in the survey mean that we

have reasonable confidence in extrapolated results. For students, response rates are generally very low and we are therefore far less sure about the robustness of data.

In both case, estimating associated GHG emissions has limitations due to the assumptions which need to be made, and our ability to disaggregate from other emissions sources and avoid double counting (such as for those commuting on the University bus as these emissions are already reported). However, even a high-level estimate indicates that they are likely to be material to the overall emissions impact and so merit a consideration of how they might be reduced.

The recent experience of all BU staff and students of operating remotely has taught us much about what is both possible and desirable. It is the intention to explore how the Work From Home Policy and Flexible Working Policy can be updated to promote a longer term move to staff working from home for a proportion of their hours, recognising that this might be more appropriate for some job roles than others and with due regard to the balance of health and wellbeing benefits and disbenefits.

There are a number of desirable outcomes with respect to commuting, all of which are more fully explored in the Travel Plan, but which include:

- Reducing the use of Single Occupancy Vehicles
- Encouraging modal shift from passive (motorised vehicles) to active modes of travel (e.g. walking and cycling)
- Promoting the use of public transport over cars
- Increasing the incidence of car sharing

The approach to achieving these aims is also set out in the Travel Plan, but we highlight here two specific issues where the situation has changed since its publication and also note that reductions and changes to commuting activity are supported by other measures such as the provision of a seamless IT service, and updates to policies related to remote working discussed elsewhere.

Ref	Title	Description	Supports objectives
TR3.1	Encourage remote working	Even prior to the Covid 19 lockdown, BU were looking at ways to encourage a reduction in the amount of single occupancy vehicle commuting as a key focus on the Travel Plan and it also included a specific measure to encourage remote working through the provision of IT tools such as video conferencing. This recommendation is to capture the lessons from the recent period of enforced remote working such that this becomes far more prevalent in the coming months and years as we learn to operate in new, more sustainable ways. Initiatives such as the phased car parking permit project will seek to move to a daily parking charge aligned with the cost of public transport as well as limiting the number of days per week that permits are available will provide a disincentive for single occupancy vehicle commuting and should see significant reductions as a result. The pilot scheduled for October 2020 should provide the data to support a wider roll-out of the scheme but staff may well be more open to increased remote working after recent experience and also BU itself has recognised that increased remote working is not necessarily always detrimental to the delivery of the core business. To this end, the Sustainability Team should engage with Human Resources to consider the Home Working and Flexible	1, 4, 5, 7a

		Working policies to identify potential changes which would further support remote working as part of the recommended wider policy review. It should be noted that balance of impact of increased remote working is not clear cut. On the one hand commuting emissions go down (as do air quality and other impacts associated with less cars on the road) along with a potential reduction in the energy used in BU buildings. On the other hand, the emissions associated with staff working from their homes (e.g. increased gas, electricity, and water use) may go up and it is not at all clear that there is an overall GHG benefit. The Sustainability Team have been contacted by an academic wishing to carry out research in this area and this should be fully supported as it is likely to have impact well beyond BU particularly if the research can consider the broader health and wellbeing impacts that are also likely to accrue.	
TR3.2	Promote active travel	A number of measures focused on increasing the uptake of active travel (cycling, walking) across the BU community are included in the Travel Plan and these are all supported by the CECAP. Generally, such measures are used in an attempt to reduce the use of single occupancy cars and cars in general, but we are also hoping to encourage students particularly to switch from bus to active travel as it not only reduces carbon but also brings considerable health and wellbeing benefits. Of particular importance in supporting these initiatives is the engagement with BCP Council to improve the off-campus cycling infrastructure between sites and this work has already begun. Although it is not necessary to include the measures from the Travel Plan here, this recommendation is specifically included to promote taking full advantage of the currently allocated £250,000 capital funding by implementing works such as the provision of a new cycle compound and enhancing showering facilities on Talbot Campus which have been previously considered as soon as possible.	4, 5
TR3.3	Travel for Work loan.	While this initiative is already in place and mainly used for the interest free purchase of rail tickets, this recommendation is to include reference to it in the communication plan to highlight its flexibility (e.g. it can also be used to purchase walking equipment) and, specifically, to increase staff awareness that, since the publication of the Travel Plan, it can now also be used for electric vehicles, bikes, and motorised two wheelers, all of which are less impactful than single occupancy cars.	4, 5

Waste

WS1 Operational waste

We have two key targets that are focused on waste, one which has now expired, and one future target:

- Achieve an 80% non-residential recycling rate by July 2020

- Reduce operational waste to 20 kg per staff and student FTE per year by 2025/26

Although we saw a 5% improvement in the recycling rate between 2017/18 and 2018/19, we would need a similar improvement again in 2019/20 to achieve the recycling target which is ambitious but we are yet to understand the impact of Covid19 so whether we achieve this target is not yet clear. We include a recommendation on extending this target below.

The reduction target is newly adopted and reflects the focus on avoiding waste in the first place – performance will be reviewed every year.

As the awareness and engagement activity (such as the working with the resource reuse scheme, Warpit, working with local charities, and so on) carried out previously has been successful in improving performance, we recommend continuing with this approach and therefore do not set out existing activity below. We do however include some recommendations to supplement that activity below.

Ref	Title	Description	Supports objectives
WS1.1	Focus on supplier packaging and single use materials	As much of the waste generated on campus is derived from packaging, we recommend engaging with the BU supply chain with the support of the Procurement team to explore with existing suppliers how packaging, and particularly single use material, can be reduced, potentially through the use of measures such as take-back schemes, and exploring with suppliers more novel ideas such as soft drink refill stations. In addition to engaging with existing suppliers, we also recommend building requirements around waste into future contracts such that there is an emphasis on how products are supplied as well as the products themselves. Again, this will require input from the Procurement team.	5
WS1.2	Net zero waste contract	The existing waste provider contract is due for renewal in 2023 and, although some way off, this recommendation is to prepare for this with the help of the Procurement Team by exploring how the contract could include a requirement for net zero emissions, including opportunities to reduce vehicle emissions.	5
WS1.3	Increase and maintain recycling rate target	As the existing target of 80% recycling rate by July 2020 has now come to an end and we have not achieved it, we recommend that the target is extended to 2022/23 and increased to an 85% recycling rate. Activity to achieve this should continue with the previous campaign which has seen considerable success and the enhanced comms strategy and carbon literacy discussed elsewhere in the plan used to promote increased recycling rates.	5, 8

WS2 Construction waste

Until now we have not reported the carbon impact of waste associated with construction activities, however, data tends to be relatively good, especially for major projects. The focus here, therefore, is to ensure that the data is gathered in a consistent and robust way to allow ongoing reporting, and to set targets for reducing the volume of waste associated with construction activity.

Ref	Title	Description	Supports objectives

WS2.1	Improve collection of construction and demolition waste data	In years where there is major construction work, this waste constitutes a significant proportion of the BU resource consumption and a sizeable proportion of our overall waste related emissions. This recommendation focuses on ensuring that waste data for capital projects is collected consistently and robustly across projects where different contractors are involved. A standard pro-forma, including a worked example, should be developed which all contractors should be required to complete as a means for data collection. This consistently collected data could also feed into calculations of embodied carbon and thus the quantification of offset requirements.	5, 8
WS2.2	Set stringent targets on construction waste	The use of the highest rating of construction waste performance from the BREEAM standard could see a significant reduction in Scope 3 waste production (although worth noting the lower emissions factors for construction waste streams versus operational), particularly in the coming few years (as Arne House is delivered). Although we already set waste targets for major capital projects, this recommendation focuses on ensuring that waste must be fully considered in the design process and BUs current approach of bringing contractors onto projects during the process in order to benefit from their experience and expertise should include a particular focus on designing out waste through approaches such as pre-fabrication, etc.	5, 8

FD1 Food

Ref	Title	Description	Supports objectives
FD1.1	Reduce food impact	Food is one of the most impactful, and obviously ubiquitous, areas where we can make powerful choices every day to improve our response to the crisis. This recommendation is very general and could encompass a range of activities – we suggest a number here but undoubtedly more will present themselves over time. Arrange food offers in catering outlets using nudge theory / choice architecture such that lower impact foods appear first and at eye level. Serve vegetarian or vegan food as default at all BU meetings and conferences Remove all high impact foods (such as ruminant meats, farmed prawns, etc) from our food outlets Develop and implement a policy for local and seasonal food sourcing wherever possible	4

IT1 IT provision

Reducing energy demand of IT equipment and associated infrastructure, and encouraging efficient use will be key to underpinning a sustainable approach to the future IT strategy and continuing to supporting remote working.

Ref	Title	Description	Supports objectives
IT1.1	Support enhancements to remote working	As discussed elsewhere, the Covid19 lockdown has taught us a great deal about how to provide our IT users with a robust means of working remotely. Ensuring that we maximise the benefits of continuing a practice of appropriate and proportionate home working will be key to the delivery of a number of other CECAP recommendations. This recommendation is to ensure that the CECAP supports continued investment in the necessary IT hardware, software, and other resources required to provide users with seamless connectivity to enable remote working in a variety of forms (such as voice and video calls / meetings, virtual conference options, etc).	4, 5
IT1.2	Low energy IT and energy focused IT controls	Despite continued efficiency in the energy consumption of distributed IT equipment, the fact that it is now ubiquitous in most modern workplaces means that the cumulative impact of IT equipment is often significant. The recommendation here is firstly to ensure that any new IT equipment procurement specifically includes a consideration of energy consumption when making choices between different products and that this can be robustly reported when required. Secondly, the recommendation also supports the implementation of systems such that equipment enters a low power mode when not in use.	5
IT1.3	Review UPS provision and replace significantly under-utilised units	Improvements in the energy efficiency of IT equipment over time mean that UPS system which have been in place for some years are often now oversized for the load they support - review of existing UPS has found that around 50% of existing units are less than 25% utilised. As most of these are static systems (i.e. based on batteries), efficiency drops at part load and there is an opportunity to improve efficiency by relocating units so that they are appropriately loaded and / or to purchase new units for lower loaded rooms to increase efficiency. We recommend supporting the project to replace existing UPS in distributed server and comms rooms. This recommendation is scheduled to be delivered as part of the ongoing RGF programme (see EB1.2).	5
IT1.4	Relocation of Studland House data centre to the cloud	The relocation of the services currently provided in the Studland House Data Centre to the cloud represents an opportunity to significantly reduce the energy consumption of the building with this small area being responsible for around 45% of total electricity use of this building.	5

		To realise the best possible outcome, it will be essential that the space released by closure of the data centre is repurposed with a keen focus on minimising energy consumption.	

PC1 Procurement

We know that the impact of procurement is particularly hard to quantify due to the many and varied factors associated with the broad activity in an organisation like BU. We also know that if we could quantify the impacts, every indication is that they would likely be significant.

The recommendations below focus both on strengthening our approach to procurement (with respect to the scope of the CECAP), and to start to gather better data from our supply chain so that we can begin to understand the impact of procurement.

In some areas industry is already in a position to respond positively (e.g. zero waste to landfill contracts), whereas for others practice is not so developed. We recognise that tackling procurement impact will take time and that our approach will develop as we learn. We also recognise that we should be careful not to unduly disadvantage some suppliers (such as SMEs) in the way we go about developing our response.

It is worth noting that procurement features heavily in the operational waste recommendations, but these are not repeated here.

Ref	Title	Description	Supports objectives
PC1.1	Consider redrafting the Sustainable Procurement Policy	As an example of the potential changes to various BU policies, the Sustainable Procurement Policy has been reviewed in detail and specific comments are included as an appendix to this plan. This recommendation is to adopt the suggested changes so that the policy includes, for example, specific reference to carbon emissions, it explicitly states any key triggers for the use of the LCA (beyond cost), and improves the definitions offered in the LCA to support users understanding, including those for transport and waste. We have also reviewed the LCA template, and make the following specific recommendations for enhancing: Organise questions in the LCA as a hierarchy. Develop more realistic procurement examples for inclusion in the LCA including how to explore the potential for reuse first. Provide guidance on how to incorporate the LCA into evaluation criteria. Provide users direction regarding what questions to ask of suppliers. Provide guidance on the relative impacts of various aspects of procurement (e.g. transport, packaging).	1, 4, 5
PC1.2	Gather data on carbon (and potentially wider environmental) credentials of	The intent of this recommendation is to start a dialogue with existing suppliers which begins to position BU as a client who requires its supply chain to support our response to the crisis and with a view to starting reporting of procurement related Scope 3 emissions.	5

	suppliers	Initially this could be for major contracts and incorporate a requirement to have carbon reduction policies, water conservation policies, provide details of reporting, recent carbon reduction activity, etc. Ideally, incorporate such questions into scoring of contracts.	

RP1 Reporting

Ref	Title	Description	Supports objectives
RP1.1	Align reporting with best practice (GHG Protocol)	In order to robustly declare a position of net zero carbon emissions, it is essential that reporting of emissions aligns with best practice principles. This goes significantly beyond the requirements of the annual EMR and should be carefully considered as part of the strategy for delivering the stated goal.	5, 8
RP1.2	Enhance metering systems	Continue to invest in data capture systems to provide information for robust decision making. Provide information to staff, students and visitors to inform them of the performance of the estate and what they can do to help. It is important though that data collection is appropriately aligned with our ability to usefully utilise it.	5, 8
RP1.3	Align with TCFD reporting requirements	Build on the CC Risk Register to quantify the risks and opportunities and to publish these as part of BU's annual financial reporting.	1, 7b, 8
RP1.4	Improve data capture	As our intent is to address our impact in a broad range of areas and recognising that we want our response to be as effective as possible, we will need to develop and implement robust data capture for those impacts where our current data is patchy or unreliable, or both, such as: procurement and some elements of transport.	8
RP1.5	Improve data management	As we improve data capture and align reporting with best practice, we will need to enhance our existing processes for managing and reporting data so that time and effort is not unnecessarily wasted on these activities. This recommendation is therefore to investigate the potential role of software solutions for data management and reporting and to invest as necessary.	8
RP1.6	Set additional targets where appropriate	Although we have already established a science-based target and trajectory, we should revisit this as we get a better understanding of our impacts (especially on Scope 3 emissions sources) to ensure it remains relevant. We should also set specific targets which help focus on particular aspects of our impact, informed by better data – this may be, for instance, establishing a target for supplier packaging or staff commuting. Finally, there are areas of our crisis response where we do not currently have targets (such as nature-based solutions or	8

		habitat creation) and we should identify the potential for such targets and implement where they would be useful.	

Appendix 7: Modelling assumptions

Business as Usual

The main modelling developed as part of the CECAP is to establish a Business As Usual (BAU) case against which to estimate a range of other issues such as emissions reduction scenarios and offsetting requirements.

The BAU is based on historic data for each of the emission sources, the most significant of which is energy used in our building followed by flights. It should be noted that the impacts of Coronavirus are likely to be very significant in the short term and potentially have a considerable impact in the future. We have not attempted to model the impact at this time but will take it into account in future iterations.

Electricity

The trend of electricity consumption in our estate is declining over time although some individual buildings have seen an increasing demand. We have assumed that we will see a continuing 0.5% year on year decrease in overall electricity demand through the impact of maintenance and more efficient equipment (such as IT).

As the decrease is modelled as a percentage of the previous year, the year on year change decreases over time to reflect the fact that there is likely to be a floor to the reductions that are possible.

Gas

Most of the gas we use is for providing space heating. This gas consumption is therefore significantly affected by the weather – we use more gas through cold winters. Historic gas consumption has been normalised to remove the impact of the weather before being projected forward.

We have assumed a flat forward projection as activity to reduce space heating demand is likely to revolve around improvements to building fabric and these would typically be subject to specific projects rather than ongoing maintenance. Any of these planned changes have been accounted for through the modelling of future changes, discussed below.

Flights

There are only two years of historic data available for flights and this is not sufficient to provide an understanding of any trends. We have therefore assumed that emissions from flights will continue at 2018/19 levels.

Future changes

A key part of the future emissions landscape at BU is driven by our programme of capital projects which include new buildings, refurbishments, and so on. Where these changes occur (either increases or reductions in existing buildings, or the addition of new buildings) emissions in years following the change are assumed to remain constant.

Table 17: Summary of future changes to the estate modelled in the BAU

Project	Year of implementation	Notes
Talbot Campus: HV transformer replacement	2023/24	Replacing DSS1, 2 & 3 only-100,000 kWh.
Christchurch House: provision of new lab space and platform lift	2019/20 (Phase 1) 2020/21 (Phase 2) 2016/27 (Phase 3&4)	Phase 1 increases annual consumption by 115,000 kWh Electric and 20,000 kWh Gas; Phase 2 increases annual consumption by 80,000 kWh Electric; Phases 3 & 4 increase annual consumption by 20,000 kWh Electric.

Project	Year of implementation	Notes
Jurassic House: cooling enhancement	2023/24	Upgrading cooling decreases annual consumption by 50,000 kWh Electric.
SMC Library: redevelopment and extension	2027/28 2028/29 (Optimisation)	Projected to increase BAU consumption by 54% for Electric, Gas and Water.
Weymouth House: refurbishment of the building services	2025/26 (GF) 2026/27 (3F) 2027/28 (2F) 2028/29 (1F)	The refurbishment of each floor decreases annual consumption by 2.5% Electric.
Tolpuddle Annex 1: removal	2024/25	Temporary consent expires December 2024 with retention assumed until this date.
Tolpuddle Annex 2: removal	2024/25	Temporary consent expires December 2024 with retention assumed until this date.
Tolpuddle Annex 3: removal	2024/25	Temporary consent expires December 2024 with retention assumed until this date.
Poole Gateway Building: opening	2019/20 2022/23 (Optimisation)	Operational from 3 February 2020. Initial annual consumption 600,000 kWh Electric, 300,000 kWh Gas and benchmark 0.54 m^3/m^2 Water with optimisation generating annual savings of 25,000 kWh Electric and 15,000 kWh Gas.
Arne House: opening	2026/27 2027/28 (Optimisation)	Anticipated opening summer 2026. Projected annual consumption 600,000 kWh Electric, 300,000 kWh Gas and 0.54 m^3/m^2 Water. It has been assumed that the building will be all-electric, with heating provided by heat pump (assumed SER of 3). Projected gas consumption divided by 3 and added to electric to give projected consumption 976,000 kWh Electric and 0.54 m^3/m^2 Water. Optimisation savings of 4% Electric and 5% Gas were derived from the Poole Gateway Building.
Park & Stride: Additional car park lighting	2019/20	Increase annual consumption by 8,000 kWh Electric.
Studland House: refurbishment and reconfiguration	2019/20 (Phase 2) 2020/21 (Phase 3) 2021/22 (Additional staff)	Phase 2 boiler replacement decreases annual consumption by 56,000 kWh Gas; Phase 3 data centre cooling enhancement decreases annual consumption by 36,000 kWh Electric; Addition of approximately 300 MH staff projected to increase consumption by

Project	Year of implementation	Notes
		200,000 kWh Electric.
Melbury House: exit	2021/22	End of lease.
Bournemouth House: disposal and exit	2020/21	
Royal London House: disposal and exit	2020/21	
Exec Business Centre	2023/24	End of lease.
Bournemouth Gateway: opening	2020/21 (Opening including MRI Scanner) 2023/24 (Optimisation)	Operational from July 2020. Initial annual consumption 970,000 kWh Electric, 125,000 kWh Gas and benchmark 0.54 m^3/m^2 Water. MRI scanner consumes 277 kWh/day on a typical day, with 365 typical days assumed in year. Optimisation projected to generate annual savings of 90,000 kWh Electric and 6,250 kWh Gas.
Additional Space (yet to be determined)	2020/21	Assuming benchmark 80 kWh/m^2 Electric, 240 kWh/m^2 Gas and 0.54 m^3/m^2 Water with a floor area of 1000 m^2.
Elliot Road Unit: exit	2020/21	Disposal December 2020.
Installation of PV on the roof of Studland House.	2019/20	Expected annual generation 20,000 kWh Electric.
Installation of PV on the roof of Poole House Facilities Block.	2019/20	Expected annual generation 130,000 kWh Electric.
Installation of PV on the roof of Poole House Tower Block.	2021/22	Expected annual generation 20,000 kWh Electric.
Installation of PV on the roof of Jurassic House.	2020/21	Expected annual generation 20,000 kWh Electric.
Installation of PV on the south façade of the SMC Library.	2024/25	Expected annual generation 18,000 kWh Electric.

Emissions factors.

In line with Defra's environmental reporting guidelines, historic emissions factors applied in the CECAP have been sourced from the 2019 set of the UK Government Greenhouse gas reporting conversion factors. With the exception of grid electricity (discussed in the following section), the future projections have been assumed constant from the 2019 reported value[8].

Grid Electricity

The Future Energy Scenarios (FES) document, produced by the National Grid, discusses how the UK's energy landscape is changing. Last year's report, FES 2019[9], makes projections of how the mix of

[8] https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting).

[9] https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2019-documents

generation in the grid is likely to change between now and 2050 – the year by which the Climate Change Act 2008 set the target of reducing the UK's CO_2 emissions by 80% from 1990 levels. This target has now been revised to be Net Zero in light of the Committee on Climate Change's recent report and the declaration of a Climate Emergency.

FES discusses these projections in one of four scenarios and the BAU combines these future trajectories with the actual carbon intensity of the National Grid over the past 13 years. The reported emissions associated with electricity generation have fallen steeply since 2012 and in all cases, the FES 2019 scenarios see the carbon factor of electricity fall below 0.100 $kgCO_2/kWh$ by 2035

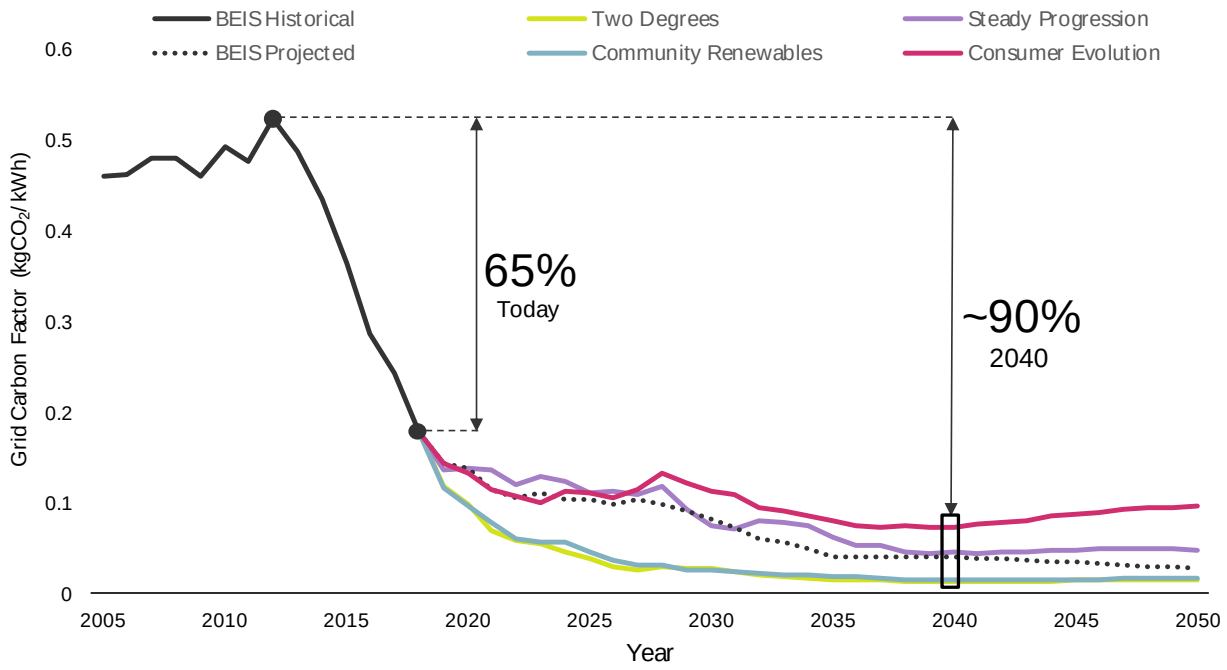


Figure 3: Historic and future projected carbon factor for the National Grid. Transmission and distribution losses are included. Sources: BEIS Green Book (historic carbon factors); National Grid Future Energy Scenarios (FES) 2019 (future projected carbon factors).

In recognition of the decarbonisation of the national grid, a future projection has been made for grid electricity. A smoothed series has been modelled between last known year for historical data, 2019, and the predicted generation-based factor for the CECAP end year, 2031, to prevent a sharp drop between historic and predicted emissions in year one of the forecast. The BU previously reported figures have been sourced from the UK Government Greenhouse gas reporting conversion factors. The predicted generation-based factor in the CECAP end year, 2031, has been sourced from the 2019 set of tables that support the Treasury Green Book supplementary appraisal guidance on valuing energy use and greenhouse gas emissions[10].

The table below shows the grid electricity emissions factors calculated using the generation-based smoothed approach for future years (note that 2004/05 to 2018/19 figures in the generation based smooth data set are UK Government Greenhouse gas reporting conversion factors).

Table 18: Emissions factors for grid electricity.

Academic Year	BU previous figures/ $kgCO_2e/kWh$	Generation-based/ $kgCO_2e/kWh$	Generation-based smoothed/ $kgCO_2e/kWh$
2004/05	0.537		0.47853

[10] https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal

Academic Year	BU previous figures/ $kgCO_2e/kWh$	Generation-based/ $kgCO_2e/kWh$	Generation-based smoothed/ $kgCO_2e/kWh$
2005/06	0.519		0.47337
2006/07	0.503		0.46673
2007/08	0.535		0.49608
2008/09	0.533		0.49381
2009/10	0.524	0.460	0.48531
2010/11	0.491	0.443	0.45205
2011/12	0.496	0.485	0.46002
2012/13	0.484	0.452	0.44548
2013/14	0.537	0.402	0.49426
2014/15	0.500	0.337	0.46219
2015/16	0.449	0.266	0.41205
2016/17	0.384	0.226	0.35156
2017/18	0.307	0.165	0.28307
2018/19		0.133	0.2556
2019/20		0.128	0.240
2020/21		0.105	0.224
2021/22		0.098	0.208
2022/23		0.102	0.193
2023/24		0.095	0.177
2024/25		0.096	0.161
2025/26		0.090	0.145
2026/27		0.096	0.130
2027/28		0.091	0.114
2028/29		0.084	0.098
2029/30		0.076	0.082
2030/31		0.067	0.067

Assumptions for measures

The following assumptions have been used in the modelling of emission reduction measures.

Table 19: Summary of the assumptions and inputs used for the proposed measures.

Measure	Assumptions
1: Energy conservation measures	Energy conservation measures type, energy savings, CAPEX and lifetime extracted from BU supplied project list.xlsx and RGF spend roadmap Jun20-Jul21.xlsx.

Measure	Assumptions
	A 2% annual inflation to energy unit cost was assumed. A 1% reduction was applied to the predicted CAPEX for each installation year subsequent to 2020 to account for learning effects.
2: Heat switch	Percentage of gas consumption associated with space heating: estimated for each building across the estate. Heat pump SER: 3.8 Implementation year varies for each building, but earliest switch is 2025, latest year is 2030.
3: Data centre closure	BU provided energy metering data for Studland House, showing that the data centre consumed 313,194 kWh in 2018 and 294,765 kWh in 2019 against building totals of 686,587 kWh and 655,453 kWh respectively. The relative consumption of the data centre was averaged over the two years and assumed to be 45% of the total Studland House consumption. It was assumed that the area occupied by the data centre would be converted into a heated space. To account for this change of use, it was assumed that the annual Electric and Gas consumption would increase by 2%. A 2% annual inflation to energy unit cost was assumed.
4: PV installation	The electricity generation of potential PV arrays on BU buildings was determined using aerial images and heuristics based on previous project experience. Array areas (m^2_ for installations on car park canopies, rooftops and facades were proposed and subsequently measured using aerial images accessed via Google Earth, taking into account any external plant or other obstructions. Array fill factors were applied, assuming 50% for flat roofs, facades and canopies, and 80% for pitched roofs. Using area rated annual electricity outputs (kWh/m^2/annum) for high efficiency panels based on maximum panel power, orientation (south, south-east or south-west) and assumed 20% inverter losses, the predicted annual electricity output (kWh) was calculated for each potential array. The CAPEX cost for each potential array was calculated by multiplying predicted annual output (kWh/annum) by the cost per unit output (£/kWh/annum). The cost per unit output was calculated using data supplied for previous PV installations at BU. The electricity output (kWh/annum) was taken from the BAU calculation and total installation cost (£) from PV Calc.xlsx. This gave an average value of £2.20/kWh/annum, with a standard error of £0.13/kWh/annum. A 2% annual inflation to energy unit cost was assumed. A 3% reduction was applied to the predicted CAPEX for each installation year subsequent to 2020 to account for learning effects. A 2% increase was applied to the predicted array output for each installation year subsequent to 2020 to account for improvements to maximum power (Wp) of PV panels.
5 Flights	As projected emissions factors for flights and rail travel are constant, emissions were used as a proxy distance. Domestic flights: reduce to 50% of current levels over five years to 2026/27 70% of the reduced travel distance from domestic flights assumed to

Measure	Assumptions
	transition to rail travel. International flights reduce to 75% of current levels between 2021/22 and 2026/27. Cost savings estimated based on estimated cost of current flights (and rail) extrapolated from information from October 2019 – February 2020.
6 EV fleet	BU's vehicle fleet was grouped into two categories to simplify the emissions calculations for switching to an EV fleet. For cars, the fuel efficiency was assumed to be HMRC's advisory miles per gallon value for company claims on vehicles for diesel engine sizes up to 1600 cc, 76.4 miles/gallon (link: https://www.gov.uk/guidance/advisory-fuel-rates#when-you-can-use-the-mileage-rates). For vans, the fuel efficiency was assumed to be the highest efficiency for a Ford Transit Custom, 46.3 miles/gallon (link https://vanfueldata.vehicle-certification-agency.gov.uk/vehicles.aspx). The calculated distances (miles) were converted into emissions using factors sourced from the 2020 set of the UK Government Greenhouse gas reporting conversion factors (link: https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting). The emissions factor used for cars was 0.0134 $kgCO_2e$/mile and for vans, 0.0922 $kgCO_2e$/mile.
7: LEV buses	The emissions reduction percentage for switching to the most efficient hybrid (37%) or electric (69%) buses from diesel buses reported in BU research have been assumed. The percentage reductions have been applied to the BAU bus data.

Appendix 8: Emissions reductions scenarios

The following measures have been modelled to estimate their emissions reduction potential. The measures have also been combined in four scenarios to illustrate their collective impact against the BAU base case forecast.

Measures

Measure 1: ECMs
Energy conservation measures (ECMs) reduce the demand for energy within buildings. Even on a purely financial basis, and disregarding the associated carbon benefit, ECMs are often good value for money. In line with this thinking, the Energy Team have proposed a number to ECMs to be implemented across the estate in the forthcoming years. This measure models the impact of these ECMs to be funded by the Revolving Green Fund and programmed over the next three years.

Utilising the spend roadmap produced by, and conversations with, the Energy Team ECMs contained within in the project list were allocated across the three years AY2020/21 to AY2022/23 , to ensure as far as possible, equal CAPEX spend. As projects in this list reduce electricity consumption, the carbon benefit in future years reduces as the emissions intensity of the grid continues to decline. It may be possible to balance this with identification of additional projects over time, but it should be noted that as more and more of the available projects are completed savings from ECMs are likely to reduce.

Measure 2A/B: Heat switch
Gas accounts for over 23% of the 2018/19 baseline and is used in our buildings primarily for provision of space heating and hot water. By transitioning away from the use of natural gas to a different technology, significant reductions in emissions could be realised. The model assumes the use of electrically driven heat pumps in each building but the key principle is not to use natural gas rather than a particular alternative technology.

The modelling makes some assumptions regarding the split of demand between space heating and hot water in each building and assumes an efficiency for heat pumps.

Measure 2A considers a switch away from gas on Talbot Campus only, Measure 2B examines a more ambitious switch across the whole BU estate. In both cases implementation takes place in the five years 2025 – 2030 as it is assumed that initial investigations and feasibility work will need to take place first and sufficient capital funding is unlikely to be available to implement in the immediate short term.

Measure 3A/B: Data centre closure
Data centres are critical to the functioning of modern universities, providing secure data storage, supporting advanced machine learning experiments and allowing flexible home working. Despite the demand for data centres increasing rapidly over the past decade, researchers have found that the associated energy consumption has remained flat, indicating that there have been significant energy efficiency improvements in new server equipment, resulting from scale, network and learning effects. These energy efficiency improvements provide the rationale for closing the BU's existing data centre in Studland House and using cloud data storage instead; a project already being explored by the IT team.

Measure 3A models the impact of early closure of the data centre (2021/22), while Measure 3B looks at closure later in the period but still prior to the target year (closure assumed in 2027/28).

The proportion of electricity consumed by the data centre has been discounted from the future emissions of Studland House, based on metering information supplied by the Energy Team. An allowance has been made for converting the area occupied by the data centre into a heated space.

Measure 4A/B: PV
Over the past decade, the cost of photovoltaic (PV) panels has decreased, whilst their efficiency in converting sunlight into electricity has increased. Displacing electricity supplied from the national grid with

on-site renewable technologies will reduce operating costs and carbon emissions whilst also will reducing demand on the strained electricity grid.

As BU has existing PV installations at several locations, in addition to anticipated installations at Jurassic House, The Sir Michael Cobham Library and Poole House Main Tower, further PV array installations have not been proposed until the year 2023/24. To better formulate combinations with the other measures proposed, a low and high PV scenario have been calculated. The rationale for the installations selected under the low scenario is to select sites with minimal disruption to buildings, no structural restrictions, and where discussions have indicated could occur in concert with other planned works, in particular resurfacing of the Chapel Gate Car Park. We have also included Talbot Campus Car Park B in the low scenario although we do not believe resurfacing works are planned. For the high PV scenario, additional arrays have been proposed on buildings with roofs where the mounting of panels is unlikely to present significant logistical challenges whilst also generating a high PV output. These are Dorset House, Christchurch House and the Student Centre. The PV installations have been sequenced to prevent the associated CAPEX costs coinciding. It should be noted that as the proposed PV arrays generate electricity savings, the resulting emissions savings will decline as the greenhouse gas emissions associated with the national grid decrease. The feasibility of these installations in terms of structural and electrical infrastructure will need be assessed as part of developing business cases prior to implementation.

The installations programmed for Jurassic House and Poole House are already included in the Business as Usual model so this measure focuses on other potential locations for installations of PV, both building mounted and on canopies of appropriate car parking areas.

Measure 4a assumes installation of PVs on canopies over the Chapel Gate car park and Car Park B on Talbot Campus, and Measure 4b assumes installations on several buildings in addition to the above.

Measure 5: Flights

Flights constitute around 75% of our current reported Scope 3 emissions. The aviation sector has proven difficult to decarbonise and, therefore, to reduce the emissions associated with flights the underlying distance flown must be reduced. This measure considers the emissions benefit of reducing the distance flown by BU staff. The utility of video conferencing demonstrated by the coronavirus pandemic has shown that meetings can be conducted remotely. The pandemic itself will also limit flights, at least in the short term.

To allow a smooth transition, we have suggested that any proposed reduction in flights should take place over a number of years. It has been assumed that from the year 2021/22, the distance covered by domestic flights will decrease by 50% over the subsequent five years. In recognition of the fact that many of these journeys may still be taken, it is assumed that 70% of the domestic flight distance reduction will be converted into rail travel. For international flights (short, medium and long), it has been assumed that the distance covered will decrease by a total of 25% over the five years following 2021/22.

Limited data on the current cost of flights and rail travel for the 2019/20 year was available and data later in the available period is not representative of typical costs as travel was significantly reduced due to the Covid19 lockdown restrictions. Nonetheless, data for October 2019 to February 2020 was extrapolated for a full year and cost savings estimated on this basis.

Measure 6: EV Fleet

For several years, BU has been transitioning its fleet to electric vehicles (EVs) and this measure considers the emissions savings achieved by fully transitioning to an EV fleet from 2024/25. The carbon factor of grid electricity, and consequently the emissions from EVs, is projected to decrease in the long-term. The emissions associated with the combustion of diesel or petrol are unlikely to reduce over the same timeframe. According to the UK Government GHG Conversion Factors for Company Reporting, even today EVs perform better from an emissions perspective than diesel or petrol. For these reasons, an EV fleet would be beneficial both today and in the future.

To calculate the emissions benefit of transitioning to EVs, the fuel consumption calculated in the BAU has been converted into projected distances according to typical fuel efficiency values for the three classes of

vehicles reported: car, vans and minibuses. Using conversion factors, the EV emissions resulting from those distances have been calculated.

Measure 7A/B: LEV / ULEV Buses

The BU bus fleet (operated by a third-party provider) currently run on diesel and, in busy periods, newer buses are supplemented by older, less efficient models. Utilising research carried out by a BU student, we have modelled the potential emissions reduction associated with moving the main fleet to either hybrid or electric models in the 2025/26 when the current contract is to be renewed.

The research reports the emissions reduction percentage for hybrid or electric buses relative to diesel buses and these have been applied to the BAU base case forecast. The highest efficiency reductions indicated have been used as it assumed these will be easily attainable by 2025/26. It should also be noted that whilst BU run double decker buses, it has been assumed that the percentage saving for moving to full electric will be the same as for singles (for which performance data is available). In addition to the emissions benefits, LEV, and particularly ULEV, buses have the added benefits of reducing air pollution and serving as a visual statement of BU's environmental commitments to its surrounding community.

Both hybrid and electric buses are significantly more expensive than standard diesel models (circa £450,000 versus £200,000 in the case of EV buses), however, the current model is not to purchase the vehicles but to wrap the cost into a term contract – the current contract runs for 10 years. As such, there is unlikely to be a capital cost associated with moving to LEV or ULEV buses and therefore this has not been modelled, but there would certainly be a significant increase in revenue cost. The current contract costs in the region of £13,000,000, equating to around £100,000 / bus / year; we should expect this to be considerably higher when moving to alternative fuel vehicles.

Performance of measures

Emissions reduction performance has been estimated for all the above measures. Where cost savings are through a reduction in electricity and gas, these have been estimated. Capital costs have been included only where they have been provided (Measure 1) or where cost data from previous projects is available (Measures 4A and 4B). We recommend that cost advice is sought at the appropriate time to inform the development of business cases as these are required.

Performance of the measures is set out in the below tables.

Table 20: Emissions reduction measures annual GHG savings

Annual GHG Saving											
	Measure										
	1	**2A**	**2B**	**3A**	**3B**	**4A**	**4B**	**5**	**6**	**7A**	**7B**
Year	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e	tCO2e
2020/21	18.4	-	-	-	-	-	-	0.3	-	-	-
2021/22	27.8	-	-	74.8	-	-	-	72.1	-	-	-
2022/23	36.8	-	-	69.1	-	-	-	143.5	-	-	-
2023/24	33.8	-	-	63.3	-	31.9	31.9	214.9	-	-	-
2024/25	30.8	153.3	166.0	57.6	-	29.0	37.3	286.2	15.2	-	-
2025/26	27.8	193.6	219.8	51.9	-	26.2	33.7	357.6	15.2	10.8	20.2
2026/27	24.8	199.1	229.8	46.2	-	23.3	42.8	357.6	15.2	10.8	20.2
2027/28	21.8	575.6	617.7	40.4	40.4	26.7	37.6	357.6	15.2	10.8	20.2
2028/29	18.7	590.4	644.4	34.7	34.7	23.0	40.2	357.6	15.2	10.8	20.2
2029/30	15.7	1,035.8	1,102.3	29.0	29.0	19.3	33.8	357.6	15.2	10.8	20.2
2030/31	12.7	1,054.4	1,134.0	23.2	23.2	15.6	31.5	357.6	15.2	10.8	20.2
	269.2	**3,802.2**	**4,114.1**	**490.2**	**127.3**	**195.1**	**288.8**	**2,862.8**	**106.1**	**65.0**	**121.2**

Table 21: Emissions reduction measures annual cost savings

Annual cost saving											
	Measure										
	1	2A	2B	3A	3B	4A	4B	5	6	7A	7B
Year	£	£	£	£	£	£	£	£	£	£	£
2020/21	£13,309	£0	£0	£0	£0	£0	£0	-£84	£0	£0	£0
2021/22	£22,082	£0	£0	£59,858	£0	£0	£0	£7,199	£0	£0	£0
2022/23	£32,229	£0	£0	£61,055	£0	£0	£0	£14,709	£0	£0	£0
2023/24	£32,873	£0	£0	£62,276	£0	£30,979	£30,979	£22,591	£0	£0	£0
2024/25	£33,531	-£2,605	-£2,847	£63,521	£0	£31,599	£40,616	£30,858	£0	£0	£0
2025/26	£34,202	-£3,146	-£3,629	£64,792	£0	£32,231	£41,428	£39,524	£0	£0	£0
2026/27	£34,886	-£3,146	-£3,696	£66,088	£0	£32,875	£60,296	£40,512	£0	£0	£0
2027/28	£35,583	-£3,863	-£4,597	£67,409	£67,409	£43,688	£61,502	£41,524	£0	£0	£0
2028/29	£36,295	-£3,863	-£4,781	£68,758	£68,758	£44,561	£77,894	£42,563	£0	£0	£0
2029/30	£37,021	£56,499	£55,398	£70,133	£70,133	£45,453	£79,452	£43,627	£0	£0	£0
2030/31	£37,761	£56,499	£55,214	£71,535	£71,535	£46,362	£93,608	£44,717	£0	£0	£0
	£349,772	**£96,373**	**£91,062**	**£655,424**	**£277,835**	**£307,747**	**£485,776**	**£327,740**	**£0**	**£0**	**£0**

Table 22: Emissions reduction measures annual capital cost

Annual capex											
	Measure										
	1	2A	2B	3A	3B	4A	4B	5	6	7A	7B
Year	£	£	£	£	£	£	£	£	£	£	£
2020/21	£89,717	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2021/22	£42,917	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2022/23	£42,051	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2023/24	£0	£0	£0	£0	£0	£368,666	£368,666	£0	£0	£0	£0
2024/25	£0	£0	£0	£0	£0	£0	£102,048	£0	£0	£0	£0
2025/26	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2026/27	£0	£0	£0	£0	£0	£0	£184,627	£0	£0	£0	£0
2027/28	£0	£0	£0	£0	£0	£98,837	£0	£0	£0	£0	£0
2028/29	£0	£0	£0	£0	£0	£0	£140,342	£0	£0	£0	£0
2029/30	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
2030/31	£0	£0	£0	£0	£0	£0	£105,193	£0	£0	£0	£0
	£174,684	**£0**	**£0**	**£0**	**£0**	**£467,503**	**£900,876**	**£0**	**£0**	**£0**	**£0**

Scenarios

Four scenarios have been modelled, each of which represents a different combination of the above measures. The scenarios serve to illustrate the potential of the measures, in combination, to reach both the SBT target year emissions and the appropriate level of decarbonisation, and to achieve the SBT trajectory to limit cumulative emissions.

Table 23: Emissions reductions scenarios measure combinations

	Measures										
Scenario	1	2A	2B	3A	3B	4A	4B	5	6	7A	7B
	ECMs	Heat switch		Data centre		PVs		Flights	EV Fleet	Buses	
		TC Only	All sites	Early	Late	Low	High			Hybrid	EV
A	Y	N	N	N	N	Y	N	N	N	Y	N
B	Y	N	N	N	N	N	Y	Y	Y	Y	N
C	Y	Y	N	N	Y	N	Y	N	Y	N	Y
D	Y	N	Y	Y	N	N	Y	Y	Y	N	Y
	Y: Included in scenario N: Not included in scenario										

Details of the performance of each scenario is shown below.

Table 24: Emissions reduction scenario A performance

	Capex	Cumulative capex	Cost saving	GHG Saving	Emissions	Scenario A cumulative saving
	£	£	£	tCO2e	tCO2e	tCO2e
2020/21	£ 89,717	£ 89,717	£ 13,309	18	5,823	18
2021/22	£ 42,917	£ 132,634	£ 22,082	28	5,686	46
2022/23	£ 42,051	£ 174,684	£ 32,229	37	5,360	83
2023/24	£ 368,666	£ 543,350	£ 63,853	66	5,131	149
2024/25	£ -	£ 543,350	£ 65,130	60	4,882	209
2025/26	£ -	£ 543,350	£ 66,432	65	4,743	273
2026/27	£ -	£ 543,350	£ 67,761	59	4,760	332
2027/28	£ 98,837	£ 642,187	£ 79,271	59	4,685	392
2028/29	£ -	£ 642,187	£ 80,856	53	4,547	444
2029/30	£ -	£ 642,187	£ 82,473	46	4,401	490
2030/31	£ -	£ 642,187	£ 84,123	39	4,256	529

Table 25: Emissions reduction scenario B performance

	Capex	Cumulative capex	Cost saving	GHG Saving	Emissions	Scenario B cumulative saving
	£	£	£	tCO2e	tCO2e	tCO2e
2020/21	£ 89,717	£ 89,717	£ 13,225	19	5,822	19
2021/22	£ 42,917	£ 132,634	£ 29,281	100	5,614	119
2022/23	£ 42,051	£ 174,684	£ 46,938	180	5,217	299
2023/24	£ 368,666	£ 543,350	£ 86,444	281	4,916	579
2024/25	£ 102,048	£ 645,398	£ 105,005	370	4,572	949
2025/26	£ -	£ 645,398	£ 115,153	445	4,362	1,394
2026/27	£ 184,627	£ 830,025	£ 135,693	451	4,367	1,845
2027/28	£ -	£ 830,025	£ 138,610	443	4,301	2,288
2028/29	£ 140,342	£ 970,367	£ 156,752	443	4,157	2,731
2029/30	£ -	£ 970,367	£ 160,100	433	4,014	3,164
2030/31	£ 105,193	£ 1,075,560	£ 176,087	428	3,867	3,592

Table 26: Emissions reduction scenario C performance

	Capex	Cumulative capex	Cost saving	GHG Saving	Emissions	Scenario C cumulative saving
	£	£	£	tCO2e	tCO2e	tCO2e
2020/21	£ 89,717	£ 89,717	£ 13,309	18	5,823	18
2021/22	£ 42,917	£ 132,634	£ 22,082	28	5,686	46
2022/23	£ 42,051	£ 174,684	£ 32,229	37	5,360	83
2023/24	£ 368,666	£ 543,350	£ 63,853	66	5,131	149
2024/25	£ 102,048	£ 645,398	£ 71,541	237	4,705	385
2025/26	£ -	£ 645,398	£ 72,484	290	4,517	676
2026/27	£ 184,627	£ 830,025	£ 92,036	302	4,516	978
2027/28	£ -	£ 830,025	£ 160,631	711	4,033	1,688
2028/29	£ 140,342	£ 970,367	£ 179,083	719	3,881	2,408
2029/30	£ -	£ 970,367	£ 243,104	1,150	3,297	3,558
2030/31	£ 105,193	£ 1,075,560	£ 259,403	1,157	3,138	4,715

Table 27: Emissions reduction scenario D performance

	Capex	Cumulative capex	Cost saving	GHG Saving	Emissions	Scenario D cumulative saving
	£	£	£	tCO2e	tCO2e	tCO2e
2020/21	£ 89,717	£ 89,717	£ 13,225	19	5,822	19
2021/22	£ 42,917	£ 132,634	£ 89,139	175	5,540	193
2022/23	£ 42,051	£ 174,684	£ 107,993	249	5,148	443
2023/24	£ 368,666	£ 543,350	£ 148,720	344	4,852	787
2024/25	£ 102,048	£ 645,398	£ 165,679	593	4,348	1,380
2025/26	£ -	£ 645,398	£ 176,316	726	4,081	2,106
2026/27	£ 184,627	£ 830,025	£ 198,084	737	4,082	2,842
2027/28	£ -	£ 830,025	£ 201,422	1,110	3,634	3,953
2028/29	£ 140,342	£ 970,367	£ 220,729	1,131	3,469	5,084
2029/30	£ -	£ 970,367	£ 285,630	1,574	2,873	6,658
2030/31	£ 105,193	£ 1,075,560	£ 302,836	1,594	2,700	8,252

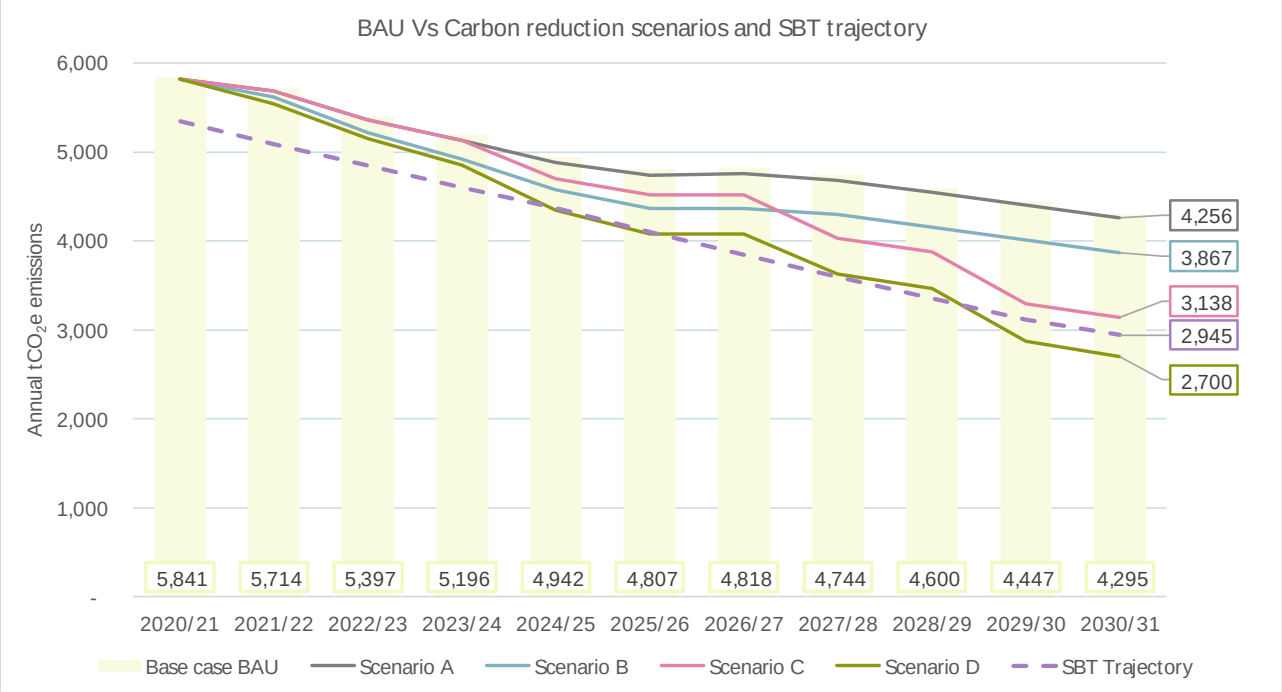


Figure 4: BAU annual emissions Vs carbon reduction scenarios and SBT trajectory

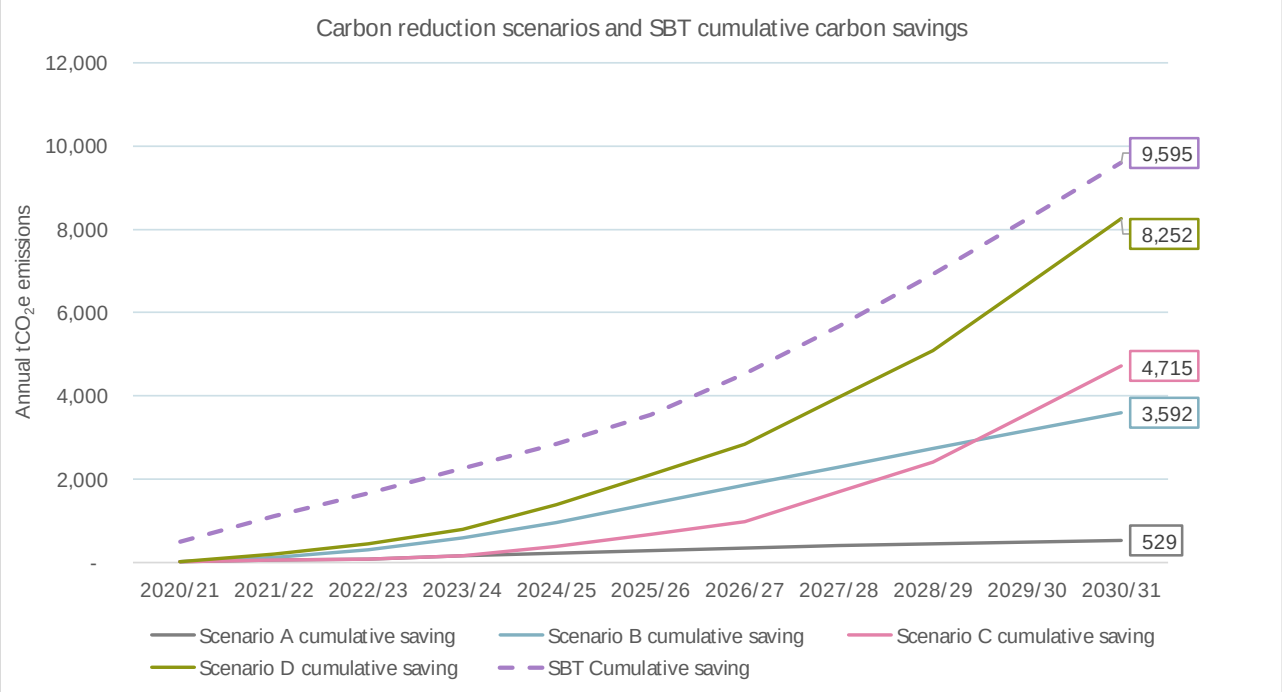


Figure 5: Carbon reduction scenarios and SBT cumulative carbon savings

It can be seen that only Scenario D achieves the SBT emissions reduction target in 2030/31. However, even this scenario does not achieve the cumulative emissions reductions of the SBT trajectory. One potential way to improve on this performance would be to accelerate the implementation of measures (particularly the transition away from fossil fuel for heat generation) although this is dependent on sufficient capital funding being available.

Appendix 9: Offsetting

A key part of the net zero target is to offset any residual emissions after decarbonising such that our net emissions equate to zero. A strict application of the scientific definition of net zero emissions would require that the means of dealing with residual emissions should be through carbon dioxide removal (CDR). CDR projects focus on the direct removal of carbon from the atmosphere with approaches including tree planting and storing carbon in soils or the ocean. However, the majority of offsetting schemes on the market are described as avoidance schemes, such as providing better cooking stoves, as these do not remove carbon from the atmosphere but do contribute by reducing carbon emissions at source.

As we have already seen, our position does not align entirely with the net zero emissions definition and there are several reasons for taking a more relaxed view of which offsets we might consider, at least initially:

1. As our target year (AY2030/31) is significantly ahead of the UK net zero deadline (2050), we have some time to develop our offsetting strategy.
2. We would like the investments we make in offsetting to both support our net zero position and other sustainability goals (i.e. the UNSDGs to align with our BU2025 outcomes).
3. The current lack of an accepted market definition of net zero emissions in practice means we are able to fairly define a robust but flexible approach to how we offset residual emissions.

While the CECAP presents the basis for an approach to offsetting, the uncertainty and developing nature of the market leads us to recommend that a more detailed offsetting strategy is developed in the short term and that initially the CECAP group take on this responsibility. As described, the group will need to include representatives from the student body, and the Finance and Legal teams.

One issue for the offsetting group to consider is to what extent our offset portfolio should include CDR projects as opposed to avoidance projects. It may be for instance that we aim to transition to all CDR investment by 2030, or use CDR to achieve net zero emissions but decide to make an additional investment in other avoidance offsets.

When should we start offsetting and what should we offset?

The latest year in which we can start offsetting is the target year as, if we don't, we won't achieve our target, but it would be possible to begin offsetting sooner. Taking this approach would have several benefits:

- give us time to develop our approach to reporting offsetting activity;
- help us to become an informed purchaser of offsets ahead of the target year;
- to support the development of a robust market for good quality offset schemes; and
- ensure the internal mechanisms, finance, etc are in place in readiness for the target year, and beyond, when we must offset.

For these reasons, we recommend that we begin offsetting prior to the target year, and as soon as finances allow.

This leaves us with the question of how much to offset.

In developing the CECAP we've considered a Business As Usual (BAU) case (see Section 7 in the main CECAP document), which suggests what our emissions in the target year might be if we carry on as we are and don't take extra measures to reduce them. This also helps us to understand what emissions we would be likely to have to offset in the target year.

Also, given that we have established a science-based decarbonisation target trajectory, we could potentially offset any emissions above this trajectory in each year, as illustrated in Figure 6, below. The offsets required here are illustrated based on the difference between the science-based target trajectory and the base case BAU forecast. Any improvement on the base case BAU (e.g. through decarbonisation activity) would reduce the amount of offsets required.

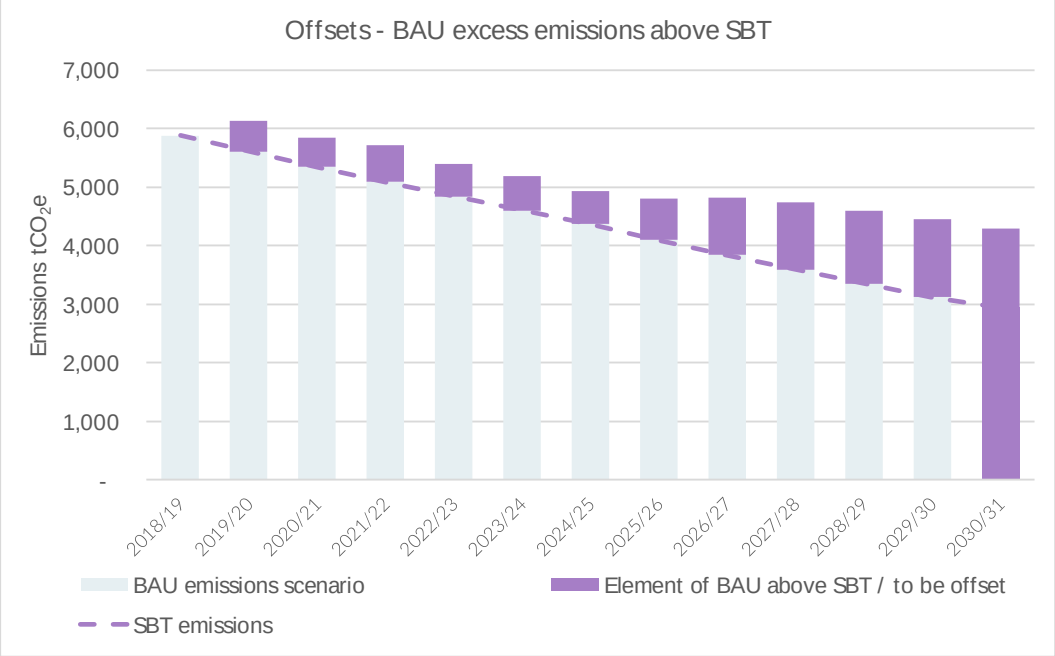


Figure 6: Offset requirements based on science-based trajectory Vs BAU

This would bring the benefits of the early offsetting approach listed above whilst limiting expenditure at a time when we are financially constrained. One issue with this approach is the significant step up in offsetting cost between the penultimate and target years which would need to be planned for.

Should decarbonisation activity mean that the offsets required are reduced to zero (i.e. annual emissions are at, or below, the SBT trajectory), or the financial situation improve sufficiently, a stretch goal could be implemented where any emissions above a zero emissions trajectory were offset. Keeping this option in reserve means that we can be flexible to changes in the landscape over the CECAP period and beyond. This is illustrated in Figure 7, below.

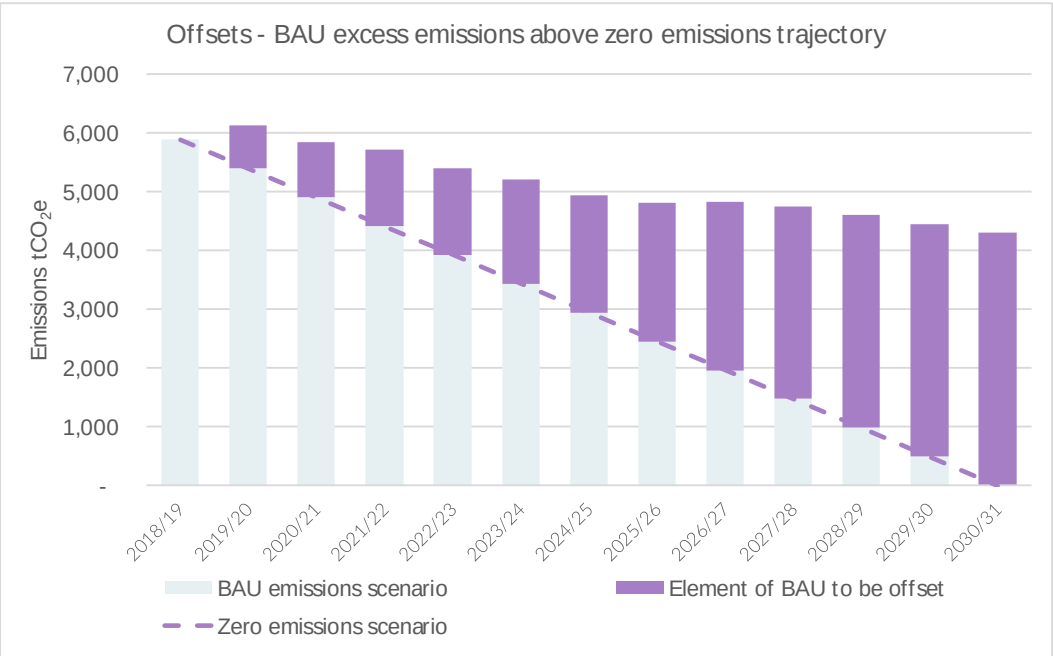


Figure 7: Offset requirements for a stretch goal, offsetting emissions above a zero-carbon trajectory

We therefore recommend that we offset, annually, any emissions above the SBT trajectory and, where annual emissions are equal to or below the SBT trajectory, consider offsetting any emissions above the zero emissions trajectory.

We also recommend that this strategy is reviewed every three years to ensure that it reflects our developing understanding of the offsetting market.

Types of offset

There are four approaches to balancing residual emissions – some are compatible with the strict scientific definition of net zero emissions and others are more aligned to the carbon neutral definition. We have already discussed the relaxed way in which these terms are generally applied outside the scientific community but the table below (based on the Science Based Target Initiative paper "Towards a science-based approach to climate neutrality in the corporate sector"[11]) is based on these strict definitions and is a useful introduction to the approaches.

Table 28: Approaches to offsetting and their alignment with carbon target definitions

		Effectiveness to neutralise impacts from the organisation on the climate	Consistency with 1.5°C mitigation pathways	Effectiveness to mitigate climate-related transition risks	Effectiveness to transition towards a business model that is likely to be viable under a net-zero carbon economy
1	Balance of emissions with removals within the value-chain of the company	Depending on the permanence of the removals	Consistent only when removals are permanent and limited to balance residual emissions	In some cases	In some cases
2	Balance of emissions with carbon credits sourced from activities that remove carbon from the atmosphere	Depending on the permanence of the removals	Consistent only when removals are permanent and limited to balance residual emissions	Limited	Limited
3	Balance of emissions with carbon credits sourced from activities that avoid or reduce emissions	Limited	Not consistent	Limited	Limited
4	Balance of emissions with avoided emissions from the use of sold-products	Limited	Not consistent	Limited	Limited

[11] https://sciencebasedtargets.org/wp-content/uploads/2019/10/Towards-a-science-based-approach-to-climate-neutrality-in-the-corporate-sector-Draft-for-comments.pdf

Approach 1 focuses on CDR and is therefore the most effective and consistent means of dealing with residual emissions (after decarbonisation) although permanence is a potential issue with some methods of capturing and storing carbon.

Approach 2 focuses on organisations investing in projects which could include CDR, but could also be projects which reduce emissions against a reference scenario in some other way.

Approach 3 focuses on investment in projects which reduce emissions from sources external to the organisation purchasing the offsets.

Approach 4 focuses on an organisation's sold products reducing emissions compared to a scenario where their products did not exist.

It is worth noting that none of the approaches is entirely effective or consistent with 1.5^{o}C mitigation pathways. Also, the availability of projects in which to invest and which are of good quality (see below) may be limited, particularly as the market develops which may lead to demand out-stripping supply as more organisations attempt to invest.

Finally, it is critical that none of these approaches displaces decarbonisation activity which is the only approach to achieving net zero emissions which is both highly effective and can be fully consistent with the 1.5oC pathway.

Which offsets should we purchase?

Accepting that we are going to be making an ongoing investment in offsetting, we want to ensure that the investment has maximum impact. Specifically, we want our investments to remove carbon from the atmosphere (in response to the net zero emissions definition) but also to maximise non-carbon benefits as far as possible.

We should see our investment in the context of our response to the climate and ecological crisis. In particular, investing in CDR projects such as afforestation (Nature Based Solution) would both remove carbon from the atmosphere and, if done well, support an increase in biodiversity. Beyond this, we could also use our investment to support delivery of the UNSDGs, thus enriching society in line with our BU2025 objectives.

In some cases, these objectives can be achieved in the same offsetting project, but it may be that we want to invest in a range of products each year to achieve these objectives and so that we have flexibility to change our approach over time.

With this in mind, we recommend that our approach to offsets should be to invest in a range of schemes all of which meet the key criteria for offset projects set out below, and that both include the direct removal of atmospheric carbon and have demonstrable non-carbon benefits which align with the UNSDGs.

Good quality offsets

As regulation on voluntary carbon offsetting has progressed slowly and doesn't reflect the growing importance of this mitigation strategy, there is significant variability in the quality of carbon offset products available to purchase. Defra's Environmental Reporting Guidelines[12] establish the following key criteria for carbon offset projects:

- Additionality: It would not have happened without offset funding;
- Avoiding leakage: It cannot lead to an increase in emissions elsewhere;
- Permanence: It must exist for the defined lifetime;
- Validation and verification: It must receive third party accreditation;
- Timing: Credit for carbon offsets should be transferred after emissions reductions have occurred;

[12] Defra's Environmental Reporting Guidelines

- Avoiding double counting: Credit for carbon offsets can only be transferred and received once;
- Transparency: Information on carbon offset credits should be publicly available.

PAS 2060:2014 defines the requirements for claiming carbon neutrality and, while we are aiming for a higher performance (i.e. net zero emissions), usefully includes some examples of schemes which can provide carbon credits and offsets that meet the principles of the specification, as shown, below.

Table 29: Good quality offset schemes that meet the requirements of PAS2060.

Offset schemes	
Kyoto-compliant	– Clean Development Mechanism (Certified Emission Reductions) – Joint Implementation (Emission Reduction Units) – EU Allowances
Non-Kyoto compliant (voluntary emissions reductions)	– Gold Standard – Voluntary Carbon Standard – Climate, Community and Biodiversity Standard
Domestic schemes	– In UK – the Woodland Carbon Code[13]

Carefully selecting products from these schemes would provide a robust basis for public reporting of our approach to offsetting.

Non-carbon benefits

Aside from the primary role of offsetting schemes, some have the potential to offer several co-benefits, effectively at no extra cost. Such schemes would support other aims around alignment with the UN SDGs and our response to the ecological crisis. The examples in Table 30, below, are taken from the Gold Standard portfolio of projects. Note that the co-benefits listed are in addition to the primary goal of Climate Action (SDG13), and, for some, there are likely to be other benefits not listed in the project description such as gender equality.

Table 30: Non-carbon benefits of sample Gold Standard offsetting projects

Improved cooking stoves, Guinea		1: No poverty 3: Good health and wellbeing 7: Affordable and clean energy
Cleaner, Safer Water in Cambodia		3: Good health and wellbeing 6: Clean water and sanitation 8: Decent work and economic growth 15: Life on land
The Nicaforest High Impact Reforestation Program		3: Good health and wellbeing 12: Responsible consumption and production 15: Life on land

Limitations on investment

[13] https://woodlandcarboncode.org.uk/

An important consideration for BU, as a charity, is that it is not possible (i.e. legal) for us to invest in other charities and this may limit our ability to purchase certain offset products. Any investment must therefore be discussed with and approved by the legal team. Such approvals will be an important part of our offsetting process and should be overseen by the recommended offsetting group.

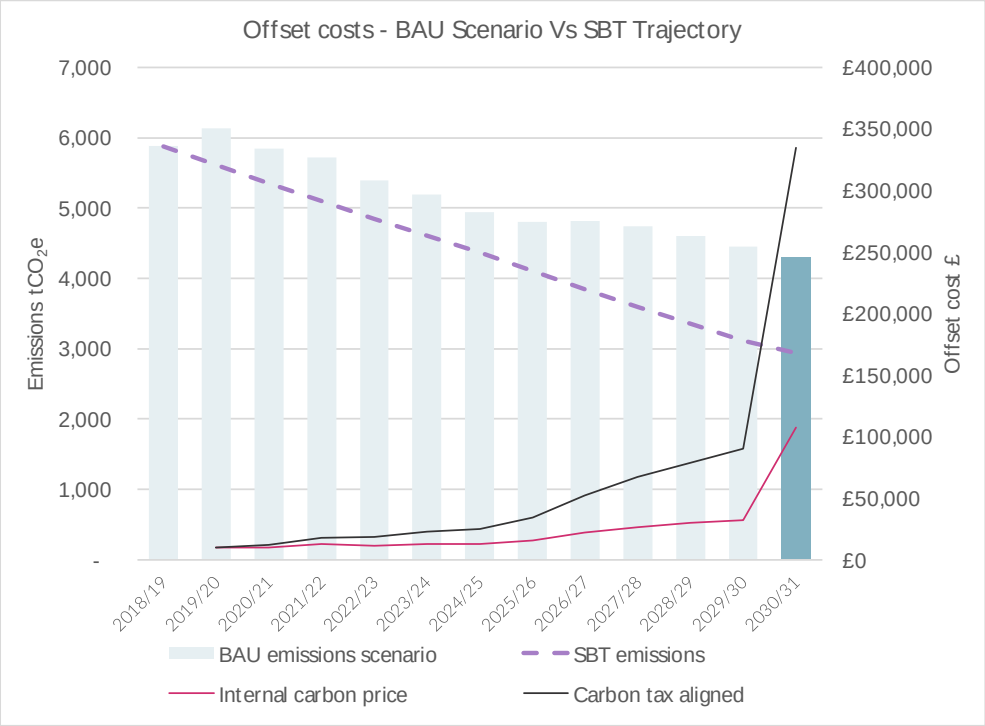
Cost of offsetting

While accepting that we will only invest in good quality offsets and the limitations mentioned above does reduce the range of available projects, the cost of offsetting each tonne of carbon is still very variable. The absolute cost of offsetting will be the price paid for the offsetting projects, but there are other factors we may want to consider as part of developing the offsetting strategy, including whether we want to set an internal carbon price and, if so, at what level, and encouraging behaviour change through a polluter pays principle where the cost of dealing with carbon is, to some extent, shared across BU.

Irrespective of these issues, we illustrate two scenarios below to provide an indication of potential offsetting costs using the SBT offsetting approach discussed above. Both scenarios start at an initial internally set carbon price of £19/tonne which is based on the closing price of the mandatory Carbon Reduction Commitment Energy Efficiency (CRCEE) scheme and which provides some flexibility for selecting projects (i.e. a range of good quality offsets are available at less than this price, although some cost more).

In the first scenario, this price simply increases at 2.5% per year to notionally reflect inflation. In the second scenario, the price maps a trajectory to £78/tonne in 2030 which is the value of carbon tax required in order for the UK to hit its carbon targets as estimated in a study commissioned by the Committee on Climate Change (CCC[14]) – the tax price continues to increase to £220//tCO_2e in 2050.

The scenarios are illustrated in the chart below and clearly indicates the significant increase in cost in the target year when basing offset purchase on the SBT trajectory – a steadier (but costlier) increase is achieved in the zero emissions offset approach.



[14] https://www.theccc.org.uk/wp-content/uploads/2019/08/Vivid-Economics-The-Future-of-Carbon-Pricing-in-the-UK.pdf

Figure 8: Illustration of potential offset costs when adopting the SBT excess emissions approach Vs BAU

An additional consideration is that we are recommending a process of continual improvement in our carbon reporting and, as we gather more accurate data on emissions sources not currently included in the baseline, the quantum of emissions to be offset would increase.

Set against this are efforts to decarbonise which will reduce emissions and thus reduce the amount we need to offset. Given the impact of the unprecedented Covid-19 pandemic and the subsequent lockdown (particularly on travel and individuals understanding of engaging with different ways of working) there are clear opportunities which we should capitalise on to secure ongoing emissions savings.

To illustrate the potential of measures to reduce emissions and also reduce future offsetting costs, we have modelled both sets of offset pricing against the best-case emission reduction scenario (see Appendix 8: Emissions reductions scenarios) as shown below.

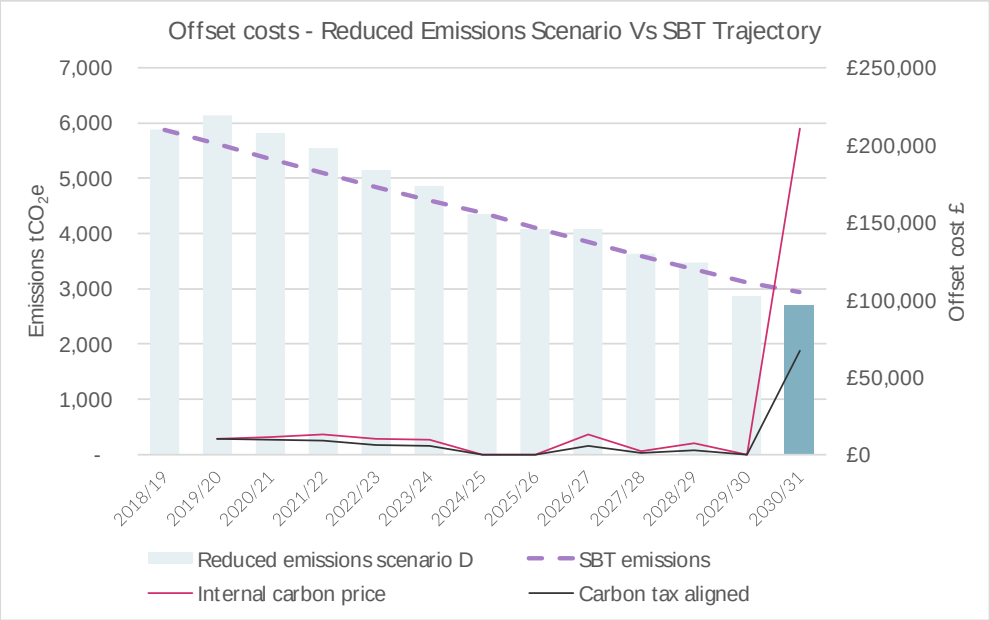


Figure 9: Illustration of potential offset costs with implementation of emissions reduction scenario D

An illustration of annual and cumulative estimated costs for all the above scenarios is set out below.

Table 31: Illustrative annual and cumulative offsetting costs for BAU and emissions reduction scenario D

	Internal carbon price	Cumulative cost	Carbon tax aligned	Cumulative cost	Internal carbon price	Cumulative cost	Carbon tax aligned	Cumulative cost
2019/20	£9,883	£9,883	£9,883	£9,883	£9,883	£9,883	£9,883	£9,883
2020/21	£9,579	£19,461	£11,763	£21,646	£9,250	£19,133	£11,360	£21,243
2021/22	£12,418	£31,879	£17,937	£39,583	£8,931	£28,064	£12,900	£34,142
2022/23	£11,316	£43,195	£18,665	£58,248	£6,214	£34,277	£10,249	£44,392
2023/24	£12,452	£55,647	£22,957	£81,204	£5,240	£39,517	£9,661	£54,052
2024/25	£12,340	£67,986	£25,018	£106,223	£0	£39,517	£0	£54,052
2025/26	£15,580	£83,567	£34,294	£140,517	£0	£39,517	£0	£54,052

Year	BAU emissions scenario				Reduced emissions Scenario D			
2026/27	£22,045	£105,611	£52,139	£192,656	£5,410	£44,927	£12,796	£66,848
2027/28	£26,636	£132,247	£67,117	£259,773	£929	£45,856	£2,341	£69,189
2028/29	£29,594	£161,841	£78,885	£338,657	£2,755	£48,611	£7,344	£76,533
2029/30	£32,269	£194,110	£90,441	£429,098	£0	£48,611	£0	£76,533
2030/31	£107,067	£301,177	£334,992	£764,090	£67,317	£115,929	£210,622	£287,155
	£301,177		**£764,090**		**£115,929**		**£287,155**	

The above illustrates the significant savings in offsetting costs represented by the reduced emissions scenarios although it is worth noting that implementation of the measures to achieve this level of reduction will be considerable. The Scenario D forecast suggests that emissions may be slightly lower than the SBT trajectory in some years so there is no offsetting cost – this is dependent on final feasibility of the measures and the rate of their implementation.

It should also be noted that there is significant uncertainty regarding the future price of offsets and it may be that the modelled internal price does not keep pace with the market or emerging guidance on the setting of internal carbon prices.

Who should pay?

Our current thinking is that most of the money for offsets would come from central BU funds and be managed by the CECAP Group. However, there are a number of potential sources of funds which might be explored, including:

- Centrally financed
- Departments (e.g. fleet vehicles, business flights)
- Term contractors (e.g. through waste contract)
- Construction contracts (e.g. to offset embodied carbon)
- Staff and possibly students (e.g. through parking charges)

Not all of these funds will be available to spend directly on offsets (as some of the offsetting will be undertaken by suppliers) but all represent a reduction in carbon emissions even if the reduction cannot be directly quantified in our reporting.

The table below sets out initial thinking on how offset funding might work for various emissions sources.

Table 32: Potential funding streams for various emissions sources

Scope	**Emission source**	Potential approach to funding
1	**Gas**	Centrally funded
1	**LPG**	Centrally funded
1	**Biomass (non-CO_2)**	Centrally funded
1	**Fleet vehicles**	Department
1	**Fugitive emissions**	Centrally funded
2	**Grid electricity**	Centrally funded
3	**BU Bus fleet**	Centrally funded
3	**Hire vehicles**	Department

Scope	Emission source	Potential approach to funding
3	**Flights**	Department
3	**Grey fleet**	Excluded from baseline but would be included in the Enterprise scheme and would be funded by departments
3	**Commuting**	Excluded from baseline – note that change to parking permit could be seen as a means of 'insetting' with funding being used to focus on decarbonisation activity.
3	**Rail**	Department
3	**Water**	Centrally funded
3	**Waste water**	Centrally funded
3	**Operational waste**	Centrally funded
3	**Construction waste**	Embodied carbon, including waste to be funded as part of major project budget. Minor works centrally funded.
3	**Procurement**	Excluded from baseline but could be included in contract price in future in which case it would be funded by departments
OOS	**Biomass**	N/A

We recommend the establishment of a polluter pays principle to support the collection of funds specifically for investment in either decarbonisation or offsetting initiatives based on the emissions associated with specific activities, starting with those that are simple to capture and measure (such as international flights); over time other activities could be identified and added.

As decarbonisation should be a priority, we can see that the setting of an internal carbon price at a level which allows for meaningful investment in this area needs to be carefully considered as the cost of reducing emissions on-site will typically be considerably higher than purchasing offsets – if this approach were followed, the £19/tonne mentioned earlier would likely need to be increased.

Other plans which incidentally raise revenue include the potential change to the approach to staff and student parking permits (moving from annual to daily charges) should be treated as 'insetting' and should not ideally be used to purchase offsets, but, we recommend, be channelled to supporting decarbonisation activities for those emission sources included in emissions reporting (currently, commuting is not included as data is not sufficiently robust to accurately quantify the associated emissions).

Additionally, the government is currently consulting on transport offsetting and the outcome may impact how BU deal with this issue.

Therefore, we recommend:

- The adoption of a polluter pays principle for defined activities, potentially to be expanded later as better data becomes available.
- That funds raised by potential changes to the parking permit regime are directed to fund BU decarbonisation projects.

Appendix 10: Action Plan

The action plan, which sets out activities to be undertaken to support the implementation of each of the recommendations over the next six years, is contained in a separate Excel document (refer to DOC-BU CECAP Action plan Rev03.xlsx). Presented below is a summary of the timetable for implementation of each recommendation.

We have selected six years as the action plan period as 2025/26 is the latest year for a recommendation with a specific implementation date.

The action plan includes the following information:

Table 33: Action plan description

Ref	The recommendation reference as set out in Appendix 6: Recommendations.
Title	The recommendation title as set out in Appendix 6: Recommendations.
Who's responsible?	For each action an owner has been suggested but there is a general assumption that in all cases the activity of implementation will be initiated, driven, and monitored by the Sustainability Team and overseen by the Sustainability Committee who has overall responsibility for the CECAP.
Who do we need to influence?	The action plan recognises that collaboration will be necessary if recommendations are to be successfully implemented. This item records key individuals, teams, etc who will need to be engaged to ensure they support implementation.
Cost	A high level indication of order of magnitude costs are included for each item as follows: IRC – Internal Revenue Cost. This indicates that there is no capital cost but will require input from the Sustainability Team and others. £ - indicates an estimated capital cost of less than £25,000 ££ - indicates an estimated capital cost of between £25,000 and £100,00 £££ - indicates an estimated capital cost of more than £100,000 Where external costs are indicated a business case presenting a cost benefit analysis should be developed to support expenditure prior to implementation.
Timeline	An indicative timeline has been included covering the next 6 years
	Implementation year. Some recommendations will require ongoing action to fully action so are shown implementing over several years (such as reviewing all relevant policy documents at expiry date)
	Ongoing activity. Some recommendations require an initial action to implement and then an amount of ongoing effort to maintain impact (such as updating training materials)

Table 34: CECAP Action plan summary

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
GO1.1	Climate focus for BU2025 refresh	Sustainability Manager	VC Policy Advisor	IRC						
	23/24 update			IRC						
GO1.2	Review policy framework to ensure all policies respond to the crisis	Sustainability Manager	ULT	IRC						
GO1.3	Reappraise Departmental KPIs	Sustainability Manager	HR	IRC						
GO1.4	Review, and amend as appropriate, the Academic Career Framework	HR/COO/Deputy Vice Chancellor in consultation with the Unions	HR	IRC						
GO1.5	Make individuals explicitly responsible - adopt goal alignment	Sustainability Manager	HR	IRC						
GO1.6	Review existing controls on development and research funds	Sustainability Manager	DDR	IRC						
GO1.7	Create a body to oversee the purchase of carbon offsets	Energy Manager	CECAP Group	IRC						
GO1.8	Agree effective carbon price to inform offsetting strategy and project viability	Energy Manager	CECAP Group	IRC / ££ - £££						
GO1.9	Adopt polluter pays principles for certain activities	Sustainability Manager	CECAP Group	IRC						
GO1.10	Rename and extend the remit of the CMP Group and Sustainability Team to cover all emissions sources	Energy & Sustainability Manager	CECAP Group	IRC						
GO1.11	Include relevant areas of the response in the TORs of all committees	Sustainability Manager	VC Policy Advisor	IRC						
GO1.12	Implement a staff and student assembly	Sustainability Manager	CECAP Group	IRC						
GO1.13	Revise governance to support a reduction in the environmental impact of research	Deputy Vice Chancellor	RDS/DDR	IRC						
GO1.14	Ensure the climate and ecological crisis is included on BU risk register	Sustainability Manager	ULT	IRC						
BH1.1	CECAP Charter	Sustainability Manager	HR/ULT	IRC						
BH1.2	Develop and implement crisis literacy training	Sustainability Team	HR (OD)	£						
BH1.3	Continue staff focused Green Rewards scheme and other behaviour change campaigns	SSO	CECAP Group	££						

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
BH1.4	Continue Green Impact and other student focused behaviour change programmes	SUBU/SSO	SUBU	£						
BH1.5	Enhance and promote existing mechanisms to reward pro-environmental behaviour	Sustainability Manager	HR	IRC						
BH2.1	Developing a baseline of scope 3 carbon emissions and setting a target for carbon reduction.	Energy Manager	CECAP Group	IRC						
BH2.2	Ongoing annual communication and engagement plan	SSO	M&C/SUBU	IRC						
BH2.3	Sustainability team to work with other departments and teams to engage students in the crisis response	SSO	SUBU/Faculties	£						
ES1.1	Continue to align programmes with SDGs and include the climate and ecological crisis in all levels of programmes in the indicative content of at least one unit per level by 2022/23	SAN/ESD CoP	Academic Quality/Deputy Vice Chancellor/ULT/ FLIE	IRC						
ES1.2	Continue to align research with SDGs	SAN/ESD CoP	Academic Quality/Deputy Vice Chancellor/ULT/ FLIE	IRC						
ES1.3	Review approvals process for new programmes	SAN (supported by the SSO)	RDS	IRC						
ES1.4	Develop a Living Labs programme to support the CECAP	SAN/ESD CoP	Student Services	£						
AR1.1	Support staff to develop personal resilience plans	Sustainability Manager	HR	IRC						
NB1.1	New builds that respond to the climate and ecological crisis	Head Of Estates Development	EDC/SC	IRC						
	Roll-out beyond construction	Sustainability Manager/PMU	SC/ULT	IRC						
NB1.2	Ensure budget setting reflects required project outcomes.	Head Of Estates Development	EDC/SC/Finance/ Board	IRC						
NB1.3	Enhance effectiveness of minor works programme to address the climate and ecological crisis	Head Of Estates Development/ Energy Manager/MSM	EDC/Estates SMT	IRC						
NB1.4	Maximise the climate and ecological benefits of large scale refurbishments	Head Of Estates Development/ Energy Manager	EDC/SC	IRC						
NB1.5	Prioritise nature-based solutions	Head of Estates Development	Biodiversity Group / EDC	IRC						

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
EB1.1	Roll-out LED lighting to all BU buildings	Energy Manager/MSM	EDC/Finance Director/CECAP group	£££						
EB1.2	Continue with RGF projects as they are identified	Energy Manager/MSM	EDC/Finance Director/CECAP group	£££						
EB1.3	Carry out estate-wide energy focused BMS audit	Energy Manager/MSM	Estates SMT/CECAP group	££						
EB1.4	Optimisation of new Gateway buildings	Energy Manager/Head Of Estates Development/MSM	EDC/CECAP group	££						
EB1.5	Poole House smoke vent compressor	Energy Manager/MSM	EDC/Estates SMT/CECAP group	££						
EB1.6	Fan and pump replacements, and control enhancements	Energy Manager/MSM	EDC/Estates SMT/CECAP group	££						
EB1.7	Consider options to enhance PPM and reactive maintenance impact	Energy Manager/MSM	CECAP group	££						
EB1.8	Upgrade Talbot Campus transformers	Energy Manager/Head Of Estates Development/MSM	EDC/CECAP group	£££						
EB2.1	Identify buildings to trial replacement of gas boilers with heat pumps	Energy Manager/MSM	CECAP group	IRC						
EB2.2	Identify opportunities to reduce space heating system temperatures in existing buildings	Energy Manager/MSM	CECAP group	£						
EB2.3	Monitor new technologies and seek opportunities to trial	Energy Team	CECAP group	IRC						
EB2.4	Replace dependence on LPG at Chapel Gate	Energy Manager/ General Manager/MSM	CECAP group/EDC	£££						
EB3.1	Optimising cooling provision at Talbot Campus	Energy Manager/MSM/ Head of Estates Development	EDC/CECAP group	£						
EB3.2	IT cooling	Energy Manager/ Infrastructure Architect, IT	CECAP group	IRC / ££						
EB4.1	Better monitoring of building utilisation	Energy Manager/Space Planning Manager/Head of FM	Estates SMT/EDC	££						
	Potential timetable compression	Energy Manager/Space Planning Manager/Head of FM	Estates SMT/EDC	IRC						

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
EB5.1	Adopt active energy management principles.	Energy Team	CECAP group	IRC						
EB6.1	Rainwater harvesting	MSM/Energy Team	CECAP group	£						
EB6.2	Greywater recycling	MSM/Energy Team	CECAP group	£						
EB6.3	Purified water systems	MSM/Energy Team/SciTech	CECAP group	IRC						
EB6.4	TC borehole feasibility study	Energy Manager/MSM/ Head of Estates Development	EDC/CECAP group	IRC						
EB7.1	Replacement of all refrigerants with low / zero GWP alternatives	Energy Manager/MSM/ Programme Manager	Estates SMT	IRC						
NA1.1	Update relevant policies to include NBS	Sustainability Manager/ Biodiversity Group	SC	IRC						
NA1.2	Consider co-benefits of approach to offsetting	Energy Manager / Biodiversity Group	CECAP Group	IRC						
NA1.3	Identify opportunities to support nature	Sustainability Manager / Biodiversity Group	SC	IRC						
NA1.4	Encourage staff and students to connect with nature	Sustainability Manager / Biodiversity Group	SC	IRC						
NA1.5	Incorporate nature into education and research	SAN (supported by the SSO)	RDS/FLIE	IRC						
RE1.1	Building mounted PV arrays	Energy Manager	EDC/CECAP Group	££ - £££						
RE1.2	Install solar canopies over appropriate car parking	Energy Manager	EDC/CECAP Group	£££						
RE1.3	Examine the potential for battery storage technology associated with PV arrays	Energy Manager	EDC/CECAP Group	£						
TR1.1	Reduce the impact of the BU bus fleet									
	Engage with More Bus re driving efficiency	Travel & Transport Manager	More Bus	IRC						
	Non-diesel buses at contract renewal	Travel & Transport Manager	TPG	£££						
TR1.2	Move to all electric vehicle fleet by 2025	Travel & Transport Manager	TPG	££						
TR1.3	Implement staff salary sacrifice scheme for EVs	Travel & Transport Manager	TPG	IRC						
TR2.1	Revise the Business Travel Policy and support with communications and guidance	Sustainability & Travel & Transport Managers	ULT	IRC						
TR2.2	Provision of EcoDriver training	Travel & Transport Manager/HSW team	TPG	£						

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
TR2.3	Introduce stop-start technology on new buses	Travel & Transport Manager	Unibus	IRC						
TR2.4	Refresh the BU bike share scheme	Travel & Transport Manager	TPG	IRC						
TR2.5	Work with suppliers to only provide lower impact commercial hire vehicles	Head of Procurement	SC	£						
TR2.6	Provision of pool cars	Travel & Transport Manager	TPG	££						
TR3.1	Encourage remote working	Travel & Transport Manager/Director of HR	ULT	IRC						
TR3.2	Promote active travel	Travel & Transport Manager	TPG	IRC						
TR3.3	Travel for Work loan	Travel & Transport Manager	TPG	IRC						
WS1.1	Focus on supplier packaging and single use materials	SSO/Head of procurement/ Chartwells/SUBU	SC	IRC						
WS1.2	Net zero waste contract	Sustainability Manager	SCAG	IRC						
WS1.3	Increase and maintain recycling rate target	SSO	Suez	IRC						
WS2.1	Improve collection of construction and demolition waste data	Head of Estates Development/ Sustainability Manager	EDC	IRC						
WS2.2	Set stringent targets on construction waste	Head of Estates Development/ Sustainability Manager	EDC	IRC						
FD1.1	Reduce food impact	SSO/Chartwells/ SUBU	CUG	IRC						
IT1.1	Support enhancements to remote working	Director of IT Services/Director of HR/Travel & Transport Manager	DUIT/SC	£££						
IT1.2	Low energy IT and energy focused IT controls	Director of IT Services/Head of Procurement/ Energy Manager/SSO	DUIT/SC	££ - £££						
IT1.3	Review UPS provision and replace significantly under-utilised units	Director of IT/Infrastructure Architect/Energy Manager	DUIT/EDC	££						
IT1.4	Relocation of Studland House data centre to the cloud	Director of IT/Head of Procurement	DUIT	£££						
PC1.1	Consider redrafting the Sustainable Procurement Policy	Head of Procurement	SC	IRC						

Ref	Title	Who's responsible?	Who do we need to influence?	Cost	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
PC1.2	Gather data on carbon (and potentially wider environmental) credentials of suppliers	SSO/Head of Procurement	SC/FRC	IRC						
RP1.1	Align reporting with best practice (GHG Protocol)	Sustainability Team	CECAP Group/SC	£ - ££						
RP1.2	Enhance metering systems	Energy Team	CECAP group	££						
RP1.3	Align with TCFD reporting requirements	Sustainability Manager/Finance Director	CECAP group/FRC/SC	£						
RP1.4	Improve data capture	Sustainability Team	CECAP group	£						
RP1.5	Improve data management	Sustainability Team	CECAP group	£ - ££						
RP1.6	Set additional targets where appropriate	Sustainability Team	CECAP group	IRC						

Appendix 11: Policy review

One of the more significant recommendations in the governance theme is that all relevant policies across BU are updated to include specific reference to, consideration of, and response to the climate and ecological crisis. The schedule below indicates the main policies concerned, their owners and expiry date, and brief recommendations although all policies will need to be reviewed to ensure they align with the CECAP. The Sustainable Procurement Policy and the Business Travel Policy have been reviewed in more detail as part of developing the CECAP; the former has already been updated and comments on the latter are included in Table 36, below.

Table 35: Policies to be reviewed and updated to align with the CECAP

Policy	Owner	Expiry date	CECAP recommendation
BU2025	Board	2025	Include focus on crisis in update Review CECAP in 2024 to align with new BU strategy
Staff appraisal	Director of HR		Require at least one objective focused on contribution towards SDGs and CECAP in objectives Reward staff for actions to enrich society (SDGs) and reducing carbon emissions (CECAP)
Staff Development Policy 2019	Director of HR		Crisis literacy and other development offers
Business Travel	Finance Director	06-Mar-21	*See specific recommendations below.*
Driving and the use of vehicles – policy & procedure	Director of HR	12-Feb-21	Include requirement to use Enterprise hire cars and explicitly list exemptions. Include requirement for completion of eco-driver training for fleet vehicle / pool car users.
Procurement Manual	Head of Procurement	Apr-20	Update to require budget holders to complete mini LCA on all purchases below £25k threshold (as per Sustainable Procurement Policy)
Sustainable Procurement Policy	Head of Procurement	Apr-21	Updated in June 20. Need for training/support for budget holders so can complete mini LCA as described above
Sustainable Construction Policy	Head of Estates Development	Nov-20	GBC net zero definitions & Nature Based Solutions to be added. Set building budget envelope such that sustainability features included (and protected)
Biodiversity Policy	Sustainability Manager	Jan-21	Commitment to inspire staff and students about what nature provides & NBS opportunities Include maintenance of habitats to ensure continued support for biodiversity.

Policy	Owner	Expiry date	CECAP recommendation
Sustainability Policy	Sustainability Manager	Sep-20	Add net zero target, Commitment to inspire staff and students about what nature provides & NBS opportunities
Sustainable IT Policy	Director of IT	Jun-21	Add net zero target & support for flexible working and business travel practices
Travel Plan	Travel & Transport Manager	2025	Review against CECAP/new BU strategy
Sustainable Food Policy	Sustainability Manager	Nov-20	Commitment to net zero. Reduction/removal of high carbon food sources (primarily beef and dairy) from both food outlets and hospitality menus
JDs	Director of HR		Update CMP ref to net zero on all new JDs
Academic Career Framework	Director of HR		Update to reward staff for enriching society and minimising carbon emissions from education, research and professional practice and to remove / amend any areas which conflict with CECAP outcomes
Flexible working policy	Director of HR	27-Oct-19	Review against WFH at least one day a week
Extreme weather policy for staff	Director of HR		Update with ref to resilience guidance and that staff may need to WFH due to impact on infrastructure and knock on effect on their family (eg wildfire causes school closure)
Home/Remote working policy	Director of HR	12-Sep-21	Update to encourage staff where they are able to WFH at least one day a week or more
Honoraria Scheme	Director of HR	01-Sep-21	Update to include enriching society (aligned with UN SDGs) and minimising carbon emissions from education, research and professional practice
2B – Programme Structure and Curriculum Design Characteristics: Procedure	Academic Quality	Aug-19	Update to reflect UN SDGs and the climate and ecological crisis. Current text: Globalisation, Internationalisation and Sustainability (C3B, C5, S2D) embed concepts of globalisation in all academic units and programmes to facilitate global perspectives, cultural awareness, international mobility, diversity and sustainable development; See also Appendix 3 – What is Education for Sustainable Development?

Policy	Owner	Expiry date	CECAP recommendation
4H - Evaluation, Monitoring and Modification of Postgraduate Research Degree Programmes: Procedure	Academic Quality	Aug-19	Update to reflect UN SDGs and climate and ecological crisis
5A - Welcome Guide and Programme/Level Handbooks: Procedure	Academic Quality	Aug-20	Programme handbook includes ref to UN SDGs & climate and ecological crisis
Developing your research impact: how to enable your research to make a difference	RDS		Update to ref UN SDGs and climate and ecological crisis impacts
6C – Principles of Assessment Design: Policy	Academic Quality	Jul-19	Update to assess student understanding of the UN SDGs and the climate and ecological crisis
Brightspace	FLIE		Update with staff/student resources on the UN SDGs and the climate and ecological crisis

Business travel policy

The comments are presented as suggested updates to the existing Business Travel Policy. Comments are referenced against the relevant section number.

Table 36: Comments on the Business Travel Policy

Section	Commenting on	Comment
Contents		The contents should include reference to offsetting payments if the polluter pays principle is adopted
1.1 Policy objectives	Bulleted objectives	These objectives could feature sustainability much more strongly and ahead of some other items
	Final para of 1.1	This guiding principle may be more helpful before the objectives.
1.2		Suggest adding the ability to capture the impact of travel as a further benefit. Ideally place this near the top of the list to make it clear that travel does have an impact.
1.3	Accommodation organised by event organiser	Could this exception only be valid where organisers can confirm sustainability benefit?

Section	Commenting on	Comment
	Group travel bookings	Where these are competitively bid, can guidance be provided for ensuring the process includes robust consideration of sustainability?
	“In order that financial benefits…”	This para should also mention minimising the environmental impact of business travel.
2	Environmental factors objective	This objective could be stronger, e.g. "To minimise business travel and to ensure that, where business travel can be demonstrated to be necessary, to ensure it is undertaken in the most sustainable way practicable."
4.1	2nd bullet	There is an obvious conflict here - more sustainable travel modes (particularly train) are often more expensive than others (car, flights). This tension should be explicitly addressed so that bookers understand how to make the appropriate choice.
	3rd bullet	Potential conflict between personal incentives and sustainable travel - only cost is cited as a reason not to purchase.
	5th bullet	Could include reference to the provision of an assurance statement as part of these individual’s budget responsibilities.
	8th bullet	The provision of this 'free' travel insurance could be removed to provide a disincentive to travel.
4.2		It would be very useful to include some guidance on what might constitute 'necessary' travel
5	1st para	Could this wording be stronger? I.e. expenses for travel not booked through the TMC will not routinely be paid? If so, the circumstances where they will be paid would need to be defined.
	3rd para	This could also mention the benefits of better understanding of environmental impact.
5.1	2nd para: “Online booking ***can*** be made…”	Should this be rephrased to “should be made”, or even “must be made”?
6	1st para	The opening para here could reaffirm the requirement to be sure that air travel is necessary (as defined earlier in the policy)
6.1	2nd para	Suggest business class flights should not be allowed even where there is no cost (financial) increase as this incurs ~50% - 190% additional carbon cost (depending on type of flight).
	3rd para	Similar issues to above for upgrading to premium economy.
7	4th para	It may be that allowing first class travel instead of domestic air travel is a possible motivator.

Section	Commenting on	Comment
9.3	3rd bullet	This will be particularly important if departments are paying for carbon impact for flights as without ensuring the cancellation is recorded, they would likely still be charged for offsetting.

Appendix 12: Historic performance metrics

The following charts indicate changing performance of various emissions sources over time.

Electricity

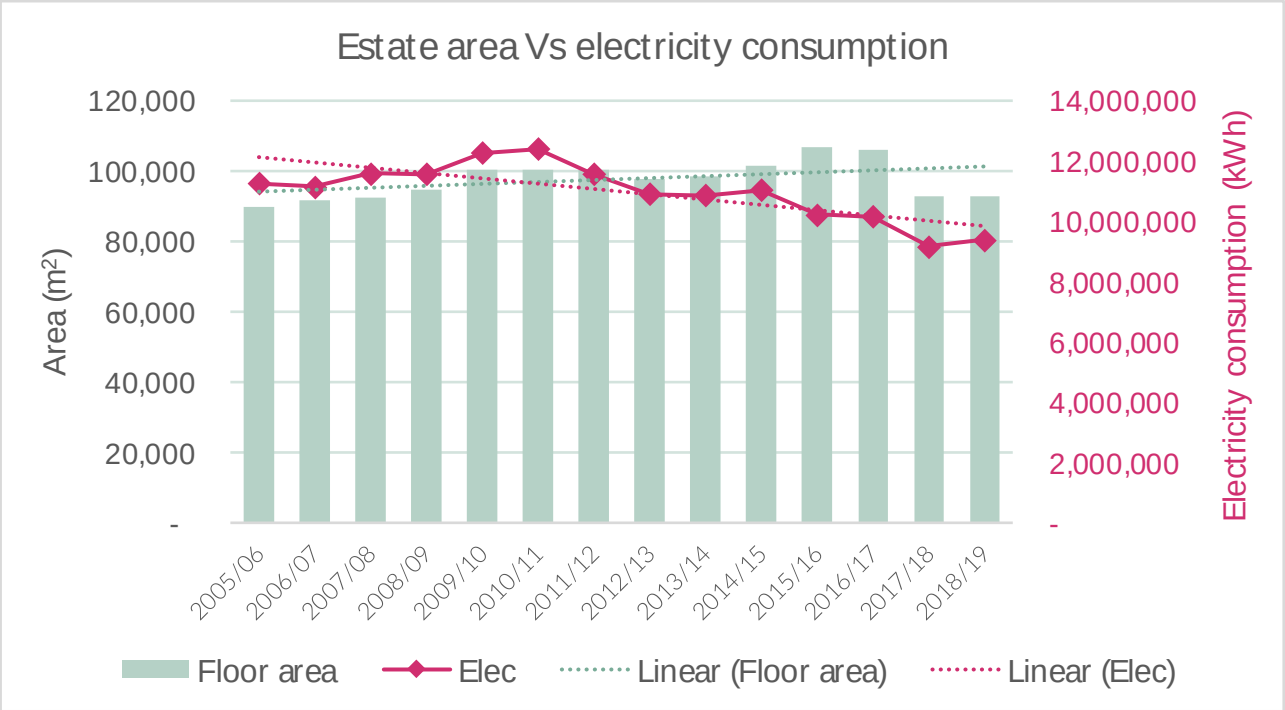


Figure 10: Estate area Vs electricity consumption

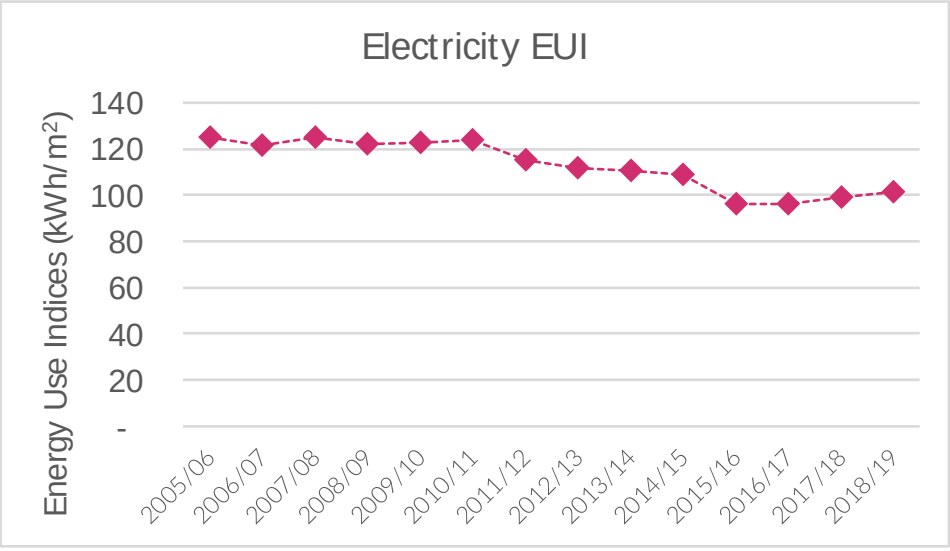


Figure 11: Electricity energy use indices

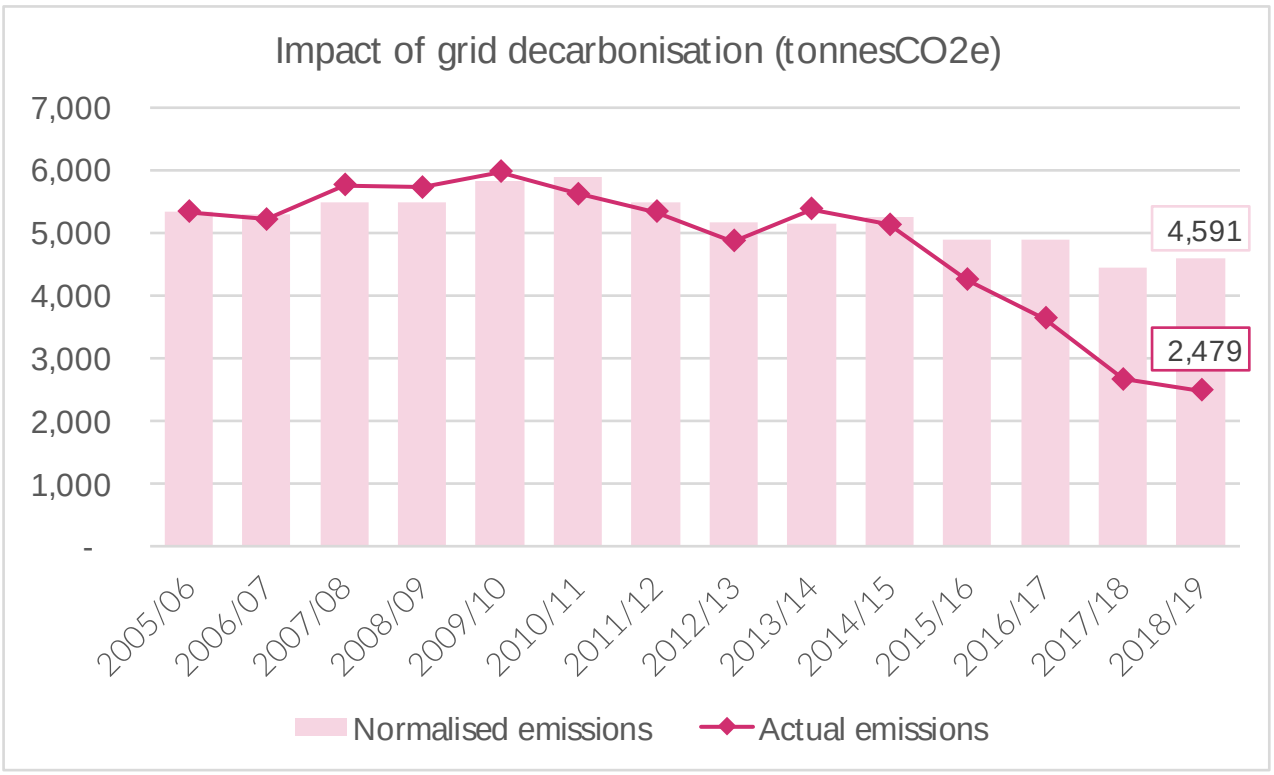


Figure 12: Impact of grid decarbonisations

Gas

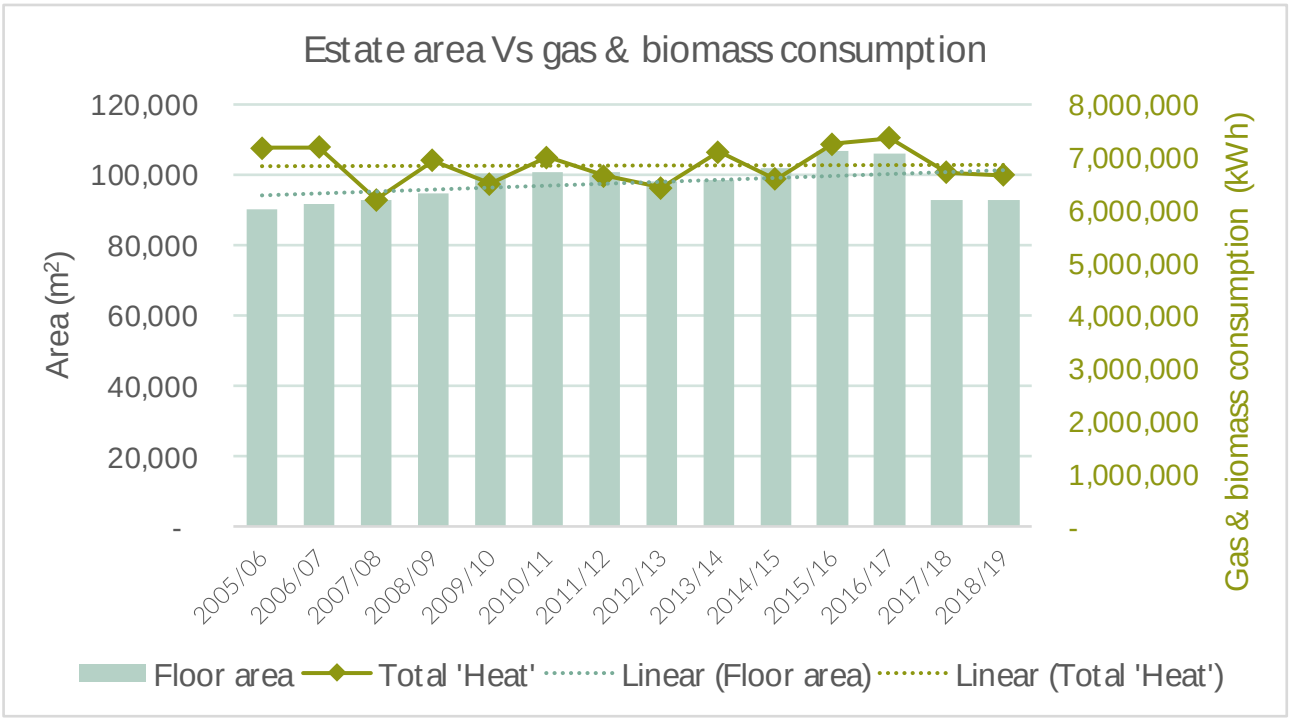


Figure 13: Estate area Vs gas and biomass consumption

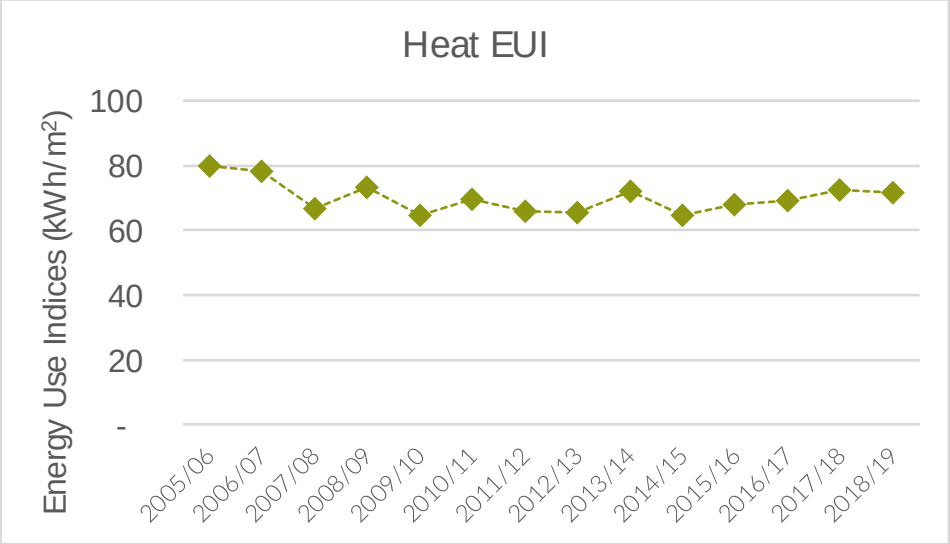


Figure 14: Heat energy use indices

Water

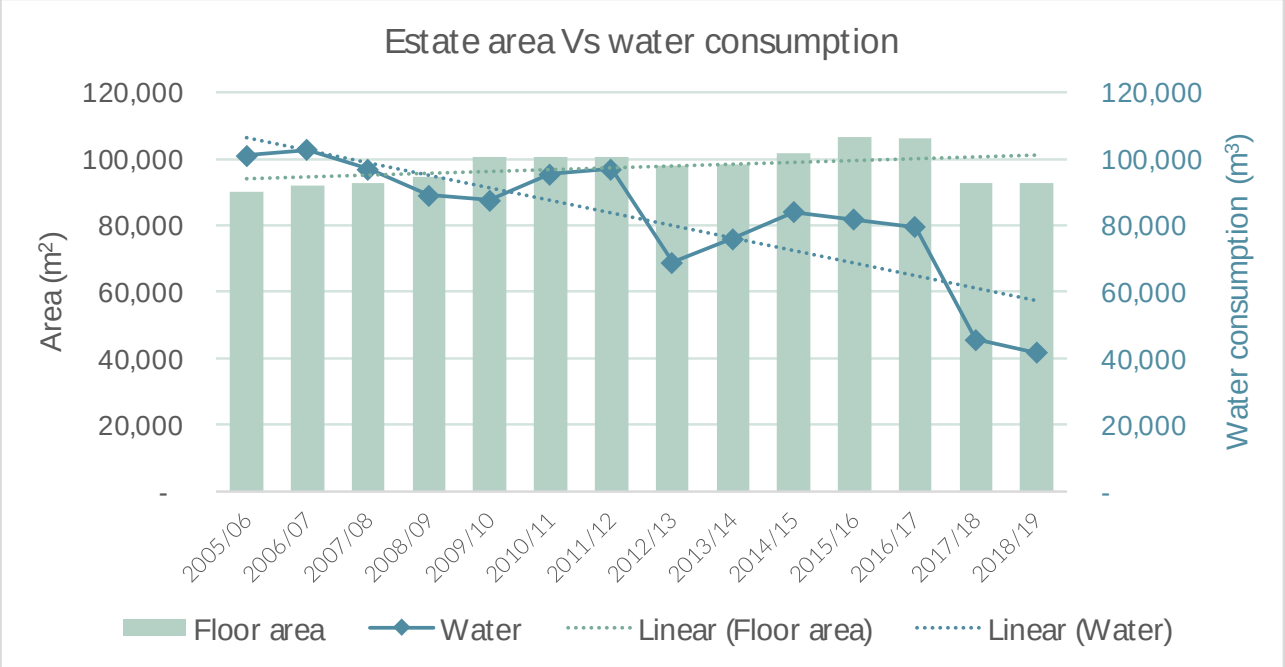


Figure 15: Estate area Vs water consumption

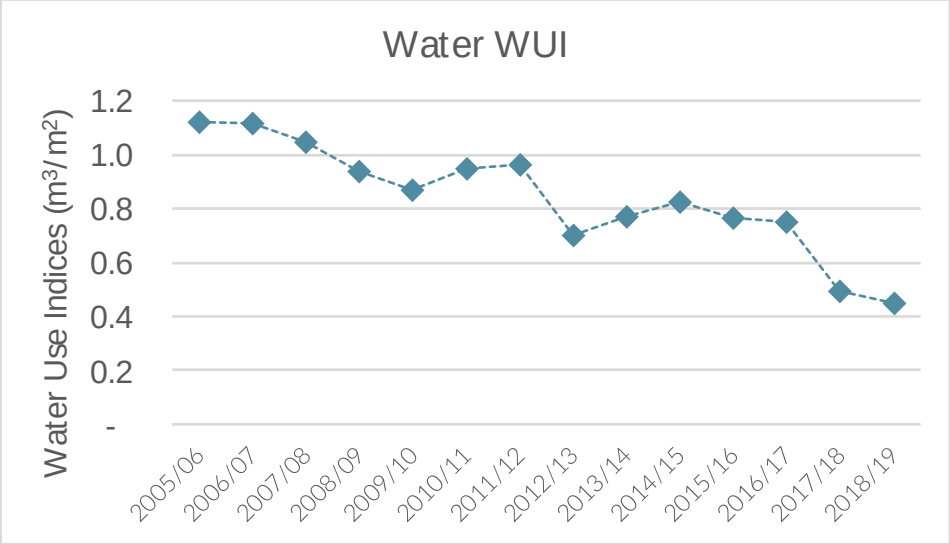


Figure 16: Water use indices

Flights

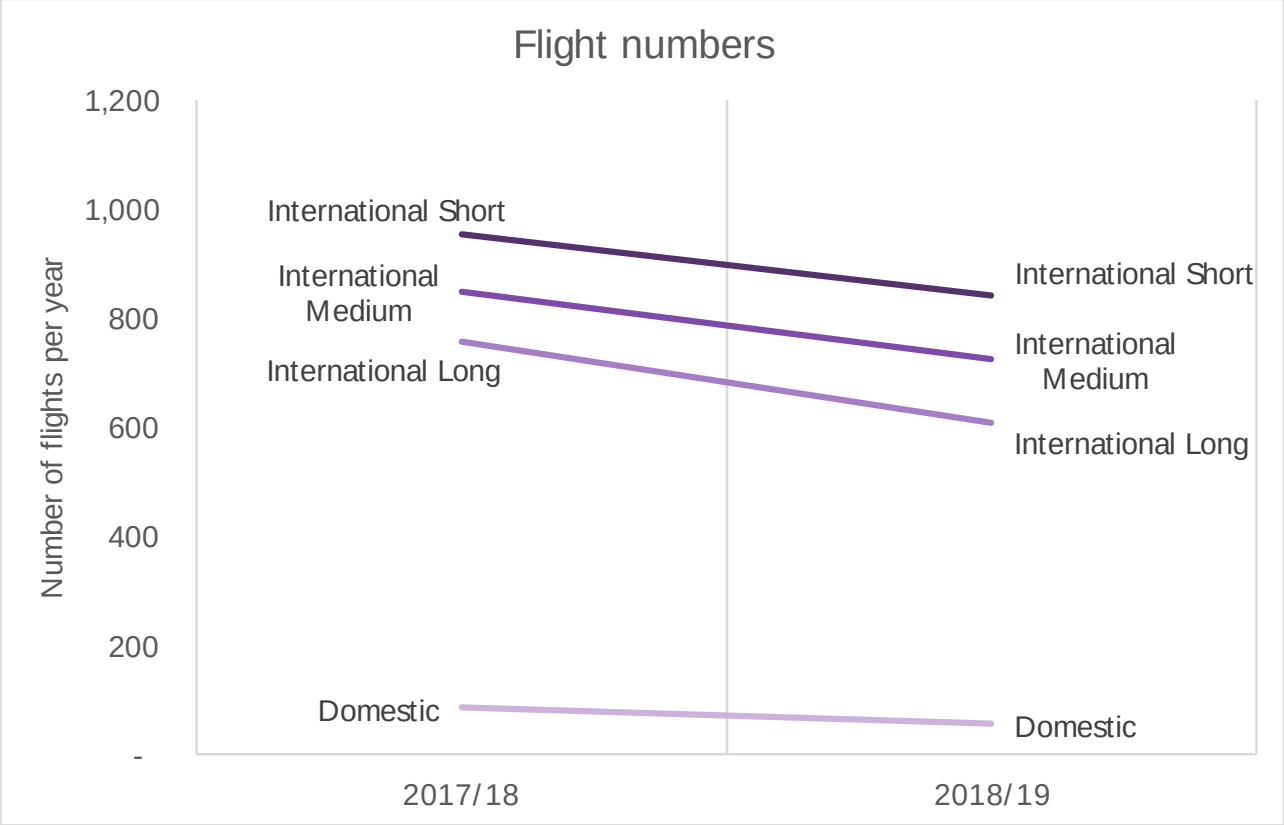


Figure 17: Flight numbers

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