

## Annual Energy and Environment Report: Jan 2016

*This report covers aspects of the University's environmental performance in the year 2014/15. Whilst the report is retrospective in nature, the University's commitment to minimising any negative environmental impacts associated with its activities is an ongoing one. The University has determined that it needs to grow in order to secure its future sustainability and continue to deliver its charitable objectives to the high standards of excellence it is currently known for. Delivering growth, particularly in terms of physical infrastructure, whilst minimising negative environmental impacts is a challenge. The University is looking to new technologies (such as CHP, photovoltaic arrays and LED lighting) and best practice (such as modifying behaviours through feedback on energy usage, and best building design practice) to help it meet the challenge.*

### **Executive Summary**

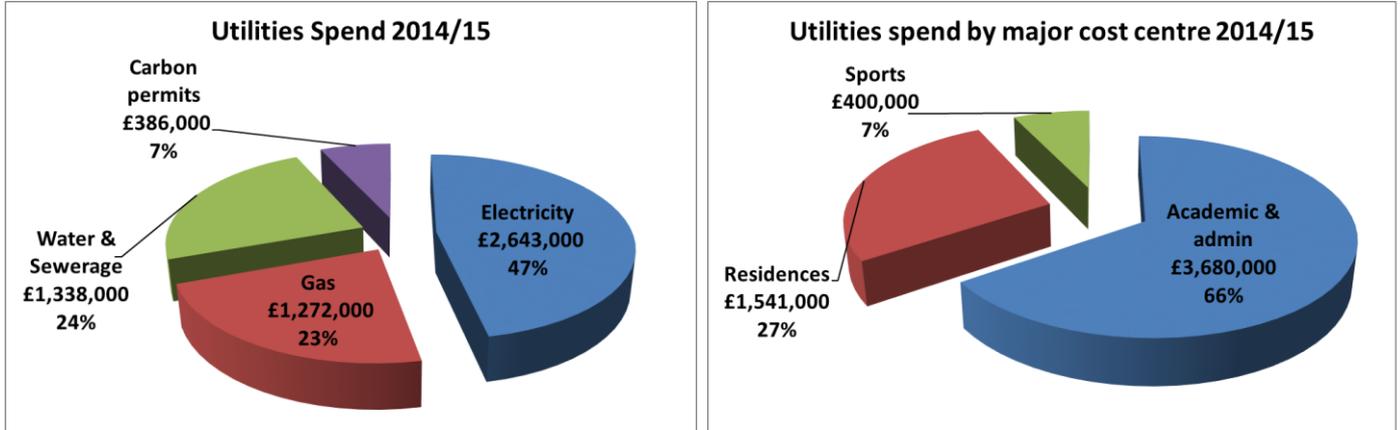
- Energy and water consumption for 2014/15 rose compared to the previous year due to significant growth in the University, but the underlying trend excluding new build is still downwards. Compared with 9 years ago:
  - electricity use 5% down, 12% excluding recent growth
  - gas use 11% down (weather-corrected), 20% excluding growth
  - water use 21% down, 28% excluding growth
  - saving £0.6m annually, £1.5m excluding growth
- Carbon emissions for 2014/15 are down 10% since 2005/6 and 5% since 2008/9 despite significant growth in the University. We have not achieved our original highly challenging carbon target, predominantly due to much higher than anticipated expansion. Emissions per building floor area and per student are 21% down over the last 6 years.
- Self-generation of electricity has increased by 25% – the new CHP (Combined Heat and Power) unit for the Chancellors' Building and The Quads has produced 5% of the campus' electricity needs, saving 350 tonnes CO<sub>2</sub> carbon emissions. This, along with the older CHP unit in the Sports Training Village, has generated 1.5 million units of electricity annually, enough for 450 houses, and recycled over 2 million units of heat.
- New solar panels on the Chancellors' Building are the largest system in Bath; added to the existing system on the East Building and the systems being installed on new buildings (4 East South and 10 West) we will soon have 146kW capacity installed on campus.
- Awarded £600k from a new HEFCE/SALIX Revolving Green Fund for investment in efficiency projects, mostly lighting improvements – this adds to the existing £250k fund.
- Recycling rates maintained following previous years' significant improvements; last summer the University collected 24 tonnes of 'end of term' unwanted food, clothing, crockery and appliances that was donated to charities instead of going to landfill.

- Car trips per Full Time Equivalent staff/student reduced by 7% between 2011 and 2014, above the targeted reduction of 1% per annum. Since 2007 daily car trips per FTE staff/student have fallen by 22.3%.
- Between 2007 and 2014 daily traffic flows have reduced by 4.8%. In the same time the number of people travelling to and from the University by bus has increased by 58%. These changes are set against the staff and student population increasing by around 23% over the same period.
- The Accommodation and Hospitality Services department continue to achieve certification to the ISO 14001 Environmental Management standard.
- 'Go Green' weeks in February and October 2015 were held by the Students' Union and the University.

## 1.0 ENERGY AND WATER USE

### 1.1 Financials

We spent around £5.5 million in 2014/15 on utilities:



### 1.2 Consumptions

Comparing the 2014/15 academic year with the previous year:

- electricity imported (i.e. bought) up 5%
- electricity consumed up 6%
- self-generated electricity up 30% – now at 5% of total University use
- excluding new builds, electricity import down 1%
- gas 10% up, but held level when weather and new build taken into account
- water 6% up, but down 3% when new build taken into account

**Electricity:** From the following graphs it can be seen that electricity ‘consumed’ has been rising in recent years due to new buildings, but our increase in self-generation has partially offset this. The opening of the Quads/Lime Tree accounts for a 4% rise in electricity, 6% rise in gas, and 9% rise in water use for the University and is the biggest step change increase in recent years (almost 4 times the impact of The Chancellors’ Building in running costs).

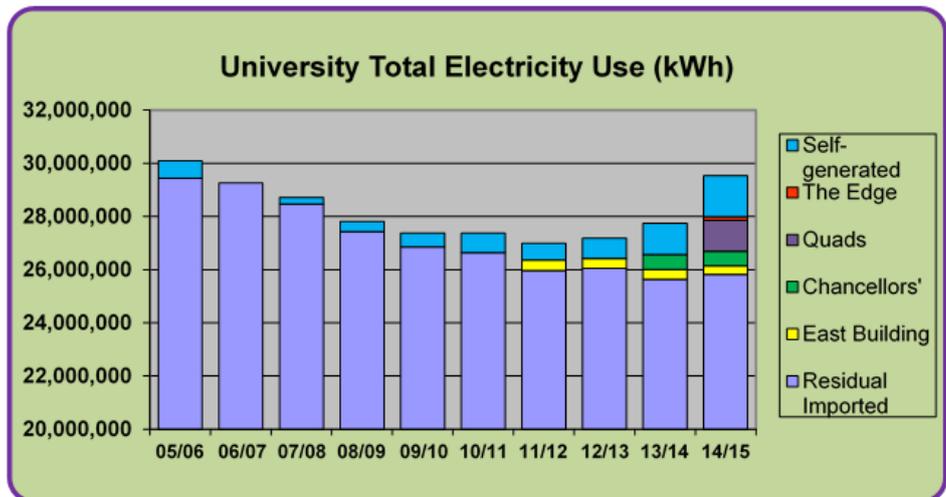
**Self-generation:** We produce our own electricity from 2 gas-powered Combined Heat & Power (CHP) engines, and also from solar panels. We are now producing around 5% of our own electricity on campus from CHPs, and 0.2% from solar. Our forecast is 8% self-generation for this year following further improvements.

**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 here. The long term trend is a reduction in gas use, even though we have delivered a significant expansion in the Estate. Last year’s weather was statistically similar to 2007/8 but consumption was down 11% excluding new build. Gas use will also increase as we use CHP more, but this is more than offset in financial and carbon savings by the electricity produced.

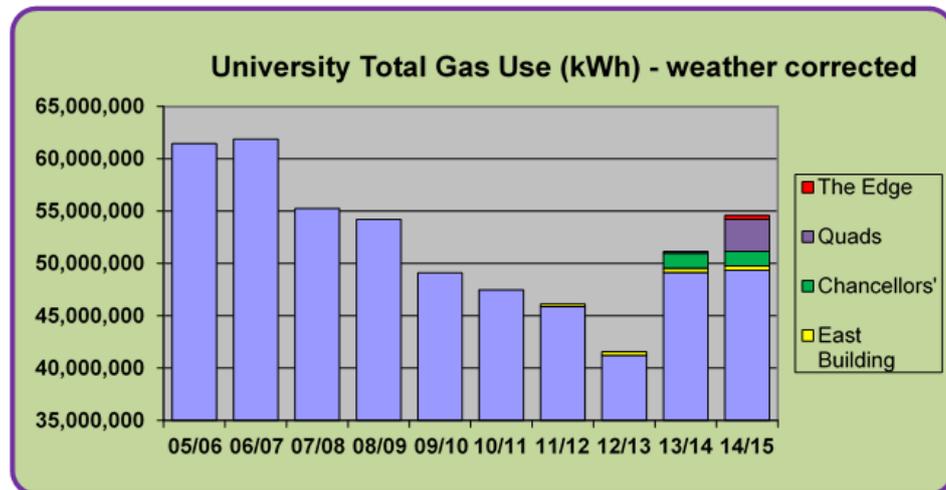
**Water use** has continued to fall due to a variety of water-saving projects, and improved leak detection. We have a target to reduce our water consumption in existing buildings by 15% from a baseline of 2009/10. **Consumption in 2014/15 was 15.5% down from this point so the target has been achieved despite growth.** Since 2005/6 we have achieved a 21% reduction in water use, a saving of 80 million litres every year (or 44 Olympic-sized swimming pools).

# Utilities use summary (2014/15)

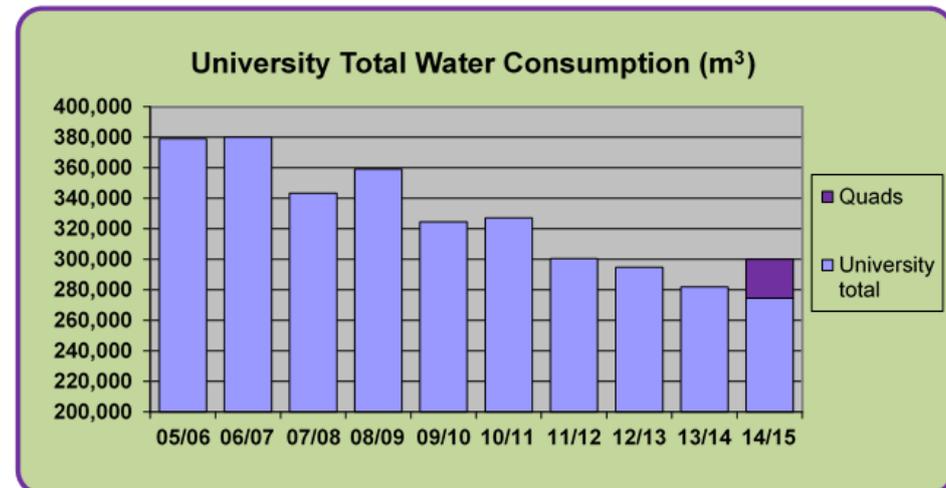
**Electricity consumption 5% down in 9 years**



**Gas consumption 11% down in 9 years**



**Water consumption 21% down in 9 years**



**Cumulative savings over 9 years, despite significant growth in the campus, have been:**

- £3.7 million worth of energy & water use
- 5,000 tonnes CO<sub>2</sub>
- 150 Olympic-sized swimming pools of water

## Longer term trends:

These are still downwards, particularly when growth is taken into account:

- **Electricity imported still below 2007/8 levels**
- **Electricity imported 5% down in 9 years** - 12% down excluding recent new build
- **Gas 11% down in 9 years** (weather-corrected) - 20% down excluding new build
- **Water 21% down in 9 years** - 28% down excluding new build

The graphs also highlight the influence of recent new buildings on consumptions. Over the 9 year period the following buildings/facilities have been added: 4 South Annexe, Woodland Court, 4 West, 5 West server room, East building, Student Centre, 1 West phase 1 (extension), Chancellors' Building, The Quads/Lime Tree, and The Edge. **We have reduced our annual usage of energy and water by around £0.6m-worth over this period, despite this significant growth.** 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.**

## 2.0 IMPROVEMENTS MADE

### 2.1 Technical improvements

A number of improvements have been implemented since the last report. These include:

**Lighting upgrades** to latest high efficiency LED fittings with automatic controls and daylight dimming. The vast majority of student residence buildings have now had the corridors and stairs upgraded, along with 3 South, 4 South, 5 West level 2, Wessex House level 3, and 2 East level 2. We have also upgraded the main pool lights, the University Hall, the whole of Library level 5 and the lighting in many external areas. This is a total spend of well over £350k, generally with a payback of 3-4 years, and saving over 350t CO<sub>2</sub> annually. The general refurbishments of Marlborough and Solsbury also included upgrades to the lighting in all corridors, kitchens and bedrooms, along with those in 9 West, 4 South and 4 East laboratories. LED fittings have an added benefit of longer life and lower maintenance cost, as well as improving the appearance of the refurbished areas.

**IT projects** – our Computing Services department has implemented auto-powerdown software on 1300 PCs across campus saving £80k and 300tCO<sub>2</sub> annually, with further roll-out to come. A process of server 'virtualisation' also continues with about 200 servers having been virtualised onto 10 physical servers, saving at least £15k and 30tCO<sub>2</sub>.

**Building Management System (BMS)** software – a complex controls tuning exercise was carried out across all the campus residential estate with estimated savings of 5% of gas use.

**3WN laboratories** – several years ago we cut the energy usage of this 'clean room' research area by 40% by working with the lab users to ensure certain equipment was turned off whenever possible. We have now made further improvements (rebalancing the room pressures, adding a variable speed drive to the ventilation and improving the controls) which means that the overall reduction is now 80%, saving £80k and 300 tCO<sub>2</sub> a year.

### 2.2 Student Switch Off

The student residences energy-saving competition 'Student Switch Off' has run for the 9th year and continues to be the catalyst for good savings. Students continue to embrace the campaign, with over a third of 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 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.



This campaign runs at over 40 universities in the UK, and we continue to be a leader amongst these in our implementation, with a higher proportion of sign-ups than most others. We are also part of a select group to access EU funds to extend Student Switch Off into Europe, and to add live data feedback to our competition. A web-based 'dashboard' has been developed which utilises live data from our 'smart' metering system to give students feedback via webpages and new apps.

### **2.3 Metering**

We now have over 1700 meters for gas, electricity, water and heat across campus. The majority are automated i.e. they are 'smart meters' connected to our remote monitoring system. Consumption data feeds back every half hour, creating a sector-leading information system collecting half a million data points every week.

This rich data source is vital to allow our energy use to be managed and reduced as it highlights energy wastage, allows prioritisation of areas for improvement and measures the impact of improvements made, whether a lighting upgrade or a change to a heating control system. The number of meters continues to increase, e.g. the Chancellors' Building alone has 80 separate submeters. We have also made substantial investment to improve resilience and future capacity in the network, and are trialling new web-based software that will be used to share the data via dashboards to aid with communicating summary data to others.

### **2.4 Self-generation**

#### **Renewables**

We have solar thermal systems generating hot water on 4 student residence blocks in Westwood, and systems on Woodland Court and 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 generates enough energy for 12 houses (see [http://www.bath.ac.uk/estates/docs/Chancellors\\_PV.pdf](http://www.bath.ac.uk/estates/docs/Chancellors_PV.pdf) for more details).

The new buildings due for completion in 2016 will include large solar arrays, with 33kW and 39 kW systems on 10 West and 4 East South respectively.

#### **Combined Heat & Power (CHP)**

Gas-powered CHP is a particularly efficient form of generating electricity as it allows the waste heat to be 'recycled' locally on site. We have 2 CHP engines:

- CHP for Chancellors' Building/The Quads: installed 2013, with waste heat going to provide heating and hot water to both buildings. This makes £17 net saving for every hour it runs = £95k/year and 350 tonnes CO<sub>2</sub> saved. We have increased the output by 115% on the previous year due to The Quads coming on line and by making improvements in the complex control systems, and produced around 1,000,000 units of electricity in the year.
- CHP in Sports Training Village: installed in 1997, with waste heat going to heat the swimming pool. £7/hour saving = £30k/year and 90tCO<sub>2</sub> saved. This has been kept running this year despite the pool refurbishment – only losing 30% of normal output, much better than budgeted.

These 2 systems will this year generate around 2 million units of electricity annually, enough for 600 houses. (For more info see [http://www.bath.ac.uk/estates/energy-sustainability-environment/The\\_University\\_Power\\_Stations.html](http://www.bath.ac.uk/estates/energy-sustainability-environment/The_University_Power_Stations.html))

### **2.5 New buildings**

We have used BREEAM (Building Research Establishment Environmental Assessment Methodology) as an 'eco-design' process for many years. We have not always formally implemented BREEAM on new builds, but use 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 have been designed to a high EPC (Energy Performance

Certificate) 'B' standard. We are also implementing much of the industry best practice 'Soft Landings' approach to new and refurbished buildings. We are now using a more formal BREEAM process with specific sustainability consultants on the Milner Centre and other future projects, with further enhanced carbon targets.

Two major new buildings recently completed are The Quads student residence, and The Edge. Both have been built to high energy standards, with excellent levels of insulation and airtightness, sophisticated heating and ventilation controls, and high efficiency automated lighting. The new CHP unit was also part of the energy strategy for The Quads project. Over the last 3 years we have undertaken a £22m 3-stage refurbishment of 1 West which has effectively converted an inefficient 1960s-built building into one with modern levels of insulation with fully upgraded, highly efficient plant and services.

### **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 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.

This 'hedging' approach allows us to purchase up to 18 months in advance and respond rapidly to changing market conditions. This year we have achieved a saving of £630k through this method (£118k cashable, £62k cost avoidance, and £450k traded). This has been partly through changes in strategy and through better aggregation with other Universities in the trading 'basket'.

#### **3.2 Longer term costs**

Non-commodity charges (Climate Change Levy, Renewables Obligation, distribution and transmission charges etc.) now make up over 50% 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 continue to increase electricity prices significantly over the coming years, even against a backdrop of falling commodity costs, linked to global oil prices.

Government changes to the Climate Change Levy will mean an additional on cost of £100k/year to the University. Cuts to the Feed in Tariff for solar panels will not affect existing systems, but will slightly reduce the income for panels on new buildings (but the panels are usually needed anyway to ensure buildings are compliant with regulations and to meet our energy targets).

We are also subject to stringent peak electricity 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 continue to increase as a reflection of the national 'supply gap'. As well as reducing demand during this time, self-generation can be used to offset these costs, hence another significant benefit of CHP – our CHP systems are designed to run during this period every day.

#### **3.3 Funds for investment**

**We successfully bid for £600k from a new HEFCE/SALIX Revolving Green Fund** for investment in efficiency projects, mostly lighting improvements – this will be spent on projects with up to an 8 year payback, and acts as a 'self-replenishing' fund.

We have an existing fund of £250k from SALIX/HEFCE, also a 'revolving' 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. Much investment in our existing Estate is also made for reasons other than pure energy efficiency, and hence is funded differently, but generally these projects will also be carried out to the best practical standards and hence efficiency gains are also 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 were our CMP targets:

**We aim to reduce our Scope 1 and 2 CO<sub>2</sub> 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**

**These targets are absolute targets i.e. any growth will clearly make the targets much harder to achieve. These targets were set before major changes in the UK HE sector funding regime, and while they allowed for a degree of growth in the University, the actual growth has been much greater than anticipated. We plan to review these and set new targets in line with our actual and forecast growth.**

### 4.2 Progress against targets

Carbon emissions for 2014/15 are down 10.4% since 2005 and 5% since the 2008/09 baseline in the Carbon Management Plan. We are continuing to make good progress but our carbon targets are increasingly challenging given the scale of recent and planned campus growth.

In terms of relative carbon emissions:

- CO<sub>2</sub> per m<sup>2</sup> building floor area - 21% down over the period of the CMP; 28% down in last 9 years
- CO<sub>2</sub> per student – 21% down during CMP; 30% down in 9 years
- CO<sub>2</sub> per £ financial turnover – 29% down during CMP; 47% down in 9 years

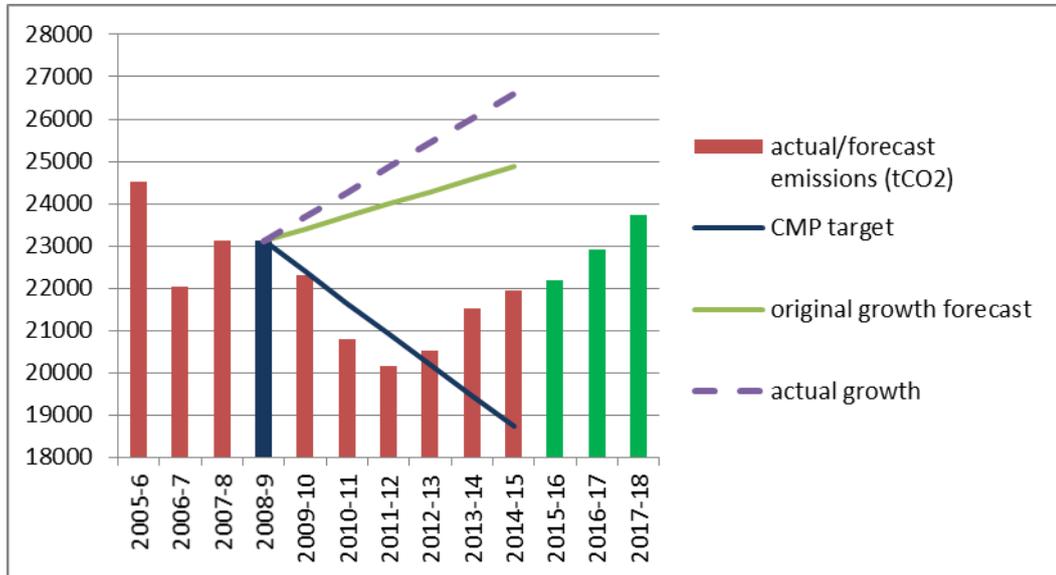
The following graph shows our annual carbon emissions in tonnes CO<sub>2</sub>, including projected figures for the next 3 years given planned growth. The blue CMP target line is what we needed to achieve to reach our target assuming a linear progression. The green line (original growth forecast) is 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. a 'Business As Usual' case). This growth, however, has been significantly greater than our original assumptions – the purple dashed line shows the actual growth over the period due to new buildings (Chancellors', 1 West, The Quads & Lime Tree, The Edge). Future carbon emissions have also been projected forward allowing for future new builds (4 East South, 10 West, Milner Building and future student residences). No allowance for increased student numbers or other growth has been included.

As well as growth, a factor that influences our gas use and hence carbon emissions significantly is the weather. For example, carbon emissions rose in 2012/13 predominantly due to the weather – gas usage was up by 8% due to the cold winter and spring.

Apart from the weather, another factor outside our control that has an effect on our carbon figures is the assumed conversion rate from kWh of electricity to CO<sub>2</sub>. These are set by government (DEFRA) and can change according to the changing UK electricity generation

mix. These have been falling generally but can fluctuate e.g. the ‘dash for coal’ increased the grid factor by 11% in 2014. There are a number of differing interpretations of how carbon emissions should be reported, with no standardised approach to these changing grid factors. The assumption made is that we will continue to report actual energy use as well as carbon emissions, and to follow DEFRA guidelines and use the most up to date annual grid conversion factors, but also to be open and clear about our assumptions.

### **Annual carbon emissions (in tonnes CO<sub>2</sub>)**



### **4.3 Carbon legislation**

#### **Carbon Reduction Commitment (CRC)**

This legislation commenced in April 2010 as an emissions trading scheme whereby all organisations of a certain scale have to annually purchase emissions permits, at an initial fixed price of £12/tonne CO<sub>2</sub>. In effect this is now a simple Carbon Tax – the price per tonne for this year has now risen to £16.50, with an annual cost of £375,000 to the University. This legislation is currently under review by government. Under this legislation our CRC emissions were 22,259 tCO<sub>2</sub> in the year to April 2015.

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

This legislation requires all public sector buildings above 250m<sup>2</sup> floor area to display a certificate showing the energy performance of a building based on actual consumption, 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 CO<sub>2</sub> 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 250-500m<sup>2</sup>).

Including off-site residences the University now has to provide 63 DECs. This year the number of buildings in each category is: A:1, B:8, C:28, D:14, E:5, F:2, and G:5. 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 have reduced the number of G rated buildings from 8 in 2009 to 5 this year. We also voluntarily produce a DEC for the whole campus as a measure of our improvement. The rating for the whole campus is an ‘E’ with a rating of 106; in 2009 this was an ‘E’ with a rating of 120 – i.e. we have seen an 12% improvement overall. We have an interactive website showing all our DECs – see <http://bathuni.energyprojects.net/>

## 5.0 WASTE AND RECYCLING

The recycling rate for 2013/14 was 36% and it is expected that this rate will have remained level for 2014/15 as well. Although it is positive that recycling has not decreased it looks unlikely that we will meet the recycling target of 50% by 2014/15. This is despite significant work being done to improve the segregation of waste and to improve communication to both staff and students.

### 5.1 Operational

All the general waste produced at the University goes for treatment in a Mechanical Biological Treatment plant; this means that only approximately 10% of general waste goes to landfill. In 2013/14 over 1,445 tonnes of waste subsequently went to an Energy from Waste plant instead of going to landfill and an additional 213 tonnes of the waste was captured for recycling.

Work is always being done to find new routes for items to be recycled and to encourage the correct segregation of waste, and improvements have been made to the waste yard to make this process as easy as possible. Recycling of previously difficult waste streams has been increasing rapidly, including:

- **Confidential waste** – this is shredded on site and then recycled into tissue within the UK. In 2014/15, 38.2 tonnes of paper were shredded which is an increase of 8.4 tonnes from 2013/14.
- **Metal** – this is segregated on site including the breakdown of chairs, desks and shelving, plus any unwanted filing cabinets. This is placed in a metal skip in the waste yard and then scrapped locally. In 2014/15, 42.6 tonnes of metal were recycled, an increase of 19.2 tonnes from 2013/14.
- **Wood** – this is classed as “dirty” wood and includes pallets, desk tops and shelving. This is placed in a special wood skip and means that all the wood is either recycled or used for energy from waste. So far in 2015/16, 14.9 tonnes of wood have been diverted from landfill.
- **Unwanted furniture** – where possible any furniture that is in good condition is reused within the University, and some items have gone to a local Scout Troup (eg. 100 chairs). A partnership with a local company has led to a further 4.4 tonnes of furniture being reused or recycled so far in 2015/16.

The Accommodation Department worked hard during the summer of 2015 to ensure that as much furniture as possible was reused and recycled when Marlborough and Solsbury Court were refurbished. A number of items were donated to local charities as well, including:

- 20+ large kitchen tables to local charities
- 8 fridge/freezers to the Genesis Trust
- Over 1 tonne of duvets to local dog charities to be used as bedding

As far as possible, items were recycled, including all the unwanted bedding, duvets and pillows, with over 2.2 tonnes going to a local textile recycler. A large amount of furniture was also reused internally within the Department, replacing items which were at end of life, or were stored to replace items throughout the year. Furniture was broken down where possible with the metal and wood components being recycled.

### 5.2 Campaigns and Communication

The ‘Zero Waste’ end of term campaign has continued to improve, with over 17 tonnes donated to the British Heart Foundation in 2014/15. An additional 7 tonnes of items such as food, crockery and books have also been donated to local charities or offered to the next year’s students so they do not have to buy new items.

In 2014/15 the Accommodation Department challenged 4 different flats in the Quads, Marlborough and Solsbury Court to live “waste free” for a fortnight. They had support from their local accommodation staff, cleaners and porters throughout the process with the amount

of waste and recycling monitored before, during and after the trial. Recycling almost doubled in some flats, especially food waste, and general waste and contamination averaged at only 6% of what was thrown away. The students were encouraged to ask if they were unsure about any of the items they were throwing away and also to work together as a flat to be able to achieve a Zero Waste Lifestyle. Feedback from the students was mainly positive with some additional flats asking to be part of the trial.

In 2015/16 the campaign was rebranded as 'Less Landfill = More Planet' and in Semester 1 over 20 kitchen groups signed up to take part in the campaign; the same is planned again for Semester 2 which will mean that over 5% of students living on campus will have taken part.

Each year 5 students are employed as 'Green Champions' to promote recycling, energy-saving and other environmental topics to the students. They visit the students in their kitchens which is the perfect opportunity to discuss issues "on the ground" such as contamination of recycling. The Green Champions have also organised a number of events including stalls promoting Fairtrade, a vegan bake sale, textiles upcycling workshops and a Christmas stall promoting reuse. The Accommodation website has also been improved with a recycling A-Z provided to help students quickly check whether they can recycle certain items. Contamination stickers are also being used by porters, when emptying kitchen bins, to explain when items have been put in the wrong bin.

## 6.0 TRANSPORT

Our Environmental Policy includes a specific objective to minimise carbon emissions from regular commuting to and from campus by encouraging the use of car sharing, public transport, cycling or walking. The University monitors greenhouse emissions associated with commuting travel using the biennial travel surveys and will, once baseline data has been established, calculate the same for business travel. The last travel surveys were undertaken in 2014 and the emissions per annum for staff and student commuting are:

- Staff 2,063 tCO<sub>2</sub> equivalent
- Students 1,896 tCO<sub>2</sub> equivalent
- 0.263 tCO<sub>2</sub> per FTE staff/student

The University has operated a travel plan for the campus since 2002. It has implemented a number of transport improvements in recent years:

- In 2014, improvements were made 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 serving the site.
- In 2015, improvements have been made to public transport, with buses running 24 hours a day and the frequency of First services to the campus being increased. Improvements to the Arrivals Square have also been implemented to improve the efficiency and use of this main transport hub on campus.

Between 2007 and 2014 daily traffic flows associated the University have decreased from around 10,400 movements to 9,900, a reduction of 4.8%. 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 12,300, an increase of 58%. These changes are set against the staff and student population increasing by around 23% over the same period.

Despite reduced car movements, since 2007 peak parking levels have remained relatively constant with, in 2014, the maximum observed accumulation being 1,892 cars parked at 12:00 on a Tuesday which equates to around 96% of the overall number of parking spaces available on campus at the time of the survey. Hence over the last 7 years, the University has demonstrated an ability to grow by just over 3% 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 in previous years.

In terms of meeting the targets of the travel plan, this year the number of vehicle movements per head of staff and students was 0.634, which is a decrease (5.8%) compared with 0.697 in 2013. However these figures are calculated from Automated Traffic Count 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 the overall number of recorded vehicle movements.

Classified manual counts are also undertaken as part of the annual transport surveys on a single day. Based on this car trips per FTE staff/student head have fallen from 0.389 in 2011 to 0.362 in 2014, a reduction of 6.9%, 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 0.362, a reduction of 22.3%.

The 2012 and 2014 travel surveys highlighted an unawareness of the University's car sharing scheme, and hence this will be targeted as a way of reducing car journeys further. It should be noted that major construction work was being carried out at the University at the time of the transport surveys and that as a result the number of parking spaces on campus had been significantly reduced compared to previous years. Some permanent parking had already been provided in a new extension to the East Car Park as part of the development and overspill parking on grass adjacent to the West car park was allowed at the time of the surveys.

Car parking provision in 2014 increased from 1923 spaces in 2013 to 1966, hence parking on campus is still 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 compliant with the Euro IV standard for exhaust emissions and the University is looking to ensure that the remainder of the vehicles serving the University are compliant to this level.

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).

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 was 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.

Business travel is not part of the travel surveys at the campus, and limited 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 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 and monitor its carbon emissions.

The University has installed 6 electric vehicle charging points, with plans for 12 more on campus and one at Manvers St. We have also purchased 3 new electric vehicles for Estates and Security, saving an estimated 3tCO<sub>2</sub> every year.

## **7.0 BIODIVERSITY**

The University Department of Estates Landscape Section were the overall winners in the Environmental Project category in both the 2014 and 2015 'Bath in Bloom' competition. The areas judged in 2014 were the wildlife pond, the green wall at 8 West, the Jubilee Garden, the

Quiet Garden and the Wessex House rockeries, and in 2015 the award was for the planting around The Quads.

The University operates a LEMP (Landscape Ecology Management Plan); the following recent improvements have been made:

- Non-active flora has been removed from Quarry Road to preserve and protect underlying geology subject to a SSSI (Site of Special Scientific Interest).
- Work has continued to improve pathways through the wooded areas on campus; this improves the social amenity as well as actively supporting bat life on campus by providing suitable flight routes.
- Additional work has been undertaken to remove non-native flora from woodland areas and to replace with native wildflower species.
- Tree assets are subject to a "Tree Management Plan" that was developed in 2012; a number of trees were identified as requiring removal due to their poor condition. Where possible trees are initially reduced in height, rather than removed completely, in order to provide a suitable habitat for insects and other fauna. Log piles have also been established to further support habitat creation.
- A number of trees have been removed as a result of campus developments; in accordance with our tree strategy, each tree has been replaced with one or more saplings.
- Swales around the Sports Training Village and North Car Park have been cleared of willows, shrubs and non-native species and replaced with native herbaceous wildflowers.
- Additional wildflower planting has also been undertaken at various areas around site including the establishment of a "Wildflower Meadow" adjacent to 4 East South.
- The Natural Pond established in 2014 is reported as having become well established.
- Future projects include replanting the area around the Bobsleigh track with birch, hawthorn, hazel and pine.

## 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>). All major procurement activity is now subject to a sustainable procurement impact risk assessment which identifies those goods, services and works that provide the greatest opportunity to create a positive impact when procuring them. Where relevant, members of the Sustainability Team have been engaged and sustainability-related factors have been specified and evaluation criteria introduced within the supplier selection process. In support of this, where appropriate, a whole life costing approach has been used to capture the true cost of ownership for the University which may include elements of cost that directly impact on the University's environmental targets such as energy usage and disposal.

Work has begun to review and refresh the University's Sustainable Procurement Policy and associated Action Plan to ensure that it continues to support the University's strategic objectives and in particular the objectives detailed within the Environmental Policy. It is anticipated that the future Sustainable Procurement Policy will continue to embed good sustainable procurement practice and provide greater focus on the key areas outlined in the Flexible Framework (a sustainable procurement tool developed by DEFRA) of people, policy, process, supplier engagement and results.

## 9.0 CURRICULUM

A sub-group reporting to the Sustainability & Carbon Management Steering Group (SCMSG) has been set up to look at sustainability within our teaching across the University. This has:

- identified existing teaching modules within the University that include sustainability: units including some explicit aspect of sustainability accounted for 16% of all units and for 7% of core units;
- researched the importance of sustainability teaching on potential student segments: some research was conducted by the 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 themes that came out of this discussion was the desire for much more integration of sustainability within the curriculum;
- worked 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: this has established that about 27% of academic staff at Bath teach or research sustainability-related issues.

National research by the NUS also shows that 80% of students consistently believe that Sustainable Development (SD) should be actively incorporated and promoted by universities, and over two thirds believe that SD should be incorporated into all university courses. To build on this we are sponsoring a final year project in the School of Management which looks to get evidence from Bath students and prospective employers.

## 10.0 OTHER DEVELOPMENTS

### 10.1 ISO 14001 management system

Accommodation and Hospitality Services continue to achieve 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 department also supports initiatives such as WE-CARE, Student Switch Off, 'Less Landfill = More Planet', and Zero Waste.

### 10.2 Students' Union

The Students' Union (SU) environmental policy promotes a change in behaviour to use fewer resources and recycle more and has established an elected student role of Environmental & Sustainability Rep. to boost environmental student activity. The SU is represented on SCMSG and a regional green networking group involving the Estates Department, Bath Spa University, the local council, Bath College and Wessex Water.

In February 2015 and also October 2015 the Students' Union in conjunction with Estates and Accommodation & Hospitality Services ran a **Go Green Week** to promote environmental messages to students and staff. Both weeks followed a similar theme of:

- Meat free Monday
- Travel Light/Turn it off Tuesday
- Waste not Wednesday
- Turn it off/This Thursday
- Fossil free Friday

External companies and Bath and North East Somerset Council came on to campus to provide the students with information about environmental concerns; events included Bike Doctor, Fairtrade promotions, Love Food Hate Waste and a cycle-powered cinema.

The Students' Union Volunteering Team, as part of Student Volunteering Week, organised a "Big Spring Clean" litter pick on the popular walking routes in to Bath City Centre and collected over 20 bags of rubbish. 15+ volunteers gave up their Saturday morning to brave the cold and tidy up the streets. The event was supported by the Estates Department and also BaNES Council.

## **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. For more details of our sustainability research see <http://www.bath.ac.uk/research/>

*Peter Phelps - Energy and Environment Manager, on behalf of the Sustainability & Carbon Management Steering Group (SCMSG)*