Carbon Reduction Management Plan 2018 – 2030

Foreword by the Vice-Chancellor

Climate change is widely accepted as one of the greatest threats facing the world today and we all have a part to play in tackling it. Through its long-term planning approach and position of influence on future generations, the Higher Education sector is uniquely placed to demonstrate leadership in the field of carbon reduction and sustainability.

At Bath Spa University, we are committed to excellent carbon management. This has been demonstrated over the first seven years of our 2010 Carbon Reduction Management Plan, which, during a period of unprecedented growth for the University, has led to a reduction in carbon intensity of 50% per m^2 of floor space and 30% per FTE.

The energy conservation programme implemented to date has been based on sound business economics and, in addition to reducing carbon emissions, has greatly improved the working and studying environment for staff and students.

By setting out a clear long-term vision for the University to become Carbon Neutral by 2030, this revised Carbon Reduction Management Plan demonstrates Bath Spa's commitment to being a leader in the field of sustainability. This ambition aligns with our vision to be a leading university in creativity, culture and enterprise, producing graduates who are socially engaged global citizens. One of the three key principles that underpin this vision is that the University acts ethically and we believe that climate-change action is an ethical, as well as an economic decision.

Meeting the targets in this plan will be challenging, especially if the University continues to grow as planned. However, given the success of our efforts to date, I am confident that the University will be successful in meeting these targets as they are an integral part of achieving our vision and ambitions.

Professor Sue Rigby
Vice-Chancellor

Executive Summary

In 2010, Bath Spa embarked on ten-year carbon and energy reduction plan, which aimed to cut CO_2 emissions in half from 4,000 to 2,000 tonnes per year by 2020. The programme of energy conservation measures outlined in the Carbon Reduction Management Plan (CRMP) has now been largely completed and has so far led to the avoidance of over 8,000 tonnes of CO_2 emissions. This is estimated to have saved the University around £1.5M in energy costs against business-as-usual (by 2018), and is expected to break even on expenditure to date by around 2024. At this point we will have spent in the region of £4M on energy and carbon reduction activities and saved approximately the same amount in energy costs. By 2024, annual savings against business-as-usual will be in the order of £700k per year, which means that our carbon-reduction activities to date will become cost-positive for the University.

In the first four years of the programme, gas consumption was reduced by almost 50% and electricity by 11%, equating to a 23% decrease in CO_2. However, the University has since grown significantly, increasing floor area by 50%, building operation by 20-25%, staff and students by 10% and students in University-owned accommodation by around 900. This has caused an underlying increase in energy consumption and consequent CO_2 emissions, which are now almost back to our 2008 baseline. Bath Spa's growth path is set to continue with the opening of our new Locksbrook Rd facility in 2019 and other potential developments in the pipeline.

With this growth in the business, the completion of the 2010 CRMP programme of measures and an increasing requirement to include emissions from other business-related activities, such as waste, water, procurement and transport, it is time to develop a new plan. One that is flexible, to account for changes in business activity, forward-looking, to address the increasing urgency of climate change, expansive, to cover all our business activities and ambitious, to ensure we are at the forefront of responsible business development in the HE sector.

This document outlines the progress we have made so far and sets out a vision, strategy and high-level plan over the period to 2030.

Our Vision is to play a leading role in the decarbonisation of the HE sector, to deliver on our responsibilities under the Climate Change Act 2008, the Paris Agreement of 2016 and their future iterations, and to share our learning with our students and the wider HE community.

The significant achievements that we'll be aiming to meet along the way will be:

- 3,300 tonnes Scope 1 & 2 CO_{2e} by 2020
- 2,000 tonnes Scope 1 & 2 CO_{2e} by 2025
- 100% renewable electricity by 2027 and;
- Certified Carbon Neutral (PAS2060) by 2030

Our Strategic approach will be four-fold:

1. Continually improving the energy efficiency of our estate by eliminating energy waste through close control of plant, the up-skilling of the estates team and the fostering of energy-aware behaviours throughout the BSU community.
2. Upgrading to more energy-efficient and low-carbon plant and equipment wherever practicable.

3. Developing on and off-site renewable energy generation and procurement of energy from renewable sources.
4. Offsetting what cannot be eliminated by the above means, through financial partnerships with sustainable development schemes that can contribute to the learning opportunities of our students.

Much planning and detail remains to be resolved in achieving these goals but we relish the challenge and look forward to continuing our journey to becoming a net-positive business.

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Introduction

In 2010, the Bath Spa University Board of Governors ratified our Carbon Reduction Management Plan (CRMP), which spanned the period 2010-2020. This plan set out a programme of energy conservation, efficiency and renewable energy initiatives that were forecast to deliver Scope 1 and 2 carbon savings of 2,000 tonnes per year, halving our annual emissions in 10 years, from a 2008/9 baseline of 4,000 tonnes.

The programme set out in the 2010 CRMP has now been delivered in full, three years ahead of schedule and we expect that this (2016/17) year will see CO_2 emissions approximately 2,300 tonnes below the business-as-usual level projected from 2008. However, during this time BSU has grown beyond all expectation, which has impacted our carbon emissions to an extent unforeseeable in 2010.

The gross internal area (GIA) of the BSU estate has increased by 48% from around 38,000 m^2 to almost 58,000 m^2 and this growth is set to continue until at least 2020. In addition, our operations are increasingly 7 days a week, in some cases 24 hrs and ever-expanding into the summer period. At the same time, the number of students that live in BSU-owned property, and are therefore now included in our Scope 1 & 2 emissions footprint, has increased almost 4-fold and our overall staff and student FTE numbers have increased by over 10%.

The consequence of this growth has meant that, despite our continuing efforts to reduce CO_2 emissions and our early, rapid success, Scope 1 & 2 emissions have increased again and are now close to our baseline level of 4,000 tonnes per year. Clearly, BSU is a very different business today than it was in 2010 when the CRMP was envisaged. This, together with the completion of the work programme set out therein, means that it is now time to take stock and develop a new plan to take us forward through the next phases of our journey.

This revision presents a resume of what we have achieved to date and sets out a vision, strategy and high-level plan over the period to 2030.

The story so far

During 2010, we published our first Carbon Reduction Management Plan (CRMP), which set out how we would reduce our Scope 1 and 2 emissions (see Figure 3) by 50%, or 2,000 tonnes, over the following 10 years to 2020. This was a challenging target for Bath Spa, due to the large proportion of Heritage buildings within our estate and the particular constraints related to the Listed Landscape of Newton Park, which severely restricts the opportunities for renewable electricity generation.

We have made great progress since, implementing just about every measure in the plan, including energy waste avoidance, energy efficiency and renewable energy projects. As a result, we have so far managed to avoid emitting over 6,500 tonnes of CO_2, against a "business as usual" model and have reduced the carbon intensity of our business in terms of CO_2 per unit of turnover by 31% (Table 1)

	Turnover	CO_2 t/£M
2009/10	£ 50,600,000	69.87
2010/11	£ 51,600,000	62.90
2011/12	£ 48,700,000	64.20
2012/13	£ 52,500,000	60.33
2013/14	£ 58,100,000	54.01
2014/15	£ 68,900,000	57.30
2015/16	£ 75,600,000	48.07

Table 1. Bath Spa University turnover and CO2 per £Million since 2009/10, showing 31% decrease in carbon intensity over this period.

However, like many successful businesses, we have also been growing rapidly and plan to continue doing so until at least 2020. In 2015, this led to a revision of the 2020 target in the BSU Vision and Strategy document to 2,750 tonnes, in view of the 560 bed residential development at Newton Park. This development, while increasing our own carbon footprint, had a positive effect by housing students in more efficient buildings on the location of their academic activities, so also reducing transport emissions.

Despite our estate being approximately 50% larger than it was in 2008/9 (Figure 2), our operating hours being over 20% greater and the number of students living in University-owned accommodation having more than trebled, our total Carbon emissions are now 24% lower than they were in 2008/9 (Figure 1). This has been helped by a reduction in UK electricity grid carbon, due to the displacement of coal-generated electricity with renewables. However, in the first five years of the programme, before our rapid expansion, we reduced gas consumption by 4 million kWh/y, which is around 45% of our 2008/9 baseline (Figure 2). Reductions in electricity consumption were slower to achieve but fell steadily for the first four years by 11% in total, until the construction of the Commons building at Newton Park, followed by the Gardens residences, which were also responsible for the large increase in gas consumption seen in 2014/15 (Figure 2). When viewed in the context of our expanding Estate, Figure 1 reveals a picture of steadily increasing efficiency in terms of CO_2 per m^2, which has reduced by 50% since 2008/9 from 90kg to 45kg $CO_2/m^2/y$.

Such has been the pace of our expansion and of the delivery of our carbon-reduction activities, that it is now time to develop a new carbon management plan for the challenges ahead. A plan that is forward-looking and adaptive, which reflects our ever-developing business and includes the management of Scope 3 emissions (see figure 3), while fully addressing the National drive and global need for decarbonisation. To address the global impacts of climate change, we will continue to work towards absolute reduction targets. However, we will also adopt relative metrics, which will enable us to assess progress relative to the growth of our business, both in terms of the number of staff and students we have and the size of our estate.

To prepare for the inclusion of Scope 3 emissions in our carbon management activities, we've been measuring an increasing selection of these in order to be able to set meaningful baselines and targets for their management and reduction. These are waste, water, transport, including both business travel and commuting and more recently, procurement.

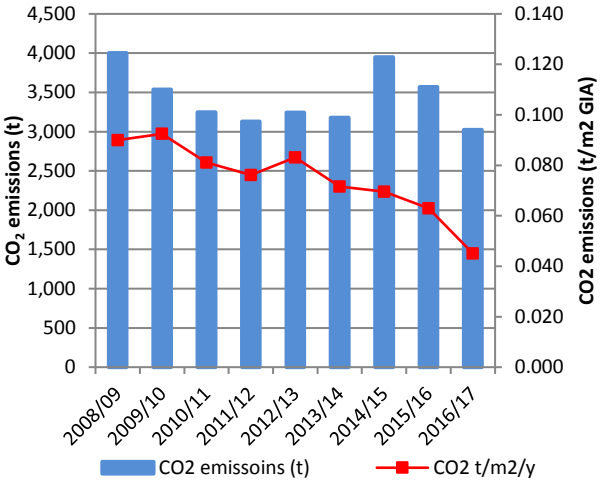


Figure 1. Total Scope 1 and 2 CO_2 emissions (blue bar) and CO_2 emissions per unit area of buildings (m^2 GIA, red squares)

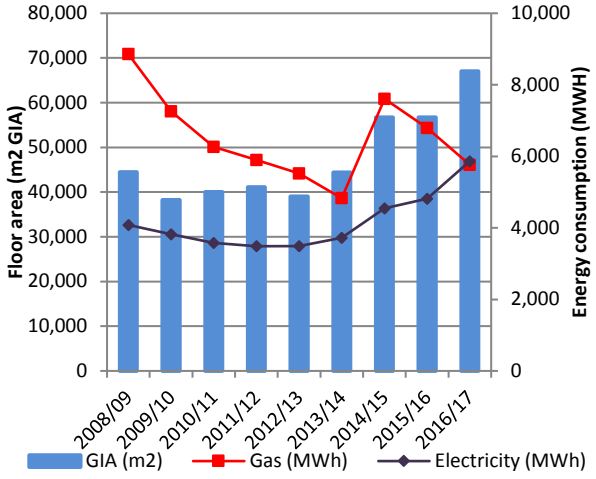


Figure 1. Floor area of University buildings (m^2 GIA, blue bars) electricity consumption (kWh, purple diamonds) and gas consumption (kWh, red squares)

Now that Phase 1 of our CRMP 2010-2020 has been completed (by 2017), the majority of the readily available opportunities for energy efficiency, such as; energy-aware behaviours, energy management software, LED lighting, insulation, draught-proofing and plant replacement, have now been implemented. Going forward, our primary focus during the next phase will be on continuing optimisation of the Building Energy Management System (BEMS) controls and the development of renewable energy and energy storage opportunities. We will of course continue to search out and implement cost-effective energy-saving and efficiency projects wherever possible, strive to ensure our new developments achieve the highest practicable levels of efficiency and continually engage with staff and students over energy-aware behaviours.

Context

The warming impact on our climate of anthropogenic greenhouse gas (GHG) emissions from the burning of fossil fuels is now well established science. It is also widely accepted that without radical change, this will lead to large-scale and long-term disruption to our climate in the near future, which is likely to have civilisation-threatening, worldwide economic and social consequences. The scientific consensus is that, in order to avoid serious economic, social and environmental consequences, global warming must be kept below 2°C and ideally below 1.5°C above pre-industrial levels.

We have just reached 1°C.

In 2008 the Department of Energy and Climate Change (DECC) published The Climate Change Act (2008)[1], which commits the UK to achieve an 80% reduction in CO_2 emissions by 2050, based on a 1990 baseline, with an interim target of 34% reduction by 2020.

In November 2016, the United Nations Framework Convention on Climate Change (UNFCCC) "Paris Agreement" came into force. This international treaty, in which the 194 member states have made voluntary national commitments to cut GHG emissions, is designed to keep global temperature increase below 1.5 - 2°C. However, it is widely accepted that the measures proposed under the Paris Agreement fall well short of the measures needed to meet these targets.

The UK's commitment under the Paris Agreement is to shoulder 1.5% of the agreed global emissions cuts and this will be done through the policy framework set out in the Climate Change Act 2008.

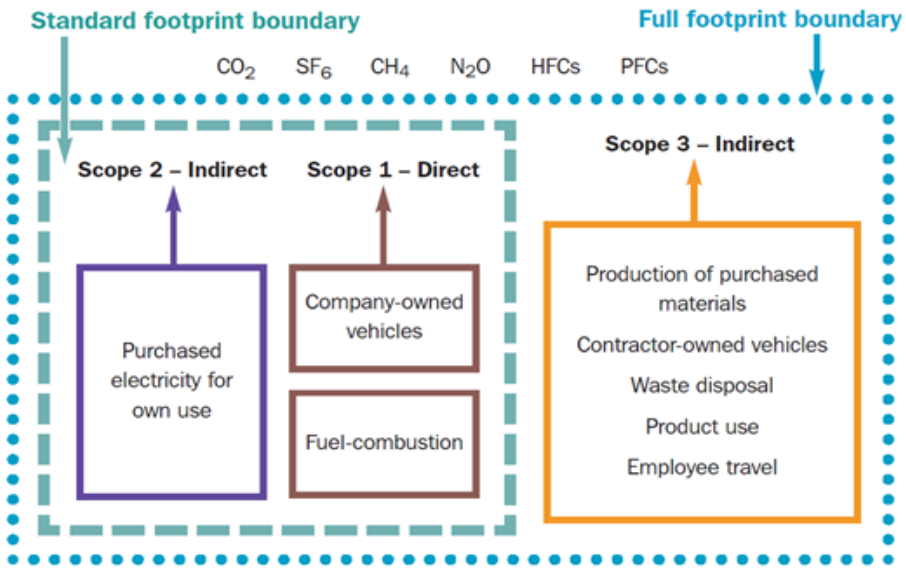
The worlds HE sector is crucial for the future prosperity of mankind, which includes playing a leading role in the decarbonisation of society. Recognising this, The Secretary of State for Innovation, Universities and Skills, in the Grant Letter to HEFCE of January 2009, made clear that the UK HE sector is expected to play a leading role in achieving The Climate Change Act targets and that capital funding to HE institutions was to be linked to performance against these targets. This remains the case today.

The Bath Spa University community recognises that all our activities have an impact on the environment, particularly in terms of carbon emissions and that we have our role to play in achieving the targets set. This awareness is matched by a strong desire to improve performance and reduce our emissions wherever possible.

This Carbon Reduction Management Plan 2017-2030, outlines Bath Spa's response to this most pressing of needs.

Emissions Scopes 1, 2 & 3

By international convention, carbon emissions are separated into Scopes 1, 2 and 3, according to the World Resources Institute (WRI) definitions, embodied in the Green House Gas (GHG) Protocol.



Source: Clean Air-Cool Planet and Forum for the Future (2008)[15]

Figure 2. Definition of emission classes from World Resources Institute.

Vision

Our Vision is to play a leading role in the decarbonisation of the HE sector, to deliver on our responsibilities under the Climate Change Act 2008, the Paris Agreement of 2016 and their future iterations, and to share our learning with our students and the wider HE community.

The significant achievements that we'll be aiming to meet along the way will be:

- 3,300 tonnes Scope 1 & 2 CO_{2e} by 2020
- 2,000 tonnes Scope 1 & 2 CO_{2e} by 2025
- 100% renewable electricity by 2027 and;
- Certified Carbon Neutral (PAS2060) by 2030

Strategic approach

This Plan forms a cornerstone of our institutional strategy to be an ethically-led, world-leading institution in the liberal arts and forms a strategic component of our Sustainability Strategy.

Our Strategic approach will be four-fold:

1. Continually improving the energy efficiency of our estate by eliminating energy waste through close control of plant, the up-skilling of the estates team and the fostering of energy-aware behaviours throughout the BSU community.
2. Upgrading to more energy-efficient and low-carbon plant and equipment wherever practicable.
3. Developing on and off-site renewable energy generation and procurement of energy from renewable sources.
4. Offsetting what cannot be eliminated through contributions to sustainable development schemes that can contribute to the learning opportunities of our students.

Planning, implementation, monitoring and reporting of progress will be managed according to the Plan-Do-Check-Review model, within our ISO14001 environmental management system.

Progress will be reported annually to Senior Management and the Board of Governors, via the Environmental Steering Group (ESG).

Transport-related Scope 3 emissions will be managed and reduced by the Transport Planning Group, via our Travel Plan. Emissions will be reported annually to ESG.

Waste minimisation and water efficiency will be managed by the Estates Team and via our ISO14001 EMS and Scope 3 emissions from these sources will be reported to ESG.

Our primary carbon reduction targets will remain as "absolute" targets and will not be relative to such metrics as FTE, Gross Internal Area or turnover. This is to reflect the fact that there is a finite limit to the quantity of global carbon emissions that can be safely emitted. However, such relative metrics will be monitored and reported as they are good measures of business performance.

Governance

Reporting to:	Vice-Chancellor and Board of Governors
Steering:	Environmental Steering Group, Chaired by the Chief Operating Officer
Delivery management:	Sustainability Manger
Delivery Group:	Estates and Services Team

Carbon reduction Policy

Bath Spa University recognises that the energy, products and services it consumes cause the emission of greenhouse gases to the atmosphere, which contribute to climate change. As part of our overall goal of sustainable development, we are committed to continual improvement in the management and reduction of energy consumption and carbon emissions.

To this end we will:

- Manage energy consumption via a systematic, auditable energy management system
- Ensure continual compliance with energy related legislation, HEFCE requirements and corporate commitments
- Implement a sustainable energy strategy to reach Carbon-Neutrality* by 2030
- Ensure any new development contributes to the sustainable energy strategy
- Continually improve the energy efficiency of our existing estate
- Regularly monitor and review energy consumption against our reduction targets
- Ensure the necessary resources are made available to achieve these goals, cost-effectively
- Manage Scope 3 emissions from waste, water, transport, products and services, via our ISO14001 Environmental Management System
- Promote energy awareness among our staff and student body
- Communicate progress to internal and external stakeholders

* Certified to internationally-recognised PAS 2060 Carbon Neutral Standard.

This policy will be reviewed annually to ensure it continues to reflect Bath Spa University's commitment to reducing carbon emissions.

Scope boundary of BSU Carbon Reduction Management Plan

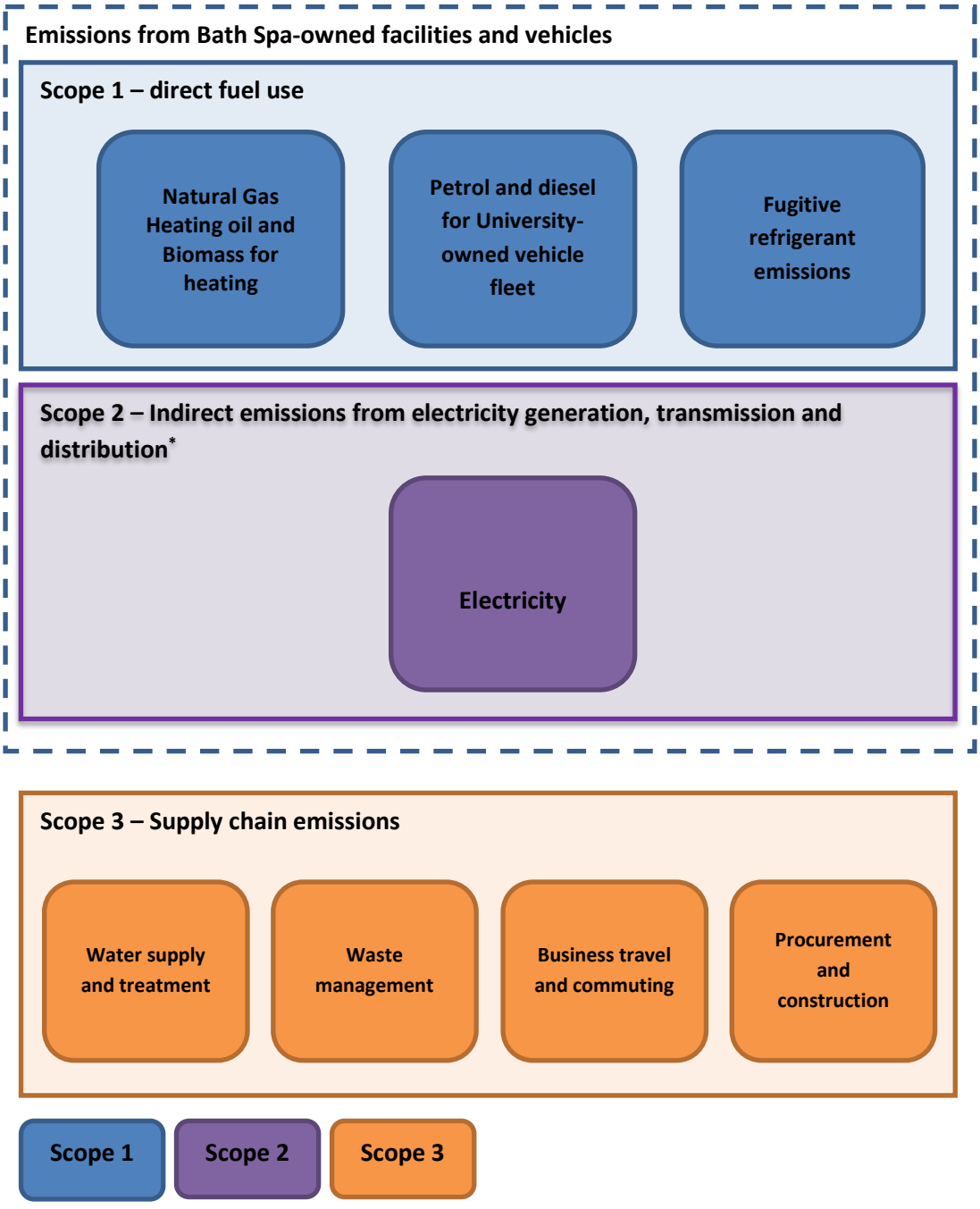


Figure 3. Scope boundary for Bath Spa Carbon Reduction Management Plan, including Scope 1, 2 and 3 emission classes.

Carbon emission baselines and targets

Table 2. Baselines and targets for Scope 1, 2 & 3 emission classes.

Emission source	Baseline year	Absolute Baseline – total CO_{2e} emissions (tonnes)	Relative Baseline – CO_{2e} kg/m^2 GIA*	Relative Baseline – kg CO_{2e} per student/staff FTE	2016/17 Total emissions (tonnes CO_{2e})	2020 Target (Tonnes - absolute)	2025 Target (Tonnes - absolute)	2030 Target (Tonnes - absolute)
Electricity	(2005 - 2008/9)	2,200	49.5	302	2,255	2,000	710**	0
BSU fleet vehicle fuels	(2005 - 2008/9)	25	N/A	N/A	28	20	15	10
Fugitive emissions****	(2005 - 2008/9)	25	N/A	N/A	13	20	15	10
Heating fossil fuels	(2005 - 2008/9)	1,770	39.8	243	1060	1,210	1,210	1,210
Biomass	(2017)	7	0.123	0.10	15	50	50	50
Total Scope 1 & 2	**(2005 - 2008/9)**	**4,020**	**89**	**0.545**	**3,371**	**3,300**	**2,000**	**1,280**
Waste	(2017)	12	0.176	1.42	9	15	10	5
Water	(2017)	60	1.06	8.6	52	85	80	75
Daily commuting	(2015 – 2017)	3,246	N/A	490	2,851	3,000	2,500	2,000
Overseas commuting	(2015 – 2017)	1,339	N/A	1.52***	1,147	1,300	1,300	1,300
Business travel	(2015 – 2017)	630	N/A	90	646	600	550	520
Construction	2017	2,112	N/A	270	2,112	2,112	2,112	2,112*****
Procurement	2017	5,214	N/A	668	5,214	5,214	5,214	5,214*****
Total Scope 1, 2 & 3					**15,402**	**15,626**	**13,766**	**12,506**
Potential Carbon offsetting	**2030**	**0**	**0**	**0**	**0**	**0**	**0**	**5,200**

*GIA = Gross Internal Area

**Reduction aligned to UK Gov carbon intensity forecast

***Per overseas student

****Refrigerants

*****Supply chain, including construction emissions excluded from offsetting

Primary targets

- 3,300 tonnes Scope 1 & 2 CO_{2e} by 2020/21
- 2,000 tonnes Scope 1 & 2 CO_{2e} by 2025
- 100% renewable electricity by 2027 and;
- Certified Carbon Neutral (PAS2060) by 2030

Emissions and cost forecast to 2020

Our carbon emissions forecast is updated each year to reflect performance to date and to include potential new projects going forward (Figure 5). Our forecast also includes an estimate of what CO_2 emissions would be if we had not chosen to undertake the energy efficiency and carbon reduction activities (Figure 5 light blue crosses), which enables us to estimate avoided emissions and cost savings. This model is presented in financial terms in Figure 6.

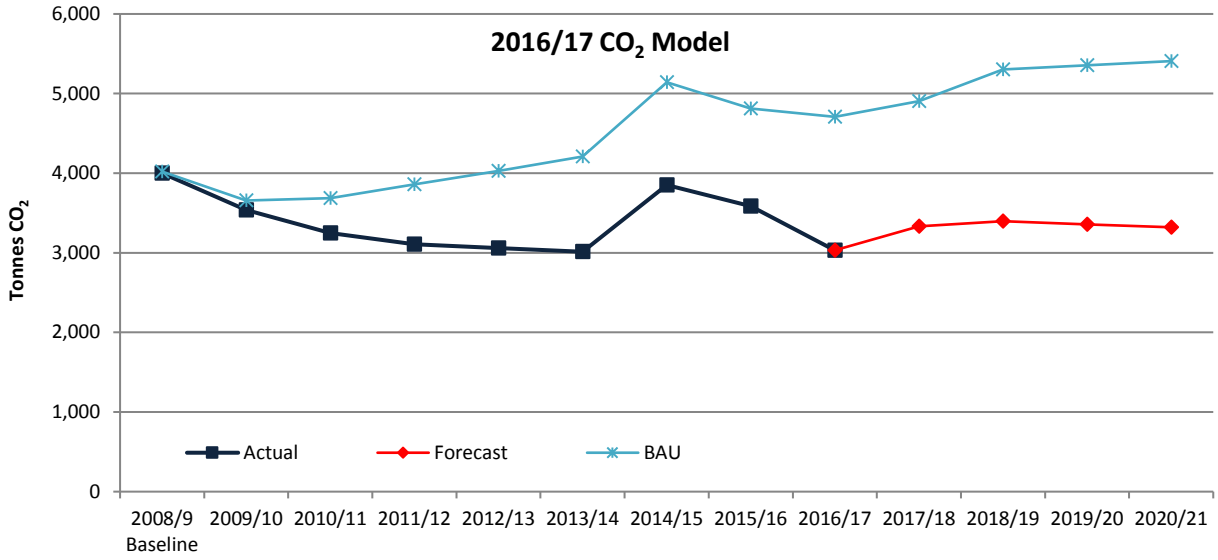


Figure 4. CO_2 emissions forecast 2008/9 to 2020/21, showing business as usual (BAU- light blue crosses), actual emissions (dark blue squares) forecast carbon reduction emissions (red diamonds).

According to the current model, if we successfully implement the next phase of renewable energy and efficiency projects outlined in Table 3, we will have avoided the emission of around 23,000 tonnes of CO_2 and saved around £2.5M in energy costs by 2020/21. This forecast has reduced significantly due to the falling gas price over the last 24 months, which has extended our breakeven point to 2024, by which time, we will have saved around £4M in energy cost.

However, there is, as always, some uncertainty over this forecast at this point in time as some of the projects are in early-stage development and have not yet been fully scoped. In addition, we are in the process of acquiring further property, which is currently poorly understood in energy terms. Finally, we expect the Locksbrook Rd development to become operational in 2018/19, which is not yet fully designed and its operational energy consumption not yet defined.

These, and other variables, will be included in future iterations of the model, which will be extended to 2025 and 2030, as more information becomes available.

In the same way as carbon emissions are recorded and modelled towards 2020, so too are costs and savings (Figure 6). Each year, the model is updated with the previous year's actual energy spend and better forecast data as future projects become better defined.

The model given in Figure 5 assumes an annual energy cost inflation rate of 2% and shows that the accumulated savings will be around £2.5M by 2020, at which time the annual saving would be in excess of £360,000 per year.

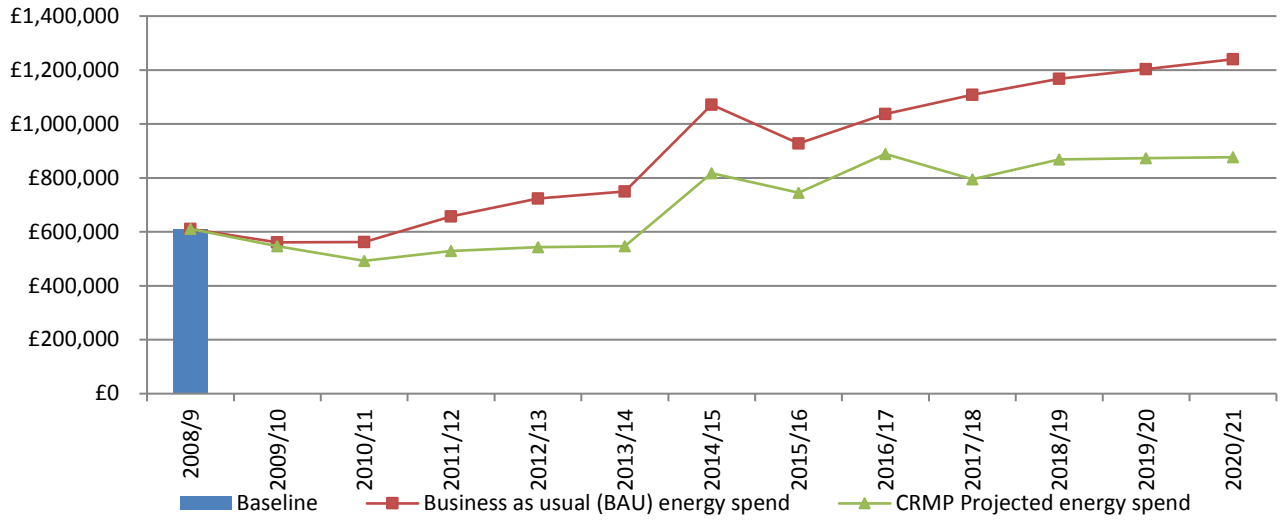


Figure 5. Energy cost forecast to 2020/21, including Business-as-usual, which are modelled to exclude the energy-saving projects carried out through the 2010 CRMP

Programmes

2018 – 2020

During 2016, we completed the last of the feasible projects listed in our 2010 CRMP, along with a few additional measures, in the form of an Energy Performance Contract. There now follows a three-year period of optimisation, which is termed "PASS-phase operational efficiency" in Table 3. This will be carried out alongside a renewed search for additional energy conservation measures. We are also carrying out a feasibility study into developing a combined renewable energy and battery storage project, which may be via a community-owned business model.

Clearly, at this early stage, there is uncertainty over the scale and potential carbon savings of these projects and it may be that a community-owned renewable energy project could produce a significant quantity (if not all) of our electricity requirements. However, for this document, conservative estimates of the savings available from efficiency optimisation have been combined with PV generation capacity according to Bath Spa-owned available roof space. Additional carbon savings from renewable sources developed under this project will be included in detail as the project develops.

Use of woodchip energy in our district heating networks (Commons and Gardens) will increase during the 2017/18 heating season to full capacity in 2019, following their expansion during late 2016. This is expected to reduce emissions by *c.*270 tonnes.

Table 3. Energy efficiency and carbon reduction projects currently under way or planned between 2017/18 and 2020.

Project No.	**Intervention**	**Estimated Gas saving (kWh)**	**Estimated electricity saving (kWh/y)**	**Estimated CO_2 reduction by 2020 (t/y)**	**Notes**
2017/18 - 001	PV and Battery storage feasibility study	NA	NA	-	Feasibility study is completed and is being evaluated for potential business models
2017/18 - 002	Commons biomass system expansion	900,000	0	180	Project completed Jan 2017 – full emission reductions expected 2017 - 2019
2017/18 - 003	Gardens biomass system expansion	450,000	0	90	Project completed Jan 2017 – full emission reductions expected 2017 - 2019
2017/18 - 004	GPH heating controls	0	250,000	100	Project now complete
2018/19 - 001	PASS-phase operational efficiency optimisation	50,000	50,000	30	Post-EPC optimisation programme between BSU and Schneider Electric
2018/19 - 002	Solar PV Newton Park	0	150,000	60	Detailed proposal and funding path subject of Project: 2017/18 – 001
2018/19 - 003	Solar PV Sion Hill	0	40,000	16	Detailed proposal and funding path subject of Project: 2017/18 – 001
2018/19 - 004	PASS-phase operational efficiency optimisation	50,000	50,000	30	Post-EPC optimisation programme between BSU and Schneider Electric
2019/20 - 001	Heat capture from Commons Chiller	50,000	0	10	To be fully scoped and costed during 2017
2019/20 - 005	Twiverton datacentre cooling	0	100,000	40	To be fully scoped and costed during 2018 – current cooling system reaching end of life
2019/20 - 006	GPH PV	0	100,000	40	Detailed proposal and funding path subject of Project: 2017/18 – 001
2019/20 - 007	Herman Miller PV	0	70,000	28	Detailed proposal and funding path subject of Project: 2017/18 – 001
2019/20 - 008	PASS-phase operational efficiency optimisation	50,000	50,000	30	Post-EPC optimisation programme between BSU and Schneider Electric
Total 2017-2020		**1,550,000**	**860,000**	**654**	

The way ahead

As has been the case over recent years, there is much uncertainty regarding UK energy policy and how grid-decarbonisation will be achieved in the coming decades. The current administration has committed to taking all coal-fired generation off line by 2025, favouring new nuclear generation to take its place, beginning with Hinkley Point C. There is great uncertainty that this will be on line by 2025. Investment in new gas generation is becoming increasingly difficult to attract, due to the intermittency of need in the face of growing (but variable) renewables supply, which has led to the scrapping of some planned gas-fired power stations. Despite almost 10 years of pushing the technology, domestic gas supply from fracking is still a long way off and is unlikely to materially alter supply or price in the UK. This has led many to question how these factors will affect energy security in the next decade or so. What industry and policy makers do agree upon is the need for rapid-response storage, to balance supply and demand and to offer grid stabilisation.

As we have completed much of the cost-effective energy conservation and efficiency work that is available to us, our approach going forward will be ever more affected by externalities such as those above. While still focussing on continual optimisation of our controls and the implementation of new or more efficient technologies where they arise, our mid-term plans will focus increasingly on renewable energy generation and battery storage, shifting to offsetting opportunities to compensate for the remaining unavoidable emissions towards 2030.

The returns on investment from renewable installations of the scale required to satisfy all our electricity requirements have fallen dramatically as changes to support mechanisms and tax regimes have conspired to reduce cost-effectiveness. However, new contractual possibilities and grid management structures are developing, which, coupled with battery storage technology, may enable a cost-effective package to be developed. Understanding how a workable business model may be developed that combines these innovations is the subject of a current feasibility study that will inform our programme to 2025.

Carbon offsetting has become one of the fastest-growing mechanisms for clean development in many under-developed areas of the world, bringing with it tangible social, health and environmental improvements. While there is some debate regarding the use of these schemes to effectively "excuse" organisations from continuing to emit their own CO_2, Bath Spa University's approach of minimising waste, maximising efficiency, generating renewables means that offsetting the remainder would be a last-resort measure, which is the right way to approach achieving carbon neutrality.

The current cost of offsetting our residual carbon in a robust offsetting scheme that would enable our students to engage through lectures, work experience, research placements and volunteering would be approximately £90k over 10 years. Much work remains to build a robust curriculum-based business model that would enable such a scheme to demonstrably improve our offering to the student market and achieve the multiple benefits discussed and this will be a primary focus in the mid-term.

At BSU, we run a number of sustainability-related courses, including "Global Development" and "Climate Change and Sustainability". These courses already consider the process and impacts of development schemes funded from sources such as carbon offsetting. Building a relationship with the right funding organisation would open opportunities for our students to actually take part in and study the projects that are being supported by our subscriptions. Such real-life opportunities would offer greater employability to students that take part and would help to build a circular benefit to the University, our students and distant local communities.

Clearly, there is much uncertainty and planning ahead, but our mid to longer-term direction can be summarised as:

2018 – 2020

Continued optimisation of new plant and control systems installed under the EPC project, installation of PV where possible and optimisation of energy consumption at our new locations.

2020 – 2025

In addition to on-going optimisation and implementation of energy conservation measures identified during 2018-20, the focus of this phase will be on developing additional local renewable energy generation and storage, which, it is intended, will provide all our electricity requirements in the following period.

Transport-related Scope 3 emissions will be managed by our Transport Planning Group, according to our Travel Plan, which includes individual targets and proposed measures to meet them. Our IT department is beginning a long-term project to upgrade our virtual meeting facilities to enable virtual meeting to be the default choice for staff. Other Scope 3 emissions that lie within our Scope boundary will be managed through our ISO14001 EMS.

2025 - 2030

Heading towards carbon neutrality during this phase will involve a continuation of energy efficiency works, coupled with procurement of renewable gas to supply what cannot be avoided through efficiency and woodchip heating, and offsetting the remainder through schemes that our Sustainable Development undergraduates can engage with and contribute to as part of their Degree course.