The University of the West of England, Bristol

Carbon Management Plan 2013–2020

Date: 21/03/2017

Version: 03 (Mid-Plan Review)

Pro-Vice-Chancellor's Introduction

Our updated Carbon Management Plan 2013-2020 demonstrates the commitment and ambition that UWE Bristol has for reducing our impact on the environment.

This Plan sets out the journey we must take to ensure the Carbon Management targets set in the Sustainability Plan 2013–2020 are achieved. Meeting these targets is not only important for our staff and students, but the local and global communities that we live in.

This is reflected in the UWE Bristol Strategy 2020 which explores how to provide our graduates and staff with promising futures in a sustainable learning environment. A key measure of our success in achieving this is through improving our per capita carbon footprint, as well as estate usage and efficiency.

We believe that UWE Bristol is in a unique position to make a dramatic difference to carbon reductions, not only within our own estate, but through our research in energy and water management; our partnerships wider businesses; and, through inspiring our students to become responsible global citizens.

This updated Carbon Management Plan for 2017 represents our latest performance against the targets, additional targets and post-2020 vision, as part of a mid-plan review.

I am proud to give my support for this Plan, as it demonstrates clear, robust, challenging, yet achievable targets. Even as the UWE Bristol estate continues to expand over the next few years, we are committed to reducing carbon emissions, and this Plan demonstrates how.

William Marshall
Pro Vice-Chancellor (Commercial Director and Corporation Secretary)
March 2017

Foreword from the Carbon Trust

Cutting carbon emissions as part of the fight against climate change should be a key priority for Universities - it's all about getting your own house in order and leading by example. The UK government has identified the Public sector as key to delivering carbon reduction across the UK in line with the Climate Change Act targets, and the Carbon Management process is designed in response to this. It assists Universities in saving money on energy and putting it to better use elsewhere, whilst also helping to mitigate the economic and social risks from dangerous climate change.

The University of the West of England partnered with the Carbon Trust on this ambitious programme in 2013 in order to realise substantial carbon and cost savings. This Carbon Management Plan commits the university to an absolute target of reducing CO_2 by 22.5% by 2020 and underpins potential financial savings to the institution of nearly £2.78m in 2020. .

There are those that can and those that do. Universities can contribute significantly to reducing CO_2 emissions. The Carbon Trust is very proud to support the University of the West of England in their ongoing implementation of carbon management.

CARBON TRUST

Tim Pryce
Head of Public Sector
July 2014.

Foreword from the Energy Manager

This plan has been developed with the help of many staff and academics within UWE. In particular, the professional engineers, surveyors and project managers within the UWE Estates Team provided expert advice to ensure that the projects identified to meet the targets are realistic and deliverable. This plan has also been developed with the support of many academics and students across the faculties, who provided cutting-edge thinking to our approach to the Carbon Management Plan.

I would particularly like to thank the Carbon Trust who have provided support to UWE Bristol from when we were one of the first universities to pilot the Carbon Management Plan in 2005, to today's plan. And finally, to Carbon Credentials, who provided valuable insight into the vital role of engagement and communication of the plan. The 2016 revision of the plan represents further work that has been carried out with Carbon Credentials to validate our carbon emissions and set out a detailed methodology.

We will report annually on our progress against the targets in this plan, and provide an update in our Annual Report. This plan will be continually updated and revised to ensure that UWE Bristol is on track for meeting the ambitious targets, and to ensure we remain innovative and agile in the ever-changing area of carbon management.

Fabia Jeddere-Fisher,
Energy Manager
March 2017

Our core purpose is reducing our energy and cost wastage to enable us to deliver world class teaching facilities

This Carbon Management Plan sets out how we will achieve the reductions in carbon related activities needed to meet our 2020 targets

With rising energy costs[1], CRC costs[2], and the planned growth of the UWE campuses[3], our costs related to Scope 1&2 emissions[4] are set to rise dramatically over the life of this plan.

Our ambition

- **Achieve carbon reduction** goals within the growing university estate – a 22.5% reduction in absolute carbon emissions[5] between 2005[6] and 2020.
- Empower our **students and staff** with the knowledge and skills to reduce environmental impact in their homes and local communities.
- Connect with **local and national businesses** to advance knowledge in delivering sustainable development.

A reduction of 29% over our 2015/16 emissions need to be made to meet our 2020/21 targets.

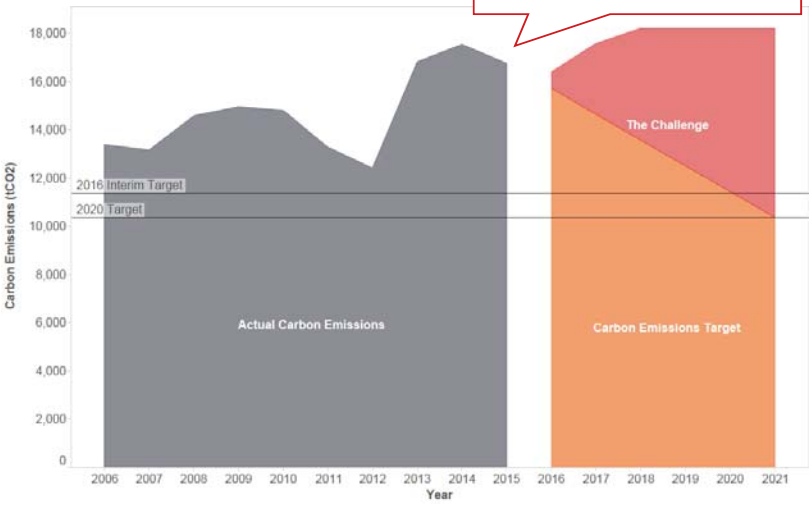


Figure 1 shows UWE's carbon emissions progress to date (in grey), the reductions required if the 2020 target is to be met (in orange) and the scale of the challenge (in red).

[1] A conservative 4.0% increase has been assumed in this plan, however greater increases have been estimated by experts.
[2] Carbon Reduction Commitment (CRC) costs have increased from £12/TCO_2 to £16/TCO_2 from 2014/15.
[3] UWE New Campus Masterplan details here: http://www1.uwe.ac.uk/aboutus/visionandmission/uwenewcampus/uwenewcampusmasterplan.aspx
[4] Scope 1&2 are the direct emissions (natural gas burnt in UWE facilities, any refrigerants released to atmosphere, and emissions from UWE-owned vehicles) and indirect emissions related to energy-imports such as grid electricity.
[5] An 'absolute' figure has not been adjusted for the size of the university either through number of students, or floor area of buildings.
[6] HEFCE Baseline Year

Our priorities for action:

- **Focus on 'Good Housekeeping':** Maintain good working systems throughout the estate, reducing failure costs, and increasing longevity of the infrastructure.
- **Reduce energy demand:** prioritise fabric improvements to improve thermal efficiency of the estate.
- **Supply energy efficiently:** ensure all elements of the heating, cooling, ventilation and power systems are maximised for efficiency.
- **Design for low carbon buildings:** consider the environmental impact of new buildings at the concept design stage.
- **Maximise opportunities for renewables:** Identify opportunities for installing renewables on existing and new buildings.
- **Measure, monitor and reduce all our emissions:** including in-direct emissions such as travel, waste, procurement and water (i.e. Scope 3 emissions[7]).

"Energy management is a continuous process that develops over time. You are unlikely to tackle everything at once, so it's vital to prioritise. Dealing with the fundamentals first will provide the foundations for longer-term success"

Carbon Trust Guide to Energy Management, CTG054

Our approach

Scope 3 emissions are much more difficult to calculate than Scope 1&2. For this plan, we are reporting Scope 3, but not including them in the baseline, or project list.

UWE Bristol has a variety of types, age and location of buildings across Bristol, and we recognise that tackling carbon reductions will be different for each one. **This Carbon Management Plan sets out a 'Road Map' for carbon reductions on each of our major campuses:**

- **Frenchay,**
- **Glenside**
- **Bower Ashton**

as well as addressing:

- **UWE-Wide, organisational-level, projects.**

This plan is also aligned with our academic offering, as UWE Bristol run the energy managers education course of the Energy Institute and have a dedicated courses on climate change, energy management and carbon management. This Carbon Management Plan, and the implementation of the plan, will be used as a real-life education tool for the students.

Our Sustainability Plan 2013-2020 sets the targets as well as additional **post-2020 ambitions** for Carbon Management, as follows:

Each Faculty and Service operates to a Carbon Budget.

To be on track to be "Off-grid capable" by 2040.[8]

These are aspirational targets that demonstrate our longer term ambition, past 2020.

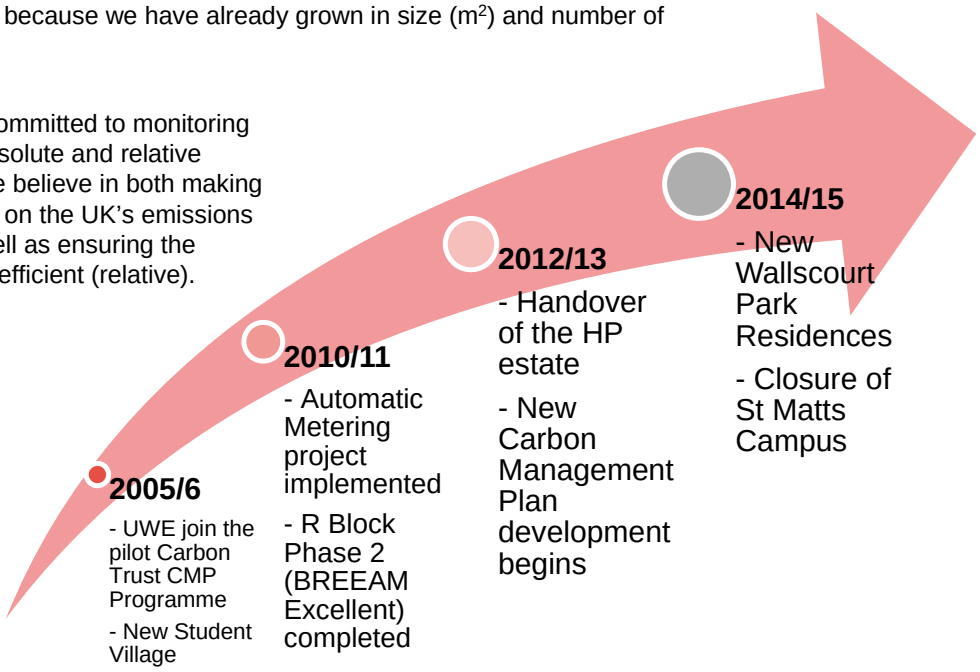
[7] Scope 3 emissions are other indirect emissions, related to travel (excl UWE owned fleet), waste, procurement and water.
[8] By 2040, for UWE campuses to be "Off-grid capable" from the electricity grid, using onsite generation, demand control technologies and battery storage

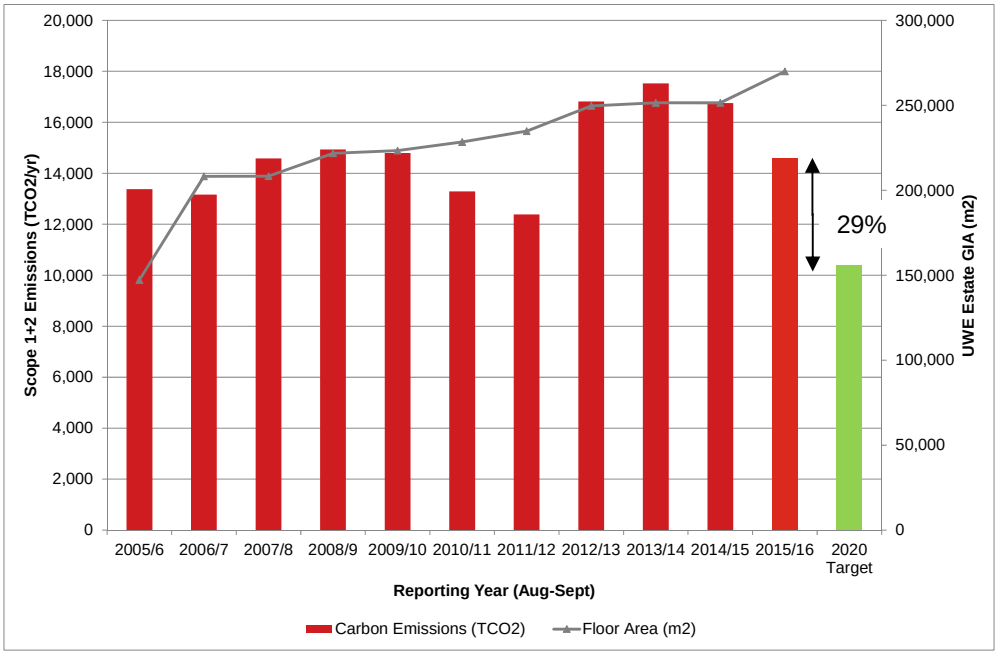
The journey so far

In response to the UK Climate Change Act, UWE Bristol set a target with HEFCE to achieve an absolute reduction of our 2005 Scope 1&2[9] emissions by 22.5% by 2020. Considering the level of reductions already made before 2005, and plans to expand the campus, this was, and still is, a very challenging target.

For 2015/16, a 22.5% reduction over our 2005/06 emissions is equivalent to 29% of our emissions because we have already grown in size (m^2) and number of students.

UWE Bristol is committed to monitoring and reporting absolute and relative emissions, as we believe in both making an actual impact on the UK's emissions (absolute), as well as ensuring the estate we run is efficient (relative).





[9] Scope 1&2 are the direct emissions (natural gas burnt in UWE facilities, any refrigerants released to atmosphere, and emissions from UWE-owned vehicles) and indirect emissions related to energy-imports such as grid electricity.

Scope 1 & 2 Baseline and Targets

UWE Bristol is dedicated to reducing its impact on the environment and has set targets which are challenging, yet realistic.

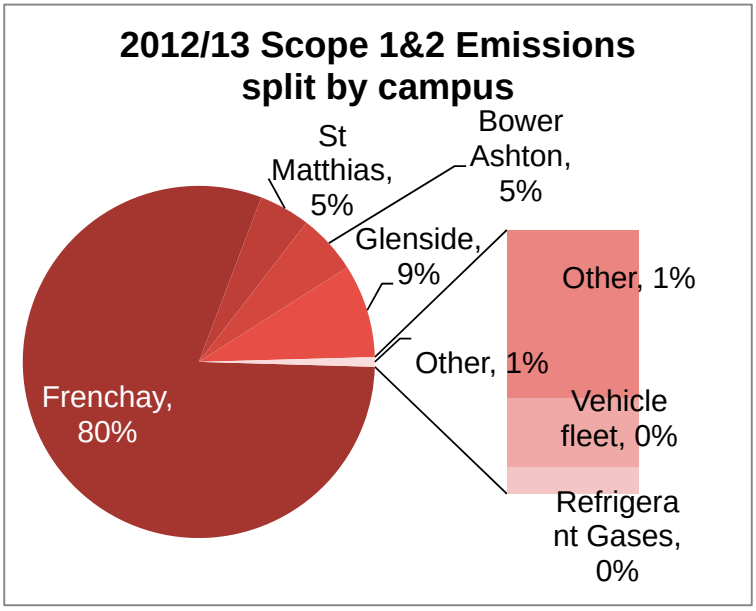
Current Baseline

Our current baseline for this Carbon Management Plan is the 2012/13 reporting year.

The total Scope 1 and 2 baseline for 2012/13 is 16,814TCO$_2$.

We currently spend approximately £3.6m on our Scope 1 and 2 emissions and this is set to rise with increasing electricity prices.

Our predicted energy costs in 2020 without implementing the carbon reduction projects will be £6.5m



2020 Targets

The Sustainability Plan 2013-2020 renewed the targets previously set for carbon reductions, set against our baseline 2005/6. It also included targets for the campus development to ensure new buildings are low impact.

Sustainability Plan 2013-2020 Carbon Management Targets:

"Absolute reduction from 2005/6 – 2020/21:

- **22.5% total reduction** by 2020/21
- 1.5% annual reduction
- 2016 interim target: 16.5% total reduction

Relative reduction from 2005/6 - 2020/21:

- **50% relative reduction** (based on kg CO_2 per m^2 and average weather)
- 2016 interim target: 38% relative reduction

Low and Zero Carbon (LZC) Technology Target:

- **10%, and 20%** of the University's electricity and heat consumption respectively, to be generated from on, or near, site low or zero carbon technologies by 2020/21. "

Sustainability Plan 2013-2020 Campus Development Targets:

- Completed projects to exceed by 5% Building Regulations Part L2A targets for carbon emissions
- By the end of the Post Occupancy Evaluation period new buildings to perform to within 20% of energy efficiency of design prediction. CIBSE TM54/ 39 guides to be utilised to produce design stage predicted energy use model to enable comparison during post-occupancy period.

Scope 3 Baseline and Targets

In addition to the Scope 1 and 2 reporting, UWE are making progress in reporting the Scope 3 emissions. This year (2014-15) is one of the first comprehensive breakdowns of the Scope 3 emissions with further plans to improve the methodology for future years, and take into account the more difficult to calculate aspects, such as international student commuting before/end of term.

Scope 3 Baseline

Our baseline for the Scope 3 is the 2014/15 reporting year which represents the most complete year of data, based on data reported as part of the HESA annual returns.

The total Scope 3 baseline for 2014/15 is 39,388TCO_2 (including construction) and 23,523TCO_2 (excluding construction).

The Scope 3 total is comprised of the following contributions:-

- Procurement[10] = 38,381 TCO_2/yr with construction (excluding construction 22,945 TCO_2/yr)
- Water = 111 TCO_2/yr
- Sewage (wastewater) = 218 TCO_2/yr
- Waste = 69 TCO_2/yr
- Student Commuting = (26.1 (bus) +37.9 (car) + 0.1 (motorbike)) = 64 TCO_2/yr
- Staff Commuting = (1.2 (rail) +5.7 (bus) + 107.8 (car) + 1.3 (motorbike)) = 116 TCO_2/yr

This gives a total Scope 1, 2 & 3 emissions in 2014/15 of 56,141 TCO_2/yr (including construction).

Per Student Total Scope Baseline

For the 2014/15 FTE student and staff population this is 2.02 TCO_2/yr per capita

Scope 3 2020 Targets

The Sustainability Plan 2013-2020 set the following targets for Scope 3. This updated Plan sets the baseline, and updated targets from the mid-plan review.

Sustainability Plan 2013-2020 Carbon Management Targets:

Scope 3 Target 2014/15 - 2020/21:

- By 2018/19 to have developed a specific Scope 3 reduction strategy identifying projects to reduce scope 3.
- 10% absolute reduction (including construction) over 2014/15 baseline by 2020/21
- 5% relative reduction (excluding construction) over 2014/15 baseline by 2020/21 (based on kg CO2 per FTE student)

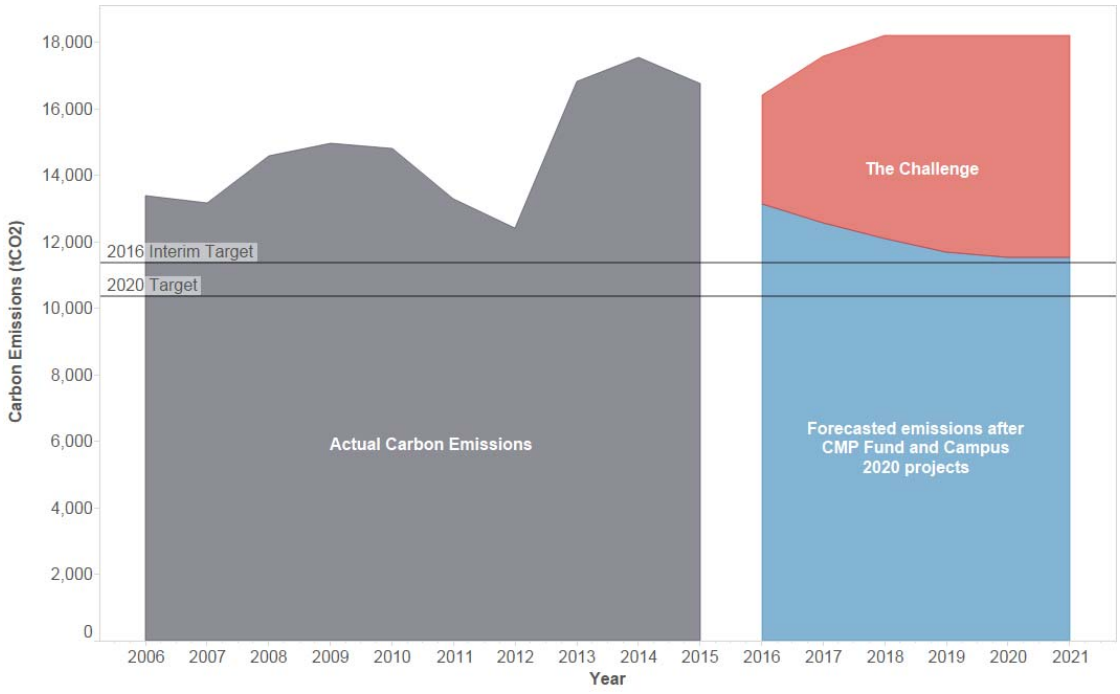
[10] Procurement emissions are calculated using the Southern Universities Purchasing Consortium (SUPC) methodology and include: Supplies and services (Audio Visual, Library, Catering, Medical, Janitorial), Furnishings, Business Travel etc.

Road to 2020

UWE Bristol believes that the pathway to successful implementation of a Carbon Management Plan is in clear target setting; creating a culture of behaviour change; strong governance; and genuine financial and resource commitment.

Setting the Target

The chart below shows our carbon emissions as the UWE Bristol campus grows (red area: "The Challenge"), against our targets. This includes completion of new buildings as part of the Masterplan. The blue area ("Forecast emissions after CMP Projects") presents forecasted emissions to 2020, demonstrating that 85% of the required reductions to meet 2020 targets have been identified despite significant increases in portfolio size. The remaining reductions will come from identifying further projects and technologies over the next four years, and grid decarbonisation.

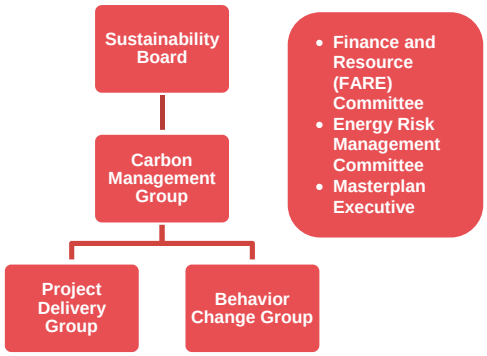


Governance and project delivery

The Chair of the Sustainability Board, holds overall responsibility for the plan, with the lead Energy Manager holding responsibility for the implementation.

To support delivery, three new groups will be set up:

- **Carbon Management Group** with the key managers responsible for each area of carbon emissions: Buildings, Travel, Waste and Procurement.
- **Project Delivery Group(s)** with the engineers and projects managers; responsible for project implementation.
- **Behaviour Change group** with our Sustainability team; responsible for broader student, staff and visitor engagement.



We will report annually on our progress against the targets in this plan, and provide an update in our UWE Bristol Annual Report. The Annex 1 Chapter 6 provides more detail on the governance structure.

Funding the plan

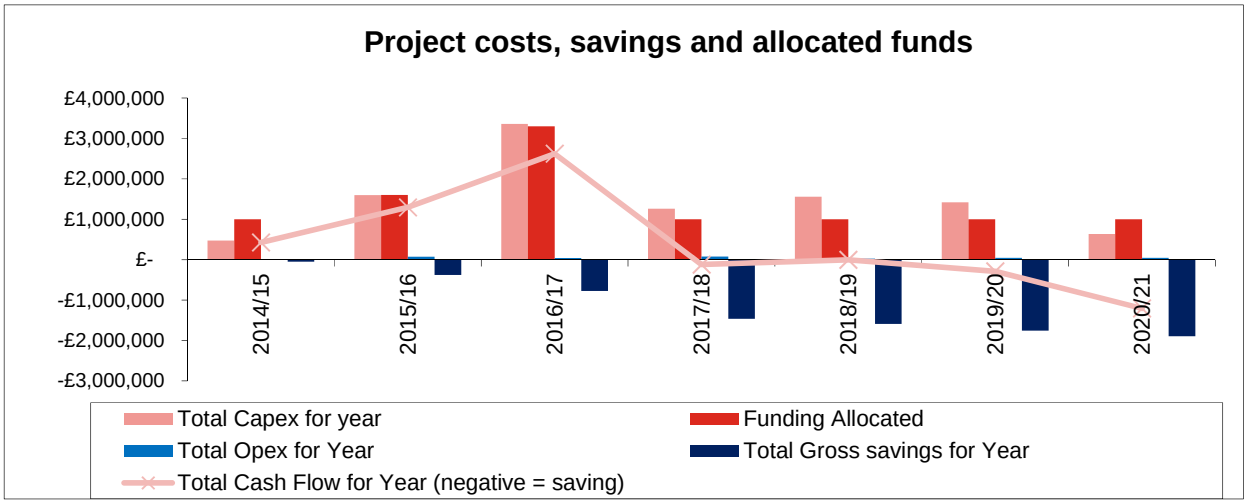
The 'Value at Stake' of not implementing these projects is £11.5m across the lifetime of the plan. However to avoid these costs, there will be significant financial and resource required from UWE Bristol to deliver this plan. This section shows the level of commitment required and how projects will be financially evaluated.

Key Points:

- To implement the projects defined in this plan it will **cost £10.2m** across the seven years of the plan.
- UWE Bristol have allocated **£1m funding for each year** of the plan including funding from Campus 2020 Board for specific masterplanning projects such as the District Heating for Frenchay.
- When all these projects are implemented it will result in **estimated annual financial savings of £2.8m/yr** in 2020 which will continue past the life of this plan.
- The overall payback period of all the projects in this plan is **6 years.**

Financing the plan

The plan is expected to pay back its costs in full by 2020, and make ongoing savings to the university thereafter. Annex 1 includes the detail of the project funding required. Here is a summary of the year on year project costs, savings and allocated funds.



Sources of funding

The funding for these projects will be from two principle sources:

- **UWE Carbon Management Project (CMP) Fund: circa £1m per year.**
- **UWE Masterplanning projects: Project specific funding.**

Evaluation Criteria for project funding

Each project needs to meet the certain criteria, such as simple payback, cost of carbon and net present cost. The criteria is set out in Annex 1 and agreed with the finance executive.

Measurement and Verification

Each project will be expected to provide a Measurement and Verification (M&V) Plan[11] along with the business case, and carry out post-project review to validate savings at 6-, 12- and 24-months post project completion.

[11] Guidance on preparing an M&V plan can be found at the Efficiency Valuation Organization (EVO) website, which publishes the International Performance Measurement and Verification Protocol (IPMVP)

Carbon Road Map: Frenchay

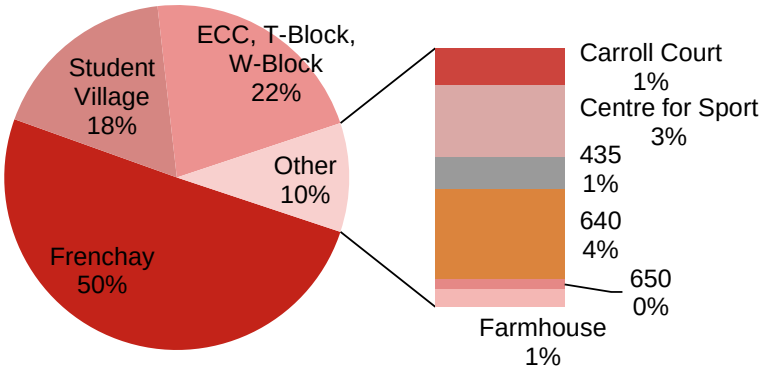
The Frenchay campus was originally built in the 1970's and has expanded year on year with further major buildings to be completed in the next few years. Frenchay campus, and associated buildings, are responsible for 80% of our Scope 1&2 emissions.

Campus Summary

Frenchay campus accounts for a huge proportion of UWE Bristol's Scope 1 and 2 emissions and this is predominantly from three major facilities on the campus:

- Academic space of circa 90,000m²;
- Student Village for approx 2,000 students; and,
- The former-HP buildings (now Bristol Robotics Laboratory and the Exhibition and Conference Centre).

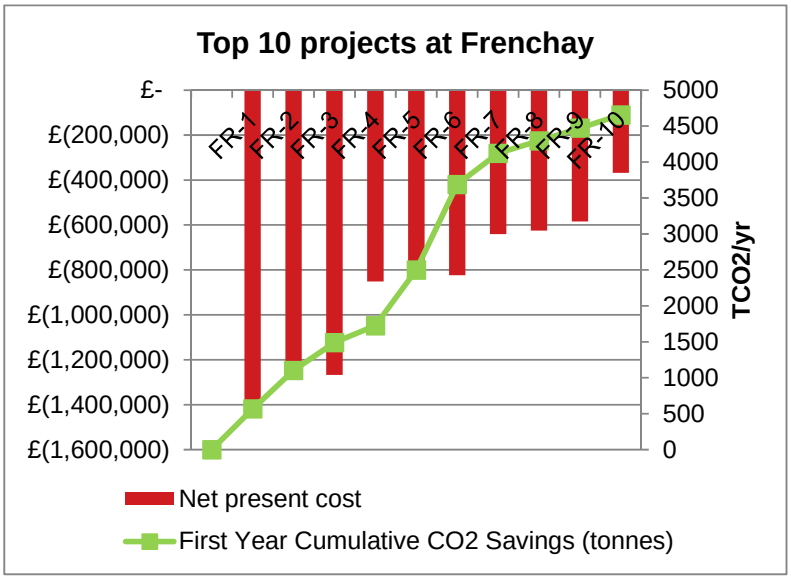
Frenchay Scope 1 & 2 emissions split by building



Key Carbon Reduction Projects

- Significant savings in the former-HP buildings related to BMS controls, lighting upgrades, roof insulation, solar photovoltaics and heating controls. (Ref FR-1,2,3,4 and 8)
- District Heating Opportunities at the masterplan site and within the E and G blocks. (Ref FR-5 and 6)
- Demand reduction heating controls at Student Village (Ref FR-7)
- Solar Photovoltaics on the flat roofs of the main campus (Ref FR-9)
- Boiler Improvements (Ref FR-10)

Full list of projects are included in the Annex 1.



The total project portfolio for the Frenchay projects are capable of delivering 65% of our 2020 absolute target.

Carbon Road Map: Glenside

Glenside campus is the newest addition to UWE Bristol's estate, having been opened in 1996, however it is the oldest and is Grade II listed. This makes the campus a gem of the estate to be preserved and celebrated, but comes with real challenges in terms of reducing carbon emissions.

Campus Summary

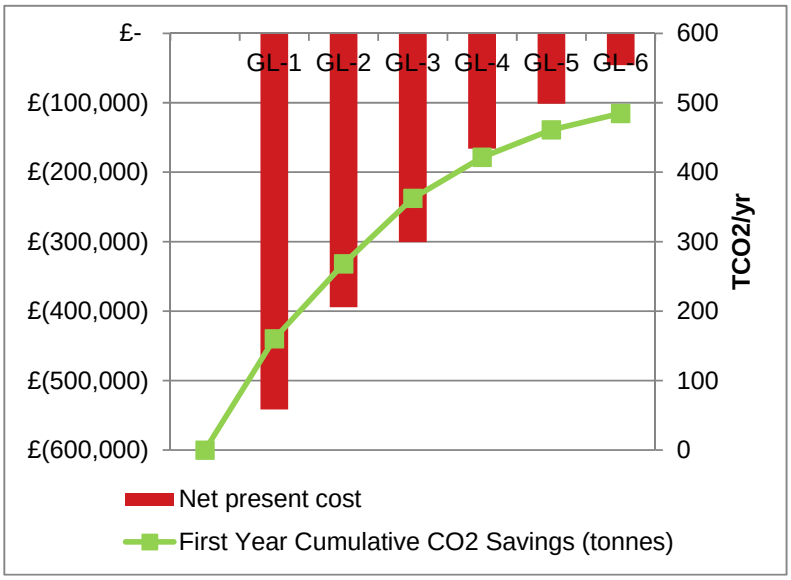
Glenside Campus is home to the Health, Nursing and Midwifery courses. It accounts for 9% of our 2012 Baseline and 11% of our estate. UWE Bristol has a number of refurbishment projects programmed for Glenside including a new lecture theatre in the old laundry area, and an area of G Block is due to be converted to a Child Nursing Simulation Suite.

Key Carbon Reduction Projects

- Lighting upgrades to LED where suitable (Ref GL-1)
- Heating upgrades and improved controls on boilers (Ref GL-2)
- Extend the BMS and Metering systems to include Glenside, improving controllability of the heating, cooling and ventilation as well as analysis of energy use (Ref GL-3 and 4)
- Improve fabric such as draughtproofing for windows and roof insulation (Ref GL-5 and 6)

Detail of projects are included in the Annex 1.

The total project portfolio for the Glenside projects are capable of delivering 8% of our 2020 absolute target.



Carbon Road Map: Bower Ashton

Bower Ashton campus is located in Bristol, close to the picturesque Ashton Court Estate. The majority of the campus is 1970 buildings, with newer buildings F-Block (2008) and the A-Block Courtyard Infill project (due for completion September 2014).

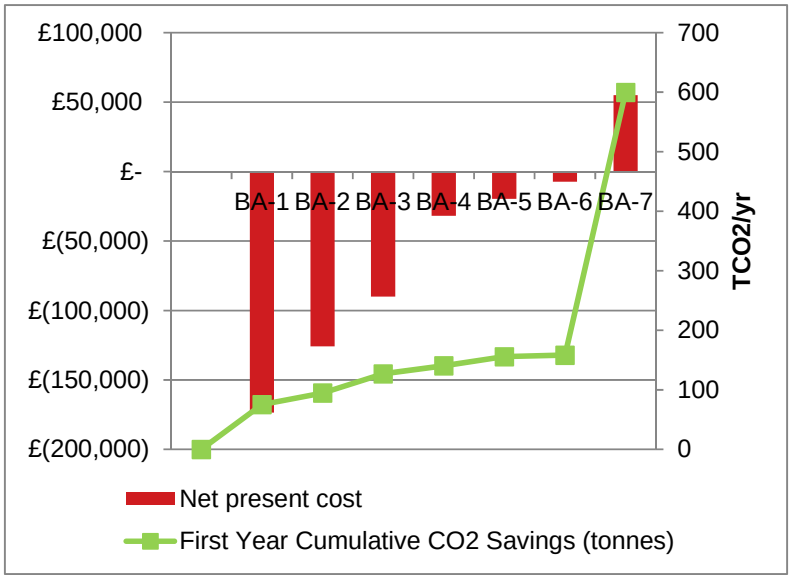
Campus Summary

Bower Ashton is home to the Arts, Creative Industries courses, and with the move of Drama courses from St Matthias campus to Bower Ashton in Summer 2014, Bower Ashton is set to be a busy and bustling campus.

Key Carbon Reduction Projects

- Expand the BMS systems at Bower Ashton, improving controllability of the heating, cooling and ventilation (Ref BA-1)
- Solar Photovoltaics on the flat roofs of the campus (Ref BA-2)
- Heating upgrades and improved controls on boilers (Ref BA-3)
- Lighting upgrades to LED where suitable (Ref BA-4)
- Improve fabric such as cavity wall insulation and roof insulation (Ref BA-5 and 6)
- Install Biomass Boiler to supply the campus with renewable heat (Ref BA-7)

Detail of projects are included in the Annex 1.



The total project portfolio for the Bower Ashton projects are capable of delivering 7% of our 2020 absolute target.

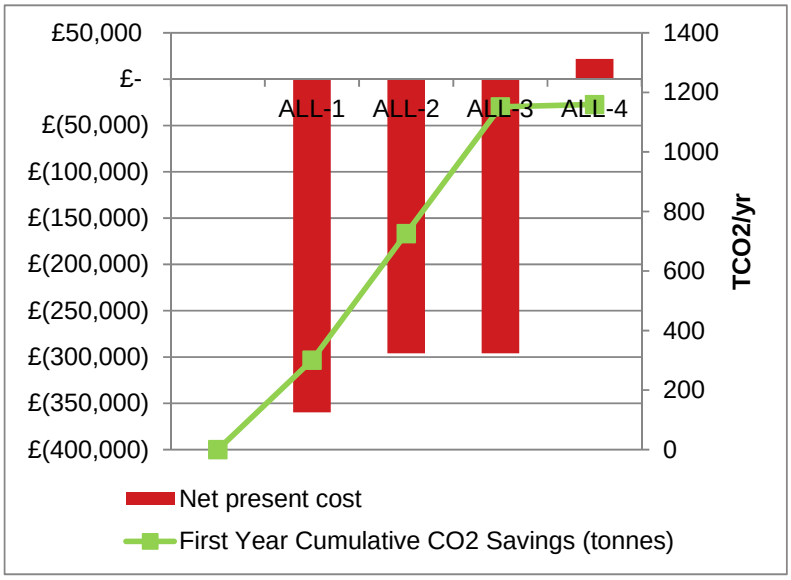
Carbon Road Map: University wide

Across the university we have many organisational systems and procedures that contribute to our carbon emissions, from IT services, to room timetabling. This Road Map looks at the organisational projects that could make either significant reductions in carbon emissions, or be the 'enablers' for other carbon reduction projects.

Key Carbon Reduction Projects

- Maintain 'good housekeeping' on all aspects of energy including ongoing engagement projects and revisiting projects completed to measure actual performance (Ref ALL-1)
- Increase resourcing for the energy and BMS teams to enable successful project delivery (Ref ALL-2 and 3)
- ITS software to switch-off PCs and Printers when not in use (Ref ALL-4)

The total project portfolio for the University-wide projects are capable of delivering 14% of our 2020 absolute target.



Further Carbon Reduction Projects being investigated

UWE Bristol has the potential to provide further savings to space utilisation as well as carbon, with the following projects:

- Staff and Student Engagement projects and 'energy challenges'.
- Central PC Hub for out of hours access to key software packages.
- Central Academic Hub for out-of-hours bookings for events and social committees.
- Faculty-level carbon budgeting to enable faculties to measure and monitor their improvements against activities.
- For all new projects, implement the principles of Soft Landings[12] and utilise an independent commissioning agent.

[12] BSRIA Soft Landings Framework https://www.bsria.co.uk/services/design/soft-landings/

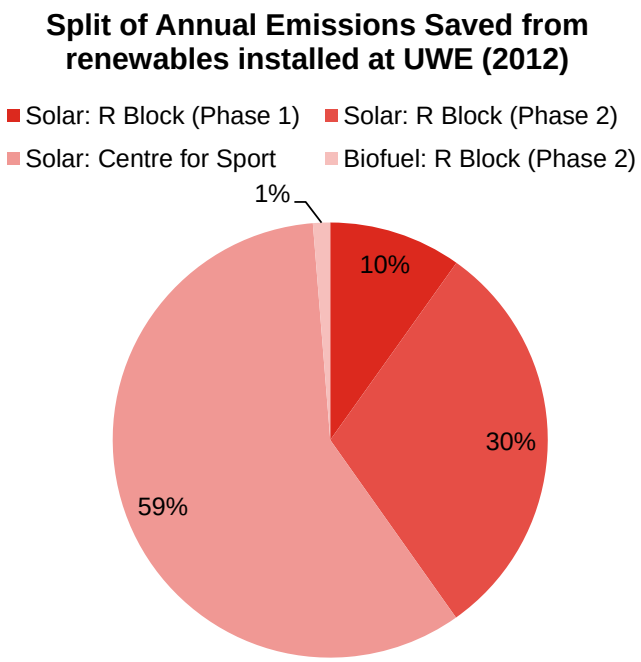
Low and Zero Carbon Technologies Road Map

To support South Gloucestershire's renewable targets, the University has set a target of 10%, and 20% of the University's electricity and heat consumption respectively, to be generated from on, or near, site low or zero carbon technologies by 2020/21.

Existing Systems

UWE Bristol has already invested in the renewable technologies at the Frenchay campus including the largest roof mounted array in the UK HE sector installed summer 2016. Therefore, UWE have over 500kWp of solar photovoltaics and a biofuel boiler run on recycled cooking oil from our kitchens.

The total carbon emissions saved from renewables in 2012/13 is 27TCO$_2$

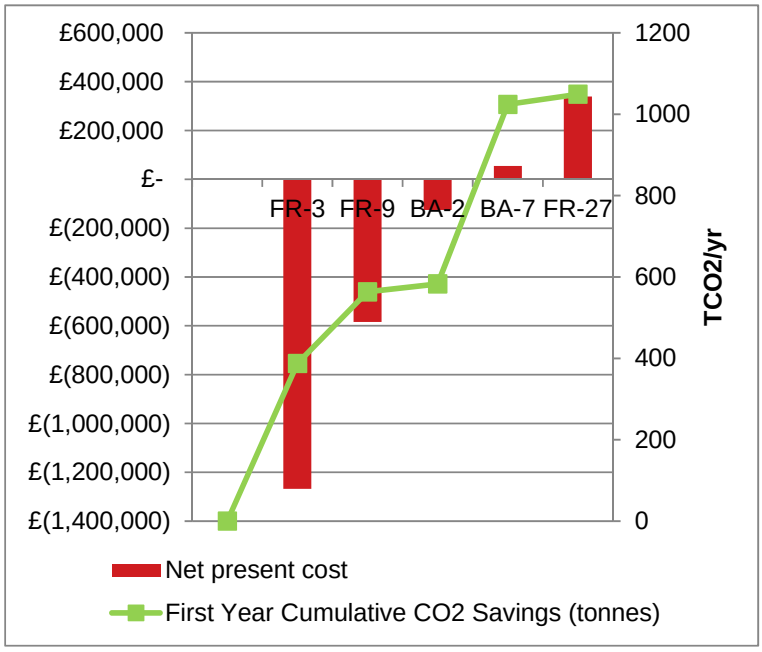


Key Carbon Reduction Projects

Opportunities for onsite renewable technologies have been identified across the Bower and Frenchay campuses. The following projects would enable us to meet our 2020 Renewables Target:

- Solar Photovoltaics at T-Block, ECC, Frenchay main campus and Bower Ashton (Ref FR-3,-9 and BA-2)
- Biomass Boiler at Bower Ashton supplied by Local Wood Chip (Ref BA-7)
- Solar Thermal providing hot water at the Frenchay Student Village (Ref FR-27)

The total project portfolio for renewable energy projects are capable of *exceeding* our 2020 renewables target delivering 12% and 7% of our electricity and gas consumption.



Electricity Grid Demand reduction

To support the UK aims to decarbonise the grid, the University recognises the need to reduce peak demands as much as possible. This can be achieved using demand management technology, battery storage, and behaviour change.

Grid Decarbonisation

The UK National Grid peak hours of demand are between 4-7pm, particularly during heating season (Nov – Feb). Therefore, if UWE Bristol can reduce, or move, electricity consumption away from these periods, then UWE are not only supporting the national targets, but also making significant financial savings from the peak charges.

Mid-Plan review targets:

Maximum Grid Electricity Demand Strategy:

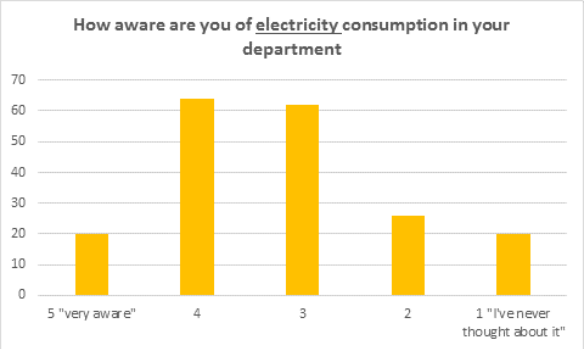
- By Spring 2018, to have developed a strategy for managing maximum grid electricity demand, based on assessment of historic usage patterns, and utilising on site generation, to minimise strains on the national grid and support its decarbonisation.

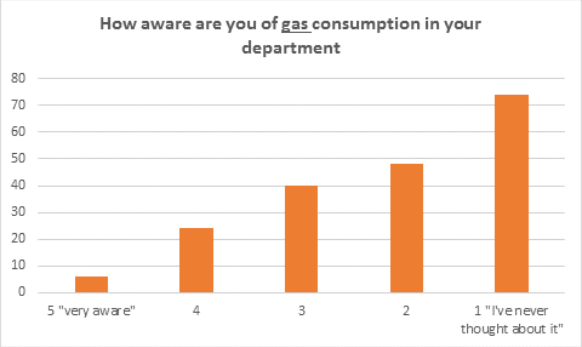
Improved energy and carbon awareness

UWE Bristol are committed to being a responsible educator, not only for the students but staff as well. Therefore, as part of the mid-plan review, an additional target of measuring energy and carbon awareness has been included.

2016 survey results

The baseline of staff awareness from a survey in 2016 for the pilot areas of the Carbon Action Project (HAS, SU, UWE Exec, Accommodation and Sport) is shown below:





Mid-Plan review targets:

Improved energy and carbon awareness:

- By 2020 to have over 50% of the responses either 'aware' or 'very aware' to questions on electricity and gas awareness.

How to get involved

- If you see energy and water wastage let us know by contacting the 222 Helpdesk or emailing **energyteam@uwe.ac.uk**
- Communicate with others on saving energy and reducing waste; join student Green Leaders and the UWE sustainability supporters network – email **sustainability@uwe.ac.uk**
- Switch off lights PCs and projectors and take part in student and staff energy saving campaigns e.g. UWE Student Switch off.
- Print only when really needed (double sided) to save energy paper and ink
- Shorten your showers in the Student Village to reduce energy and water consumption
- Come along to our winter evening Green mingles and energy watches email **sustainability@uwe.ac.uk**

How to find out more

- Go to our Sustainability and Energy webpages **http://www1.uwe.ac.uk/aboutus/visionandmission/sustainability.aspx**
- Explore our policies and strategies webpages **http://www1.uwe.ac.uk/aboutus/visionandmission/sustainability/facilitiesandoperations/energyandwater.aspx**
- Expand your understanding of carbon management with the Carbon Trust guides webpages **www.carbontrust.com**
- See what UWE Bristol are doing for the Bristol Green Capital 2014 webpages **bristolgreencapital.org**
- Follow us on Twitter **@UWEEnergyTeam**

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