Issues and Challenges in Organizing an Effective Campus Energy Saving Culture

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Abstract

The impact of energy consumption and carbon emission in Malaysia poses a grave challenge. This challenge is particularly high amongst students of University of Malaya’s (UM) residential colleges, where usage of electricity and carbon emission remain invisible. In student residential colleges, personal choices and social influences affect electricity consumption and ultimately resulting to increase in carbon emissions. Therefore, innovative solutions are required to change students’ energy consumption behaviour and one promising part of the solution is to inculcate energy saving culture via informative and also interactive platform, while, at the same time, appointing an energy saving team (utilising existing UMCares Clubs) in each college to induce motivation among the students. It is expected that this will motivate students living in the residential colleges to reduce their electricity wastage and, therefore, control the energy cost and also reduce the carbon emissions released into the environment. In the present paper, we focus on the issues and challenges in organising an effective campus energy saving culture at University of Malaya residential colleges to study energy conservation and carbon emission reduction strategies.
**Introduction**

The first step a campus should take to become green is to reinforce, reinvigorate, and to expand its energy conservation program. Energy consumption produces the most significant environmental impacts associated with campus operations. Thus, there is a need to operate campus buildings and equipment in an energy efficient manner and to employ conservation measures wherever possible (Fischer, 2008).

While many reasons may be given for energy wastage on campus, there really is no excuse for it. Conservation and efficiency methods are well-established and they pay for themselves. As reported at Universiti Teknologi Malaysia (UTM), conservation can reduce total campus energy consumption by 30 percent or more (Zakaria et al., 2012).

To stop global warming, we need significant reductions in CO2 emissions, which can only be achieved by switching to clean, renewable sources of power that are carbon-free or carbon-neutral. These include solar heating, daylighting, photovoltaics, sustainable biomass, and wind power. However, efforts towards campus environmental sustainability are deceptive if it does not acknowledge the huge energy challenge of transforming the business as usual mind-set to an energy saving culture. The full dimensions of the campus sustainable energy challenge are just beginning to be appreciated as more and more campuses commit to achieving climate neutrality (Petersen, Shunturov, Janda, Platt, & Weinberger, 2007). In this study, the building blocks of an effective energy saving culture program is discussed.

**Winning the Top Management Commitment**

To reach a full potential, an energy saving culture program needs a clear commitment from the university top management. Top management including deans, residential college masters, and registrar can inspire and insist that their campus communities support energy conservation efforts. Top level leadership is essential for achieving excellence in energy sustainability as well as campus greening. Campus leadership support plays out in a variety of ways (Vicente-Molina, Fernández-Sáinz, & Izagirre-Olaizola, 2013). As an example, when there is a complain on why some offices and seminar rooms are not air conditioned on a Sunday afternoon, it is important that the leadership stay in support of the campus conservation program or else operational conservation measures will be viewed as futile and abandoned. Of course, there is a need to accommodate the research mission of universities but that does not mean all campus buildings should operate seven days a week. When the support is wavering or in need of
reinforcement, one strategy is to speak the language of administrators by demonstrating how your energy program reinforces academic excellence, public service, and a good campus image and saves money which can be used on academic and research programs. Another approach is to give campus top management a piece of the action by inviting them to participate in press events and bask in the spotlight whenever your program generates good news.

Empowerment of Department of Development and Estate Management (JPPHB)

As the operator of the campus physical facilities management and maintenance, JPPHB has the greatest opportunity and ability to save energy. For this reason, it is essential that top management mandate and empower JPPHB to perform this job to the best of its ability. The vehicle for achieving steady progress on energy conservation is the formation of an energy committee. This committee should be chaired by a high-level administrator with enough rank and resources to get things done. At some universities, this job is held by the Deputy Vice Chancellor for development who makes it clear to facilities staff that energy conservation is a top priority. Planning and implementation of conservation measures between committee meetings is accomplished by a three-person team; the director for utilities operations, the utilities manager, and the energy manager.

An energy committee should also be comprised of facilities supervisors who are responsible for energy management systems, temperature control, cooling and distribution systems, electrical, mechanical, and boiler maintenance, as well as planning and design. The energy committee should meet frequently, e.g. every other week when starting up and monthly or every other month when established. This in-house energy committee is facilities operations oriented and distinct from a campus-wide environmental task force or sustainability council. All mid- to large-size campuses should have full-time energy officers in addition to energy managers who supervise utilities operations and energy purchasing. The energy officer should be a free agent who develops large and small energy conservation projects, spearheads awareness efforts, and provides overall leadership to the energy program. Needless to say, it is essential that the energy officer report to the top of the organizational ladder and have the full cooperation of facilities directors and staff. The energy officer should be technically trained and competent and also be an able community organizer, educator, and advocate who are authorized to cross organizational boundaries, rock the boat every now and then, and get things done. Otherwise the inertia and energy waste associated with business-as-usual will prevail (Moganadas, Corral-Verdugo, & Ramanathan, 2013).

Of course, saving energy is not just up to the energy officer. It is a team effort. All facilities staff members that are in a position to spot energy waste or implement energy conservation should be doing so. This expectation can be
formalized by supervisors who understand the mission and carry the torch and by rewriting job descriptions so facilities staff or technicians are evaluated on the basis of their energy performance. Highly motivated facilities staff members or technicians that are enthusiastic about saving energy should be encouraged and given the green light and resources to pursue energy conservation measures. Conservation sometimes means taking reasonable chances and risking complaints. Campus leaders and facilities directors need to recognise this reality and give facilities operations staff enough support and room to do their jobs.

**Executing Energy Awareness Program**

Raising energy awareness is an essential component of an effective campus sustainable energy program. An energy awareness campaign can change the campus culture and create a climate for conservation. On a busy campus, raising energy awareness may be difficult because it is hard to get people’s attention. Thus, a variety of methods and media is required (Carrico & Riemer, 2011). The basics include an attractive, well-liked, and well-used website, e-mail notices, campus mailings, articles in on and off campus newspapers, posters, stickers, lecture presentations and guest speakers. But these are just a start. Creativity and persistence are key to an effective awareness program which not only increases support for campus energy conservation efforts but also contributes to the eco-literacy of graduates.

One idea is by using an LCD installed in the main entrance or office counter of all campus buildings that provides each building’s annual energy costs. The high electricity consumption figures usually shock people and spur conversations about the need to conserve.

In addition, launching periodical outreach programs with catchy slogans, logos, and coordinated resource materials can increase awareness effectiveness. One of UM’s most recent campaigns was pioneered by the Living Lab Energy Saving Culture in UM Campus Project (LL015-16SUS), led by Dr. Adi Ainurzaman Jamaludin and other authors of this paper as team members. This project used poster (Fig. 1a), informative brochure (Fig. 1b), and stickers (Fig. 1f) to empower students, faculty, and staff and convey the simple message that everyone at UM has “the power to turn things off.” The “Colour your energy” book deliberately tried to be edgy and experimental in order to reach young students which are the new generation young adults. It is a hip colouring book, exclusively designed with energy savings messages printed on every page (Fig. 1c, 1d, 1e). There were also energy savings logo and poster competition where participating students could win gifts for their winning design. Incorporating energy conservation within a larger campus environmental program is also helpful. The more students, faculty, and staff think about the environment and practice environmentally friendly behaviours like recycling, the more likely they are to want to save energy too. Each green program reinforces the others (Sharp, 2002). Creating an energy
volunteers’ platform is an effective way to reach all segments of the campus community and thus get beyond small events. This kind of platform consists of a staff or faculty member from every office and department on campus. These volunteers serve as informational agents and liaisons between their areas and the campus’ energy and environmental programs.

The energy volunteers could bring energy awareness to the campus at grassroots level. However, a network like this will not function on its own. It takes one’s time not only to create it but to keep it going and active. It is critically important that energy awareness programs speak to the hearts and minds students, faculty, and staff. An effective campus energy awareness program needs to connect the dots between campus energy waste and the wider regional and global environmental and social impacts of energy consumption. Climate change is foremost among those impacts. Thus, an effective campus energy awareness program needs to educate about climate change and ask members of the campus community to take action to reduce their own and their college or university’s carbon footprints.
Figure 1 (a) Poster, (b) Brochure, (c)(d)(e) ‘Colour Your Energy colouring book, (f) ‘Unplug’ reminder sticker
Creating Energy Policy
Campus energy policies play a critical role. They establish and institutionalise energy goals and they authorize action and programs to achieve compliance (Mcmillin & Dyball, 2009). Energy policies should be drafted by a committee with representation from the academic, maintenance, and business sides of the institution. Needless to say, the best time to develop conservation-minded campus energy policies is when your campus energy costs are high and the budget is tight. Also, a genuine institutional commitment to address climate change by reducing greenhouse gas emissions should drive energy policies in a conserving, sustainable direction.

Here are some of the issues which can be addressed by one or more campus energy policies:

- Air conditioner temperature settings
- Computer operations and "green computing"
- Restrictions on portable appliances per staff
- Energy efficiency purchasing standards for various types of equipment
- Green design and energy efficiency standards for new construction
- Energy practices in residential colleges and staff accommodations
- Campus transportation
- Alternative fuels and efficiency for campus bus
- Campus renewable energy development
- Greenhouse gas emissions reductions

Energy policies need not always stand-alone (Moore, 2005). They can also be embedded in other types of campus policies. One likely place is a comprehensive campus environmental policy. But it is important that sustainable energy policies and commitments find their way into campus strategic and master plans as well.

Green Design
An inefficiently designed new building is either a great retrofit candidate or an energy vampire for the next 50 or 100 years. While retrofitting buildings to improve efficiency makes sense, the retrofit exercise is costly and time-consuming. Many buildings undergo retrofitting and start recording great energy savings numbers. But one of the lessons learned from retrofitting is that new buildings should be designed right and energy efficient in the first place, thereby minimising the need for retrofitting. Progressive campus architects, engineers, facilities directors, and sustainability advocates are now championing sustainable or green building design for all new construction (Van Weenen, 2000). Green design prioritizes energy efficiency and the use of bioclimatic design for daylighting and air conditioning. These green design considerations, as well as others pertaining to siting, building materials, and indoor environment, are incorporated in the Green Building Index (GBI). GBI certified buildings may achieve a platinum, gold, silver, bronze or certified rating depending on how many
points they achieve. While it is tempting to pursue a GBI rating by identifying the easiest and cheapest points achievable by your project, this "checklist" approach violates the spirit of green design, which is holistic and integrative in pursuing design solutions that genuinely seek to minimize environmental impact. The truth is that the greenest building is the one not built. Trimming new construction plans and making better use of existing buildings makes the most sense environmentally. This green design principle may be hard to accept if your campus is intent on expansion and in the midst of buildout. In that case, the green design movement reminds us that there are better and worse ways to put up those new buildings (Velazquez, Munguia, Platt, & Taddei, 2006).

The premium costs of green buildings should be put in perspective. First, the investment amount may be exaggerated. Smart design can make it possible to design super-efficient new buildings at no additional cost. Where there are additional first costs, they need to be balanced against savings in life-cycle operating costs. The rise for green design is just beginning. It is a significant frontier for campus energy and environmental sustainability and another opportunity for campuses to lead or follow (Wright, 2002).

**Conclusion**
The institutionalisation of campus energy savings culture should involve educational and awareness campaigns, dialogue, series of meetings in identifying the targets, establishing the system, mechanism and Key Performance Indicators (KPIs). Those must be coupled with the living lab approach which allows contribution from all campus community; academician, students and professional as well as supporting groups. Teamwork and top management commitment are identified as critical success factors in building the people and the culture, towards the sustainability of the energy program.

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