INTEGRATING UI GREEN METRIC AND ECO ACTION 21 ENVIRONMENTAL PERFORMANCE INDICES INTO AN ENVIRONMENTAL MANAGEMENT SYSTEM FOR THE UNIVERSITY OF MALAYA

Hariz Zain[1], Noor Zalina bt Mahmood[2], Zeeda Fatimah Mohamad[2]

[1]UMCares – The Community & Sustainability Centre,
[2]Faculty of Science
University of Malaya, Kuala Lumpur, Malaysia.

Hariz_zain@um.edu.my

ABSTRACT

The University of Malaya (UM) Environmental Competition began in 2009 as a coopetitive (competitive and cooperative) environmental assessment framework for its 12 residential colleges. To date, the competition has resulted in improved environmental performances of the residential colleges, both in terms of quality and quantity. This paper will introduce the UM Environmental Competition Criteria and sustainability framework formulation, in particular its environmental assessment methodology which has been implemented and improved organically overtime. The paper will also share the authors' rationale and experience in evolving the approach, especially the mechanisms of the environmental assessment over 2013. The insights gained from this paper can encourage other universities to consider using the coopetitive approach to kick-start their campus sustainability assessment activities, taking into consideration the unique realities of their campus environment.

Keywords: Sustainable campus, environmental assessment framework, audit, environmental competition.

1. INTRODUCTION

Our current socioeconomic system of mass production, mass consumption, and mass disposal affords us convenient and comfortable lifestyles. However, our way of life puts enormous strain on the natural environment, putting our socioeconomic activities out of harmony with the natural world. If we do not make some changes, we may be threatening our very existence.

Making a shift to a sustainable society requires a four-part strategy. Creating an environmentally-friendly society where people can enjoy the rich abundance of nature for generations to come; reducing consumption and disposal of natural resources; reusing, recycling, creating 3R-driven recycling-oriented society; and drastically cutting back on greenhouse gas emissions to create a low carbon society.

From the perspective of campus sustainability, a university is assumed to increase, control and improve its environmental performance depending on the level of environmental impacts towards the ecosystem. A system is needed for the university to monitor and reduce its environmental impacts because the system can become the basis from which the university sets periodic objectives; reflecting their commitment to continual improvement in environmental performance. The objectives should also have specific targets that can help the university to monitor its progress in fully integrating sustainability concerns in its daily operations and services.

An Environmental Management System (EMS) is a set of processes that enable an organization to reduce its environmental impacts and increase its operating efficiency (ISO,2004). From the perspective of EMS, a university is assumed to increase, control and improve its environmental performance depending on the level of environmental impacts towards the ecosystem. The target of thisis to help the university to monitor its progress in fully integrating sustainability concerns in its daily operation services.

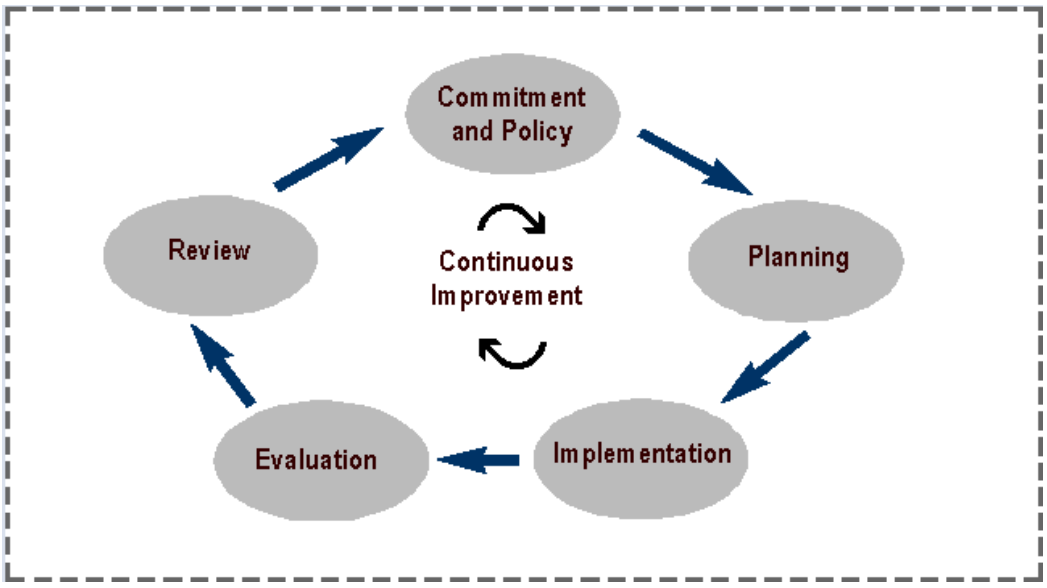

Figure 1 : The continuous improvement of EMS (ISO, 2004).

The main element required in all of this is a review of the university's environmental goals. The university then needs to analyze its environmental impacts and legal requirements. Setting the university's environmental objectives and targets to reduce environmental impacts also allows it to ensure that it complies with legal requirements such as the Environmental Quality Acts 1974 for Malaysia. The university must then establish programs and training to meet those determined environmental objectives and targets. After that, the progress must be monitored and measured so as to be able to assess whether the environmental objectives have been achieved. Audits should be done to ensure students' and staff environmental awareness and competence. Finally, the EMS progress should be periodically reviewed for continuous improvement.

1.1 Challenge of having ISO 14001 in a University

EMS works to reduce environmental burdens like the amount of energy usage, resources consumed or the amount of waste generated that arises from campus and business activities. In addition, the assessment demands that institutions implement environmental initiatives (such as offering environmentally friendly products and services) according to the following steps:
a) (P:Plan) Voluntarily establish environmental initiatives, policies and targets.
b) (D:Do) Set up an organizational framework to achieve those targets and carry out necessary measures (i.e: establishing Environmental Squads/Volunteers etc.)
c) (C:Check) Examine and evaluate system operations and target achievement. (i.e: organize environmental audit, presentation and etc.)
d) (A:Action) Make improvements and review the system regularly. (i.e: Environmental reporting, broadcasting, video making, publicity etc.)

It is quite hard for an institution called a campus or university to start implementing EMS. Institutions often struggle with the following issues when trying to carry out environmental initiatives at their offices and campuses.

a) Even if good rules are put in place, they are ad hoc and eventually ignored. For example, when the vice chancellor of the university changes, there is no more effort to maintain the sustainability of the campus since there is only a top down approach by the top management only.
b) Even if overburden and wastefulness in business activities are identified, nothing might be done to reduce them if there is no dedicated person assigned to tackle the issue or one who is passionate about the issues and can overcome obstacles to find solutions.
c) Even if targets are set, it is difficult to really achieve them.
d) In a university, specific jobs are often handled only by certain individuals.Researchers, officers, lecturers and students are often busy with their own specific jobs and functions; with time taken away from those jobs to focus on campus sustainability issues, their primary job functions will suffer.

1.2 Research Objectives

With those reasons in mind, a backup plan is needed to achieve sustainability targets with less tension and burden.This paper aims to integrate the systematic and campus-oriented sustainability framework which is the Universitas Indonesia (UI) Green Metric assessment method with a simpler version of ISO 14001 which is EcoAction 21 into the existing UM Campus Sustainability System. The objective of this paper is to determine the 2015 Sustainability Framework for the UM Environmental Competition Criteria from the UI Green Metric and EcoAction 21.

1.3 UI Green Metric

The UI Green Metric is a world university ranking system for universities to assess and compare campus sustainability efforts. It was launched by Universitas Indonesia in 2010. It is intended as an entry-level means of assessment for higher education institutions (HEIs) around the world.

It is open to global participation, accessible to HEIs in both developed and developing countries and should contribute to academic discourse on sustainability in education and the greening of campuses.It should also encourage university-led social change with regards to sustainability goals.

1.4 Idealism of UI Green Metric

Future challenges to civilization include population, climate change, energy security, environmental degradation, water and food security and sustainable development issues. Despite much scientific research and public discussion, governments around the globe have yet to commit to a sustainable agenda. Thus, the UI Green Metric has become a good platform to make univeristy environmental performance visible for further internal and external action of the university. This includes concepts such as the Triple Bottom Line, the 3Es: Equity, Economy, Environment, Green Building, and Education for Sustainable Development (ESD).

1.5 Existing Sustainable Campus Models

The UI Green Metric is not based on any existing ranking system. It was however developed with an awareness of a number of existing sustainability assessment systems and academic university rankings. The Holcim Sustainability Awards, GREENSHIP (the rating system recently developed by the Green Building Council of Indonesia which itself was based on the Leadership in Energy and Environmental Design (LEED) system used in the U.S and elsewhere), The Sustainability, Tracking, Assessment and Rating System (STARS) and The College Sustainability Report Card (also known as the Green Report Card) were systems that UI based their final assessment method on.

Meanwhile, university academic ranking systems that were studied during the design phase of Green Metric included: the Times Higher Education World University Rankings (THE) sponsored by Thompson Reuters, the QS World University Rankings, the Academic Ranking of World Universities (ARWU) published by Shanghai Jiao Tong University (SJTU), and the Webometrics rankings of World Universities (Webometrics), published by Cybermetrics Lab, CINDOC-CSIC in Spain. (UI, 2012).

1.6 The Criteria of UI Green Metric

Selection criteria are generally thought to be of great importance by universities concerned with sustainability. These include the collection of a basic profile of the size of a university and its zoning profile, whether urban, suburban or rural. The degree of green space and electricity consumption with its carbon footprint are also important criteria to evaluate. Ranking systems would also want to know about university transportation systems, water usage, waste management and so on. Beyond these indicators, the assessments need to get a picture of how the university responds to or deals with the issue of sustainability through policies, actions and

communication. The categories of UI Green Metric are shown in Table 1 along with the number of indicators for each category and the weighting of points for each.

Table 1: Categories used in the ranking and their weighting (UI, 2012)

	Category	Percentage of Total Points
1	Setting and Infrastructure (SI)	15
2	Energy and Climate Change (EC)	21
3	Waste (WS)	18
4	Water (WR)	10
5	Transportation (TR)	18
6	Education (ED)	18
	TOTAL	100

1.7 Eco Action 21

What is EcoAction 21?

Building a sustainable society, especially for the campus community requires that environmental initiatives be actively carried out by a full spectrum of socioeconomic actors. For their part, institutions or universities must take an environmentally conscious approach to all services and student activities – striving for energy efficiency, conservation of natural resources, waste reduction and the like. The overall aim of the EcoAction 21 program is to encourage institutions and the university to carry out environmental initiatives, thereby contributing to the achievement of a sustainable campus.

The typical procedure institutions or universities follow when implementing EcoAction 21 is outlined below in Figure 1. In some cases, the actual sequence will differ from the thirteen requirements of ISO 14001.

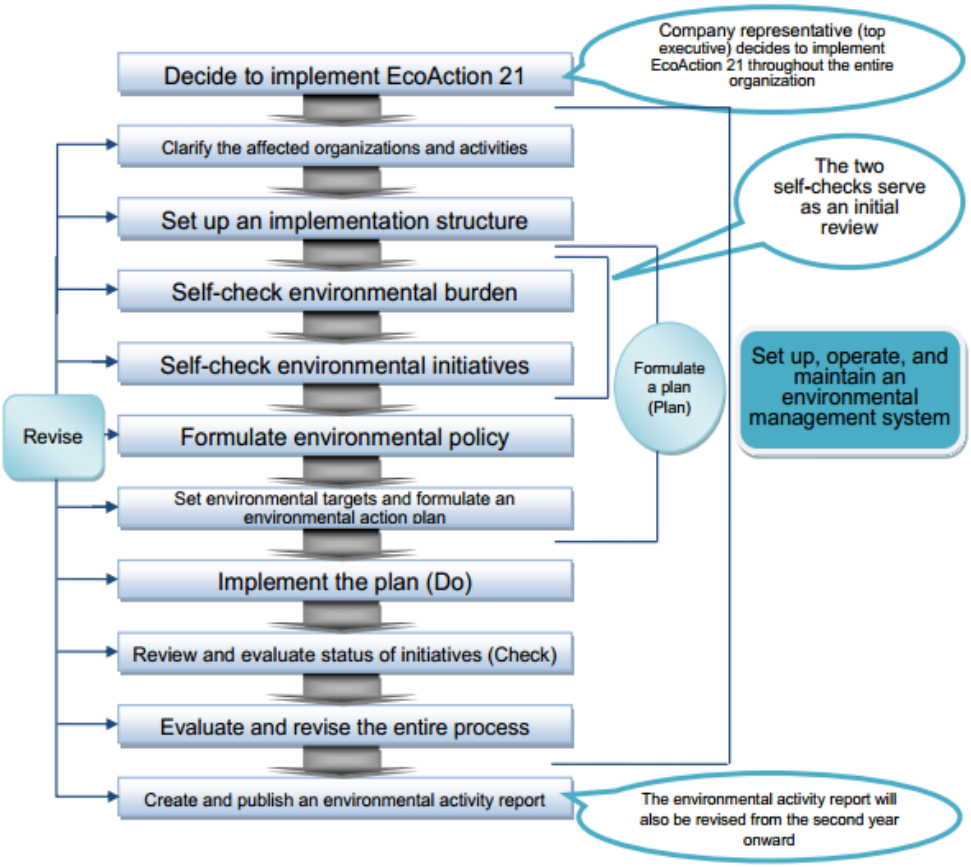

Figure 1 : EcoAction 21 Procedural Flow (MOE,2009)

This paper discusses the framework of EcoAction 21 without considering its actual implementation structure. If an institution or university has never implemented EcoAction 21 before, the first step is for the university representative to decide that the campus will enact the initiatives throughout its entire organization and clarify the scope of activities and organizations or units within the university that will be affected.

The EcoAction 21 PDCA cycle is also shown in Figure 1. For PLAN, the university's top management or leadership must decide whether to implement EcoAction 21 or not. Then, the leader must clarify the affected faculties/residential colleges/centers affected. After that, the leader must set up an implementation structure for example, developing a working committee group or volunteers to drive the green agenda. Then, the group must do a self-check for environmental burden and environmental initiatives (also referred to in the ISO 14001 assessment as environmental impact and aspect analysis). The environmental burden is depicted in Table 2.The environmental policy should then be formulated, leading to the setting of environmental targets and an environmental action plan for the university.

Table 2. Environmental Burden (Audit criteria) for EcoAction 21 adopted from (MOE, 2009).

Environmental Burden		Unit	Year
Greenhouse gas emissions	Carbon dioxide	kg CO2 eq	
Amount of waste generated and amount to landfill	Sold (valuable) waste	t	
	Recycled waste	t	
	middle	t	
	landfill	t	
Total water drainage	Discharge into public waterbodies	Cubic meter	
	Discharge into sewer	Cubic meter	
Water usage	Municipal waters	Cubic meter	
	Industrial use waters	Cubic meter	
	Groundwater	Cubic meter	
Amount of chemical substance used		kg	
Amount of energy used	Electric energy purchased	MJ	
	Fossil fuels	MJ	
	Alternative energy sources	MJ	
	Others	MJ	
Amount of materials used	Resources used	t	
	Recycled material used	t	
Education and research on environment	Education on environment		
	Research on environment		
	Voluntary activity of students		

DO is the implementation of the plan. For example, if there is a need to train the community or students who pollute certain areas, road-shows or training is needed to improve the situation and change behaviours. Enforcement and complaint mechanisms are also included.

Following that, CHECK is to evaluate the status of initiatives. The best check is to conduct an environmental audit and make corrections by reviewing and revising the entire process.

Finally, in ACT, the university is to create and publish an environmental activity report and to disclose it to the public to increase awareness.

1.8 UM Environmental Competition 2013 Criteria

Background

The Environmental Competition (EC) has beenthe UMCARES' (University of Malaya Environmental Secretariat) annual project since 2009. It is the university's main campaign to instill awareness of environmental protection, conservation and appreciation in the UM Campus. There are five key elements under the EC i.e. Waste Management, Biodiversity Conservation, Water Conservation, Energy Conservation and Sustainable Lifestyles

Objectives

1. To expose students to environmental awareness, environmental protection and nature appreciation within the basic environmental elements such as biodiversity, water conservation,waste management, low carbon and sustainable lifestyle. This effort begins witih students at the residential colleges with a view to later influencing faculties, centers and UM's external community partners.
2. To empower the capacity of UM staff and students to become sustainablity transfer agents for the nation and global communities.
3. To produce staff and students of UM who develop the "heartware" for the environment, social community in order to achieve global sustainable development.

Environmental Aspects and the Audit Sheet

The main environmental aspects assessed in the Environmental Competition 2013 were Waste Management, Biodiversity Conservation, Water Conservation, Energy Conservation and Sustainable Lifestyles (Table 3). The environmental aspects were then converted into an "audit/assessment checklist" to a performance evaluation tool for the competition.

Table 3. Environmental Audit Criteria for the year 2013

No.	Criteria
1	Waste Management
2	Biodiversity Conservation
3	Water Conservation
4	Energy Conservation
5	Sustainable Lifestyles
6	Generic
7	Green Procurement

2. METHODOLOGY

2.1 Sustainability Metric

To decideon new criteria for the UMCares Competition 2015, this paper applies a comparison matrix to integrate the EC 2013 Criteria, the UI Green Metric and EcoAction 21 to become the EC Criteria 2015. Table 4 illustrates the Sustainability Matrix that leads to the UMCares Competition Criteria 2015. These are the relevant stakeholders who can assist with the assessment in terms of audit and observation advice.

Table 4 : UMCares Sustainablity Matrix

Indices	Criteria 2013	UI Green Metric	Eco Action 21	Criteria 2015	Future plan and strategy
Generic					UMCares
Infrastructure					JPPHB
Waste Management					ZWC
Water Management					WW
Climate Change/Energy					Research
Transportation					Research
Research and Education					SDSN
Green Procurement					ZWC
Sustainable Lifestyles					KK
Landscape and Biodiversity					RIMBA
Chemical usage					UKKP
Material Usage					JPPHB
Community Engagement					UMCares
Green office management					UMCares
GHG emission reduction					Research

3. FINDINGS

3.1 Stakeholders

The goal is to ensure that the University of Malaya adds the UI Green Metric criteria and the EcoAction 21 Framework to the criteria for the 2015 UMCares Competition. The 2015 UMCares Competition also needs to include elements of community engagement to the environmental component. The stakeholders who could potentially becomeinvolvedin the assessment/audit are detailed below:

Stakeholder 1: UMCares Administration

Criteria	Description
Generic	Profiling of potential collaborating volunteer organizations including jobscope, objectives and organization background (assessed by UMCares administrative staff).
Community Engagement	The element of community engagement is assessed by the community engagement officer of the unit to empower students to organize a community project and engage with and assist a community outside of campus, possibly linking them to available experts within the university.
Green Office Management	The officer that leads the Green Office Project will assess otheruniversity offices and promote green office initiatives among residential colleges and faculty offices.

Stakeholder 2: Department of Development and Maintenance (JPPHB)

Criteria	Description
Infrastructure	JPPHB controls and manages the development of campus infrastructure and facilities. Thus, they can assess the infrastructure element including building quality, green areas, retention areas, and information related to student populations in residential colleges.
Material Usage	JPPHB controls vendors such as cafeteria, shops, building construction and material stocks used by the university such as paper, plastic, metal and others. JPPHB has the right to audit the use of these items in the operation systems of residential colleges and faculties.

Stakeholder 3: Zero Waste Center

Criteria	Description
Waste Management	Dedicated waste management expert assesses this key area including waste reduction, recycling, and other waste treatment processeson campus.
Green Procurement	This unit advises JPPHB on the mitigation of the supply of Styrofoam, plastics, and other non-eco-friendly products from entering campus.

Stakeholder 4: Water Warriors

Criteria	Description
Water Management	Dedicated water management experts will assess this key area including water conservation, water management, water-related awareness programmes and other water treatment processeson campus.

Stakeholder 5: RIMBA Team

Criteria	Description
Landscape and Biodiversity	Dedicated ecology and biodiversity experts will assess this key area including species richness, flora inventory, green spaces and biodiversity awareness campaigns on campus.

Stakeholder 6: Residential Colleges (KKs)

Criteria	Description
Sustainable Lifestyles	This key element is a cross-cutting element combining the other environmental elements into the lifestyle of the campus population. Fellows and college masters will become the assessors for this criteria.

Stakeholder 7: Occupational, Safety & Health Unit (UKKP)

Criteria	Description
Chemical usage	UKKP is the unit that chemical usage and safety including the disposal of chemical substances. This unit also assesses safety and health elements of KKs, faculties, units and centres.

Stakeholder 8: Sustainable Development Solution Network (SDSN)

Criteria	Description
Research and Education	One of the functions of the Sustainable Development Solution Network is to collate research and education programmes relates to campus sustainability. This unit assessing the research and education element of the organization.

Stakeholder 9: Researcher

Criteria	Description
Climate change/Energy	Research in the area of climate change, transportation and greenhouse gas reduction are often new to universities in a developing country. For this key area, researchers play a main role in determining campus achievements in climate change mitigation measures, efficiency of transportation systems and the reduction of greenhouse gas emissions.
Transportation	
Greenhouse gasses reduction	

3.2 Environmental Management System Checklist

The UMCares Competition needs to be located under a management system adapted from EcoAction 21. Table 5 depicts the whole 2015 Environmental Competition framework.

Table 5: Environmental Management System of University of Malaya 2015 Environmental Competition

Requirement		Contents / Strategy
PLAN	Environmental Impact and aspect analysis	
	Environmental Policy Development	
	Target (impact reduction) in a year	
	Action Plan in UM Management	
DO	Capacity Building and Training	
	Environmental Monitoring	
	Pollution prevention	
	Law Enforcement	
	Report and complaints	
	Record Control System	
	Guidelines and Standard Operation Procedure.	
CHECK	Environmental Audit	
	Correction and improvement	
ACT	Annual Sustainability Report	
	Publication	
	Report disclosure	

i. Plan

To kick-start the environmental management system, a study of environmental impacts and aspects must be organized. It is important to establish environmental policies based on the severity level of the impacts after the study. The policy can then be established with the relevant environmental impact reduction target. University action plans also can be developed after an environmental policy is derived.

ii. Do

The action of to be taken as a result of the planning phase consists of the training, capacity building, environmental quality monitoring, pollution prevention implementation, managing the environmental complaints from the public and the development of environmental guidelines for the betterment and improvement of the environmental quality in the society.

iii. Check

An organization must undergo environmental audits and then improvement and correction of issues that arise or non-conformance. The corrections must be done in order to achieve targets and to comply with the policy so that environmental degradation can be reduced.

iv. Act

This final stage of the system comprises the reporting, publication and report disclosure for public consumption. Thus, the effortstaken the organization can be diffused to the whole nation.

The findings highlight the following:

1. Environmental Competition 2013 Criteria were the preliminary trials of the University of Malaya environmental management system in the campus.
2. The UI Green Metric Criteria become the foundationupon which the university can compile and document sustainability efforts and compare that effort with other universities around the globe for improvement.
3. EcoAction 21 become the basic framework for the sustainability management system to complete the (Plan, Do, Check & Act) closed loop.

4. CONCLUSION

The 2015 Environmental Criteria and the Sustainability Management System needs cooperation and good interaction between many stakeholders (i.e: UMCares administrative, JPPHB, Zero Waste Campaign, Water Warriors, RIMBA Team, Residential Colleges, UKKP, SDSN and researchers) to achieve the goal of sustainability for the campus.

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