

KEELE UNIVERSITY Sustainability Report 2013



Keele
University



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For information on environmental sustainability at Keele University please see:

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FOREWORD BY THE CHANCELLOR

Jonathon Porritt
Chancellor, Keele University

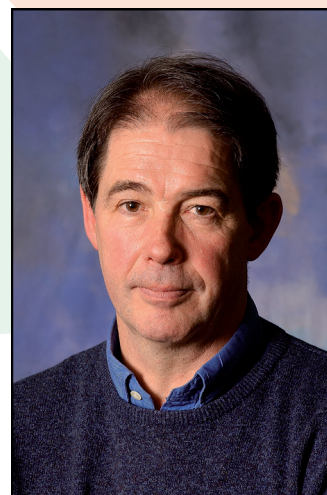
A key focus for me this year has been thinking about what the world might look like in 2050. If we don't make good, bold decisions today and in the coming decade or so, we are storing up massive problems for the next generation. There may be a debate about how quickly the climate is changing, but there is little doubt that it is changing, and, moreover, that there is a huge amount that we should already be doing to address the underlying problems.

How should a University be responding to these global issues? The first responsibility must be to ensure that all of our students are made aware of the issues (particularly climate change) during their studies. This is unlikely to work if the topics are forced on them, and that is not, in any case, the way that deep learning takes place. More effective must be the raising of sustainability within the curriculum of their own discipline, with the opportunity to discuss and explore the complexity that underpins almost all sustainability problems. The curriculum section (see page 10) of this report summarizes how Keele is attempting to do this.

Students should also be given the opportunity to be involved in sustainability outside their discipline-specific studies; this is an important

part of the Distinctive Keele Curriculum (DKC). The DKC provides the opportunity for students from any discipline to take elective modules that address sustainability, as well as opportunities to work with the community or support campus projects to improve the environment. And of course, these sorts of activities help develop important skills for the workplace – e.g. problem-solving, communication skills, and team working.

However, there is also a responsibility for the University to be 'doing' as well as 'educating'. So it is crucial that all of the activities of the University reflect a commitment to sustainability – from recycling initiatives to the installation of low energy lighting, from ethical investments to the provision of cycle sheds, from using electric vehicles to running sustainability activities for the local community. Like every institution, Keele still has a long way to go - we've had a difficult year, for instance, in managing our carbon footprint, for all sorts of different reasons (see page 4) but this annual report also shows the impressive progress that the University has made on many other fronts.



INTRODUCTION BY THE VICE-CHANCELLOR

Professor Nick Foskett,
Vice-Chancellor, Keele University

This is the third annual *Sustainability Report*, and it demonstrates the considerable strides that Keele has made in addressing the complex issues of sustainability. If there was any suspicion that 2011 and 2012 were 'bumper years', and that the agenda might lose momentum, then this report should allay those concerns. We have seen major progress on almost every front, with a range of projects embedding sustainability within discipline curricula, a very successful year for research, several major estates initiatives (e.g. a major grant for low energy lighting in the library, and the installation of solar PV arrays), and more outreach activities than ever before – most notably through the Hub, which continues to thrive.

Underpinning all of the developments has been the fantastic engagement of Keele University community, and there are two examples of this that really stand out. The first is the enthusiasm with which the KeeleSU and the KPA have supported sustainability initiatives, and have been willing to find the time to be actively involved in so many projects; we see the fruits of this in the Sustainable Student Bungalow (which has

provided 'green' meals for over 100 guests), and through the activities of the influential Think:Green group. The second has been the response of over 100 staff engaging with the Green Impact project, again with involvement of our student community to help run and assess the work of the GI teams.

Not only has 2013 has been another very productive year for Keele's sustainability ambitions, but the projects have laid the foundations for longer term success, helping us in our aim to be the most sustainable campus university in the UK.



A handwritten signature of Nick Foskett in black ink.

Professor Nick Foskett,
Vice-Chancellor, Keele University

VISION AND KEY ACHIEVEMENTS



• Professor Pat Bailey,
• Pro Vice-Chancellor (Environment & Sustainability)

• This is our 3rd annual *Sustainability Report*,
• but it is important to remind ourselves of our
• vision for Keele University. Interestingly, the
• developments that we've seen over the past
• 3 years were underpinned by a 'deep green
• environmental vision' in 2008/09, but the
• whole concept of what we wanted to do then
• included issues of sustainability and justice. To
• more fully articulate our original intention, the
• vision now is that Keele should be an exemplar
• of a sustainable campus, with the principles
• of sustainability embedded in everything that
• we do as a community, and in our education
• and research.

• Keele's 50th anniversary year in 2012 was
• an important milestone in the University's
• commitment to sustainability. We appointed
• Jonathon Porritt as our new Chancellor – his
• very appointment made a bold statement about
• Keele's commitment to sustainability, but he
• has also been a wonderful friend (sometimes
• a critical one) and champion for everything
• that we have been trying to do. The Keele
• Sustainability Hub opened in October 2011, so
• 2012 was its first full year of operation. And 2012
• was also the year when Zoe Robinson (who
• won her National Teaching Fellowship that year)
• accepted the role of Director of Education for
• Sustainability, and we took on three Project
• officers to help us embed sustainability in the
• Keele University curriculum.

• This report provides a summary of our
• sustainability achievements in 2013. It is divided
• into about a dozen sections, so that we can
• see how sustainability has been developed
• within the various themes and across the
• whole campus, and it is the breadth of that
• engagement that really stands out. Just picking
• out some of the highlights, the Hub's reputation
• has shown that its first successful year was
• not simply due to its novelty – 2013 was more
• successful than 2012 by every measure, with
• the engagement with Schools (both at the
• Hub and through activities run by *Science for
• Sustainability*) being especially noteworthy. The
• engagement of the KeeleSU and KPA has also
• been a real feature of 2013, with the successes
• of the Student Eats project and the Sustainable
• Student Bungalow being highlights. We have
• also seen sustainability being embedded
• into both the curriculum and co-curriculum
• activities, through a range of initiatives
• supported by the Project Officers, with Green

Week being especially memorable. But special
mention needs to be made of *Green Impact*;
this is a nationwide project led by the National
Union of Students, but Keele has engaged more
people (ca 100, in 28 teams) than any other
University, and we'll see whether it has lived up
to its name when the assessments and awards
are made around Easter time.

The purpose of this report is not only to identify
our successes, but also to point to ways in
which we can improve. In the People & Planet
Green League Table (GLT), we improved our
position to 59th [and a solid 2(i) classification].
One reason for this modest performance is the
size of our estate and the relatively small size of
us as an institution, which penalizes us in several
of the metrics. Interestingly, the GLT analyses
are being delayed in 2014, whilst a major
review takes place concerning the way that the
metrics are assessed and the scores calculated.
Although that review is still taking place, we're
hoping that much more emphasis will be placed
on community action and sustainable education,
rather than being so heavily weighted towards
factors that are embedded in the estate (and
so are difficult to change quickly). This is not to
say that we shouldn't be tackling the big issues
concerning our estate, and the 150 kW of solar
PV and £340k of funding for LED lighting are
examples of progress in making our buildings
more energy efficient.

Nevertheless, there is one exciting vision for the
Keele campus that is all about its estate, and
the efficiency of its buildings. This is the plan
to develop our services infrastructure into a
Sustainable Energy Network, allowing economic
use of electricity, gas and heat, and powered
by low or zero carbon sources that lie under, on
and above our campus. If our plans gain funding
from local and national government, and from
HEFCE and EU sources, then we hope to be able
to use a mix of geothermal, coal bed methane,
wind, solar and bio-fuel energy sources to meet
the majority of our energy needs by 2020. This
is hugely ambitious, and there are many hurdles
to overcome if we are to achieve success but, if
we could deliver it, then it would undoubtedly
place Keele University as a unique exemplar of a
sustainable campus.

STUDENT ENGAGEMENT

Written by Victoria Taylor and Emmanuel Blondel

Green issues have continued to be championed at KeeleSU with the support of Think:Green and a number of dedicated student volunteers, who successfully work alongside the University to champion environmental issues amongst students, staff and the wider community. KeeleSU are participating in the Green Impact scheme and we are keen to build on our successes from last year. We've made some internal changes so that all of our take-away containers are fully compostable, and we're also keen to invest in the generation of bio-diesel for use in the Safety Buses we run. KeeleSU are continuing to support the University's sustainable development by helping our members to drive change and by engaging with larger projects, such as Green Week, with online promotion and incentives.

We're excited to be involved with the campus-wide Green Week initiative; we will be encouraging students to participate in the variety of activities across campus by providing free entry to the Students' Union, and encouraging our full and part-time officers to make the most of the experiences provided during the week.

The positive working relationship between the Students' Union and the University has continued with an increased focus on wider student engagement, with which we're really happy to be involved. There are some exciting student-led focus groups that will provide a really useful insight into the ways we can develop students' relationship with sustainability issues on campus and at home.

There are two key student-led projects which have really rocketed this year; the projects are mainly promoted by current students who reiterate their commitment to sustainability and ethical issues, at Keele and much further beyond. KeeleSU are incredibly proud and supportive of these students and the change they can make to the local community.

The Student Sustainable Bungalow Initiative:

The Student Sustainable Bungalow project is now in its third year, with its third group of 'housemates'. Each year the student 'housemates' are able to explore ways that they can live more sustainably, in a standard 1960s bungalow on the University campus. This year, the four students living in the house (Alex Melson, Andrea Grainger, Sophie

Kilgallon and Emmanuel Blondel) decided to take the house in a slightly different direction. Identifying that among students, the house was still unfortunately rather unknown, they started a system of providing free vegan meals to those who wanted them, funded largely through donations and bulk buying from local producers, thanks to a team of about a dozen close knit and committed students. The Students have fed over a hundred unique guests, according to the data they have collected, and while they are now scaling back this part of the project to only a few days a week, they are happy that the word has successfully been spread much further than ever before. They will be using their new support base to focus on the garden in the coming spring and, having taught many about the environmental advantages of a more plant-based diet, they can teach other students how they can live a more sustainable lifestyle.

Student Eats

The student food-growing scheme is going from strength to strength in its first true year of activity, after the launch of the project in April. After a tough but surprisingly productive summer, during which many students and residents who were still on campus lent their muscles and minds, a fresh new committee has been elected, tasked with carrying out the aims established at the wonderful Visioning Workshop that took place earlier this autumn. A multi-section compost bin is under construction from old pallets, and a series of workshops have got the team thinking and learning. We are all very excited for the spring, which the hard work of the last 8 months has really been leading up to, so come down and join us on our Friday lunchtime sessions, 12:30 in the Lindsay Walled Garden.



“There are some exciting student-led focus groups that will provide a really useful insight into the ways we can develop students' relationship with sustainability issues on campus and at home.”



UNIVERSITY CARBON MANAGEMENT PLAN

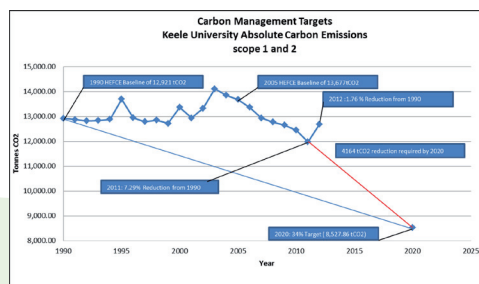
Keele University is committed to a reduction in absolute carbon dioxide emissions of 34% by 2020 based on 1990 levels, but 2012/13 has been a challenging 12 months. One problem is that the targets are based entirely on the 1990 data, irrespective of growth in student numbers (now about double the 1990 numbers), longer opening hours of some buildings (e.g. 24/7 for the library during term-time), and other buildings being included in the University's estate. The weather was also unhelpful (hard winter in 2012/13), and the following data summarise the out-turn of the utility use for the year 2012/2013 compared to the year 2011/2012.

- Gas consumption increased by 5,860,631 kWh or 19.6%
- Electricity consumption increased by 248,336 kWh or 2%
- Water consumption increased by 7,927 m³ or 3.4%

Carbon Dioxide (CO₂ Emissions) Performance

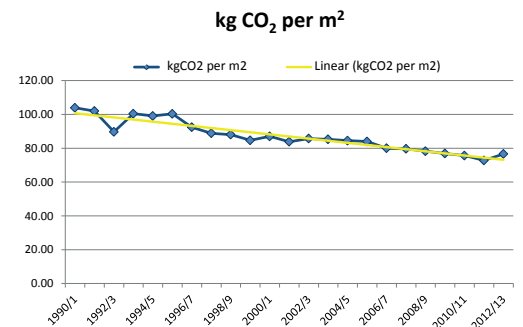
Due to increased utility consumption in the past year our Carbon Dioxide (CO₂) Emissions Scope 1 & 2 (energy related emissions) have also increased by 713 tCO₂ or 5.21% from last year.

- **Keele University 2012/2013 annual emissions - 12,693 tCO₂ (Scope 1 & 2)**
- HEFCE 1990 baseline for Keele University - 12,921 tCO₂
- HEFCE 2020 target for Keele University - 8,528 tCO₂ / 34%
- Current reduction against 1990 target - 228 tCO₂ / 1.76%



But correcting our emissions for the floor area of buildings, we're doing quite well:

- **Keele University 2012/2013 annual emissions/floor area - 76.59 tCO₂/m²**
- HEFCE 1990 baseline for Keele University - 103.91 tCO₂/m²
- Current reduction against 1990 baseline - 27.32 tCO₂/m²/ 26.29%



Salix report

The University has participated in the SALIX/HEFCE revolving Green Fund, which is used to implement energy saving projects that will pay back within five years, and the estimated savings are put back in to the fund to be reused. We have won several major Salix awards that have allowed major upgrades, and we were delighted to win £340k in 2013, primarily to fit out the library (with its 24h opening policy) with low energy LED lighting.

Carbon Reduction Commitment (CRC) report

The University is a participant in the Carbon Reduction Commitment (CRC) Scheme based on the amount of electricity and gas it consumes annually. This scheme was initially designed as a carbon credits trading process that encouraged energy efficiency and reduction, with repayments associated with league table performance. The University achieved its early targets: Automated Meter Reading (AMR) on all primary meters and a recognised energy efficiency accreditation such as the Carbon Trust Standard (year-on-year reduction in carbon emissions). Renewal of the Carbon Trust Standard was achieved in 2011, with the University achieving good assessment marks (90% in all categories) ...

but the government then withdrew from the repayment scheme. The scheme is under review at present, and national consultations have taken place to see if a simpler and fairer scheme can be devised. It is also worth noting that the carbon price per tonne is planned to rise to £20 by 2020.

Data & results

Baseline 2012 figure - 12,690 tCO₂

Financial Cost @£12 per tCO₂ = £152,280

Submitted 2013 figure - 12,086 tCO₂

Financial Cost @£12 per tCO₂ = £145,032

Key Developments

TDEC and EPC as a measure of energy efficiency

The University is required to comply with the Display of Energy Certificates (DECs) and Energy Performance Certificates (EPCs) under the European Building Performance Directive (EBPD). The main criterion that affects Keele University to date is to display DECs in building over 500m² with access to the public. For accommodation buildings, 6 are B rated and 2 are D rated; for academic and central services buildings, only one of these (the newest) is A rated (Claus Moser), with most being C or D. This means that there are obviously opportunities for improving the energy efficiency of most of our buildings - although retro-fitting of energy-saving features is very costly.

Automated Metering of Electricity

The University is able to monitor, through its own installed automated metering system, the half hourly electricity to the major buildings on campus. This allows for the detailed monitoring of the building's use, which is used to create annual consumption graphs to target improvements. Annual electricity consumptions for these main buildings/areas are detailed below based on performance against previous year (2011/2012).

Solar PV

Last year we completed a full feasibility across campus for the installation of solar photovoltaic arrays. The University committed £300k to this project, and installed three 50KWp systems in March and April of 2013. These arrays will provide ca 115,000 kWh of free electricity per year, and save ca 60 tonnes of CO₂ per year.

Future Developments

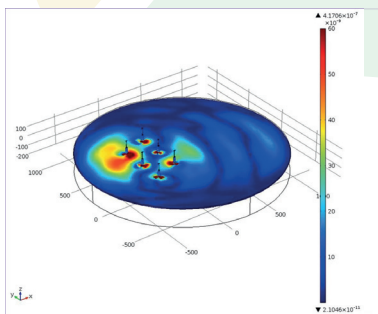
Currently we are evaluating a number of projects and opportunities that will meet the Salix criteria, including:

- Accommodation lighting - Kitchen lights
- Lighting Control - occupancy sensors
- Fridges & freezers - replacement programme with efficient equipment and controls
- Fume cupboards - efficient controls
- Building fabric - insulation & glazing
- HVAC & Chilling
- ICT - opportunities arising from consultant's report
- BEMS - continual improvement programme and monitoring
- Zoned Heating - Lindsay district heating area
- Spirotech - Dirt Separation on heating systems

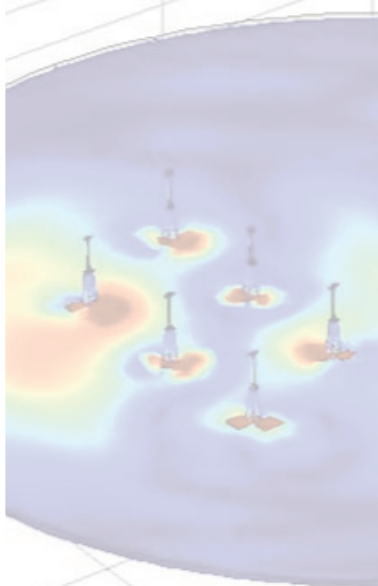
Other opportunities that become available through new technologies will be evaluated and considered if applicable to Keele University and its estate. Along with these specific projects, we are planning to increase our automated metering in the student accommodation, increasing the amount of accurate real time information on the electricity consumption in each block. We hope that this will encourage all of the resident student population to be responsible for electricity use in their own 'homes'.



RENEWABLE, SUSTAINABLE AND LOW CARBON ENERGY



Infra-red thermal Image of part of the Sustainability Hub. Bright values indicate heat loss



2013 has perhaps been most notable for the external influence which Keele, and our model for low-carbon, locally-derived energy delivery, has had on our neighbours (in the widest sense) as surrounding councils and local authorities have begun to act on projects for which we were instrumental in sowing the seeds. Closest to home, Stoke-on-Trent Council, in conjunction with the Local Enterprise Partnership and with the aid of Keele University, have made a strong approach to Government under the City Deal scheme, based on using Stoke as a demonstrator as to how industrial and post-industrial cities can turn what are often seen as legacy problems to their advantage. These include plans to capture and use:

- Abandoned mine methane released from the old mined seams and present in the south of the North Staffordshire coalfield;
- Mine water geothermal which is warm water, at the surprisingly high temperature of ca 40 °C, from the northern part of the Staffordshire coalfield;
- Deeper geothermal from beneath the coal measures, directly building on work carried out with iGas on Keele campus;
- Plans for coal-bed methane to help power the ceramics industry and help restore their global competitiveness.

Just over the border, Cheshire East have now recognised work which was done in a project for the MSc in Environmental Sustainability & Green Technology, which evaluated the potential of the deep Permian rocks of the Cheshire basin; this suggested that there was excellent potential in the Crewe area, and a plan to drill between Leighton Hospital and the Bentley Factory are under way. We have also had some input to the Central Manchester Oxford Road deep geothermal scheme, which is planned to deliver heating to the Hospitals and University quarter; our knowledge of issues associated with induced seismicity, as exemplified by a cluster of minor earthquakes which troubled the citizens of south Manchester a few years ago, has provided valuable information for the geothermal plans.

The environmental issues which have become (rightly in some case and not in others) associated with shale gas has kept Peter Styles and Ian Stimpson busy, as the demand for talks and lectures has been relentless. Their expertise has been sought through visits to the Ukraine (who are very eager to become independent in energy generation and reduce reliance on Siberian pipelines), and Western Australia (where there are large reserves of unconventional gas but which lie in tribal ownership ... which raises many issues that are environmental, political and sociological).

The School of Physical & Geographical Sciences is a major part of a collaborative programme called ReFinE (Research on Fracking in Europe) funded by a consortium of Energy companies and NERC; the initiative is addressing technical, environmental and socio-economic issues, and is led by Durham, with Keele, Heriot-Watt and Newcastle Universities as partners.

The long-running research carried out by the Applied & Environmental Geophysics Research Group on environmental vibrations from wind turbines, and the potential effects on the Comprehensive Test Ban Treaty, led to a new area of research with National Grid who are part of the White Rose Partnership; this proposal aims to capture CO₂ from the giant DRAX power station, and transport it to the North Sea for sequestration in deep saline aquifers. This is, however, where large offshore wind farms are planned, and this raises the issues of whether turbine vibrational noise and vibration might affect the capability of monitoring the stability and permanence of storage of these greenhouse gases. Rachel Westwood and Sam Toon were able to use techniques developed for Eskdalemuir to model the potential effects of large offshore wind turbines, and an example of the modelled wave-field is shown below, illustrating how an array of turbines can act as a focussing beam through constructive interference, thereby leading to enhanced wave propagation in specific directions.

ESTATES DEVELOPMENTS

Transport and Travel

The University has won funding from the Local Sustainable Transport Fund (LSTF), and the main benefits to Keele University have been as follows:

- A new cycle store at Barnes Halls of Residence has been installed; the store has room to accommodate 28 bicycles and has electronic access control via the Keele Card System.
- A baseline survey has been carried out to determine current travel behaviour amongst staff and students, and to identify barriers to (and awareness of) sustainable modes of transport; the aim is to identify how best to encourage a step change in the way that people travel, and for this to inform the prioritization of potential future funding.
- Cycling Training and Maintenance Sessions facilitated by "Bikeright". The activities were very popular, and included a bike bus on the SU car park, where staff and students could find more information about cycling and have free maintenance checks on their personal bicycles.

Electric vehicles

In order to reduce the environmental impact from the University's vehicles and improve efficiency, the Post Room van was replaced in September 2012 with an electric vehicle. To date, the van has travelled 4,800 miles and saved 1.2 tonnes of CO₂e, compared to a conventional petrol van.

The University has also taken the long-term loan of a Nissan Leaf 100% electric vehicle. The vehicle is used by University staff to attend local meetings and events, and it has travelled more than 2,000 miles in its first 12 months on campus.

Green Impact Scheme

It's critical to engage effectively with staff and students at the University to increase efficiency and reduce our environmental impact, and 2013 has seen the launch of 'Green Impact' at Keele University. This scheme, led by the National Union of Students, uses an environmental action approach, creating a structure for individuals to bring about small changes that together have a big impact. It has been running

for 5 years, and is used by over 50 Higher Education and Further Education Institutions.

We are delighted with the support the scheme has received at Keele, with over 70 staff and students attending the launch event, with 28 teams with over 100 members active within different buildings.

Teams log-on to an online workbook, and tick off actions as they go. The actions are grouped under themes:

- Greening teams, action plans and communications
- Waste
- Energy
- Transport
- Procurement
- Water
- Well-being

This scheme is proving to be huge success due to its collaborative approach, and the support from a range of stakeholders across the institution.

Student Eats

Keele University was selected as one of 18 institutions to take part in the Student Eats Project. This scheme, funded by 'Local Food' and the 'Big Lottery Fund', will create a network of new local food growing sites on 18 English University and College campuses. At Keele University, the funding has been used to develop our Allotment Site, so as to provide additional space for the Student Society to grow its own food. Student Eats has also supported the existing food growing at the 'Student Sustainable House' on campus, which is an exemplar of sustainable student living.

Over £7,000 pounds has been spent from the Student Eats funding on providing a growing space, water points, fencing and supplies of equipment. Produce grown by the students has been sold to students and staff on campus, and the money raised will be put back into buying seeds for next year's growing calendar.

The Student Eats Project was recently awarded Level 2 (from 5) in the RHS *It's Your Neighbourhood Awards*.



WASTE AND RECYCLING



The current 'Waste and Recycling Contract' has been in place since 1st November 2010. In the 3 years since then, there has been a considerable increase in the availability of recycling facilities on campus.

The University campus creates a range of different wastes, ranging from green waste generated by day-to-day grounds maintenance to office waste and food waste from our catering outlets. All of the different waste products need to be handled and disposed of with as little environmental impact as possible. The University is increasing awareness to ensure waste is reduced at source, such as reusing office furniture and equipment. Where reduction and reuse isn't possible, we are improving our segregation for recycling. Our main recycling streams include:

- Dry mixed recycling (paper, cardboard, plastics and cans)
- Glass recycling
- Food waste – sent for anaerobic digestion
- Waste cooking oil- reused offsite
- Green waste – composted

In total, over 60% of the University's waste is recycled but there are still many more improvements to be made – we need to develop the facilities to make recycling easily accessible whilst also raising awareness of staff and students. The University's existing Waste Collection Contract will expire in 2014; the new contract will be used as a springboard to develop further the waste and recycling facilities and awareness at the University.

Some of the key improvements over the last year include:

• New External Recycling Bins

There are 8 new and improved external waste recycling bins installed at key locations around campus; these new installations will improve the access to recycling bins and also raise the awareness of recycling on campus.

• British Heart Foundation Collection Points

A British Heart Foundation collection point has been placed in each of the Halls of Residence on campus. The campaign aims to encourage students to donate unwanted textiles, books, bric-a-brac, CDs and DVDs to be sold in the British Heart Foundation's local shops. Since the collection points were introduced in late

May 2013, over 2 tonnes of waste has been diverted from landfill, raising over £6,000 pounds for the British Heart Foundation charity.

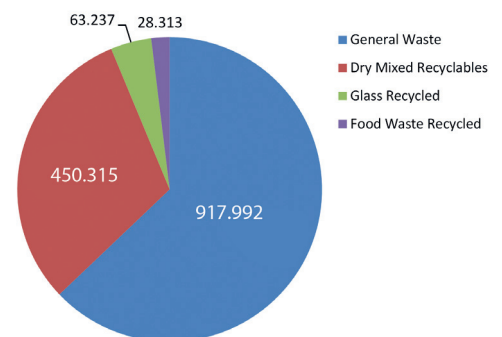
(Insert: picture of BHF campaign)

• Recycling Awareness Material

Waste recycling awareness flyers have been produced in conjunction with the Local Authority, Newcastle-under-Lyme Borough Council. The new flyers have catchy slogans, and are aimed at students. The flyers have been distributed to students on campus and in Halls of Residence, whilst the Local Authority has run its own bespoke campaign to students living off campus. It is hoped that the new and consistent design will bring familiarity to students when living on and off campus, and so help improve the amount of recycling.



Total tonnes of waste



Keele's waste: Total tonnes of waste produced from Academic, Central Services Buildings, Catering Outlets and Halls of Residence in the 2012/2013 year.

SUSTAINABLE PROCUREMENT AND CATERING

A Sustainable Procurement Steering Group has been set up to develop policies across the University. Following best practice, the group will target achieving a Level 4 of the National Public Sector Flexible Framework for Sustainable Procurement.

Print Strategy and e-Procurement – environmental benefits

A new print rationalisation strategy has been introduced to reduce the number of desktop printers and replace them with new efficient centralised printers (multifunctional digital printers). The removal of 600 printers and replacement with centralised energy efficient devices is calculated to save the energy equivalent of travelling 219,361 km in a car. An e-Procurement system (Parabilis) was implemented in April 2011 and was further enhanced in April 2013. Parabilis enables purchase orders and invoices to be processed electronically, increasing efficiency, sustainability and enhancing best procurement practice. Some 13,000 purchase orders have been raised and sent electronically to suppliers, removing the need to print the Purchase Order. In addition to this, 4,160 invoices have been processed in a fully electronic manner.

“... replacement with centralised energy efficient devices is calculated to save the energy equivalent of travelling 219,361 km in a car.”

University catering outlets

The University catering outlets are aiming to embed sustainability within their products and operations. A range of improvements have been implemented including: all eggs purchased are free range and locally sourced; food waste is recycled; the majority of fish purchased is certified to the Marine Stewardship Council (MSC) standard; and Fairtrade products are sold and promoted. Some of the highlights over the past year have been:

- In order to reduce the environmental impact, a charge was introduced for purchasing **plastic bags** at the University's supermarket (Campus Store). In 2011/2012, 176,000 carrier bags were used by customers at the Campus Store. After a charge of 5p per bag was put in place during 2012/2013, the amount of bags used by customers reduced to 142,000 - a 20% reduction.
- Both the University and KeeleSU catering outlets have introduced more **sustainable takeaway material** that can be recycled, such as cardboard takeaway trays.
- “Le Café” now sells **“Grumpy Mule” Coffee** that is (Triple-certified) Fairtrade, Organic and Rainforest alliance certified. This message is being conveyed through branding in Le Cafe, Vite & Eat and Medical School Cafe.
- **Fairtrade fortnight** (25th Feb – 10th March) was celebrated with a number of events including a Fairtrade pledge tree, gift stall, and 5-a-side football tournament.



SUSTAINABILITY IN THE CURRICULUM AND STUDENT EXPERIENCE



Our approach to embedding sustainability in the curriculum

Keele is committed to embedding sustainability into all of its educational programmes, to offering co-curricular sustainability opportunities for all students, and to developing a culture of sustainability within the University. As a key part of the strategy for embedding sustainability education into the curriculum and culture of the University, devised during Keele's participation in the Higher Education Academy's (HEA) Green Academy Change programme in 2010/11, sustainability was named as one of three core themes (alongside employability and internationalisation) in the Distinctive Keele Curriculum. As a result of this development and the presence of sustainability education in the Keele Graduate Attributes, all programmes are required to address these areas through their curriculum, and additional opportunities for students to engage in these areas are sought in various co-curricula offerings.

Putting sustainability at the heart of the curriculum and student experience at Keele continues to follow a multi-strand approach covering the following areas:

- *Staff development*, through one-to-one consultation, and Education for Sustainable Development (ESD) workshops tailored for different disciplines and for new lecturers
- *Integration into undergraduate and postgraduate taught programmes* as part of the Distinctive Keele Curriculum, which sees Sustainability as one of three strands alongside Internationalisation and Employability running throughout students' curriculum and co-curriculum experiences
- *Discrete undergraduate sustainability modules*, such as the 'Greening Business' elective available to all 1st year undergraduate students, giving students the skills and motivation to drive positive sustainability change in organisations
- *Integration into PGR training*
- *Specific sustainability-related programmes*, such as the BSc in Environmental Sustainability, BA in Environmental Studies, MSc in Environmental Sustainability & Green Technology, MAs in Climate Change Studies

and Environmental Politics

- *Co-curriculum developments* for students to become involved in sustainability projects, through volunteering, campus-based sustainability developments, research projects, and student-led projects such as the Sustainable Student Bungalow
- *Continuing Professional Development activities*, building on the success of Project Green, Keele Connect and Destination Green, using our sustainability expertise to expand sustainability education beyond the boundaries of the University campus, to business and local communities
- *Teacher education*, through integration into PGCE programmes, and exploring the meaning of ESD for trainee teachers' own subject specialisms, for example considerations of 'green ICT' in ICT, or the renewable nature of building materials in the Tudor period of history

Under the environment/sustainability theme, we have about 200 undergraduates studying a variety of programmes, and a similar number of postgraduates. All of these courses (UG and PG) have a project component, often in collaboration with industry, and many of these will be directly aligned with activities in the Keele University Sustainability Hub, thereby enhancing its materials, resources and outreach capability. At the doctoral level, members of academic staff run a prestigious two week summer school on environmental politics and policy for twenty international PhD students, funded by the European Consortium for Political Research.

New Education for Sustainability developments in 2013

2013 has seen Keele developing its reputation for the provision of sustainability within the curriculum and student experience. Below are some of the highlights of 2013.

Establishment of the Education for Sustainability team and sustainable education consultancy

Following the appointment of the University's first Director of Education for Sustainability in 2012, 2013 saw the establishment of a full

'Education for Sustainability' team, with the three Sustainability Project Officers, Philippa Calver, Giulia Mininni, and Rebecca Laycock becoming established. One of the activities of the team has been to support individuals to embed sustainability into their curriculum. For example, the team has played a role in bringing together materials for the new 'Sustainable Chemistry' module run by Katherine Haxton (Chemistry), and in helping tailor an essay assessment for 60 students on the Humanities & Social Science Foundation year, with Robin Bell (English Language Unit).

Sustainability and staff development

The Staff Sustainability Survey showed that only 15% of academic staff respondents felt they had undertaken any training related to sustainability. There are an increasing number of sustainability-related staff development opportunities at Keele, including a session on 'Higher Education for Sustainable Development' as part of the Teaching & Learning in Higher Education Programme undertaken by all new academic staff. A workshop on 'Keele's sustainability activities and vision' is run as part of the Keele Knowledge Programme from the Learning & Professional Development Centre and is repeated throughout the year, along with bespoke training events as requested by programme areas. In January 2014, Keele will host a workshop as part of the Higher Education Academy's Thematic Seminar series entitled 'New to ESD: Integrating Education for Sustainable Development in teaching and the student experience'.

New sustainability programmes and developments

2013 saw the start of a new dual honours BA in Environmental Studies run by the School of Politics, International Relations and Philosophy. The programme is designed for students with environmental interests who do not want to cover the scientific aspects of the subject, and it complements the existing two undergraduate programmes run from the School of Physical & Geographical Sciences - the dual honours/Major route BSc in Applied Environmental Science, and the highly interdisciplinary single honours BSc in Environment & Sustainability. Both the Applied Environmental Science and Environment & Sustainability programmes

have been accredited by the Institution of Environmental Sciences, and have opened new four-year programmes with a work placement year between the second and final year. This gives the student the opportunity to gain significant work experience within the environmental sector as part of their degree.

New discipline-specific sustainability modules

A number of disciplines which may not traditionally be associated with sustainability have started to integrate sustainability into their teaching programmes. In 2011/12, the School of Pharmacy started a module called 'Sustainable Pharmacy' as a third year option module as part of the MPharm degree, and have since further embedded sustainability into core teaching for a wider number of pharmacy students. This year, the single honours chemistry route introduced a module called 'Sustainable Chemistry'. Other recent sustainability-focused modules across different disciplines include a new History module entitled 'Nature, Society and the Past: An Environmental History of the Western World 1800-2000' and 'Environmental Ethics' run from the School of Politics, International Relations & Philosophy.

Consultation and communication

2013 has seen the continuation of regular sustainability consultation events for staff and students through a 'Sustainability Forum' held during Green Week in February and again in November. This provides an opportunity to discuss ideas for sustainability improvements in the overall staff and student experience, and for students to feed these directly to those with responsibilities for environmental and sustainability activity at Keele. Minutes from these meetings are available from the Green:Keele website.

Throughout 2013 the Green:Keele website has been further developed to provide a summary of sustainability-related activities at Keele; 2013 has also seen the start of a tri-annual Green:Keele newsletter, circulated electronically to all staff and students, aiming to keep the Keele community up-to-date with sustainability initiatives around the University. The occasionally published 'Keele Times' newspaper also carries sustainability-related articles in each issue.



SUSTAINABILITY IN THE CURRICULUM AND STUDENT EXPERIENCE (CONTINUED)

Sustainability and problem-based learning

This year saw the end of a major three-year HEA-funded project in collaboration with the Universities of Manchester and Staffordshire, entitled 'Hybrid PBL: A scalable approach to sustainability education'. This project investigated the potential for using online technologies to deliver problem-based learning (a method we coined as 'hybrid PBL') for sustainability education. To disseminate the results of the project, four day-long workshops were held across the country, at Keele, Glyndwr University (near Wrexham), University of Gloucestershire, and London South Bank University; over 100 delegates attended these workshops, and a toolkit was produced which is available for download at: http://www.heacademy.ac.uk/assets/documents/ntfs/projects/Final_Report_Keele_Hybrid_PBL.pdf

Future developments

Much of 2013 has been spent planning for new developments, including piloting the inclusion of discipline-specific sustainability issues as a vehicle for generic skills development as part of the Distinctive Keele Curriculum. For example, 1st year physiotherapy students will practice their note-taking skills at a mock NHS Sustainable Development Unit conference. The overall aim is to embed sustainability into many different areas of activity in the University so it truly becomes part of every staff and student's experience at Keele and part of the very culture of the institution.

*For further information of sustainability curriculum developments and projects at Keele contact Dr Zoe Robinson:
z.p.robinson@keele.ac.uk*



RESEARCH

In 2013 Keele has continued to strengthen its reputation as a broad-based research-led University, with a further significant increase in research grant income on the previous year's record level, and further growth in postgraduate research student numbers creating a vibrant research environment. In 2013, we also saw Keele make its submission to the 2014 Research Excellence Framework (REF 2014), the UK government's research assessment exercise held every six to seven years, and we made a submission under an environmental Unit of Assessment for the first time.

Several large collaborative research grants in the sustainability area, four of which are briefly described below, have contributed significantly to Keele's research grant income and external research profile, as well as a large number of smaller research grants across many different disciplines. One of Keele's real strengths in sustainability research is both its interdisciplinarity and multidisciplinary, involving academic staff from many Schools and disciplines, including: environmental science, earth science, physical and human geography, life sciences, chemistry, mathematics, computer science, psychology, politics and international relations, law, sociology and social policy, education, economics, business and management, English and history. Across the university, over 60 research students and research assistants are engaged in a wide range of exciting research projects in the area of environment and sustainability.

Within the Research Excellence Framework there is no distinct Unit of Assessment (UoA) for sustainability, with units of assessment being largely on single discipline lines. Thus staff undertaking research in different areas of sustainability formed part of the submissions to ten of the seventeen UoAs to which Keele made returns, most notably the submissions to Earth Systems & Environmental Science, General Engineering and Politics & International Studies. These submissions included a number of strong impact case studies based around Keele sustainability research, which has had significant societal, political or economic, as well as environmental impact.

In the 2012 Sustainability Report we covered our RECKKN project, 'Reducing Energy Consumption through Knowledge Networks',

a large £500k interdisciplinary project. It was one of only seven proposals funded jointly by the ESRC and EPSRC under their 'Energy and Communities' collaborative programme, with a project team consisting of Professors Andy Dobson and Mark Ormerod, and Drs Phil Catney, Sherilyn MacGregor and Zoe Robinson, which combines our expertise in social and natural sciences, as well as the Marches Energy Agency (a nationally renowned third sector energy awareness organisation). The project has just finished, and has compared four communities within Newcastle-under-Lyme and Shrewsbury with different socio-economic profiles, and in particular working with households within these contrasting communities to identify how information and knowledge about energy is shared and circulated between people and organisations within these communities. The project has produced some really interesting and important findings, which have been presented at a number of major conferences, through three publications to date in Energy Policy and Local Environment, and through two videos aimed at communities and policymakers and stakeholders.

More information is available at: <http://www.recckn.org.uk/>

By investigating these 'knowledge networks' the team has shown that trust is a key issue, and that to increase people's energy knowledge and change their energy behaviour, existing networks that they trust are really important, and a move away from the idea that energy information provision should always be a one-way top-down process is required. With reducing energy use and the price of energy being key political and societal issues, the findings from the project have huge relevance to future energy policy, including the Green Deal, end use energy reduction and fuel poverty.

Dr Sami Ullah (Environmental Science) is part of a large £2.5 million NERC consortium grant, "Analysis and simulation of long-term/large-scale interactions of C, N and P in UK land, freshwater and atmosphere", involving eight partners - Keele University, Liverpool University, Lancaster University, University College London, NERC's Centre for Ecology and Hydrology, British Geological Survey, Rothamsted Research and the James Hutton Institute. Dr Ullah and his research group are



Dr. Sherilyn MacGregor, part of the RECKKN project



RESEARCH (CONTINUED)

investigating the impact of landscape position and land use on soil denitrification rates in the Ribble and Conwy River watersheds in the UK. The research is highly relevant to both global change and food security, and has significant ecological and socio-economic implications. Understanding the impacts of fertilizers and land use on the amount of nitrogen in the soil is of critical importance in informing us how best to deploy fertilizers in the future.

Professor Mark Ormerod, Professor of Clean Technology (Chemistry – Sustainable Energy and Materials) is leading a large, multidisciplinary £1.4M UK-India collaborative project funded by Research Council's UK Energy Programme and the Indian Department of Science & Technology, 'Modelling Accelerated Ageing and Deactivation in Solid Oxide Fuel Cells (SOFCs)' (MAAD-SOFC), involving Keele, Birmingham and Loughborough Universities and the Indian Institutes of Technology in Madras, Hyderabad and Delhi. The three and a half year project is investigating deactivation and ageing in solid oxide fuel cells, developing, testing and modelling new SOFC materials running on a range of hydrocarbon fuels (including biogas), with the aim of gaining greater insight into the various deactivation and ageing mechanisms in SOFCs, and ultimately developing more tolerant and durable SOFCs.

In related research, Dr. Richard Darton and Professor Ormerod have discovered a series of entirely new catalysts, based on novel perovskite materials made by a hydrothermal synthesis method, which show excellent activity and very high selectivity for the reforming of waste biogas. The catalysts show dramatically improved resistance to undesirable carbon formation, which leads to catalyst poisoning, compared to conventional supported catalysts. Two patents have been successfully filed covering these novel materials, which offer genuine potential for the conversion of waste biogas, which is currently largely vented wastefully and detrimentally into the atmosphere, into useful chemicals and energy.

Dr. Sami Ullah, part of a team investigating the impact of landscape position and land use type on soil denitrification rates in the Ribble and Conwy River watersheds.

Maria Heckl (Applied Mathematics), who was promoted to Professor of Engineering Mathematics in 2013, is leading a large European consortium Initial Training Network grant entitled 'TANGO'. It is a multi-disciplinary project that provides training for research students in fluid mechanics, thermodynamics, mechanical and control engineering, all from an analytical, numerical and experimental perspective. The consortium has been chosen so as to bring together complementary skills from internationally-renowned experts from both academia and industry. In recent years, the development of clean combustion systems with reduced emissions and environmental pollution has become a priority. However, devices such as gas turbine engines and domestic burners are particularly prone to combustion instabilities, and there is an urgent need to understand the physical processes responsible so that methods to predict and prevent these instabilities can be developed. The TANGO project is taking a multi-disciplinary approach to address these issues. Fundamental studies are giving insight into the three-way coupling between sound, combustion and vortices in a combustion chamber, while on the applied side, active and passive control methods to allow safe operation of gas turbines on a variety of fuels and operating conditions are being developed.

Our research strengths and expertise in environment and sustainability have continued to underpin successful research-related enterprise activities and interactions with business, and our outreach and public engagement activities, in both of which we have a nationally leading reputation and have won significant external recognition and awards. More detail on this is covered in the following sections.



OUTREACH

Halloween at the Hub

After its success last year, Halloween was again the focus of a spooky science event called Spooktacular, and that attracting more than 200 participants. Visitors listened to a lecture about the strange history and traditions of Halloween, and the scientific theory that could provide the answer to the mystery of the Salem Witches. They then had fun with hands-on activities during which they handled snakes and reptiles, learned about habitats, made fake wounds, prepared slime and took part in craft sessions using recycled materials. Pumpkin recipes were given out during a pumpkin-carving workshop, and visitors solved crimes using science. The event received such positive feedback this has now become an annual activity in the diary.

After dark, the Hub took a turn for the sinister as staff and MSc students put on a Murder Mystery production: 'Keeled Over' for 50 guests. This was set in 1949, the inaugural year for Keele University. Staff acted out a plot involving deceit and ambition around energy development, and guests had fun solving the mystery using forensic science techniques in the Earth Observatory.

Science by Stealth

The University has engaged the public this year through the fantastic facilities at the Sustainability Hub, with families making use of the Hub Family Fun Days every Wednesday throughout the school summer vacation period. These sessions were designed under the popular "Science by Stealth" banner, with families looking for mini-beasts in the Hub's Wildflower Meadow, learning about dinosaurs, encountering birds of prey, making bottle rockets from recycled materials, and even learning about senses with our messy barefoot walk featuring mud, sand and baked beans.

Chemistry at work

Keele University Sustainability Hub hosted schools and colleges this year as part of its wider outreach activities. Particularly successful was a one-day 'Chemistry at Work' event funded by the Royal Society of Chemistry, attended by around 150 pupils, with local employers from Johnson Matthey, Dermal Technologies Ltd and Erigal taking part in the event.

Green Christmas Fayre

The Green Christmas Fayre has now become an eagerly awaited annual event, and this

year it attracted over 300 visitors to the Hub to buy locally and sustainably produced goods. The event also featured a 'Swish', where guests could bring their unwanted clothes and swap them with other guests – this helped to raise awareness about waste, keep materials out of landfill, and provided people with some fantastic swaps.

Getting a buzz from sustainability

A geocache called 'Trees, Bees and Student Fees', organised by Dr Rachel Westwood and Dr Sam Toon, took place at the Sustainability Hub in March 2013, where members of the public used GPS to take part in a treasure hunt around the campus. This was one of a number of trails that are available from the Hub, allowing people to discover the amazingly diverse wildlife around the campus.

Biodiversity all around us

The Sustainability Hub hosted a Summer School for 60 pupils from Charlton Secondary School, where students spent two full days learning about plant nutrients, fertilisers, and soil tests; they also carried out ecological surveys in the Wildflower Meadow and the development site around the Hub looking at plant zonation, insect diversity and ecosystems. Pupils particularly enjoyed looking at bee and moth species, and even set a moth trap overnight.

Science for Sustainability

The popularity of the Science for Sustainability (SfS) outreach activities continued to grow. SfS focuses on development of sustainable approaches to our future energy and societal needs. To date, the group has delivered over 300 workshops for schoolchildren, schoolteachers and community engagement events, directly reaching over 9,500 school children from the ages of 5 to 18, 550 schoolteachers, and 17,000 members of the wider public. The bicycle-powered smoothie maker was added to the existing range of hands-on activities and proved to be a popular attraction, including at Bestival, a festival on the Isle of Wight that's attended by around 50,000 people. The group has also developed educational packs on waste for Veolia Environmental Services, and on waste electrical and electronic equipment for Valpak, a provider of environmental compliance solutions; these packs will be used to deliver school environmental education workshops throughout the region.

Physicubes

The Ogden Trust is a charity that supports a range of initiatives, programmes and projects to promote the teaching and learning of physics. Dr Sharon George received £10,000 funding from the Trust to design a range of interactive physics displays called Physicubes. The seven eye-catching and interactive portable stations are easy to use and can be aimed at most stages from nursery to A-Level education, and include a Stirling engine, a robot arm, solar PV and solar thermal displays, a light experiment and activities highlighting conservation of energy. A further grant of £10,000 per year for up to three years has been secured, to fund an Ogden Science Officer role to establish a partnership of local teachers, and to ensure that the Physicubes are rolled out to schools free of charge.



ENTERPRISE

Internships supported by Santander continue to be awarded by the University to a wide range of local small and medium sized businesses.

Sustainable Futures Summit

The Sustainable Futures Summit was a business led event, hosted at Keele University, exploring the actions needed to take to create a sustainable future for local communities across the UK. The event was nationally relevant with high profile speakers, and was a joint production between BITC in England West, hosted by Keele University and supported by business partners. The conference built on previous Mayday Summits convened by Business in the Community (BITC), and explored the 9 billion challenge and the risks and opportunities for local economic prosperity and resilience in relation to key aspects such as food, water and energy. It also provided a forum to develop practical, action orientated ideas that promote innovation, collaboration and leadership towards a sustainable future.

The purpose of the event was to bring together leaders and provide cutting-edge thinking that enabled people to debate the key issues that need to be addressed to enable the UK's growing population to live high quality sustainable lives now and into the future.

The event identified potential for innovation and collaboration that can enable businesses and communities to maximise the economic opportunities and build local resilience.

The conference featured inspiring and challenging speakers including Jonathan Porritt, Founder of Forum for the Future and Chancellor at Keele University, Dr Alan Knight, Marketplace Sustainability Director at Business in the Community, Chris Shearlock, Sustainable Development Manager at the Co-operative Group, Chris Matthews, Head of Sustainability at United Utilities, Fiona Stark, Corporate Affairs Director at E.ON and Joan Walley MP. It focussed on these topics:

- What does sustainable capitalism look like? Where will growth come from?
- What if growth doesn't return, if flat or contracting is the new normal?
- How do we build resilience, prosperity and economic participation opportunities now and in the future?

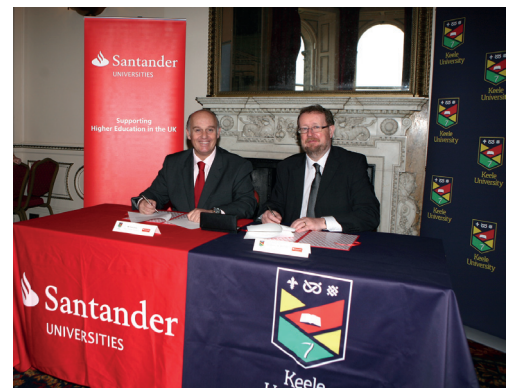
Santander Universities

On Thursday 13 June 2013, Keele University hosted the Santander Scholarship Reception at Keele Hall, and welcomed a number of Santander representatives for the signing of a new three-year agreement between Keele University and Santander Universities UK. The agreement signifies ways in which Santander will support Keele students across a range of employability, internationalisation and enterprise provisions, including environmental projects. Amongst those provisions are paid internships for Keele graduates, building on the highly successful 'Destination Green' programme that provided project placements with local businesses and other organizations.

Graduates and employers who have already benefited from Santander's internships were present at the event and were very positive about the scheme. Internships supported by Santander continue to be awarded by the University to a wide range of local small and medium sized businesses. For more information contact internships@keele.ac.uk

Keele University – making green connections
with businesses and graduates

DESTINATION GREEN



Enterprise 'bootcamp'

Budding entrepreneurs received a crash-course in starting their own business in August, thanks to the Student Enterprise Team who developed Keele Launchpad, the first ever FREE 2-day business bootcamp at Keele.

Participants learned the essentials about business planning, financial planning and record-keeping, tax, marketing, sales and more.

The event proved extremely popular with 45 attendees, many of whom are returning graduates from MMU, Chester University, Sheffield Hallam, Royal Holloway, Winchester, DeMontfort University and more, along with 17 exhibitors and key speakers, including Howard Tomlinson, co-creator of the popular game Bejewelled, from Astraware Ltd and ex SPEED student Kath Warrilow of Cupcake Yourself.

Keele University is "Ready for Business"

Over 70 delegates enjoyed a breakfast networking event on Wednesday 2 October at Keele Hall, with around 40 local companies represented.

The event was organised by the Employer Engagement Team within Research and Enterprise Services. Spotlight presentations were given on areas such as student placements, graduate internships, accessing the University's expertise, workforce development and the Science & Business Park.

Simon Pooler from Interlock Digital, a local employer who benefited from employing a recent Keele graduate, delivered a short presentation to the audience and was overwhelmingly positive about his experience of dealing with Keele University. He explained that the Santander funding that he received via Keele University enabled him to try out Daniel's potential without a huge financial commitment, and he has now been able to offer him a permanent role.

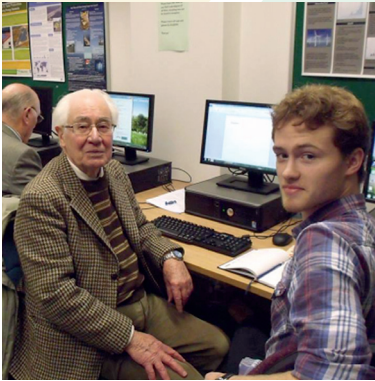
#keeleready4biz was set up for the event and a delegate from Pro-Hire Plc tweeted "Internships are a fantastic opportunity for graduates venturing into the working world"

Social Enterprise

A total of seven awards from a HEFCE/UnLtd seed fund have been allocated to nascent social enterprises at Keele, including the nationally recognised CLOCK project in Law. Keele's Social Enterprise programme is regarded as highly collaborative and is well-regarded nationally by UnLtd and HEFCE, and we have successfully bid for more £25k additional funding for 2013/14, supported by Santander have agreed to provide an element of match-funding. Social enterprises addressing environmental concerns will be eligible for support.



KEELE UNIVERSITY SUSTAINABILITY HUB



"An unusual and interesting concept on how the University is using on site "State of the Art" facilities to work positively with the local community relating to horticulture and the environment."

Phil Meeson, 'Newcastle in Bloom' Judge 2013

The Sustainability Hub is a centre facilitating education, research and demonstration in sustainability and clean technology. Since its opening in October 2011, it has continued to attract a growing audience of visitors, with around 10,000 visitors a year attending workshops and public lectures, outreach events, business events and activities.

The courtyard has now been fitted with accessible, attractive raised beds in three themes: edible; pollinator-friendly; and sensory. Visitors this year were surprised to see tomatoes, gooseberries, sweetcorn, fennel, beetroot and parsnips among the plants on display. The community group Grey Matters, based at the Hub, received a £500 grant from the Cooperative Community Fund this year to support a project called "Bee Friendly" in the Hub courtyard. This project facilitated the establishment of the bee-friendly area at the Hub and supported the donation of pollinator-friendly plants and flowers to ten schools and nurseries. The project was awarded Silver in the local 'Newcastle in Bloom Community Projects' category.

As the energy demands of a growing population squeeze our planet's limited resources, engaging the public in discussion about sustainability and energy has never been more important. The awareness and education role of the Hub has been a major part of its activity during 2013. Public lectures have proven popular with students, staff and the public alike on relevant topics from bee conservation to fracking. Topical public talks have been delivered on a range of themes by both academic research staff and external representatives; for example, alumnus John Mosesson (Chairman of Stramit International) gave a talk on sustainable construction, whilst other presentations been given by the Staffordshire Badger Conservation Group, Siemens, and Schott Solar UK.

NIMBY© is an interactive team game developed at the Hub that teaches principles of conflicting interests and impacts in renewable energy development. The game involves taking conflicting roles within a community, within the context of a village applying for funding for a low carbon project. The concept has been used with schools and colleges, including international student groups from Poland and Japan, and with corporate audiences as part of CPD events. The aim was to highlight principles of green technology development, but also to make people more aware of the importance of understanding the conflicts that can arise when managing sustainable development.

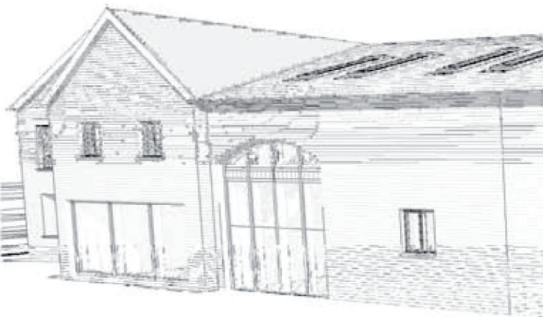
The Hub also supported sustainability-focussed careers this year by hosting two 8 week placements for the *Pioneers into Practice Programme 2013*. The Pioneers, Ágnes Portik from Hungary and Lukas Müller from Germany, worked as part of the Sustainability Hub team developing the outreach programme and organising a Green IT event.

Business links to the Hub have been crucial to the success of the public engagement activities and the education programmes at the Hub. The MSc had input from Schott Solar UK, Siemens, McCamley UK Ltd, Dorothy Clive Gardens, Wardell Armstrong and Marston's. A collaborative project on Waste Minimisation and Behaviour Change with Newcastle Borough Council and Keele University academics evaluated targeted resident-specific interventions.

The Sustainable Hub has become the venue of choice, not just for teaching and business meetings. A wide range of audiences are now using the Hub for activities from student Think:Green Society events to Geoconservation UK meetings and local Parish Council meetings.



R. Burgess, 2013



PROJECT CAMEOS

“Heading home from the Sustainability Conference feeling invigorated, enthralled and empowered. Thank you to all involved”

‘Student Action for Sustainability’ conference

On 29th and 30th October 2013, Keele University hosted the ‘Student Action for Sustainability’ conference, funded by the Higher Education Academy. UK and international students, staff and professionals from an array of universities and other organisations shared experiences and ideas on student action projects for sustainability.

Keynote speakers from other European countries gave the delegates an insight into projects carried out by students abroad. These included the student-initiated and run centre, Cemus, at the University of Uppsala, where since the 1990s students have co-designed their own sustainability courses; the student-led Green Office from Maastricht University which coordinates and runs sustainability initiatives within the University, and the student-run World Student Environmental Summit. Further presentations included, amongst many others, student sustainability activism within the visual communication curriculum, the use of online worlds in student sustainability activism, partnership working across institutions, and student experiences of establishing community food growing projects. Presentations from the conference can be found here: <http://www.keele.ac.uk/greenkeele/events/studentactionforsustainabilityconference/delegatespresentations/>

The Student Action for Sustainability Conference succeeded in offering a platform for the debating and sharing of ideas about how student actions can achieve sustainability across universities and how this can be supported. One delegate’s ‘tweet’ summed up the conference:

“Heading home from the Sustainability Conference feeling invigorated, enthralled and empowered. Thank you to all involved”

Walled Garden

2013 has seen the real take off of food growing at Keele, through the development of allotments in the Walled Garden and the establishment of the Student Eats food growing society. The year has seen many developments...

The spring was marked by exploration and creativity – most students had not grown food before and had the opportunity to start planting early on in the greenhouse before moving to the raised beds outdoors. This set the stage for the “Year of the Tomatoes”, an accidental surprise of hundreds of tomato seedlings!

While many students left for the summer, some stayed behind, and they were joined by postgraduate students, campus staff and residents (and even a local Scout group) who all pitched in and lent a hand. Distributing the produce was a challenge given that most of



the hungry students were gone, and one of the solutions was selling it outside the Students' Union on a trial basis. The challenges were overcome, including achievement of a food hygiene certificate. The selling of food was a hit, but the garden couldn't produce enough to make it a regular event. (But maybe next year!)

Autumn ushered in the ripening of the tomatoes – but not all of them. A vast quantity of green tomato chutney was produced, much to the joy of the students living in the Sustainable Student Bungalow. It was also many students' first brush with canning to preserve produce over the winter. The students were also recognised for their hard work over the summer by the Royal Horticultural Society, receiving a Level 2 'It's Your Neighbourhood Award'.

A visioning workshop was held in October, giving students, staff, and community members participating in the food growing initiatives on campus an opportunity to take part in shaping future developments in the Walled Garden.

As we have slowly progressed into winter, the Staffordshire Wildlife Trust has hosted workshops about what you can do in the garden during the off-season. The garden has also become a focus of students' academic work, including a project by eco-psychology students about how gardening affects well-being.

As was hoped, many students have already gained valuable skills and knowledge about food growing. But Student Eats has also been a success in providing a space for building a sense of community on campus, as well as supporting students developing project management skills and teaching the importance of taking initiative. The prospects for 2014, with a greater degree of knowledge and more time for planning, are bright and hopefully abundant!

Sustainability Champion finalist

Dr Zoe Robinson, Director of Education for Sustainability, was shortlisted as a finalist in the new 'Sustainability Champion' category of the high profile Green Gown Awards, which celebrate sustainability achievements across the higher and further education sector. The judges said: "The breadth of scale and innovation led by Zoe is inspiring and to be celebrated". This recognition reflects the many wide-ranging initiatives Zoe has led and/or inspired, to embed sustainability in the curriculum and student experience at Keele, and the impact that this is having on the student population.

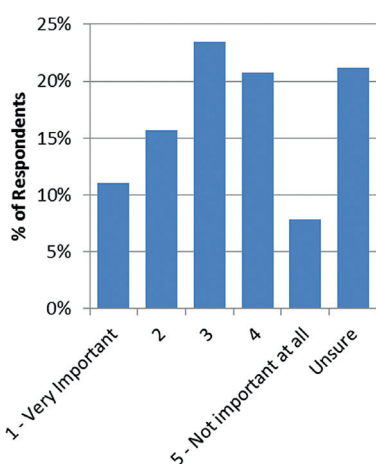


Dr Zoe Robinson, Finalist for the Sustainability Champion Award, 2013

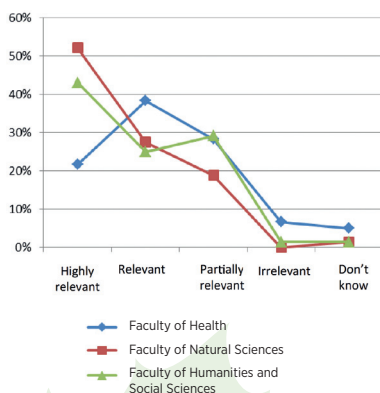


PROJECT CAMEOS (CONTINUED)

How important is developing the 'sustainability literacy' of the students within your School at the moment?



How relevant do you see your subject area in helping society move towards a more sustainable future - Three Main Faculties



Staff Survey

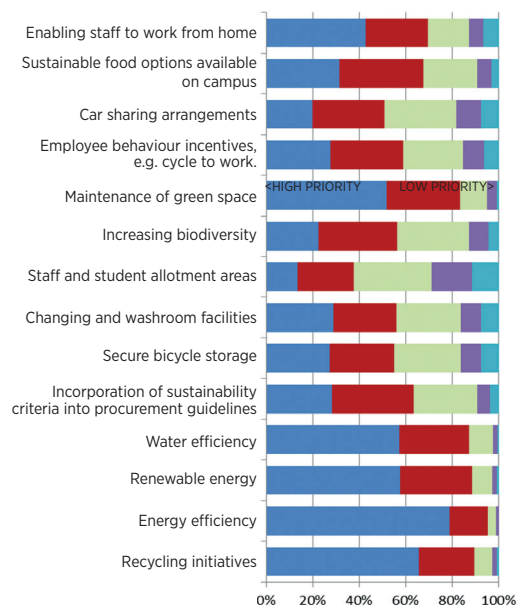
A staff survey about sustainability was carried out in September/October 2013. This survey aimed to find out the level of existing sustainability expertise within the current staff base; to give staff a voice about the areas that they would like to see improvement in and would like support with; and to help direct future sustainability developments at Keele. The survey was completed by 582 staff, representing 28% of all Keele University staff. A total of 287 'non-academic staff' (25% of all non-academic staff), and 295 'academic staff' (32% of all academic staff) completed this questionnaire.

Key findings

1. There is a strong interest in sustainability from staff – 70% of academic and 65% of non-academic staff stated they were interested in sustainability. However, only 30% of academic and 18% of non-academic staff felt confident in explaining sustainable development as a concept. Only 15% of academic responses and 9% of non-academic staff have undertaken training relating to sustainability, showing that there is a need to increase the availability of training for staff.
2. Over 60% of respondents see opportunities for them to support the institution to become more sustainable.
3. 78% of responses stated that they believe we should be developing the 'sustainability literacy' of our graduates. Despite this, developing the sustainability literacy of students is not seen as a very important area within many Schools at the moment (Fig 1)
4. The majority of responses felt that the best way of delivering sustainability education was through embedding it within existing core modules, followed by embedding sustainability in existing option modules, followed by embedding within the development strand. However, a wide range of different approaches to embedding sustainability were supported by academic staff.
5. 67% of academic staff believe that their subject area is 'highly relevant' or 'relevant' in helping society move towards a more sustainable future, and only 2% of respondents believed that sustainability was irrelevant to their subject area.

6. The most popular area of support to help staff engage with sustainability in their teaching was an intranet site of discipline-specific resources, suggesting a priority area of work to develop.
7. Staff were asked to state their desire for future investment/ focus on set areas of sustainability projects at the institution. Energy efficiency was the area that was most highly prioritised, followed by recycling, renewable energy, water efficiency, maintenance of green spaces, and allowing staff to work from home.

Please prioritise on a scale of 1-5 to indicate your preference for (further) investment in/focus on the following initiatives on the University



This survey has highlighted that there is a good level of existing expertise about sustainability in the institution. Further work needs to be undertaken to understand the sustainability skills and experience already within the staff at Keele, allowing the creation of a strong institutional network to draw from when needed. In order to help programmes embed sustainability into their core teaching, further training opportunities for staff need to be made available, as well as a database of discipline-specific resources, alongside the existing one-to-one support. The full report will be available online from Green:Keele Web pages in 2014.

A STRATEGY FOR ENVIRONMENTAL SUSTAINABILITY

The overarching strategy is summarised at the top level through the University's Strategic Map, which identifies environment and sustainability (E&S) as one of its 6 key aims in the 2010-15 Strategic Plan:

STRATEGIC AIM 5: To develop an environmentally aware and sustainable outward-facing campus community

STRATEGIC OBJECTIVES

- **To provide models of innovation and good practice in environmental sustainability through all our activities**
- **To unlock the potential of the University Estate so that it underpins the attainment of our vision**
- **To share and provide the University's expertise in environment and sustainability to local, regional, national and international communities and partners**

But the crucial question is how the high-level strategy is actually implemented around the campus. There are several components to this, and a key underpinning mechanism has been by identifying influential players to lead on the sustainability agenda in their specific part of the University, and the 11 areas (slightly modified since last year) comprise:

- Student Engagement
- University Carbon Management Plan
- Renewable and Low Carbon Energy
- Estates Developments
- Waste and Recycling
- Procurement and Catering
- Sustainability in the Curriculum & Student Experience
- Research
- Outreach
- Enterprise
- Keele University Sustainability Hub

The people leading on these topics can be found in the list of members of the 'Environment & Sustainability Steering Group' (on the next page), which meets every three months to review progress across the University, and agree new initiatives or foci. It should also be recognized that the appointment of our three Sustainability Project Officers (Philippa Calver, Giulia Mininni and Bekki Laycock) has been a huge boost to taking forward a whole range of initiatives, and especially the way that we are embedding sustainability in the curriculum; they support a wide range of projects, initiatives and activities, many generated by our enthusiastic and committed students. We have also identified task-and-finish groups to make step changes in key areas – in 2012, the recommendations of 'cycling' and 'allotments' groups were being implemented, and their fruits are apparent in 2013. Three new task-and-finish groups have been set up in 2013, on 'transport', 'sustainable procurement' and 'student engagement'.

However, we do need to review regularly, and sometimes radically change, the overall strategic direction or emphasis of key University themes. The 2015-2020 Strategic Planning process is now underway, and we are taking a long, hard look at whether we have the correct vision, strategy and processes in place to meet the challenges of being able to claim that our campus is an exemplar of sustainability. It is likely that there will be a significantly revised strategy in place this time next year and, if so, this will have been driven forward by input from both staff and students who form the Keele community.

"But the crucial question is how the high-level strategy is actually implemented around the campus."

ENVIRONMENT AND SUSTAINABILITY STEERING GROUP

Professor Patrick Bailey	Pro Vice-Chancellor (Environment and Sustainability) and Dean, Faculty of Natural Sciences
Kelly Montana-Williams	Faculty Business Manager and Research Institute Manager, EPSAM
Ally Bird	Vice President, Education, KeeleSU
Philip Butters	Director of Estates and Development
Emmanuel Blondel	President, Keele Think: Green Society
Philippa Calver	Sustainability Project Officer
Professor Andrew Dobson	Professor of Politics, SPIRE
John Downing	Head of Grounds
Huw Evans	Environmental Manager
Dr Sharon George	Sustainability Hub Manager and Lecturer, School of Physical and Geographical Sciences
Dr Peter Hooper	Head of Research and Enterprise Services
Lisa Ironside	President, KPA
Rebecca Laycock	Sustainability Project Officer
Daniel McCarthy Stott	Vice President, Welfare, KeeleSU
Dr Sherilyn MacGregor	Senior Lecturer in Politics, SPIRE
Giulia Mininni	Sustainability Project Officer
Professor Mark Ormerod	Pro Vice-Chancellor, Research and Enterprise
Andy Parry	Head of Operations, Estates and Development
Paul Richards	Senior Operations Manager, Estates and Development
Dr Zoe Robinson	Director of Education for Sustainability and Senior Lecturer, School of Physical and Geographical Sciences
Chris Stone	Media and Communications Officer, MAC
Professor Peter Styles	Professor in Applied and Environmental Geophysics, School of Physical and Geographical Sciences
Linda Sutton	Procurement Manager, Finance
Victoria Taylor	President, KeeleSU
Lavinia Ioana Udrea	KeeleSU Environmental Representative
Susan Warrender	Head of Catering and Retail
Dr Joanna Wright	Sustainability Hub Co-Ordinator and Lecturer, School of Physical and Geographical Sciences



ENVIRONMENTAL SUSTAINABILITY

KEY FACTS IN 2013

1. Donations to the British Heart Foundation recycling points have resulted in over 2 tonnes of waste being diverted from landfill, raising over £7,000
2. More than 60% of the University's waste is recycled
3. Introducing a 5p charge at the campus store has resulted in 34,000 fewer bags being purchased
4. Keele University is one of the first Universities to be certified to the Energy Management System (EnMS) standard, ISO 50001
5. The University has achieved a NUS national record, with 28 teams in specific buildings and departments 'signing up' to the Green Impact scheme
6. The allotments schemes have engaged dozens of people in growing their own food, and the 'Student Eats' project was awarded has already achieved Level 2 in the RHS It's Your Neighbourhood awards
7. The Post Room electric van travelled 4,800 miles delivering mail, and saved 1.2 tonnes of CO₂e compared to a conventional vehicle
8. We installed three 50 kW Solar PV arrays, thereby saving over 60 tonnes of CO₂e per annum
9. Funding gained from Revolving Green Fund for energy saving projects = £343,000, mainly for fitting out the library with low energy LED lighting
10. Cycling improvements and activities have been funded through the Local Sustainable Transport Fund (LSTF), and 28 University employees have used the cycle-to-work scheme
11. We awarded an honorary degree to Deborah Meaden, TV celebrity and green campaigner, who talked to students and visited the Hub on her degree day
12. The Keele University Sustainability Hub hosted a total of 11,110 visitors during 2012/13 and was the venue for 530 separate events (123 more than the previous year)

To learn more about the University's commitment to the environment and sustainability visit:
www.keele.ac.uk/greenkeele

