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# Carbon Management Plan 2017/18

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Consultation	Director of E&F, E&F Head of FM, Engineering Team Manager, Energy Officer, Environmental Officer

**Version Control Sheet**

<b>Version</b>	<b>Date</b>	<b>Reviewed By</b>	<b>Revision Details</b>
Rev 1	April 17	LH, MW, BT, RS, CW	Draft version to EFSMT
Rev 2	June 17	LH MW	Amends made after receiving EFSMT feedback to Project Plan

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## **Section 1: A World Class Eco Campus**

75% by 2020

## **Introduction**

The journey began as an ambitious and innovated 'Ecoversity' Project in 2005 sustainability is now embedded into all elements of campus activities through students, staff and visitors alike resulting in significant reduction in our environmental impact and substantial financial savings.

We are proud of the many awards our success has delivered and will continue to promote the value of successful energy reduction both within and outside the HE sector.

There are many reasons to reduce our energy use and CO2 emissions including environmental impact, legislative, business continuity and financial sustainability. These are all considered as part of the plan for 2017/18.

As a requirement from HEFCE, and in response to the UK and HE sector carbon emissions targets, this Carbon Management Plan will set out an annual strategy to reflect the ambitions of the university's reduction commitment, taking into account the changing dynamics in technologies, market conditions, government policies, and wider university needs.

## **Ambition and Targets**

We are proud of our World Class Eco Campus and this Carbon Management Plan sets out how we will not only continue our successful journey but also deliver against our original 50% target 3 years ahead of the original target year.

We will commit to a new carbon reduction target for scope 1 and 2 emissions of 75% by 2020 and deliver our original 2020 target of 50% by 2017. Our 2050 target will increase from 80% to 85% and furthermore, we will commit to a 20% reduction in emissions from water (scope 3) by 2020 (based from our 2008/9 baseline).

All projects will be prioritised on a financial business case, monitored, reviewed and reported.

We will continue our ambition of being regarded as sector leaders in Carbon Management and continue to learn and respond to new technologies and innovations.

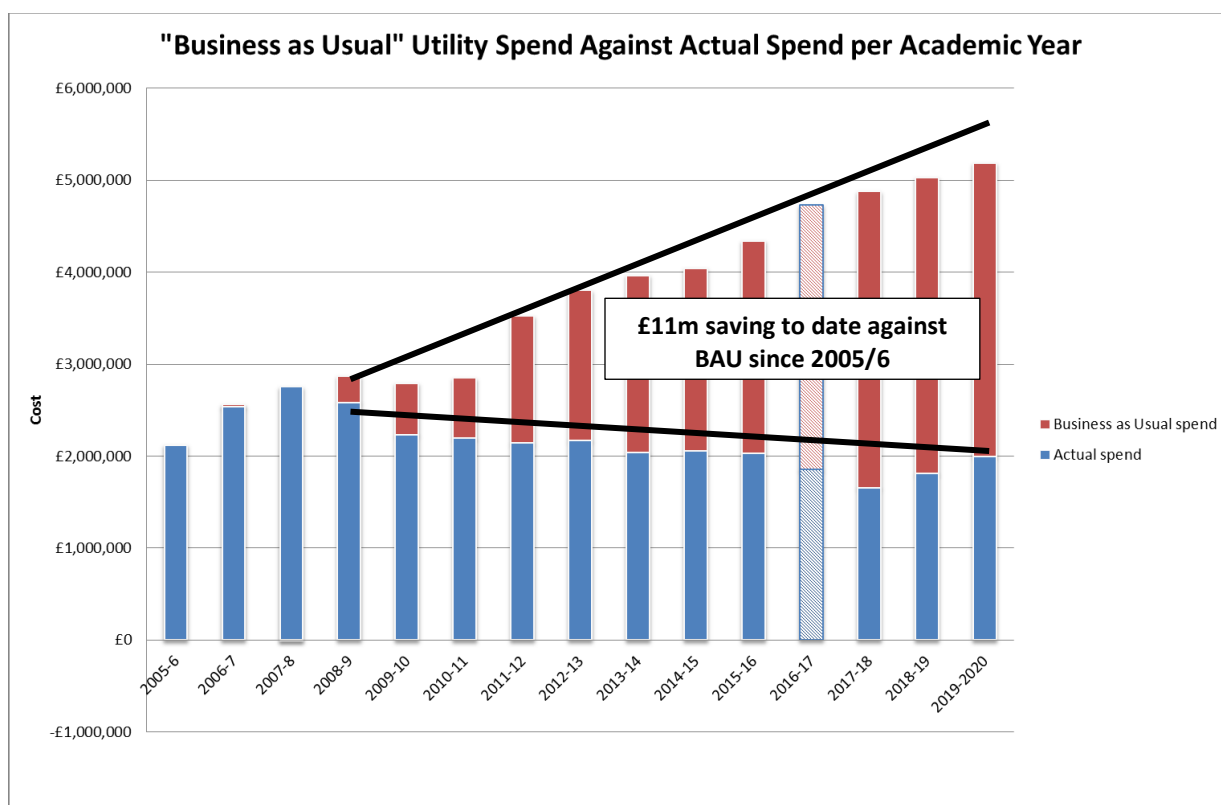
## **A Message from the Director of Estates and Facilities (Plan Sponsor)**

As project sponsor of the original Ecoversity Project in 2005 I recognise the importance of reducing our CO2 emissions and whilst our success to date is regarded as an exemplar throughout the HE sector I am committed to ensuring we continue the journey and challenge ourselves to deliver ambitious targets beyond traditional expectations for both environmental and financial benefit.

This Carbon Management Plan outlines the most ambitious carbon reduction target within the sector which be delivered within the principals of a sustainable financial business case over the next few years.

***Clive Wilson April 2017***

## **Section 2: Our Journey**

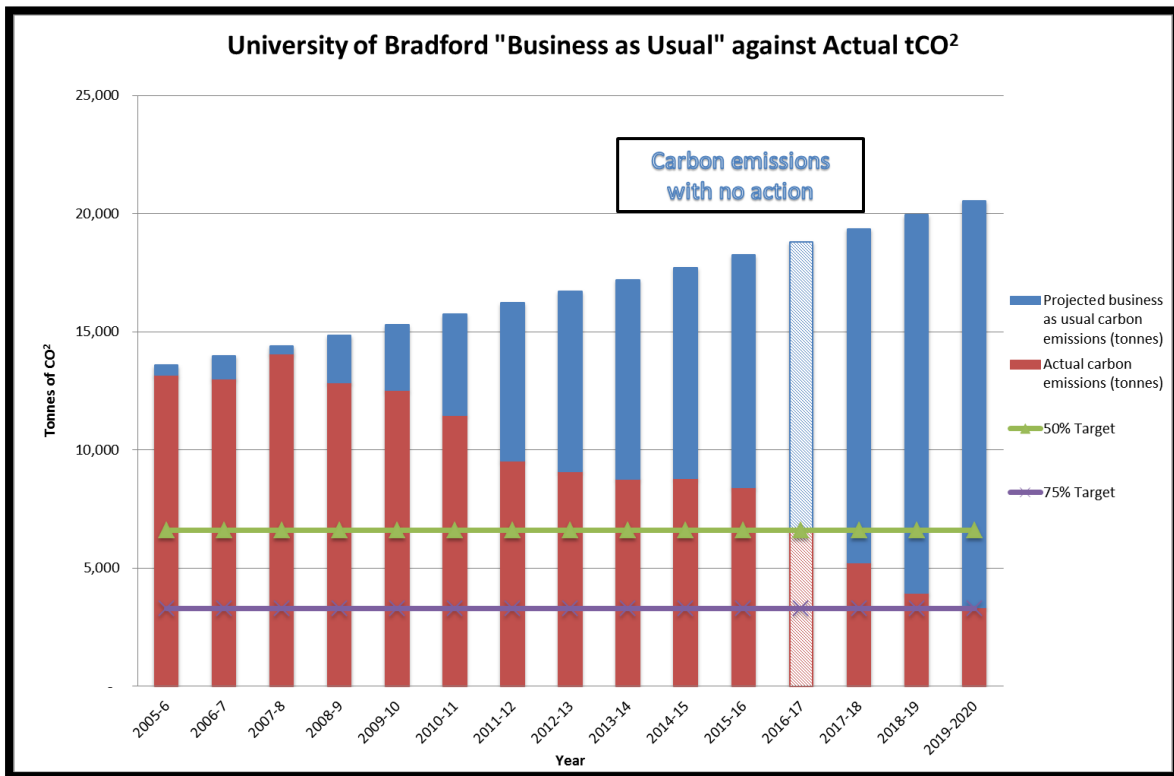


The above graph demonstrates the financial impact of utilities including the impact of flexible procurement strategy and CRC compliance. The University has made significant strides in reducing our utility spend, despite upward trends in utility pricing. Due to our actions since the start of the Ecovercity project, we have been able to reduce spend on our utility budget, saving over £11.1m since 2005/06 based on our "Business As Usual" scenario to 2016/17.

Our procurement savings have been calculated using static 5% on gas and electricity costs from start of flexible procurement framework 2010/11. BAU costs calculated using delivered £/kWh up to 2016/17 and a conservative 5% increase on delivered costs from previous year from 2017/18 to 2019/20. The predicted actual spend does not take into account growth in student numbers/building stock and policy changes from 2017 onwards which could further affect financial predictions.

## Carbon Impact

We have been managing our energy usage for over 20 years, however, to be consistent with HE sector guidance we use 2005/06 academic year as our baseline. Considerable success has been achieved particularly during the last five years and our current performance against our ambitious targets is shown below.



We have adopted a 3% increase for Business As Usual (BAU) scenario projected to 2020/21. The above reports on both scope 1 and 2 emissions form Gas and Electricity usage for the whole university estate. Major step-changes to note are the 2011/12 decrease due to the 1.4MW CHP going live and the step change at 2016/17 for the energy quarter going live.

2016/17 reduction against baseline (absolute): 50.21% (prediction to the end of July 2017 based on actual data up to February 2017)

## CRC Cost and Carbon Impact

Year	Carbon Emissions*	Cost per tonne	Total CRC Cost
2010-11	12981	£12.00	£155,772.00
2011-12	10478	£12.00	£125,736.00
2012-13	9822	£12.00	£117,864.00
2013-14	9242	£12.00	£110,904.00
2014-15	7602	£16.40	£124,672.80
2015-16	6825	£16.90	£115,342.50
2016-17	6231**	£17.20	£107,173.20

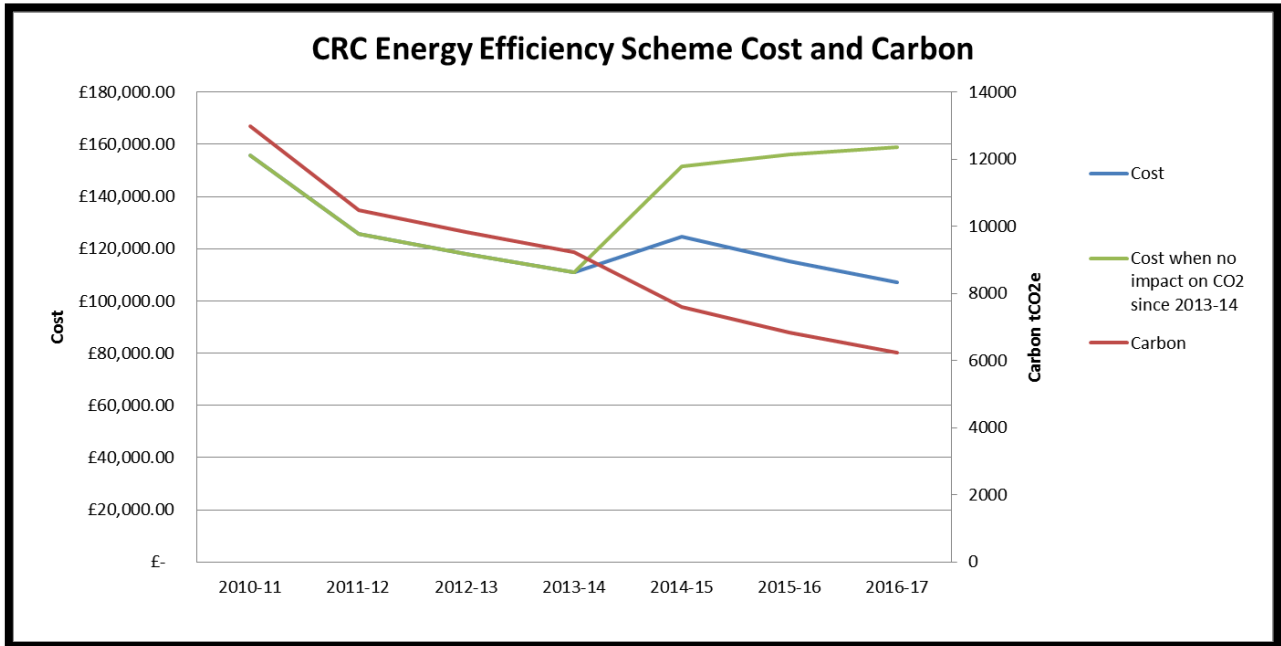
\*Reporting period for CRC varies from internal/HEFCE reporting period hence differences in emissions/emission factors used

\*\* Estimated figures to year end, based on 10 months of data at time of writing

The university has been required to take part in the Carbon Reduction Commitment Energy Efficiency Scheme since it commenced in 2010. Each year, the university is taxed on each tonne of carbon it emits with the cost over the last six years circa £750k. Following the 2018/19 compliance year, the scheme will be closed following the announcement at the March 2016 Budget, and will be replaced by an increased Climate Change Levy<sup>1</sup>.

<sup>1</sup> Department for Business, Energy & Industrial Strategy and Environment Agency. 2015. CRC Energy Efficiency Scheme. [ONLINE] Available at: <https://www.gov.uk/government/collections/crc-energy-efficiency-scheme>. [Accessed 14 March 2017].

By implementing actions to reduce our carbon emissions and increase efficiencies within our building stock, we have managed to successfully reduce our carbon.



The above graph demonstrates how a reduction in our carbon emissions results in a reduction in our CRC costs. Since 2014/15, the cost per tonne of carbon has increased year on year by RPI, so even with a static carbon output, CRC costs would still have increased, as shown by the green line in the graph above.



## Display Energy Certificate Impact

Each year, the University is required to renew their Display Energy Certificates as a legal requirement. Display Energy Certificates are designed to show the energy performance of public buildings, running a scale from A to G with G being the least efficient. The general trend of the University's performance has been a positive one, with many buildings improving year on year as a result of various projects undertaken. Other factors affecting the scores are operational hours for buildings, type of building and its usage.

Site	Internal Area m <sup>3</sup>	2008	2016
Phoenix North East	2910	G200	B47
NCC	1028	C64	C60
IPI	3200	D90	D80
Phoenix South West	5126	G200	D77
JBPL	11361	G200	C73
Ashfield	1047	C61	C74
Pemberton	2611	C61	D80
Richmond	33992	E116	D88
Workshop Block	8536	G189	E106
ICT	2810	G227	G260
Sports Centre	4095	G115*	C52
Student Central	6710	G200	B35
Airedale	1697	E114	D85
Emm Lane	1330	C73	D77
Heaton Mount	2799	D83	C71
Heaton Mount Extension	1593	D83	C71
Bright Building	1800	N/A	A23
STEM	400	N/A	C70
Cartwright	1960	N/A	D90
Squash Courts/Nursery	693	N/A	D90

\*Sports Centre DEC for 2009-10

The ICT building is a particularly energy intensive building due to the nature of its usage being a 24/7 research facility. We have undertaken audits to understand where the energy is being used and we continue to explore opportunities to reduce its baseline by working closely with building users.

## Headline Projects

We have embarked on a wide range of projects to deliver our success to date which help to save energy and improve our campus environments. Below are a list undertaken in the recent past:-

### **2016-2017 Revolving Green Fund 4- Micro Smart Grid**

Following on from a successful application to HEFCE's Revolving Green Fund 4 in 2015, the University were awarded £1.9m to complete plans to produce a micro smart grid, creating an energy quarter covering the JBP Library, Student Central, Phoenix North East and Phoenix South West buildings on campus.



### **2015-17 Refurbishment of Phoenix South West for the Health and Wellbeing Centre**

Due to be completed in July 2017, extensive refurbishment of Phoenix South West is well underway to create a state of the art health and wellbeing centre on campus. This £8.4m project will provide a dedicated space to integrate health care research, teaching and innovation as part of the Digital Health Enterprise Zone.

### **2016 Richmond Heat Pumps**

By carrying out works to replace the aging heat pumps in the main Richmond boiler house, we have helped to improve circulation of heat across our district heating system and saved £1,000's in increased efficiencies.

### **2016 LED replacement**

A rolling plan to replace lamps to more efficient LED fittings has been ongoing over the last year. Areas of external lighting across campus have been upgraded, with plans in place to replace areas of ICT and IPI building over the next year.

### **2015 0.5MW Combined Heat and Power Plant**

Funded from an interest free loan from Salix for £900k, the new 0.5MW engine forms part of the city campus' main energy centre replacing aged steam plant and delivering savings of £200k per annum.

### **2010 -2015 Photovoltaic Panels**

We currently have over 200m<sup>2</sup> of roof space which houses PV panels across the University's city campus across four different buildings delivering in excess of 50,000 kWh per annum.



### 2012 – 2016 Staff and Student Engagement

A wide variety of projects including Green Impact for staff, student led initiatives such as the Midnight Project entailing out of hours student patrols of campus, green energy move for the Faculty of Health, and Energy Detective Initiatives for the Facilities Team cleaning operatives.



### 2013 Refurbishment of JBPL Library

An ambitious £1.9M project to refurbish the library space to enhance student experience was delivered, funded by a project based on energy savings and payback. The project received numerous awards, received considerable positive user feedback and the success of the project helped move the library from an “E” rated DEC building to “A” rating in the first year following refurbishment.



### 2011 1.4MW Combined Heat and Power Plant

A HEFCE funded £4m project to improve the estate infrastructure, delivering 2,000 tonnes of carbon savings per annum and improved heating performance across city campus.

### 2010 Biomass Boilers

Two biomass boilers have been installed, providing heat to the JBP Library/Student Central on city campus and the Sir Titus Salt building at the Faculty of Law and Management Campus. Occupied 24hours a day, using locally sourced biomass accredited by the Forestry Stewardship Council.

### Monitoring and Targeting

We use a wide range of platforms to evaluate our energy usage across our portfolio. By investing in our metering capabilities, detail around where our energy is being used is apparent and can be used to better inform capital projects and long term maintenance schedules. By monitoring our gas, water and electricity usage, we can better engage with users and implement meaningful behaviour change strategies.

### Embedded Energy Management

We consider energy management within our day to day approach to managing the estate and staffing structures. Examples of how we have improved campus facilities include LED roll out and improved heating controls funded by establishing links to future maintenance budgets. Energy management is considered as part of the function of the existing teams with the development of roles including our Building Services Technicians who support the delivery of energy management.

### **Bradford Excellence Programme: 50@50**

As part of the Bradford Excellence programme, the department has undergone a number of cost reductions through several key areas. By working alongside our procurement teams and health and safety teams, we have been trialling new technologies, consolidating printing facilities, reviewing the utilisation of small appliances and electric heaters. This is part of a university-wide initiative which consequently impacts upon carbon emissions.

It is the actions of the wide ranging scope of projects and individual actions, which makes all the difference in reducing our overall emissions and environmental impact.

### **External Recognition**

The University has been successful in securing many external accolades and can be proud of being sector leaders in energy reduction and management. More recently, the University has had success in securing the second CIBSE Carbon Champions Award in February 2017, an award which was first won by the University in 2012. Furthermore, the Estates and Facilities department scooped up the Energy and Facilities Management Team Award at the prestigious 2017 event.

In September 2016 the Estates and Facilities department were one of the first organisations to achieve the new improved international management standard ISO14001:2015. The department is leading the way within the university by achieving this prestigious accreditation which ensures thorough systems are in place for continual improvement of our environmental impacts and full legal compliance. Recent developments led by the system have been reviews of contractor and project management processes, compliance works around F-Gas and Oil Storage and the creation of new improvement action plans around energy, travel and biodiversity.



## **Section 3: 2017/18 Plan and Project Delivery**

### **Project Plan**

We have identified a number of feasibility studies and projects to be undertaken over the next 12 months to deliver financial savings of £100k within the 2017/18 financial year and the utilities budget has been set in accordance to this saving.

The project comprises of three themes:-

**Optimising Building Performance**

**Innovation, Technology and Investment**

**Delivery of Estates Maintenance Strategy**



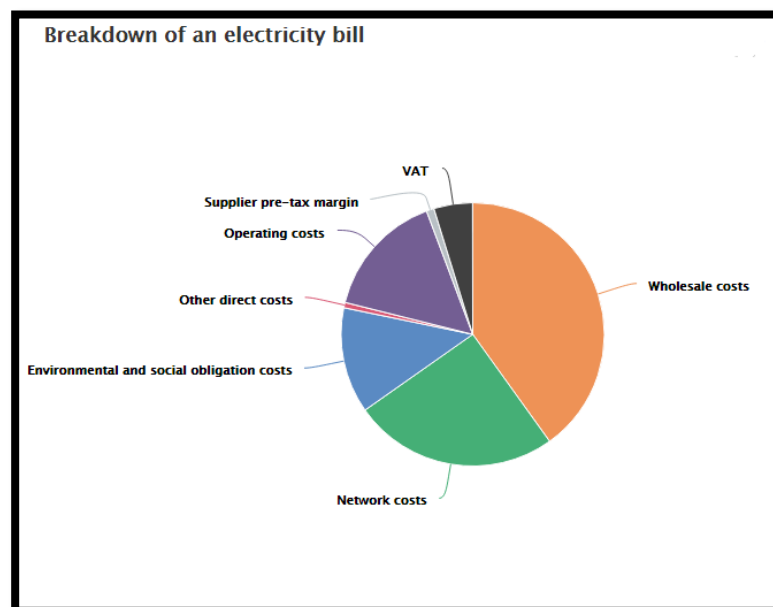
## Project Plan

Action	Milestones	Targeted Financial Savings p/a (approximate)	Resources/ Funding Required	Risks of Not Undertaking Action
Building Specific Energy Audits	Ongoing audits, targeting high energy users first. Engagement with users to understand patterns of usage.	£7,500	Internal resource and existing maintenance budgets	Both financial and carbon savings at risk.
CHP Optimisation	Ongoing optimisation of CHP and controls to increase output and run times of engines on campus.	£20,000	Internal resource, no capital outlay	Risk of engine failure at peak periods. Risk to carbon and budget
Review AC Loads	Review local demand and loadings for highly conditioned areas. Identify opportunities for removal- Summer 2017	£3,500	Internal resource, linked to future LTM funding	Carbon reduction affected. Risk to budget
Water Reduction Strategy	Determine baseloads utilising flow monitoring data. Targeting labs usage, urinals and redundant services for removal.	£11,000	Internal resource primarily. External where specialist contractors are required.	Carbon reduction affected. Risk to budget
Upgrade of Horton hot water system	Feasibility carried out by June 2017, works to be carried out over summer.	£2,000	Internal resource and existing maintenance budgets	Carbon reduction affected. Risk to budget
LED rollout to IPI and ICT Buildings	To be completed by October 2017	£15,000	Internal resource	Carbon reduction affected. Risk to budget
Improvements to JBPL and Emm Lane biomass boilers	Review of procurement of biomass fuel source and retender where necessary- Summer 2017	£14,000	Specialist contractor	Carbon reduction affected. Risk to budget
Increased revenue stream from export and electricity market reform opportunities	Winter 2017/18 for triad avoidance and load shedding. Await autumn budget for governmental steer. Work up Capacity Market Strategy	£14,500 Capacity Market : £30-40k	Specialist external resource required	Risk of missing opportunity to increase income stream.
Increased Generator Output	To be completed by November 2017	£6,000	Specialist external resource required	Security of supply.
<b>Feasibility Study</b>				
Compressed Air Review	Summer 2017 to investigate Chesham compressor utilisation.	N/A	Initial internal resource	Carbon and financial savings at risk.
ICT Ventilation Review	Review undertaken to ensure ventilation of ICT building is adequate for users and opportunities for savings identified and rolled out.	£15,000	External specialist support required. Business case to be developed	Government licenses and staff engagement affected
Investigate Battery Storage options	Feasibility to be drawn up, costings and funding options considered	N/A	External specialist support required	Risk of missing opportunity to increase income stream.

## Future Landscape and Outlook

The University of Bradford has a strong track record of securing substantial amounts of external funding to help deliver a number of highly successful, award winning projects and we will continue to utilise external funding opportunities in the future if they arise.

A major influence in shaping the direction for further carbon reductions and financial savings will be the future energy market developments. This includes all aspects of the Electricity Market Reform which is currently well underway, including Capacity market, Grid infrastructure, Renewables, CRC, and CCL among others. This has already had an effect on pricing within the electricity market industry and will become more prominent in the coming years as security of supply becomes more uncertain. Increasingly, we have seen a shift in importance of when energy is used, opposed to how much is being used, as demonstrated by Demand Side Response and Triad avoidance. Below shows how only a third of the cost per unit of electricity is attributed to the actual unit of power<sup>2</sup>. The remainder two thirds are made up of pass through charges including network charges, environmental levies and VAT.



As a result of the ever changing policies, the university have adopted a short term approach to producing their carbon management plan as these factors will inevitably affect future planning.

Internally, we will continuously monitor, review and report on:

- Cost and consumption
- Technologies and innovations
- Potential funding and revenue streams
- National and global policies and market reforms.

Due to the complexities of the above, this carbon management plan will be reviewed on an annual basis to reflect changes in these areas.

<sup>2</sup> Ofgem, (2016). <https://www.ofgem.gov.uk/chart/breakdown-electricity-bill>. [image] Available at: <https://www.ofgem.gov.uk/chart/breakdown-electricity-bill> [Accessed 5 Mar. 2017].