

Annual Sustainability Report – September 2014

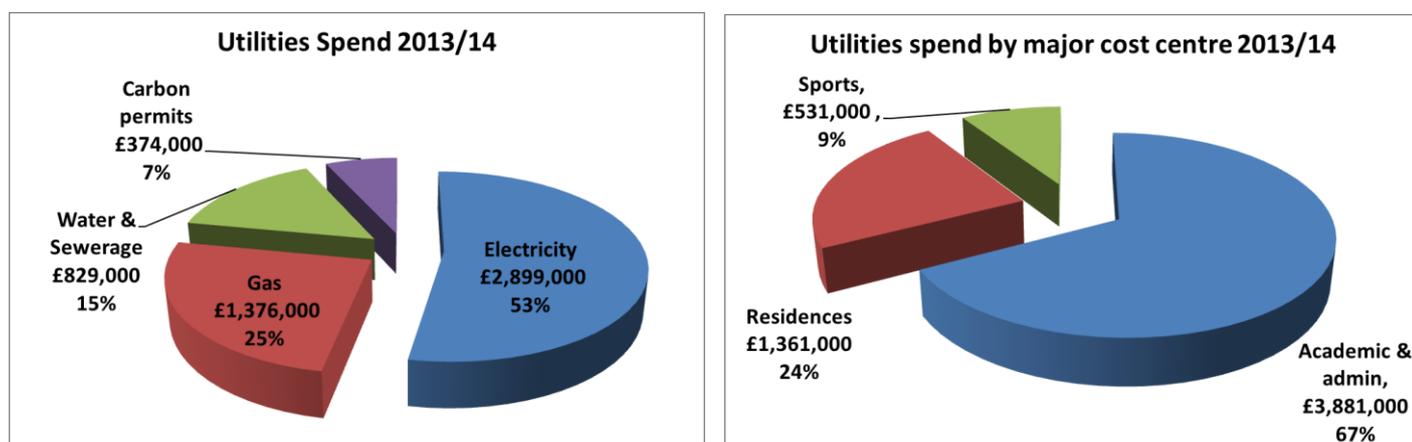
Executive Summary

- Energy and water consumption has continued to fall or held steady in the context of significant growth in the University. Consuming ~ £1m worth of utilities less annually compared with usage 8 years ago:
 - electricity 10% down
 - gas 20% down (weather-corrected)
 - water 26% down (54 Olympic pools being saved every year)
- Comparing the 13/14 academic year with the previous year:
 - electricity increased by only 0.5% (in a growth context)
 - gas 6% down (weather-related)
 - water 5% down
- Carbon emissions for 2013/14 are down 14% since 2005 and 7% since 2008/09. Emissions per building floor area are 26% down in 8 years and per student are 33% down in 8 years.
- New CHP (Combined Heat and Power) unit for Chancellors' Building and Quads will generate 5% of the campus' electricity needs, saving 350 tonnes CO₂ annually. This, along with the existing CHP unit in the Sports Training Village, will generate around 2 million units of electricity annually, enough for 600 houses.
- New solar panels on Chancellors' Building are largest system in Bath.
- Utilities costs continue to rise (budgeted £7m spend for 2014/15). Potential doubling in electricity costs by 2020; utilities spend likely to exceed £10m by 2020. New flexible utility procurement contracts, however, have captured savings of £1.9m over 3 years.
- Carbon Reduction Commitment legislation continues to assign a cost to carbon emissions which has increased by 33% this year - £375,000 annual cost for University
- Recycling rates improving significantly – up from 20% in 2011/12 to 36% for 2012/13
- The Accommodation and Hospitality Services Department continue to achieve certification to the ISO 14001 Environmental Management standard.
- Since 2007, daily car trips per FTE staff/student head have fallen by 19.3%. Bus journeys have increased by 47% over last 6 years.
- New Sustainable Procurement Policy and Action Plan approved in 2014.

1.0 Energy and water use

1.1 Financials

We spent around £5.5 million in 2013/14 on utilities:



1.2 Consumptions

Comparing the 2013/14 academic year with 2012/13:

- electricity 0.5% up
- gas 6% down
- water 5% down

The new 5-storey Chancellors' Building increased our academic floor area by 7% and total floor area by 4%, so holding consumptions level is a real achievement.

Electricity 'consumed' was actually up by 2%, but self-generation increased via CHP (Combined Heat and Power) hence the electricity 'imported' was only slightly up on the previous year.

Gas use is heavily dependent on weather so we 'normalise' our data using statistical temperature records ('degree day' information). The 'weather-corrected' data is presented below. The long term trend is a reduction in gas use, even though we have delivered a significant expansion in the Estate.

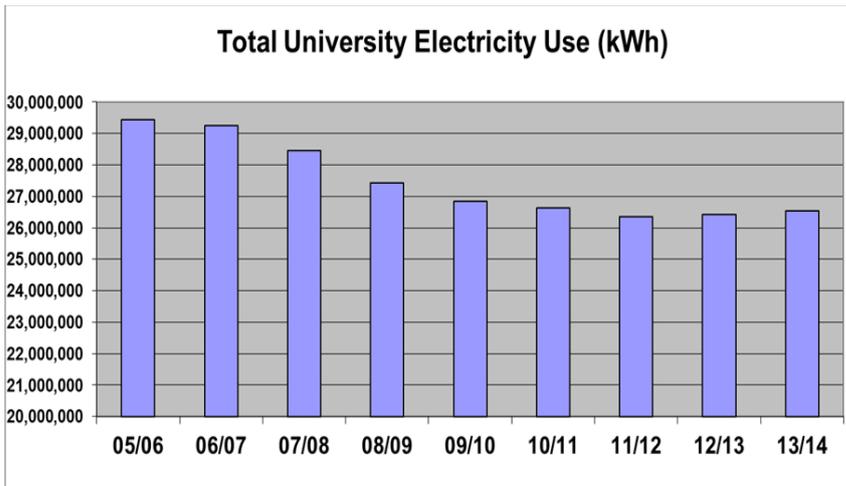
Water use has continued to fall due to a variety of water-saving projects, and improved leak detection. We have a target to reduce our water consumption in existing buildings by 15% from a baseline of 2009/10. Consumption in 2013/14 was 13.5% down from this point so the target has almost been achieved. Since 2005/6 we have achieved a 26% reduction in water use, a saving of 98 million litres every year (or 54 Olympic-sized swimming pools).

Energy-saving work has led to the following reductions over the last 8 years:

- **Electricity 10% down**
- **Gas 20% down** (weather-corrected)
- **Water 26% down**

These trends are shown below, along with annual savings at current prices from these reductions, totalling £1.06 million. The trend data does not take account of the continued growth in physical infrastructure, with 4 South Annexe, Woodland Court, 4 West, 5 West machine room, East building, Student Centre, 1 West phase 1 (extension) and the Chancellors' Building being added during this 8 year period. Factoring in this growth, whilst also allowing for any old buildings/facilities that have been discontinued, we are spending about £1.5m less annually than we would have otherwise.

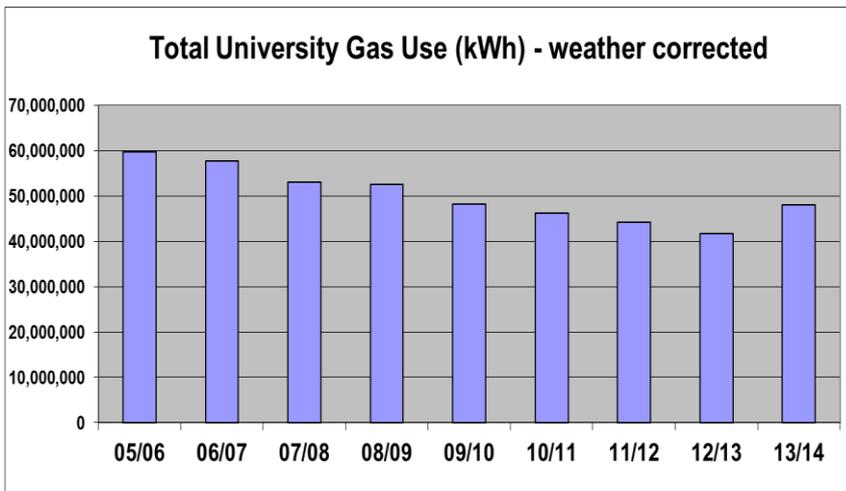
University Utilities Summary



10% down in 8 years

£380k being saved every year

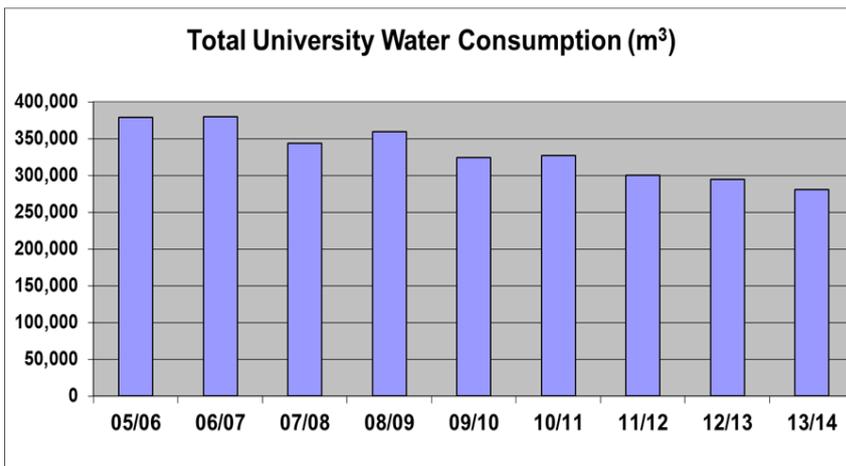
0.5% increase on last year due to new build



20% down in 8 years

£414k being saved every year

Increase last year in weather-corrected usage due to growth and lower efficiency in mild conditions



26% down in 8 years

£265k being saved every year

5% reduction on last year

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

2.0 Improvements

A number of technical improvements have been implemented within the last 12 months. There have also been many additional enhancements 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.

2.1 Student Switch Off



The student residences energy-saving competition 'Student Switch Off' has run for the 8th year and continues to catalyse good savings. Half of all student residents in halls embraced the campaign, with a record 1669 students pledging to behave in an energy efficient way. Students are provided with top tips on the web, competitions, quizzes, training, and regular updates including updated graphs showing how much electricity they have been using. A 'Beer & Curry' prize is awarded to the winning hall, and there are a number of other prizes given away during the competition. The results last year were:

- **77,566kWh** saved October to February 2013-14 – 4% reduction
- **£9,700** financial equivalent saved
- **38 tonnes** of CO₂ saved
- **1669** students signed up as Eco-Power Rangers (49% of 3402 students living in residences)
- **69** attendees at the Student Switch Off Ambassador training session
- **109** photos submitted in picture competitions
- **655** students took part in the climate change quiz
- **200+ students** joined the 'University of Bath Student Switch Off' Facebook fan page

We were part of a consortium bid to an EU fund to extend Student Switch Off into Europe, which will add live data feedback to our own provision. Also as part of our student engagement, a web-based 'dashboard' is being developed which will utilise live data from our 'smart' metering system to give students feedback via webpages and new apps.

2.2 Metering

We now have over 1400 meters for gas, electricity, water and heat across campus. The majority are 'automated' i.e. connected to our remote monitoring system (AMR – Automated Meter Reading) so readings feedback every half hour, creating a sector-leading information system collecting half a million data points every week.

This rich data source is invaluable for highlighting wastage, analysing areas for improvement and measuring the impact of improvements made. The number of meters continues to increase, with the Chancellors' Building alone having 80 separate submeters. We have also made substantial investment to improve resilience and future capacity in the network.

2.3 Self-generation

Renewables

We 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 22,000kWh heat each year. We also have a large 24kWp solar photovoltaic (PV) system covering the roof of the East building which generates 20,000kWh electricity annually. In September 2014 we completed a new solar PV system on the Chancellors' Building – a 50kW system (the equal largest in Bath) which will generate enough energy for 12 houses.

Combined Heat & Power (CHP)

Gas-powered CHP is a particularly efficient form of self-generation of electricity as it allows the waste heat to be used locally on site. We have 2 CHP engines, one installed in 1997 in the Sports Training Village, generating over 750,000 kWh a year with waste heat going to heat the 50m swimming pool. The other is a new system installed as part of the new district heating scheme serving the Chancellors' building and The Quads, complete with thermal

store, which will generate over 1,250,000 kWh of electricity a year. This new CHP will generate 5% of the campus' electricity needs, and save over £75k and 350 tonnes CO₂ annually compared to a conventional system. These 2 systems will generate around 2 million units of electricity annually, enough for 600 houses.

2.4 New buildings

We reference BREEAM (Building Research Establishment Environmental Assessment Methodology) as an 'eco-design' process but are not formally implementing BREEAM on new builds, rather we are using the method in a pragmatic, more resource efficient way and have enhanced this with specific targets for energy and carbon efficiency. Both 10 West and 4 East South are being designed to an EPC (Energy Performance Certificate) 'A' standard. 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 Energy Procurement

We operate on flexible energy procurement contracts rather than the traditional fixed price, fixed term contracts, which allows 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.

This 'hedging' approach allows us to purchase up to 18 months in advance and respond rapidly to changing market conditions. We have achieved a saving of £1.9m on the initial 3 year framework contracts compared with what we would have paid with a benchmark traditional fixed contract. This approach has been extended to 2016 and some additional savings are planned through changes in strategy and through better aggregation with other Universities in the trading 'basket'.

3.2 Longer term costs

We expect our total utility bill to exceed £10m by 2020 even without our planned expansion. 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).

Along these lines we saw significant increases in these 'pass-through' electricity charges from April 2013 which meant an immediate increase in costs for that year of £250k. We are also subject to stringent peak charges: a unit of electricity during the winter weekday peak hours of 17:00 to 19:00 costs over twice that of a normal unit, and this peak period premium is set to increase. As well as reducing demand during this time, self-generation can be used to offset these costs, hence another significant benefit of CHP – the new CHP system is designed to run during this period every day.

3.3 Funds for investment

The main fund currently used for investment in pure energy efficiency is the SALIX/HEFCE Revolving Green Fund, a £250k 'self-replenishing' fund whereby energy savings are fed back into the fund for future use. It provides approximately £100k/year for technical projects 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. It is planned to apply for another HEFCE revolving fund this year of £500k. Much investment in

our existing Estate is also made for reasons other than pure energy efficiency, but generally these will also be carried out to the best practical standards and hence efficiency gains are made – eg. if an area is being refurbished we will tend to upgrade the lighting at the same time.

4.0 Carbon

4.1 Carbon Management Plan (CMP)

In April 2011 the University produced a new Carbon Management Plan (CMP) including targets for reducing emissions. The following are our CMP targets:

We aim to reduce our Scope 1 and 2 CO₂ emissions by 43% by 2020 from a 2005 baseline.

We aim to reduce emissions by 19% by 2014/15 against a 2008/9 baseline target

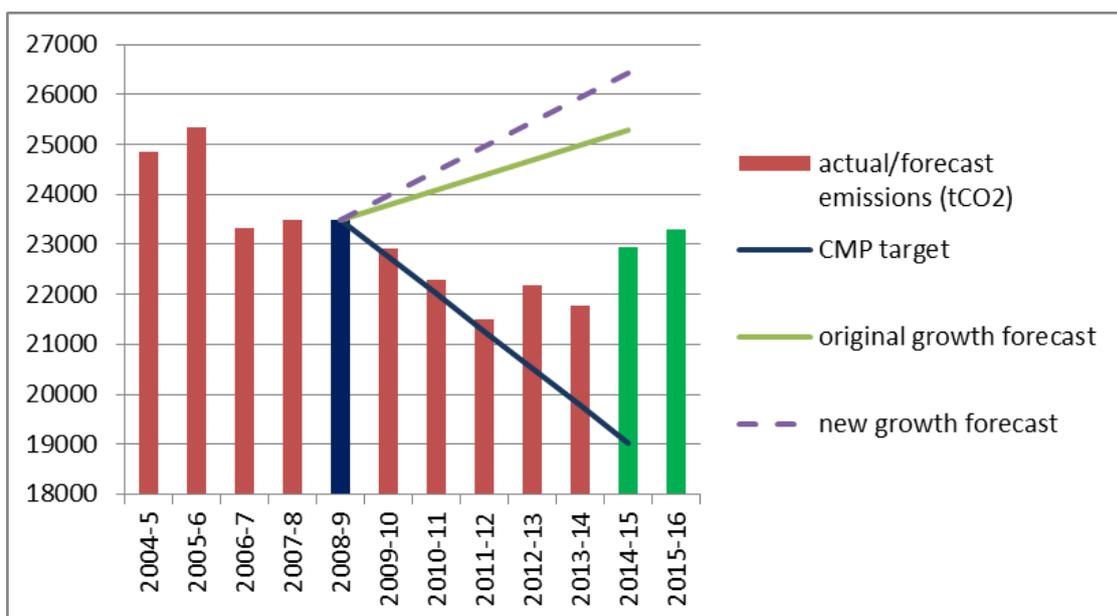
4.2 Progress against targets

Carbon emissions for 2013/14 are down 14% since 2005 and 7% since the 2008/09 baseline in the Carbon Management Plan. Emissions per building floor area (26% down in 8 years) and per student (33% down in 8 years) continue to fall. We are continuing to make good progress although our carbon targets are increasingly challenging given the scale of recent and planned campus growth.

The following graph shows our annual carbon emissions in tonnes CO₂, including projected figures for the next 2 years given the planned growth. 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 now due to be significantly greater than our original assumptions – the purple dashed line shows the new modelled growth forecast based on the currently planned and approved new buildings (Chancellors', 1West, The Quads, Arts, 4 East South and 10 West). (No allowance for increased student numbers or other growth has been included).

It can be seen that the general trend for carbon emissions is a reduction. Carbon emissions for 2011/12 had fallen 15% since 2005 and 8% since the 08/09 baseline in the Carbon Management Plan. However, carbon emissions rose in 2012/13, partly due to growth in physical infrastructure but predominantly due to the weather – gas usage was up by 8% due to the cold winter and spring.

Another factor outside our control that has an effect on our carbon figures is the assumed conversion rate from kWh to CO₂. These are set by DECC/DEFRA and can change according to the changing UK electricity generation mix.



4.3 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:

- 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
- The inclusion of environmental criteria in job descriptions has been further investigated with HR
- Space charging – we now use true costs based on metering in TRAC (Transparent Approach to Costing) modelling and we are investigating with the Finance teams a similar approach in the RAM (Resource Allocation Model)

4.4 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 effect this is now a simple Carbon Tax – the price per tonne for this year has risen to £16 and hence an annual cost of £375,000 to the University. In the last 12 months several changes to the legislation have occurred aimed at simplification.

Under this legislation our CRC emissions were 21,638tCO₂ in the year to April 2014.

Display Energy Certificates (DECs)

This legislation came into effect in October 2008. It requires all public sector buildings above 500m² 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 theoretical benchmark building with a performance typical of its type, where A is the lowest CO₂ emissions (best) and G is the highest emissions (worst). Also shown on a DEC 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 was recently expanded to include smaller buildings (between 500-1000m²).

The University now has 54 buildings which are covered by DEC's. This year the number of buildings in each category is as follows: **A: 1 B: 5 C: 22 D: 14 E: 3 F: G: 8**. We have a significant number of 'G' rated science/laboratory buildings, but this a nature of the simplistic benchmark for laboratories, and due to the energy-intensive research equipment in the buildings concerned.

We voluntarily produce a DEC for the whole campus as a measure of our improvement. The rating for the whole campus is a 'D' with a rating of 98; in 2009 this was an 'E' with a rating of 120 – i.e. we have seen an 18% improvement overall.

We have an interactive website showing all our DEC's – see <http://bathuni.energyprojects.net/>

5.0 Waste Reduction and Recycling

The recycling rate for 2012/13 is 36%, which is a significant improvement from the 2011/12 figure of 20%. Whilst the recycling rate has been increasing the amount of waste produced by the University has been decreasing, which is a significant accomplishment when the number of students and staff at the University has increased. The projections for the 2013/14 academic year also look to show another improvement in the recycling rate.

The recycling rate of 36% meant that the University has exceeded its target to recycle 30% of waste by 2012/13; there is a further target of 50% recycling by 2014/15. A significant amount of work is being done to reach the next target which includes:

- Maintaining consistency with branding across the University, including in the new buildings and Halls of Residence
- Working with the waste and recycling contractors to get more accurate reporting on the weights of the waste and recycling which has been collected
- Ensuring that all waste collected is sent to some form of pre-treatment before landfill; the site currently being used is reaching 70% recycling and energy from waste
- Collecting food waste from all Halls of Residence and the majority of campus hospitality outlets and sending it to an anaerobic digestion plant
- Finding recycling routes for some of the more difficult materials such as mattresses and electrical items

There have been a number of projects and campaigns run to help promote recycling and decrease waste, including:

- Zero Waste campaign at the end of term which collected a large quantity of unwanted items for local charities from all Halls of Residence, over 1 tonne of unwanted food was collected for Foodbank Bath.
- A number of 'Love Food Hate Waste' events were held with a professional chef explaining how to cook using left overs. Games were used to explain supermarket packaging and how best to store food.
- 5 students have also been employed as 'Green Champions' to promote waste and recycling with the students and other environmental topics as well. The Green Champions organised events and visited every kitchen group in University owned Halls of Residence.

The University has renewed all its waste and recycling contracts which has given the University best value for money and also increased some of the items which can be recycled. The University produces various different sorts of waste, including:

- **Cardboard** – this is sorted and baled on site, we can then sell the cardboard for recycling. In 2013/14 78.68 tonnes of cardboard were baled on campus.
- **Confidential waste** – this is shredded on site and then recycled into tissue within the UK. In 2013/14 29.8 tonnes of paper were shredded on campus.
- **Metal** – this is segregated on site, including the breaking down of chairs, desks and shelving, this is then scrapped locally. In 2013/14 23.4 tonnes of metal were sent for scrap.

- **WEEE (Waste Electrical and Electronic Equipment)** – this includes everything electrical from IT equipment, small household appliances and lab equipment. In 2013/14 16.8 tonnes of WEEE were sent for recycling.

6.0 Transport

Our Environmental Policy includes targets on transport to:

- 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;

Within the 2011 Travel Plan our targets are to:

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

We have also set ourselves the goals to:

- update our Bus Code of Practice in terms of on-site operation and vehicle emissions standards;
- provide information to international students on the environmental impact of travel options to help them make informed travel decisions;

The University has implemented a number of transport improvements in recent years:

- In 2012 the University 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, bus Real Time Information was provided at stops on the Campus.
- In 2013 a £700,000 improvement scheme was undertaken at 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 2014, the investment in transport infrastructure continued, with improvements to seating and raised kerbing in the Arrivals Square, and enhancing the pedestrian environment north of the new Chancellors Building (a £120,000 scheme). The University has also continued to invest in surveys, particularly of public transport usage, to seek to improve provision by the three operators now serving the site.

As a result of the travel plan, the University's transport policies and the measures it has implemented, between 2007 and 2013 daily traffic flows associated the University have decreased from around 10,400 movements to 10,250 a reduction of 1.4%, although the 2013 flows are higher than in 2012, which in turn were slightly up on 2011 flows. 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 11,500, an increase of 47%. These changes are set against the staff and student population increasing by around 20% over the same period.

In terms of meeting the targets of the travel plan, this year the number of vehicle movements per head of staff and students was 0.697, which is a slight decrease (1.8%) compared with 0.710 in 2012. These figures are calculated from ATC data and so will include all vehicular movements, including construction traffic. Over the past few years there has been a significant amount of building work undertaken on the campus and the inclusion of

construction traffic will have had an appreciable effect on the overall number of recorded vehicle movements.

As part of the annual transport surveys classified manual counts are also undertaken for a single day at the University. Using the number of daily car trips from these surveys, car trips per FTE staff/student head have fallen 3.8% from 2011 to 2013, a reduction of which is above the targeted reduction of 1% per annum. Since 2007, daily car trips per FTE staff/student head have fallen from 0.466 to 0.376 a reduction of 19.3%.

The 2012 travel survey highlighted an unawareness of the University's car sharing scheme, and hence this will be targeted as a way of reducing car journeys further. Other schemes that the University run include a tax-free cycle purchase scheme, loans for public transport season tickets, and a scheme to allow free trials of electric cycles. We also have 6 electric vehicle charging points, a large number of cycle racks and showers, a walking network, and we even have a set of cycle racks at the bottom of Bathwick Hill for staff that do not wish to try cycling up the hill (see <http://www.bath.ac.uk/transport/> for more info on any of these).

Car parking provision in 2013 was down from 2077 spaces in 2012 to 1923 spaces in 2013, hence parking on campus is now below the travel plan target, although with the completion of development parking levels will increase to the level set in the travel plan.

With regard to bus provision, many of the buses serving the University are now Euro IV compliant and the University is looking to ensure that the remainder of the vehicles serving the University are compliant to this level.

It should also be noted that, under a S106 agreement with BANES which ended in 2013, the University made an annual contribution to the Council which it used 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.

In 2010, the University appointed a travel management company, Ian Allen Travel Management, to help manage business travel. As part of this initiative, staff are prompted to consider alternatives to actually making a journey.

7.0 Biodiversity

The Biodiversity targets from the Environment Policy were:

- 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.

Progress made in 2013/14:

- The removal of non-native species in Quarry Road has continued. The dry stone wall which lines the road is a known habitat for adders. Over recent months sapling roots have started to damage the rock face. For the benefit of the adders and route users, the saplings will be removed in 2014.
- Non-native species such as Laurel have been removed from our woodland areas and replaced with native species - Hazel, Beech and Hawthorn - known to be attractive to a wide range of fauna for nesting and food.
- The Landscape Ecology Management Plan (LEMP) has been developed as part of the requirements of the Masterplan.
- We were overall winner within the environmental project category of the 'Bath and Bloom' competition.

- A new wildlife habitat has been created at Lime Kiln and is maturing well.

Following the success and popularity of wild flower plantings, more areas have been created.

- General areas around the East Building and student accommodation have been the subject of re-planting to remove non-native species and replace with a more natural appearance.
- Swale areas – ornamental shrubs such as Cornus, Berberis, Salix have been removed and replaced with natural planting such as Hazel, Woodruff and Fritillaries.
- Insect stacks have been created from fallen tree trunks
- Badger sett appears to have relocated to under the sports hut.
- Beehives now removed from Hazardous Waste compound and installed with other research hives at Bathampton.

8.0 Sustainable Procurement

In 2014 a new Sustainable Procurement Policy and Action Plan were approved. (<http://www.bath.ac.uk/purchasing/sustainability.bho/index.html>). Environmental weighting is in all specifications with the weighting applied set at an appropriate level to the goods, services or works being procured.

Developments include:

1. *provide targeted refresher training on latest sustainable procurement principles.*
2. *augment the environmental sustainability purchasing policy with a strategy covering risk.*
3. *assess all contracts for general sustainability risks and identify management actions.*
4. *implement a targeted supplier engagement programme, promoting continual sustainability improvement.*
5. *apply a life-cycle approach to cost/impact assessment.*

9.0 Curriculum

A sub-group reporting to SCMSG was set up to look at sustainability within our teaching across the University. In the 2012-13 Annual Environmental report, this sub-group committed to the following next steps:

- 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 Pro-Vice-Chancellor (Learning and Teaching) to ensure the most suitable process for discussing this project with unit convenors and setting up a network

First, an assessment of sustainability in unit templates was conducted. Using the standard triple bottom line understanding of sustainability and a conservative reading of unit templates, units including some explicit aspect of sustainability accounted for 16% of all units and for 7% of core units. Given that there are many across the University who conduct research on sustainability, it is possible that this number is higher or will be in the near future given research-led teaching.

Second, information has been collected from a number of different sources in an attempt to ascertain the importance of sustainability with teaching at the University. Some has been

conducted by the SU (Student Union) in the form of the 'Big Green Discussion' in 2014, where students from Bath and Bath Spa came together to talk about green issues. One of the key and unprompted themes that came out of this discussion was the need for much more integration of sustainability within the curriculum

Along with University of Bath and sectoral interest, there is interest from external parties, in our sustainability activities and teaching:

- a. Green Gown Awards – have been running for 10 years now, these awards recognize 'exceptional sustainability initiatives being undertaken by universities and colleges across the UK' http://www.eauc.org.uk/green_gown_awards.
- b. People & Planet Green League – ranks UK universities based on their environmental and ethical performance from an operational standpoint and is published in both the Guardian and in THE magazine. <http://peopleandplanet.org/greenleague>.
- c. Global Green MBA – in 2013 Global Green was started and has a similar mandate to Beyond Grey Pinstripes which ran from 1999-2012 in that it focuses on the 'integration of sustainability into the curriculums of leading business schools around the world'. In 2014 they ranked us 11th out of 100 schools in the Corporate Knights Global Green MBA ranking and we are ranked 1st in the UK. <http://www.corporateknights.com/wp-content/uploads/2014/10/Corporate-Knights-2014-MBA-Data.pdf>

Finally, the School of Management is required to provide evidence of Ethics, Responsibility & Sustainability to renew their EQUIS accreditation which is due for renewal this year.

10.0 Other developments

10.1 ISO 14001 management system

The Accommodation and Hospitality Services Department has achieved certification to the ISO 14001 Environmental Management standard across all their operations. 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. The department also supports initiatives such as WE-CARE, Student Switch Off, Reg Fuse, and Zero Waste.

10.2 Students' Union

The Students' Union (SU) is working hard on increasing the level of environmentally focused activity.

The SU's environmental policy promotes a change in behaviour to use fewer resources and recycle more. The Environmental & Sustainability Rep is working to boost environmental student activity through the "Green Team". The Green Team aims to bring the green activities of SU societies, enterprises and volunteering groups together to create stronger and longer lasting change.

10.3 University Commercial Outlets

The introduction of a 5p single-use bag charge in April 2013 in the Fresh Grocery Store has reduced plastic bag usage by over two thirds whilst raising £2,800 for University of Bath RAG in the first year alone.

10.4 Links with research

The Department of Estates works with academic colleagues to identify areas of synergy especially in research activities.

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

- We were 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.
- The Estates Dept have sponsored a PhD in Psychology for the last 3 years, looking at transport and behaviour, to help develop and analyse the travel surveys, and to make recommendations for improvements. One outcome of this was the walking network (<http://www.bath.ac.uk/transport/walking.html>). This partnership has been extended with a new PhD post this year also to look at energy use and wider sustainability issues, and will inform our behavioural change programmes in future years.

11.0 University Sustainability Research

Although this report is predominantly focussed on 'operational' sustainability matters for the University, it should be highlighted that much of the research the University carries out also has significant positive environmental impact. Some examples include:

Reintroduction of the Great Bustard into the UK

- This project is this country's flagship platform to raise public awareness of threatened species and the need to preserve biodiversity
- Professor Székely and colleagues are part of a 10 year project (starting in 2004) to reintroduce the Great Bustard *Otis tarda*, a bird that is classified as globally vulnerable to extinction (IUCN Red List, 2013).
- The project has successfully established a new breeding population, enhanced the survival of released birds and achieved ecological enrichment in the release area.

Reducing CO₂ emissions and saving drivers' fuel costs from the Ford fleet of vehicles

- This research project was focused on reducing engine parasitic losses, thereby making the engine more efficient and reducing the CO₂ emitted.
- Research aimed at improving measurement precision of CO₂ produced by Ford vehicles.
- The adoption of cost effective CO₂ reduction technologies reduced CO₂ emissions across a range of Ford vehicles by an estimated 40,000 tonnes in 2012.
- Improvements to vehicle engines have saved over €25M in fuel costs to the owners of Ford vehicles in 2012.

Carbon Footprint of buildings

- The Hive is a new £1 million University of Bath research facility to help reduce the carbon footprint of buildings located at the University's Building Research Park at Wroughton, near Swindon.
- The HIVE will be unique in the UK for its ability to provide a flexible, real-world environment in which to test low carbon construction materials and systems.

Helping to create Ashwoods Lightfoot® and enable fleet managers to reduce the fuel costs and CO₂ footprint from 2,500 vehicles

- Research conducted in partnership with Mahle Powertrain resulted in the development of an algorithm (Universal Driver Aggression Algorithm or UDAA) to measure driver aggression based on previous PVRC research.
- The UDAA subsequently inspired activity within a project in collaboration with Ashwoods Automotive to create a new product (Lightfoot®) that incorporated UDAA.

- Lightfoot® uses visual and audible feedback to drivers to help them improve the fuel efficiency of their driving. The reduction in CO₂ emissions is achieved solely through behavioural improvements, with no modification to the vehicle engine.
- Trials run on customer fleets by Ashwoods demonstrated that Lightfoot® saved an average of around 7% in fuel/CO₂ when compared with baseline measurements. The savings were even higher for exceptionally aggressive drivers; in these cases savings of up to 20% were achieved. In service, the product has consistently returned a saving of at least 10%.
- Lightfoot® has been a commercial success and is the sector leading product, winning a number of industry awards.

For more details and other examples of sustainability research see <http://www.bath.ac.uk/i-see/index.html> and <http://www.bath.ac.uk/research/pdf/research-brochure-2013.pdf>.

Peter Phelps
Energy and Environment Manager, on behalf of SCMSG