

## Annual Energy and Environment Report – June 2012

The purpose of this report is to provide an annual update to 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 also forms the basis of a public report that will be made available to staff, students and the general public.

### Executive Summary

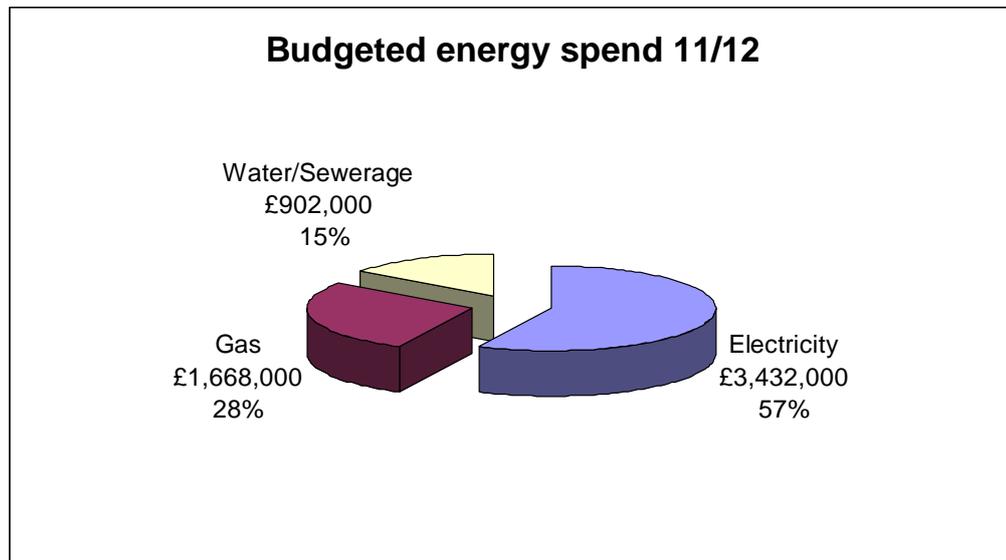
- Energy consumption continues to fall even though there has been growth in campus infrastructure, due to investment in technical and behavioural programmes. Green Impact scheme promoting practical sustainability actions by departments piloted with great success. Consuming ~£1.5m worth of utilities less annually compared with usage 5 years ago:
  - **electricity 10% down**
  - **gas 20% down** (weather-corrected)
  - **water 18% down**
- Carbon emissions have fallen 13% since 2005 and 7% since the 0809 baseline in the Carbon Plan. Continuing to make good improvements although further investment will be needed to achieve our carbon targets. The scale of planned campus development is also such that our targets are even more challenging than predicted.
- Utilities costs continuing to rise even though good progress achieved with energy-saving (25-30% price rises this year; budgeted £6.4m spend for 2012/13). New flexible utility procurement contracts captured additional savings of £687k already this year, however.
- New legislation (Carbon Reduction Commitment) assigns a cost to carbon - £260,000 annual cost for University initially.
- New travel plan launched - Gold awards in the West of England Travel Plan Awards for the last three years, and Employer of the Year in 2011.
- New Waste & Recycling Manager now in place to address poor re-cycling rates.
- 57<sup>th</sup> in People & Planet Green League in 2012, 31<sup>st</sup> in 2011 and 77<sup>th</sup> in 2010.

## 1.0 Energy and water use

The University spent £4.2 million in 2010/11 on utilities, made up of

- Electricity - £2,284k
- Gas - £1,141k
- Water/sewerage - £789k

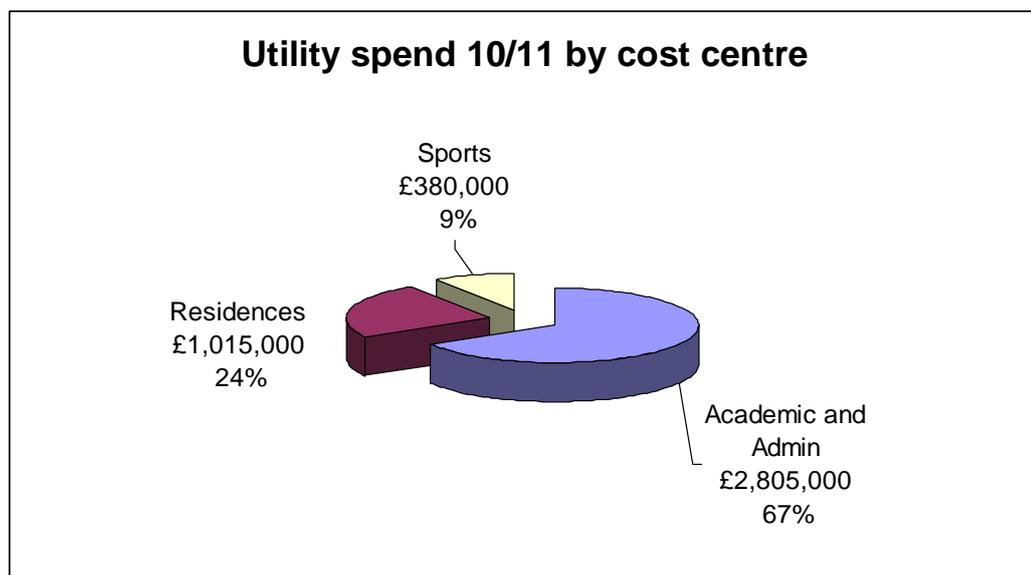
For 2011/12 the budget was £6m, and the projection for 2012/13 is £6,416k.



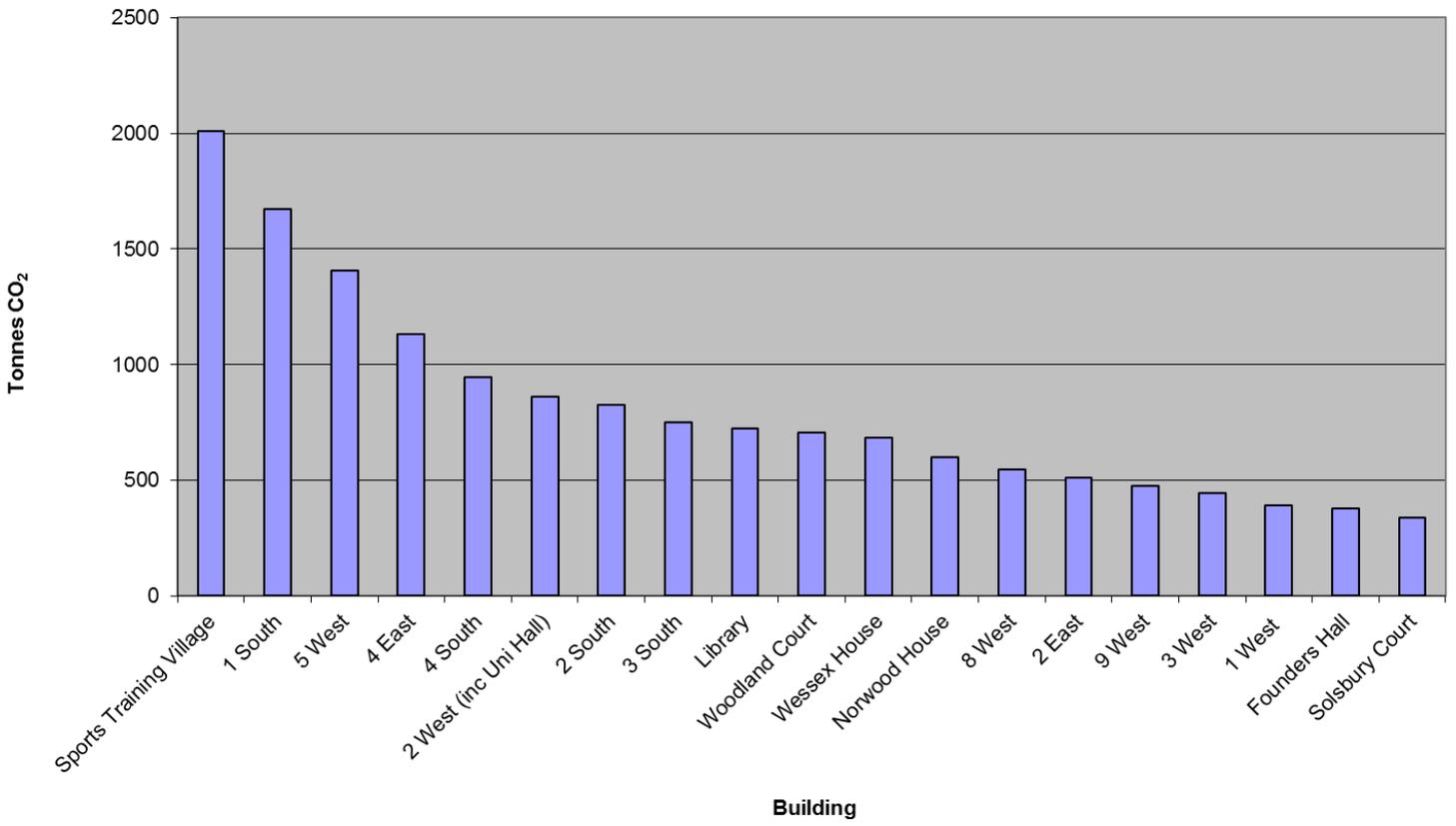
In a year we typically use the figures shown below, from which we generate around 24,000 tonnes CO<sub>2</sub> emissions:

- 27 million kWh electricity (equivalent to 9000 houses)
- 45 million kWh gas (equivalent to 3000 houses)
- 320,000 m<sup>3</sup> water (equivalent to 4000 houses)

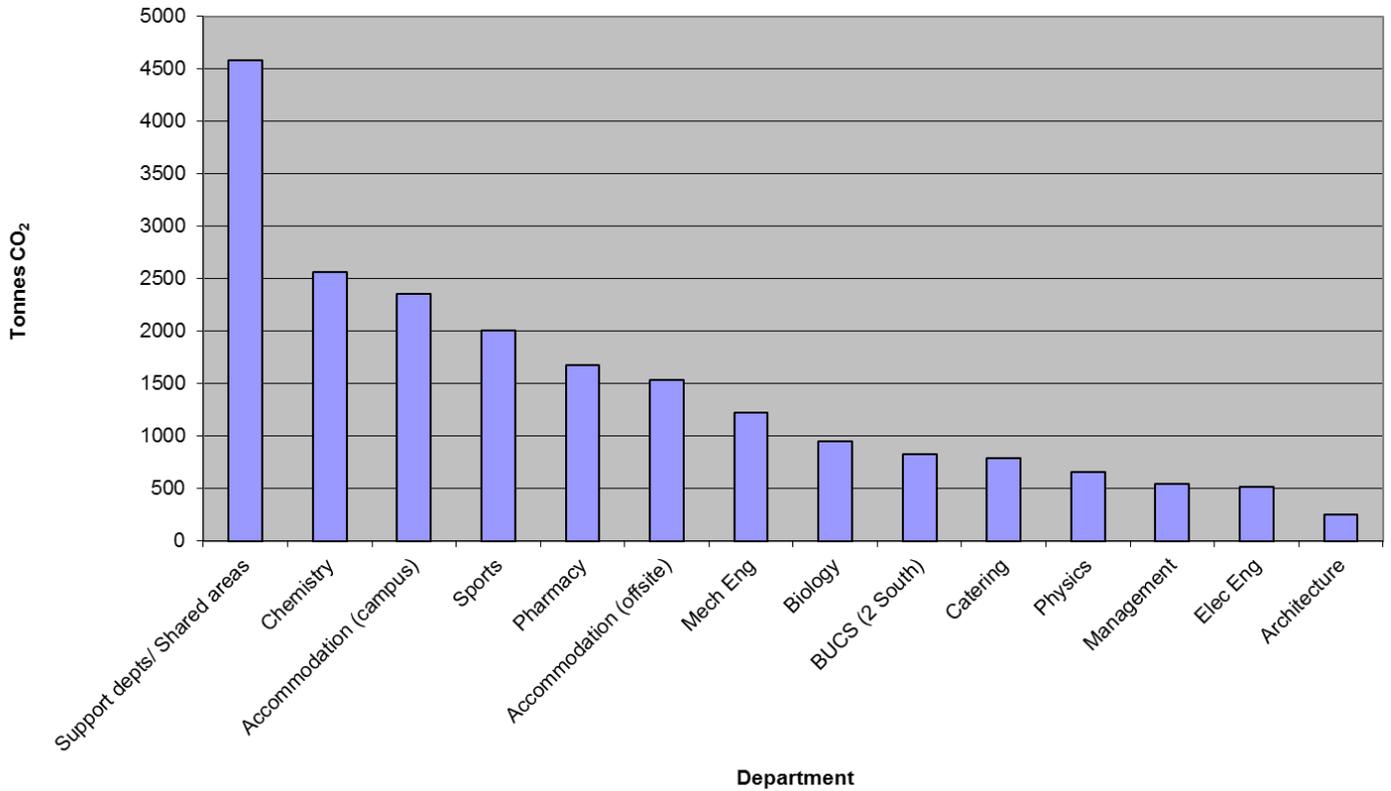
The following graphs highlight where the majority of this consumption occurs.



### CO<sub>2</sub> By Campus Building



### CO<sub>2</sub> By Department



Energy-saving work has led to the following reductions over the last 5 years:

- **Electricity 10% down**
- **Gas 20% down** (weather-corrected)
- **Water 18% 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).

The savings at current prices from these reductions are shown in the figures below – these total £930k that is being saved every year.

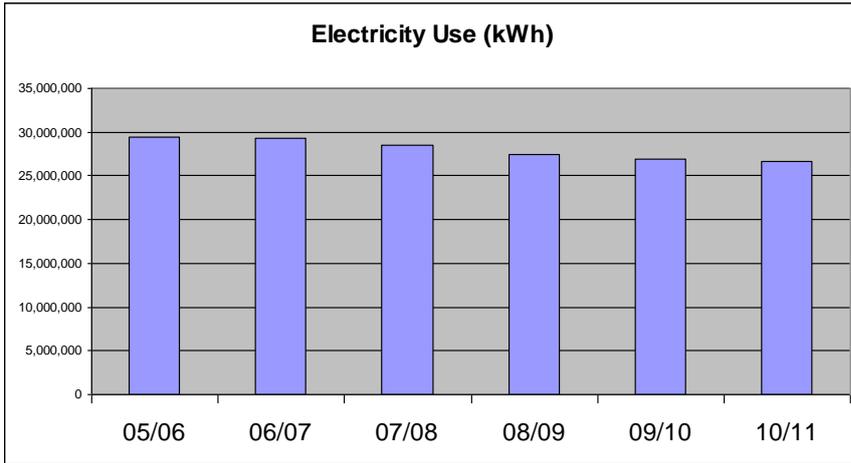
This assumes that the campus has stood still in this time, but there has been continued growth. The following are the buildings/facilities added during that period along with their annual costs to run at current prices:

- 4 South Annexe                      £129k
  - Woodland Court                      £180k
  - 4 West                                      £97k
  - 5 West machine room              £85k
  - East building                            £65k
  - Student Centre                        £30k
- Total = £586k**

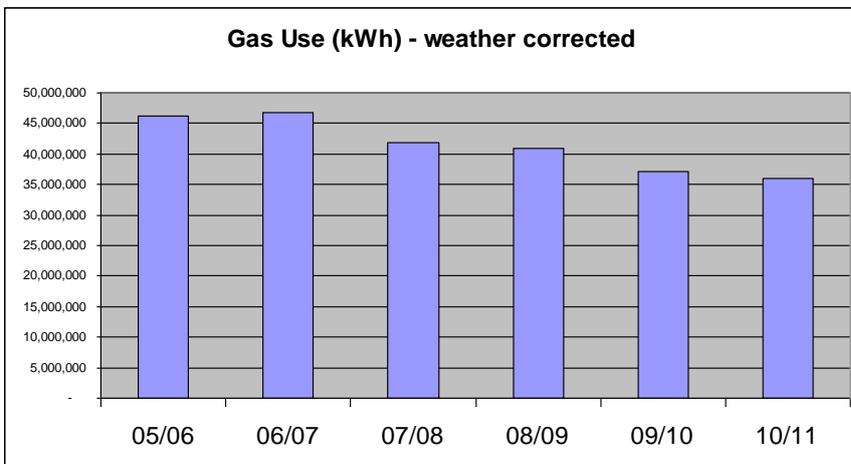
Taking account of these, whilst also allowing for any old buildings/facilities that have been discontinued, it can be seen that **we are spending close to £1.5m less annually than we would have otherwise.**

We anticipate that underlying usage will rise slightly for 2012/13 due to new construction sites and new equipment, but this should be offset by ongoing energy-saving work and the closure of 25m pool. Beyond this, however, it is anticipated that the impact of the new planned new builds will cause consumptions to rise.

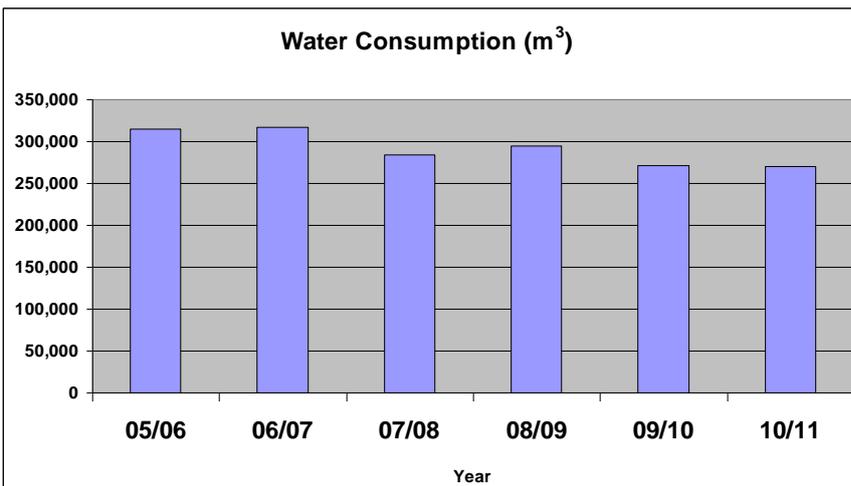
There are no specific energy targets within the Environmental Policy (these are covered by carbon targets). We have a target to reduce our water consumption in existing buildings by 15% from a baseline of 2009/10, although there is no timescale set for this target. Consumption in 10/11 remained level with 09/10, but we anticipate a fall of 3-5% for 11/12 in overall water use.



**10% down in 5 years**  
**(equivalent to £340k being saved every year)**



**20% down in 5 years**  
**(equivalent to £440k being saved every year)**



**18% down in 5 years**  
**(equivalent to £150k being saved every year)**

**All achieved while growth in campus, hence well in excess of £1m being saved every year**

## 2.0 Energy efficiency improvements made

Below is a summary of the technical energy efficiency improvements made within the last 12 months.

### 2.1 SALIX-funded projects:

Norwood draughtproofing, April 2012	Cost £20,302.26 Annual savings 183,547kWh (Gas) = £7300
3WN Lighting Upgrade, March 2012:	Cost £4,041.50 Annual savings 11,050kWh (Electricity) = £1350
Draughtproof 5 West windows, December 2011:	Cost £17,052.90 Annual savings 307,807kWh (Gas) = £12,300
Lighting Level One cafe, December 2011	Cost £43,264.68 Annual savings 69,500kWh (Electricity) = £8350
Polden Court Lighting Controls, June 2011	Cost £11,372.11 Annual savings 28,800kWh (Electricity) = £3500
Eastwood & Westwood draughtproofing, June 2011	Cost £86,605.16 Annual savings 638,575kWh (Gas) = £25,500
Library sub-metering: August 2011	Cost £6,368.65
Jencons Water chiller 5 West, January 2012	Cost £3,660.13 Annual savings 350m <sup>3</sup> Water = £900
-80 deg C freezer cost difference (more efficient model)	Cost £425 Annual savings 1,761kWh (Elec) = £210

### 2.2 Other improvements:

- Woodlands Court emergency light change from maintained to non-maintained. 75,000 kWh/annum = £9000 saved.
- Woodlands Court – fully commission all PIR sensors in kitchens and corridors. 25,000 kWh/annum = £3000 saved
- Woodlands Court LED lighting trial to kitchens with view to rolling out throughout the building trial saves 4000 kWh/annum = £500/kitchen
- Woodlands Court LED trial to 2 corridor Lights with view to rolling out throughout the building trial saves 3600 kWh/annum
- Installing automatic light sensors to all laundrettes saves 5000 kWh/annum
- 4 west nucleus corridor lighting system installation faults identified and corrected saving 12000 kWh/annum = £1500
- John wood stairs lighting controls added saving 3200 kWh
- John wood level 5 corridor lights automatic sensors fault installation identified and corrected saving 2400 kWh
- Upgrade lights in 5 West circulation area. 15000 kWh/annum = £1800 saved
- Norwood stairs lighting controls faults located and consumption reduced 5000 kWh/annum saving = £600

- Complete automation of lights in 3WN. 10000 kWh/annum = £1200 saved
- Library West stairs LED installation saving 3000 kWh/annum
- Sub metering to Dynamometers in 4E
- Main meter export put on AMR (Automated Meter Reading system)
- Identified water leaks at Sulis club annual avoiding £25k on cost
- Energy improvements to John Wood Court as part of refurbishment (LED emergency lighting etc) saving 50000 kWh/annum = £6000
- Westwood water boosting pumps replaced – saved 12,000kWh/annum = £1200
- STV CHP controls adjusted to ensure running hours further extended – self generation of 750,000 kWh electricity (3% of campus usage) worth £90k plus reclaimed heat used to heat 50m pool
- New 24kW solar PV (photovoltaics) on East building – largest scheme in Bath area. 28,000 kWh self-generated so far worth £3400 plus £8400
- Improvements to Woodland Court solar thermal system
- New 5 West Level 1 server room – problems at start, now delivering close to best in class efficiency
- LED conversions to 100 external lights - £35k investment with 50% saving in running costs and major savings in maintenance costs.

### 2.3. Awareness-raising/Behavioural Change programmes

Last year (2011) the University-wide Staff Survey included specific questions on environmental issues.

- 61% stated that practical advice in the workplace would motivate them to undertake more environmentally friendly activities at work
- 51% agreed that Green Impact had positively influenced their environmental behaviour at work (*this was after the first pilot year of Green Impact only*)
- 90% agreed that all staff should be responsible for addressing environmental issues across campus

The feedback from this highlighted the need from the majority of staff for simple practicable steps that they can take and for better publicity to be carried out on activities that are already happening to improve sustainability across the University. A continuation and expansion of Green Impact (GI) was seen as means of achieving both of these.

#### Green Impact

The NUS initiative, Green Impact, has been running UK-wide since 2009, after a pilot at Bristol University. There are currently 46 HEIs participating and due to its achievements, the NUS is extending Green Impact into local authorities, NHS trusts, schools and SMEs.



Green Impact was introduced here at the University of Bath in Sept 2010. It is based on an on-line workbook of activities, or criteria, which teams of people within departments complete over a 5 month period; they are then audited and awarded a Bronze/Silver/Gold certificate according to how many criteria they have completed. GI covers all aspects of sustainability such as energy, water, waste, transport, procurement, policy etc. and to date, the initiative has been remarkably successful regarding raising awareness and improving environmental practices at departmental level.

This is because it has empowered people to address issues that are important to them, instilled a belief that they are making a difference and a sense of responsibility to do so, and enabled them to be more informed about University-wide procedures.

In the first year (2010/11), 35 teams were involved, comprising 150 staff directly and 1450 indirectly, who undertook 274 actions as a result of the initiative pertaining to communications, recycling, savings in electricity and heating, procurement and travel. Nine of the teams achieved a Working Towards award, 22 Bronze and 4 Silver; the Gold award was not included in the first year.

In this second year the initiative was expanded and a Gold section added, and 38 teams took part. They achieved the following results: 5 Working Towards, 16 Bronze, 8 Silver and 9 Gold. Two hundred and fifty staff and students have been involved directly, all on a voluntary basis, and often with activities carried out in their own time, with over 2,000 staff indirectly involved and a total of 699 actions undertaken including all the areas from the first year plus water saving, biodiversity and the community.

A particular focus in the second year has been to engage the student population, at departmental level and as a body. As students are the largest population on the campus, this move has huge potential, especially as they are open to change and the learning of new ideas and provide an opportunity to inject fun and spontaneity into the developing success of the initiative, including the recent Green Week events. Other developments have included a wiki to facilitate networking and sharing of experiences and ideas between the teams/departments, a leadership group (GILG) of staff and students to facilitate in developments and direction. We have also run a series of monthly talks by academics to give it credibility and publicity in the academic community and bridge the gap between academic and non-academic staff.

Green Impact has provided a focus and catalyst for staff and student activity and demonstrated in a highly visible way that the University is taking its responsibilities seriously. Direct savings as a result of this initiative are hard to define and measure due to their diverse and disparate nature, but there is some clear evidence in some areas - eg the removal of 40 portable heaters in 5 West has resulted in a £10k saving. It has generally been shown that 10-15% of energy costs can be saved through behavioural changes - 6 West L1 offices gives an example of this where there has been a 25% drop in electricity use in 3 years despite no technical changes, thanks to the efforts of a motivated group of staff.

### **Student Switch Off**

The residential energy-saving competition Student Switch Off has run for the 6th year and continues to show good savings.

Around a third of student residents from all the University of Bath residences embraced the campaign, with over 900 Eco-Power Rangers pledging to switch off lights and appliances when not in use, put lids on pans when cooking and not overfill their kettles. They managed to reduce carbon emissions by 18 tonnes, which is equivalent to leaving a 15 Watt energy-saving light bulb on for 263 years or making 208 return flights from Manchester to London!



Students were provided with top tips on the web, handouts to explain how they could help reduce consumption and regular updates including updated graphs showing how much electricity they have been using. Accommodation staff, resident tutors and the SU also played their part in promoting this and improving practices.

## **2.4 Metering**

We now have over 1100 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. This is continuing to prove invaluable for highlighting wastage, analysing areas for improvement and measuring improvements made. It is also proving useful for the Estates department as a whole in terms of highlighting equipment working incorrectly and also to ensure new equipment is sized correctly when replaced. The number of meters continues to increase as a result of new builds and major refurbishment projects, but also through direct investment such as in the Library where 20 new submeters have been added. Also, all main offsite buildings' supplier electricity and gas meters are now on the AMR system.

## **2.5 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 5 residential buildings and on 4 West. These generated around 22000 kWh heat last year. We also have a large solar PV system on the new East building which has generated 28000 kWh electricity so far. Other renewables are 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 confusion from government around Feed in Tariffs highlights the difficulties in making long term financial decisions based on these subsidies.

## **2.6 New buildings**

There is a national problem 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 make improvements to the more recent new builds, with major improvements to the lighting, ventilation and solar thermal in Woodland Court, to the lighting and ventilation control strategy in 4 West, and the lighting and heating/cooling control systems in East building. 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.

### 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 £687k has been achieved so far for this year** (£210k on gas and £477k on electricity) when compared what we would have paid with a benchmark traditional fixed contract.

**A saving of £1,658k has been achieved so far on the 3 year framework contracts** (£449k gas, £1208k electricity) compared with the benchmark contract.

Global energy markets have seen a return to volatility with falls in the second half of 2011 due to global recession, but with recent increases driven by partial economic recovery, cold weather in Europe in Feb 2012 and the political situation regarding Iran. In May 2012 gas and electricity markets had fallen to their lowest value in three months caused by the uncertain political situation in the Eurozone and lower than expected growth forecasts from China. UK factors in the wholesale market (gas storage, reliance on imports) and the EU's Large Combustion Plant Directive are also having significant effects.

Utilities went up significantly before this academic year:

- Electricity – up by 20-35%
- Gas – up by 20% on average (we were also coming off a discounted interruptible contract that is no longer available)
- Water – up by 9%

The impact of carbon legislation is now being felt financially also. The CRC (Carbon Reduction Commitment) has resulted in what is in effect a carbon tax equivalent to £260,000 for the University or an approximate 8% price rise.

Electricity and gas prices as budgeted for 2012/13 have changed little with a slight drop in electricity and gas up by 4% when compared with 11/12. This is partly due to prices being unknown at the time of last year's budgeting, and also because of the savings captured by our new flexible purchasing approach.

Climate change levy is up by 5% from April 1st. Water/sewerage rates are set by regulated monopoly supplier via OFWAT and are also dependent on RPI. Water and sewerage prices are up by 8% as of April 1st 2012.

### **3.2 Recharges for Carbon costs (Sports and Student Accommodation)**

Under the CRC scheme all carbon emissions now have a cost of £12/tonne. The first payment on this (~£260k) will be made in 11/12 and this was budgeted for in the main University budget. Sports and A&HS have not, however, been recharged this before this point as this has not been included in their budget predictions – from the start of 12/13 this will be included in their recharge rates.

### **3.3 Longer term costs**

Due to our flexible contracts we can predict 2013/14 better as we have already bought a proportion of this usage. Next academic year we expect rises to be around 8% for electricity and 5% for gas. This is based purely on wholesale prices – non-commodity costs (which are passed through by the suppliers) will not be set but could add a few percentage points to these, especially electricity.

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 up to 50% by 2020.

The current overall costs to the University of £6.5m are expected to rise to around £10m by 2020 unless we invest in large scale projects to reduce energy usage.

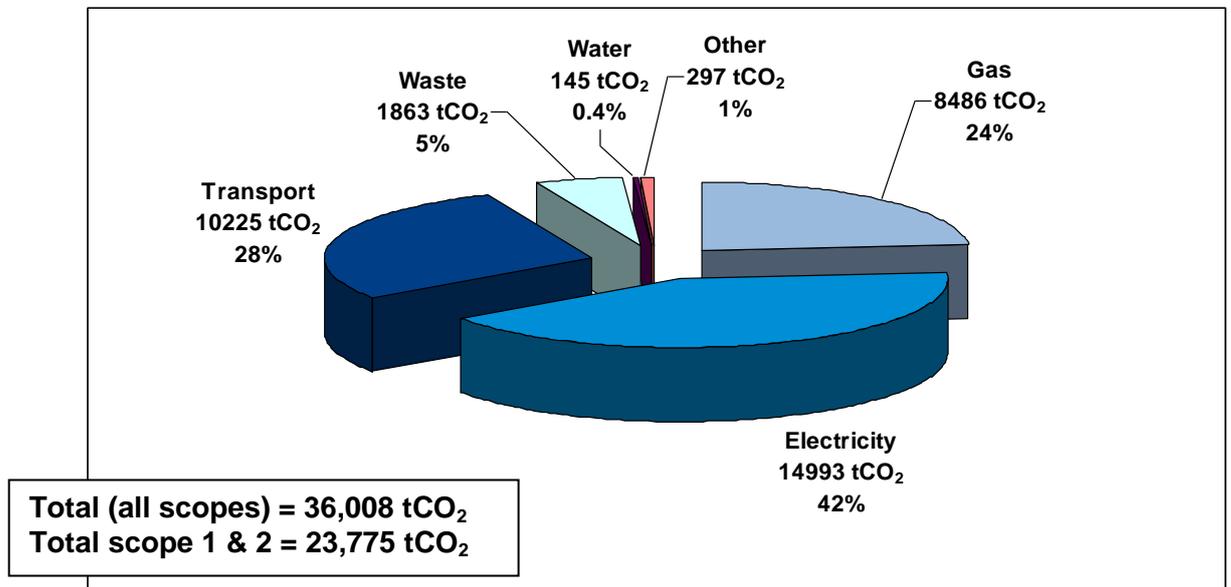
### **3.4 Funds for investment**

The main external 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, and a small draw down on the Carbon Plan finance was used to fund the behavioural change activities such as Green Impact last year.

## 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 for the University is as shown below:



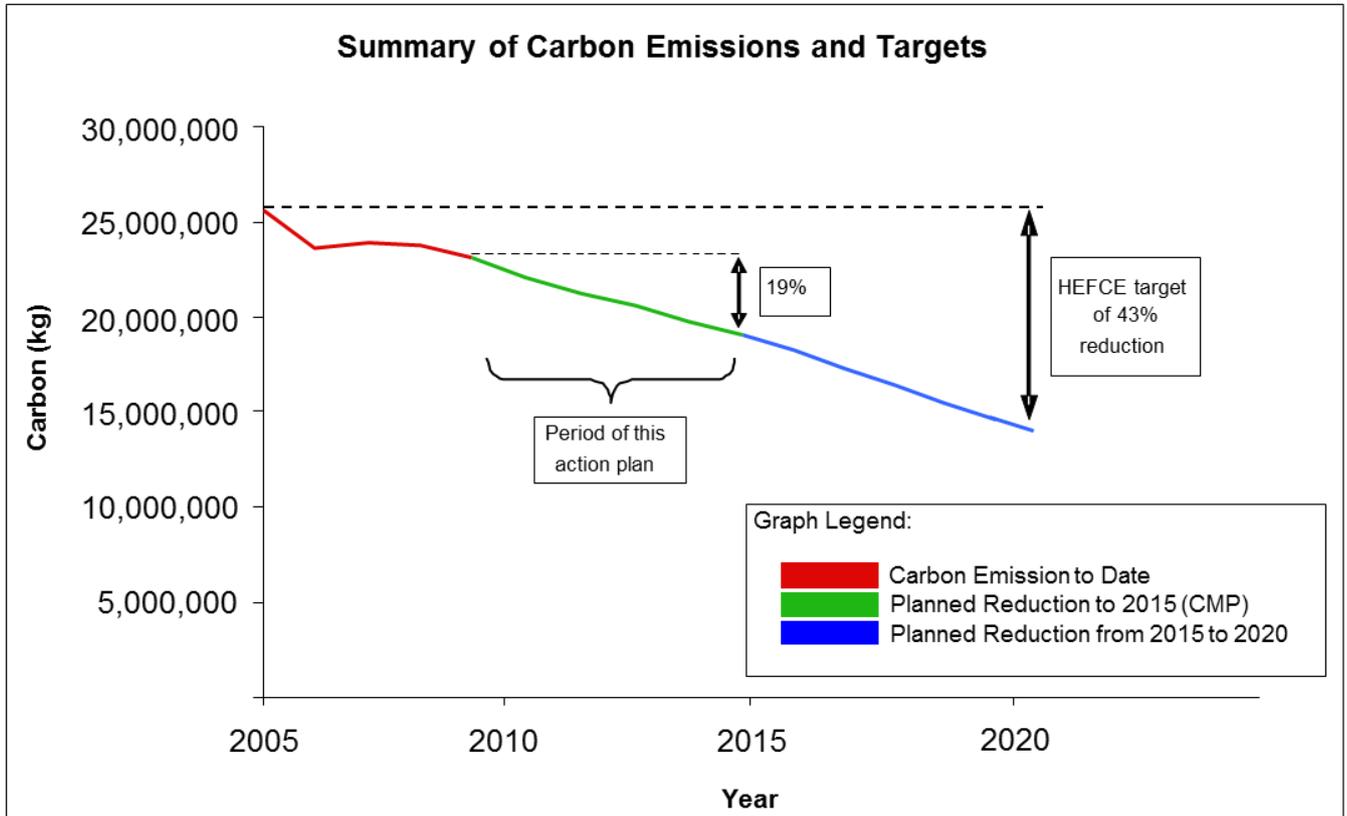
#### Note

*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 CO<sub>2</sub> emissions from its activities by 43% by 2020 from a 2005 baseline. We have already achieved a 9% reduction, despite growth in the campus.**



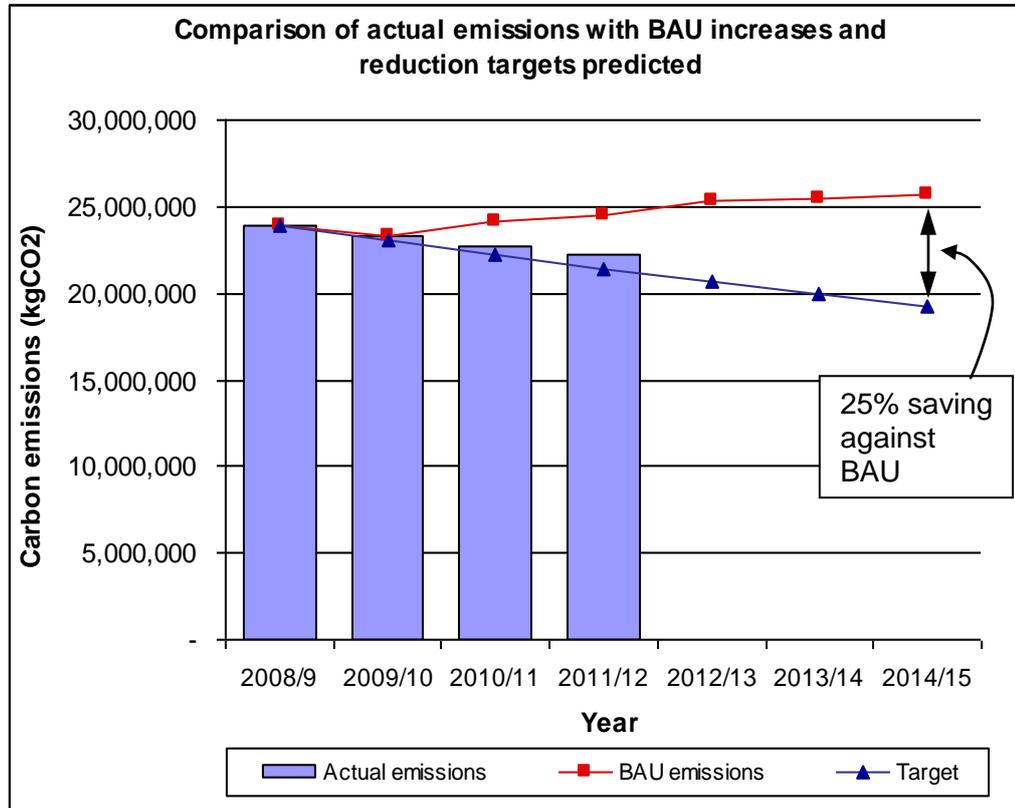
**Our intermediate target is to reduce emissions by 19% by 2014/15 against a 2008/9 baseline – the CMP sets out an action plan to reach this target**

#### 4.2 Progress against targets

The following graph shows progress against the 5 year CMP target. The blue target line is what we need to achieve to reach our targets assuming a linear progression. The red BAU (Business As Usual) line 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).

It can be seen that emissions have fallen but the gap to the target line is increasing. **Carbon emissions have fallen by 7% since the 0809 baseline in the Carbon Plan (and by 13% since 2005).** The figures for 11/12 are projected. Note that these targets are not normalised for weather variation, and that this year should be expected to be low due to this weather variation (a mild winter hence gas use is down).

The conclusion from this is that we are continuing to make good improvements, especially given the recent growth in the campus, but it will be a challenge to achieve our existing carbon targets without major infrastructure investment. The scale of current planned campus development (GTA building, R6, Arts etc) is also such that these targets are now even more challenging than was originally predicted in the CMP – the BAU line that we have to overcome before any absolute reductions take place will now be even steeper.

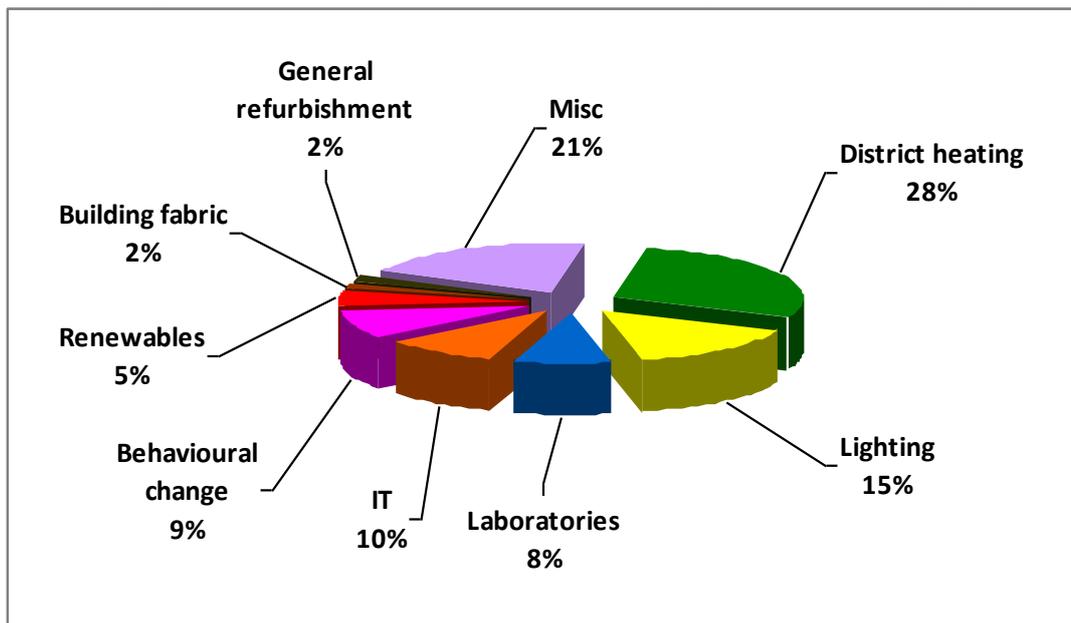


**BAU** = Business As Usual (as originally modelled in CMP)

**NB** - projected figures for 2011/12

### 4.3 CMP projects

The following shows the CMP project emissions savings by project category:



The projects identified within the CMP were not an exclusive or inflexible list of projects that would be implemented, but more a portfolio of projects that allowed the feasibility of the reduction targets to be modelled. The fact that many projects have not been implemented is not necessarily a cause for concern yet, provided that the reductions are occurring in other areas.

The following specific projects have been implemented:

- Initial year of behavioural change programmes:
  - CMP 10 - continuing Student Switch Off
  - CMP 11 - continuing Green Impact
  - CMP 50 - fume cupboards usage (implemented in some areas only so far)

These are, however, not one-off exercises but need continuous development and input, hence they had an ongoing operational expenditure associated in the Carbon Plan to allow for the people resource. CMP 11 – continuing Green Impact is under review currently, subject to resource being made available.

The following have also been progressed:

- 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 ongoing. In the pipeline is a major lighting scheme involving investment of £150-200k for which the business case will be brought forward in the coming months – this is the first phase of the major lighting projects identified within the CMP.

- CMP 16 – energy info on web and display screens. The AMR software has a ‘free’ web version that may be suitable for this purpose but the suppliers are behind schedule on development of this. It may prove more beneficial to develop this independently via an external commercial offering.
- CMP13 - 2 South server room refurbishment was in the CMP, but this is now to be combined by BUCS with a process of virtualisation of our servers which has enormous potential to reduce the numbers (eg from 100 to 3) and associated energy use. This is subject to funding.
- CMP 53 – freezers housekeeping and consolidation – this has made some progress via Green Impact in some areas, but relies on departmental initiative and requires a framework and incentive such as this to enact.
- CMP 51 – fume cupboard technical changes – this requires CMP 50 on fume cupboards usage to be fully implemented initially, and a large proportion of the savings will come via the less costly behavioural change
- CMP 61- IT screen replacement has been implemented
- CMP 62 – IT autopowerdown software is being further investigated by BUCS
- CMP 70 has been partially implemented – 5West has been draughtproofed but the offsite buildings have not yet.
- CMP 48 – BMS fine tuning has been partially implemented and is an ongoing exercise
- CMP 43 – metering improvements - has been partially implemented and is an ongoing exercise

#### Projects proposed:

#### CHP and district heating

We are currently running our existing CHP unit as an electricity generator, for 2 hours/day at the peak electricity charging period (electricity at 5-7pm is 2.5 times the cost of the normal day rate). This will save of the order of £40k/year, but the carbon savings are minimal. We are still developing a plan for the replacement CHP unit.

#### **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’ is included in the Annual Planning process
- Publicity on the CMP has continued with presentations to most departments at staff meetings
- The University orientation/induction day now includes a significant input on sustainability

- The staff survey included questions on sustainability
- The inclusion of environmental criteria in job descriptions has been further investigated with HR
- The most significant embedding process within departments has been via the Green Impact process, which has improved awareness, but also encouraged local communication, ownership and embedding within departmental processes.

#### 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 no reduction target has yet been set pending clarification of HEFCE/national requirements. We are starting to monitor our scope 3 emissions in certain areas, but there is no ongoing measurement of all of our scope 3 emissions. HEFCE is starting to request some reporting on these but at present this appears to be voluntary.

#### 4.6 Carbon legislation

##### Carbon Reduction Commitment (CRC)

This new 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 CO<sub>2</sub>, and later at a floating market rate. In the Comprehensive Spending Review in October 2010 this was significantly altered with all permit funds no longer being recycled back to the participants and the £12/t now “a matter for the Budget process”. In effect this is now a simple Carbon Tax equivalent to at least an 8% rise in our energy costs, or £260,000 annually, and potentially more in future depending on the market rate. As well as this financial impact there are annual league tables based on performance highlighting the potential reputational issue for any organisation.

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 June this year.

Under this legislation our CRC emissions were 21,750 tCO<sub>2</sub> in the footprint year. The specific methods of calculating 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).

The first league table was published in October 2011. The position in this depends on emissions reduction performance in future 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 University ranked 30<sup>th</sup> out of 4000 organisations that fall within the legislation, and was the 2<sup>nd</sup> highest ranked University.**

It is expected that the legislation will be simplified in the future, or possibly replaced entirely but also that the costs will rise – this will be set annually by the Treasury.

## **Display Energy Certificates (DECs):**

This legislation came into effect in October 2008. It requires all public sector buildings >1000m<sup>2</sup> 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 CO<sub>2</sub> emissions (best) and G is the highest CO<sub>2</sub> 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 legal driver 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 46 buildings which are covered by DECs. The following diagram summarises the ratings of our buildings.



## 5.0 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”
- 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;
- 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 September 2011. Amongst other things the survey sought to understand awareness of the University’s target to reduce its Carbon emissions by 43% by the year 2020. Results are outlined in the following table:

<b>Aware of 43% carbon reduction requirement by the year 2020?</b>			
	<b>Yes</b>	<b>No</b>	<b>Total</b>
Staff	55.2%	44.8%	1063
Students	13.2%	86.8%	1292
<b>TOTAL</b>	<b>32.2%</b>	<b>67.8%</b>	2355

In general, only 32.2% of respondents were aware of the CO<sub>2</sub> reduction the University faces. However, this result is heavily dependent on the staff/student gap in awareness. The slight majority of staff (55.2%) were aware of the target, whereas only 13.2% of the students were aware.

Transport and parking are key issues for the future of the University. Although most of the students live either on campus or in the centre of Bath, many of the staff live in towns and villages to the south and east of the city where transport links are particularly poor. As a result 62% of staff drive to the University and all members of staff are entitled to a car parking permit at a current annual cost of up to £166.22 for a general permit, with the cost varying by salary grade and working hours. To encourage car sharing, car share permits are available which offer a financial incentive.

Undergraduate students are not eligible for parking permits unless they live outside the city, but they can still use the Pay & Display car parks at a cost of £1 per hour up to a maximum of £6. The University also receives many visitors, from prospective students to research collaborators, and it is essential that they should be able to park without too much difficulty.

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.

As a result of the travel plan, the University's transport policies and the measures it has implemented, between 2007 and 2011 daily traffic flows associated the University have decreased from around 10,400 movements to 9,500, a reduction of 8.7%. 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 10,900, an increase of 40%. These changes are set against the staff and student population increasing by around 13% over the same period.

Despite reduced car movements, since 2007 peak parking levels have remained largely constant with, in 2011, the maximum observed accumulation being 1,894 cars parked at 13:00 on a Wednesday which equates to around 90% of the overall parking provision of 2106 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.

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).

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

It should also be noted that, under the section 106 agreement with BANES, the University makes an annual contribution (£26,000 in 2011) 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.

Business travel is one of the areas that has not been 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. This will be done in liaison with B&NES Council.

In the last two years, we have appointed a travel management company, Ian Allen Travel Management, to help manage our business travel. As part of this initiative, staff are prompted to consider alternatives to actually making a journey. Other future plans on business travel include:

- We will 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.

Once this information is available, 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.

## **6.0 Waste Reduction and Recycling**

The University is continuing to put every effort in to reducing the amount of general waste and increase the amount of recycling produced across the campus and off site. The recycling figures for the 2010/11 academic year are 12.6%, this is an increase from the 2008/09 figure however there is still room for improvement.

There are targets in place to increase recycling to 30% by 2012/13 and 50% by 2014/15, there is a lot of work being done to try to meet this, including:

- Increasing the number of internal recycling bins (Academic, Accommodation and STV) around the campus
- Increasing the number of external recycling points (Academic and Accommodation) around the campus
- Working closer with the students to raise awareness around the need to recycle as much of their waste as possible
- Increasing the items which can be recycled to include different types of plastics and aerosols and a trial food waste collection in some of the residencies

There have been a number of projects and campaigns run on campus in recent months to increase recycling, including:

- A student competition to produce a film to encourage students to recycle
- A trial to introduce recycling to the Library which will hopefully be extended to include the whole Library by the end of the summer
- A revamp of the external recycling bins to make them fit for purpose and increase recycling on-the-go around campus
- Zero Waste campaign at the end of term to encourage the students living in Halls to donate any unwanted items to charity
- Movable external recycling bins to be used during large events, such as the Olympic Torch Relay and University Open Days
- “Pimp my Bin” decorated recycling bins, organised and designed by students, to be used in the Student Union to increase recycling of plastics and cans

The contracts for both waste and recycling collections will be up for renewal in the beginning of 2013 and this will be used as an opportunity to look at the different options available, including whether to go for zero waste to landfill and therefore have some form of treatment for the general waste. By pre-treating the waste it means that any recyclables could be removed before the waste is used for energy from waste, for example. Another option to increase the recycling rate and hitting the 50% recycling rate by 2014/15 is to look at having a mixed collection of recyclables making it easier for staff and students to recycle.

The University appointed a new Waste & Recycling Manager in Sept 2011 and hence we now have the resources and potential for significant improvements in this area.

## **7.0 Biodiversity**

Our biodiversity targets are to:

- Improve Quarry Road SSSI 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;
- Reintroduce 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.

## **7.1 Work undertaken previously**

The starting point for the University's biodiversity working group was to identify research and action already taken at the University.

### Habitat Survey

Carried out in 2007 by Ecosulis Ltd. Their focus related to the:

- Presence of woodlands (ecologically or historically important)
- Active badger setts
- Habitat which had potential for:
  - Roosting and foraging bats
  - Dormice
  - Foraging, hibernating and commuting reptiles
  - Breeding great crested newts
  - Foraging and hibernating hedgehogs
  - UK BAP invertebrates (insects, arachnids, molluscs and others)
  - Spiked star of Bethlehem (Bath asparagus)

The report did not conclusively state that all of the identified flora and fauna existed on campus but did suggest that the campus provided a suitable habitat for it to do so.

### Environment Policy

The University's Environment Policy states that there are currently four hedgerows on campus which have ecological and historical importance. The campus is used by low numbers of lesser horseshoe bat and there is an active badger sett. The policy states that the University will work in partnerships with Bath and North East Somerset Council to contribute to the local biodiversity plan and align the University's biodiversity action plan with local goals and national objectives. It further states that it will reintroduce indigenous flora and fauna species.

## **7.2 Current activity – Flora**

Woodland - A full survey is being undertaken in May/June which will list and assess the condition of each tree on site. This survey will help inform future work for Estates in managing the woodland areas but it will also provide useful data for the bio-diversity of the tree stock. The objective of the bio-diversity action plan is to have a wide range of species on campus but to ensure that this range is focused on native stock i.e. what would have thrived on this site before any human intervention. A tour of the Claverton Down site by the landscape manager and Head of UHS&E demonstrated that non-native species have previously been planted around the accommodation blocks as part of specific architects plans. Unfortunately much of this planting was very dense which has resulted in significant loss. This loss has however enabled remaining stock (trees and shrubs) to have a potentially better survival rate.

Wild Flowers –beds have already been identified and planted using a various wild flower mixes. Additional planting will continue with new beds in 2012/13.

Natural planting – wherever possible, natural planting is used in preference to formal or ornamental. Natural planting fits in well within the woodland areas around the perimeter of the site where it helps to blend the campus in with its more rural surroundings. Natural planting is also now being used around some of the new academic buildings although this will be punctuated by colourful shrubs and herbaceous planting (Cornus, Viburnum, Cistus).

A stumpery has been created near the amphitheatre using old tree roots to provide a habitat for ferns. This area would benefit from being enhanced with a greater range and quantity of ferns.

Formal planting – used around the accommodation blocks and often planted as part of a building project by external landscape contractors. Such planting demonstrated by the borders at Woodland Court often involve rows of same species shrub which is often favoured by landscape architects as it gives an immediate visual impact; is easy to maintain; provides greater impact of colour and texture. Unfortunately this planting is not always sympathetic to its surroundings and having so many plants of the same type in one area means that if one fails, there is a high likelihood that several of them will. At Woodland Court, two rows of Yew have been planted and are now dying off whilst just around the corner there have been a number of Skimmias planted which are also starting to die off.

Rock planting – rockery plants have not been used extensively although there are examples of them primarily within the area of the new Arts Lecture Theatre and behind 8 West.

Aquatic planting – the water features on site contain a number common wet loving species including Bulrush, Marsh Marigold and Iris. A full survey has not been undertaken.

### **7.3 Current activity – Fauna**

Woodland – There are a number of common species on site including grey squirrels, badgers, rabbits and deer. A survey to identify woodland fauna in more detail has not been undertaken.

Birdlife - Without undertaking a specific survey to identify birds living on site, it is extremely difficult to state definitively which species are present. The Landscape Manager has confirmed that residents include many of the common woodland and garden birds in addition to the slightly rarer Buzzard and Woodpecker. Skylark has been identified on the list of priorities from 'WILDThings'. If the University is to attract these birds then it will need to identify the preferred habitat of this bird so that this can be replicated.

Aquatic – The Claverton Down site already boasts an established lake on the south side of campus which contains a small range of aquatic wildlife including Mallard, Moorhen, Coot, Golden eye (pair), Heron (single), Carp (common, leather, ghost), Roach, Rudd, Dace, Tench and Eel.

Amphibious - There is a second water feature within the garden of the Lodge which is now an overgrown pond. Although the pond was obviously once ornamental, it has now been left to nature which means that it has been primarily overtaken by toads. There is no evidence identified of any newts currently on site.

Reptiles – Dry stone walling around the Quarry Road entrance provides a habitat for snakes and lizards. Evidence has been found that this area is used frequently by Adders. Adders tend to be shy and will only come out into the open to either feed or to bask in the sun.

#### **7.4 Future activity**

Natural pond - The site does not currently have a natural pond which would enable a very diverse range of both flora and fauna. Any such project would be a reasonably large undertaking and would not be easy but it would potentially provide a habitat for a wide number of flora and fauna not currently catered for.

Two areas have been identified as suitable for the location of a large natural pond; within Sham Castle and Lime Kiln. The latter would appear to offer the best opportunity as it provides seclusion and the necessary shelter although it is on sloping ground which means additional landscaping.

Wildlife boxes – Boxes already exist within the woodland areas around the north perimeter for birds. The boxes have different size holes to attract a variety of birdlife. The boxes are not monitored and there is no known plan as to which type of bird the boxes are aimed at attracting but it is believed by the Landscape team that the smaller holed boxes are being used.

Consideration should be given to the provision of bat boxes although bats have very specific requirements. It is known that a wide variety of bat did live on the site some years ago but changes to building layout and the demolition of some older buildings mean that there are fewer places suitable for them. A full survey of bat habitat on site has not been carried out.

Woodland development – The campus already has a wide variety of tree species and the survey currently being undertaken will provide a comprehensive list which can be expanded upon if necessary. The woodland walk around the northern side of the site includes bark pathways and fallen tree trunks which have been carved into seats. Further development of this area needs to be carefully managed to ensure it remains primarily a natural woodland area but does not pose an unnecessary health and safety risk. Fallen trees should be left in situ where possible, to rot and provide suitable habitat for insects and animals.

Planting schemes – Identifying shrubs and plants which are attractive to insects and birds would help inform future planting schemes. Similarly, using plants which provide a habitat or other use for animals should be encouraged. Simple lists can be created so that future schemes can ensure that these type of plants (Buddleia, Berberis, Cornus) are considered at the planning stage.

Education – Information boards around the site would be a good way of helping students and staff to understand what species exist on site and what action the University is taking to enhance it. These boards would help foster interest in the natural landscape but this has to be balanced against the need to leave nature alone and not to interfere in a way which may damage or disrupt the habitat of these species.

## **8.0 Sustainable Procurement**

Whilst some improvements have been made, we have not yet achieved the targets within our Environmental Policy. Environmental weighting is in all specifications, and, although generally only 5%, is being reviewed and increased in some relevant tenders. The Managed Print contract should deliver energy savings through the upgrade and rationalisation of printing equipment across the University. The procurement of new buildings continues to have a significant sustainability aspect, especially on energy. The addition of new resources in this team will allow greater improvements in sustainable procurement, 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.

## **9.0 Curriculum**

The biggest positive impact we as a University have on the environment is through our ability to influence pro-environmental behaviour in others. Thus our teaching and research outputs are arguably the most significant activity we undertake in this regard. There have been moves in the sector to ensure graduates are sufficiently 'sustainability-literate' with some institutions setting central policy and targets and making a concerted approach in the ESD (Education for Sustainable Development) arena. Here at Bath there are many examples of good practice within academic departments, but the approach is ad-hoc with no central coordination. A sub-group reporting to SCMSG has been set up looking at the curriculum, first with an eye to benchmarking the good work we are doing, and second to investigate how we can improve on our existing competencies

## **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.

The Department has been working towards achieving the standard since March 2009, building on its previous achievements such as Green Tourism Gold accreditation. The project team 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.

Described by Jane Loveys, Head of Accommodation and Hospitality Services as “a massive challenge, the absolute key to the success of achieving ISO14001 has been the department’s staff, who, in every part of the operation have been totally committed to raising and supporting environmental awareness.” The 2 stage certification assessment was undertaken in January and March 2011 and the department will continue 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 the achievement of the 8 ‘Gold awarded’ teams within Green Impact shows this department to continue to be an example of excellence to the rest of the University.

## **10.2 Council for Responsible Sport Silver award for British Paralympic Association training camps**

The Council for Responsible Sport has certification processes that recognize sporting events’ concern for supporting a lower carbon lifestyle in producing sporting events. The British Paralympic Association (BPA) successfully completed their application for Silver CRS Certification of the ParalympicsGB August 2011 training camp at the University. 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 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 31<sup>st</sup> out of 153 universities. This was a significant improvement on our 77<sup>th</sup> ranking in 2010. The 2012 league table was published in May in the Guardian; in this we dropped back from 31<sup>st</sup> to 57<sup>th</sup>. The league table is produced by the national campaigning group People & Planet based on detailed evidence and data submissions and via HEFCE/HESA data.



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.

Out of 153 Universities we have:

- 24<sup>th</sup> highest water use/FTE
- 39<sup>th</sup> highest Carbon emissions/FTE
- 35<sup>th</sup> best reduction in Carbon/FTE since 2005
- 148<sup>th</sup> worst recycling rate
- 147<sup>th</sup> highest waste mass/FTE

This league table, although by no means as prominent as the main university league tables, is gaining prominence, and is now being referenced in other leagues eg. this years' 'Complete University Guide'.

There is also now an international dimension with a new Green Metric world university ranking published in December 2011. 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 tenth place in the league. This is the second year in which the table has been compiled and the number of participating institutions has increased from 95 in 2010 to 178 in 2011.

#### **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 tool':

- 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 are 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 are 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. 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.

Peter Phelps  
Energy and Environment Manager