# Business Management Quarterly Review

Institute of Business Excellence

UNIVERSITI TEKNOLOGI MARA

# SUSTAINABLE EDUCATION: AN ASSESSMENT OF CARBON FOOTPRINT AT UCSI UNIVERSITY AND PROPOSED GREEN CAMPUS INITIATIVE FRAMEWORK

Keoy Kay Hooi
UCSI University

Padzil Hassan
Universiti Teknologi MARA

**Abstract**

*As the interest of green business sustainability is generating a lot of interests in the higher education institution, this paper evaluates the implementation of Green Campus Initiative (GCI) at the Unwavering Commitment to Serve Intentionally (UCSI) University Malaysia by evaluating their carbon footprint emission. The carbon footprint calculation and proposed framework presented in this paper aims to encourage other higher Education Institutions in Malaysia to implement the GCI. In order to reduce the environmental impact at UCSI University, the measurement of the $CO_2$ emission was a very important starting point. The paper starts with the literature review about the sustainability and implementation of GCI in other countries outside Malaysia to give an overview regarding the concept. The next section is the calculation of carbon footprint emission of UCSI University with the primary data collected from Logistics and Marketing Department during the year 2008. These primary data were processed with the formulas had been developed earlier and resulted the total carbon footprint produced by UCSI University in one year. Later on, the results of these calculations become the basic concept of developing the proposed framework to be used by higher education institution in Malaysia. Supported by the secondary data (i.e. literature review), a proposed framework of GCI implementation was developed to be tested and empirically validated in future studies. It is hope that result obtained from this paper will provide guidelines for policy maker and management of the universities to acknowledge the importance of GCI to create a sustainable and profitable business application.*
*Keywords: green campus initiatives, carbon footprint, performance, corporate social responsibility*

## Introduction

There have been growing interests in the initiative of the higher education's role in creating life-sustaining cultures (Conway, et al., 2008). The awareness intended not only to educate students about the sustainable system, but also to encourage University to bridge between sustainable business and Corporate Social Responsibility (CSR) (Wright, 2006). Some of the "greening" activities implemented by campuses include the "greening" of campuses and buildings, development of more sustainable transportation systems serving campuses, sustainability in distance education, and reduction of campus consumption (Conway, et al., 2008).

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

In Malaysia for example, effective and good environmental practices have been underlined as a key Strategic Thrust 3 of the Construction Industry Master Plan (CIMP). Underpinning the Strategic Thrust 3 is the encouragement for the industry stakeholders to better perform their Corporate Social Responsibility (CSR) in the provision of 'green' design and construction, sustainable buildings and infrastructure that can provide energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery for their projects. With this, the construction industry is expected to respond by adopting more environment friendly processes to produce products that would not adversely affect the environment. The introduction of the Green Building Index (GBI) by Pertubuhan Akitek Malaysia (PAM) and Association of Consulting Engineers Malaysia (ACEM) is a positive step forward. Notwithstanding, more initiatives are necessary because construction industry concerns not only property development but the built-environment as a whole. The subject of the provision of environmentally friendly building and CSR in the Malaysian higher education industry may be a new subject, but this has been in place in the developed countries for over the last few decades. In the face of the global competition, this will ultimately be one of the pre-requisites for a competitive industry.

In conceiving the need for the Malaysian construction industry move towards environmental friendly business education, a study was undertaken by the authors to contend with the issue of CO2 emissions, which is a key pollutant and a chief contributor to environmental degradation. Initiatives by UCSI University to evaluate carbon emission initiated in September 2008 with the simple objective to reduce the environmental impact caused by its business operations. The initiative is now the core component of the University's Strategic Plan to provide basic ideas, analysis, and action plans to undertake a University Wide Greening Initiative. The common reasons in promoting the GCI and transition to more sustainable campus can be evident by the climate change concern as one of the interest in the environmental, and also the benefits to human health that will affect the financial benefits as the result of "greening" the educational building and environment (Woolliams, et al., 2005). Through the green campus initiative implemented at Malaysian higher education, a more sustainable environment in educational industry can be enhanced and archiving the Triple Bottom-line objectives.

This rest of the section will discuss the sustainability and GCI concept that has been practiced in other countries outside Malaysia. The purpose is to give a better understanding of the concept and how is the implementation of the concept. Third session will be the calculation of the UCSI University's carbon footprint emission for the year 2008 and continued with the proposed framework of CGI for Malaysians Higher Education Institutions.

## Rationale

### Concept of CSR and Triple Bottom Line (TBL)

Corporate social responsibility (CSR) is understood to be the way firms "integrate social, environmental and economic concerns into their values, culture, decision making, strategy and operations in a transparent and accountable manner and thereby establish better practices within the firm, create wealth and improve society " (Hohnen and Potts, pg4, 2007). As the awareness of creating and sustaining development has become more important, questions have been raised as to how the

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

business sector addresses them. This is now also becoming an element of CSR. There is no concise definition in CSR but the most generic concept of CSR can be seen with reference to ISO 26000 Working Group on Social Responsibility (http://isotc.iso.org). Hence, CSR is defined as "Social responsibility (is the) responsibility of an organisation for the impacts of its decisions and activities on society and the environment through transparent and ethical behavior that is consistent with sustainable development and the welfare of society; takes into account the expectations of stakeholders; is in compliance with applicable law and consistent with international norms of behavior; and is integrated throughout the organisation." As CSR issues become increasingly integrated into modern business practices, there is a trend towards referring to it as "responsible competitiveness" or "corporate sustainability" (Hohnen and Potts, 2007). Other terms used that related indirectly to the concept of CSR include corporate responsibility, corporate accountability, corporate ethics, corporate citizenship or stewardship, responsible entrepreneurship, and "triple bottom line".

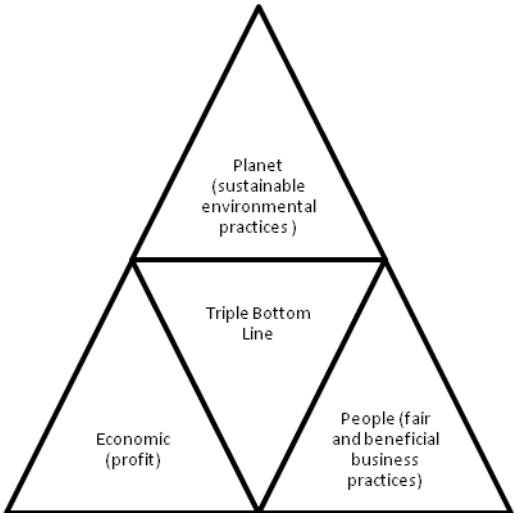


**Figure 1 Triple Bottom Line**

According to Widemann and Lenzen (2006), the concept of CSR is revolved around the notion of the "Triple Bottom Line" '(see Figure 1). Triple Bottom Line (TBL) was first introduced by John Elkington (Elkington , 1998) to describe corporations moving beyond reporting only on their financial "bottom line" to assessing and reporting on the three spheres of sustainability: economic, social and environmental. TBL had been used regularly to encompass vast areas that cover social, economic and environmental indicators and to facilitate decision-makers to quantify trade-offs between different facets of sustainability (Wiedmann and Lenzen, 2006).

Traditionally, businesses evaluate their own performance against one bottom line – the economic perspective (profit). However, with the increase of awareness in CSR, businesses are evaluating and considering to what extend their business operations and processes have effected the environment and their communities. Therefore, the concept of Triple Bottom Line (TBL) enables companies to assess their performance against three bottom lines: environmental, social and economic.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

However, it is imperative to acknowledge the uniqueness of each business and there is no generic approach to suit all organisations. As a result, it is important for each business to develop a business case in order justify the measureable value to invest in business sustainability.

**Sustainability**

The use of non-renewable energy sources for human life can be said as critical since many of the primaries needs use non-renewable source as energy supplier. The evidence can be seen in the use of oil or natural gas in the production of electricity in many countries, the use of gasoline for most of the vehicle around the world, and also the use of oil and natural gas for households and industries. It is only a matter of time before demand of the non-renewable energy source will exceed the supply. There are many examples of countries which has turn from net exporter in energy source to net importer. For Malaysia itself, the total energy demand is projected to be increase about 6.3% annually (Ibrahim, 2009).Tow options are available in order to save the non-renewable energy source which are created by a new source of supply or cut down the consumption. The new source of energy can come from many sources including renewable, such as waste, water, solar, and wind. According to Fischedick (2008 cited by Horn, 2009, p.10) stated: 'Fossil fuel is in short supply, which are we need to switch to renewable resources'. For example the utilization of waste heat by Swiss municipality of Uitikon which planning to use the heat of an IBM computing centre to provide warm water for the local indoor swimming pool (Briseno, 2009). Solar and wind also can be one of the alternative of renewable energy source. Both of them can be used to generate electricity through the conversion using devices such as Solar Photovoltaic (Solar PV). The output of solar and wind generated electricity is difficult to predict due to the various condition of weather and time each day (Horn, 2009). Researchers are working to overcome this limitation by creating energy storage to meet the challenges of climate change and supply stable energy source.

**Green Initiative**

China is now the world's largest emitter of Greenhouse Gas (GHG), but also positioning itself as a leader in low-carbon technology manufacturing and usage (Morrison & Yoshida, 2009). China plans to drop its energy usage by 20 percent between 2005 to 2010 per Gross Domestic Product (GDP). On the other hand, United States's investment in the green initiatives in 2008 – 09 were approximately 8 percent of GDP, surpassed only by China which allocated 14 percent of its GDP. The owner of Empire State Building, In United States, announced that the building was going to 'going green' as a part of model project and it was estimated to save $4.4 million annually (Jonas, 2009). The multi-million project will includes window upgrades, more efficient air conditioning and heating systems, insulation, and energy saving lighting. The other story about energy efficiency upgrades was The California Environmental Protection Agency (EPA) Building which added $500,000 to the project cost, but saved over $610,000 in energy costs in the first year of its operation (Biblow, 2009).

The trend of environmental friendly also affects the world's automotive industry as the demand increases. The European Union (EU) has launched the European Green Cars Initiative (GCI) which involves the broad range of research technology and smart energy infrastructures essential to achieve the use of renewable

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

and non-polluting energy sources (Venables, 2009). Many projects have been undertaken by corporations to overcome the environmental issue that result new legislation, community pressure, or customer safety concerns. There are also significant progresses by the legislation in many countries to reduce the automobile exhaust emission, industrial and household pollution, and eliminating the use of lead-based paint. The changes on the behavior have spread across all of society's stakeholders, from lawmaker to corporate executives and customer advocates (Olson, 2008). The green strategy practiced by a given company aims to seek the strategic actions that have the positive impact to the environment. The strategy then become the main objective of the company and implemented by its operation strategy, information strategy, infrastructure, etc. According to Olson (2008), there has been a wide practice of green strategy in many companies. Some of the common and best practices of implementing the strategy are stated in table 1 below.

| Best Practice | Illustration |
|---|---|
| **Lead by example** | ▪ Corporate sponsorship of environmental improvement initiative in the community, such as investment in reforestation.<br>▪ Support and coordination leadership provided for volunteer work such as "beach cleanup day". |
| **Provide training** | ▪ Formal training that connects the science of global warming with actions that employee can take to make a difference.<br>▪ Employee new hire training and refresher training that strengthens conservation behaviour, such as turning off lights and recycling paper. |
| **Install appropriate tools** | ▪ Place appropriate waste and recycling receptacles where they are most likely to be used.<br>▪ Provide videoconferencing as an alternative to face-to-face meeting that requires travel. |
| **Measure and report performance** | ▪ How many bottles were recycled from various facilities?<br>▪ How much paper was recycled?<br>▪ How many people volunteered?<br>▪ What newspaper articles have been written or local city officials have recognized the community contributions from employees? |
| **Make it everyone's responsibility** | ▪ Senior executives establish priorities, guiding principle and governance.<br>▪ Manager applies guiding principles to make operational decision aligned with the green strategy.<br>▪ Practitioners complete projects with a greater degree of green benefits. |
| **Create a communication and change management plan** | ▪ Communicate successes early and often, build a knowledge portal and share lesson learned.<br>▪ Have support available to answer questions and provide facts.<br>▪ Anticipate organizational needs. |

**Table 1. Best practice in implementing the green strategy (Olson, 2008)**

## Green Campus Initiative

According to Owens and Halfacre-Hitchcock (2006), several researchers acknowledge positive and negative aspects of the higher education institution's role over green initiative. Higher Education (HE) institutions are stable, with the long-term thinking, obtain research and have educative goals which enable them to educate about sustainability. HE institute successfully combined local and global knowledge merge with the faculty, students and staffs talents to create synergies to develop new solutions. On the other hand, working within HE institute also has limitations. The time constrain often limit the students to be involves in short-term projects.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

Furthermore, the nature of hierarchical and bureaucratic structure of university's administration and management creates difficulty in instituting comprehensive approaches addressing campus sustainability (Owens and Halfacre-Hitchcock, 2006, p.115).

The study of environmental impacts of HE was conducted because it is a fast growing service sector. This sector is a growing, consumer of energy and resources and generator of emission and waste. Total energy used of the UK HE building stock in 2002/2003 was 7.4 TWh, which is equals to 1.6 percent of UK's industrial, commercial and public sector energy (Roy et al., 2008). According to Roy, et al. (2008), there are two main issues in environmental programmes for the HE which is reducing energy consumption and waste on campuses, and on "greening the curriculum". One of the best way to reduce the environmental impact is by home-based and distance learning, including e-learning courses which is provided online via internet. The environmental impacts become possible to be reduced because distance learning is eliminated or reduce the infrastructure and activities that are used in conventional learning.

| Type of Initiative | Examples | Number of Campuses |
|---|---|---|
| **Awareness-raising** | ▪ General awareness<br>▪ Green week<br>▪ Conference<br>▪ Recycling<br>▪ Action (fossil fools)<br>▪ Cycling and bike repair | 45<br>15<br>15<br>13<br>8<br>6 |
| **Assessments** | ▪ Campus sustainability<br>▪ Assessment framework<br>▪ GHG inventory | 31<br><br>20 |
| **Sustainability Funds** | Fund creation | 8 |
| **Residence Challenges** | Residence challenge | 6 |
| **On-campus Retrofits or Renewable** | Retrofit or on-campus renewable | 5 |
| **Energy production on campuses** | Energy production | |
| **Multi-sectoral collaboration** | ▪ Strategic planning<br>▪ Go Beyond (British Columbia) | 5<br>3 |
| **Staff/faculty-focused Programs** | Sustainability ambassadors | 1 |
| **Policy Development** | ▪ Paper cut<br>▪ Offsets<br>▪ Student Union Policy<br>▪ U Pass (for transportation by bus) | 6<br>3<br>3<br>3 |

**Table 2. Student-led Green Campus Initiative**
Source: Helferty & Clarke (2009)

The students and staffs fuel consumption can be reduced because they will not need to travel to the campus and the reduction of student's accommodation, libraries and laboratories. The sustainable development concept has been elaborated and implemented in various academic and non-academic environments. Research conducted by Sanusi and Khelghat-Doost (2008) finds out that being part of the Regional Centre of Expertise (RCE) network will provide various benefits.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

First, it will give university greater opportunity and also encourage them to transform themselves into an agent of sustainable development. Second, it will build an excellent platform for the university-community partnership to better collaborate. Third, it will improve the university's reputation, in the same time allows them to participate in regional and global discussion of sustainability and sustainable development agenda. According to Sanusi & Khelghat-Doost (2008), p.488: 'Education for Sustainable Development (ESD) also enables people to develop the knowledge, value and skills to participate in decisions about the way we do things, individually and collectively, locally and globally, that will improve the quality of life now without damaging the future of the planet. As such, institutions of higher learning will undoubtedly contribute greatly to this process.' It is clear that the role of higher education institution is crucial in implementing the ESD principles because it is the place to educate young generation who will be leader in the future. The other role of higher education institution is to insert ESD principles in their strategic management as part of their responsibility to the society and achieve a sustainable recognition.

There are several ways in the implementation of green campus initiative including the student-led initiative. Research conducted by Helferty and Clarke (2009) over 65 campuses in Canada found the correlation between type of initiative and number of campuses execute as shown in table 2 above. The greater experience in the university's energy conservation efforts lead to the recognition that more attention needed to be given to the occupant behavior as a comprehensive energy reduction effort rather than just energy audits and system upgrades (Marans and Edelstein, 2010).

**Successful GCI: 3A's Approach**

One of the issues to be considered in implementing low carbon footprint within the Malaysian construction industry successfully is to take into consideration the state of "readiness" among participants in addition to the system as an entity itself. The most important factor for any new system implementation is to create and instill a cultural of readiness and acceptance among the participants. It has to be a "pull oriented" implementation rather than "push oriented" approach. The willingness of contractor to participate and join the revolutionary system is most crucial to ensure the success of project implementation.

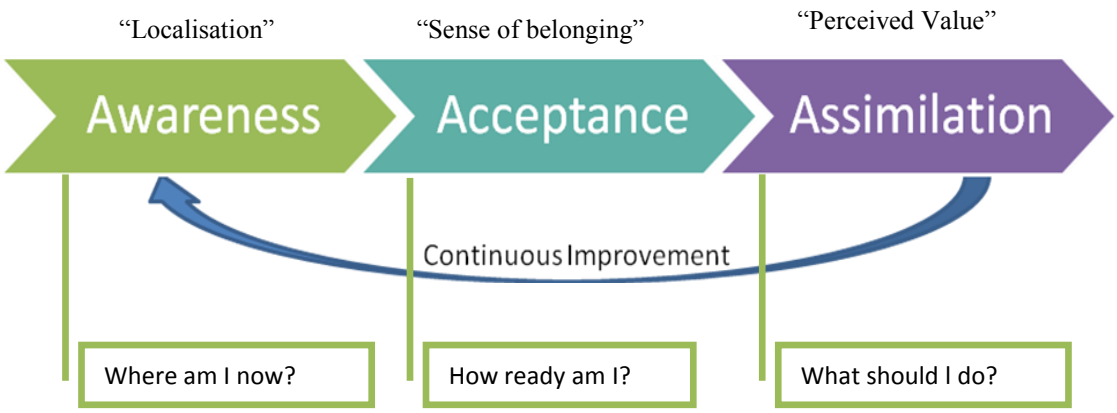


**Figure 3: 3A's Mechanisms Framework (Keoy, 2008)**

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

Taking into consideration of the current challenges within the current construction industry, the concept of 3As Mechanism Framework is proposed to be adopted and implemented to achieve a sustainable and successful implementation in Malaysia as show in Figure 3.

**Mechanism 1: Awareness**

In order for any new strategy/system to be understood and accepted in the context of an organization or National, the challenge is to create a mechanism of awareness. Many contractors and even engineers are not well aware of the green supply chain initiatives and not involved with the use of any system in their construction methods. Therefore, in order to create awareness among practicing engineers and contractors, campaign to reassure that the initiatives are able to provide fast, economical and high quality products should be carried out

**Mechanism 2: Acceptance**

Although the concept has been successfully implemented elsewhere, for example in UK or Europe, local participant would find difficult in attempt to relate this success in their local context. By having a community portal, discussions and issues raised in this portal related to their local environment and because of the sense of belonging and participation, the chances are high for them to accept the change.

**Mechanism 3: Assimilation**

Once the user "accepts" that the initiatives relate close to their perceived values and their surrounding environment, the next question for them is "What should l do to implement these initiatives?" In order words this mechanism is the easiest phase to implement because the user themselves understand the need to change and willing to accept the change.

**Carbon Footprint Assessment of UCSI University's 2008 $CO_2$ Emission**

The concept of UCSI University GCI was prepared by the Corporate Affairs Teams to present a proposal that will be implemented in the aim to reduce the environmental impact caused by UCSI University's business operations. The concept provided basic ideas, analysis, data and action plans to undertake a university's greening initiative. The objectives of the UCSI University GCI are:

1. To reduce the negative environmental impact caused by UCSI business operations.
2. To reduce wastage of resources by encouraging conservation and prudent and well-managed use of resource.
3. To brand UCSI as a green campus and one of its many Corporate Social Responsibility projects.

The figure below shows the methodology used to collect data and determine the total carbon footprint for the year 2008.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

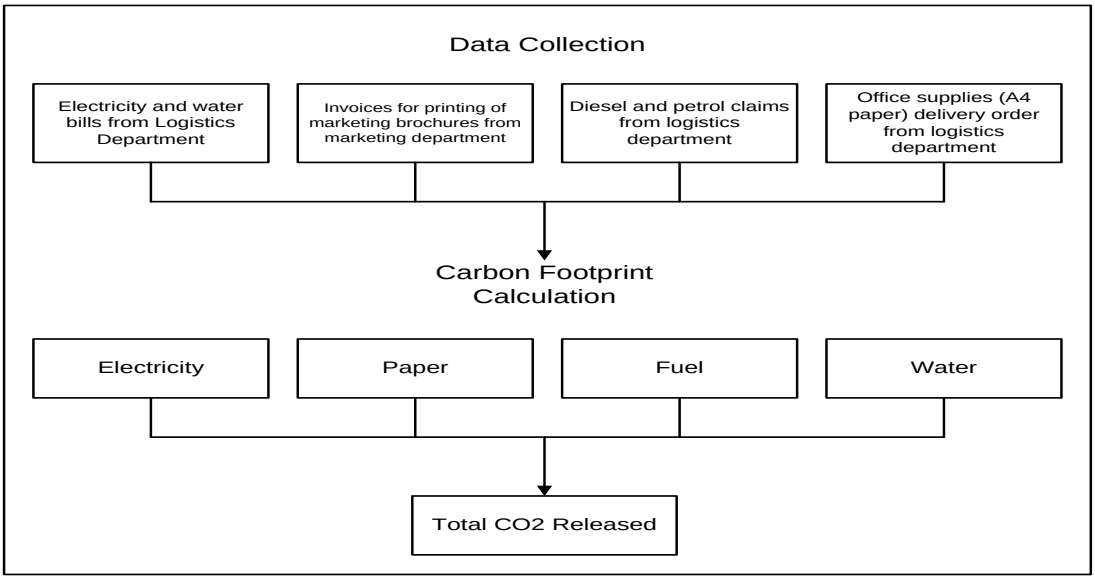


**Figure 1. UCSI University's carbon footprint measurement methodology**

Carbon footprint is a measure of the exclusive total amount of CO2 emissions that is direct and indirectly caused by an activity or is accumulated over the life stage of a product (Wiedmann & Minx, 2007). Haven (2007) defines carbon footprint analysis of an office chair as a "life-cycle assessment which took into account materials, manufacture, transport, use and disposal at every stage of development" and Eckel (2007) points out that the "Assessment of a business' carbon footprint is … not just calculating energy consumption but also with increasing every scrap of data from every aspect of the business practices." The $CO_2$ emission at UCSI University comes mainly from the use of electricity, fuel, paper and water. These four resources (see figure 2) cause a significant environmental impact that required attention. The electricity generation process which is using oil and natural gas results carbon monoxide (CO) and carbon dioxide ($CO_2$) as well as the gas produce by the fuel combustion. CO and $CO_2$ gas are considered as toxic and can cause green house effect if release excessively into the air. This is the main reason of using these four factors as a measurement.

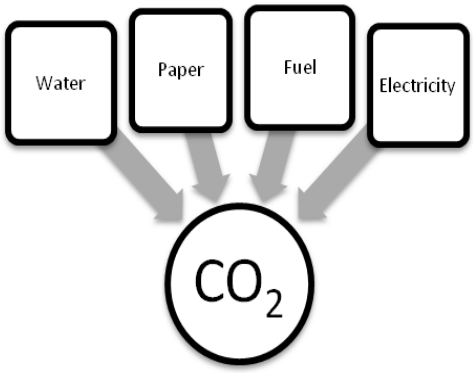


**Figure 2. Four sources of $CO_2$ emission**

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

In order to reduce the environmental impact at UCSI University, the measurement of the $CO_2$ emission was a very important starting point. The carbon footprint for the year 2008 was calculated using the formulas detailed in table 1. The carbon footprint formula for the water is not available and there is no $CO_2$ release from water used at UCSI University.

The data used to calculate the total carbon footprint produced by UCSI University was collected from Logistics and Marketing Department. The primary data collected includes electricity, fuel, and water bills. Also the invoices for printing the marketing and advertisement tools as the data source for paper used.

Table 4 shows that, on an average, UCSI University uses 280,805 kWh of electricity per month in the South Wing Kuala Lumpur (KL) Campus alone. This releases an estimated 150 ton of $CO_2$ monthly (see figure 3). It takes an estimated 1,000 trees to offset the release of UCSI's $CO_2$ emission with clean oxygen. Of this usage, nearly half the amount is used for the air-conditioning system.

| Variables | Carbon Footprint Formula | Notes |
|---|---|---|
| **Electricity** | CO2 = AME x EEF<br>▪ AME: Average Monthly Electricity used (kWh)<br>▪ EEF: Electricity Emission Factor (CO2e/kWh) | It is better to use the average EEF of West Malaysia 0.585 CO2e/mWh |
| **Fuel** | CO2 = AMF x FEF<br>▪ AMF: Average Monthly Fuel used (Litres)<br>▪ FEF: Fuel Emission Factor (CO2e/Litres) | ▪ Every litre of gasoline burnt releases 2.5 kg of CO2.<br>▪ Every litre of diesel releases 2.85 kg of CO2. |
| **Paper** | CO2 = AMP x PEF<br>▪ AMP: Average Monthly Paper used (Kg)<br>▪ PEF: Paper Emission Factor (CO2e/Kg) | ▪ 1 Kg of virgin paper produces 3.24 Kg of CO2.<br>▪ 1 Kg of recycle paper produces 1.76 Kg of CO2.<br>▪ The weight of one A4 standard paper is 5 gram. |
| **Water** | N/A | N/A |

**Table 3. Carbon footprint measurement formula**

Both the North Wing & South Wing KL Campus utilizes 800 reams of white A4 paper a month. This is equivalent to 1600kg of paper or 18 trees and causes the emission of an estimated 5 tons of $CO_2$/month.

| Resource | Average Monthly Use |
|---|---|
| **Electricity** | 280,805 kWh |
| **Transport Fuel** | ▪ Diesel: 15660.96 litres<br>▪ Staffs and students mileage: 320,000 Km |
| **A4 Cut Paper** | 16000 Kg |
| **Water** | 4338.20 litres |

**Table 4. UCSI University's resources usage**

This figure does not yet include the use of other paper materials such as envelops, notepads, brochures etc.

UCSI University's fleet of diesel vehicles used an estimated 3132.192 litres/month, which causes the emission of an estimated 8.2 tons of $CO_2$ per month. An estimated

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

800 vehicles commute to UCSI KL Campus daily. Assuming that on an average, each staff & student will need to travel 20km daily, this amounts to a cumulative total of 16,000km a day or 320,000km a month (excluding Saturday and Sunday). This give an estimated $CO_2$ released of 71.5 tons a month.

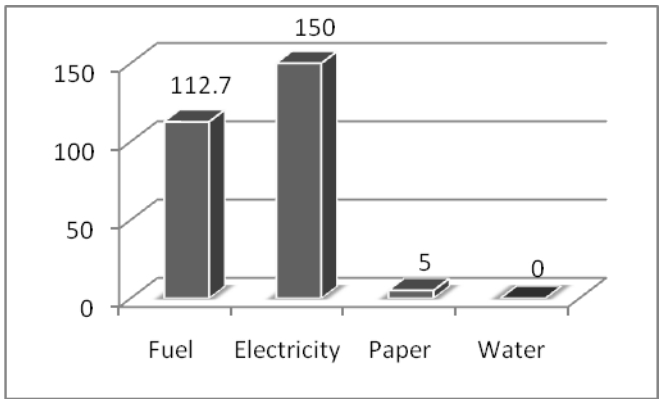


**Figure 3. UCSI University's monthly $CO_2$ emission**

**CGI: Proposed Framework**

According to Roy, et al. (2008), there are two main issues in environmental programmes for the Higher Education (HE) which is reducing energy consumption and waste on campuses, and on "greening the curriculum". One of the best way to reduce the environmental impact is by home-based and distance learning, including e-learning courses which is provided online via internet.

The environmental impacts become possible to be reduced because distance learning is eliminate or reduce the infrastructure and activities that used in conventional learning. The students and staffs fuel consumption can be reduced because they do not need to travel to the campus, and also the reduction of student's accommodation, libraries and laboratories.

The proposed framework for the next phase of this research will be based on the process flow as in figure 1 below. The success of Sustainable Performance Measurement (SPM) will be determined with the integration of strategic planning and day-to-day operations (Jamali, 2006). The flow started with the inputs which are strategic and operational level that will develop the socio cultural behavior.

This factor is the initial planning of the sustainable concept that will determine the strategic level of the organization. The combination of strategic level and operational level will determine the success of GCI. The review of the result will be based on the tangible and intangible results which will be measured later on.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

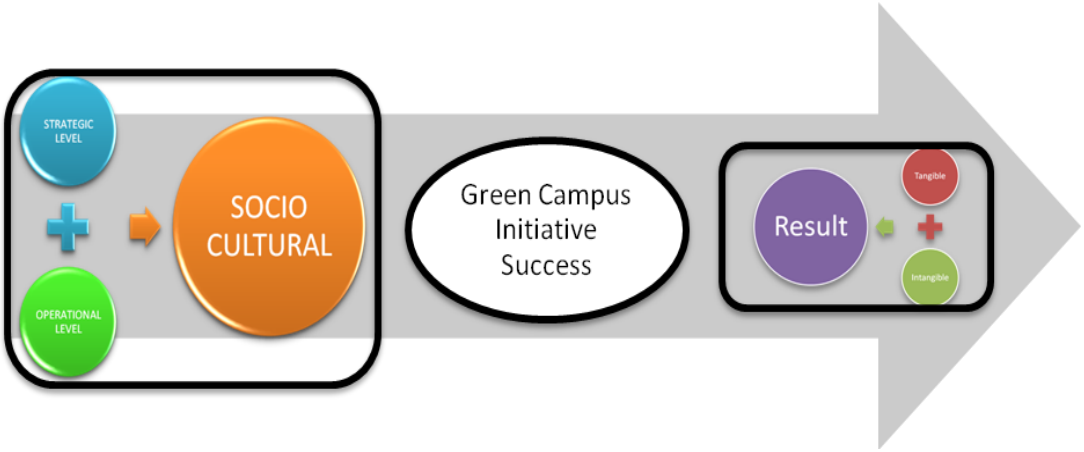


**Figure 4. Green Campus Initiative Process Flow**

From the process flow diagram above, then we are purposing a framework for the implementation of GCI as can be seen in figure 2. Based on this framework, the success of GCI influenced by many factors. From the strategic level, the factors will be economic viability, assets optimization, and sustainable business opportunities. This strategic level will come from top management in an organization, and will become the core concept of the whole implementation of GCI programmes. The concept and understanding of this strategy not only need to be known and applied by the top management, but need to be spread to the entire organization's part.

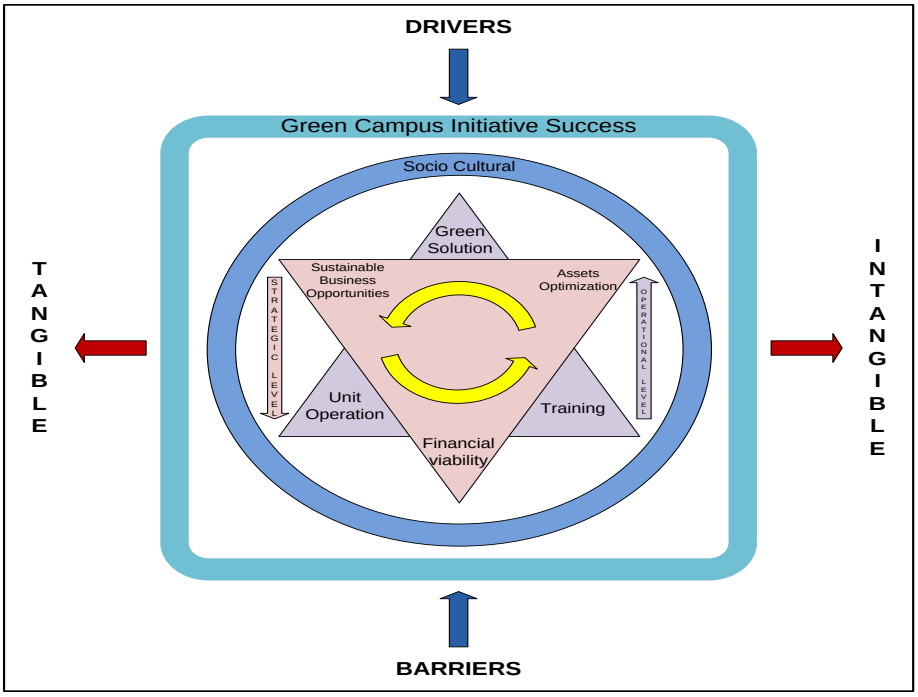


**Figure 5. Proposed GCI Framework**

The execution of concept developed in the strategic level will be in the operational level which all the necessary things for the success of GCI will be done in this level. There are some factors in the operational level which are green solution, unit training and unit operation. These strategic and operational factors will determine

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

the socio cultural factor as the intermediary factor. The success of GCI concept and implementation will also be influenced by drivers and barriers. The impact of each driver and barrier will be examined later in the questionnaire. The output or result of this concept will be tangible and intangible.

**Conclusion**

The green campus program provide a legitimacy to the environmental education programmes that will assist staffs and students in getting the sustainability initiatives . The ISO 14000 series of environmental standards might be very useful for campuses to initiating an environmental review which is the standard that provide the methodological assistance to the organizations, including the academic institutions. Furthermore, the use of ISO standard has the addition benefit in bringing the business world into the campus classroom and provide a guideline for environmental education (Fisher, 2003).

In order to make UCSI University a Green campus, various initiatives and actions are being taken. As far as CO2 emission is concerned, UCSI University has started to reduce the use of resource that has been presented earlier, mainly *Electricity*, *Fuel* and *Paper*. The carbon footprint measurement is an important starting point. Green initiatives are challenging and require determination and a long-term commitment on the part of the entire campus community. These efforts, however, can yield significant paybacks such as environmental and economic sustainability, reputation as a leader through example, economic benefits and improved quality of life on campus. UCSI University and others academic institutions can play a critical role in shaping the mindset of the young generation to be environmentally-conscious.

**References**

Briseno, C., 2009. Harvesting instead of wasting. *Symbiosis: Harnesing Technology for Business*, October – December. p.6.

Chen, W., 2009. Solar Photovoltaic: sunny solution for tomorrow. *Symbiosis: Harnesing Technology for Business*, October – December. p.26.

Conway, T.M. Dalton, C. Loo, J. & Benakoun, L., 2008. Developing ecological footprint scenarios on university campuses: A case study of the University of Toronto at Mississauga. *International Journal of Sustainability in Higher Education*, 9 (1), pp.4-20.

Dauncey, G., 2005. *Going carbon neutral: a guide for publishers.* [Online] New Society Publisher. Available at: http://www.newsociety.com/Publishers%20CO2%20Template%20Metric.pdf [Accessed 29 January 2010].

Department for Environment Food and Rural Affairs, 2009. *Greenhouse Gas (GHG) conversion factor methodology papers*. [Online] Department for Environment Food and Rural Affairs. Available at: http://www.defra.gov.uk/environment/business/reporting/methodology-papers.htm [Accessed 29 January 2010].

Fisher, R.M., 2003. Applying ISO 14001 as a business tool for campus sustainability: A case study from New Zealand. *International Journal of Sustainability in Higher Education*, 4 (2), pp.138-50.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777

Horn, M., 2009. Reliable electricity from sun and wind. *Symbiosis: Harnesing Technology for Business,* October – December. p.10.

Ibrahim, A., 2009. Championing energy efficiency for a sustainable future. *Symbiosis: Harnesing Technology for Business,* October – December. p.4.

Maniates, M.F. & Whissel, J.C., 2000. Environmental studies: the sky is not falling. *Bioscience,* 50, pp.509-17.

Riddell, W. et al., 2009. Assessing carbon dioxide emission from energy use at a university. *International Journal of Sustainability in Higher Education,* 10 (3), pp.266-78.

Roy, R. Potter, S. & Yarrow, K., 2008. Designing low carbon higher education system. *International Journal of Sustainability in Higher Education,* 9 (2), pp.116-30.

Sanusi, Z.A. & Khelghat-Doost, H., 2008. Regional centre of expertise as transformational platform for sustainability: A case study of University Sains Malaysia, Penang. *International Journal of Sustainability in Higher Education,* 9 (4), pp.487-97.

U.S. Department of Energy, 2007. *Electricity emission factors.* [Online] U.S. Department of Energy. Available at: http://www.eia.doe.gov/oiaf/1605/pdf/Appendix%20F_r071023.pdf [Accessed 29 January 2010].

U.S. Energy Information Administration., 2007. *Foreign Electricity Emission Factors, 1999-2002.* [internet] International Energy Agency. Available at: http://www.eia.doe.gov/oiaf/1605/excel/electricity_factors_99-02country.xls [Accessed 29 January 2010].

Varming, S., 2004. *CDM potential in the energy sector.* [Online] Pusat Tenaga Malaysia. Available at: http://cdm.eib.org.my/useful_materials/P4_CDM_potential_SVA.pdf [Accessed 29 January 2010].

Woolliams, J. Lloyd, M. & Spengler, J.D., 2005. The case of sustainable laboratories: first step at Harvard University. *International Journal of Sustainability in Higher Education,* 6 (4), pp.363-82.

Wright, T.S.A., 2006. Giving 'teeth' to an environmental policy: a Delphi study at Dalhousie University. *Journal of Cleaner Production,* 14 (9), pp.761-68.

© University Publication Centre (UPENA) and Institute of Business Excellence 2180-2777