UNIVERSITY OFFICE OF PLANNING AND DEVELOPMENT

Policy Brief #3: Development and Implementation of Green University Policies: Relevance to the UWI

This Policy Paper examines briefly the green or sustainability trends of universities and identifies areas for the UWI in developing its green policy as articulated in the Strategic Plan, 2012-2017.

Halima Sa'adia Kassim
2013/11/05

1. Introduction

The University of the West Indies *Strategic Plan, 2012-2017* in its Mission includes among its roles 'to support inclusive [….environmental] development' (*SP, 2012-2017*). The *Plan* further identifies as one of its strategic objectives the "develop [ment] and implement [ation] of a green university policy" under the efficient resource utilisation goal in the Financial Perspective. The *Strategic Plan* identifies *inter alia* that a UWI graduate should be *socially, culturally and environmentally responsible.*

A green policy also known as an environmental or a sustainability policy focuses on minimising impact on the environment by promoting responsible resource use (Brundtland Commission 1987). Green policies are therefore underpinned by environmental consciousness as much as cost-reduction and ought to be seen as part of a larger sustainability thrust. It is anticipated as higher education institutions (HEIs) create significant economic, social, and environmental footprints (Elder and MacGregor 2008) universities would adopt a boarder, more comprehensive and strategic approach to greening, where sustainability efforts will be embedded in its Governance/Management, Curriculum/Training, Research/Innovation, Operations/Daily Practice and Outreach/Service. Greening of HEIs, according to Dahle and Neumayer (2001), is "the process of reducing the multitude of on- and off-site environmental impacts resulting from campus decisions and activities, as well as raising environmental awareness within the human communities of a college or university."

2. Purpose of Brief

The purpose of this *Brief* is to identify and explore the green or sustainability trends of universities based on the latest global information available and provide options and considerations for the UWI in developing its green policy as articulated in the *Strategic Plan, 2012-2017*. This *Brief* is part of a series on *Issues in Higher Education* that seeks to identify key issues which impact on the long term sustainability of the UWI so as to better inform the strategic planning process both at the campus and university wide levels.

3. Sustainability issue in the global context

The World Meteorological Organization notes that "there is a strong scientific consensus that the global climate is changing and that human activity contributes significantly" (WMO 2013). The United Nations Environmental Programme (UNEP) also notes that climate change is one of the major challenges of our time and adds considerable stress to our societies and to the environment (UNEP 2010). From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, UNEP (2010) asserts the impacts of climate change are global in scope and unprecedented in scale and will impact health and safety, food production, human security, public safety and the economy. Two key approaches have been identified to address the climate change challenge: adaptation (building resilience to climate change) and mitigation (moving towards a low carbon society) supplemented by improving an understanding of climate change science and communication and awareness raising (UNEP 2009).

The means of moving countries to addressing the climate change challenge have sparked many discussions and debates as well as the production of scholarly papers written on the green economy, green taxes, green growth investment, green growth, green marketing, carbon-trading, eco-innovation, eco-products, etc. produced by universities, international development agencies (e.g. UNEP) or financial institutions (e.g. IMF, World Bank) or think tanks (e.g. Brookings, British Council). Transitioning to a low-

carbon and climate-resilient economy is being seen as important steps in enhancing sustainable development, and building mitigation and adaptive capacity and developing strategies. This transition at a country-level requires creating an enabling environment for investment and development. Environmental sustainable policies are considered not only by countries and cities but by the private sector linked to their Corporate Social Responsibility (CSR) programmes. An opportunity exists for universities to supply knowledge and advice countries on green growth policies.

4. Rationale - Why sustainability matter in Universities

Universities as teaching and research institutions have a critical role to play in preparing students to live in a world concerned more and more with sustainable human development, equity and inclusive growth. Universities therefore have to grapple with curricula renewal to train new students as well as redesign professional development courses to retrain existing professionals in green growth and eco-innovation policies. Also, research needs to support the goals of sustainable development and the business operational processes that need to be modified to be more sustainable development-friendly. Through their outreach and service universities can support communities and governments with greening initiatives and green growth. A green policy will ensure that these elements are captured and embedded into actions and metrics within the university. A green policy will contribute to giving the UWI a competitive advantage in the Region and thus, position it to be the leader in the field in the Anglophone Caribbean. Further, students are more environmentally conscious and expect that the services and products they access and use to meet environmentally sustainable standards. It is not unlikely that these students will expect their university to participate in the solution towards addressing climate change as well as showcase the relationship between theory and practical realities.

5. Overview of existing trends and practices

As teaching and research institutions, universities are well placed to influence and take on the leadership for promoting sustainable development. This fact was recognised in numerous international sustainability policies and declarations[1] which acted as a catalyst for universities to integrate sustainable policies into their operations, teaching/research mission and their public service actions to improve the capacity of countries to address environment and development issues (Wright 2002). Informed by the need for smart strategies to reduce the deleterious effects of climate change as well as the actions set out in various international policies and declarations a global trend among universities show they are revising their mission statement, restructuring their courses, research programmes and operations to include sustainability in their perspectives (Faghihimani 2010).

Sustainability efforts on campuses adopt a somewhat binary approach. As Faghihimani (2010) notes the focus of greening is either operational eco-efficiency (i.e. increase raw material efficiency, reduce consumption of energy and production of waste) instead of sustainability in a broader sense, or a greater emphasis on environmental studies and therefore the neglect of policy and operational process. She, like Hall and Murray (2008), notes that a key objective in developing a green university policy would be to develop a holistic approach to integrating sustainability thinking and practice across all aspects of University life – teaching/curriculum, research and inquiry, outreach, strategic planning and operations, organisation and management style, resource management and use, physical structure underpinned by a clear ethos. Faghihimani (2010) further argues for a whole systems approach to recognising a systemic coherence and healthy emergence within and between the dimensions of its operations (i.e. ethos, curriculum, research and inquiry, organisation/management style, resource management and use,

physical structures/architectures, and community links and outreach) within a university system concerned with environmental sustainability.

Strong low carbon or environmentally-smart initiatives are emerging in campus operations, particularly in energy efficient/conservation management and renewable energy, sustainable building design, transportation, water conservation, waste management, and purchasing of products and services. However, in areas of teaching/curriculum, research and outreach the uptake of sustainability ethos is slower (Elder and MacGregor 2008). Faghihimani (2010), who assessed the commitment to sustainability among twenty universities in the United States, Canada, United Kingdom, Norway, Denmark, Sweden, and Japan[2], found that the lack of environmental sustainability in governance and administrative functions of the university has a huge impact on how the university commits to environmental sustainability in other functions such as education, research and operations. To that end, she recommends the development of a policy and an operational plan. These initiatives also need to be supported with resources and champions for greening initiatives.

England through its Higher Education Funding Council has outlined a carbon reduction target and strategy for higher education institutions. Carbon reduction carbon management policy or strategy forms part of a wider sustainability policy. Under the carbon reduction strategy set out by the Higher Education Funding Council for England (HEFCE) each university and college will turn those national goals into institutional targets that can be measured over time against regular milestones. The areas identified for carbon reduction include energy use within the university estate from fossil fuel combustion (gas, coal, oil) and electricity use; transport (institutions' own vehicle fleet, business travel and commuting); water consumption; waste; and procurement. According to the 2010/2011 HEFCE Report, in 1990, carbon emissions for the total higher education sector in England were 1.831 million tonnes of carbon dioxide (MtCO2) while in 2006 carbon emissions for the sector were 2.124 MtCO2, a rise of 16 per cent (HEFCE 2010). These figures include energy use from the estate (fossil fuel combustion (gas, coal, oil) and electricity use) and fuel used by institution's own vehicle fleet. If transport, that is institutions' own vehicle fleet, business travel and commuting) and procurement were included carbon emissions would increase significantly.

The higher education sector in England has agreed to commit to meet the government targets for carbon emission reductions in scopes 1 (direct emissions that occur from sources that are owned or controlled by the organisation) and 2 (accounts for emissions from the generation of purchased electricity consumed by the organisation) of 34 per cent by 2020 and 80 per cent by 2050 against a 1990 baseline. This is equivalent to a reduction of 0.623 MtCO2 by 2020 and 1.465 MtCO2 by 2050 against 1990 levels (HEFCE 2010). Universities through its operations, teaching and research and outreach also consume significant resources and contribute to the carbon footprint.

Elsewhere in Europe, sustainability efforts are on reducing consumption and accounting for impact through 'green accounts'. By the end of 2012, University of Copenhagen had reduced its energy consumption per person (Full Time Equivalent of students and staff) by 18.3 per cent compared with 2006 and its CO_2 emissions by more than 24 per cent (University of Copenhagen 2013). This was achieved through an investment of almost DKK130 million to lower the energy consumption of the university's buildings (achieved through energy-efficient fume cupboards and ventilation systems, insulation of pipes, light emitting diode (LED) lighting, lighting control and energy-efficient, centralised

server facilities); intelligent energy management (such as lighting control, lowering of temperatures at night and improved control of ventilation) and green Action behavioural campaign.

Accompanying the policies and strategies for greening of HEIs are several rankings that seek to measure colleges and universities efforts relating to sustainable policies, practices and programmes. These rankings provide HEIs with a framework to compare their performance with peers and can be simultaneously used as a tool to identify opportunity gaps. These ranking include:

- **Green League** is an environmental ranking of universities in the United Kingdom. Based on their environmental management and performance in making the transition to a low-carbon future universities are annually awarded a degree-style classification. The League Table is divided into policy management (environmental policy, environmental management staff FTE, environmental auditing and management systems, ethical investment, carbon management, fair trade and ethical procurement, sustainable food, staff and student engagement, and curriculum) and performance (renewable energy, waste and recycling, water consumption).
- **Princeton Review's Green Rating** evaluates colleges and universities on their environmentally related policies, practices and academic offerings. Criteria for Princeton Review's Green Rating focuses on: whether the school's students have a campus quality of life that is healthy and sustainable, how well the school is preparing its students for employment and citizenship in a world defined by environmental challenges, and the school's overall commitment to environmental issues. The institutional survey included questions on energy use, recycling, food, buildings, and transportation as well as academic offerings and action plans for reducing greenhouse gas emissions.
- **Sustainability Tracking, Assessment & Rating System (STARS)** is a transparent, self-reporting framework for colleges and universities in the United States and Canada to measure their sustainability performance. A registered trademark of Advancement of Sustainability in Higher Education (AASHE) the ranking centers on measurable environmental goals and achievements, with priority given to achievements of higher education institutions in the United States and Canada. Credit is awarded in three categories: Education and Research, Operations, and Planning, Administration and Engagement.
- **UI Green Metric:** Initiated by the Universitas Indonesia in 2010 the ranking provides the result of online survey regarding the current condition and policies related to green campus and sustainability in the universities globally. Higher education institutions are ranked on areas of setting and infrastructure, energy and climate change, waste, water, transportation and education.

Box 1 identifies universities in the abovementioned green rankings and captures successes in 'going green' and sustainability development, such as space, energy efficiency, water usage, waste management, and transport system.

BOX 1: UNIVERSITIES ON GREEN LEAGUE TABLES

- **Green League (2013):** University of Greenwich, University of Plymouth, University of Brighton, University of Gloucestershire and Nottingham Trent University were among the top five scoring high in environmental policy, staff and student engagement, and curriculum but continued to face challenges in areas of ethical investment, energy, waste and carbon emissions.
- **Princeton Review's 2013 Green Rating Honor Roll:** Twenty-one colleges were listed on the 2013 Green Rating Honor Roll out of 322 colleges and universities.
- **AASHE (Winter 2012) STARS**: Among the participating universities and colleges 34 were ranked as Gold, 90 Silver, 48 Bronze and 13 Reported.
- **UI Green Metric (2012):** Among the top schools listed on the 215 list were from the United States, United Kingdom, Ireland, Sweden and Malaysia. These schools had extensive programmes in reducing their carbon footprint, campus-wide initiatives to eat (and grow) organic food and campaigns geared toward decreasing dependence on electricity.

6. Investing in green – is it worth it?

HEIs are becoming climate change smart and adopting sustainability practices and policies into their operations and mission. Admittedly, such practices and policies can save money, enhance a university's reputation and help in the fight against climate change. By greening the campuses, universities can teach and demonstrate the principles of awareness and stewardship of the natural world, as well as increase the chances of clean and pleasant local and global environments for the future (Dahle and Neumayer 2001). Nevertheless, there are barriers to the implementation of 'greening'. These include a fundamental lack of interest and commitment towards green initiatives among administrators, staff and students; lack of financial resources; the long payback periods; a general lack of incentives for 'greening'; and a lack of environmental education within the campus community.

Gregory Kats in his 2006 study on the greening of 30 American elementary and high schools notes that green schools cost less than 2 per cent more than conventional schools - or about $3 per square foot – to build but provide financial benefits that are 20 times as large or $70 per foot. In calculating the costs and benefits of greening schools, the author assumes a 20 year term for benefits in new buildings and a 15 year term for energy efficiency savings in retrofitted existing buildings and an inflation rate of 2 per cent per year. Lower energy and water costs, improved teacher retention, and lower health costs directly save green schools about $12 per square foot, four times the additional cost of going green (Kats 2006). The total direct and indirect energy cost saving for a new green school compared with a conventional school is about $9 per square foot. The savings for a green upgrade of an existing school would be about $7 a square foot (Kats 2006). With green schools there is the reduced cost of public infrastructure, lower air and water pollution, reduced operations and maintenance costs, reduced insured and uninsured risks, improved power quality and reliability, and a better educated and compensated workforce. Further, green schools contribute to annual emission reductions in carbon dioxide ($C0_2$), the principal greenhouse gas and coarse particulate matter, a principal cause of respiratory illness.

Dahle and Neumayer (2001) citing examples from the late 1990s note through the greening of a college or university there are possibilities for significant returns on investment. They note that in the 1990s revenues and savings for 23 campus conservation projects in the USA came to more than $16 million in just one year. They also note that with implementation of energy efficient retrofits and the promotion of energy conserving awareness can have payback is also high. For instance, the State University of New York (SUNY) saves $9,000,000 although the initial capital investments were comprehensive ($17,000,000), these were paid back in less than four years while Georgetown University annually saves $45,000 on photovoltaic panels installed on its roof (Dahle and Neumayer 2001). With respect to recycling of paper the University of Wisconsin changed its recycling contractor and thereby saved the university $70,000 annually (Dahle and Neumayer 2001).

The HEFCE Report (2010) notes that the six most viable impactful and cost-effective interventions to reduce carbon emissions in higher education are: lights and electric appliances (including ICT); building energy and space management; building fabric upgrade; efficient energy supply; renewable energy; and behavioural change and new ways of working. The Report also notes that these savings are possible but in practice they may not be realised due to a lack of finance and structural issues such as planning constraints. Nevertheless, it is worth noting the cost and benefits that can be accrue by implementing some of the carbon-reducing intervention detailed in HEFCE.

TABLE 1: COSTS AND BENEFITS OF THE SIX MOST VIABLE INTERVENTIONS TO REDUCE CARBON EMISSIONS IN HIGHER EDUCATION				
	Cost-effectiveness (lifecycle)* (£/CO_2)	**Estimated abatement potential for the sector ($MtCO_2$)**	**Investment (£million)**	**Net benefits by 2020 (£million)**
Behavioural change and new ways of working	-300 to - 400	0.2	Minimal	50-70
lights and electric appliances (including ICT)	-100 to -200	0.02 to 0.34	0.3 to 5.0	3 to 50
Building energy and space management	average of -150	1	30 TO 50	150
Building fabric upgrade	-50 to -100	0.28	High	15
Renewable energy	200-300	0.5 to 0.6	100to 130	Increasingly cost-effective closer to 2020

Source: HEFCE. *Carbon reduction target and strategy for higher education in England* (2010)

* These figures are based on Marginal Abatement Cost Curves. These are an assessment and decision-making tool regarding carbon-reduction interventions. The absolute cost-effectiveness is the cost (£) of saving a tonne of carbon (tCO2) calculated on a lifecycle basis, capturing all costs and revenues and factoring in inflation and amortisation. A negative figure indicates that the intervention will generate net cost savings/revenues over its life.

HEIs have incorporated ICTs in its core functions (teaching and research) and use it for many administrative and support tasks, such as payroll and marketing. In 2009 it was estimated that the UK further and higher education sector utilised nearly 1,470,000 computers, 250,000 printers and 240,000 servers which consumed around 966,000 Mega Watt-hours (MWh) of electricity annually and likely cost around £116m and indirectly emitted over 500,000 tonnes of CO_2 emissions from electricity use (James and Hopkinson 2009). Electronic printing and copying accounts for at least 10–16 per cent of ICT-related electricity consumption, and findings from an online survey of 183 respondents suggest individuals print an average of 224 sheets a week, or 10,000 annually (James and Hopkinson 2009). This sums to over £1m of printing and copying costs in larger universities. Conversely, ICT can contribute to reduced energy consumption. t is estimated that ICT applications could reduce global CO_2 equivalent emissions in 2020 by 15 per cent and avoid approximately 5t of CO_2 emissions for each tonne that they generate through production, use and disposal of equipment. One study has found that distance learning courses reduced energy consumption and carbon emissions by 90 per cent compared to conventional campus-based ones (James and Hopkinson 2009).

While ICTs are an important driving force in economic growth, concern is growing with regards to its disposal of electronic products nationally as well as within HEIs. The results of a study by Lertchaiprasert and Wannapiroon of HEIs in Thailand showed that e-waste can be categorised into eight types: IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools, large household appliances, monitoring and control instruments, small household appliances and medical devices (2013). The study noted that waste management was generally done in accordance with Thailand's ICT Policy for 2011 – 2020 which set out every ICT product's cycle: reducing use of resources and energies (Reduce), repeating (Reuse/Repeat), recycling (Recycle) and repairing (Repair) in all ICT equipments in Thai higher education institutions – the 4Rs.

Office buildings house a wide variety of occupants with divergent energy needs, lighting, and floor loads (computers, printers, copiers, and other office machinery). According Center for Climate and Energy Solutions, the successor to the Pew Center on Global Climate Change that work to advance strong policy and action to address the twin challenges of energy and climate change, lighting accounts for about 11 per cent of energy use in residential buildings and 14 per cent of energy consumption in US commercial buildings in 2010. The Sacramento Municipal Utility District notes the lighting in buildings consume 15 to 40 per cent of the annual energy use. The UK Carbon Trust (2011) notes that on average 25 per cent of an organisation's electricity costs come from lighting. Energy efficiency can be achieved through using more efficient lighting technology or through conservation (e.g. building design to appropriately respond and optimise to local climate and site conditions, and automation, such as timers and sensors). Energy efficient lighting measures, according to UK Carbon Trust, can reduce these costs by at least 30 per cent, and up to 60 per cent in many cases (UK Carbon Trust 2011).

Building shape, design, and orientation can also have a major effect on energy use. Buildings are not generally designed with cooling as a major consideration in which thought is given to natural ventilation and free cooling combined with simpler and more cost-effective technology. There is a significant consumption of electricity by air-conditioning equipment which is often set at a temperature to make the warmest parts of the building comfortable while making other parts uncomfortably cold. In a typical office, air conditioning can account for over 30 per cent of annual electricity consumption according to a 2012 Report from UK Carbon Trust. This also has implications for maintenance of the air-condition equipment. Office space is often designed to minimise outdoor air but indoor air quality may dictate higher levels of ventilation air. For economical air-conditioning design, the intended uses of an office building must be very well established before the type of system is selected and design is begun.

The choice to invest in energy efficiency, water conservation, recycling, and renewable energy relates to cost savings as well as remedying environmental problems and mitigating climate change. While capital outlay may be high based upon the above it is clear that there are long-term economic and social benefits to be realised.

7. Policy recommendations

The University of the West Indies has just under 50,000 students and in excess of 5,000 staff distributed across 16 countries. Consequently, operations of the University will have an environmental impact, nationally, regionally and by extension, internationally. The UWI also has dedicated teaching and research centres related to environmental sustainability such as Centre for Resource Management and Environmental Studies (CERMES), Institute for Sustainable Development (ISD) and Disaster Risk Reduction Centre. There are several initiatives also underway at the UWI such as recycling bins, the use of shuttle buses, solar/wind powered lights which the UWI can expand on and create new ones to conserve energy and water, save money, reduce pollution and thus, contribute to climate change mitigation measures. The task before the UWI is how to effectively identify approaches to align sustainability in its operations, education, research, and outreach with its broader mandate of contributing to economic and social development of the Region through integrating the goals of carbon footprint reduction, ecological restoration, economic development and social equity. In other words, how can the UWI promote efficient resource use, environmental stewardship, and human resource development and engage in change advocacy to reconstruct human interaction with the environment?

BOX 2: ENVIRONMENTAL STANDARDS - ISO14001 and ISO14064

The **University** of Bristol, one of the first Russell Group universities, achieve**d** university-wide accreditations — **ISO 14001**, an environmental management system standard and **ISO 14064 (CEMARS)**, a carbon and emissions management and reduction standard.

7.1. OPERATIONS

This section looks at energy use, waste management, water management and transport. Many of these initiatives can be approached on a phased approach, consecutively or concurrently. There is also a trend towards planting more trees on campuses and creating in some cases, what is termed "a living laboratory" or determination of acreage given over to green land.

Energy Use*:* The UWI is conducting research into alternative energy solutions (solar, wind, plant, algae, waste biomass etc.) focussed on maximising renewable-energy use. For instance, at Cave Hill, faculty and researchers through several cooperation agreements with universities or the private sector have been testing photo-bioreactors (essential instruments in the growth of microalgae and a key enabler in being able to scale up to commercial production of biofuels), focussing on the production of butanol from fuelcane, collaborating on renewable energy technologies using plant, waste biomass or algae, and performance assessments of various solar photovoltaic technologies for tropical climates. At Mona campus, there has been the development a renewable energy driven microcontroller based fully automated and controlled hydroponic greenhouse as well as development of a solar panel tester, conversion of waste cooking oil and to petroleum grade biodiesel.

Given that buildings are large users of energy and greenhouse gases HEIs can design, build, maintain or retrofit buildings in ways the promote efficient energy use. Examples of initiatives which could reduce energy consumption include:

- Design of new building with energy efficiency as a major consideration taking into consideration natural ventilation, water recycling, landscaping for shade, environmentally-friendly materials
- System revisions for better indoor air quality, and improving air-condition system controls
- Substitution of existing lighting for more efficient light emitting diodes (LEDs) technologies and use of motion sensing lights
- Use of alternative energy solutions such as photovoltaic power and solar collectors
- Energy related renovation or retrofitting
- Expand the use of Energy Star appliances

Energy audits of buildings and processes should be commissioned aimed at reducing the amount of energy input into the system without negatively affecting the output(s). This activity can also be used in teaching and research. Consideration may be given to means through which the university can adopt environmentally-sustainable ICT practices as ICT is responsible for an estimated 2 per cent of global carbon emissions (James and Hopkinson 2009).

Waste management: The UWI produces both hazardous wastes from research/teaching/administrative activities and non-hazardous wastes from consumables. As part of thrust to waste diversion and reduction the UWI could:

- Develop and enforce a policy on hazardous waste disposal and e-waste disposal (e.g. computers, printers, consumer electronics, etc.)
- Encourage recycling efforts on campuses
- Air drying technologies in restrooms instead of paper towels or start composting of paper towels
- Composting for landscape and food waste.

***Water management**:* The UWI can conserve water and minimise runoff which can lead to flooding. Examples of initiatives which can lead to water conservation which can or have be started at UWI campuses include:

- Upgrading or creation of stormwater cisterns which can act as flood controls on the campuses
- The use of rain water harvesting techniques to utilise "grey water" for flushing of toilets and other non-consumption activities
- Installation of low-flow faucets across campuses
- Maintain green spaces to encourage percolation of water
- Retention of water using "porous" concrete for non-structural purposes (e.g. carparks) for flood control and reuse as "grey water".

Water audits which analyses domestic, sanitary, and landscaping water use and identify ways to make it more efficient may also be considered.

***Transport**:* Transportation is a major category of energy utilisation. Universities are major transit points with thousands of staff and students going back and forth to their homes and classes on a daily basis. Their primary mode of transport is the automobile which consumes petroleum and produces carbon dioxide which contributes to climate change.

At St Augustine campus, data for 2011/2012 shows that there is an over demand for parking spaces *(see Table 1)*. Consultants for the *Feasibility Study to Improve Parking on Main Campus* proposed after stakeholder consultations solutions to be undertaken within a ten year period: the introduction of additional efficient and reliable shuttles, covered walkways, park and ride, and multi-storey carparks. Examining the relevance of the experience of the St Augustine campus to the other campuses may also be useful. Other examples of initiatives which reduce the need for private automobiles at the UWI campuses are:

- Bicycle parking to promote cycling to campus from areas in the vicinity of the campus
- Payment for parking on campus
- Ban motor vehicles from idling for longer than two minutes on campus property.

TABLE 1: OVERVIEW OF PARKING SITUATION AT THE UWI, ST. AUGUSTINE (MAIN CAMPUS)

Parameter	Staff	Student
Population	3,673	20,477
Permit Demand	3,531	3,802
Available Parking	1,056	377
Parking demand	1,403	3,802
Deficit	347	3,425
% Over demand	33%	908%

Source: Lee Young and Partners. *Feasibility Study To Improve Parking On Main Campus, St. Augustine.* Presentation to stakeholders, Sept

As is already happening, the greater use of technology namely, video-conference and online meeting tools for academic and business meetings have contributed to reduced air-travel emissions.

Food and dining: The UWI should encourage concessionaires to provide biodegradable products (bags, cups, plates, eating utensils, etc) and promote organic recycling.

***Paper and printing**:* Encourage the recycling of paper, promote the use of e-documents and double-sided print and copy using recycled paper.

***Cleaning and janitorial services**:* Consideration should also be given to using eco-friendly cleaning products.

Purchasing (green procurement): The UWI is a large consumer of goods and services and as such, priority consideration should be given to the purchase of goods and services that minimise environmental impacts. There are several environmental benefits that may be realised from these products and services such as reduced life cycle costs, reduced energy consumption, recycled content, recyclability, extended product life, decreased maintenance, minimal packaging, low toxicity and reduce carbon emissions.

7.2. The UWI's mission (teaching/curriculum and research)

A comprehensive and directed approach is required if the ethos of sustainability is to permeate the curriculum and research functions of HEIs. Dahle and Neumayer (2001) note that "both in the classroom and by the example of its physical plant, a university can give students an understanding of the interrelationship between business decisions and the natural environment, and thereby model behaviours and attitudes that encourage environmental responsibility."

***Teaching/curriculum**:* Introduction of courses with a sustainability focus so that every student takes at least one sustainability course by graduation thus meeting the criteria for the attribute of ideal UWI graduate. Alternatively, a sustainability co-curricular programme can be introduced.

***Research**:* Most sustainability-related research on campus, which is modest at best, has been narrowly focused on the environmental and energy-related practices – in other words, on the science of sustainability. The equally important social and economic fields need to be engaged to the same degree (Elder and MacGregor 2008). The UWI's ISD, SALISES and CERMES may be well-placed to articulate the socio-economic focus for the research cluster. These research centres could also provide students with real-life problem-solving experiences as well as catering to the interests of research postgraduate students.

7.3. Building Environmental Awareness

Building environmental awareness of sustainability actions, that is, how and why actions should be undertaken. This could be done open lectures/seminars, visual means (websites, posters, stickers, etc), green/eco champions/advocates, and greening the curriculum/co-curriculum. HEFCE indicates that carbon reductions of 5-10 per cent are realistically possible through behavior change alone. The 2010 HEFCE Report cites University of Bristol Green Impact Awards which aims to empower staff, students and departments by encouraging, rewarding and celebrating environmental improvements.

7.4. Possible green indicators

The UWI may wish to gauge the university's progress towards sustainability in the following areas:

TABLE 2: EXAMPLES OF INDICATORS		
Area	Indicator	Purpose
Energy Management	Electricity consumption generated from non-renewable and renewable sources	To promote the conservation of our natural resources
	Reduce greenhouse gas emissions per student, per square foot, and overall	Greenhouse gas emissions
Recycling	Percentage of paper/cardboard that is recycled	
	Number of paperless procedures introduced	
Procurement	Percentage of expenditure on products that meet environmental certification	Shows the steady increase in total purchases of environmentally preferable or energy star products.
Transport	Mode of transport of staff and students	Reducing greenhouse gas emissions that impact on the environment while promoting healthier travel options
Building	Percentage of buildings retrofitted with green elements	The use of energy for cooling generates greenhouse gas emissions. Opportunities present itself for constructing and renovating of buildings to be as efficient and healthy as possible.
	Percentage of new 'green' buildings	
Campus Policies and Actions	Campus Sustainability Groups	University groups dedicated to and champions for sustainability or 'green'.
	Energy Audit Performed	Energy usage tracked
	Green/Sustainability/LCD University policy implemented	The university has a long term sustainability plan.
	Community Service Participation	Measure the annual community service participation of University faculty and staff.
Teaching and Learning	Environmental or Sustainability Degrees or focused courses	Identify programmes/courses/learning outcomes with sustainability focus or content and which would fulfil one of the key attributes of a UWI graduate - socially, culturally and environmentally responsible *(UWI SP 2012-2017)*
Research	Sustainability Research Identification	Identify research related to sustainability
	Faculty Involved in Sustainability Research	

8. Conclusion

As the UWI moves towards adopting a green policy serious consideration should be given to anchoring the policy on the ethos of sustainability informed by its three mutually reinforcing pillars. To that end, the policy should address Governance/Management, Curriculum/Training, Research/Innovation and Operations/Daily Practice. The policy must not only be supported by an Operational Plan and performance indicators but also champions, a communication and change management plan as many of the strategies and supporting initiatives require behaviour change and cultural shifts.

References

Association for the Advancement of Sustainability in Higher Education (AASHE). *Sustainability Tracking, Assessment & Rating System (STARS).* AASHE, 2013. https://stars.aashe.org/

Association for the Advancement of Sustainability in Higher Education (AASHE) "A Look at Changes Ahead." *Quarterly review: recap & a look ahead* (Winter 2012):4-5. http://www.aashe.org/files/documents/STARS/sqr_winter_2012-final.pdf.

Association for the Advancement of Sustainability in Higher Education (AASHE) "The Evolving Concept of Sustainability." *Quarterly review: recap & a look ahead* (Winter 2012):12-13. http://www.aashe.org/files/documents/STARS/sqr_winter_2012-final.pdf.

Calhoun, Terry. *The Best of 2012 Campus Sustainability Case Studies are online now at the Campus Ecology Project.* (blog). *Mojo* December 14, 2012. http://mojo.scup.org/profiles/blogs/the-best-of-2012-campus-sustainability-case-studies-are-online-no.

Dahle, Marianne, and Eric Neumayer. "Overcoming barriers to campus greening: A survey among higher educational institutions in London, UK." *International Journal of Sustainability in Higher Education* 2, no. 2 (2001): 139-160. doi. 10.1108/14676370110388363.

Elder, James L. and Jean MacGregor. "The Sustainability Movement in Higher Education: An Overview." *Mobilizing STEM Education for a Sustainable Future.* December 2008. http://mobilizingstem.wceruw.org/documents/The%20Sustainaiblity%20Movement%20and%20Appendices.pdf.

Faghihimani, Maryam. *Best Green University Practice.* Version: Steering Group Grønt UiO Universitetet i Oslo. September 2010. http://www.uio.no/english/about/strategy/environment/green-uio/reports/Report-best-green-university-practice-nov2010.pdf.

Florida Gulf Coast University. "Strategic Directive Environmental Sustainability." Florida Gulf Coast University, 2010. http://www.fgcu.edu/Provost/files/Copy_of_StrategicSustainabilityGoals.pdf.

Hall, Martin and Noëleen Murray. "A green campus policy framework for the University of Cape Town" *Energy Management News* Vol 14 No 3 (September 2008) http://www.erc.uct.ac.za/emnews/EMN-08-09.pdf.

Higher Education Funding Council for England (HEFCE). "Carbon reduction target and strategy for higher education in England." HEFCE 2010 | ref: 2010/01. http://www.hefce.ac.uk/media/hefce1/pubs/hefce/2010/1001/10_01a.pdf.

James, Peter and Lisa Hopkinson. "Sustainable ICT in Further and Higher Education." A Report for the Joint Information Services Committee (JISC), January 2009. http://www.jisc.ac.uk/media/documents/publications/rptgreenictv1.pdf.

Kats, Gregory. "Greening America's Schools Costs and Benefits." US Green Building Council, October 2006. http://www.usgbc.org/ShowFile.aspx?DocumentID=2908.

Lertchaiprasert, Prateep and Panita Wannapiroon. "Study of e-Waste Management with Green ICT in Thai Higher Education Institutions." *International Journal of e-Education, e-Business, e-Management and e-Learning,* Vol. 3, No. 3, June 2013. http://www.slideshare.net/drpanita/study-of-e-waste-management-with-green-ict-in-thai-higher-education-institutions.

Lee Young and Partners. *Feasibility Study To Improve Parking On Main Campus, St. Augustine.* Presentation to stakeholders, UWI, September 2013.

People and Planet. *Green League 2012 Tables.* People and Planet, 2013. http://peopleandplanet.org/green-league-2012/tables.

Princeton Review. *The Princeton Review's Guide to 322 Green Colleges*. US: TPR Education IP Holdings, LLC, 2013. http://www.princetonreview.com/uploadedFiles/Sitemap/Home_Page/Campaign/2013/GreenGuide/_MEDIA/2013_green-guide.pdf.

Universitas Indonesia. *UI GreenMetric World University Ranking.* Universitas Indonesia, 2013. http://greenmetric.ui.ac.id/id/page/ranking-2012.

University of the West Indies. The University of the West Indies Mona Annual Report to Council 2011/2012. UWI, 2013.

University of the West Indies. *The University of the West Indies Strategic Plan, 2012-2017.*

University of Copenhagen. *Green Campus.* University of Copenhagen, 2013. http://climate.ku.dk/green_campus/.

United Kingdom Carbon Trust. *Air conditioning Maximising comfort, minimising energy consumption*.London, March 2012. http://www.carbontrust.com/media/7393/ctg055_energy_surveys.pdf.

United Kingdom Carbon Trust. *Energy Surveys A practical guide to identifying energy saving opportunities*. London, September 2011. http://www.carbontrust.com/media/7393/ctg055_energy_surveys.pdf.

United Nations. *Report of the World Commission on Environment and Development: Our Common Future*. United Nations 1987. http://conspect.nl/pdf/Our_Common_Future-Brundtland_Report_1987.pdf.

United Nations Environment Programme. *UNEP Climate Change Factsheet*. July 2010. http://www.unep.org/climatechange/Introduction/tabid/233/language/en-US/Default.aspx.

United Nations Environment Programme. *UNEP Climate Change Programme.* June 2009. http://www.unep.org/climatechange/Introduction/tabid/233/language/en-US/Default.aspx.

Wright, Tarah S.A."Definitions and frameworks for environmental sustainability in higher education" *International Journal of Sustainability in Higher Education* Vol. 3 Issue: 3 (2002): 203 – 220. DOI: 10.1108/14676370210434679.

Halima-Sa'adia Kassim
2013/11/05

[1] Wright (2002) and Faghihimani (2010) identified the Stockholm Declaration (1972), Talloires Declaration (1990), Halifax Declaration (1991), The Agenda 21 (1992), The Kyoto Declaration of the International Association of Universities (1993), The Swansea Declaration (1993), Declaration of Thessaloniki (1997), Luneburg Declaration (2000), and the World Summit on Sustainable Development (2002) as examples of policies and declarations that acted as a catalyst for universities to integrate sustainability policies into their operations and mission statement.

[2] The sample study for this project is 20 universities which have signed at least one of the Education for Sustainable Development Declarations. They include: the top 10 universities according to Times Higher Education (THE) Ranking 2009

(Harvard University, Cambridge University, Yale University, UCL (University College London), Imperial College London, Oxford University, Chicago University, Princeton University, MIT (Massachusetts Institute of Technology) and CALTECH), four (4) universities, listed as the same level as University of Oslo (UiO) in Bibliometric indicators (Australian National University (THE Ranking: 17), University of Tokyo (THE Ranking: 22), Bristol University (THE Ranking: 34), University of Copenhagen (THE Ranking: 51) as well as three (3) universities which received Green award recognition (British Colombia University (THE Ranking: 40), Gothenburg University (THE Ranking: 185), Bradford University). Also, included in the sample were three (3) Norwegian universities: University of Bergen (UiB) (THE Ranking: 144), Norwegian University of Science and Technology (NTNU) and Norwegian University of Life Science (UMB).