



Sustainability Report 2011



Keele
University

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INTRODUCTION BY THE VICE-CHANCELLOR

*Professor Nick Foskett,
Vice-Chancellor, Keele University*

Developing a University that is environmentally aware, and has a sustainable outward-facing campus community, is one of Keele University's core strategic aims and is at the heart of our Strategic Plan.

We have for some time offered courses at both undergraduate and postgraduate level in the field of environmental sustainability and these courses are growing in popularity. Currently we have about 200 undergraduates studying a variety of programmes in this area, and a similar number of postgraduate students. We are committed to embedding sustainability into our educational programmes and, where possible, offering opportunities for all students to study sustainability alongside their main degree subjects.

We are fortunate to have academic colleagues who generate world-class research in environment and sustainability, including extensive activity that spans the natural and social sciences interdisciplinary boundary. This research has attracted major funding from many external bodies, and has benefited from significant institutional investment over recent years.

In addition, we undertake a range of different outreach work with local schools and colleges to educate and inform about environmental issues and how to live more sustainably. Our 'Clean & Green Roadshows' have reached over 20,000 people (both adults and children) over the last few years and more recently our Science for Sustainability work has taken activities and resources into classrooms.

This autumn will see the opening of the Keele University Sustainability Hub situated in previously derelict farm buildings at the entrance to

the University campus. The Hub affords us the opportunity to demonstrate what we do best and its aim is to address the question 'how do we engage the whole community in being more sustainable?'. Funding of £3.4m from HEFCE's Strategic Development fund has helped make this project a reality. It will be a state of the art facility boasting an exhibition space, a lecture theatre, resource room and research base, as well as a demonstrator site for renewable technologies and an educational facility. Crucially we aim to engage with all ages, and to provide multiple ways in which that engagement is maintained, and translated into action.

The Sustainability Report 2011 covers progress made in all these areas over the last academic year and is the first such report to be issued. We will now be issuing a Sustainability Report every year to mark our progress and to communicate our efforts to both internal and external audiences.

I am delighted that we are building on our success over the last 12 months, and we will continue to review our progress with the aim of deserving a reputation of being one of the most environmentally sustainable universities in the UK and internationally.



A handwritten signature in black ink that reads "Nick Foskett". The signature is written in a cursive, slightly slanted style.

*Professor Nick Foskett,
Vice-Chancellor, Keele University*

KEELE'S ENVIRONMENTAL VISION

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

Keele has had a strong record of addressing and responding to the environmental and sustainability agenda. For example, on our estate, we were among the first handful of universities to be awarded Carbon Trust Standard, with a year-on-year commitment to reducing CO₂ levels; we have well-established educational programmes in *Applied Environmental Science* at undergraduate level, and *Environmental Politics* at masters level; we have research groups which are internationally recognised for their work on impacts of climate change, wind turbine vibrations, biodiversity, fuel cells, and the social politics of sustainability. All of these activities, and many more in the area of sustainability, were already in place in 2008. However, the University had not taken an explicit decision that issues of the environment and sustainability should be at the heart of what we do as a university, and something for which we should be both proud and ambitious.

Three things have happened since then. Firstly, a motion was passed in Council in 2008, committing the University to following a 'deep green' agenda. Motions passed in Council do not necessarily lead to a fundamental change in the way a university operates, but the paper laid the foundations for the second key development – an 'Environmental Vision'. This was effectively a strategy paper, that identified the ways in which Keele University could inter-link its environmental successes to provide a much more holistic approach to sustainability; this led to several major developments over the next 3 years, of which perhaps the most influential was the award of £3.4M of Strategic Development Funding by HEFCE to develop the Keele Hub for Sustainability.

The third development has been to place 'Environment & Sustainability' (E&S) as one of the six underpinning themes of the University in its 2010-15 Strategic Plan. The other areas are crucial to the success of a university – excellence in education, student experience, research, creativity/enterprise, and resource

management. But to have identified E&S as another key feature of Keele University, with a Pro Vice-Chancellor to oversee its implementation, makes an important statement about Keele's commitment to this agenda.

It is now up to us to deliver that agenda – and I say 'us' because sustainability impinges on all of us in our work and in our daily lives. This 'Sustainability Report' will be an annual document that summarises successes (and failures too) over the past 12 months, and will form a key part of the process of setting and monitoring our targets on a wide range of E&S issues, on timescales ranging from months to decades.

The rest of this report is effectively in 4 parts. Firstly, there is a very brief summary of the main highlights from the last 12 months (and some low points too). Then there are eight sections that provide more detail on specific themes within the sustainability agenda. Next there are some articles that have been selected to provide more detail about specific projects (a main feature about the *Keele University Sustainability Hub*, and 4 smaller 'cameo' projects). Finally, there is an outline of the proposed E&S strategy, and how this will be developed, supported, and monitored.



KEY ACHIEVEMENTS IN 2010/11

In all of the eight E&S themes, for which there is more detail in the following sections, there have been major developments in the last year, for which some highlights include:

- 1) The University Carbon Management Plan – this is a complex operation with many projects running within this theme, but investments since 2009 have saved over 1.5 thousand tonnes of CO₂ per year ... although we are falling behind our 2020 target.
- 2) Renewable and Low Carbon Energy – the decision to commit £300k to a full assessment of wind turbine options was the highlight ... although winning £500k from DECC to drill for deep geothermal energy, but being unable to claim it due to timescale constraints and spiralling costs, was a disappointment.
- 3) Estates Developments – key developments here include the improved support for cyclists, the go-ahead to build a BREEAM excellent nursery, and (of course) completion of the renovation of Home Farm to create the Sustainability Hub.
- 4) Waste and Recycling – Keele had been tied into a waste disposal contract that only expired a year or so ago; the new contract with Biffa is an essential aspect of E&S, with a range of projects exploring how to optimise our recycling (already standing at 34% after less than a year).
- 5) Procurement and Catering – new e-procurement schemes and re-certification with Fairtrade should enable us to continue improving our purchasing in an ethical and sustainable way.
- 6) Sustainability in the Curriculum – the decision that 'sustainability' should be a key feature of the Keele Distinctive Curriculum, embedding E&S at the heart of our education; it is encouraging to see the continuing success of the BSc in Environment & Sustainability and

the MSc in Environmental Sustainability & Green Technology, both launched in 2009; and these developments are being underpinned by a number of externally funded projects.

- 7) With around £5m of E&S research funding since 2009, the highlight of 2010/11 is probably the £371k interdisciplinary grant from ESRC/EPSC to study energy reduction through knowledge circulation networks in communities.
- 8) Outreach & Enterprise – the Science for Sustainability group continues to reach out to schoolchildren, schoolteachers and the general public (over 20,000 participants), and Project Green (and its successor, Project FIT) have provided practical experience and training for over 200 graduates, and has worked with over 100 organisations to generate significant sustainability improvements.

Three other developments deserve special mention. Firstly, our 'Green League' performance was a significant improvement from last year (from 82nd to 63rd, and a '2:1 degree'), but still disappointing; an underpinning problem is that our older buildings and modest student numbers lead to low scores under 'energy per student', even though we perform much better under the 'energy per unit area' category. Nevertheless, we are targeting promotion to '1st class' (i.e. top 30) within the next 5 years.

Secondly, it is worth noting that transport is not a separate theme, but is embedded within the carbon management and estate plans, and includes policies to support cycle schemes, and reduce car usage. However, Keele's location means that there are major on-off campus environmental issues that are being explored.

Thirdly, the Keele University Sustainability Hub is now open, and this will impinge on almost every aspect of E&S – there is more information in the feature article on page 18.



UNIVERSITY CARBON MANAGEMENT PLAN

Introduction

The University has taken part in the Carbon Trust Higher Education Carbon Management Programme (HECMP) designed to help institutions to manage and reduce carbon emissions across a range of activities. The HECMP was formally approved by the University in September 2010 and includes a range of technical engineering and other non-technical solutions to reduce carbon emissions on a year-by-year basis. The plan sets a target of 34% by 2020 based on a 1990 baseline. The plan aims to embed carbon management across all University services and activities.

The University has also successfully been recertified to the Carbon Trust Standard which requires demonstration of a year on year reduction of carbon emissions across the University.

2. Overview

In order to reduce energy consumption and meet carbon targets the University has utilised the Salix Revolving Green Fund to finance a range of projects. Since the start of the scheme in 2009 these projects have involved a capital investment of £692k and have provided an estimated saving of 1,544 tonnes of CO₂ per year. These projects include:

- Voltage reduction technologies
- Boiler burner management
- Heating controls and valves
- Insulation
- Lighting controls

The University has also invested in the development of a carbon footprinting tool that meets the reporting requirements of HEFCE, the Carbon Trust and the Carbon Reduction Commitment legislation. The tool allows for data to be entered for all applicable scope 1, 2 and 3 emissions, and rationalises the raw data and spreadsheets that were previously used to provide reports on carbon footprint. Improved accurate carbon footprinting is key to the University managing its environmental impact and setting measurable targets.

2.1 Performance

The 2010/11 CO₂ emissions, from consumed gas and electricity, have reduced 0.8% against last year. However, electricity and gas consumption CO₂ emissions are 3.64% above the target set out in the Higher Education Carbon Management Plan. In order to meet its Carbon targets the University will consider the impact of new developments and space management on its carbon footprint.

3. Future developments

The University Executive Committee has recently approved the proposal to develop a scheme for the full planning application for two wind turbines to the south of the new development site. The proposal will deliver a full planning package feasibility which will detail the impact of the scheme, showing and evaluating the impact of two large turbines. This is to provide the University with the ability, during the pre-planning consultation period, to show what the finished product will look like and to better respond to questions and challenges. This approach will also put Keele in a far stronger position to evaluate the benefits of becoming an operator or negotiating a better package with a supplier.

Historic feasibility studies indicate the potential for two 2.4mW turbines; these would deliver 70% of Keele's current electricity demand and a potential reduction in carbon emissions of approx. 5,000 tonnes (38%) against the 1990 baseline.

3.1 Energy awareness

In order to improve efficiency across the University Estates staff are engaging with all staff across the University to raise awareness of actions they can take to reduce energy. One clear target is to review the "out of hours" energy consumption in buildings, utilising half hourly data from automatic electricity meters.

RENEWABLE AND LOW CARBON ENERGY

The start of the 2010/2011 academic year saw some long-planned initiatives begin to take shape, with drilling for coal-bed methane being carried out on the New Development Site; the viability of using this source of methane (with 20-50% reduction in the greenhouse gas impact) is being evaluated. A 1 km long seismic reflection line showing the structure along the axis of the new development site was acquired by an arrangement with FUGRO Ltd, as part of a demonstration of their new capabilities, and this helps inform the clean coal plans (and the technologies needed to evaluate it).

On the extraction of heat from the coal lying under Keele, DECC put out a second call for Deep Geothermal Energy projects, and a large proposal was assembled between Estates and the Faculty of Natural Sciences. Using the energy trapped nearer to the surface, Ground Source Heat technologies are being installed wherever appropriate (e.g. see article on the Hub).

As in other regions of the UK, planning for and development of wind energy moves slowly forward, but Keele University has just invested £300k in a full evaluation of the opportunities (see previous section on 'Carbon Management Plan').

Solar energy continues to have potential at Keele, as demonstrated by successes in solar thermal heating in Halls of Residence. However, we are now seriously considering solar PV energy, which is the subject of both an MSc project study and a commercial feasibility project.

• **CBM Update:** The drilling was completed quickly and despite prior concerns about noise and light, very few people on campus even realised that it had been carried out. Some unforeseen ground conditions have meant that, despite this continuing to be considered a very prospective site, gas rates have not yet been economic. IGas have become the sole operator and are currently assessing the way forward.

• **Deep Geothermal Energy:** Keele University was successful in its £500k bid to DECC 'Deep geothermal' call for a 1200m borehole to investigate deep geothermal energy resources but the restrictive nature of the conditions which meant that despite only being announced in January the project had to be completed by the end of March meant that it was not possible to take up this funding. However, current MSc projects on old mine workings in the area suggest that abandoned mine geothermal waters might be accessible from boreholes on campus; this would enable energy to be extracted from old workings which are now flooded, providing energy for Combined Heat and Power exploitation in new developments.

• An MSc project on the solar energy potential of Keele University has identified several target buildings for 50 kW Solar PV schemes (see diagram), and outline economics under the 'feed in tariff' (FIT) scheme is being assessed by Estates.

• Keele University is actively engaged with local and regional authorities, in order to explore how low and renewable energy options might be developed in the region. For example, Professor Peter Styles has been appointed to chair the Low Carbon Group of the Local Enterprise Partnership (LEP) for Stoke and Staffordshire, which replaces the Regional Development Agency (Advantage West Midlands).



Solar Radiation Flux (mW per m²) calculated for Keele Campus showing buildings (pink and white) with high potential for Solar PV. From the MSc thesis of Ms U. Weerakody (2011)



Coal Bed Methane drilling rig on Keele Campus



Renewable energy: solar thermal at the BREEAM Excellent Standard Lennard Jones laboratory.



The Carbon Trust Standard

ESTATES DEVELOPMENTS

Key developments

Environmental sustainability is at the core of the Estates development plan, and is crucial to the development of a campus which is genuinely sustainable. All new build and refurbishment projects consider the best environmental options available, and a commitment is made to achieve BREEAM 'very good' status, with 'excellent' being the preferred target whenever possible. Also key to attaining the sustainability vision is considering the travel to and from buildings, and how staff, students and visitors interact with our buildings.

Transport issues also form a key part of the Estates strategy, and a number of major schemes are under evaluation. Within the last year, the Keele staff and students Bicycle Users Group (BUG) was set-up, and has worked with a special task group to develop a number of schemes. This has led to the construction of a number of new and improved bicycle shelters across campus, whilst a bicycle hire scheme is currently being set up (based at Keele Sports Centre), and a 'Cycle-2-Work' salary loan scheme is being actively explored.

The University launched an Environmental Awareness campaign in February 2010. To date, about 100 staff have volunteered as Environmental Champions across the campus to co-ordinate environmental best practice. The 'Estates and Development' website has been redesigned to include monthly energy monitoring charts for campus buildings. These are used by the environmental champions and the building managers to monitor performance. In addition, voluntary informal lunch-time meetings are being held with the Environmental Champions in order to communicate key developments and gain ideas for environmental improvements.



Future Developments

Allotments

The University is in the process of identifying a site and funding for allotments on campus. Once established, the allotments should be open for use by staff, students, members of the local community, and special groups such as local schools. Land use is an ever more important feature of any community's plans for sustainability and, through its allotment scheme, Keele University will demonstrate the practical use to which land can be put, and the effect this can have on – amongst other things – reducing food miles, sustainability education, and community cohesion.

There are also plans to widen the scope for demonstrating sustainability in (and around) the Hub Building. For example, the building's courtyard has the potential for development as a 'living courtyard', once again to show how relatively small plots of land can be put to productive use.



Small scale wind turbine

An intended addition to the Keele University Sustainability Hub will be a new type of wind turbine. The innovative design includes a turbine rotor that spins about a vertical axis, enabling it to accept wind from any direction. The rotor comprises 5 vertical blades, which are encased in a stator that optimises the natural power of the wind, and provides protection for birds and bats. The proposal is to install a 1kW turbine mounted on a 10m high tilt tower, and the prototype is currently under development by the company McCamley.

The scheme is currently awaiting planning permission from the Local Authority prior to installation. If permitted, the facility will continue to be closely monitored, with all technical data being made available to Keele University. It is envisaged that the energy generated will be entirely used at the Sustainability Hub and will reduce our carbon usage from energy which would otherwise have been imported from the grid. The novel design allows the turbine to run at lower wind speeds than conventional systems, and its design also incorporates lower rotational speed, thus reducing turbine noise and vibration.



New Day Nursery

Planning permission has now been granted for a new day nursery, to replace the existing facility. The building comprises three blocks, which are linked by a wide corridor that wraps around an internal courtyard space. All rooms and facilities are directly accessible from this circulation spine, providing views to the internal courtyard and brings light into the heart of the building. Creating a sense of well-being has been key to the planning process, and the building design incorporates as much natural light as possible whilst ensuring that high levels of thermal comfort are achieved. The building is ventilated naturally in most areas, with this 'climate control' helping to minimise unnecessary heat loss or energy wastage.

The initial design assessment has been undertaken to show that the building achieves BREEAM 'Very Good' status, and we are currently assessing what additional measures could be incorporated to achieve an 'Excellent' grading; these items may be included if they truly add value environmentally (rather than just 'ticking boxes'). In addition to high efficiency heating systems and BEMs controls, the design also incorporates a Diadem warm green roof on two of the blocks; this adds value to the building by extending the life of the roofing material by protecting it from large temperature ranges and UV radiation, as well as creating a diverse habitat for insects and birds. A 50m² array of PV panels will be mounted on the roof of the third block to provide significant solar energy to the building.



WASTE AND RECYCLING



New recycling scheme: internal bins

Key developments

Historically all of the University's waste has been collected by the Local Authority (Newcastle Borough Council), using a single bin system. This meant that all waste, including recyclable materials, were classed as general waste and sent for incineration. The University introduced a new recycling scheme in November 2010, which includes the separation at source of all recyclable materials.

Following a competitive tendering process, Keele awarded a contract to Biffa Waste Ltd on a 3 (+1 optional) year contract, to provide a waste collection and disposal service. In November 2010 a new recycling scheme was launched across the campus. The service allows for the collection of dry mixed recyclables including paper, cardboard, plastics and cans. The contract requires the contractor to weigh the waste and provide monthly recycling rates. The recycling rate increased month by month during the 2010/11 academic year and reached 34% in July 2011. This is excellent progress in the first year of the contract, and the long term target is to achieve a recycling rate of 60%.

Trials have also taken place for the collection of food waste from Keele Hall and Comus Restaurant, which feed Biffa's recently developed Anaerobic Digester in Cannock. The Anaerobic Digester is capable of generating 5MW of electricity and is classed as a carbon neutral waste route for the University's carbon footprint.

Future Developments

The long term strategy is for the University to send no waste to landfill sites, and to recycle as much waste as possible. We also recognise the

importance of eliminating waste at source, and materials are reused whenever possible.

In order to facilitate higher recycling rates we plan to disseminate awareness material and regular updates on recycling rates to all areas of the University. Moreover, there is a range of projects (undertaken by undergraduate and postgraduate students) to explore the best ways to encourage recycling. It is hoped that competition between different parts of the University will encourage widespread participation, with Environmental Champions having a key role to play in this.



Waste composition analysis



External Recycling bins

PROCUREMENT AND CATERING

Key developments

The University strives to ensure that goods and services procured across the organisation support the University's environmental and social objectives. The University is an active member of the North West Purchasing Consortium (NWUPC) that assesses environmental sustainability of suppliers within framework agreements.

Key developments include the decision (in February 2011) by the University to formally approve a new sustainable catering policy in February 2011. The objective of the catering policy is to supply "food which is healthier for people and the planet" (DEFRA).

The University has also launched a new e-procurement system that will improve efficiency and reduce resources by, for example, moving away from paper invoicing. The University has also approved a 'print rationalisation project' to take an organisation-wide, strategic approach to all its photocopying and printing requirements, following the renewal of the photocopier fleet with more modern, energy efficient, multi functional devices. This will have considerable energy and carbon savings.

The University successfully renewed its Fairtrade status in February 2011, and this has continued to be promoted across the University. The new policy has led to an increase in both the variety of Fairtrade goods available, and the amount of Fairtrade goods purchased.

The University are proud to supply all catering requirements in-house and are actively seeking to source food more sustainably. For example, all eggs purchased are from free-range sources, and menus are seasonal with locally sourced

food where appropriate to reduce the carbon footprint. Specific targets that will act as our Key Performance Indicators (KPIs) and will be reviewed annually include:

- increasing the sales of Fairtrade goods annually
- reducing food waste per student/staff number annually
- reducing water & energy usage annually (with the target being in line with the University's carbon reduction target of 3.6% p.a.)
- increasing the purchase of seasonal vegetables on an annual basis

Future Developments

The University will continue to source sustainable food, and reduce the environmental impact of all of its purchases whenever possible. The University is also seeking to develop a sustainable procurement strategy that considers the whole life-cycle of procured goods, works and services. It is a strategy requiring complex assessments, and it is hoped that both undergraduate and postgraduate projects will be able to contribute significantly to these evaluations.



SUSTAINABILITY IN THE CURRICULUM

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. This commitment is reflected in high level policy, for example, the University Environmental Policy lists 'Greening the Curriculum' as its first goal. Sustainability is embedded within the University's Graduate Attribute statements, and sustainability is one of three key themes running through the new Distinctive Keele Curriculum (DKC), ensuring that sustainability will be embedded in all programmes by September 2012. This activity and commitment mirrors student demand for sustainability coverage in the curriculum, as evidenced by a recent survey of Keele undergraduates. Embedding sustainability in the curriculum is one approach for integrating sustainability holistically into the University's core activities and its culture, and there is already significant provision of sustainability education.

Putting sustainability at the heart of the campus activities at Keele is a multi-strand approach covering the following areas:

- 1) **Staff development:** Training in Education for Sustainable Development (ESD) will be incorporated into the training of all new lecturers from 2011-2012 and made available to all academic staff. Broader sustainability workshops are also available to all University staff. A sustainability-focussed teaching symposium will be run in early 2012.
- 2) **Integration into undergraduate programmes:** As part of the DKC, all programmes will be supported to identify, highlight and develop the areas of sustainability relevant to their subject area. Resources will be developed to support staff in the development and delivery of sustainability-related material within programmes.
- 3) **Discrete undergraduate sustainability modules available to all students:** A discrete first year sustainability module already exists as a free elective available to the

majority of students. In the future faculties may decide to offer their own targeted sustainability option modules. Resources and training will be made available to support this activity.

- 4) **Integration into PGT programmes:** Also as part of the DKC, PGT programmes will be supported to identify, highlight and develop the areas of sustainability relevant to their subject area, in particular through research methods modules covering ethics and research impact.
- 5) **Integration into PGR training:** Opportunities to integrate and highlight issues of sustainability within PGR training will be explored.
- 6) **Specific sustainability-related programmes at UG and PG:** Specific sustainability-focussed undergraduate and postgraduate degree programmes are already offered as part of the range of Keele degree programmes.
- 7) **Co-curriculum developments:** Opportunities for student involvement in sustainability projects (such as volunteering, campus-based sustainability developments, research projects) will be explored, alongside developing a culture of sustainable living that will be fostered through the University campus developments and related projects.
- 8) **Continuing Professional Development activities:** Building on the success of Project Green and Keele Connect, opportunities to use the campus and sustainability expertise to expand a sustainability curriculum beyond the boundaries of the University campus, and to develop further sustainability-enterprise activities, will be explored.

Educational projects and initiatives in sustainability

The 'Distinctive Keele Curriculum'

The Distinctive Keele Curriculum (DKC) is a University-wide project aimed at ensuring that all students have the opportunities to develop themselves to become prepared to embrace their place in a global society, are ready for the working environment and that they are prepared to achieve their potential in

their life and work. Sustainability is a key part of the DKC, all undergraduate programmes are currently working on embedding the three themes of 'Sustainability, Internationalisation and Employability' within their courses. The DKC also embraces the wider student experience and co-curricular activities. Opportunities for developing greater awareness of sustainability are embedded within all of these activities. This project highlights the deep commitment to putting sustainability at the very core of the student experience at Keele.

'Green Academy'



Keele's 'Green Academy' team at the residential event in Leeds

Keele was one of eight institutions, alongside Southampton, Bristol and Nottingham, selected to take part in the Higher Education Academy's major new 'Green Academy' initiative aimed at supporting institutions to embed sustainability in the curriculum. The institutions taking part worked intensively on a two day residential in cross-institutional teams comprising students, academic representatives from different faculties through to PVC positions, supported by a group of mentors, all leaders in the field of Education for Sustainable Development in the UK. The work of Keele's Green Academy team generated the 'multi-thread' strategy above for embedding sustainability throughout the curriculum, including making sustainability a core part of the Distinctive Keele Curriculum.

Hybrid Problem-Based Learning for Sustainability Education

A major project entitled 'Hybrid PBL: a scalable approach to sustainability education?', funded by the Higher Education Academy and led by Keele University in collaboration with Manchester and Staffordshire Universities, is looking at strategies to embed environmental education more widely in university programmes using problem-based learning approaches scaled up to work with large numbers of students. The three universities will be exploring ways in which real or imaginary 'problem scenarios' can be used as vehicles for students to learn about environmental and sustainability issues (called problem-based learning or PBL), and blending this with other approaches to learning, in order to generate transformative sustainability learning.

Supporting the transition to interdisciplinary sustainability-focussed undergraduate programmes

Two Keele academics carried out a project funded through the Higher Education Academy to look at ways to support students starting interdisciplinary, sustainability-focussed undergraduate degree programmes, such as the new BSc in Environment and Sustainability at Keele. This project aimed to i) investigate student experiences of studying an interdisciplinary, sustainability-focussed degree programme in order to identify the challenges facing students, and ii) to evaluate strategies to support students with the transition to these degree programmes. The project was used to develop an online resource aimed at supporting students starting interdisciplinary sustainability programmes. This resource, 'Interactive Resources for Interdisciplinary Sustainability' (IRIS) was primarily led and designed by five students on Keele's BSc in Environment and Sustainability and can be found at www.keele.ac.uk/iris.

Greening Business: An open access online teaching resource to support sustainability module development

A project entitled 'An open access online teaching resource to support sustainability module development' funded by the Higher Education Academy, has produced new teaching materials

SUSTAINABILITY IN THE CURRICULUM (CONTINUED)

on the topic of 'Greening Business', aimed at helping educators develop undergraduate teaching in this area. The online teaching resource includes: teaching materials and activities to support educators developing undergraduate courses in this area, reading and resource lists, and project coursework suggestions. The course materials cover specific environmental management in business material in addition to material to provide a broad scientific underpinning of key concepts to enhance understanding of some of the issues, although the materials are not subject specific and can be used with students studying any subject area. It is hoped that this online resource will encourage educators at other institutions to embed practical sustainability skills within their teaching. More information is available at: www.esci.keele.ac.uk/greeningbusiness.

C-change in GEES

A team of seven academics at Keele took part in a major consortium project entitled 'C-Change in GEES: Open licensing of climate change and sustainability resources in the Geography, Earth and Environmental Sciences' run by the Higher Education Academy's Geography, Earth and Environmental Sciences (GEES) subject centre, part of the national HEA/JISC Open Educational Resource project aimed at exploring the open licensing of educational resources. The Keele team 'repurposed'

existing teaching resources relating to the broad themes of climate change and sustainability to make these resources suitable as open access resources. The team produced over 100 high-quality educational



resources accessible through the Keele Repository, JorumOpen and through the Keele project website (www.esci.keele.ac.uk/c-change).

Programmes and modules in sustainability

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 (KUSH), 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. The educational courses in sustainability are outlined below.

BSc in Environment and Sustainability

A single-honours BSc in Environment and Sustainability admitted its first group of students in September 2009. As of 2011-12, there are over 40 students enrolled on the programme. The programme is highly interdisciplinary, being taught across three faculties and over ten different disciplines, and provides a holistic, problem-based approach to contemporary environmental challenges. It includes employment experience within the sustainability sector as part of the programme, providing students with an excellent range of future environment and sustainability-related employment opportunities in what is a growing and under-supplied employment market. The programme aims to produce graduates who can cross the traditional social-natural science divide, and who are conversant in a wide range of sustainability issues and different disciplinary and professional approaches to the environment.

BSc in Applied Environmental Science

Applied Environmental Science is a dual-honours programme that has been running successfully for over 10 years, which currently has around 80 students. It is an interdisciplinary programme that emphasises the role of

basic scientific understanding and practical skills in the laboratory and field for the analysis and management of environmental problems, from monitoring and evaluation through to the design of low carbon and renewable energy technologies. This course is therefore firmly anchored in the sciences, drawing from the chemical, life and geosciences and includes options from the social sciences.

Masters in Environmental Sustainability and Green Technology

In 2010-11 the Masters in ES> ran for its second year and had an impressive 21 students in total, a rise from eight students in its first year. The course is distinctive in its combination of scientific and social science disciplines coupled with the dissertation project that is aligned to the career aspirations of the student. Students on the course study a mix of subjects ranging from Decision Making in the UK to Clean and Green Technologies from Above and Below the Earth.

MA in Environmental Politics and MA in Climate Change Studies

The School of Politics, International Relations as Philosophy's MA in Environmental Politics has run since 1996 and is taught by some of the most prominent academics in the field. The course is designed for people who wish to understand and analyse the wide range of political and policy questions thrown up by increasingly complicated environmental problems, and allows students to address the social, economic and legal issues that underpin the politics of sustainability. It has attracted students from all over the UK, the EU and the world. This Masters programme is to be complemented by a new MA in Climate Change Studies starting in 2012-13.

A module on 'Greening Business'

A module entitled 'Greening Business' has been running at Keele since 2008 aimed at providing a sustainability-focussed module accessible to all first year students from any subject background. The aim of this module is to provide students with the skills and knowledge to drive sustainability improvements in their future (or current) workplaces. The course covers topics from the motivations for organizations to

green, to core concepts such as life cycle analysis, environmental management systems and environmental auditing, through to an exploration of strategies to improve sustainability performance across transport, energy, water, waste and purchasing activities. Students on the module take part in a group project investigating an aspect of the University's environmental and sustainability performance. Students are required to audit an aspect of the University's existing practice, and then to provide, through detailed research, some clearly justified recommendations for future actions. The findings of the group project have been presented through a poster presentation session, attended by members of the University senior management, in addition to external organizations.

Embedding sustainability in teacher education

Education plays a pivotal role in developing the capacity of our citizens to create more sustainable communities, with schools expected to provide students with the knowledge and skills to respond to the sustainability challenges of the 21st Century. However, this cannot be achieved without the preparation of teachers for the task, and teacher training at Keele involves staff and trainees exploring the meaning of ESD contextualised for their own subject specialisms. For example, History built a scale model of a tudor house and examined the renewable nature of materials used; ICT create and utilise OER materials, freeware and examine issues surrounding 'green ICT' such as CO₂ emissions; Geology looks at the importance of rare earth metals in new technologies; Science covers renewable energy such as biomass power plants; and Geography explores social media to connect global communities of students.



*For further information of sustainability curriculum developments and projects at Keele contact:
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RESEARCH

Keele is a research-led University with a strong commitment to fostering internationally leading research across its three Faculties of Health, Humanities & Social Sciences and Natural Sciences. Research is organised through thematic Research Institutes, which support a thriving interdisciplinary research environment. Research in environment and sustainability (E&S) is a particular strength at Keele and a key priority for future research developments. We have strong research across both the natural and social sciences, including significant activity that spans the interdisciplinary boundary, and links into health and active ageing.

To give a sense of the breadth of projects, it is noteworthy that research in E&S includes academic staff from many Schools and disciplines, including environmental science, geology, physical and human geography, life sciences, chemistry, mathematics, computer science, psychology, politics, international relations, public policy, education, sociology, english, economics, and business & management. As part of our research strategy over the last three years, we have seen a substantial growth in our research student population, with a significant proportion of these (over 60, together with research assistants), being engaged in the area of E&S covering a huge diversity of exciting research projects.

This research has attracted over £5m of external funding since mid-2009 from many external funding bodies, including UK Research Councils (EPSRC, ESRC, NERC, RCUK), government (DECC, Defra), European Union, HEFCE, charities (including Leverhulme Trust, Wellcome Trust, Royal Society, Cheshire-Lehmann Trust, National Energy Action, British Bee Keepers Association, Perry Foundation), professional bodies (including British Geographical Society, Royal Society of Chemistry, Institute of Physics), Councils, and from a wide range of industry, ranging from multinational companies to SMEs working in the environmental technology and sustainability area. Two major successes in the last year have been for an interdisciplinary project 'Reducing Energy Consumption through Knowledge Networks' funded by the Research

Councils UK (under their 'Energy and Communities' call), and for a large £1.35m UK-India project on solid oxide fuel cells (supported jointly by Research Councils UK/Department of Science & Technology India under their 'Low Carbon Technology' programme), involving internationally leading research groups in the UK and India, which is being led by Keele.

Research in E&S has benefited from significant institutional investment in our research infrastructure, including the creation or refurbishment of laboratories to support research into modern materials chemistry/sustainable technology, green IT and geochemistry/environmental science, and funding for state-of-the-art modern equipment to support projects in analysis, spectroscopy, environmental geophysics, environmental science and green IT.

Areas of E&S where we have particular research strengths include:

- wind energy, including monitoring of wind turbines
- geothermal energy, including environmental geophysics
- fuel cells
- green chemistry, including greener materials, clean catalysis, sustainable processes
- environmental analysis
- environmental chemistry, including carbon sequestration, nutrient fluxes and contaminated land remediation
- clean coal technology
- environmental change, including volcanic hazards, sea-level change, glacial/permafrost environments
- environmental biology, including insect and chemical ecology, forest dynamics, eco-hydrology, fish biology
- green IT
- environmental politics and policy issues
- environmental planning
- environmental citizenship, justice and equity
- sustainable cities and communities, and regeneration

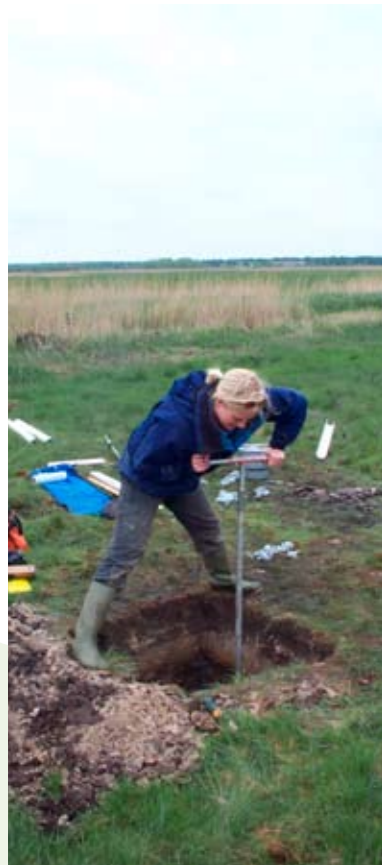
Our diverse research strengths in E&S also make a major contribution to our teaching excellence, helping to inform cutting-edge education to the benefit of our undergraduate students on programmes in Environment & Sustainability, Applied Environmental Science, Geology, Geoscience, Physical Geography, Human Geography, Biology, Chemistry, Forensic Science, Computer Science, Psychology, Politics, International Relations, Economics, Business and Management. In particular, the students have the opportunity to undertake their own individual independent final year research projects and dissertations in an area of E&S; in addition, there are extended research projects undertaken by postgraduate students on our 'Environmental Sustainability and Green Technology' and 'Environmental Politics' programmes, with many of the former involving an external industrial or public organisations as partners.

Two other areas where our research strengths and expertise in E&S are really important are in our research-related enterprise activities and interactions with business, and in our outreach and public engagement activities, in both of which we have a nationally leading reputation and have won significant external recognition and awards.

Over the last two years, three internships programmes, Project Green, Project FIT and Keele Connect, have enabled 225 graduates to undertake placement research with companies and organisations to work on environmentally related projects. The programmes have been hugely successful, helping companies to tackle or investigate particular environmental problems where they previously lacked the E&S expertise or resource, or to undertake specific environmental projects where they lacked resource. We have worked with nearly 150 different companies and organisations, both within and outside the environmental sector, who have taken on graduate interns through these schemes, with many really successful projects, some of which have led to larger collaborative projects. As an added benefit, many of these interns have been offered jobs with their

placement organisation, so that the environmental and economic benefits that they bring can be continued in the longer term.

Our nationally leading outreach work in carrying out E&S workshops and courses for children, schools, teachers and the general public is described in more detail elsewhere in this report. Funding for these activities has included support from the government Research Councils, Defra, professional bodies, and from Staffordshire County Council and Borough and District Councils, and is underpinned by our research expertise in clean and sustainable technologies, environmental science and environmental geochemistry. However, it is also noteworthy that many of our researchers feel a desire and obligation to explain the importance of their work to a wider audience, in order to ensure that we have a better-informed population, and to inspire the next generation of researchers to tackle the crucial problems in the environmental and sustainability arena.



OUTREACH AND ENTERPRISE

Keele University has a long history of engaging with industrial and third sector partners to undertake projects relating to the environment and sustainability. Alongside this, our outreach activities with children, teachers and the general public are extensive, especially in the E&S area. Below are four examples of major activities in these areas over the past year.

Sustainability Internships

One of the most successful projects in recent years has been an internships programme funded by HEFCE's Economic Challenge Investment Fund. Starting in September 2009 and running for 13 months, 'Project Green' was an internship scheme operating in Staffordshire and the surrounding areas that placed unemployed recent graduates into companies to work on environmentally-related projects, whether or not the companies operated in the environmental sector. The main idea behind this was not only to help companies fulfil a short term need for expertise or additional resource, but also to help the graduates improve their work based and employability skills by giving them the opportunity to work on a project within an organisation.

Of additional benefit to the graduate was the ability to undertake two 15 credit modules at postgraduate level: a classroom based module covering the basics behind the 'greening' of organisations and a 'placement' module. These credits can be put towards a Postgraduate Certificate or Diploma, and form core modules of Keele's new Postgraduate Certificate in Sustainable Business Management.

A total of 180 graduates and over 100 different companies benefited from Project Green and following this success, two subsequent projects, Project FIT and Keele Connect were run between March 2010 and July 2011. The latter two projects broadened the remit away from projects purely with an environmental focus, although a number of environmental companies took advantage of the schemes.

Out of a total of approximately 330 graduates, 225 were placed into an environmental project or environmental company. Over 33 graduates (that we know of at the time of writing) have been offered full time roles within their host companies after completion of their projects, and many others have secured further work in the sustainability sector.

Overall, this project has succeeded in generating significant environmental and sustainability improvements in a large number of companies, and provided sustainability training for unemployed graduates who are now able to work in the sustainability sector and help address the paucity of workers with skills and understanding in this area.

'Project Green' has been much acclaimed nationally, and was highly commended in the 'Skills' category of the prestigious Green Gown awards in 2010.

Contract Research & Consultancy

A number of Keele academics are actively involved with companies working directly in the renewable energy marketplace. Much of the work carried out by the University in this area is understandably commercially sensitive in nature, but of particular note, is Professor Peter Styles and his Applied & Environmental Geophysics Group. Professor Styles is actively working with wind turbine manufacturers, the Ministry of Defence and wind farm developers in trying to understand and mitigate against a blanket wind turbine ban imposed by the MoD in the southern uplands of Scotland – one of the UK's prime areas for wind farm development. Wind turbines produce vibrations that interfere with the defence monitoring instrumentation at Eskdalemuir and Professor Styles was instrumental in providing evidence that led to the reduction of an 80km exclusion zone around the monitoring site. This has led directly to an additional 1GW of wind energy capacity being released for development.

Membership of regional Sustainability networks

Keele is a member of a number of environmental organisations, the most relevant of the enterprise agenda being the Staffordshire Business & Environment Network (SBEN). Launched in 1992 and based within Staffordshire County Council, the remit of SBEN is to provide a portfolio of high quality environmental services and support to help Staffordshire businesses improve their environmental performance and their competitiveness and profitability.

Keele University is also a key partner of the Staffordshire Strategic Partnership's Climate Change Working Group, established in early 2007 initially to address the targets on climate change required under the Staffordshire Local Area Agreement and to deliver a climate change portal as a Flagship Priority project. Experts at Keele University were instrumental in writing a significant component of this important regional resource, known as 'OC3', Our County, Our Climate, Our Choice (OC3), which aims to help Staffordshire combat climate change. Keele is also a key and active partner in the Sustainable Development working group of the Newcastle-under-Lyme Local Strategic Partnership responsible for developing action plans to address the priority areas relating to sustainable development within the Sustainable Community Strategy and Local Area Agreement.



Outreach work with schools, teachers and the general public

Keele University has an outstanding reputation for delivering sustainability education to teachers, children and the wider public, through the work of the Science for Sustainability environmental education group. The group was established in 2006 through funding from the Climate Challenge Fund and have worked directly with 8,000 schoolchildren, 300 schoolteachers, 12,000 members of the wider public, and numerous people indirectly through media coverage and word of mouth.

The group runs workshops for school children aged from 5 to 18, on a wide range of topics around sustainable living, including energy use, climate change, waste, carbon footprints, renewable energy, and life cycle analysis. All of the workshops are carefully targeted to the age group and the needs of the school and teachers. The Science for Sustainability group has also worked directly with teachers, through the West Midlands Science Learning Centre at Keele, and through work with the Council and other educational organisations in the region, helping to improve the teachers' confidence to tackle sustainability topics in the classroom. The group has also participated in a large number of public events providing advice on sustainable living and renewable energy technologies. Most recently (September 2011) the group took their interactive public display activities to Bestival, a major international music festival on the Isle of Wight, with around 50,000 people in attendance.

The group has worked in close partnership with a number of regional sustainability organisations such as 'Beat the Cold', a North Staffordshire based fuel poverty charity, in addition to Staffordshire County Council, East Staffordshire Borough Council and Newcastle Borough Council, and many other organisations. The work of the Science for Sustainability group has twice been highly commended in the 'social responsibility' category of the prestigious Green Gown awards.



KEELE UNIVERSITY SUSTAINABILITY HUB

The renovation of the 178 year-old historic site of Home Farm was completed this year to house Keele University Sustainability Hub. The buildings had been unused since 1980 and had fell into serious disrepair. Stabilisation work began on the derelict buildings at Home Farm in 2010 and the building was completed in August 2011. The total cost of the Home Farm development is £4.5m, with some of the funding coming from Keele University and some from HEFCE's Strategic Development Fund (SDF). The purpose of the Hub is to welcome and support people who want to engage with the E&S agenda by providing facilities, resources, educational programmes and research expertise. Importantly, these different activities will cross-fertilise each other, to the benefit of all who use the Hub – students, researchers, schoolchildren, general public, businesses. The building comprises 5 main types of facility:

- Exhibition areas
- Resources rooms
- Teaching space
- Research space
- Keele Earth Observatory (KEO)

Supporting all of these are social spaces, a 90-seater lecture theatre, and an attractive courtyard area, as well as the retention of historic parts of the original farm (pig pens and under-crofts). The exhibition areas not only provide displays of modern materials, technologies and initiatives in sustainability, but also include a brief history of Home Farm, and why it was 'sustainable' in its day; the sustainability of the building itself is also on display, showing how climate control, solar PV, solar thermal, ground source heat, biomass heating, evaporative cooling and rainwater recycling contribute to making the building as 'green' as possible.

The Keele Earth Observatory (KEO) will become an outreach centre for schoolchildren and adults (funding permitting), based around 4 zones:

Geosphere – looking at the earth's structure and mineral resources

Hydrosphere – focusing on rivers, lakes, oceans, and ice

Atmosphere – measuring a range of atmospheric pollutants, including CO₂ levels, and ozone concentrations

Biosphere – appreciating biodiversity and the interdependence of organisms

The building is linked to Keele's Space Observatory by a 70m wheelchair and pushchair-friendly path, providing an important link between 'looking after planet earth' (KEO) and 'earth's place in the universe' (Space Observatory). The Hub is situated at the entrance to the university site and (although not officially open until the 17th October 2011) it is already providing a venue for 14 separate events involving staff, students, businesses and public sector organizations during September 2011 alone. Its aim is to provide a unique focus for education, research, outreach, and resources in the area of sustainability that will have impact locally, regionally, nationally and internationally.



PROJECT CAMEOS

Collaboration with Sandon Business, Enterprise & Arts College

Sandon Business, Enterprise & Arts College, a co-educational secondary school on the southern outskirts of Stoke-on-Trent, volunteered to participate in the Keele University Sustainability Hub's opening exhibit by creating an original artwork around the themes of sustainability and green technology.

Preliminary meetings established the form and parameters of the artwork and then tasks were divided up. The artwork hangs from a rhododendron branch sourced from Keele's grounds that is installed from the ceiling of the main exhibit room. The students' artwork hangs off it in a series of pendants, the lines mimicking the form of the branch. Each item contains facts about green technology or sustainability combined with complementary artwork. Visitors interact with the installation as they turn each tab around and the tabs turn and flutter with the movement of the air in the building, catching the eye and drawing visitors towards it. An extra layer of interactivity is incorporated because visitors can create their own tabs and add them to the installation.

- Collaboration with local school
- Using resources of school and university
- Reaching out to local community through school
- Unusual piece for a university science exhibit
- Conversation piece
- Interactivity

The artwork is installed in the main exhibit hall before the start of the autumn semester. The schoolchildren will be invited to visit their artwork to make it feel like an occasion for them. They may then feel more connected with the University and may want to bring their friends and family to the Hub too, to show off their artwork. Once we get people into the building and engaged with the activities and facilities that are available to them we hope they will want to come back and participate. In these ways we hope to build up an ever-widening connection to the surrounding community.



We hope that this eye-catching artwork is the prelude to a fruitful relationship with this school and that it will be a gateway piece to future partnerships with this and other organisations.

Sustainability Hub Supports Congo Project Student

Matthew Barber, a Environmental Politics MA student at Keele, volunteered to help with the development of Centre Kimbilio a street children's centre in Lubumbashi run by The Congo Children's Trust and supported by a Christian group, CMS. He volunteered to help build a dormitory block but he was looking for more long-term involvement and asked for our help with advice on the types of green technology that would be suitable for out there, and to assess the site for its potential..

Lubumbashi is DR Congo's second city with a population of approximately two million. It is located close to the Zambian border, in Katanga province that contains one of the richest mineral belts in the world. One tenth of the world's copper comes from a single mine in this province. Lubumbashi's most distinctive landmark is Big Hill, a huge cone-shaped slag-heap of copper, coltan and zinc. The major environmental issues include: water pollution; deforestation; soil erosion, wildlife poaching; and mining.

Street children started to be seen in increasing numbers in Lubumbashi during the 1990s and Centre Kimbilio aims to reduce the numbers of children living on the streets and supporting those who are already there towards a more positive future.

The electricity supply for Centre Kimbilio can be intermittent so the centre is looking into options but has not been able to source the equipment or expertise to do the required work. Keele provided support, equipment and advice to help Matthew carry out an initial site survey. Matthew is looking to establish a project that will enable the centre to receive a

permanent, sustainable electricity supply. The initial trip enabled him to make strong links with the Centre, in order to develop a collaborative project between the Centre Kimbilio, CMS and Keele University Sustainability Hub to improve the situation. He is already planning a follow-up trip with more of a focus on solar energy.

Matthew said: "This is ... a long road but it is the beginning of a project that is brimming with potential and could change many people's lives."



For more information about the centre go to <http://www.kimbiliocongo.org/>

Keele University's Sustainable Student House Initiative

Four students from the BSc programme in Environment and Sustainability have initiated a project that will see them living in new 'Sustainable Student House' on the University campus during the 2011-12 academic year. Their aim is to act as exemplars of sustainable student living, by 'living what they are learning' and demonstrating ways of living more sustainable and affordable lifestyles while at university.

The students' activities will develop throughout the year and will involve growing food in the house's garden and trying out innovative ways to reduce waste, cut costs and to improve resource efficiency through practical changes

in everyday behaviour. Throughout the year the students will carefully monitor their environmental impacts such as energy use and waste production, and make the data available on their blog, along with regular updates on their activities via their website (www.keele.ac.uk/livegreenkeele) and Twitter (www.twitter.com/livegreenkeele).

Updates from the Sustainable Student House and articles on other related sustainability topics primarily targeted at students, will be disseminated through media such as the Students' Union newsletter and the student radio station. The house will also be open for University visit days and internal visit days for staff and students. Research into the impacts and influence of this project on the wider University community will be carried out with the support of funding from the HEA Geography, Earth and Environmental Sciences subject centre. This is an example of the great energy and creativity within the student body that can help embed a culture of sustainability within the university community, while the students themselves develop a vast array of important employability and life skills.

Grey Matters

Project 'Grey Matters'@ Keele is a new outreach initiative started in September 2011 aimed primarily towards the 'ageing' (50+) local community. The project provides a meeting facility and access to education programmes for the 'older' community, where they can engage in various educational activities and be actively involved in the Keele Campus Community.

The older generation have a lot to offer in terms of experience in sustainability and a key feature of the project is intergenerational exchange of experience and knowledge. Events and activities involving students, staff and Grey Matters members are planned around the following strands:

- **The Gardening Club** – a series of talks, invited speakers from the student and academic



community, local community and the group itself to share tips, experiences and skills on growing food, composting, etc. Physical, outdoor activities based in the new sustainability hub courtyard, campus grounds and gardens and allotment developments on campus

- **Sustainable Living** – a series of invited talks from the academic and local community on how to reduce waste, energy use and energy bills
- **The Changing Planet** – a series of talks, slide shows and activities on subjects ranging from biodiversity and pollution to new technology and space

In August 2011 the project secured £3560 from Keele's Key Fund, a scheme funded by Keele alumni, to pay for initial sessions and equipment. The interdisciplinary project is based at Keele's new Sustainability Hub and brings together expertise from across the University. The project is managed by the Active Ageing team within the Institute of Life Course Studies and members of the School of Physical and Geographical Sciences within the Faculty of Natural Sciences.

STRATEGY FOR ENVIRONMENTAL SUSTAINABILITY

The 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*

For these aims and objectives to be delivered, there needs to be an operational plan lying beneath this. We have identified eight overarching themes (and some sub-themes) which have been presented in this report, with each being led by a member of staff. These themes are:

- Carbon management (Andy Parry)
- Energy (Peter Styles)
- Estate (Huw Evans)
 - Sub-themes:
 - travel (Huw Evans)
 - land use (Andy Dobson)
 - campus community (Sherilyn MacGregor)
- Waste and recycling (Huw Evans)
- Procurement and catering (Huw Evans)
- Curriculum (Zoe Robinson)
- Research (Mark Ormerod)
- Outreach and enterprise (Peter Hooper)

Additional areas include communications (Ximena Canter), and the *Sustainability Hub* (Sharon George), whilst other colleagues oversee specific activities (e.g. Linda Sutton – procurement; Susan Warrender – catering; Martin Wilde – energy). The lead individuals, plus a few other key members, comprise the E&S Strategy Group, which meets quarterly to review projects and develop new initiatives. In line with the timing of strategic planning across the whole of the university, an annually updated strategic and operational plan will be produced each November. This will include SMART targets (covering a range of timescales), and will build on the annual Sustainability Report, of which this is the first. To close the loop, this report provides a review of the E&S activities over the preceding academic year, so that progress against the strategic plan can be monitored.

We hope those who read this report, both from within Keele University and outside it, are encouraged by the progress made so far, and inspired to help us achieve much more in the E&S agenda.



ENVIRONMENT AND SUSTAINABILITY STEERING GROUP



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ENVIRONMENTAL SUSTAINABILITY

KEY FACTS

- The University has set a target of 34% reduction in CO₂ emissions by 2020 (based on a 1990 baseline)
- Since 2009, the University has invested £692k of Salix funding into energy-saving technologies, with an estimated saving of 1,544 tonnes of CO₂ per year
- The University was in the first group of 5 universities to be certified to the Carbon Trust Standard in 2008; re-certification has been achieved in September 2011
- Electricity and gas consumption CO₂ emissions are 0.8% down on 2009/10 levels, but currently 3.64% above target (2008/09 baseline)
- The 'Lakes and Valleys' project has rejuvenated the lakes and created guided walks through 100 acres of Keele woodland
- About 100 staff have volunteered as Environmental Champions across the University
- In the first year of operation, the University recycling rate reached 34% by the end of the academic year (August 2011)
- The University was re-certified with Fairtrade status in February 2011
- 'Project Green' provided environmental training and internships for around 180 graduates
- 'Sustainability' is now embedded as a core theme in the Keele Distinctive Curriculum
- Keele has around 200 undergraduates studying E&S degree programmes
- Research on E&S has attracted around £5m of external funding since 2009
- The Keele University Sustainability Hub is now open, supported by £3.4m of HEFCE funding
- Research Councils UK awarded £371k for a Keele interdisciplinary research project on 'Reducing Energy Consumption through Knowledge Networks'

For information on the Keele University Sustainability Hub please see:

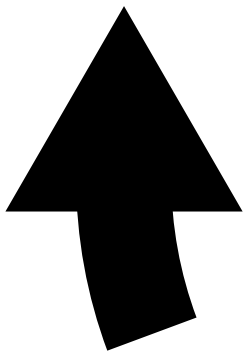
www.keele.ac.uk/keelehub

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