

BUILDING A SUSTAINABLE UNIVERSITY CAMPUS:

A CASE STUDY OF BOND UNIVERSITY

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ABSTRACT

Given the increasing evidence of an ailing earth, many would today agree and accept that there is a need to move towards a more sustainable form of development. While change has been inclined towards a top-down approach, it is equally important to work bottom-up, i.e., through communities, whose support underpins sustainability policies. The focus of this paper is on sustainability within universities. Through a review of current sustainability practices of universities in the US, UK and Australia, this paper has identified ten principles for developing a sustainable campus. These principles are then used as a framework for analysing the sustainable initiatives being implemented at Bond University. Additionally, the paper outlines opportunities for encouraging enviro-centric behaviours within the campus community.

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INTRODUCTION

The sustainability debate which started about thirty years ago is today a major national and international policy issue (Keirstead and Leach, 2007). According to The World Commission on Environment and Development (WCED, 1989), sustainable development can be defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’. Today, the ‘triple bottom line’ is a common framework for analysing the impacts of sustainability. The triangulated social, economic and environmental goals of sustainability are now the mantra of many organisations. Clarke and Clegg (2000) noted that ‘....sustainability is becoming a key business imperative, as the eternal search for domination over nature is replaced by the challenge of achieving environmental balance’.

While many studies on sustainable development have focused on an international, national, or city level of analysis, Owens and Cowell (2002) argued that the triple bottom line goals should be the collective goals of societies. In other words, communities are the foundation underpinning the achievement of these goals. Similarly, Satterthwaite (1999) alluded to the importance of local community efforts and behaviour by stating that ‘the key issue is not really “sustainable cities” but cities whose built form, government structure, production systems, consumption patterns and waste generation and management systems are compatible with sustainable development goals for the city’. This is affirmed by O’Hara (1999) who suggested that all economic activity is located within and affected by the social and environmental context within which it takes place. Therefore, it is the level of civic

involvement supported by social networks and trust that a town constantly draws on to ensure its vitality (O'Hara, 1999).

To this end, this paper focuses on sustainable development within a specific community, i.e., universities. By reviewing the sustainability initiatives taken by universities, this paper seeks to identify the key principles and practices that are important for achieving a sustainable university campus. These principles are then used as a framework for analysing the sustainable initiatives being implemented at Bond University. Bond is used as a case study because it has recently developed the first 6-star Green Star Educational Building in Australia and this has provided the impetus for many other green initiatives within the campus.

This paper is divided into six sections. Following this introduction, the paper next conducts a literature review of the state of sustainable development within university campuses. The following section then identifies ten principles for building a sustainable campus based on current best practices. Next, the research methodology for this research paper is outlined. The principles for developing a sustainable campus are then applied to Bond University as a case study and opportunities for encouraging enviro-centric behaviour within the university community are further explored. Finally, the paper ends with some concluding remarks pertaining to the prior discussion.

LITERATURE REVIEW OF SUSTAINABILITY INITIATIVES BY UNIVERSITIES

There has been a growing interest in sustainable development across government departments, business groups and the community sector reflecting a major shift in thinking about the importance of sustainability in our day-to-day lives. In line with this trend, many universities around the world have taken initiatives to make their campus communities more

sustainable. One important initiative is the Talloires Declaration developed by the Association of University Leaders for a Sustainable Future. To date, this declaration has been signed by over 350 university presidents and chancellors in over 40 countries.

The Talloires Declaration represents a voluntary environmental agreement that institutions of higher learning will be world leaders in developing, creating, supporting and maintaining sustainability by incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. The agreement includes a 10-point action plan and these are:

- 1) Increase awareness of environmentally sustainable development
- 2) Create an institutional culture of sustainability
- 3) Educate for environmentally responsible citizenship
- 4) Foster environmental literacy for all
- 5) Practice institutional ecology
- 6) Involve all stakeholders
- 7) Collaborate for interdisciplinary approaches
- 8) Enhance capacity of primary and secondary schools
- 9) Broaden service and outreach nationally and internationally
- 10) Maintain the movement

While some literature has shown voluntary environmental agreements to be powerful policy instruments generating positive environmental effects (e.g., Miranda et al., 2007; Lyon and Maxwell, 2003), others are less certain of their effectiveness (e.g., Koehler, 2007; Lehmann, 2004). Koehler (2007) noted that although firms appear willing to sign up to voluntary

environmental agreements, yet the actual outcome in terms of pollution abatement do not appear to be significant.

In line with the above findings, the “*Campus Environmental Survey*” of 59 Universities in the US which signed the Talloires Declaration (Sriberg and Tallent, 2003) reported several interesting results. First, the report found that campuses have done very well in conventional operational measures such as recycling but have been reluctant to implement tougher initiatives such as buying renewable energy and promoting alternative transport. Second, the vast majority of campuses adopt a piecemeal approach and lack campus-wide environmental policies. Third, the study also confirmed the importance of collaboration across different disciplines and functional units to advance the goals of sustainability which otherwise are hard to achieve in bureaucratic and hierarchical structures common among many universities. Finally, an appropriate governance framework is important to effectively present the sustainability agenda to campus stakeholders.

Additionally, the recent “*State of the Campus Environment*” report that was prepared by Princeton Survey Research Associates for the National Wildlife Federation reviewed 891 of the 4,100 colleges and Universities in the US and found that universities were doing relatively well in the areas of water efficiency upgrades, energy efficiency, conservation and renewable energy. However, many improvements are needed in the areas of incorporating environmental issues into the curriculum and transportation. In regard to transportation, while the most popular transport strategy was found to be providing bikes, there have been few initiatives to reduce single occupant vehicles such as discounted bus passes, carpooling programs and emergency ride home programs in the Universities. The

report also expressed concern for the lack of basic environmental literacy among the students. In particular, the study identified Engineering and Education students as being most at risk.

Carlson (2006) in an article on sustainable campus in the *Chronical of Higher Education* argued that university initiatives on sustainability are only minor steps to gain the appearance of sustainability or “greenwashing”. Others pointed out that universities are taking a very slow approach compared to corporations in these issues. David Newport from the University of Colorado Boulder opined that universities are supposed to be on the leading edge but they are falling behind the curve as sustainability has not really been integrated in the higher education seriously.

In short, it appears that there is still much scope for improvement in developing sustainable campuses. While signing the Talloires Declaration is a right step towards the triple bottom line goals of sustainability, this on its own is neither a valid indicator of an institution’s commitment to sustainability nor an organisational change strategy for sustainability (Wright, 2001; Sriberg and Tallent, 2003). A more substantive and integrated approach is needed to bring about enduring change in the sustainable development direction. In particular, while the 10-point action plan of the Talloires declaration mostly focused on community engagement to encourage sustainable behaviours, the preceding discussion has shown this to be a major weakness in the current efforts of universities. The next section considers the best practices among the university campuses and identifies principles that are important for developing a sustainable campus.

PRINCIPLES OF DEVELOPING A SUSTAINABLE CAMPUS

A review of sustainability initiatives by universities in North America, United Kingdom and Australia reveal several principles for building sustainable campuses. The review is primarily based on the information provided by the universities on their websites and annual reports on sustainability. In particular, two reports have been useful for the evaluation and identification of sustainability initiatives. These are the *Campus Environmental Survey* (Shriberg and Tallent, 2003) and *State of the Campus Environment report* (McIntosh et al, 2001). The ten key principles for developing a sustainable campus are as follows:

- 1) Sustainability governance framework
- 2) Formal policy or statement of commitment to sustainability
- 3) Flagship projects/initiatives to reduce environmental impact
- 4) Green funding and investment
- 5) Sustainable operations
- 6) Sustainable buildings
- 7) Sustainable transport/travel
- 8) Sustainability reporting
- 9) Sustainability education and research
- 10) Grassroot sustainability projects

Each of these principles will now be discussed briefly to illustrate the importance for building a sustainable campus.

1) Sustainability Governance Framework

Many universities have established governance frameworks to develop and implement sustainability action plans. For example, the University of California, Berkeley (UCB) has

an Office of Sustainability to regularly measure and report overall progress towards its aim of a sustainable campus. Additionally, there is also a Chancellor's Advisory Committee on Sustainability to give strategic guidance to the Office of Sustainability. Locally, the Australian National University (ANU) has an environmental management office called ANUGreen which is part of the Facilities' and Services Division. Through the ANUGreen office, ongoing collaboration on sustainability across departments is encouraged and supported through financial backing and long-term corporate commitments.

2) Formal policy or statement of commitment to sustainability

A large number of universities (including those who have not signed the Talloires declaration) have developed formal policies or included a statement of commitment to sustainability on their websites and official reports. For example, UCB has a Statement of Commitment to the Environment where it is stated that the students, faculty and staff are committed to taking a leadership role as responsible stewards of the physical environment and using educational and research activities to promote environmental awareness, global thinking and local action. At the University of Florida, a policy is in place to transform campus in three areas: 1) operation, 2) policies and 3) teaching to reflect her commitment to sustainability.

3) Flagship projects/initiatives to reduce environmental impact

Along with sustainability goals and mission statements, many universities also have specific projects and initiatives to achieve those goals. For example, Harvard University has developed the Harvard Green Campus initiative which commits Harvard University to a GHG reduction goal of 30 percent reduction from Fiscal Year 2006 levels by 2016.

Likewise, Oxford Brookes University has chosen to pilot a scheme with the Carbon Trust to calculate and reduce carbon emissions.

4) Green funding and investment

Some universities have also developed specific funding initiatives showing strong commitment to sustainability. For example, Harvard University has a Green Campus Loan Fund (GCLF) a \$12 million revolving loan fund that provides up-front capital for projects that reduce Harvard's environmental impact. The Cornell University Action Plan has even looked into endowment investments for sustainability and developed criteria for investment in the area of renewable energy and clean technologies.

5) Sustainable Operations

For many universities, the commitment to sustainability has extended to include environmentally-sensitive operations. These may include sustainable purchasing through an emphasis on buying local as well as recycling. Universities such as UCB, University of Florida and Oxford Brookes University are committed to increase their purchase of organic food for campus cafeterias and dining. At the same time, the impact on environment is also minimised through identifying local green products and suppliers and procuring these services and products for the University. University of Oxford has a policy of sustainable purchasing by increased use of sustainable products and products that can be recycled.

6) Sustainable Buildings

A major area for reducing energy consumption and therefore the impact on environment is the development of sustainable buildings within the campus. Oxford Brookes aims at creating up-to-date environmentally sustainable buildings to replace older, less energy-efficient ones

in the campus redevelopment plan. University of Oxford has adopted an Environmental Sustainability (ES) Policy in 2008, dealing with energy (reduce buildings and process CO2 emissions in line with UK CO2 emissions reduction targets). As part of this ES policy, University of Oxford aims to build environmentally sustainable buildings, embed sustainable building best practice into the management of estate. Any new building or refurbishment planned, built and occupied are to ensure greatest energy and water efficiency and lowest carbon emissions reasonable in the circumstances.

7) Sustainable Transport/Travel

An integral part of becoming a sustainable campus is the development of specific plans to promote sustainable modes of transport. Departments in ANU use Timely Tredlies bicycles for moving around campus. With over 60 bikes covering more than 50,000 km per year, Timely Tredlies is the largest bike fleet of its kind in Australia. Timely Tredlies have been promoted as a fast way to travel that not only reduces environmental impacts but also improve physical wellbeing. University of Florida's campus sustainability committee raised parking charges to discourage car use and promote public transport. Cornell University's action plan for transport gives all new students free transit for the first year to encourage public transit use.

8) Sustainability reporting

Many universities have taken active role in reporting the progress of their sustainability initiatives in their annual reports and websites so that the university and wider community can see the improvements made over the years. For example, ANU's annual report shows the reductions made in Co2 emissions, water use, waste to landfill, under three scenarios – business as usual approach, target and achievement.for each of the last five years. This is a

powerful way to disseminate information to the general public and gain support for these initiatives.

9) Sustainability Education and Research

A growing number of universities are integrating sustainability into the degree program coursework and research. For example, UCB conducts innovative research on sustainable technology and practices and emphasises the importance of increasing awareness of these values through instruction and example. ANU has integrated sustainability into the degree programs by offering courses ranging from Greenhouse Science to Corporate Sustainability to Human Ecology.

10) Grassroot Sustainability Projects

Another key pillar of building a sustainable campus is the initiation of grassroot sustainability projects. These projects that involve the general campus community are critical in developing a culture of sustainability. ANU's Social Environmental and Economic Sustainability at Work (SEE S@W) program is a grassroot project that aims to deliver measurable reductions of the University's ecological footprint within offices, labs and residential halls and colleges. 'Green Reps' are trained to support organisational change towards sustainability in their departments and offices. ANU has built the capacity of staff/students to be catalysts for change in their areas.

RESEARCH METHODOLOGY

Case studies are a popular research method deployed to better understand our world through an in-depth analysis of a single group, incident or community. They are empirical inquiries that explore a phenomenon within its real-life context, and are capable of generating and

testing hypotheses (Yin, 2002). As sustainable university campuses is a relatively under-researched area, the use of a case study methodology is therefore suitable for understanding the drivers and uncovering the strategies for sustainable development.

This methodology is therefore employed to test the principles of sustainable campuses outlined earlier. This takes the form of desktop research, site observations and consultations with the Bond University facilities management team. Discussion will focus on the sustainable development measures that have taken place at Bond University and the opportunities for developing enviro-centric behaviours.

CASE STUDY: BOND UNIVERSITY

Background

Bond University was founded in 1987 and is Australia's first private university. 2009 marks the 20th anniversary of Bond University since teaching first began at the site in May 1989. The university sits on 48.1 hectares of land and is located in Robina, Gold Coast. There are currently four faculties i.e., Faculty of Health Sciences and Medicine, Faculty of Law, Faculty of Humanities and Social Science, and Faculty of Business, Technology and Sustainable Development with a total student population of 4,200.

While Bond may be a small university in terms of student population, it provides the same level of access to amenities and recreational facilities as the public universities. These include six dining facilities, medical clinic, post office, bookshop, print shop and travel agency. Student campus accommodation is also provided in various forms. Additionally, there is a gymnasium, 50-metre Olympic sized swimming pool, an outdoor spa and four full-size beach volley ball courts.

Strategies for a Sustainable Campus

The following is an outline of sustainability initiatives undertaken at Bond University in the last few years. A number of these initiatives have followed the key principles and practices adopted by other universities discussed in the earlier part of the paper. As sustainability is a relatively new orientation at Bond, there is scope for integrating a number of other initiatives which have not yet been implemented.

a) Commitment to Sustainable Development

Changes in the regulatory environment together with the mounting evidence of environmental degradation have provided the impetus for Bond to urgently review its current practices and adopt a more sustainable approach. In 2008, Bond signed the Talloires Declaration. Signing the Talloires declaration is seen as strong indicator of commitment to sustainable development as well as an advocacy mechanism for translating the commitment into an action plan for a sustainable campus.

b) Governance Framework for Sustainability

Following the signing of the Talloires Declaration, the university established its first 'Sustainability Committee' in September 2008 to develop appropriate policies and procedures for sustainability within the university. The purpose of the Bond University Sustainability Committee is to provide a forum which will enable the development of appropriate policies and procedures for sustainability within the university. The committee will create a framework for environmentally sound, socially and financially feasible practices across the campus, and will focus on providing encouragement and direction to students, staff, faculty and the entire campus for the implementation of these practices. The

composition of the committee include Deputy Vice Chancellor and Provost (Chair); General Manager, Office of Operations and Commercial Services (Deputy Chair), Faculty Business Managers, a staff representative and student representative.

c) Sustainability Management Plan

Bond has developed a Sustainability Management Plan (SMP) which details strategies to be implemented in the period 2008 – 2012 for achieving improved sustainable performance in the following areas:- recycling and waste management, energy and emissions management, water management, transport, increase community awareness, environmental management.

d) Sustainable Operations

Bond University has instituted several initiatives on sustainable operations and have had some preliminary successes in the areas of water consumption and recycling. The university reduced its water consumption by 25% from 2004 and 2005 and 35% from 2007 to 2008 (Delinicolis et al., 2008). The university also recently appointed a local waste management company which provides a sustainable waste recycling management services thus minimising the waste going to landfill. Additionally, the university has introduced a number of recycling bins in various parts of the campus. The food and beverage department recycles waste cooking oil by sending it to a bio diesel company to convert the vegetable and oil into bio diesel renewable fuel. The university is also moving towards sustainable procurement policy from 2009 (Delinicolis et al., 2008).

e) Sustainability Reporting

Information regarding the implementation of sustainability policies, procedures and sustainability management plan will be provided to Senior Management via the General

Manager, Operations & Commercial Services on a quarterly basis. Bond University also participated in an environmentally sustainable benchmark survey conducted among tertiary institutions in Australia, New Zealand and Hong Kong in 2007, Bond University was considered to have 'Average Practice' (TEFMA, 2008).

f) Sustainable Building

In July 2008, the Mirvac School of Sustainable Development (MSSD) was completed. It became the first 6-star Green Star Educational Building in Australia. Its 6-star rating recognises the building as a world leader in building environmental standards. Recently the building won the "Sustainability in the Built Environment Award from the State Government's Environment Protection Agency for its innovative design. The key sustainable features incorporated within the MSSD building include:

Optimum orientation: A north-south facing was selected. This runs contrary to the overall grid of the other university buildings and special permission was required to have this changed to minimise heat transmission to the building

Energy efficient lighting and power: The building is designed to optimise natural lighting with large glass window panels and frosted glass panels to throw light into circulation corridors. In addition, a regenerative drive lift produces clean power and saves 3,588 kilowatt-hours of electricity per year.

Ecologically designed stormwater and waste water treatment: Rainwater is collected from the roof and treated to supply both potable and non-potable water. Storm water and waste water will be treated and supply water for cooling, irrigation and toilet flushing. The organic waste will be composted in a composting facility in accordance to Australian standard.

Natural ventilation strategy: The building's optimum orientation maximises solar gain and captures prevailing breezes. All offices have operable internal and external windows to

promote cross-ventilation, and ceiling fans to reduce the demand for air conditioning, a major consumer of energy. When outdoor conditions are optimum the MSSD building utilises a 'natural ventilation mode'; the building's management system senses favourable outdoor conditions and ceases operation of the air conditioning plant and building occupants open their windows to control air temperature and movement to achieve thermal comfort.

Figure 1 is a picture of the building.

<INSERT FIG 1 HERE>

OPPORTUNITIES FOR ENCOURAGING ENVIRO-CENTRIC BEHAVIOURS

Sustainability goes beyond hardware, i.e., providing green facilities. More importantly, it requires the building up of an enviro-centric culture to bring about an enduring momentum towards sustainability. While this is clearly recognised in the Talloires Declaration yet it is an area which has not been considered in earnest among the universities reviewed. Changing and developing a culture, a way of life presents many challenges and quick results are almost unrealistic. The following discussion suggests several measures to encourage a community culture of sustainability.

Knowledge and attitude

A study by the Market and Opinion Research International (MORI) noted that there are typically four groups of green consumers: Green activists, Green tinged, Pales Green and None (Corrado and Ross, 1990). Bohlen et al (1993) argued that in order to be "green", individuals must first understand the consequences of their behaviours. As such, knowledge about environmental issues will affect the attitude toward the environment which in turn influences environmentally sensitive/non-sensitive behaviour. To this end, education is an important component in creating better awareness of the environmental consequences of non-sustainable behaviour and development.

A unique feature of the MSSD building is the provision for a living laboratory. This facility serves as an educational tool in driving home the message the importance of sustainable development to students and visitors alike. It allows high school students and visitors to experience first-hand the sustainable features of the building and how it can advance the goal of sustainability. The living lab contains a large LCD wall of touch screens. The lab continually monitors the performance of the building – the amount of power being used, not only of the building as a whole but also in discrete offices and lecture theatres. The amount of water being used, the CO₂ emissions and the amount of power self-generated are monitored and benchmarked against outputs for normal buildings as a measure of operational performance. Consequently, energy and water savings are made more visible leading to a greater sensitivity to the conservation of natural resource.

Prestige and pressure

For a vast majority of the community, personal benefit is a key determinant in their behaviour pattern. Ottman et al (2006) suggested that as far as propensity for green is concerned, prestige and status is a major motivator. Henceforth, many green products are marketed as status symbols. Rather than having green product perceived to be only for “tree huggers”, i.e., strong green supporter, they are today marketed to appeal to the broader segment of consumers. Toyota’s gas and electric hybrid car, the Prius has been marketed to represent “green chic”. Research has also shown that people usually respond to social pressure and hence would like to be seen as supporting a good social cause, i.e., the feel good factor (Kuusela and Spence, 1999).

The MSSD building is well positioned to meet the symbolism and status needs of its building occupants. It is first of all, designed to be an iconic building with grand architectural features.

Second, it represents a first in Australia and targets “World’s Best Practice” in sustainable buildings. The prestige and status factor thus act as a motivator for enviro-centric behaviour whilst the social pressure factor may inhibit non-environmentally sensitive actions.

Leadership

Management support is also crucial in setting the tone for the occupants. In leading by example, occupants are more likely to accept the changes that have to be made in using green space. Kuusela and Spence (1999) termed this the behavioural/attitudinal paradigm in making a behaviour shift. For many people, there is an innate desire to follow others’ leads. As such, the benefits of enviro-centric behaviour need to be demonstrated. Where there is strong endorsement by the management, the university community will be more prepared to embrace a culture of sustainability.

To date, senior management at Bond University has demonstrated its commitment to sustainable development by commissioning the construction of the MSSD building at A\$13 million. It has also provided the much needed resource support to implement the Sustainability Management Plan. The long-term goal for Bond University is to be one of the world’s leading independent universities.

Facilities-led sustainable behaviour

To encourage greater energy efficiency, the MSSD building offers its occupants generous access to natural lighting and ventilation. In this regard, occupants are encouraged to minimise the use of lights and air-conditioning. The building management system is pre-programmed to detect optimum comfort level. When the light panels along the corridor light up, it implies the building is in a natural ventilation mode and air-conditioning/heating will

not be allowed. However, occupants are also provided with individual control of room temperature and lighting. To operate the lights, fan and/or air-conditioning, the office door key needs to be inserted into a panel on the wall. The natural working condition is the most frequently adopted mode. Consequently, since its inception in July 2008, the electrical consumption of the MSSD building has been marginal averaging at 10,462kWh per month. The strategy has clearly worked to encourage sustainable behaviour among the building occupants.

Communication and Information on Sustainability initiatives at Bond

For the dissemination of information on sustainability, the university website can include a web page on sustainability which identifies all sustainability efforts in the areas of governance, teaching, research, operations and community outreach. The website can also provide information on sustainability projects supported by the university, administration, projects initiated by students and staff which others can participate in and contribute to.

CONCLUSION

The sustainability of university campuses is an integral part of the larger sustainable development jigsaw. It is also the very foundation on which future sustainable development initiatives are built as students are imbibed with the importance of this issue as they pass through the gates of these institutes of higher learning. This paper has identified several principles on which sustainable campuses can be developed. It illustrated the application of these principles using Bond University as a case study. In addition, the paper highlighted the opportunities for advancing the goals of sustainable development within campuses. One of which is the development of a culture of sustainability among the community. However, this requires a paradigm shift in mindset and lifestyle for which immediate results are not

possible. Sustainability is a broad issue that requires co-operation at multiple levels. Isolated efforts may therefore be limited in terms of its impact. While the goals of sustainability are lofty and challenging, the impact of doing nothing about it is grave and extensive. Consequently, efforts no matter how small and incremental, are important to the building up of a sustainability culture until the tipping point is reached and enviro-centric behaviour becomes a mainstream culture among the community.

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Figure 1: The Mirvac School of Sustainable Development Building