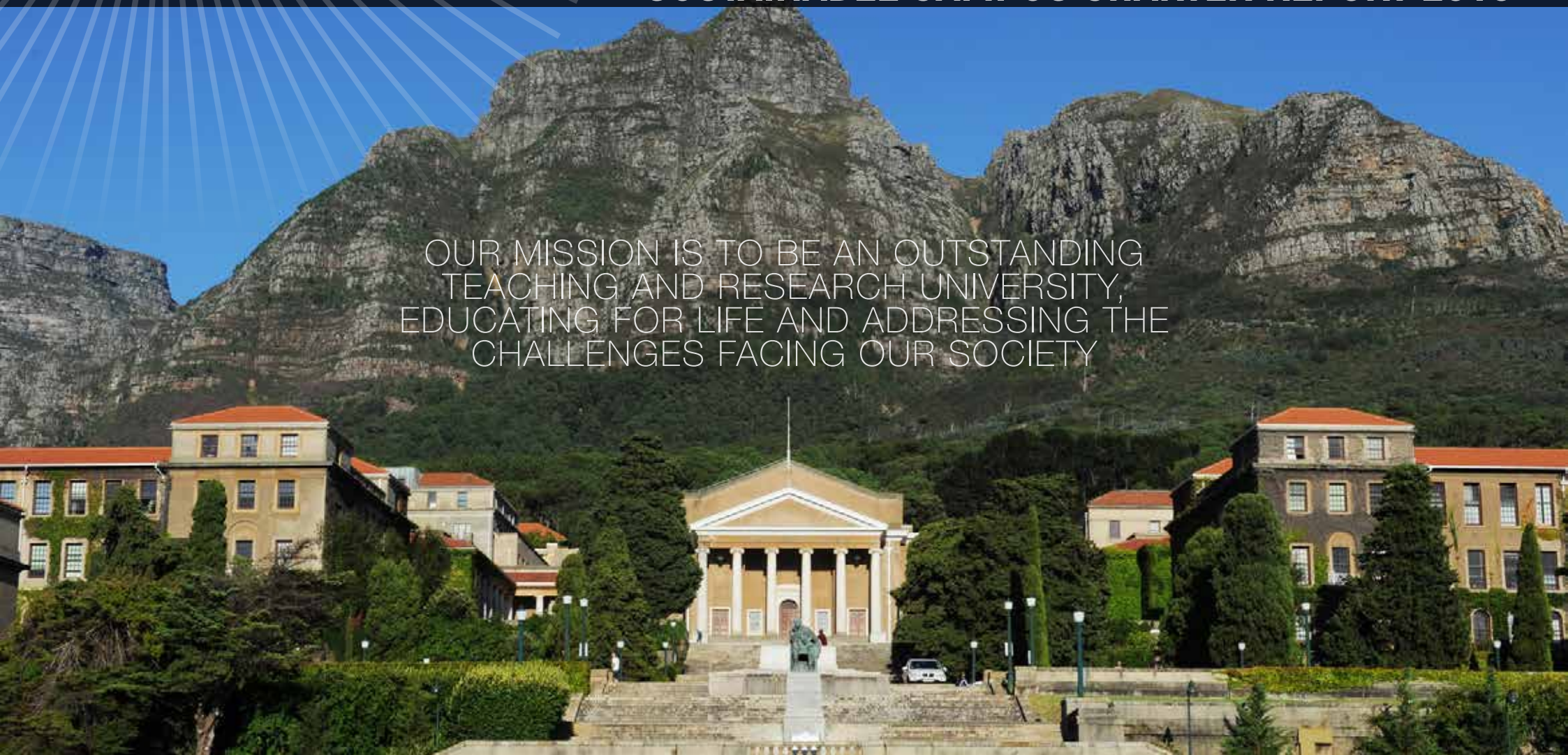




ISCN-GULF

SUSTAINABLE CAMPUS CHARTER REPORT 2013

OUR MISSION IS TO BE AN OUTSTANDING
TEACHING AND RESEARCH UNIVERSITY,
EDUCATING FOR LIFE AND ADDRESSING THE
CHALLENGES FACING OUR SOCIETY





ISCN-GULF

SUSTAINABLE CAMPUS CHARTER REPORT 2013



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This Report was undertaken by Properties and Services Department, University of Cape Town.

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Reviewed by Associate Professor Dr Merle Sowman (UCT)

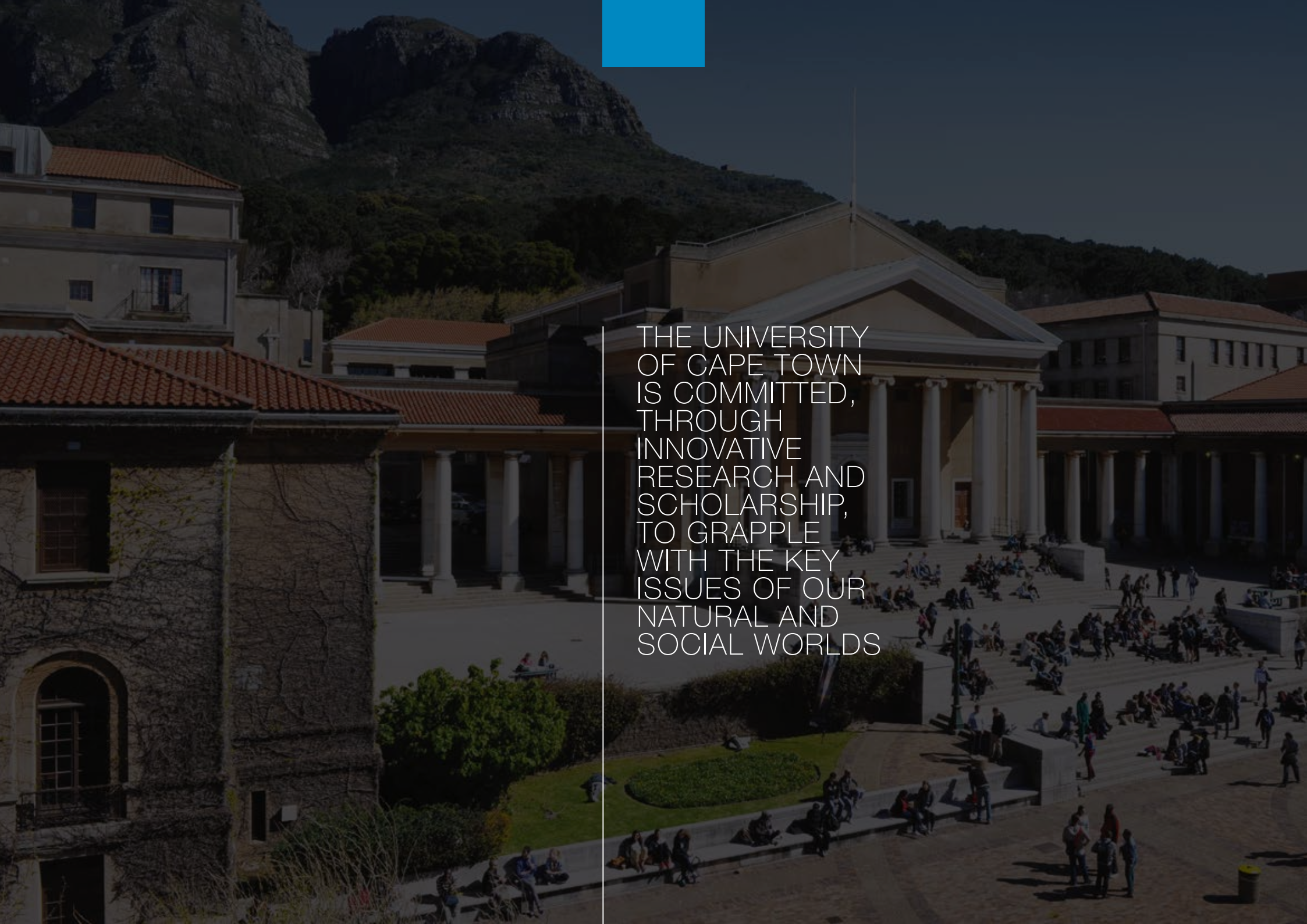
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** The report was created as an electronic publication only, as part of UCT's commitment to a greener environment.*

A photograph of the University of Cape Town's main building, a grand neoclassical structure with a prominent portico supported by columns. The building is set against a backdrop of a large, rocky mountain. In the foreground, a wide, paved plaza is filled with many people, some sitting on the steps and others walking. The image is overlaid with a semi-transparent dark blue filter, and a solid blue square is in the top right corner.

THE UNIVERSITY
OF CAPE TOWN
IS COMMITTED,
THROUGH
INNOVATIVE
RESEARCH AND
SCHOLARSHIP,
TO GRAPPLE
WITH THE KEY
ISSUES OF OUR
NATURAL AND
SOCIAL WORLDS

ABOUT THIS REPORT

This Charter Report is the second sustainability report to be produced for the University of Cape Town (UCT), and is for the two-year period 2012 to 2013. It also draws on the UCT carbon footprint reports produced in those years.

Supporting documents can be found at www.greening.uct.ac.za

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UCT's Green Campus Initiative members gathering for 'Green Police' training.

THE REPORT IS DIVIDED INTO 3 CATEGORIES:

Principle 1 – Sustainability Performance of Buildings on Campus

Principle 2 – Campus-Wide Master Planning and Target Setting

Principle 3 – Integration of Facilities, Research, and Education



The New Engineering Building on Upper Campus with façade designed to ensure adequate solar control.

INTRODUCTION

CAMPUS SUSTAINABILITY

The past five years have seen a growing commitment towards the goal of a sustainable campus, in terms of policy and practices, education, and research.

International and internal sustainability policies have been in place for some time at the University of Cape Town; however, the allocation of resources towards this goal has gained momentum more recently.

In 2008, the *Green Campus Policy Framework* was adopted. Then the *Green Campus Action Plan* was developed, mainly relating to operational issues.

This action plan has been implemented through the University's Properties and Services department, the Environmental Management Working Group, and the Green Campus Initiative student movement.

The ISCN-GULF Sustainable Campus Charter has brought together policies relating to operational issues with sustainability in education and research. Programmes in research and teaching regarding sustainability are also well established and growing across all faculties and departments at the university.

A second mapping study of the extent to which sustainability principles and issues have been integrated into programmes and courses reflects an increase over the previous mapping for 2011.

The African Climate and Development Initiative (ACDI) was established in 2011 to help accomplish the university's strategic goal of addressing the climate and development challenges of Africa.

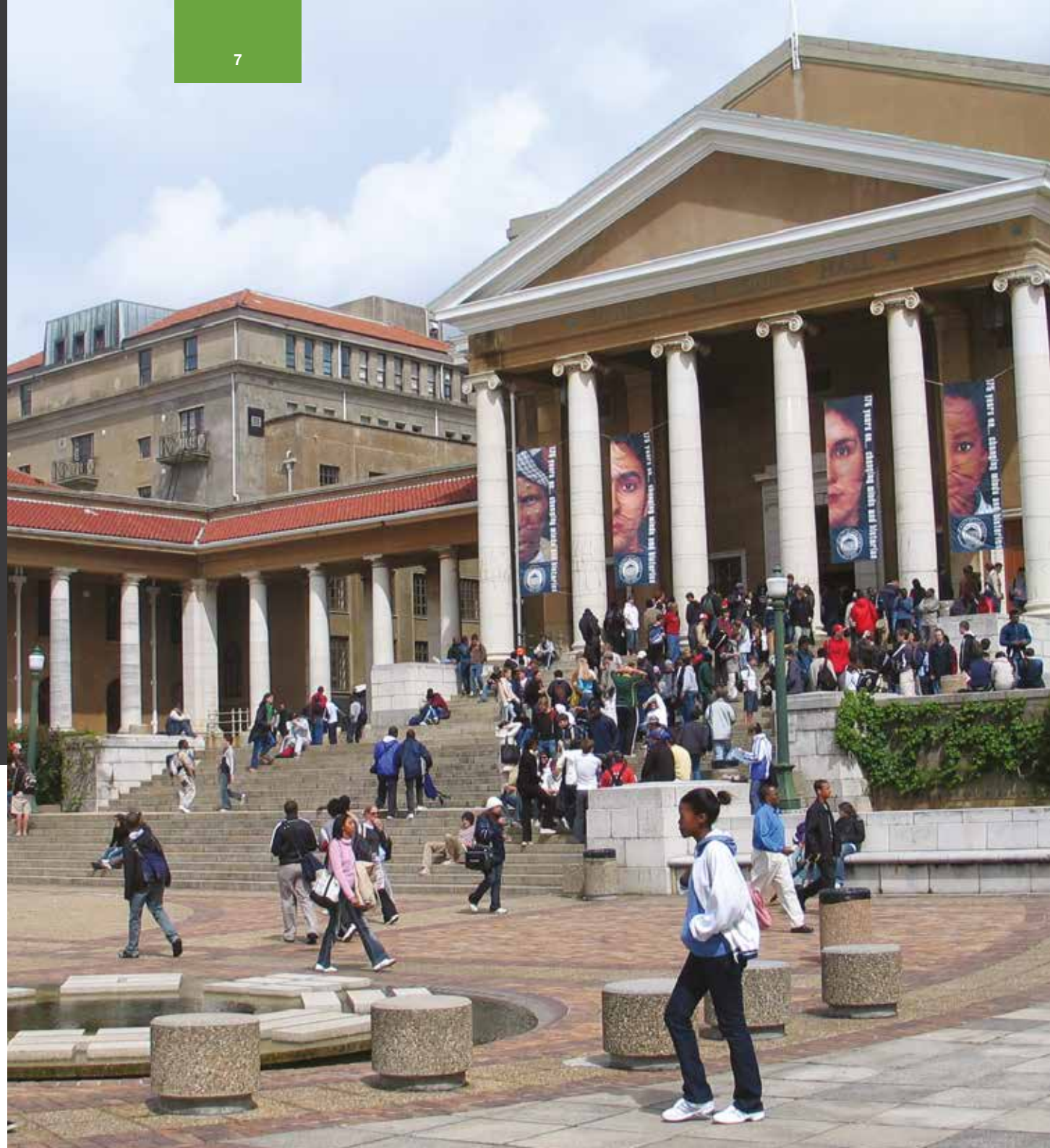
The ACDI merges climate change with development issues, and brings together relevant research and teaching to foster inter-disciplinary approaches to these complex issues. In addition, the ACDI supports innovative research in partnership with government, business and civil society.

A number of other research units at UCT undertake interdisciplinary research concerning sustainable development.

ABOUT UCT

The University of Cape Town is South Africa's oldest university, founded in 1829 as the South African College, and developed into a fully-fledged university during the period 1880 to 1900. The main campus comprises an iconic set of buildings of heritage value, located on the slopes of Table Mountain, which is a World Heritage Site, a national park, and considered a global biodiversity 'hotspot'.

The university has six faculties, over 50 departments, more than 60 specialist research units and is home to more than a quarter of South Africa's A-rated researchers. It has approximately 26 000 students, and employs over 5 000 staff members, with 937 academics. The student body includes 22% international students, who contribute to the richness of academic, social and cultural diversity. The estate comprises more than 75 buildings on its Main Campus, and has a number of satellite campuses and residences across the city, including the Health Sciences campus, Hiddingh Fine Arts campus, and the Graduate School of Business campus.



UCT seeks to contribute to addressing problems of global significance, as well as local societal challenges, including climate-change vulnerability, poverty and inequality.

COMMUNITY AND CULTURE

UCT's vision commits to producing graduates who are not only well-educated, but also aware of the responsibilities of democratic citizenship. During the 1980s UCT was known for its opposition to apartheid, and today the institution remains committed to social transformation, including making tertiary education accessible to previously disadvantaged groups. UCT seeks to contribute to addressing problems of global significance, as well as local societal challenges, including climate-change vulnerability, poverty and inequality, through research as well as through a wide range of socially-responsive research and outreach programmes.

GOVERNANCE AND INSTITUTIONAL CONTEXT

The university is governed by a Council, responsible for determining the mission, objectives, goals, strategies and policies for the progress of the institution. A Senate is responsible for academic governance.

The executive comprises the Chancellor, Vice-Chancellor, and four Deputy Vice-Chancellors.

There are two Pro Vice-Chancellors, responsible for addressing the major strategic areas of Climate Change and Development, and Poverty and Inequality respectively.

The university's Properties and Services department is responsible for the provision of all services, the procurement of new buildings and maintenance of existing facilities, physical planning, transportation, and health and safety.

Properties and Services have been responsible for environmental management and sustainability in relation to facilities and services and are now responsible for reporting in terms of the ISCN-GULF Charter, with respect to Principles 1 and 2. Principle 3 aspects are the responsibility of one of the Deputy Vice-Chancellors, whose portfolio includes providing leadership in the areas of teaching and learning, and academic planning.

Presently, sustainability research across faculties is not coordinated except through specific research groupings. Properties and Services convene the Environmental Management Working Group and support the student-led environmental movement, the Green Campus Initiative (GCI). The Environmental Risk Officer, tasked with the management of hazardous substances, is based in this department.

The Environmental Management Working Group, an advisory body, reports to the University Building and Development Committee (UB&DC), and includes staff of Properties and Services, academics from a number of departments and student representatives from the Green Campus Initiative and the Students Representative Council. Recommendations on the sustainability of campus developments and operations are taken forward to the monthly UB&DC meetings; however, at present there is no representative for sustainability issues in this forum.

PRINCIPLE 1

SUSTAINABILITY PERFORMANCE OF BUILDINGS ON CAMPUS

Principle 1:

To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation, and operation of buildings on campus.

MANAGEMENT APPROACH TO PRINCIPLE 1 TOPICS

The implementation of the priority actions identified in the Green Campus Action Plan¹ continues to be managed and budgeted for by Properties and Services, with input from the Environmental Management Working Group, which meets on a quarterly basis.

Electricity consumption remains by far the largest contributor to carbon emissions (76%), and the retrofitting of energy-efficient technologies is ongoing, as is planned maintenance.

A phased roll-out of digital electricity meters has been in progress since 2011, commencing on the Main campus and the Health Sciences campus. In 2013 an important decision was taken to install energy metering down to building level, and this will be implemented over coming years. There are presently no targets for reduction in consumption.

Solid waste management has been one of the most active areas of campus sustainability for some years, and has been the focus of efforts by the Green Campus Initiative student movement, in partnership with Properties and Services.

Waste management has been improved and expanded beyond general waste and recycling to a wider range of materials, including office paper, electronic waste, printer cartridges and fluorescent tubes.

The percentage of total waste that is recycled is 60 percent. **The removal of organic waste from the waste stream has become a new focus area, and the 2015 waste contract will include the composting of food waste.** The Waste Task Team reports to the Environmental Management Working Group, and is convened by the students of the Green Campus Initiative. It focuses on behavioural change and education towards improved solid waste management.

A Green Building policy for new buildings was adopted by UCT Council in June 2012, with the aim of achieving a minimum of 4-Star standard in terms of the Green Star SA Rating Tool for future buildings. This has become possible now that the Green Building Council of South Africa has developed a rating system for education facilities.

With respect to addressing the needs of disabled persons, UCT's vision, guided by UCT's Disability Policy adopted in 2011, is to provide disabled people with the opportunity for a fair and equal educational and work experience. **A new initiative towards improved Universal Access standards at UCT commenced in 2013, with a comprehensive, 30-building audit of universal access compliance, with the intention of remodelling existing buildings to improve standards in accordance with best practice.** This work was managed by UCT's Disability Service, a specialist consultant, and Properties and Services.



The Atrium of the New Engineering Building.

¹ The Green Campus Action Plan (version 2, 2012) comprises selected priority actions relating to campus operations, maintenance and transport, divided into the following categories: Energy, Water, Waste, Indoor Air Quality, Transport, Landscaping and Biodiversity.

MAIN INITIATIVES AND RESULTS

RESOURCE USE

UCT draws its energy from the national coal-fired electricity grid (and a minor portion from nuclear energy). The government launched a renewable energy power-generation programme a few years ago, and this energy will be fed into the grid from mid-2014. The threat of power outages due to a lack of generation capacity and the high annual increases in electricity tariffs have been key drivers of energy efficiency, and demand reduction measures.

Retrofitting new, more efficient technologies for lighting, ballasts, chillers and heat pumps for water heating has been implemented by Properties and Services over the last five years.

Regular servicing and planned maintenance of air-conditioning plants to optimise energy use has improved since 2007. Measurement, monitoring and reporting of electricity consumption has become a more established practice, with results reported in the annual UCT Carbon Footprint reports to inform energy demand reduction strategies and capital expenditure decisions.

Overall, electricity consumption increased marginally from 2012 to 2013, by 0.4%. With a population increase of 1.5% and floor area increase of 2.9%, the result can be considered positive. Emissions for Main campus increased marginally, by 0.4%, while the area increased by 3.9%, reflecting a reduction. A reduction in electricity of 3.6% was

recorded for Medical campus (floor area increased by 1.5%), due to energy-efficiency measures. Electricity for the Off-campus residences increased by 2.1%, while the area increased by 2.5%. However, greater reductions in consumption might have been expected due to the ongoing retrofitting of end-of-life equipment with new, efficient technologies, which typically produces higher savings.

In terms of energy intensity, for Main campus there has been a 6.3% reduction in kilowatt hours per square metre of floor area compared with 2007 (the baseline year for Carbon Footprint reporting), reflecting the energy efficiency retrofits of electrical equipment.

Renewable energy

In terms of renewable energy, there is currently no commitment to investment in on-site energy generation. Until the full extent of available energy efficiency measures has been implemented, and unless a feasible financial model for such investment in renewable energy technologies is developed, this is not expected to change.

A limited number of solar water heaters have been installed at selected small and medium-sized residences, which are considered suitable for this technology. In larger residences, where early morning demand peaks make solar water heating unsuitable, energy-efficient heat pumps for providing hot water have been installed.

Overall, electricity consumption increased marginally from 2012 to 2013, by 0.4%. With a population increase of 1.5% and floor area increase of 2.9%, the result can be considered positive.

Water

Measurement and monitoring of water consumption towards management and conservation of this resource use is not occurring, and accurate data on water consumption across the university is not yet available.

Investigations into digital water sub-metering technologies to address this have been underway during 2012/2013. It is reported that the phased implementation of water metering will only be programmed once the energy meters have been installed to building level, which will take a few years.

Water conservation has been addressed to a degree with the retrofitting of water-efficient sanitary fittings, and these are specified for all new buildings. **Waterless urinals are becoming more feasible and are being piloted, as the local supply and design of these fittings has now matured in South Africa.** Water conservation is expected to receive more attention in future, with water scarcity, water restrictions and tariff increases driving this change.

On the Main campus, much of the water for irrigation of gardens and sports fields is drawn from a large dam on Upper campus, avoiding potable water use. Some small-scale, sustainable urban drainage projects have been completed on Middle campus, using permeable paving and stormwater swales to promote stormwater infiltration and attenuation.

Purchased products

A decentralised procurement policy exists at UCT, with purchasing of paper, stationery, vehicles and furniture occurring at departmental level, making control of the environmental aspects of these products difficult. Procurement and Payment Services is responsible for negotiating the terms and conditions of purchase and payment for assets, especially laboratory equipment. Procurement policies do not yet include environmental clauses, but the need for this is now recognised.

Sustainable procurement criteria under consideration include environmental impact of products and services, small business development, and purchasing of local products. Some of the paper and IT equipment is centrally purchased by the ICTS department, and therefore the use of these products may have environmental impacts, which should be addressed.

WASTE MANAGEMENT AND EMISSIONS

The diversion of solid waste from landfill has been a focus of campus greening initiatives and has been measured at UCT since mid-2009; however the collection of statistics needs improvement, as the waste-volume estimation techniques currently in use are not robust.

A two-bin separation-at-source system is well established in outdoor areas on all campuses; further development of the indoor recycling systems is required in terms of infrastructure and education.

Overall, the quantity of waste removed from UCT increased from 967 tons in 2012 to 1365 tons in 2013 (40%), with a 1.5% increase in population in the same period. It is uncertain whether this increase is due to changes in measurement methods or an actual increase, and research is required. In 2012 the percentage of waste recycled was reported as 61%, and in 2013 this remained the same (Figure 1). This is a disappointing result, given the efforts of Properties and Services and the Green Campus Initiative during the last five years to provide recycling infrastructure, training and awareness campaigns. Recycled waste reported for 2012 was 591 tons, and 829 tons in 2013, amounting to a 40% increase; however, over 11% of the increase in Recycled waste is attributed to the inclusion of new recycled waste categories, namely Hazardous Waste (Chemical and Medical), e-Waste, and printer cartridges.

Solid waste management at UCT clearly requires attention and research in particular to understand the slow pace

of behaviour change for recycling at source that is evident in these results. There is still much contamination of recyclables and incorrect separation into bins. Waste-management training for staff and students at UCT should remain well supported by the administration. Furthermore, greater awareness and use of the existing systems at UCT for the recycling of e-Waste, printer cartridges and white office paper is needed, and should be addressed by education and communication initiatives.

The importance of providing solid waste-management training for members of the UCT community was recognised a few years ago, and has since been addressed.

Ongoing waste management training sessions are conducted for custodial and grounds staff. In 2013, a one-week short course on waste management was conducted, facilitated by an independent specialist trainer (Envirosus), with

Figure 1 UCT Waste % recycled



PLAN FOR CLIMATE CHANGE, SAYS PROF NEW

Even if he covered nothing new in his talk, it was the way in which the themes were strung together that made you sit up and take notice. But pulling themes and projects together just about sums up the job description for Professor Mark New, UCT Pro Vice-Chancellor for climate change and director of the African Climate and Development Initiative (ACDI). So New's inaugural lecture, delivered to an overflowing lecture theatre on 11 April 2012, covered a lot of ground.

In his introduction, New noted that it's impossible to understand such a complex social-ecological problem without understanding all its components. And, indeed, bringing them together to form a solution.

It's in this spirit of true interdisciplinarity – the core driver behind the ACDI – that New drew together a cornucopia of research, including his own, to give the audience a broad-brush outline of climate change – the what, the why, and the where to from here.

It's not a pretty picture he painted. There's no doubt that climate change is caused by humans, New said at the outset. "We are pushing the earth system outside the conditions humans have experienced during modern human evolution." To have a 50/50 chance of staying below a 2°C increase in global temperature, the internationally-agreed target for avoiding dangerous climate-change impacts, society would need to emit

(from the year 1870 to 2300) no more than 1 trillion tonnes of carbon. But, said New, humans have "already used up 55% of that cake" – i.e. 557.5 billion tonnes of carbon, and climbing.

"Essentially, two degrees is out of the window. The reality is we should be planning for coping with climate changes larger than two degrees, but at the same time pushing for emissions reductions to get us as close as possible to the two-degree target."



Prof Mark New in Kuyasa, Khayelitsha, where thousands of low-cost homes have been fitted with solar water-heaters, insulated ceilings, and energy-efficient lighting.

For South Africa, a 2°C increase would mean a 3°C to 3.5°C rise in local warming. With this would come more and greater extreme weather events, such as storms and floods. What does it mean for global sustainability and human development, especially in Africa? For economies such as Africa's – which are often agriculture-driven, sit very low on the human development index, and are on track for huge spikes in population numbers – change will require a rethink of future development. For one thing, by 2050 many African countries will have to bring in drought- and heat-resistant maize varieties, says New.

Improved farming practices and more efficient food storage will have to go hand in hand with these new climate-resilient farming objectives to help overcome the shortfall.

The bottom line, New said, is that Africa has to find another development pathway if it wants to improve economic well-being and reduce damage to the environment. And that pathway cannot be based on the path taken by today's high-carbon emitters, and will rather have to call on green technology.

"We have the technology and the tools to do it, but the international political system is in gridlock," cautioned New. And it was with this parting thought that the audience filed out of the lecture theatre to tsunami alerts, and forecasts of an impending heat wave.

participants from the university (Student Housing; Properties and Services), waste and custodial service providers (Metro, Fedics, and Supercare), and members of the public. The course also covered an overview of ISO 14001 Environmental Management Systems and sustainability reporting. Custodial service providers followed up with training of their own staff, and this is ongoing. In August 2013, a successful workshop was held for approximately 60 participants on recycling at the Hiddingh campus, which was attended by the HOD, academic staff and many students, and included the custodial staff for that campus.

The diversion of food waste from landfill and the reuse of these nutrients has become a new focus of waste management, with assessment of various potential methods for composting either on or off campus being undertaken.

Audits of food waste were conducted in 2013, and can be compared to an earlier study in 2009. Results estimate an amount of between six and 10 metric tons per month that could be diverted from landfill. In recognition of this issue, composting has been added to the new terms of reference for the waste management contract by Properties and Services. The effective composting of garden vegetation waste is also undergoing investigation, with trials of composting equipment in currently in progress.

The collection and responsible disposal of electronic waste continues, with positive results. Importantly, there is a commitment to the sustainable management of this e-waste, established through a service agreement between UCT and the Southern African E-Waste Alliance² (SAWEA), in which the old equipment is refurbished for reuse where possible and sold or donated to charities, or the materials are recovered in an environmentally responsible manner. A new collection system for printer cartridges was established at the beginning of 2013, using an external service provider that buys back and collects all laser printer cartridges for recycling and provides reporting on these statistics.

Towards reducing environmentally damaging emissions to water and air, a 'Green Cleaning' initiative began in 2009, working with the custodial service providers to gradually introduce alternative products and methods as they became locally available and were successfully trialled. The 'Green Cleaning' market has transformed considerably in South Africa since then, with the larger commercial custodial-services companies all providing alternative cleaning materials and methods as part of their marketing differentiation strategies.

HAZARDOUS SUBSTANCES MANAGEMENT

The Hazardous Substances Control programme is ongoing at UCT and is focused on substances used for research, such as Hazardous Biological Agents, Genetically Modified Organisms, Hazardous Chemical Substances, and Ionising Radiation.

The programme promotes the reduction of the quantity of hazardous substances being acquired, handled, stored, and disposed of in UCT laboratories. A further initiative to identify chemicals that can be shared between research groups has been prioritised, to reduce the amount of chemicals on campus. Activities in 2013 included identifying all chemicals for disposal, undertaking an Inventory of hazardous substances, and delivering talks on safe storage. A reduction in the amount of radio-nuclides used in research has been reported, with researchers shifting to alternative methods. There are ongoing debates and oversight by the Biosafety Committee in the Health Sciences faculty, and risk assessments are undertaken by a GMO Committee.

A Chemical Safety Officer was appointed in the Chemistry Department in 2013, and this new post has resulted in improved communications between academic departments and the Environmental Risk Officer based in Properties and Services. In addition to these posts, the need for an oversight committee of the Hazardous Substances Control Programme has been identified.

²sa.ewastealliance.co.za/

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A new initiative has been launched for the upgrading of air quality in lecture theatres.

National and local legislation and regulations on waste reporting have changed in recent years, requiring waste contractors to report on all waste managed by them. This has resulted in UCT's reporting system becoming better established and more consistent.

USERS

Inclusivity and Universal Access

The UCT Disability Service continues to provide support for the accommodation of people with disabilities, as well as providing specialist services including counselling support, advising on academic accommodations for specific disabilities,

physical access design, and assistive technologies. A door-to-door transport service has been in place for many years, and is well used; however, upgrading of vehicles is required. While the Disability Services' principle role is one of advocacy, it is also tasked with reviewing new buildings in the design stage and working with architects or specialist disability consultants. www.uct.ac.za/services/disability

A comprehensive, 30-building audit of universal access compliance commenced in 2013, which is intended to inform design and auditing of all university buildings in future. To date, campus buildings have complied with the national building regulations; however, the current objective

is to apply best-practice standards in future. An extensive upgrade of the teaching facilities has been undertaken, which has introduced assisted-hearing equipment in large to medium-sized venues.

In 2013, the UCT Disability unit began the development of a Universal Access Guideline document to inform building design and refurbishments on campuses. This will align with national standards, while drawing on best practice in the international literature.

Indoor Air Quality

A new initiative has been launched for the upgrading of air quality in lecture theatres over the next five years. The majority of large teaching venues will be air-conditioned, and ventilation rates in these spaces will be increased beyond the regulatory requirements, to comply with best-practice standards.

Stakeholder participation in planning

Stakeholder participation in planning at UCT has in the past been ad-hoc, without formal policy guidelines. A 'Communications Matrix' is being developed to guide stakeholder engagement around planning and design at UCT. This guideline will deal with internal and external stakeholder engagement, as well as with neighbouring communities and the City. UCT is not required to seek approval of all its building projects from local authorities or heritage authorities, in terms of the rights bestowed according to the original bequest of the land upon which Main campus is located. Approvals are sought on a voluntary basis to promote the principles of participation and good governance, participatory planning and consultation.

BUILDING DESIGN ASPECTS

Since the previous ISCN report, there has been rapid transformation in the green building arena in South Africa. Rating tools for the local context have been developed by the

Green Building Council of South Africa (GBCSA), including the rating system for Public and Education buildings. In November 2013, the Nelson Mandela Metropolitan University's new Business School became the first building in South Africa to achieve a 4-Star Green Star SA design certification using this rating tool. The UCT Council took a formal policy decision in 2012 on this issue, adopting the requirement that all new buildings must be designed and constructed to a minimum 4-Star Green Star SA rating. The proposed New Lecture Theatre project on Upper Campus will present the next opportunity for achieving Green Star SA certification.

Prior to this policy decision, despite an intention to build the New Engineering Building to achieve Green Star certification, this was not achieved. However, an independent sustainability consultant was included in the professional team and energy modelling was undertaken, which significantly enhanced the energy efficiency of the building design and informed the facade design. Adjacent to this building, the new Teaching and Learning Building currently under construction – while not designed to achieve 4-Star standard – will incorporate the same thermal comfort and energy-efficiency strategies as the New Engineering Building.

The new lecture theatre building project, now at conceptual design stage, is prominently located at the end of the axis of the pedestrianised University Avenue. This building will encompass a range of uses, including educational and social-gathering spaces.

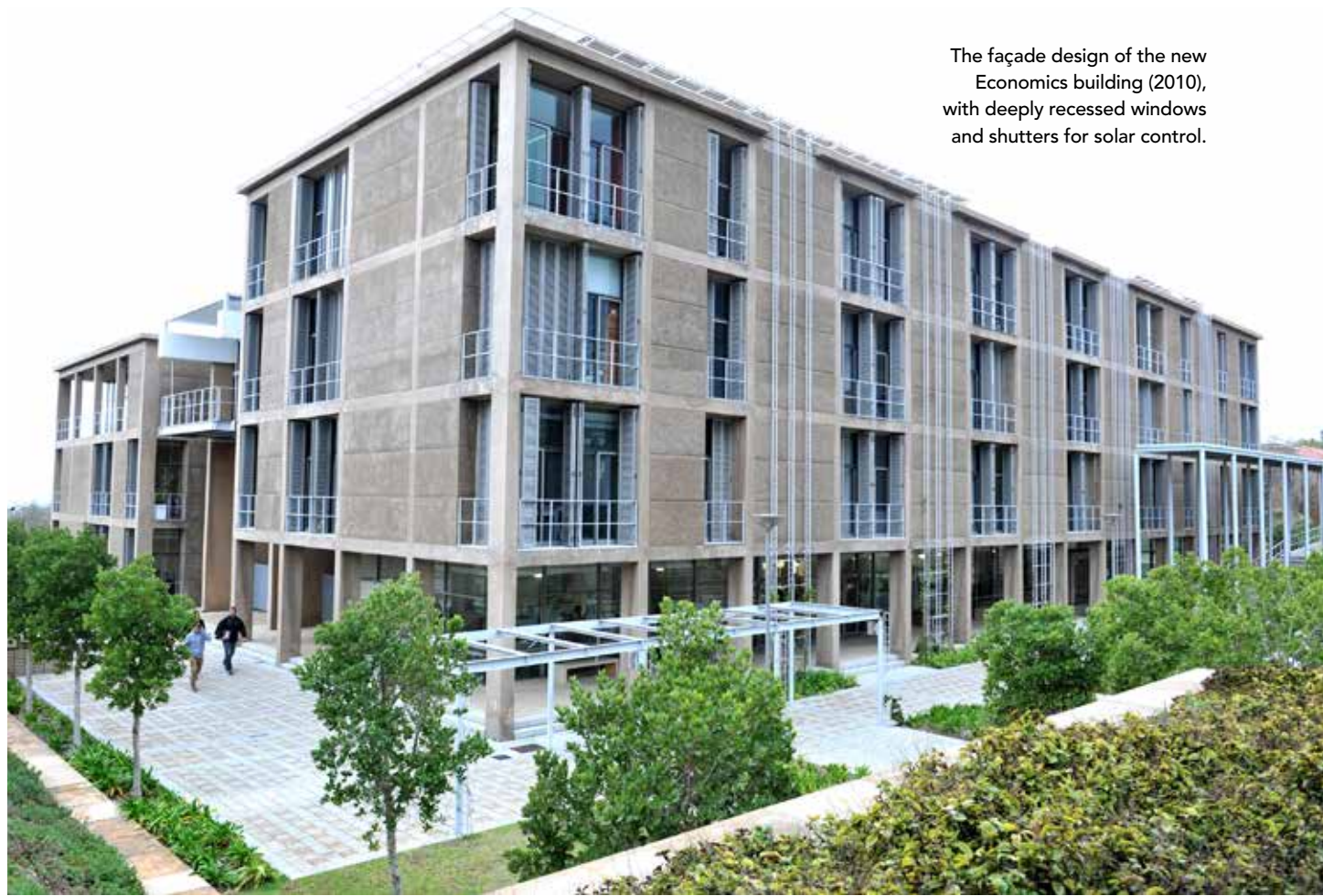
The project brief requires it to be designed to a minimum 4-Star Green Star SA standard; a sustainability consultant was appointed at the outset as a member of the professional team, as well as engineers with sustainable-design skills and experience.

Landscape integration with buildings

Over the last decade, campus developments such as the Chemical Engineering building (2001), and the Middle

Campus Development of 2010 (Student Administration and Economics), have been designed to incorporate public open spaces and landscaped areas. The plaza created around the Middle Campus development is reported to be somewhat underutilised at present. Creating outdoor gathering spaces that become well-used and popular remains an ongoing effort within the Physical Planning Unit. New building projects at UCT are typically conceived and implemented together with investment in the surrounding

spaces. The New Engineering Building, recently completed, has landscaped courtyard spaces and pedestrian routes constructed as part of the project. The Teaching and Learning building, currently under construction, will also include hard and soft landscaping of the surrounding spaces. The current 'My Space' initiative (see below under Interaction Spaces) seeks to upgrade previously underutilised spaces around buildings to attract users for social and impromptu learning activities.



The façade design of the new Economics building (2010), with deeply recessed windows and shutters for solar control.

WASTE TO POWER — IT'S A GAS

A UCT team has been awarded a R2.5m grant by the National Research Foundation (NRF) for South African biogas projects, in which they will test alternative energy systems in urban and rural settings.

Waste needn't go to waste – as has been shown by a UCT project to convert organic waste into an alternative energy source.

The UCT team, led by Associate Professor Harro von Blottnitz of the Department of Chemical Engineering, will be supporting biogas demonstration projects, in urban settings in Cape Town and in rural settings. The work will be conducted in collaboration with the Department of Physics at the University of Venda, which has already developed some expertise in biogas technology in rural settings.

The first two of these demonstration activities are small-scale biodigesters operating solely on food waste. These are operational at UCT's Leo Marquard Hall residence and at a community food garden in Khayelitsha.

A biodigester generates methane gas (a versatile fuel) when organic waste products – say, the leftovers from a meal, as at Leo Marquard – are added to a sealed, water-filled chamber containing certain anaerobic bacteria. These bacteria then ingest the organic waste and release methane, which is captured and diverted to a traditional gas hob, where it is used for cooking.

Another byproduct of this process is liquid slurry that contains high volumes of nutrients suitable for fertilising crops, as is happening in a project run by the UCT student chapter of Engineers without Borders (EwB) in Khayelitsha.



Waste not: Assoc Prof Harro von Blottnitz checks the Leo Marquard biodigester.

In 2012, members of EwB designed and donated a biodigester to the Siyazama Community Allotment Garden Association (SCAGA). The methane runs a gas cooker in the SCAGA kitchen, while the fertiliser is used in the gardens.

EwB's volunteering work is backed up by PhD student Rethabile Melamu, one of the authors of the proposal to the NRF. The award was granted through the NRF's Global Change, Society and Sustainability Research Programme, which addresses the challenges of "science and technology for global change", with a focus on climate change.

OVERVIEW OF UCT'S PRINCIPLE 1 GOALS

TOPICS	GOALS AND INITIATIVES		RESULTS		
Priority topics (with units of measurement)	Objectives and targets (for reporting year, for the following year, and/or beyond)	Key Initiatives (in reporting year, and /or planned for the following year and beyond)	Performance 2011	Performance 2012	Performance 2013
RESOURCE USE					
Electricity (MWh/annum)	Aim for continual reduction of demand against baseline in 2007 Total MWh/a: ~63 500	Installation of web-based digital metering for improved monitoring. Ongoing retrofitting with more efficient technologies for air-conditioning and lighting	Main campus: 53 002 MWh/a 33 digital meters installed on Main Campus Population: 29 069	All campuses: 68 780 MWh/a Population: 30 579 Floor Area: 649 404	All campuses: 69 030 MWh/a 37 digital meters installed with ongoing roll-out to building level Population: 31 040 (up 1.5%) Floor Area: 668 165 (up 2.9%)
Water (Total kl/annum) Baseline 2009: 350 000kl (Main Campus only)	Reduction of potable water consumption	Baseline established; investigation of sub-metering	Total consumption not available	Total consumption for all campuses 512 829 kl/a	Accurate data not available due to municipal billing anomalies that remain unresolved
WASTE, RECYCLING, LOCAL EMISSIONS, AND NON-COMPLIANCE					
Solid Waste (tons per annum) Baseline 2010: 756 tons; 50% recycled	Reduction of waste to landfill through recycling; target of 70% recycling; develop measurement and reporting system Provide ongoing waste management training	Changed to 2-bin recycle system outdoors; education campaigns about what can be recycled; waste training for staff	2011: 1 044 tons 53% recycled	2012: 970 tons 60% recycled	2013: 1 365 tons 60% Recycled ~90 people received waste management training
e-Waste System (kg per annum)	Diversion of e-Waste from landfill for reuse and recycling	e-Waste system ongoing; sustainable reuse, donation, material recovery and safe disposal	6 565kg recycled	5 970kg recycled	10 288kg recycled
Pollution from custodial practices 'Green Cleaning'	Minimise the use of cleaning products that are harmful to health and ecosystems	Green Cleaning established; Rationalisation of list of products and suppliers; trial of alternative products; bleach removed	Ongoing trial of newly developed products	n/a	Green Cleaning products and methods have become mainstream in commercial custodial service providers

HAZARDOUS SUBSTANCES MANAGEMENT					
Hazardous waste (Chemical: litres Medical: kilograms) 2010 Chemical: 100 466 litres (major clear-out campaign) Medical waste data incomplete	Safe removal and disposal of hazardous chemical wastes	Hazardous Substances Control programme	Chemical: 39 535 litres Medical: 41 403kg	2012 Chemical: 51 612 litres Medical: 36 232 kg	2013 Chemical: 29 130 litres Medical: 33 158 kg
USERS					
Inclusivity	Continual improvement towards the objectives of the UCT Disability Policy	The ongoing work of the UCT Disability Service to provide advice, advocacy and support services to the disabled	Annual Report on progress against Policy objectives and the achievements of the disabled (available online)	Annual Report on progress available online	Major audit of Universal Access on sample of 30 buildings (extrapolated to all 176 buildings) to secure government funding for upgrades
Indoor air quality		Upgrade of majority of large lecture theatres air-con over 5 yrs	n/a	n/a	Lecture theatre air-con upgrade commenced
Stakeholder participation	Formalise stakeholder participation and adopt policy	Develop a 'Communications Matrix' to guide participation processes internal and external	n/a	n/a	Communications Matrix in progress
BUILDING DESIGN ASPECTS					
Green Building practices	Achievement of minimum standards of best practice, 4-Star Green Star SA for all new buildings and major refurbishments	University Council adopted a policy of minimum 4-Star Green Star SA rating in June 2012. New Lecture Theatre project at design stage will aim for 4-Star certification.	Design of new Engineering building (NEB) was optimised for energy efficiency, thermal comfort through energy modelling and facade design	Policy of minimum 4-Star Green Star SA formally adopted by Council	New Teaching & Learning T&L building being built to same energy/thermal standards as NEB
Landscape integration with building design	Integration of landscaping with building design on all new developments	Investment in hard and soft landscaping for New Engineering building and Teaching & Learning buildings	New plaza and open spaces around Student Administration & Economics buildings completed	Design phase of the New Engineering Building	New Engineering and Teaching & Learning buildings with associated courtyard spaces

PRINCIPLE 2

CAMPUS-WIDE MASTER PLANNING AND TARGET- SETTING

Principle 2:

To ensure long-term sustainable campus development, campus-wide master planning and target-setting should include environmental and social goals.

MANAGEMENT APPROACH TO PRINCIPLE 2 TOPICS

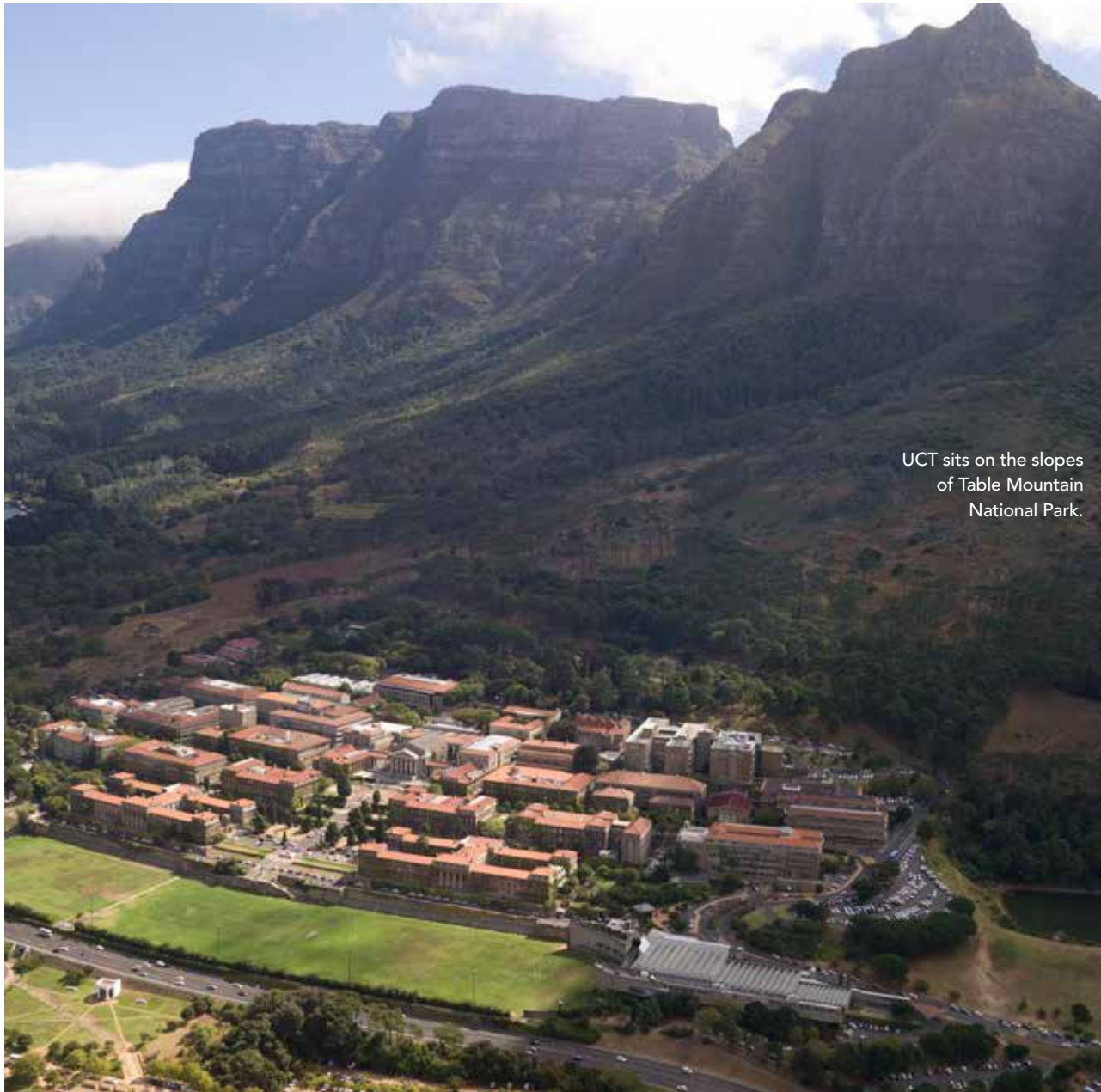
Campus planning is the responsibility of the Physical Planning Unit within Properties and Services, these matters being dealt with by the formal University Building and Development Committee (UB&DC). The University Building and Development Committee advises Council on physical development and oversees major capital projects. Associated groups of the UB&DC include the Physical Planning and Landscape Sub-Committee and the Environmental Management Working Group, and the chairs of these groups are members of the UB&DC.

In the past, a number of master planning studies have been completed at UCT, usually guided by the UCT Physical Planning Unit and undertaken by external consultants. In 2013 a major integrated planning process was launched at UCT, which is expected to take three years. The approach is one of a 'Package of Plans' comprising Frameworks for each component, such as Landscaping, Conservation, Transport and Mobility, Student Housing and Sports & Recreation. These Frameworks will provide design Guidelines to inform all future development and renovation of the campuses, which will be addressed on a Precinct basis.

The annual measurement of UCT's Carbon Footprint has now become established under Properties and Services. The first, baseline study was undertaken in 2009, and this has been followed by a report for 2012 and for 2013, with a commitment made to annual reporting in future. The Information Systems Department has incorporated this work into their curriculum and the students undertake research and analysis of components of the carbon emissions that feed into the formal report. Systems

Table 1 Carbon Footprint for 2013 according to GHG Protocol

CATEGORY	SOURCE	EMISSIONS 2013		% OF TOTAL
		Tons	CO ₂ e	
Scope 1:	Direct Emissions	755		0.88
	UCT vehicle Fleet		465.41	0.55
	LPG		289.38	0.34
Scope 2:	Indirect Emissions from Electricity	64 888		76.02
	Electricity: Main Campus		42 582.81	49.89
	Electricity: Medical campus		10 647.97	12.47
	Electricity: Off-Campus Residences		10 124.12	11.86
	Electricity: GSB		1 416.65	1.66
	Electricity: Hiddingh		116.50	0.14
Scope 3:	Other Indirect Emissions	19 717		23.10
	WTT Fuels		94.81	0.11
	WTT flights		278.39	0.33
	WTT LPG		36.25	0.04
	Business Travel		384.57	0.45
	Employee travel		9 634.20	11.29
	Food Supply		6 484.63	7.60
	Official flights		2 021.23	2.37
	Paper products		487.41	0.57
	Water supply		120.56	0.14
	Non-recycled waste		155.52	0.18
	Recycled Waste		19.63	0.02
	TOTAL		85 360.02	
INTENSITY METRICS		2013	2012	
	Gross Area	668 165	649 404	
	Tons CO₂e/m²	0.13	0.14	
	Population	31 041	30 579	
	Tons CO₂e/capita	2.75	2.87	



UCT sits on the slopes
of Table Mountain
National Park.

for ongoing measurement and documentation of UCT's Carbon Footprint are being formalised and improved.

An Integrated Transport Plan has been under development by an external consultancy since 2012, directed by the Physical Planning unit. The issues identified were the need to identify strategies for transport mode shifts away from private car use, optimisation of the Jammie shuttle operation, a review of the UCT parking strategy, and development of non-motorised transport (NMT). This major study is ongoing, and incorporates all campuses.

Sustainable food is a relatively new issue at UCT, championed in recent years by the Green Campus Initiative through advocacy and education campaigns and the student-run 'Vegilicious' society. Food supply has been included in Scope 3 of the carbon footprint measurements for 2012 and 2013. Awareness of the impacts of food supply on campus sustainability has begun to develop within Properties and Services, so that willingness to co-operate in UCT's sustainability initiatives is included in tender criteria. The GCI and Students Representative Council are consulted on all vendor tendering processes, allowing them to advocate for more sustainable food supply to UCT.

With the Main campus being adjacent to the Table Mountain National Park, a World Heritage Site, with its globally significant biodiversity resources, biodiversity is considered a priority in the Green Campus Action Plan. Objectives include enhancing the biodiversity and ecological value of the estate by planting endemic and indigenous vegetation and creating habitats to support local fauna and flora. Land use, landscaping and biodiversity issues are the responsibility of the Physical Planning and Landscape Sub-Committee, who may advise the decision-making body, the UB&DC. In the landscaping projects undertaken by the UCT Gardens department, biodiversity and showcasing the use of indigenous species has become a more established principle and practice.

MAIN INITIATIVES AND RESULTS

CARBON EMISSIONS IN TONS CO ₂ -eq/yr		
	2012	2013
Scope 1:	888	755
Scope 2:	64 830	64 888
Scope 3:	21 299	19 717
Total	87 777	85 360

A second Carbon Footprint report was produced in 2013 for 2012, using the GHG Protocol carbon accounting methodology for the first time. Compared to the 2007 result of 84 925 tons CO₂e (without including Food Supply), the result for 2012 was 76 704 tons CO₂e, a reduction of 9.7%. Considering that the population over the five-year period (students and staff) increased from 26 062 to 30 579 (17.3%), and the floor area also increased by new developments and by inclusion of the full extent of campuses and properties, this result was very positive.

In 2013, a third annual report was produced, which also revised the 2012 total up to 87 777 tons CO₂e after changes to align with current methodology and revised data. The total emissions decreased by 2.7% compared to 2012, with the main factors contributing to this change being electricity reductions due to energy-efficiency measures on Medical campus, and the revised commuting data obtained from a new survey. The 1.5% increase in population and the 2.9% increase in floor area

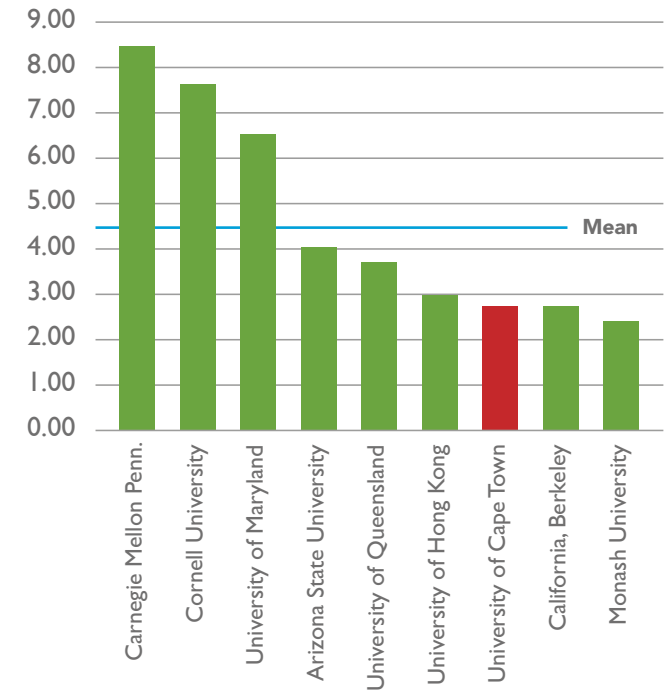
since 2012 indicate a neutral-to-positive trend with respect to carbon emissions. In terms of intensity benchmarks, results show that UCT has relatively low emissions at 2.75 tons of CO₂e per capita, and this improved over the 2012 result of 2.87 t CO₂e.

MASTER PLANNING

A major Integrated Planning process is underway at UCT. Previously, a number of master planning studies were completed at UCT that continue to inform land use and physical development; in particular, the Dewar et al report of 2005 (and the Physical Planning Unit's subsequent revision of this work in 2010) have been an important source of reference material. Numerous studies have been conducted in the fields of integrated transport planning, heritage conservation, landscape frameworks, environmental sustainability, student housing, and sport, as well as specific plans for 'precincts' such as Hiddingh and the Lower Campus. The current planning process seeks to *"...meaningfully assimilate, interpret and integrate this plethora of previous work into a more comprehensive whole that seeks to link spatial planning to growth management"*.

The current planning study focuses on Main Campus in Rondebosch and Rosebank and on the Medical campus. The outcomes of the process will comprise an overall Integrated Development Framework (IDF), providing the baseline analysis, background information, and an opportunities and constraints assessment; as well as detailed strategic recommendations

Figure 8 Comparison of per capita emissions of selected universities



relating to the Spatial Framework, Growth Management Strategy and Implementation Framework. The IDF Report will be submitted to the relevant authorities (City and Heritage authorities), to secure and confirm development rights. Furthermore, detailed Sectoral and Action Reports will be produced with a focus on implementation, as well as ongoing detailed Precinct Plans.

In March 2013, a Precinct Plan for the Hiddingh Campus (by a multi-disciplinary team, under the direction of Physical Planning) was commenced, and a final draft is presently under review.

Until the current planning process is completed, the Landscape Framework Policy (Oberholzer, 2006), while it focuses on Main campus, remains in use to guide projects using the principles of an open space system that has ecological, recreational and educational value, and addresses issues of ecological sustainability, accessibility, safety, security and comfort. The Landscape Framework identified the need for open spaces and landscaping at UCT to play a stronger social and educational role.



Toward the University's aim of a sustainable transport system, one of its strategies is to improve the Jammie Shuttle operational quality and explore routing alternatives. The Jammie Shuttle is a free transport system to help UCT students access campus and residences and includes a fleet of 26 buses, including a special one for disabled passengers. These buses operate between residences, all UCT campuses and some public bus, train and parking facilities in the local vicinity.

SUSTAINABLE TRANSPORTATION

An Integrated Transport Plan has been under development since 2012, commencing with the development of a vision for integrated transport at UCT. UCT's mission statement and the ISCN Charter principles have informed these studies, and the vision is thus to provide equitable access to all of the UCT community.

Objectives defined include reducing the impact of private vehicle access to the UCT campuses; promoting the increased use of public transport and NMT modes; minimising the impacts of vehicular traffic circulation on UCT campuses; and promoting pedestrian-dominated campuses. Among the strategies presented to the UB&DC in April 2013 was the need to:

- Improve Jammie Shuttle operational quality and explore routing alternatives
- Improve integration with the passenger train services
- Develop additional 'Park and Ride' schemes
- Expand the Ridelink carpooling programme
- Improve the NMT environment

UCT has been expanding the successful Jammie Shuttle service that services all campuses and has been operational since 2009. Concurrently, the City's public transport system, including a new bus system ('Bus Rapid Transport' or BRT) is also being expanded; therefore the linkages of the two systems require investigation through engagement with City Transport Planners, to inform planning and resource allocation between these systems.

Research for this report found that no traffic surveys have been conducted for the Main Campus in recent years, and this needs to be addressed. An understanding of the current split of commuting modes and any trends reflecting shifts from private car use to other modes would inform future infrastructure and parking space requirements.

UCT has a small vehicle fleet that has been reduced in recent years to about 130 vehicles. This reduction is due to a policy that decentralised the ownership of vehicles to department level. Many of the vehicles are now older than 10 years, and there is no 'replacement policy' requiring vehicles to be upgraded after a certain age. Therefore the current vehicles are not fuel-efficient, and have relatively high maintenance costs.

Renewal of the bus fleet is under consideration, and environmental issues are being considered in the development of these specifications.

The UCT Ridelink web-based carpooling system was first established in 2009 by students, and then became a partnership project with Properties and Services and the GCI. At the time of the 2012 ISCN Report, there were over 900 participants in the scheme, making use of the

preferential parking provided for those participating. Problems with the web platform led to UCT partnering with a young local entrepreneur, the developer of a proprietary carpooling software platform called 'FindaLift'. The new Ridelink platform commenced running in January 2013, and the IT problems appear to be resolved. However, the uptake since then has not been strong, and there are currently only 208 registered users. This reduced activity is probably due to a lack of awareness of the existence of the system; and changing travel behaviour takes time, and requires constant awareness-raising campaigns. Lack of monitoring and reporting of usage trends for the Ridelink scheme have been identified as a weakness of the system, and are being addressed, along with the launch of a new marketing and communications campaign. The GCI has been a key driver of the Ridelink car pooling initiative. The Ridelink website can be accessed at www.ridelink.findalift.co.za.

A cycle infrastructure project has been underway for a few years and the first phase, covering Main campus, was implemented in 2013, comprising signage, road markings and other infrastructure. Bike parking stations are still at the planning and design stage. Such infrastructure will be rolled out to other campuses in future, when the outcomes of the first phase can inform further implementation.

A pilot bicycle rental scheme, entitled 'Jammie Bike' (since it is linked to the UCT Jammie Shuttle system) has been launched, comprising 200 branded mountain bikes that can handle steep terrain. These are available for the UCT community to lease on an annual basis. The popularity of the initiative remains to be determined when uptake numbers become available. Videos to be used for online cycling tutorials, especially for beginners, were produced by the GCI in collaboration with the Bicycle Empowerment Network (BEN), an NGO whose mission is to address poverty and mobility through the promotion of cycling.



Sustainable transportation has seen the marketing of a carpooling system, RideLink; the launch of a fleet of bicycles, JammieBike, for rent to students; and a cycle infrastructure project with bicycle routes clearly signed and mapped out. These are all partly aimed at providing alternative greener transport access to campuses.

Air travel and video-conferencing

Air travel at UCT was measured in the 2012 and 2013 UCT Carbon Footprint Reports, using data from preferred travel agencies, and excludes air travel booked by external funders and booked directly by staff on the Internet. The results for 2013 compared to 2012 show an increase in the number of flights, from 2 756 to 3 257 (18%). Domestic travel alone increased by a significant 17% year-on-year from 2012 to 2013. Of the total air-travel activity, domestic travel comprises 38.5%, regional travel 6%, and international travel a significant 55.5%. Research is required to understand the drivers of these trends. An alternative to air travel, video conferencing, was introduced at UCT a few years ago and is growing in usage, but does not appear to be reducing air travel. A first annual data set for video conferencing was gathered for 2013; findings were that an annual total of 930 video conferences occurred, lasting 270 hours, averaging about 23 hours of video conferences per month. This data provides a benchmark against which future trends relating to this activity can be tracked.

SUSTAINABLE FOOD

A research study (an MSc dissertation) on campus food supply was undertaken in 2013: Food Sustainability at UCT (Gravenor, 2013). This was the first attempt to describe UCT's food system with regard to sustainability concerns, and with respect to estimating its carbon footprint. The findings include a detailed description of the food system flows at UCT, as well as surveys conducted of food preferences in residences and campus food outlets. Students and staff surveyed about the food available on campus expressed concerns that there is insufficient healthy food available. The study identified food waste as a major concern that could be addressed by introducing a 'trayless' dining system to avoid plate waste, and by composting food waste. In the Carbon Footprint reports for 2012 and 2013, food supply emissions were found to make up 7-8% of the total carbon footprint, the third-highest component after electricity and transport emissions. A student initiative towards sustainable food is the *Vegilicious*³ society, which supplies vegetarian food for campus events and highlights the

environmental impacts of various food choices provided in residences and campus food outlets.

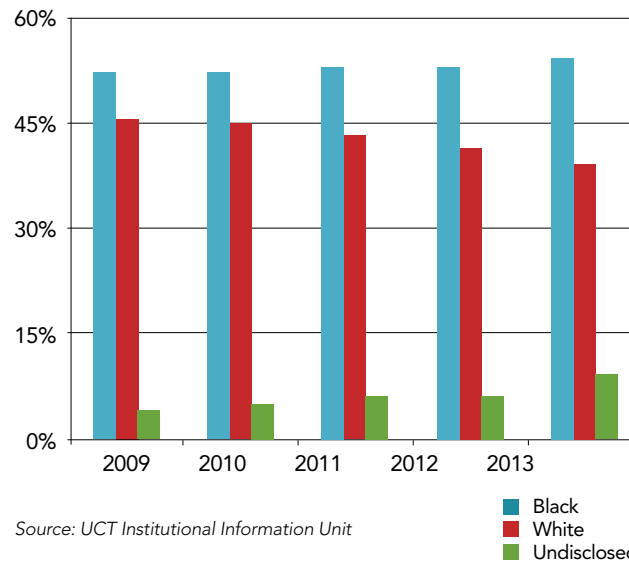
SOCIAL INCLUSION AND PROTECTION

Diversity of faculty, staff and students

Diversity and transformation are high priorities at UCT, given South Africa's apartheid past. In the post-apartheid South African context, 'transformation' refers to racial equality and gender equity, now enshrined in the Constitution. UCT's mission states that "UCT will promote diversity and transformation within our institution and beyond, including growing the next generation of academics."

In terms of UCT policy, all faculties are required to prepare an equity plan that seeks to improve the demographic profile of staff and students at UCT.

Figure 2: Student enrolment by race (excl. international students)



³ www.vegiliciouscapetown.com/

⁴ The definition used for 'black' employees is the same as used by the Department of Labour, i.e. including African, Coloured and Indian staff.

For the period 2012-2013, over half of UCT's enrolment was made up of black⁴ students, with over half the students registered being women (Figure 2).

With respect to diversity among the academic staff (all levels): in terms of gender, the ratio of males to females for the years 2011, 2012 and 2013 has been in the order of 60:40. In terms of race groups, the statistics for academic staff for the same period remained stable, and reflect the percentage of black staff at a total of 20%; white staff 53%; foreign nationals 26%; and 1% unknown.

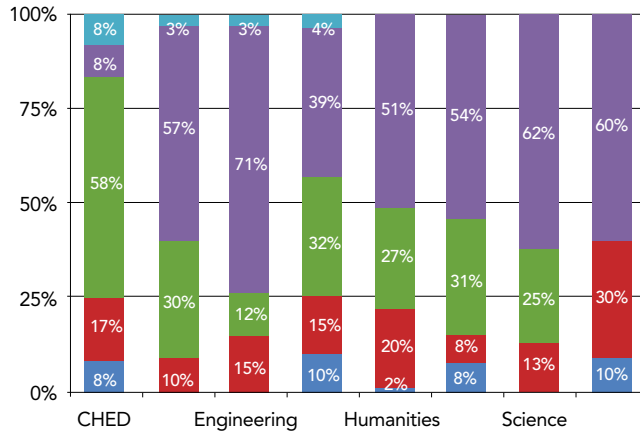
Analysis of the statistics for senior academic staff (Professors and Associate Professors) shows the highest proportion consists of white males (39%), followed by foreign nationals (25%). White women account for 20% of Professors and Associate Professors, while black women account for only 3%. 11% of Professors and Associate Professors are black males. As shown in Figure 3 below (excludes foreign nationals), racial and gender equity vary considerably by faculty.

More positive transformation trends are evident in the statistics for the category of black and white South African Senior Lecturers and Lecturers (Figure 4), where the highest proportion consists of white females (30%). Interestingly, there are more black female employees (15%) than black male employees (10%) in this category. White males make up 21% of UCT's Senior Lecturers and Lecturers.

Access to education

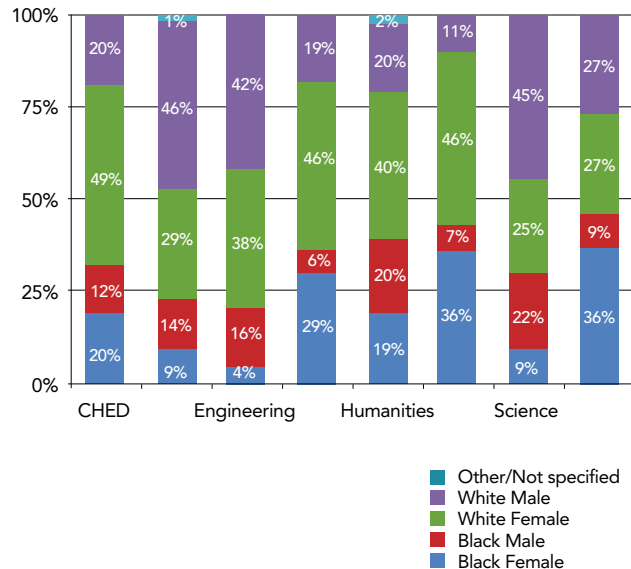
For many decades UCT has been providing financial assistance to financially disadvantaged students to study at UCT. Two financial assistance programmes are in place: a financial aid package, and gap funding. The University allocates significant funds annually to financial assistance programmes to meet this commitment, with the support of donors and the national government student loan scheme. UCT uses the government's National Means Test

Figure 3: Percentage of South African Academic staff by race and gender 2013



Source: UCT Institutional Information Unit

Figure 4: Percentage of South African Senior Lecturers and Lecturers by race and gender 2013



Source: UCT Institutional Information Unit

to determine financial eligibility. The test calculates an 'Expected Family Contribution', which is the only amount that students must contribute towards the cost of attendance.

The Centre for Open Learning (COL) contributes to the University's social responsiveness commitments by acting to make the academic resources of the university accessible to a wider range of participants. The COL provides a range of courses and learning opportunities for local and overseas university students as well as participants from commerce and industry, government departments, NGOs and the general public. COL coordinates the annual UCT Summer School, which is open to the public and provides continuing education courses for working people.

Supporting professional development

Human Resources Development coordinates and facilitates staff development initiatives at UCT. This includes the provision of an on-campus annual learning and development programme, the Staff Learning Programme. In addition, there are many other centres of learning for staff at UCT, including Centre for Higher Education Development (CHED), Information and Communication Technology Services (ICTS), the Research Office and the Health and Safety department. Some of the courses are SETA-accredited and so that certification can be obtained, while opportunities are also provided for more informal training and personal development. www.staff.uct.ac.za/training/centresoflearning

The Centre for Higher Education Development (CHED) is a cross-faculty unit primarily concerned with continual improvement in the quality of higher education through widening access, developing the curriculum in partnership with faculties, enhancing the competence of graduates by ensuring the provision of key skills and abilities, and enabling systemic improvement through the research-led development of informed policy options. It has teaching and research responsibilities; provides specialist educational expertise; and

functions to assist faculties to meet UCT's educational and strategic goals. Functions include academic staff development, the design and use of ICTS in the curriculum, academic writing support, and career development.

Interaction spaces

The historical Upper campus of UCT in particular is endowed with numerous well-functioning interaction spaces. Creating these on other campuses has been an objective, but these initiatives have not always been successful. For example, the outdoor spaces created around the 2010 Middle Campus development currently appear to be underutilised. Understanding the design attributes inherent in such spaces remains an ongoing agenda within the Physical Planning Unit. This department is currently engaged in a project aimed at addressing the development of underutilised space, both within buildings and externally, entitled 'My Space', which commenced in 2013 and is ongoing. Outdoor spaces between older buildings are being redesigned and upgraded, with the provision of street furniture, to provide new spaces that could be used for either social interaction or group learning. Furthermore, the entire University Avenue area is being reconsidered with a view to design interventions that enhance spaces for social and learning interactions.

Access to services and commerce

A wide range of services and amenities are available on campus:

- The UCT Disability Service, with fully accessible transport between residences and lectures.
- An Educare Centre, accommodating about 75 children in six pre-school classes. In 2013 the Centre was expanded, with additional care for babies.
- A well-utilised Student Health Service.
- The annual Wellness Fair, hosted for students and staff by the Human Resources Department. Services included massages, fitness demonstrations, and health screenings for blood pressure, cholesterol, diabetes, psychological distress, and HIV. The event is part of an ongoing effort to

ensure that health services are readily available for the campus community.

- The objective of the HIV/AIDS Institutional Co-Ordination Unit (HAICU) is to ensure that the university is responding appropriately to the HIV pandemic in a coordinated manner in the areas of HIV management, teaching and research.
- 35 contracts with third parties provide food services, at outlets ranging from fully operational cafeterias to smaller kiosks.
- A post office, a camera/PC/mobile phone shop and a bookshop are located on the Upper campus

- There are 100 student societies reflecting a wide range of interests, including academic, religious, cultural, social and political activities.
- There are 35 sports clubs, with over 9 000 students and staff registered

Participative campus planning integrating users and neighbours

A 'Communications Matrix' is being developed to guide stakeholder engagement around planning and design at UCT. This guideline will deal with internal and external stakeholder engagement, as well as with neighbouring communities and the City.

UCT continues investing in improving the quality of the neighbourhoods surrounding the university through its participation in the Groote Schuur Central Improvement District (GSCID), established in 2010. The main areas of activity of the GSCID are the safety, security and cleanliness of the neighbourhood. The Director of Properties and Services is on the board of the GSCID.

Health and Safety of laboratory workers

The health and safety of laboratory workers is addressed through the ongoing provision of training, and by having clear procedures in place within departments, which are monitored by the Health and Safety Representatives in each department. As a further safeguard, the Health Sciences Faculty has a Chemicals sub-committee responsible for oversight of hazardous chemical substances control.

LAND-USE AND BIODIVERSITY

Landscaping projects to enhance the quality of the estate are ongoing, undertaken by the Gardens Department with guidance and input from the Physical Planning and Landscape Sub-Committee. In total, for the period 2012 and 2013, approximately 30 000 plants, including trees, were planted. During 2013, the PPLSC undertook the upgrading of



New landscaping projects on campus with indigenous plantings.

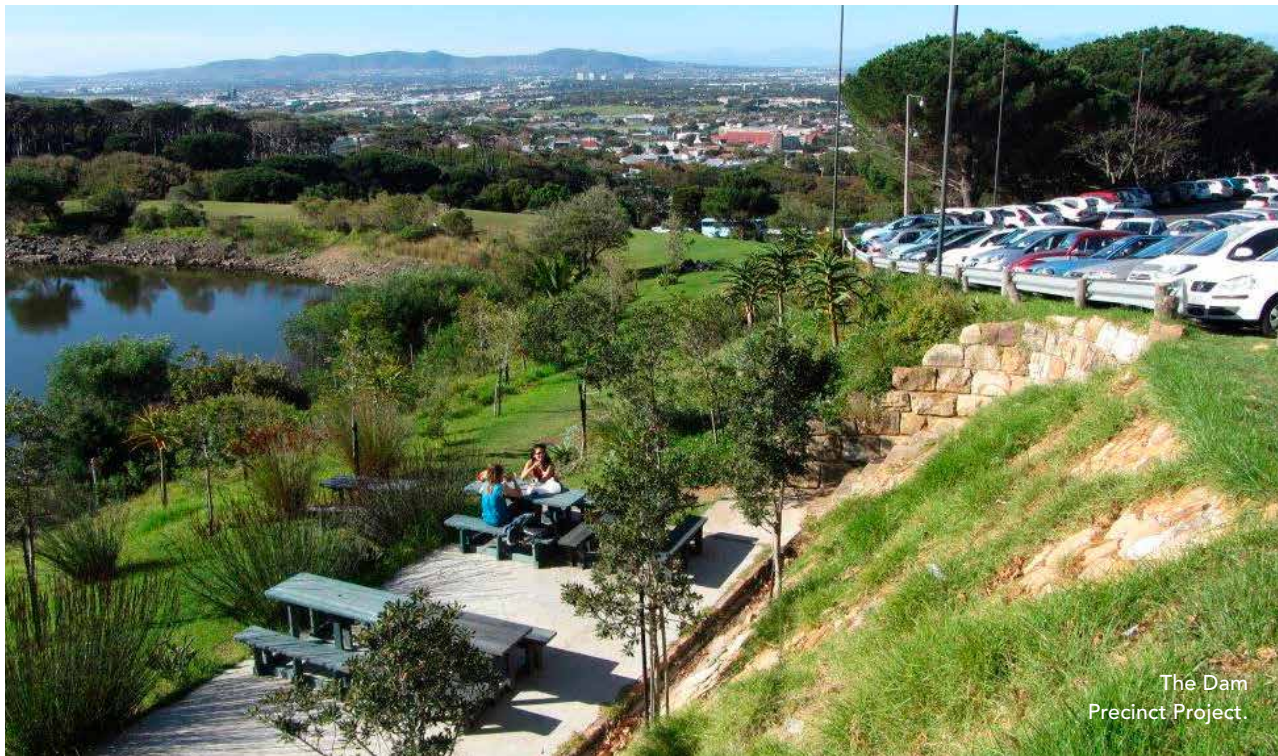
the pedestrian routes along Ring Road at the rear of Upper campus. In another initiative, a Landscape Architecture consultancy was appointed to produce a landscaping study on the Historical Core of the Upper Campus.

- **The Dam Precinct Project (2013)**, on the northern edge of Upper Campus, involved extensive clearing of alien vegetation; creation of new routes and pathways linking to parking areas; new outdoor seating and tables; and an outdoor classroom or meeting area. Planting included around 70 indigenous and endemic trees, a wide range of local Fynbos species, bulbous flora, Restios (grasses) and

a mix of indigenous shrubs. The result has been a major increase in pedestrian traffic since the upgrade of the area, and it has become a well-used walking route and outdoor social area. Furthermore, the provision of indigenous habitat has seen an increase in birdlife.

- The **Main Entrance Gateway** landscaping project along the embankment of the main access to Upper Campus, Ring Road, was initiated in 2011, and work is still in progress for Phase 3 of this project. The landscape design aims to showcase the unique indigenous and endemic flora of the Western Cape.

- At **Hanover Park Health Sciences Clinic**, where medical students gain practical experience, an urban food garden has been developed to promote the practice of self-reliance. In addition, over 60 trees were planted at this site. A successful training workshop for patients and staff was delivered, in partnership with a local nursery, on how to cultivate fruit trees, herbs and vegetables.
- At the **Educare childcare centre** on Upper Campus, a project comprising substantial planting of indigenous trees, shrubs and groundcovers was implemented to enhance the entrance to the new Baby Centre.
- A major landscaping project was implemented at Welgelegen Manor House, the historic national monument on Lower campus, comprising a circular ornamental sunken garden. This project involved management of stormwater run-off, followed by the planting of over 6 000 plants of predominantly Western Cape indigenous species and the creation of a bi-seasonal floral display.



The Dam
Precinct Project.

Biodiversity conservation (and alien vegetation control)
The Upper Campus of UCT (part of the Main Campus) lies on the lower slopes of Table Mountain, which is a UNESCO World Heritage Site, managed by the state as a protected area, the Table Mountain National Park. The mountain's vegetation types form part of a recognised global biodiversity 'hotspot', the Cape Floristic Region, where an estimated 2 200 species of plants are endemic to Table Mountain.

Clearing of alien vegetation in the Upper Campus forest adjacent to the Table Mountain National Park is an ongoing task for the Gardens Department. This is done to avoid fire risk, prevent the spread of invasive species, and conserve biodiversity. A major clearance was undertaken in 2013, along with the removal of dead pine trees to reduce fire risk. Further removal of alien vegetation to the northern edge of the forest was undertaken during site preparation and clearing for the Dam Precinct Landscaping Project.

An initiative to develop a management plan for the Upper Campus forest commenced in January 2011, and after an assessment and participation process, a report was tabled to the UB&DC in July 2012, titled the 'UCT Heritage Park Framework Plan'.

This Framework Plan proposed the regeneration of less invasive (Stone Pine) trees, removal of all invasive species, and replanting with indigenous species in other areas, providing space for recreational and outdoor educational activities. The forest trees are an old plantation of alien pine species and are due for felling; however they perform a function as a visual backdrop to the iconic Upper campus buildings and are considered of heritage value.

Some stakeholders proposed regeneration of the forest, while others preferred a replanting with indigenous and endemic vegetation to enhance and conserve biodiversity. Outcomes of the process aimed to achieve a compromise solution, addressing issues of both heritage and biodiversity. Since mid-2012, this Plan has not progressed towards detailed design and implementation, while debate has continued around funding models for the implementation phases.

The Main Campus has a population of threatened frogs: the Cape Rain Frog, which is Red-Listed as Vulnerable. A baseline distribution survey of these frogs on Middle and Lower campus areas was commissioned by Properties and Services in 2009, due to proposed stormwater management infrastructure in their habitat. The study found that the population is conservation-worthy, with a relatively large adult population estimated at ~320 individuals that would remain viable if the habitat was well managed, as per the recommendations of the report.

While the conservation of this frog is considered by the Gardens Department in terms of the timing of major garden works, the full extent of the recommendations

for conservation of the frogs has not been adopted or implemented. The population on Middle and Lower campuses can be supported by avoiding further fragmentation of the rain frog's habitat and vital movement corridors; landscape management to encourage expansion of the population into new habitats; a monitoring programme and further research to determine population trends; and increasing awareness, by erecting informative signage at strategic points.



The threatened Cape Rain Frog (*Beviceps gibbosus*), found on UCT's Main Campus.

THE EFFECT OF ICE-CAP MELT DATA COLLECTION INNOVATION

Deep-sea data collection instruments are playing a vital role in telling oceanographers how increased ice-cap melt is affecting the nature and flow of water between the North and South Atlantic Oceans.

UCT's Dr Isabelle Ansoorge (Oceanography Department and the Marine Research Institute) is part of an international scientific team involved in beefing up data collection in the South Atlantic.

Ansoorge and a group of UCT oceanography students recently returned from an expedition aboard the new South African polar vessel, *SA Agulhas II*, to deploy additional observational monitoring instruments in the region.

These deployments will monitor the Meridional Overturning Circulation (MOC), a system of surface and deep ocean currents that extend across the globe. It's the main pathway for the large-scale circulation of heat, salt and carbon dioxide from the tropics polewards.

"One impact of continued global warming is the threat of increased melting of Greenland's ice cap, which may result in an influx of cold and fresh surface waters into the North Atlantic Ocean," said Ansoorge.



Gathering data: Dr Isabelle Ansoorge, chief scientist Marcel van den Berg, and French technician Michel Hamon about to deploy a Current Pressure Inverted Echo-Sounder (CPIES) into the South Atlantic.

Already, the North Atlantic ice melt is precipitating changes to the ocean, reflected in factors such as temperature and salinity. And scientists predict that the injection of fresh water into the sea as a result may soon be enough to change the composition and flow of the world's oceans on lengthy time scales, ranging from decades to centuries.

Climate models have predicted that increased levels of greenhouse gases may also be interfering with this process, by slowing down the circulation in the North Atlantic – the northern limb of the MOC.

"Although individual efforts to measure the circulation south of Africa exist, none of these efforts have previously been co-ordinated; nor have these systems been designed for long-term monitoring," said Ansoorge, the principal investigator of South Atlantic Meridional Overturning Circulation SA (SAMOC-SA), an initiative she leads with Dr Mike Roberts of the Department of Environmental Affairs Oceans and Coasts, and Professor Sabrina Speich of the University of Brest in France. "There's growing recognition of the intimate link between the North and South Atlantic basins, and the critical need to study the full ocean water column on a more regular and long-term basis."

OVERVIEW OF UCT'S PRINCIPLE 2 GOALS

TOPICS	GOALS AND INITIATIVES		RESULTS		
			Performance 2011	Performance 2012	Performance 2013
Priority topics (with units of measurement)	Objectives and targets (for reporting year, for the following year, and/or beyond)	Key Initiatives (in reporting year, and /or planned for the following year and beyond)			
INSTITUTION-WIDE CARBON TARGETS AND RELATED ACHIEVEMENTS					
GHG reduction	Calculate annual GHG emissions and set reduction targets. Baseline established: 83 400 tons CO ₂ e total CO ₂ emissions for 2007	Institutional arrangements and information systems for ongoing reporting of GHG emissions are being formalised and streamlined	n/a	Total Carbon Footprint: 87 777 tons CO ₂ -q	2013 Total Carbon Footprint: 85 360 tons CO ₂ e Reduction of 2.7%
MASTER PLANNING					
Campus Master Plan	Requirement to give due consideration to equity, heritage, landscape, sustainability, safety and security; Enhanced transportation and pedestrian access networks	Major Integrated Planning Process launched at UCT, which is expected to take 3 years			Integrated Planning process underway
TRANSPORTATION					
Integrated Transport planning	Development of university-wide integrated transport plan	Integrated Transport Plan study has been underway since 2012	n/a		Jammie shuttle mileage reduction pilot planned for 2014
Commuting transportation Number of Shuttle Passengers 2010: 5 116 032	Reduce private car travel	Provide free Shuttle service to all campuses; integrate with city transport system	Number of Shuttle Passengers: 4 487 926	Number of Shuttle passengers 2012: 4 804 165	Number of Shuttle passengers 2013: 4 667 753
Car-pooling (3-person minimum)	Increase number of car-pooling participants; increase preferential parking areas	Car-pooling incentivised with preferential parking area for 80 cars; access controlled	842 participants	unknown	208 registered members; 146 registered journeys; 345.231 kg of carbon dioxide saved
Promote cycling (numbers of commuting cyclists)	Provide adequate infrastructure to ensure safety of cyclists and promote cycling. Extend cycle infrastructure to all campuses	Cycle infrastructure design and documentation for Main Campus; implemented in 2013	Detailed design for Main Campus completed; tender documentation in progress	Cycle infrastructure commenced.	Main campus cycle infrastructure completed in 2013; modified in 2014.

Bike rental scheme	Promote cycling by provision of rented bikes	Planning of bike rental scheme; procurement of bikes; loan arrangements; legal issues	Development of Jammie Bike rental scheme and leasing arrangements	First 200 rental bikes were procured and branded with Jammie Bike logo.	Bike rental scheme launched April 2014
Business travel management (number of video conference units installed)	Reduce air miles and provide video conference access	Deploy video conferencing as alternative to travel; IT department provides assistance	Number of video conferencing units = 2	Steady growth of video conferencing infrastructure and usage	Over the 12-month period since July 2013, there were a total of 930 video conferences lasting 270 hours
SOCIAL INCLUSION AND PROTECTION					
Diversity - staff	Promote cultural diversity and transformation	UCT's mission to promote diversity and transformation within the institution and beyond, including growing the next generation of academics	Refer to above statistics and graphs	Refer to above statistics and graphs	Refer to above statistics and graphs
Diversity - students	Promote diversity and transformation among the student body		Black = 52.3% White = 42.3% Undisclosed = 5.4%	Black = 52.9% White = 41.5% Undisclosed = 5.6%	Black = 52.7%; White = 38.6% Undisclosed = 8.7% Female <50%
Access to services (number of services available on campus)	Enhance provision of services and amenities for the campus community		30 food outlets 35 student sports clubs; 80 student organisations; kindergarten for 75 children	30 food outlets 35 student sports clubs; 80 student organisations; Student Health Service; kindergarten for 75 children	35 food outlets 35 sports clubs, 9 000 users; 100 student organisations; kindergarten for 75 children; new Baby Centre
Participative campus and neighbourhood planning	Continue/foster dialogue with neighbourhood, city and institutions (schools)	Establishment of a neighbourhood Groote Schuur Central Improvement District (GSCID) (2010); ongoing participation and leadership	UCT is represented on the board of the GSCID; UCT's Director of Properties is on the board of the GSCID		A 'Communications Matrix' is being developed to guide stakeholder engagement
Health and safety of laboratory workers (No. of incidents per annum)	All incidents are consistently reported			n/a	Incident reporting to becoming standard/embedded

LAND-USE AND BIODIVERSITY					
Landscaping projects					Dam Precinct; Welgelegen Garden
Alien clearing (ha or annual expenditure)					
Forest regeneration and management	Develop plan for the area that considers ecological, educational and recreational uses; remove invasive aliens; replace ageing trees with indigenous species	Forest management study, planning process and consultation during 2011 and 2012	Spatial concept and final report available for stakeholder comment and approval; approval to occur in 2012	UCT Heritage Park Framework Plan tabled at UB&DC in July 2012	No further progress; no funding allocated for detailed design phase.
Tree planting	Develop and adopt an indigenous tree-planting policy, balancing heritage, biodiversity and maintenance aspects	Tree-planting list finalised	~100 Indigenous trees planted		~30,000 plants and trees planted between 2012 & 2013; shrubs largely indigenous

PRINCIPLE 3

INTEGRATION OF FACILITIES, RESEARCH, AND EDUCATION

Principle 3:

To align the organisation's core mission with sustainable development, facilities, research, and education should be linked to create a 'living laboratory' for sustainability.

MANAGEMENT APPROACH TO PRINCIPLE 3 TOPICS

One of the university's strategic goals is to expand and enhance UCT's contribution to South Africa's development challenges. To this end UCT has identified four key institution-wide initiatives that seek to address critical social challenges, and turned these into strategic research drives:

- Safety and Violence Initiative
- African Climate & Development Initiative
- Poverty & Inequality Initiative
- Schools Improvement Initiative

Of these four initiatives, the last three have relevance to Principle 3 of the ISCN-GULF Charter:

AFRICAN CLIMATE & DEVELOPMENT INITIATIVE

The Vice-Chancellor's commitment to establish a platform for climate research led to the adoption of climate research as a focus area in UCT's current strategic plan 2010-2014.

In 2012, the first Pro Vice-Chancellor was appointed at UCT to provide enhanced academic leadership around the strategic goal of addressing the climate and development challenges of Africa, from an African perspective. The Pro Vice-Chancellor is tasked with taking the lead in facilitating and substantially extending climate research at UCT. The Pro Vice-Chancellor is also director of the African Climate and Development Initiative (ACDI) that aims to coordinate the University's current resources, partnerships and intellectual capital across a range of disciplines relevant to climate change and development in research, teaching at postgraduate level, and promoting public awareness.

POVERTY AND INEQUALITY INITIATIVE

The Poverty and Inequality Initiative aims to identify and stimulate work that tackles the question of why poverty and inequality are so persistent in a country of rich resources, and why poverty and inequality are persisting (and even, in the case of inequality, increasing). The initiative also aims to share this work beyond the university in order to contribute to the national effort. This is achieved by providing a portal through which relevant work at UCT can be mapped and made accessible. A core debate in this grouping is defining poverty and inequality more broadly than merely meeting people's basic needs.

SCHOOLS IMPROVEMENT INITIATIVE (SII)

This Initiative is a response to the education crisis in South Africa, characterised by a cycle of under-achievement which not only has negative implications for the country, but poses serious challenges for tertiary education. This initiative aims to break the cycle of under-achievement in schools by addressing the quality of educational provision. Through the SSI, UCT engages practically with the problems of schooling, drawing on university-wide resources and on student organisations, and working in collaboration with education-related groups outside UCT, including local and national education departments. Both teacher and student development are targeted through a range of school-based interventions, both at primary and secondary level.

Sustainability principles and topics have gradually become integrated into courses across the Faculties of Economics, Science, Engineering and the Built Environment, Humanities,

Health Sciences, Law and the Graduate School of Business. A second mapping study that documented the extent to which sustainability was integrated into the curriculum was undertaken for this report. This followed a more formal process, where the Deans were requested by the office of the Deputy Vice-Chancellor to circulate the information relevant to their faculties to validate, amend or supplement the data.

In the research arena there are a number of research groups that engage in interdisciplinary sustainability research. These include Climate Change; Environmental and Social Dimensions of the Bio-economy; Governance of natural resources, Resource economics, African Cities, Energy; and Marine Research. There are a number of research chairs of the South African Research Chairs Initiative (SARChI)⁵ associated with these research groups. Apart from research groupings, there are many researchers doing sustainability-related research work across the university, but no inventory is currently kept and there is no coordination, making this difficult to report on.

The **UCT Global Citizenship Programme** provides an opportunity for students across faculties to engage with



⁵ www.researchoffice.uct.ac.za/strategic_initiatives/sarchi_chairs/



UCT's GCI students and Dr Kevin Winter, from the EGS Department, are seen here removing a large patch of *Phragmites* reeds, to test their rate of re-growth as part of an ongoing effort to restore a wetland in the lower Liesbeek River.

provides a hub for finding project partners for people both inside and outside the university.

A significant role in transition towards a sustainable living, a sustainable campus and social cohesion around these issues is delivered by the **Green Campus Initiative (GCI)**, which is a student-led movement, with some staff membership and collaboration. The GCI is supported by Properties and Services and works closely with their staff, attending the Environmental Management Working Group, and working on joint initiatives. The structure of the GCI comprises committee members with portfolios, and many dedicated volunteers. The movement has grown rapidly since its small membership of 100 in 2007; in 2013, the GCI had a committee of 20 volunteers and a membership of over 2 200. Their activities also involve external partners such as the City of Cape Town, scientific institutions, schools, and other universities in southern Africa. In the reporting period, new partnerships were formed with Greenpeace, WWF, Trashback (an external NGO) and SHAWCO (UCT's development agency focusing on health care and education). The GCI remains responsible for convening the quarterly Waste Task Team meetings for waste management at UCT, comprising staff of Properties and Services, students, and academic staff. Greening initiatives within the residences are a large part of GCI activities, and there are representatives in each residence.

questions relating to global citizenship and social justice beyond their degree requirements, and to develop capacity for leadership on contemporary global and social justice issues, including sustainability.

UCT has set a strategic goal to expand and enhance its contribution to South Africa's development challenges. The **Social Responsiveness Programme** responds to this goal by engaging with communities and other non-academic constituencies through their expertise and research, to address societal and development challenges. Social Responsiveness embraces engaged scholarship involving academic staff, civic engagement involving students' community service,

and professional engagement involving professional and administrative staff using their professional expertise. The University Social Responsiveness Committee comprises a representative of each Faculty, a Chair (Deputy Vice-Chancellor), graduate students, and representatives of the Students Council, other student groups and non-academic staff. Social Responsiveness is recognised through a range of means: an Annual Award to an individual or research group as well as an annual event where project partners are invited to talk about their experiences in engaging in receiving social responsiveness inputs from UCT, and where the annual report is handed over. Committee representatives engage with Deans of faculties and hold seminars to raise awareness. UCT's **Knowledge Co-op**

UCT has participated in a regional initiative, under the auspices of the Cape Higher Education Consortium (CHEC) and the Western Cape Government (WCG). Collaborative research work across four universities is underway in four strategic areas identified, one of which is Climate Change, Sustainability and Adaptation. This area was launched with a workshop in October 2012, which was attended by 100 delegates from all four universities involved, the WCG and the City of Cape Town. The workshop deliberations led to the identification of a number of areas for collaborative research work, of which three have been pursued subsequently: green precincts; skills development for the green economy (discussed below), and the nexus between food, water and energy.

MAIN INITIATIVES AND RESULTS

TOPICAL INTEGRATION

Courses that integrate sustainability theory and principles

A mapping study of sustainability in the curriculum was undertaken for this report. The findings reflect an increase in sustainability-focused courses from 40 in 2011 to 52 for 2012/13, amounting to a 30 percent increase; and an increase in sustainability-focused programmes from 15 to 18, a 20 percent increase. As in the previous report, a distinction was made between courses that focus on the topic of sustainability and those that are merely sustainability-related, only including some lectures on specific aspects of sustainability. These results can be considered as more accurate than the previous findings, since a more formal process was followed, via the Faculty Deans. The increased number of courses may be due in part to better data collection. The distribution of sustainability courses was found to be well spread across the faculties, with a significant increase in the Faculty of Engineering and the Built Environment and at the Graduate School of Business (Table 1). The full listing of these programmes and courses can be found at www.greening.uct.ac.za/about/curriculum/

UCT's Department of Institutional Planning has participated in a regional initiative, with the Cape Higher Education Consortium (CHEC) and the Western Cape Government, comprising a curriculum-mapping exercise of offerings at the four Western Cape universities. This curriculum mapping aims to assess how effectively these universities are preparing

Table 2 Sustainability in Education at UCT 2012-2013

SUSTAINABILITY IN EDUCATION AT UCT - 2012 TO 2013			
Faculty/Unit	Programmes	Courses ('Focused')	Courses ('Related')
Engineering & Built Environment	7	15	12
Commerce		1	2
Health Sciences	1	3	
Law	2	8	1
Humanities		5	5
Science	7	12	11
Graduate School of Business	1	8	2
Centre for Higher Education			1
TOTAL	18	52	33

students in areas related to the 'Green Economy'. The four focus areas are Transport and Communication, Natural Resource Management (Agriculture/Mariculture), Tourism, and Renewable Energy. Workshops will be organised, with the academics teaching the programmes/courses in the near future to discuss the findings and plan the curricula.

Research/courses that transcend disciplines

In the research arena there are a number of research groups that engage in interdisciplinary sustainability research. These include Climate Change; Environmental and Social Dimensions of the Bio-economy; African Cities; Energy; and Marine Research:

- The **African Climate and Development Initiative (ACDI)** is a cross-cutting, interdisciplinary initiative working across numerous fields and faculties to consolidate and coordinate the climate-change research at UCT. Interdisciplinary work includes research on mitigating climate change, and research on how human and ecological systems can adapt to changing climatic conditions, both now and in the future. The ACDI focuses on four categories of climate-change research: Mitigation, Vulnerability, Impacts and Adaptation, Climate Science and Sustainable Development. acdi.uct.ac.za/research
- The **African Centre for Cities (ACC)** is an interdisciplinary research and teaching programme focused on quality scholarship regarding the dynamics of unsustainable urbanisation processes in Africa, with an eye on identifying systemic responses. Wide-ranging applied research work encompasses such issues as urban culture, ecology and food security; monitoring the informal economy in cities; climate adaptation at the local scale; and re-conceptualising sustainable human settlements and urban

A UCT researcher conducting a focus group with *Pelargonium sidoides* harvesters in Tsatsane Village, Lesotho circa 2009. The research formed part of a master's thesis undertaken with support from the National Research Foundation, via the Environmental Evaluation Unit, Department of Environmental and Geographical Science, UCT.



neighbourhoods of the future. Scholars and postgraduate students across UCT with an interest in urban research can participate in a number of ways. The ACC offers a master's programme, monthly open seminars and informal discussions to advance interdisciplinary discourse on urban research topics and on contemporary developments in the urban development policy field. Quality publications by African scholars on urban topics are disseminated in papers, books and a periodical entitled *Cityscapes*.

- The **Climate Systems Analysis Group (CSAG)** is a research group addressing the climate change knowledge needs of developing nations, delivering tailored climate change information, building capacity within the continent, and engaging with users around adaptation, policy and impacts. Research topics include adaptive interventions in agriculture to reduce the vulnerability of different farming systems in South Africa; exploring the limits to predictability of the climate system; health, environmental change and adaptive capacity with respect to anticipating future risks of water-related vector-borne diseases in eastern Africa; developing a wind atlas for South Africa; and climate change projections with a particular focus on storm water management, a critical issue for a city vulnerable to urban flooding.
- The **Environmental-Economics Policy Research Unit (EPRU)** in the School of Economics is a collaborative association of researchers specialising in environmental and natural resource issues. The EPRU aims to enhance the effectiveness of environmental policy-making by adopting a threefold strategy of research, teaching and policy consultation. Research pertains to ecosystems management, biodiversity conservation, air quality and water quality; the socio-economics of agriculture, fisheries and conservation; land use and rural poverty; and inequality among subsistence fishermen, as well as the role of community-based wildlife conservation in poverty mitigation. The EPRU is now the South African
- branch of the international Environment for Development Initiative (Efd) initiated and managed by the Environmental Economics Unit, University of Gothenburg, Sweden.
- The **Energy Research Centre (ERC)** is a multi-disciplinary centre which pursues excellence in technology, policy and sustainable development research, education and capacity-building programmes at a local and international level. The major research focus areas are Energy, Poverty and Development concerned with energy issues that affect livelihoods for poorer communities in developing countries; energy efficiency at the demand level; energy modelling with the aim of assisting local industry and government to identify and assess technology and policy options; and research on the intersection between energy, local environment and global climate change.
- The **Environmental Evaluation Unit (EEU)**⁶ is a research and consulting unit in the field of sustainable development, environmental and integrated coastal management, responding to local, regional and global environmental challenges using interdisciplinary and participatory approaches. The EEU is engaged in a number of multi- and trans-disciplinary research projects with partners across the world on issues of governance for justice and sustainability.
- The **Marine Research (MA-RE) Institute** aims to enhance UCT's strength in the marine research and teaching field through formalised collaboration and coordination of all marine researchers and academics across disciplinary boundaries. The institute strives to transform the marine field through capacity building and skills development, and is open to all marine-related research groups and individuals at UCT, as well as all issues influencing these areas (e.g. socio-economic, legal and historical).
- The **Centre of Criminology** is a research unit in the Faculty of Law, where current research includes the critical area of Environmental Security. Research explores emerging

⁶The EEU has been reconfigured and now operates as a group of researchers within the Department of Environmental and Geographical Science including a SARCHi Chair in Environmental and Social Dimensions of the Bio-economy.

institutions of governance for mitigation and adaptation to climate change; how communities manage the increasing risks associated with climate change; how regulatory institutions contribute to these processes; and what alliances can be built between them. The Centre builds close collaborative partnerships with other institutions across the science, education, public and private sector divides. Outreach programmes with schools and colleges aim to integrate understandings of sustainability into science curricula.

In the Engineering and the Built Environment (EBE) faculty, an elective undergraduate course entitled Social Infrastructures: Engaging with Community for Change was developed and launched in 2013, with 33 registered students. It is open to students across all faculties, across all years and from all the disciplines within the faculty. The course helps students broaden their understanding of socio-economic issues in ways that a narrow, discipline-based curriculum is unable to do. It allows them to develop new skills; knowledge, values and attitudes that can help them function better as professionals in their chosen fields. Themes include cities, infrastructure and social change; urban food security; cities and climate change; water, sanitation and service delivery and sustainable urban development (Box 1).

SOCIAL INTEGRATION

Connecting campus users with industry, government and civil society

The Social Responsiveness Programme at UCT, referred to above, specifically aims to connect academics and students with government and civil society. Policy in this arena was refined in 2012 with the development of a Social Responsiveness Policy Framework in July 2012. The policy deals with how the value of social responsiveness work can be defined, elevated, encouraged and acknowledged, given that outputs differ from the usual metrics of a university (journal papers and degrees). The Social Responsiveness

Committee is in the process of preparing an audit of such projects across the campus. Further information can be found in the Social Responsiveness annual reports at www.uct.ac.za/about/intro/socialresponse/

There are hundreds of academics and researchers engaged in research that is socially relevant, from work on developing new drugs to treat HIV/AIDS, to supporting small farmers who preserve indigenous seed. Since there is no coordination of this sustainability research across faculties, it is difficult to report on, and for potential collaboration between researchers to occur.

Engagement with civil society to address a range of development challenges is fostered by UCT's Knowledge Co-op, established to enable community groups to access academic expertise more easily. It provides an opportunity for academics and students to engage with society, to address the needs of communities and to apply their knowledge to real-world issues. Examples of projects facilitated by the Knowledge Co-op include:

- A master's thesis in using alternative energy sources for pumping water in the rural Elundini municipality compared solar and wind to currently-used diesel power. Energy Research Centre (Co-op #29)
- One practical intervention underway is collaboration between UCT engineering students and the NGO Engineers without Borders (EwB UCT). This partnership aims to develop and install a bio-digester to generate electricity from bio-waste. (Co-op #122)
- Three undergraduate research papers have been completed on assessing sustainable food gardening in low-income areas, both at household level and in communal gardens. Economics 3009F. (Co-op #95, 173, 176)

The **OpenUCT Initiative** aims to make freely available as many as possible of UCT's research, teaching and

“These (social responsiveness) activities reveal the commitment of academics to draw on their scholarly expertise and work across disciplines to solve the country's challenges. It also reveals the extent to which the concept of engaging external constituencies in solving the challenges is beginning to engender new practices in community-university partnerships.”
– UCT VC
Dr Max Price

community-focused scholarly resources to those with internet access; and to engage with the higher education openness agenda, from the perspective of the global south. The UCT OpenContent directory is the web portal for accessing open teaching and learning content from UCT.

The **Sustainable Enterprise & Emergent Change** research group at the Graduate School of Business looks at the contribution that organisations – particularly business organisations – can make to sustainable development.

Community-based collaborative research projects have formed a core element of the human geography and environmental management and sustainability-teaching curriculum in the **Department of Environment and Geographical Science** over the past decade. Long-term partnerships with non-governmental organisations in the townships around Cape Town as well as in rural communities have facilitated the development of these projects. Research projects have been defined that contribute to the goals and knowledge needs of the community-based organisations, while providing opportunities for student learning, in terms of qualitative fieldwork skills, and in-depth immersion in a range of critical issues central to socio-political and economic challenges. Projects also provide unique opportunities for students and community activists to work together, despite often having different backgrounds. Student exposure to developmental debates combined with training and grounding in local research is considered crucial in the South African and southern developmental context.

The **Animal Demography Unit (ADU)** based in the Department of Biological Sciences works closely with members of the public to add to a growing database of flora and fauna locations. Through their many citizen science projects, anyone can contribute to this growing body of knowledge of where different African plants and animals can be found. The mission of the ADU is to contribute to the understanding of animal populations, especially population

dynamics, and thus provide input to their conservation. This is achieved through mass-participation projects, long-term monitoring, innovative statistical modelling and population-level interpretation of results. The emphasis is on the curation, analysis, publication and dissemination of data.

The major research groupings mentioned above play a significant role in connecting academics and students with government, industry and civil society: the African Climate and Development Initiative; the African Centre for Cities, which has ongoing partnership with local government influencing urban policy; the Environmental Evaluation Unit; the Centre of Criminology; and the Energy Research Centre.

Programmes that further student interaction and social cohesion on campus

The section above on 'Research/courses that transcend disciplines' describes those courses that encourage cross-faculty integration and promote social interaction and cohesion around themes of sustainable development. This section focuses on programmes not core to the curriculum.

The **UCT Global Citizenship Programme**, which commenced in 2010, comprises a series of co-curricular activities for students across all faculties, aimed at exposing students to contemporary global citizenship and social justice issues beyond their degree requirements. The programme comprises the Global Debates, Local Voices workshop series, which addresses issues of environmental degradation, climate change and exploitation of resources. A further module of 60 hours of voluntary community service provides an opportunity for students to consider issues of leadership and citizenship.

The annual '**Green Week**' is the major sustainability awareness-raising drive, comprising music concerts, documentary film screenings and panel discussions, and including City officials, sustainability researchers and experts, and civic society leaders. Green Week is organised by GCI

and supported financially and logistically by Properties and Services. Orientation Week provides another important annual platform for awareness-raising around campus sustainability. The annual **GCI Sustainability Awards** launched by the GCI in 2010 has become a regular annual event. The award winner in 2012 was Dr. Andrea Rother (Occupational & Environmental Health Department), who has worked on pesticide awareness and use at UCT.

A wide range of regular events and activities is organised on campuses by the GCI. Regular education events are organised during lunchtimes, with guest speakers and panel discussions around specific themes, involving local and international academics, civil-society activists and government representatives. The 'Green Police' are present at all events – a GCI sub-group of energetic young activists, wearing their trademark green overalls. They engage with the public, inviting debate around issues, and provide education and aid to campus greening events. Regular Clothing Swap events have been held in conjunction with 'Trashback Cape Town', a waste-recycling NGO. These clothing swaps demonstrate the possibility of a low-carbon lifestyle and the value of reusing products.

An annual **Sustainability Month** is held in residences every August. In collaboration with Student Housing and Residence Life, and the catering and cleaning service providers, a whole month of events centred on sustainability and green issues is organised by the GCI. Experts are invited to speak on topics such as energy efficiency and how to reduce one's carbon footprint. Catering and cleaning staff are involved in these programmes. In 2013 a food-waste audit was conducted for a week in all the dining halls by the catering company, to measure the quantity of food wasted. Students were required to scrape their own plates, according to the type of waste, to create awareness. The month-long event culminates in a prize-giving, with prizes awarded to the top five residences in categories such as best catering team, cleaning team, student team, and best waste-to-art display.



Shawco volunteer working with children in education.

Courses using participatory and project-based training around Sustainability

In both 2012 and 2013, the third-year Information Systems course in the Faculty of Commerce structured the group student projects around the topic of measuring and reporting on the UCT Carbon Footprint and providing recommendations for mitigation. Students conducted interviews and surveys, which while providing data, also raised awareness around the issues (e.g. the 'mode of commuting' transport survey).

The Professional Communication course in the Commerce Faculty has used campus sustainability as the topic for the student semester projects for the last five years. Students are required to undertake research on their selected campus sustainability topics, write up reports and then deliver professional presentations of these for examination. The UCT sustainability coordinator participates in the course by providing current topics, delivering guest lectures, guiding student research and attending the final presentations.

Behavioural programmes aiming at more sustainable actions by students, staff, or external community members

The **SHAWCO** student society at UCT has a core mission to practise and promote responsible citizenship in the South African context through health, education and social entrepreneurship initiatives. It was started in 1943 by a UCT medical student who established a clinic in a disadvantaged community of Cape Town. With support from the Medical School, this initiative quickly grew into one of the country's largest student volunteer organisations, and ran health and welfare projects throughout South Africa's apartheid era. In 1994, with the arrival of democracy, SHAWCO moved from welfare to a development model – still running primary healthcare clinics, but moving to skills development and education programmes. In 2003, this move was further consolidated by the narrowing of the developmental sector to Youth Education. SHAWCO has developed further into two main service sectors: SHAWCO Education and SHAWCO Health. Activities in the health sector involve the running of primary healthcare clinics; and in education, providing skills development and youth education programmes. Relying on donors for support, UCT's annual student parade raises funds towards SHAWCO.

Ubunye is an umbrella organisation for three different education-related projects operating in township schools and centres in Cape Town: Inkanyezi (Let Us Shine), TeachOut,

and the Township Debating League. It is entirely student-run, and the newest development agency at UCT.

- **Inkanyezi** aims to provide learners with the knowledge and skills needed to take advantage of the post-high-school opportunities available to them. It provides its learners with academic support, motivates learners to perform well academically, and provides career advice, mentorship and lifestyle support.
- **TeachOut** aims to harness the experience and expertise of UCT students to provide academic assistance to high-school learners in Cape Town's disadvantaged communities, running after-school and Saturday tutorials in various academic subjects.
- The **Township Debating League** is a project that teaches high-school learners to debate, empowers them with the ability to speak publicly and with confidence, and improves critical thinking.

The **Green Campus Initiative** also engages in outreach activities in external communities. These have included a schools-learning programme focused on recycling education, vegetable gardens, and tree planting. Monthly sessions are hosted in disadvantaged communities, involving school children in recycling workshops and waste clean-ups. GCI members volunteer for the 'Eco-clubs' programme in schools around the Cape Town area driven by the 'Project 90 x 2030' organisation, which aims to build carbon-reduced communities and climate-resilient economies in South Africa. Activities include visiting schools and offering advice and information about the environment, and helping schools run or establish their own "Green School Initiative".

INSTITUTIONAL COMMITMENTS AND RESOURCES FOR CAMPUS SUSTAINABILITY

In 2013, the governance for sustainability concept became

more clearly established. Properties and Services are responsible for, and will budget for, sustainability around ISCN Principles 1: Building Design and Operations, and Principle 2: *Planning and Campus-Wide Strategies*. With respect to Principle 3: *Sustainability in Education*, responsibility lies with the office of Deputy Vice-Chancellor Klopper. However, there is still a lack of clear institutional responsibility for co-ordination of sustainability across research, teaching and learning, and operations. Institutional mechanisms need to be developed for such co-ordination, reporting, and sharing of information across faculties.

The posts within Properties and Services of Director: Maintenance and Operations and Senior Architect now have sustainability as part of their job descriptions, and a dedicated budget for this, which is a significant positive change.

Properties and Services continue to support the Green Campus Initiative financially and logistically for such events as an annual Green Week, and attendance at conferences. Properties and Services also commission the annual Carbon Footprint and Sustainability reports.



CITIZEN SCIENTISTS THE POWER OF SMALL NUMBERS

The Kalahari plated lizard (*Gerrhosaurus multilineatus*), featured in the recently launched Reptile Atlas, lives in holes between roots of shrubs in the bushveld and Kalahari sandveld of Namibia. Until recently it had never been photographed. But thanks to the efforts of citizen scientists, there's now a visual record of this handsome lizard.

Public participation is being harnessed by the Animal Demography Unit (ADU), co-ordinators of the Reptile Atlas, to provide a reach far beyond formal fieldwork. "[Citizen scientist] contributions are invaluable," says ADU director Emeritus Professor Les Underhill. "The wealth of data and information contributed by these people, collated and curated at the ADU, and analysed by its students and staff, has greatly improved biodiversity conservation in Southern Africa."

Detailed reports of reptile finds, with photographs and GPS co-ordinates, stream in to the ADU's Virtual Museum (vmus.adu.org.za) – and each is identified by a panel of experts. These records not only provide information on species distribution, but also yield useful information on rare species.

The growth in public participation has been spurred by developments in digital photography and GPS units, which have revolutionised data collection and made virtual museums possible. Now, anyone with a digital camera can become a citizen scientist.

"By becoming involved in these projects, people learn an enormous amount about the natural world," says ADU postdoctoral research fellow Sally Hofmeyr, whose interest is science communication.

Around 1 360 citizen scientists contributed to the South African Bird Atlas Project 2 (SABAP2) database. Of these, 43 submitted 500 or more checklists, at least one every five days since the project began. Collectively, they've submitted 37 000 checklists, some 37% of SABAP2's database. The impetus has taken the ADU's Virtual Museum to a new milestone: 80 000 entries.

Keen to build exposure to science at the critical school levels, Hofmeyr is also working with transmedia education publishers Siyavula (whose online textbooks are free to download as open education resources), to get citizen science material into their books. The idea is to grow citizen scientists early.

OVERVIEW OF UCT'S PRINCIPLE 3 GOALS

TOPICS	GOALS AND INITIATIVES		RESULTS		
	Objectives and targets (for reporting year, for the following year, and/or beyond)	Key Initiatives (in reporting year, and /or planned for the following year and beyond)	Performance 2011	Performance 2012	Performance 2013
TOPICAL INTEGRATION					
Sustainability courses and programmes	Increase the number and quality of sustainability-focused and -related courses	Second mapping of sustainability courses across faculties	n/a	40 Sustainability-focused courses; 15 Sustainability Programmes	52 Sustainability-focused courses; 18 Sustainability Programmes; 33 Sustainability-related courses. Western Cape Regional mapping of courses relating to the Green Economy
Courses and/or research that transcends disciplines	Enhance academic leadership and interdisciplinary engagement around societal and environmental challenges	African Centre for Cities; EPRU; MA-RE institute; EEU; ERC; CSAG	5 academic chairs with interdisciplinary research objectives closely tied to sustainable development	ACDI initiative with Pro VC to engage with climate and development research. 5 academic chairs with interdisciplinary research objectives closely tied to sustainable development	5 academic chairs with interdisciplinary research objectives closely tied to sustainable development. EBE Course END1019L Social Infrastructures: Engaging with Community for Change
SOCIAL INTEGRATION					
Connecting campus users with industry, government and civil society	Engage with communities and other non-academic constituencies to address societal and development challenges	Social Responsiveness (SR) Programme The Knowledge Co-op		Social Responsiveness Policy Framework developed. Addresses how this work can be acknowledged and encouraged	SR Annual Reports; Awards; Audit of projects Projects facilitated by the Knowledge Co-op
Programmes that further student interaction and social cohesion on campus	Growing awareness and action towards a sustainable campus and beyond to lifestyles	UCT Global Citizenship Programme (co-curricular, beyond degree requirements)	236 students	184 students	210 students Total of 953 students completed course since inception in 2010
	Number of members of the Green Campus Initiative (GCI) Membership in 1st year 2008: 570	Orientation week membership drive; social media; regular events, seminars and actions	~1600 students and staff	~1900 students and staff	~2200 students and staff

	Education and communication around 'green' issues	Exhibitions, films, concerts, panel discussions, Awards	4th Annual Green Week and Green Awards	5th Annual Green Week and Green Awards	6th Annual Green week and Green Awards
	Sharing of knowledge and experience in campus sustainability with other southern African Universities	Engagement in establishing the country-wide university network the BlueBuck Network	First BlueBuck Annual Summit held in 2011	n/a	3 Delegates attend Annual BlueBuck summit
	Participation in International Environmental Forums		GCI had 10 members attend the UNFCCC Conference of the Parties 17 in Durban	2 GCI committee members attended the World Student Environmental Summit (WSES) in Switzerland	2 GCI delegates attended World Student Environmental Summit
Courses using participatory and project-based training			Information Systems course (INF3011F) on Green IT. Professional Communications (BUS2035S) course semester project topics on campus sustainability	Annual carbon footprint study in 2012 undertaken by Information Systems course (INF3011F). Professional Communications (BUS2035S) course semester project topics on campus sustainability	Annual carbon footprint study in 2013 undertaken by Information Systems course (INF3011F). Professional Communications (BUS2035S) course semester project topics on campus sustainability
Behavioural programs aiming at more sustainable actions by students, staff and external communities	Continual improvement towards a more sustainable campus and sustainable living beyond campus		SHAWCO healthcare and youth education initiatives GCI Outreach - Green School Initiative	SHAWCO healthcare and youth education initiatives GCI Outreach - Green School Initiative	SHAWCO healthcare and youth education initiatives GCI Outreach - Green School Initiative

COMMITMENTS AND RESOURCES FOR CAMPUS SUSTAINABILITY

Sustainability policy (internal) that integrates operational and academic issues	To work consistently towards campus sustainability re operations, research and education	Policies in force: Green Campus Policy Framework (2008) Green Campus Action Plan v2 (2011)	Ongoing implementation of Green Campus Action Plan	Ongoing implementation of Green Campus Action Plan	Ongoing implementation of Green Campus Action Plan.
Dedicated resources (processes, human and fiscal)	Provide the resources to coordinate and drive campus sustainability	Full-time Environmental Risk Officer; members meet quarterly at EMWG	2 dedicated staff (Risk Officer and Sustainability Coordinator); EMWG	2 dedicated staff (Risk Officer and Sustainability Coordinator); EMWG	Sustainability becomes a KPA for the posts of Director: Maintenance & Operations and Senior Architect. Risk Officer; EMWG
Commitment to external sustainability initiatives ISCN-GULF Charter	Submission of annual report to ISCN-GULF Secretariat	Actively engaging with ISCN network to further campus sustainability	n/a	ISCN Charter signed and recognised by university leadership. First report submitted	No report in 2013; this report covers both 2012 & 2013

