

Annual Energy and Environment Report – June 2013

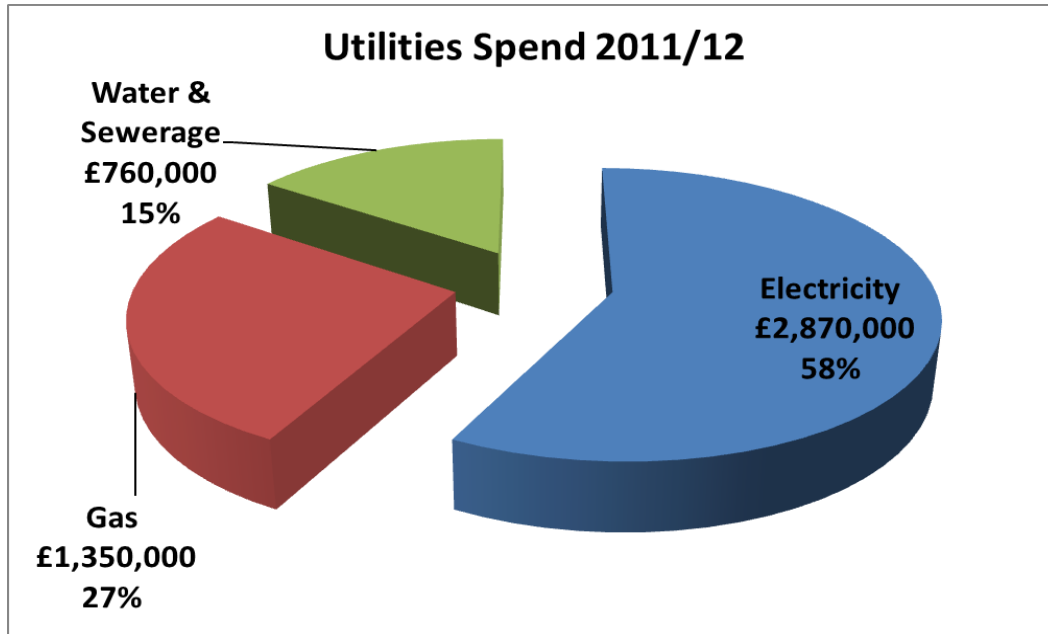
The purpose of this report is to provide an annual update to the University Executive from the Sustainability and Carbon Management Steering Group (SCMSG) on the University's performance against the targets set within the Environmental Policy (see <http://www.bath.ac.uk/estates/energy/pdf%20files/Environmental%20Policy%202010.pdf>). It is proposed that this report is a public report that will be made available to staff, students and the general public.

Executive Summary

- Energy consumption continues to fall even though the University has grown. Consuming ~£1.5m worth of utilities less annually compared with usage 6 years ago:
 - electricity 11% down
 - gas 24% down (weather-corrected)
 - water 21% down
- Carbon emissions for 2011/12 down 15% since 2005 and 8% since the 2008/09 baseline in the Carbon Plan. We are continuing to make good improvements, however, our carbon targets are increasingly challenging given the scale of planned campus growth. 2012/13 emissions increased due to growth and a colder than average winter.
- Utilities costs continue to rise (25-30% price rises last year; budgeted £6.8m spend for 2013/14). Projecting a doubling in electricity costs by 2020. New flexible utility procurement contracts captured savings of £1.9m over 3 years, however.
- Carbon Reduction Commitment legislation continues to assign a cost to carbon emissions - £260,000 annual cost for University initially, rising to £350,000 next year.
- Gold awards in the West of England Travel Plan Awards for the last three years, and Employer of the Year in 2011.
- Recycling rates starting to improve significantly.
- Gold award for British Paralympic Association training camp from Council for Responsible Sport.
- The Accommodation and Hospitality Services Department continue to achieve certification to the ISO 14001 Environmental Management standard.

1.0 Energy and water use

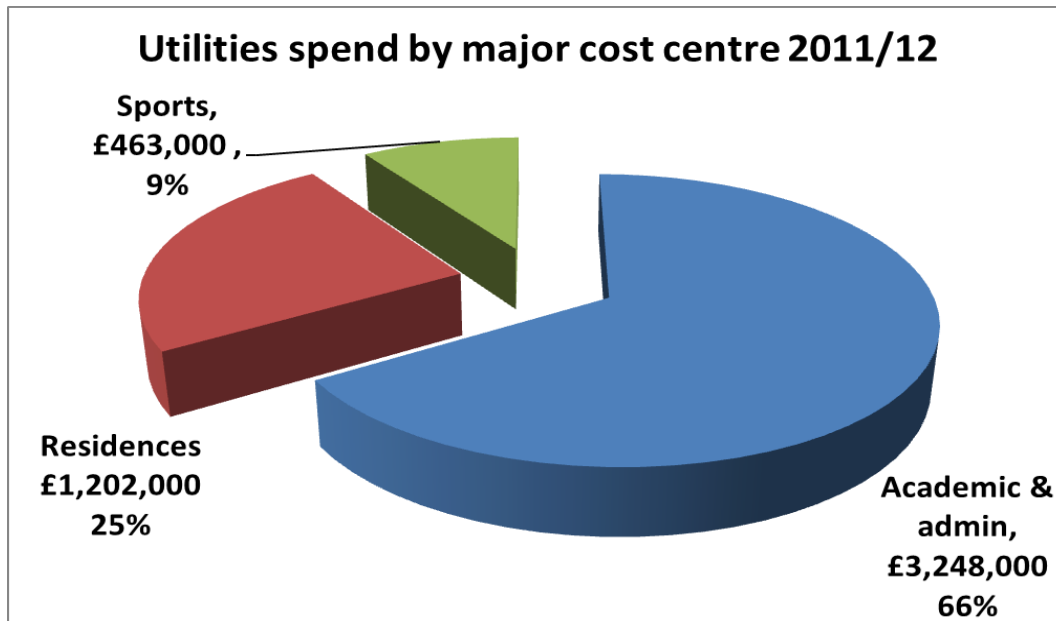
The University spent just under £5 million in 2011/12 on utilities, as follows:



In a year we typically use the figures shown below, from which we are responsible for around 24,000 tonnes of CO₂ emissions:

- 27 million kWh electricity (equivalent to 9000 houses)
- 45 million kWh gas (equivalent to 3000 houses)
- 300,000 m³ water (equivalent to 4000 houses)

The following is our expenditure on the 3 major cost centres for the University:



The graphs in Appendix 1 break these 2011/12 costs down further for the University by building. This highlights the domination of our usage by the scientific and research buildings, as well as larger buildings such as the STV.

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Energy-saving work has led to the following reductions over the last 6 years:

- **Electricity 11% down**
- **Gas 24% down** (weather-corrected)
- **Water 21% down**

Note that, as gas use is clearly heavily dependent on weather, the normal approach to understand underlying trends is to 'normalise' the data to allow for this. This is done using statistical temperature records ('degree day' information). This, however, is not the required approach when measuring carbon emissions (see section 4).

The savings at current prices from these reductions are shown in the graphs below – these total £1062k that is being saved every year. This assumes that the campus has stood still in this time, but there has been continued growth. The following are the buildings/facilities added during that period along with their annual costs to run at current (2013) prices:

- 4 South Annexe £129k
- Woodland Court £180k
- 4 West £97k
- 5 West machine room £85k
- East building £65k
- Student Centre £30k

Total = £586k

Taking account of these, whilst also allowing for any old buildings/facilities that have been discontinued, it can be seen that our savings mean **we are spending about £1.5m less annually than we would have otherwise.**

There are no specific energy targets within the Environmental Policy (as these are covered by our carbon targets). We have a target to reduce our water consumption in existing buildings by 15% from a baseline of 2009/10. Consumption in 10/11 remained level with the 09/10 baseline, but we saw a fall of 8% for 11/12 in overall water use.

Projections for 2012/13 and beyond

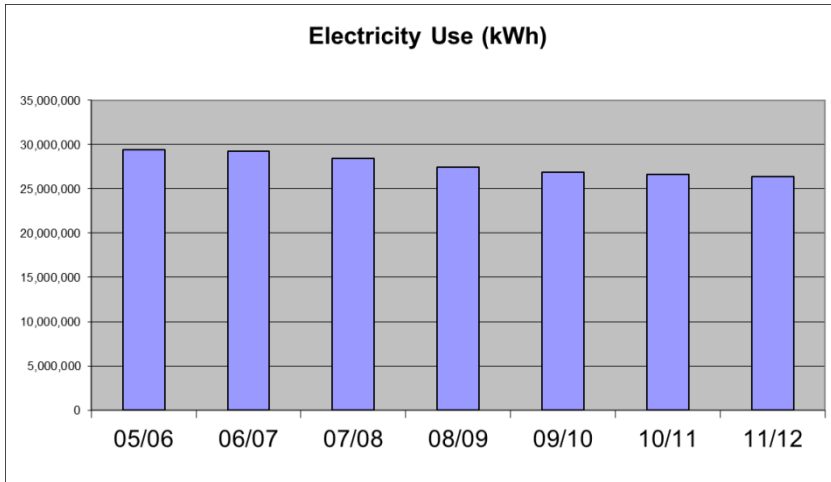
We anticipated that underlying usage would rise slightly for 2012/13 due to new construction sites and new equipment, but this should be offset by on-going energy-saving work and the closure of the 25m pool. This academic year is projected to see electricity use remain level, and water use to fall, but **gas usage is up by 8% on last year due to the cold winter and spring.** This winter was 32% statistically colder than the 20 year average. **It was the coldest year for 20 years, with the coldest March for 35 years.** Another area of growth in 2012/13 was the University Managed Housing - this has led to a further increase in usage of approximately 1% for gas and electricity.

Beyond this year, however, it is anticipated that the impact of the planned new builds will cause consumptions to rise. The following are approximate predictions for utility costs for the buildings currently planned and approved.

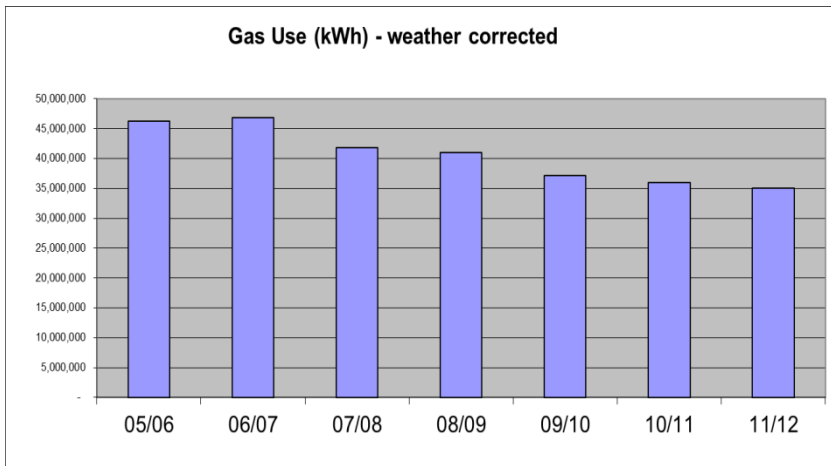
- Chancellors' Building - £150k
- 1 West - £50k
- R6 - £250k
- Arts - £45k

Even if current prices remain the same (which is highly unlikely), it can be seen that this will lead to **an increase of £0.5m in annual costs**, despite the buildings being designed to high levels of energy efficiency.

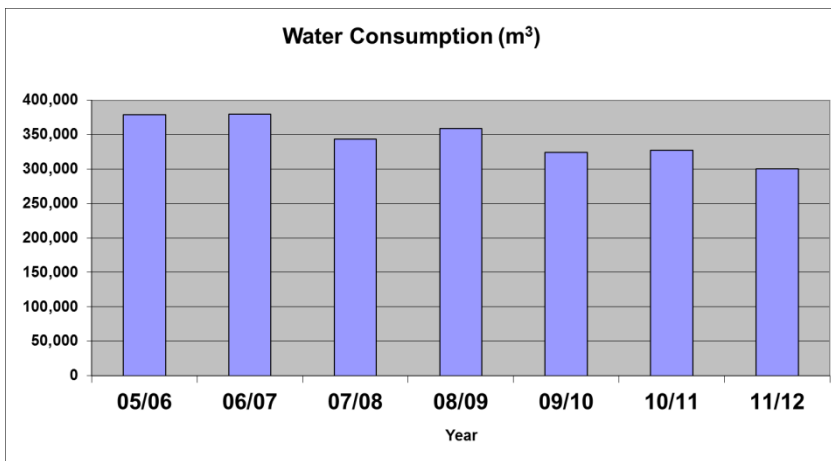
University Utilities summary



11% down in 6 years
£380k being saved every year
1% reduction on last year



24% down in 6 years
£484k being saved every year
2.5% reduction on last year



21% down in 6 years
£198k being saved every year
8% reduction on last year

All achieved while growth in campus, hence well in excess of £1.5m being saved every year

2.0 Technical improvements made

Appendix 2 shows a summary of the technical improvements made within the last 12 months. There have also been many additional enhancements made as part of on-going adjustments such as to the Building Management System that controls the heating and ventilation in the majority of our buildings.

These add up to savings of 281,000kWh electricity through lighting improvements, water savings of 1000m³ from new urinal controls, and 79,000kWh electricity through laboratory improvements. The total financial impact from these is £49k saved annually.

2.3. Awareness-raising/Behavioural Change programmes

Student Switch Off

The residential energy-saving competition 'Student Switch Off' has run for the 7th year and continues to show good savings. Around a third of student residents from all the University of Bath residences embraced the campaign this year, with a record 1100 students signing up and pledging to switch off lights and appliances when not in use, put lids on pans when cooking and not overfill their kettles. Derhill and Osborne House were the winning residences, both of which managed to reduce their electricity use by 15-20%.



Students were provided with top tips on the web, competitions, quizzes, training, and regular updates including updated graphs showing how much electricity they have been using.

The University is part of a consortium bid to an EU fund which, if successful, will allow live data from our metering system to give almost instant feedback to students via webpages and specially developed apps in future competitions.

'Bath Green Challenge'

HEFCE have made £5m available to the NUS to develop a Student Green Fund. The University has submitted a bid in collaboration with Bath Spa University and the local BANES council to develop a 2 year regional initiative – 'Bath Green Challenge', aimed at creating a step change in the engagement of staff and students with sustainability issues in the Bath area. The outcome of this bid will be known in August.

2.4 Metering

We now have over 1200 meters for gas, electricity, water and heat that we have installed across the campus. The majority of these have now been 'automated' i.e. connected to our remote monitoring system (AMR – Automated Meter Reading) so we now have readings every half hour coming back from these meters, creating a sector-leading information system. This is continuing to prove invaluable for highlighting wastage, analysing areas for improvement and measuring improvements made. The number of meters continues to increase, not just as a result of new builds and major refurbishment projects, but also through direct investment – this year we have added over 85 electrical submeters to 7 West, 9 West and other areas. We have also made substantial investment to improve resilience and future capacity in the network.

2.5 Self- generation

Renewables

The focus for the University has always been on demand reduction before renewables, but we do have solar thermal systems generating hot water on 4 student residence blocks in Westwood, a large system on Woodland Court and on 4 West. These typically generate around 22,000 kWh heat each year. We also have a large 24kWp solar photovoltaic (PV) system covering the roof of the new East building which generates 20,000 kWh electricity annually (£2.5k worth). From this we also benefit from government incentives via the Feed-In Tariff to the order of £8k/year.

Renewables are automatically considered as part of any new build process, and we have examined the possibility of biomass boilers in some areas. Wind generation only makes technical and financial sense when large scale and although potentially feasible for the campus, this is not being pursued at this time. Many of these technologies only make financial sense with the added government subsidies, and the previous confusion from government around Feed in Tariffs highlights the difficulties in making long term financial decisions based on these subsidies.

Although they play their part, renewables are often an order of scale too small in the general University context – total annual electricity consumption is around 28,000,000 kWh. They can play a valuable role in encouraging positive behaviour, however, and can be a highly visible demonstration of our green credentials. The PV panels are generally very low maintenance and have been problem-free so far. We are planning to install further PV systems on the new 1 West facility as part of phase 2 of the project, and are currently reviewing the business case for even larger systems on the new Chancellors' Building and R6 residences.

Combined Heat & Power (CHP)

Gas-powered CHP is another form of self-generation of electricity, and is particularly efficient as it allows the waste heat to be used locally. We have 2 CHP engines on site, one in the Sports Training Village, generating over 850,000 kWh a year with waste heat going to heat the 50m pool. The other is a new system installed as part of the new district heating scheme serving the Chancellors' building and the future R6 residences, complete with thermal store, which will generate over 1,200,000 kWh a year when both buildings are complete.

2.6 New buildings

We continue to make improvements to the more recent new builds to fine-tune their operation. There is a national problem in the construction industry with new buildings being energy efficient in design, but not in implementation – recent research has shown that actual consumptions can be between 2 and 8 times that predicted for new buildings across the UK. We are contributing to this research at Bath in a major way (see Links with Research) and have also further improved our processes to reduce the likelihood of this happening with our own new builds.

We continue to use BREEAM as an 'eco-design' process (although we are not now formally implementing BREEAM on the current new builds), and have enhanced this with specific new build targets for energy and carbon efficiency. We have also significantly enhanced our specification for the role of Independent Commissioning Managers on the project design teams to act as validators for these targets for up to 2 years after completion of a building, and thus implementing many of the industry best practice 'Soft Landings' approach.

3.0 Utility financials

3.1 Utility Procurement

We are now operating on flexible energy procurement contracts rather than the traditional fixed price, fixed term contracts, which now allow any market falls to be captured, while defending against market rises. The key advantage is to allow a budget figure to be better 'defended' and the risk to be spread across several separate purchasing decisions. The supplier 'risk margin' will also be lower, and in a falling market the savings can be locked in. In a rising market a variety of trigger mechanisms and a risk framework allow protection of the budgeted spend.

A saving of £1,868k has been achieved so far on the 3 year framework contracts (£582k gas, £1286k electricity) compared with what we would have paid with a benchmark traditional fixed contract.

The Climate change levy is up by 3% from April 1st. Water/sewerage increases are set by the regulated monopoly supplier via OFWAT and are also dependent on RPI. Water and sewerage prices are up by 5% as of April 1st 2013.

3.2 Longer term costs

Non-commodity charges (Climate Change Levy, Renewables Obligation, distribution/transmission charges etc) make up 30-40% of the price of electricity and are increasing significantly to pay for UK investment in renewables, infrastructure, and new generating plant. These are set by government, OFGEM and the distribution companies and are **predicted to increase electricity prices by at least 50% by 2020 (many predictions are for a doubling by 2020)**. The current overall costs to the University of £6.5m are expected to rise to around £10m by 2020 even with future energy reductions.

Along these lines we saw significant increases in these 'pass-through' electricity charges from April 2013 for the University which meant an immediate increase in costs for this year of £250k. The University is also subject to particularly stringent peak charges due to the region we are in. **A unit of electricity during the weekday hours of 17:00 to 19:00 costs 3 times that of a normal unit**, and this peak period premium increased by 23% in April. As well as reducing demand during this time, self-generation can be used to offset these costs, hence another significant benefit of CHP.

3.3 Funds for investment

The main fund currently used for investment is the SALIX/HEFCE Revolving Green Fund. This is a £250k 'self-replenishing' fund that involves the energy savings being fed back into the investment fund for future use. In effect it provides approx £100k/year for investment in any technical project with a 5 year payback or better. A small annual budget of ~£50k is also used for small improvements. A draw down on the Carbon Plan finance was used to fund £250k worth of lighting improvements underway this year following approval of the business case.

4.0 Carbon

4.1 Carbon Management Plan (CMP)

In April 2011 the University signed up to a new Carbon Management Plan (CMP) including targets for reducing emissions. The carbon footprint as measured at the time for the University is as shown in Appendix 3.

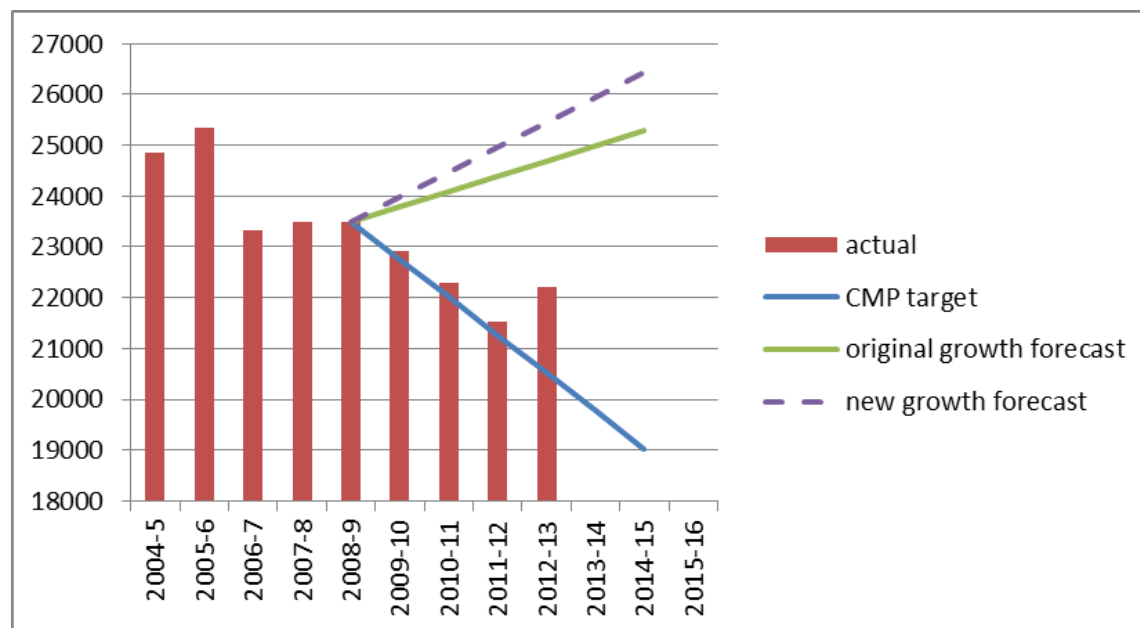
The following are the targets as set within the CMP (see Appendix 3 for more details):

The University of Bath will aim to reduce the Scope 1 and 2 CO₂ emissions from its activities by 43% by 2020 from a 2005 baseline. We have already achieved a 9% reduction, despite growth in the campus.

Our intermediate target is to reduce emissions by 19% by 2014/15 against a 2008/9 baseline – the CMP sets out an action plan to reach this target

4.2 Progress against targets

The following graph shows our annual carbon emissions in tonnes CO₂, including a projected figure for 2012/13. The blue CMP target line is what we need to achieve to reach our targets assuming a linear progression. The green line (original growth forecast) is what was modelled at the time of preparing the CMP, given the then projected increase in size of the University and assuming the CMP was not implemented (i.e. to achieve our reductions targets we have to also take account of growth in the Estate which makes the challenge even greater). **This growth, however, is due to be significantly greater than originally planned** – the purple dashed line shows the new modelled growth forecast based on the currently planned and approved new buildings (Chancellors', 1West, R6, Arts). (No allowance for increased student numbers or other growth has been included.)

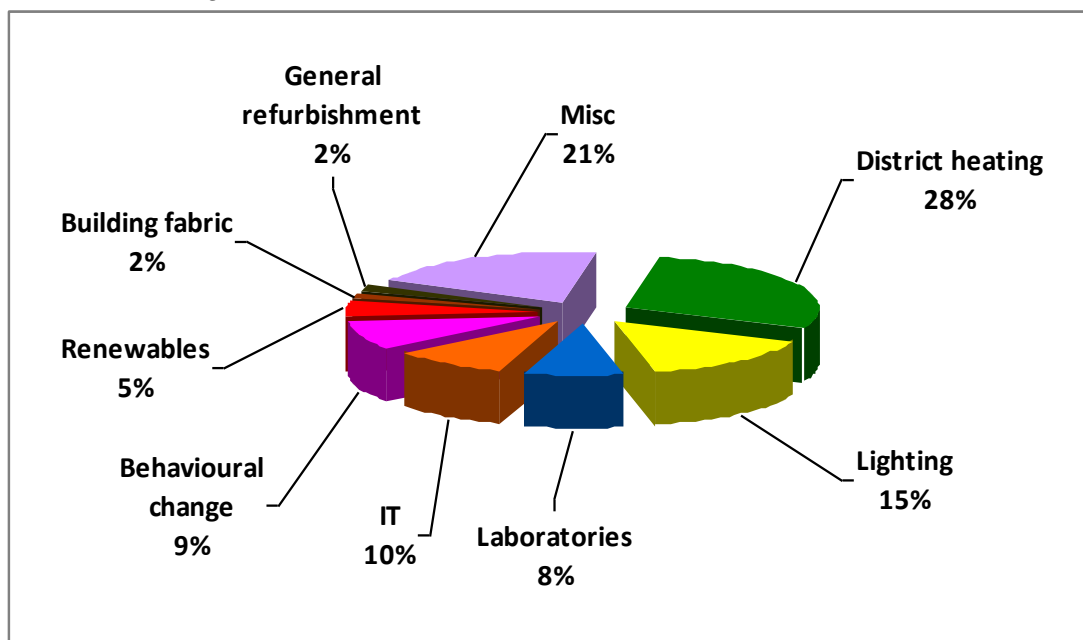


It can be seen that despite this underlying growth and expansion of the University, carbon emissions have been falling in recent years. **Carbon emissions for 2011/12 had fallen 15% since 2005 and 8% since the 08/09 baseline in the Carbon Plan.** It can also be seen, however, that **carbon emissions have risen significantly in 2012/13.** This is partly due to growth, but predominantly due to the weather – as discussed in section 1, gas usage is up by 8% due to the cold winter and spring, and this factor outside of our control clearly has a significant impact on our carbon figures.

So, although we are doing well to achieve reductions in relative energy use and emissions (i.e. per student, building floor area, turnover, and when weather-corrected), our 'absolute' emissions have increased this year. These carbon targets are absolute targets (as set by UK government, HEFCE and the Carbon Trust) and so make no allowance for growth or weather. It is also clear that **the scale of growth now underway is such that the original very challenging targets are even more challenging**, and despite best efforts, it is unlikely these will be met.

4.3 CMP projects

The following shows potential CMP projects by project category, sized according to emissions savings:



The projects identified within the CMP were an indicativelist of projects that could be implemented and were collated to allow the feasibility of the reduction targets to be modelled. Appendix 4 shows a summary update on specific CMP projects.

4.4 Embedding carbon

A significant part of the CMP identified non-technical improvements to embed 'carbon-thinking' in our decision-making and internal processes. Some examples of progress on this include:

- Carbon and the CMP are on the University Risk Register
- A 'carbon question' has been included in the Annual Planning process
- Publicity on the CMP has continued with presentations to nearly all departments at staff meetings
- The University orientation/induction day now includes a significant input on sustainability
- The staff survey in 2012 included questions on sustainability

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- The inclusion of environmental criteria in job descriptions has been further investigated with HR
- Embedding within departments via the Green Impact process
- Space charging – will now use true costs based on metering in RAM (Resource Allocation Model) - implementation by Finance Dept. for next academic year.

4.5 Scope 3 emissions

We have a target in the Environmental Policy to establish a baseline for our scope 3 emissions and to set a reduction target. The first part of this was done as part of the Carbon Management Plan for the 08/09 academic year, but we are awaiting clarification of HEFCE/national requirements before setting specific targets. We are starting to monitor our scope 3 emissions in certain areas, , although reporting on Scope 3 remains voluntary.

4.6 Carbon legislation

Carbon Reduction Commitment (CRC)

This legislation commenced in April 2010 as an emissions trading scheme whereby all organisations of sufficient scale have to annually purchase emissions permits at an initial fixed price of £12/tonne CO₂. In the Comprehensive Spending Review in October 2010 this was significantly altered with all permit funds no longer being recycled back to the participants. In effect this is now a simple Carbon Tax equivalent to at least an 8% rise in our energy costs, or £260,000 annually. In the last 12 months several changes to the legislation have occurred aimed at simplification. The price per tonne will also rise to £16 next year and hence an annual cost of £350,000 to the University.

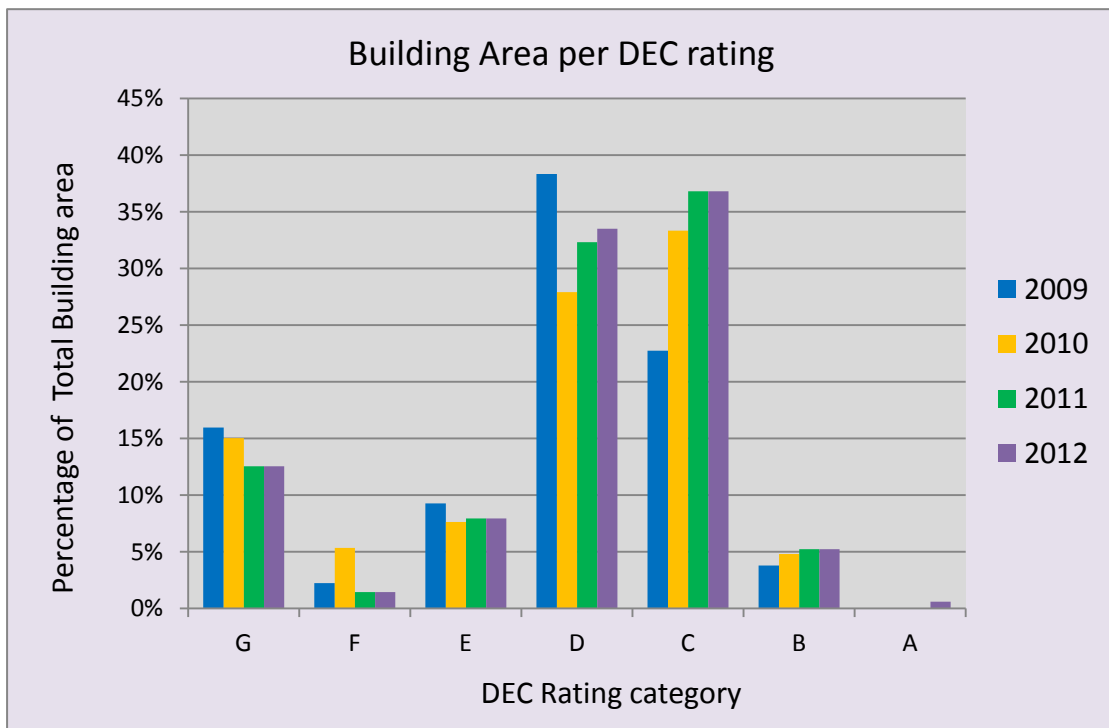
Under this legislation we have had to submit a footprint report and an annual report on our emissions. We also have to set up audit processes and an evidence pack, and will be buying permits for our emissions in September this year. For the University the main impact beyond the financial has been the administrative costs. Under this legislation our CRC emissions were about 22,250 tCO₂ in the year to April 2013. The specific methods of calculating the footprint within the CRC is different to others hence the emissions figures will not be consistent with other carbon reporting (eg Carbon Trust, the CMP, and HEFCE).

As well as this financial impact, annual league tables were produced based on performance aimed at highlighting the potential reputational issue for any organisation. The position in this depends on emissions reduction performance in later years, but initially an Early Action Metric was used based on the levels of AMR metering and the membership of accreditation schemes such as the Carbon Trust Standard (an in depth auditing process of our carbon management processes). The first league table was published in October 2011. The University ranked 30th out of 4000 organisations that fell within the legislation, and was the 2nd highest ranked University. In 2012 we ranked 575th due to the changing method of assessment. The league table is now to be abolished under the simplification of the legislation.

Display Energy Certificates (DECs):

This legislation came into effect in October 2008. It requires all public sector buildings above 1000m² floor area to display a certificate showing the energy performance of a building based on actual energy. A DEC is valid for one year and must be updated annually. It shows an A to G rating based on a comparison with a benchmark hypothetical building with a performance typical of its type, where A is the lowest CO₂ emissions (best) and G is the highest CO₂ emissions (worst). Also shown are the ratings for the previous two years; this provides information on whether the energy performance of the building is improving or not. This legislation therefore results in a potential reputational driver as the information is freely available and displayed publically in each building. It is expected that this legislation will be expanded to include smaller buildings and also may cover private sector buildings.

The University has 47 buildings which are covered by DECs. This year 13 buildings have moved up a rating category, and the number of buildings in each category is as follows: **A: 1 B: 5 C: 19 D: 12 E: 2 F: 2 G: 6**. The following figure shows this by floor area and the progress over the 4 years.



The diagram in Appendix 5 summarises the ratings of our campus buildings, which can also be found on an interactive website -

<http://bathuni.energyprojects.net/>

5.0 Waste Reduction and Recycling

The University is continuing to make significant improvements with regards to its waste and recycling, working hard to reduce the amount of general waste and increase the amount of recycling produced across the campus and off site. The recycling figures for the 2011/12 academic year are 20%; this is a large increase from the 2010/11 figure of 12.6%.

There are targets in place to increase recycling to 30% by 2012/13 and we are currently on track to meet this target, a further target of 50% recycling by 2014/15 is also in place. A large amount of work has been done to meet the target of 30%, including:

- Improving communications in the student kitchens, including posters and labels to make it clearer about how to use the bins and what can and cannot be recycled
- Working with the current recycling contractors to get more accurate reporting on the weights of the recycling which has been collected
- Working with the current waste contractor to ensure as much waste as possible is pre-treated before landfill

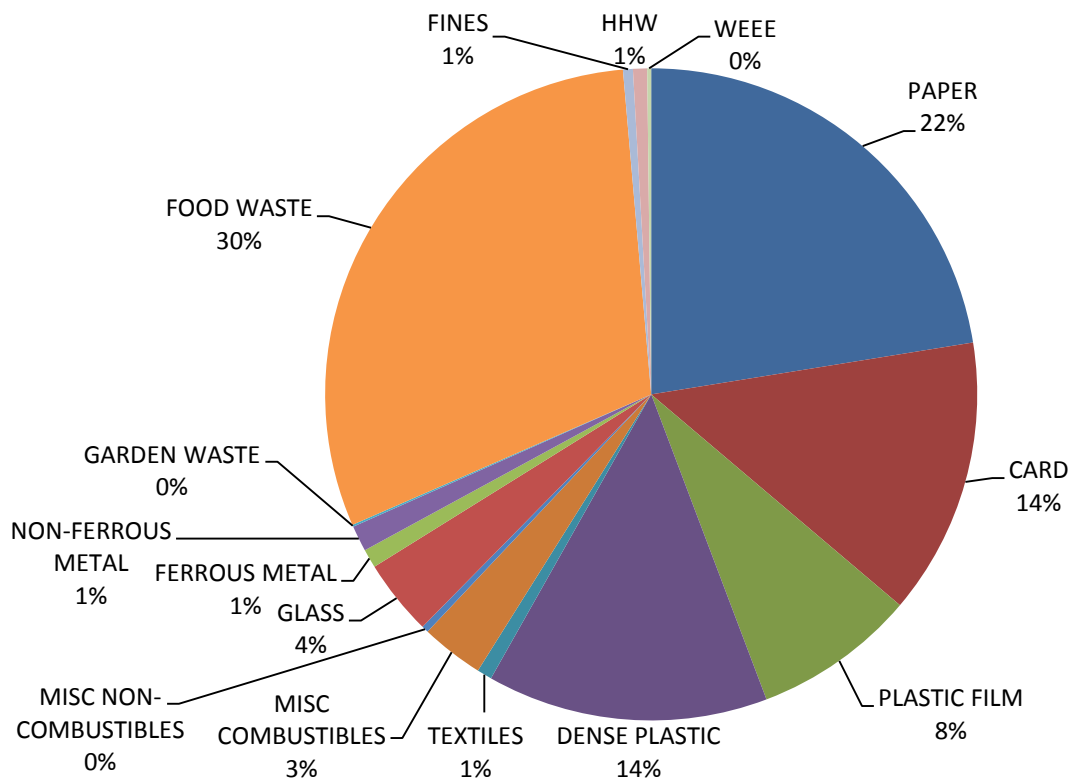
There have also been a number of projects and campaigns run throughout the year to increase recycling, including:

- Zero Waste campaign at the end of term which collected over 6 tonnes of unwanted items for local charities from the on campus residencies, including a new collection of unwanted food for Foodbank Bath
- A new book bank for the British Heart Foundation, for use by staff and students
- Improved posters and label for the recycling bins and staff noticeboards
- Following on from the success of the trial of recycling bins in the library, this was extended across the library and has helped to capture more recycling
- A food waste trial in three Halls of Residence which will be rolled out to all Residences in 2013/14
- A trial in some Halls of Residence where students were asked to empty their own general waste bins while the porters continued to do their recycling, hence the more the students recycle the less they have to empty their rubbish bin
- On-going presentations to Academic departments during team meetings to increase awareness about recycling

A compositional analysis of the waste and recycling from across the University was carried out in December 2012, with the results being used to focus on particular problem areas and items of waste and recycling.

The figure below shows the average composition of a general waste bin from across the University. (Note that HHW is hazardous waste, and WEEE is Waste Electrical Electronic Equipment).

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Compositional Analysis of general waste from across the University

It clearly shows how much recycling can still be found in the general waste stream. The key items which could have easily been recycled are paper 22%, card 14% and dense plastics (bottles, tubs and trays) 14%. There was also a high amount of food waste in the general waste at 30%; this highlights the potential requirement for a food waste collection from staff offices.

The contracts for both the waste and recycling are currently in the process of being retendered with the new contracts hopefully in place by September 2013. The new contracts will help the University to meet the recycling targets by requiring pre-treatment of general waste before landfill: this will help to capture any recyclables which had not been separated at source. The new recycling contract will also help to capture more items for recycling with the increased food waste collection helping further.

The role of Waste and Recycling Manager has been made a permanent contract, further demonstrating the University's commitment to improving waste and recycling.

6.0 Transport

Our Environmental Policy includes a specific objective to:

- minimise carbon emissions from regular commuting to and from campus by encouraging the use of car sharing, public transport, cycling or walking;

Our Environmental Policy includes targets on transport to:

- develop and publish a new Transport Plan by 2011;
- improve the bus arrivals area to improve the experience for passengers and facilitate the operation of competing bus services;

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- develop a methodology, in partnership with our transport consultants, to
- provide a credible estimate of carbon emissions for travel associated with commuting to campus, business trips and international students visiting their country of domicile;
- continue to work towards reducing the demand for car parking places on campus;
- increase cycle storage, including covered, and secure storage on campus by a further 10% by 2011/12.

Within the more recent Travel Plan our targets are to:

- i. reduce car trips to campus per staff/student head by 1% per annum for the next five years;
- ii. reduce car parking capacity from 2209 spaces in 2003 to 2009 spaces in 2014/2015;
- iii. ensure bus operators serving campus meet Euro 4 exhaust emissions by March 2012;

We have also set ourselves the additional task of establishing baseline data for business travel which may be used for future target setting, and also to

- update our Bus Code of Practice in terms of on-site operation and vehicle emissions standards;
- review our information systems on business travel, and as necessary adapt them to provide baseline information on the frequency, mode, origin & destinations, and purpose of business travel over the year;
- provide information to international students on the environmental impact of travel options to help them make informed travel decisions.

The University carried out a transport survey in November 2012. Amongst other things the survey sought to understand issues identified in the previous survey, including confusion over parking permits and awareness of the University of Bath Car-Share scheme, both of which were investigated in more detail in this survey.

The University has operated a travel plan for the campus since 2002. It has implemented a number of transport improvements in recent years, the most recent of which is a £700,000 improvement to the Arrivals Square to provide an additional bus stop, 2 new bus shelters, a new footbridge and improved pedestrian routes, improved accessibility for those with disabilities, improved cycle parking, and a new taxi rank. It has also installed 2 puffin crossings on campus to ensure ease of pedestrian movement. In 2012 it has also committed, through a S106 Agreement, to contributions of £400,000 to subsidise bus services to the University and £30,000 towards improving off-site pedestrian routes. In 2013, in conjunction with B&NES, it is introducing bus Real Time Information at stops on the Campus.

As a result of the travel plan, the University's transport policies and the measures it has implemented, between 2007 and 2012 daily traffic flows associated with the University have decreased from around 10,400 movements to 9,800, a reduction of 5.8%, although the 2012 flows are slightly up on 2011. In the same time the number of people travelling to and from the Arrivals Square by bus between 08:00 and midnight has increased from around 7,800 to 10,600, an increase of 36%. These

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changes are set against the staff and student population increasing by around 15% over the same period.

Despite reduced car movements, since 2007 peak parking levels have remained largely constant with, in 2012, the maximum observed accumulation being 1,902 cars parked at 13:00 on a Tuesday which equates to around 92% of the overall parking provision of 2077 spaces.

Hence over the last 4 years, the University has demonstrated an ability to grow by just under 4% per annum while decreasing car movements and car mode share. The success of the University's travel plan has been recognised through the University being given Gold awards in the West of England Travel Plan Awards for the last three years, and Employer of the Year in 2011.

In terms of meeting the targets of the travel plan, this year the number of car journeys per head of staff and students was 0.710, which is a slight increase (1.7%) compared with 0.698 in 2011. However this may be as a result of 2011 being a notable drop on the 2010 figure of 0.762 and so there has been a little bounce back. Since 2007, the number of car journeys per head of staff and students has reduced from 0.856 to 0.710, a reduction of 17%. However the University will need to monitor changes to 2013/14 to ensure the slight increase this year does not continue as a trend. The travel survey has highlighted an unawareness of the University's car sharing scheme, and hence this will be targeted as a way of reducing car journeys.

Car parking provision in 2012 was down from 2106 spaces in 2011 to 2077 spaces in 2012, and hence the University is on track to achieve the reduction to 2009 spaces in 2014/15. There is some pressure on car parks from current construction projects, but to help minimise this we have mandated that contractors' staff park off campus and use shuttle buses.

With regard to bus provision, many of the buses serving the University are now Euro IV compliant and the University is looking to ensure next year, its target for the University to be served by buses meeting Euro IV standards or better is met.

The University has installed 3 electric vehicle charging points in East Car Park, and also electric motorbike/scooter charging points in the Underdeck. We have also introduced an electric cycle trial scheme, such that staff and students can be loaned an electric bike on trial for a 2 week period, prior to purchasing under the University cycle purchase scheme.

The Masterplan reflects the success of the University's Green Transport Plan and, while it envisages increased student numbers, it anticipates no additional car parking (save for additional space to accommodate decanting during the development process). Indeed, parking provision reduced between 2011 and 2012.

Furthermore, the Masterplan proposes the provision of an additional 2400 student beds on campus, and this will significantly reduce the need of students to travel to and from the campus to study and use its leisure facilities. The first phase of this residential accommodation is now under construction and will provide some 708 additional beds on campus. The Masterplan therefore anticipates no increase in car movements, with the travel demands associated with growth of student numbers continuing to be managed through the University's travel plan, and most notably by

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increased on-site accommodation and, as necessary, improvements to public transport.

It should also be noted that, under the section 106 agreement with BANES which ends in 2013, the University makes an annual contribution to the Council which it uses to subsidise the 20A/C bus that serves the University but also provides many other benefits to the wider community. However, the University has committed to an additional £400,000 (index linked) to be drawn down by the Council as required to continue to subsidise the provision of the 20A/C service up to 2027.

Business travel is one of the areas that remains un-audited as part of the recent travel surveys at the campus, and little information is currently available to provide an effective understanding of how much travel is undertaken and its nature (i.e. mode, times, opportunities for sharing resources etc.). Therefore a key goal for the University will be to obtain a full understanding of its business travel and to then set targets and measures to promote more sustainable travel where possible.

We will consider ways in which staff and students can be encouraged to undertake business travel in more sustainable ways. This might, for instance, include:

- Encouraging greater use of our existing Access Grid Nodes and Skype facilities to facilitate participation in meetings, interviews etc. without travel;
- Considering the timing of meetings to make travel by public transport a more realistic option;
- Promoting car sharing by staff (we already pay a passenger allowance) where travel by car is the only realistic option but joint travelling would be possible;
- Paying all mileage allowances at a rate appropriate to fuel efficient cars;
- Promoting non-car travel by means that have the lowest environmental impact (e.g. considering the choice between train or flying, or between operators based on vehicle technology etc.).

Travel home by International Students also has a significant impact. We will seek to provide information to international students on the environmental impact of travel options to help them make informed travel decisions.

7.0 Biodiversity

Our biodiversity targets are to:

Improve Quarry Road SSSI (Site of Special Scientific Interest) by removing non-native species and enhancing native species;

- Conserve and enhance habitat for the lesser horseshoe bat by improving existing woodlands and hedgerows with further planting of native species;
- Re-introduce indigenous flora and fauna species;
- Remove non-native invasive species from campus as far as is reasonably practicable.

Since November 2011, a small working group has been developed which includes members from UHS&E and Estates. The group have identified a number of actions which it believes will support a wide range of bio-diversity across the campus, some of which can be implemented relatively simply but others which may take considerably longer to achieve.

The Biodiversity Action Plan (BAP) was presented to S&CMSG and agreed in June 2012. Shortly afterwards however, biodiversity of the site was identified by the local planning authority as being essentially linked to the build Masterplan. Further to this the Council and Natural England wanted land management in general to be closely linked with any future building proposals which meant that the biodiversity action plan needed to be much more robust and linked to valid research. As a consequence of this, Ecosulis, a group of consultant ecologists were employed to develop the action plan and carry out suitable wildlife surveys especially in respect of the bat transects around campus. This in turn has helped to form the basis for the new LEMP (Landscape and Ecology Management Plan) which has been requested by the local Council as part of the Masterplan building application. The LEMP pulls together the University's action plan and recently produced tree survey together with existing and new ecology surveys, to help satisfy concerns of the Council and Natural England that any development at the University will not adversely affect the flora and fauna.

A site meeting of all interested parties took place on Tuesday 7th May. The result of that meeting was to commission additional bat surveys from Ecosulis. Both Natural England and BaNES were interested in the level of input from students in respect to Biodiversity projects. Efforts have been made to engage the students group, People and Planet, to encourage them to help but so far, this has not been successful.

Although the BAP has been subsumed into the LEMP, the actions from it are still relevant and as such are continuing. Work has already started on clearing the area in Limekiln for the natural pond and preparing the ground ready for planting and development later in the year. The Stumpery and wild flower beds are being expanded in line with the action plan together with more natural planting on the Eastern side of campus. In line with requests from Natural England, the plan now includes a greater emphasis on enhancing native species and reintroducing indigenous flora and fauna, especially around the Quarry Road area which has SSSI status.

8.0 Sustainable Procurement

Sustainable procurement is a key area for the University given its significant purchasing spend – it is estimated that 25-50% of the total (i.e. including Scope 3) carbon emissions for an organisation of this type is through the supply chain. Environmental weighting is in all specifications, and although generally only 5%, is being reviewed and increased in some relevant tenders. The procurement of new buildings continues to have a significant sustainability aspect, especially on energy. The targets within our Environmental Policy and the progress made are as follows:

We will

1. provide targeted refresher training on latest sustainable procurement principles.

This was delivered on the 22nd April and attended by Procurement staff and members of the S&CMG.

2. augment the environmental sustainability purchasing policy with a strategy covering risk.

A new Procurement Strategy containing a section specifically on sustainable procurement has been approved and will be launched during July 2013. In parallel with this a new Sustainable Procurement policy and action plan has been developed, albeit in draft form at present.

3. assess all contracts for general sustainability risks and identify management actions.

Sustainability related evaluation criteria have been used where appropriate. The new procurement strategy reinforces the need to embed sustainability considerations throughout all our standard procurement processes and procedures, and the sustainable procurement policy will provide the detail required to make this happen.

4. implement a targeted supplier engagement programme, promoting continual sustainability improvement.

A number of suppliers have been invited to comment on the new Procurement strategy and sustainable procurement policy. The strategy and policy will be promoted at all future supplier engagement events.

5. apply a life-cycle approach to cost/impact assessment.

The use of whole life-costing mechanisms is contained within the sustainable procurement policy and is one of the measures that will be used to determine if the University reaches level 4 of the Flexible framework.

9.0 Curriculum

The positive impacts we as a University have on the environment through our teaching and research outputs are arguably the most significant in this regard. A sub-group reporting to SCMSG has been set up to identify sustainability within our teaching across the University. The purpose of this activity is two-fold. First, to identify modules (and their convenors) that either focus on, or include, sustainability related concepts and practices so that a network of individuals might be created who can share best practice, material, and otherwise help in other modules as relevant. Second, in bringing this information together, the aim is to help increase the profile of our sustainability teaching in a form that is useful in marketing the University. This marketing material can be used in the recruitment of UG & PG students for our

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general programmes but also for our specialist degrees, such as the MSc in Sustainability & Management. We also anticipate it will help to generate more profile for the University around sustainability activities by demonstrating that our world class research around sustainability is also found in the classroom.

Upon completion of marketing material demonstrating our sustainability teaching, we hope to track the extent to which this information helps us to attract high quality PhD students, enhance our profile with external bodies such as ESRC, EPSRC & HEFCE, and in demonstrating our commitment to rating/ranking bodies who use sustainability criteria.

Initial meetings have been held with the Pro-Vice-Chancellor for Learning & Teaching and the Director of Marketing & Communications to set out and agree a way forward. Our next steps are to:

- identify modules that potentially include sustainability from reviewing publicly available unit templates,
- bring this information together with existing research about the importance of sustainability teaching on potential student segments, and work with Marketing to build a case for developing marketing material around sustainability teaching in conjunction with relevant marketing managers
- work with the PVC for Learning & Teaching to ensure the most suitable process for discussing this project with unit convenors and setting up a network

10.0 Miscellaneous

10.1 ISO 14001 management system

The Accommodation and Hospitality Services Department have achieved certification to the ISO 14001 Environmental Management standard. They have successfully implemented a comprehensive and robust environmental management system that focuses on a large range of areas, including compliance with legislation, aspects and impacts, auditing and training.

The 2 stage certification assessment was undertaken in January and March 2011 and the department has continued to receive annual surveillance visits to ensure the standard is maintained. This system, combined with the enthusiasm of staff and other initiatives such as WE-CARE, Student Switch Off, Reg Fuse, and Zero Waste shows this department continues to be an example of excellence to the rest of the University.

10.2 Gold award for British Paralympic Association training camps

The Council for Responsible Sport has certification processes that recognise concern for supporting a lower carbon lifestyle in producing sporting events. The British Paralympic Association (BPA) successfully completed their application for Gold CRS Certification of the ParalympicsGB August 2012 training camp at the University, following their Silver award in 2011. This certification of a multi-day, residential event was a first for the Council; all previous CRS Certified events have been one-day races like the Gold Certified EDF Energy Birmingham Half Marathon in the UK and the Big Sur Half Marathon in the U.S.

The University and EDF Energy has been working in partnership with the BPA since 2010, helping them become a greener team ahead of London 2012. They worked together to improve the environmental impact of the athletes' stay in a number of

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ways - from promoting recycling facilities and low carbon transport to helping make sure local, organic and fair-trade food was available to the athletes.

10.3 League tables

The University achieved a 'First' in the national university 'Green League' in 2011, ranked 31st out of 143 universities. This was a significant improvement on our 77th ranking in 2010. In 2012 we were 57th. The 2013 league table was published in June in the Guardian; in this we dropped back from 57th to 81st. The league table is produced by the national campaigning group People & Planet, based on detailed evidence and data submissions and via HEFCE/HESA data. Although by no means as prominent as the main university league tables, it is gaining prominence, and is now being referenced in other leagues eg. this year's 'Complete University Guide'.

Generally we score well for environmental policy, carbon management, student/staff engagement and energy, but perform poorly in the sections on environmental auditing, waste, procurement, ethical investment, and curriculum. Our profile as a STEM-focussed research-intensive university results in our performance data as being seen as poor when compared with the 'average' HEI – we have high carbon, waste and water figures per FTE student/staff – highlighting the limitations of the league table.

There is also now an international dimension with the Green Metric world university ranking published in December 2012. Green Metric is promoted by Universitas Indonesia as 'an opportunity for institutions in both the developed and developing world to compare their efforts towards campus sustainability and environment friendly University management'. We achieved 9th place in the league in 2012. This is the third year in which the table has been compiled and the number of participating institutions has increased from 95 in 2010 to 215 in 2012, although only 11 UK HEIs took part.

10.4 Links with research

It has been a deliberate policy of the Department of Estates to break down barriers between academia and operations within the University and look for areas of synergy especially in research activities. The Energy & Environment Manager sits on the board of ISEE (Institute for Sustainable Energy & the Environment) to encourage this activity and communication.

The following are some of the current areas of collaboration and where the University Estate is being used as a research and teaching resource:

- We are the largest part of the UK-wide Technology Strategy Board funded Building Performance Evaluation research programme with Architecture & Civil Engineering, looking at the discrepancy between predicted energy performance of buildings and their actual performance, using the recent builds of Woodland Court and 4 West as case studies.
- We have been working with Architecture & Civil Engineering/Psychology/Computer Science on a research project on energy demand reduction, looking at behavioural change and information feedback. This uses our live AMR data to feed back via a tablet display in 6 kitchens in student residences in Norwood House.
- We have been working with Electrical & Electronic Engineering on a project funded by the University's EPSRC Knowledge Transfer Account, matched by RWE npower involving installing a DC network in the Library.

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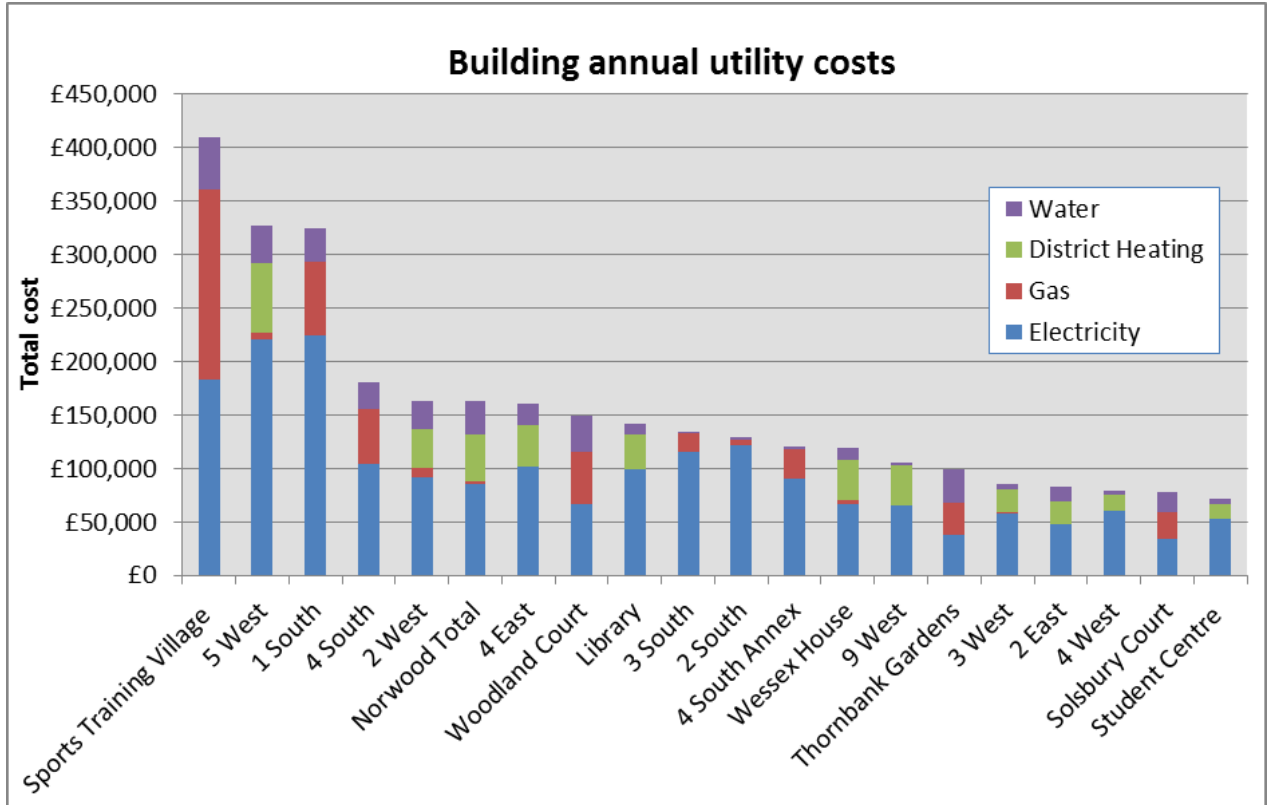
This powers a number of PCs, plus DC lighting, and uses data from the solar PV on the East Building to model the feasibility of such networks.

- The 1 West capital project was used as an real-world exercise for final year undergraduate Civil Engineers for their environmental design project into the remodelling and refurbishment of this building
- The final year Mechanical Engineering module 'Energy & Environment' used the Carbon Management Plan for the University as a basis for their group projects

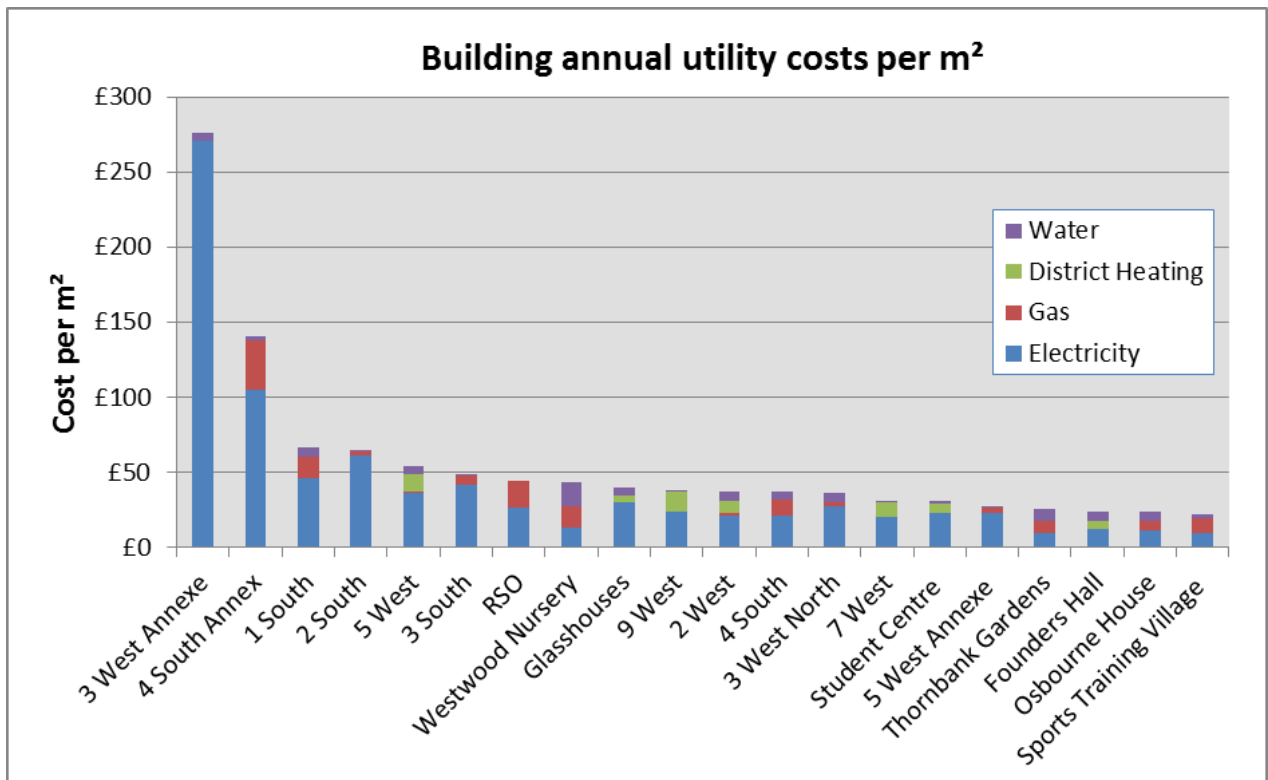
Peter Phelps
Energy and Environment Manager on behalf of SCMSG

Appendix 1 – 2011/12 utility costs by building

These graphs break the 2011/12 costs down further for the University by building. This highlights the domination of our usage by the scientific and research buildings, as well as larger buildings such as the STV:



The following is by building floor area, showing some of our most energy-intensive facilities such as 3WN:

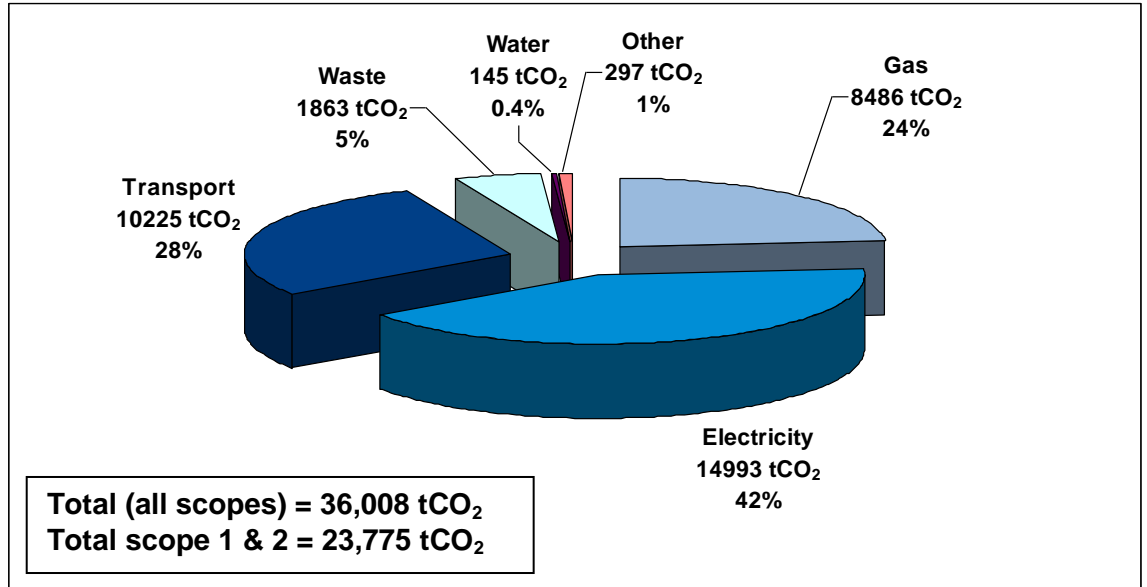


Appendix 2 - Specific utility improvement measures made in last 12 months

- 3 West North Photonics cleanroom – installation of inverter control to the main Air Handling Unit and adjustments to the control systems and settings. Weekly electricity consumption has been reduced by 50%, down from 2,500kWh to around 1,250kWh, saving 65,000kWh of electricity, £8.5k and over 36 tonnes of CO₂ annually
- Thornbank corridor lights replaced with LED lights with automatic sensors, £20k investment, 70,000kWh/annum saved, 2 year payback
- Pulteney Court corridor and stairs lights replaced with LED lights and automatic sensors, £30k investment, 5 year payback saving ~50,000kWh and much improved lighting output
- 300 external lights for car parks and paths upgraded from 80W lamps to 40W LEDs saving 12,000kWh (£15k/year)
- 8 West: LED lights with sensors installed to North stairs, toilets on all levels, and Level 1, 3 and 4 Corridors, 50,000kWh reduction per annum
- 4 West Stairs lighting sensors, 8000kWh per annum reduction
- Eastwood House 33 replaced corridor lights with LED, 3000kWh reduction
- Re-commissioned and repaired lighting sensors in Eastwood 1-51, 5000kWh/annum reduction, and Westwood, 10,000kWh/annum reduction
- Brendon Court corridor lighting replaced with sensor controlled LED lights 35,000kWh/annum reduction
- John Wood Court KA repair to lighting controls, 10,000kWh/year saved
- Boiler House stairs and communal area lighting changed to LED with sensors, 5000kWh/annum reduction
- 6 East stairs and level 2 corridor replaced lighting with sensor controlled LED lights, 12,000kWh/annum reduction
- 4 East Level 3 corridor lighting improvements, 11,000kWh saved
- Automatic urinal controls fitted to various buildings including 1 South, 2 South, 3 South, 4 South, 2 West, 3 West, Wessex House and Student Centre, payback under 24 months, 1000m³ reduction per annum
- Major unseen underground water leak identified - was losing 100 m³ per day costing £7500 per month
- -80 degree freezers – three energy efficient freezers purchased, these will reduce electricity consumption by around 13,800kWh annually, saving £1,800
- 1 South – Fume cupboards: trial of reduced sash heights. One laboratory is being used to assess the practicality of reducing the maximum normal working height of fume cupboards from 500mm to 400mm. Rolled out across 1 South this would directly reduce space heating gas consumption by around 400,000kWh, saving £14,000. Much work is on-going in this building to improve the ventilation controls, with even greater potential for savings.
- Electrical submetering installed in Norwood under deck (10 meters), North car park (5 meters), 7 West (14 meters), 9 West (17 meters), Brendon Court (18 meters)
- Upgraded and expanded electrical submetering in 'L' substation (12 meters feeding East car park, Arts Lecture Theatre, tennis courts, bus shelter, etc.), and 'A' substation (6 meters)
- Electric Car Chargers metering installed in East Car Park (4 meters)
- Metering monitoring system upgrade to improve data handling and resilience

Appendix 3 – Carbon Management Plan (CMP) – footprint and targets

In April 2011 the University signed up to a new Carbon Management Plan (CMP) including targets for reducing emissions. The carbon footprint as measured at the time for the University is as shown below:



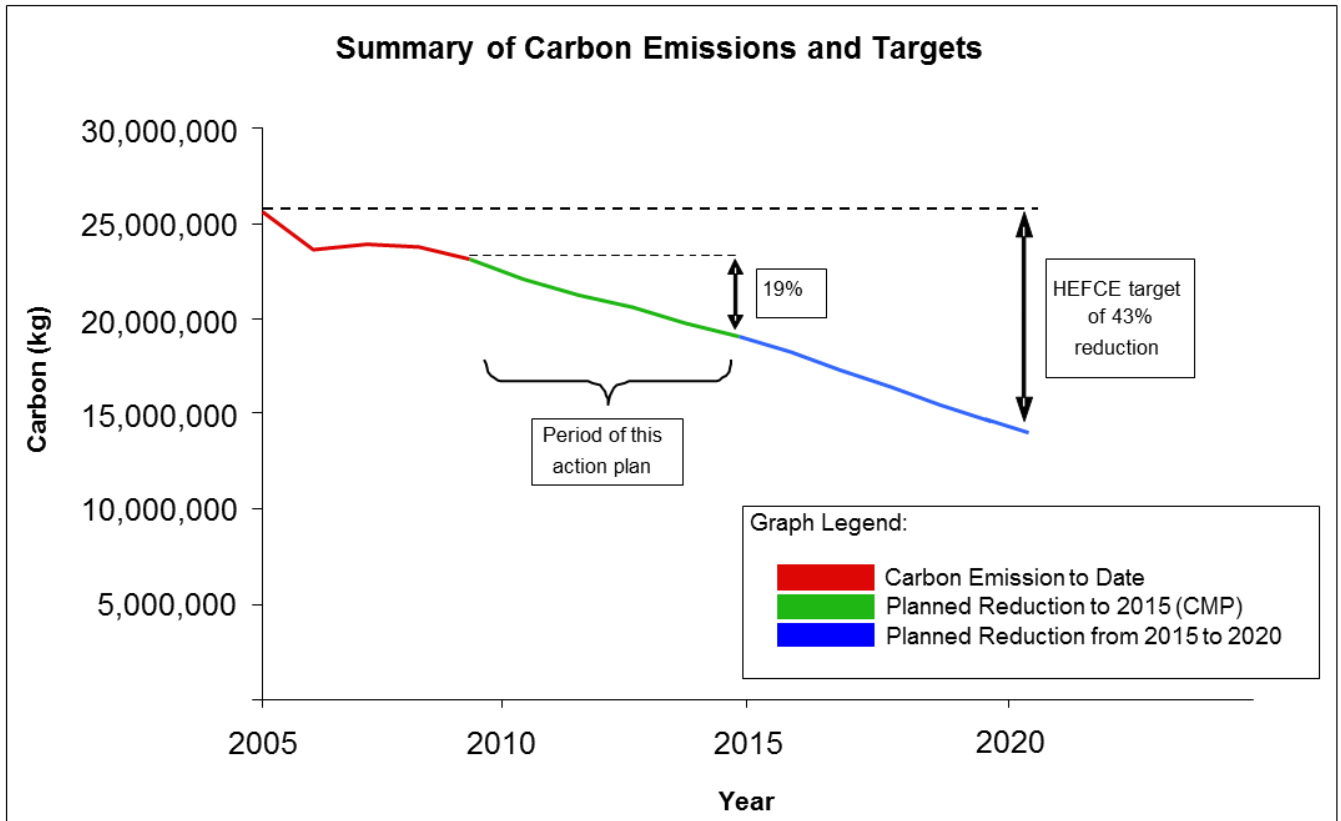
Note

The following is the internationally recognised method of classifying emissions categories as defined by the World Business Council for Sustainable Development (WBCSD):

- **Scope 1 emissions** - from sources that are owned or controlled by the institution, such as heating plant and vehicles.
- **Scope 2 emissions** - from the generation of purchased electricity consumed by the institution.
- **Scope 3 emissions** - all other indirect emissions that are a consequence of the activities of the organisation and include commuting by staff/students, international travel, water use, waste production, and the purchase of goods and services.

The following summarises the targets as set within the CMP:

The University of Bath will aim to reduce the Scope 1 and 2 CO₂ emissions from its activities by 43% by 2020 from a 2005 baseline. We have already achieved a 9% reduction, despite growth in the campus.



Our intermediate target is to reduce emissions by 19% by 2014/15 against a 2008/9 baseline – the CMP sets out an action plan to reach this target

Appendix 4 – Carbon Management Plan (CMP) – projects update

The following specific projects have been implemented:

- Behavioural change programmes:
 - CMP 10 - continuing Student Switch Off
 - CMP 11 - continuing Green Impact (for 2 years only)
 - CMP 50 - fume cupboards usage (implemented in some areas only)

These are, however, not one-off exercises but need continuous development and input, hence they had an on-going operational expenditure associated in the Carbon Plan to allow for the people resource.

The following have also been implemented or progressed in the last 12 months:

- Lighting improvements (CMP projects 25-32, 41, 42) made up a substantial proportion of the CMP. As can be seen many lighting improvements have already been made and are on-going. The business case for the first major lighting CMP funding drawdown involving investment of £234k was approved this year, and this is the first phase of the major lighting projects identified within the CMP. This package of works focusses on corridors, especially in student residences and involves the replacement of older fluorescent fittings with LED fittings along with automatic controls. The payback at today's prices for the package of works was less than 4 years and has the added benefit of lower maintenance costs due to longer life of LEDs.
- CMP13 – 2 South server room upgrade: the University has 2 major server rooms, the newest of which has a 'best in class' energy efficiency and utilises free cooling 75% of the year. The older 2 South server room refurbishment was in the CMP, but the plan now is for the new FED (Faculty of Engineering & Design) building to house a replacement server room with high energy efficiency. BUCS are also now underway with a process of virtualisation of our servers which has enormous potential to reduce the numbers of these (eg in one area from 100 to 6) and associated energy use (potentially approx. £100k). It is also planned to invest in smaller short term modification to the existing 2 South area with a cold aisle design that should save around £25k annually for an investment of £35k.
- CMP 53 – freezers housekeeping and consolidation – this has made some progress in some areas, but relies greatly on departmental initiative. We are working closely with several departments to develop such a framework for encouraging this
- CMP 50 & 51 – fume cupboard technical and behavioural changes – some progress has been made, as highlighted in section 2.
- CMP 62 – IT autowerdown software is still being further investigated and implemented by BUCS. Around 500 public access PCs in computer labs will have this implemented by the end of summer 2013.
- CMP 48 – Building Management System fine tuning has been partially implemented and is an on-going exercise.

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- CMP 43 – metering improvements - has been partially implemented and is an on-going exercise. Further submetering has been added in a number of areas.
- CMP 4, 6, 83 and 84 were all renewables projects (biomass, solar thermal and PV). The focus for renewables is on opportunities within the new buildings, as this is generally more technically and financially viable than on existing buildings. The East Building proved an opportunity for large scale solar panels, as will 1 West. The business case for the Chancellors' Building and R6 residences is being investigated.

CHP and district heating

The University heats many of its central buildings via a district heating network. CMP 1 and 2 identified the potential for significant carbon saving through investment in this area. It is intended that a proposal for large scale investment in the existing district heating network and major CHP plant is developed into a full business case later this year.

Appendix 5 – Display Energy Certificate ratings for the campus buildings

This diagram summarises the energy ratings of our campus buildings, which can also be found on an interactive website - <http://bathuni.energyprojects.net/>

