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GUIDELINES FOR SUSTAINABILITY AND ENERGY EFFICIENCY IN HIGHER EDUCATION INSTITUTIONS

SUCCEED Network
'East African Higher Education Network on Sustainable and Energy Efficient Campus Development'
(FED/2013/320-274)

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SUCCEED Network consortium:

European Union:

- University of Alicante, Spain (Coordinator)

East Africa:

- Université de Burundi, Burundi
- Moi University, Kenya
- University of Rwanda, Rwanda
- Mzumbe University, Tanzania
- Makerere University, Uganda
- Inter-University Council of East Africa, Uganda

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Foreword

This document has been produced by the SUCCEED Network project in order to serve as a general guide of Good Practices in the field of Energy Efficiency (EE) for Higher Education Institutions (HEIs).

The intention of the present document is to present a series of basic general recommendations that could be taken as guidelines for universities wishing to begin implementing sustainability measures on their campuses, particularly where energy efficiency is concerned. It is by no means an exhaustive list; the options are as varied as the institutions implementing them and can be simpler or more complex depending on the budget available. Many detailed examples of Good Practices in Sustainability and Energy Efficiency can be found online in documents from university campuses around the world.

Launched in October 2013, the three-year project SUCCEED Network is an ACP-Edulink funded project (contract number FED/2013/320-274) which aims to promote East African university campuses as "living laboratories" for sustainability and energy efficiency, in particular by establishing a sustainable campus development platform to foster collaborative learning and action for energy access and efficiency, with the idea of contributing to solve the problems described above. The project will do this via a set of activities whose objective will be to improve institutional, academic and cooperation building which should result in a stronger institutional background, an enriched academic offer in renewable energy and energy efficiency, and an increased attractiveness for relevant

stakeholders in order to establish new cooperation schemes in the field of energy. This includes setting up Energy Efficiency Units on partner campuses, responsible for launching Energy Campaigns, undertaking Energy Efficiency Audits, identifying Good Sustainability Practices to share or supporting teachers to prepare online courses in Energy matters.

The project is coordinated by an experienced team from the University of Alicante (Spain). The members of the consortium in East Africa are all public universities with a national coverage: l'Université du Burundi (Burundi) Moi University (Kenya), the University of Rwanda (Rwanda), Mzumbe University (Tanzania) and Makerere University (Uganda). The project also counts on the support of the Inter-University Council for East Africa (IUCEA) as an associate partner.

1. Sustainability, Energy Efficiency and Conservation

In 1992, at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, 178 Governments signed the *Agenda 21* action plan[1]. Since then governments, agencies, institutions and even individuals around the world have become more aware of sustainability issues and increasingly concerned about climate change. As a result of this the world has seen an increase in measures aiming at improving governments' / institutions' / organisations' etc. sustainability or minimising their impacts on climate change. This includes an increase in HEIs around the world that now implement procedures in their campuses in order to use their resources in a sustainable manner.

A key component of sustainable development measures in energy matters is the implementation of energy efficiency and conservation policies as

> *"Energy is essential to economic and social development and improved quality of life. Much of the world's energy, however, is currently produced and consumed in ways that could not be sustained if technology were to remain constant and if overall quantities were to increase substantially. The need to control atmospheric emissions of greenhouse and other gases and substances will increasingly need to be based on efficiency in energy production, transmission, distribution and consumption, and on growing reliance on environmentally sound energy systems, particularly new and renewable sources of energy. All energy sources will need to*

1. https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf

be used in ways that respect the atmosphere, human health and the environment as a whole." (Agenda 21)

So what are *Energy Efficiency* and *Energy Conservation?* In simple terms, **Energy Efficiency means using less energy to provide the same service as before**, whereas the objective of **Energy Conservation is simply to reduce the overall energy consumption, via energy efficiency measures as well as others (such as behavioural changes)**. An example of energy efficiency would be changing traditional incandescent light bulbs with modern fluorescent ones. A fluorescent bulb will produce the same illumination as its incandescent equivalent, but using a significantly smaller of electricity. The broader concept of energy conservation would include behavioural actions such as simply turning off the lights and thus reducing the number of hours they are being used, resulting in a lower electrical consumption.

In any good sustainability plan, both energy efficiency and energy conservation measures must go hand in hand. Improving the energy consumption capacities of an institution's equipment without working on modifying the behaviour of the people involved will result in only half-successful programs. **Raising people's awareness** on the importance of sustainability measures, in particular energy-related ones, **is the key to obtaining results in reducing energy consumption**. To change behavioural patterns, people must be informed and educated in these matters.

Other than a wish to become more sustainable, the main reasons for implementing energy efficiency and conservation methods tend to be either for cost reduction or to make the most of limited energy resources available. No matter where energy is used, there are always ways to improve efficiency. The cost for these improvements usually ends up paying for itself over time by the savings obtained through the lower energy bills.

2. Key players in HEIs

When preparing to develop and implement a sustainability plan, **the first step** any higher education institution (HEI) should do is to **identify the key players involved and define their roles**. An HEI is a complex system of interdependent components constituted of the various groups that make up the university community. For any campus-wide initiative (on sustainability or other) to be successful, it must consider these various components and their linkages and find ways to involve them in the process from the very beginning (in the development phase) in order to instil a sense of ownership and increase their willingness to participate when it comes time to implementing it. An institution might create a brilliant sustainability plan, but if it cannot involve the entire community in its implementation, then there is little chance of success. As stated in the UNCED's Agenda 21 (Chapter 23):

> *"One of the fundamental prerequisites for the achievement of sustainable development is broad public participation in decision-making. (…) This includes the need of individuals, groups and organizations to participate in environmental impact assessment procedures and to know about and participate in decisions, particularly those which potentially affect the communities in which they live and work."*

For this reason it is essential to involve the key players of the HEI community and have them participate in the development and implementation of the sustainability plan. They in turn will ensure the involvement of the rest of the HEI community when it comes to implementing the plan.

a. University Leadership and Top Management

A motivated team in an HEI may develop the "perfect" sustainability and energy efficiency plan, but without the support of the institution's leadership and the rest of the people "at the top" it is doubtful it will result in anything significant. After all, how can they expect the rest of the community to dedicate time and effort to this when the leadership has no interest in it? Not to mention the need for institutional funding for many of the measures.

On the other hand, if the plan has the backing of the institution's leadership, it will be much easier to get other members of the community to participate in its implementation. A good leader can be counted upon to exert their influence on other members of the community in order to get things done. Having the backing of the current leadership will also help to have the concept of sustainability incorporated into the HEI's vision and mission which will result in sustainability becoming a part of the HEI's general strategic plan. This in turn will put pressure on future HEI leaders to continue the initiative.

b. University Staff

Professors, researchers, technical and administrative staff. These are the people for whom the HEI is practically a home away from home. They spend 8h a day (or more) on campus, interact with every other level of the university community and usually have very heavy workloads. They can't be simply ordered to implement sustainability measures which will result in disruptions of their routines (however slight) and be expected to acquiesce willingly. Unless they are motivated, made to feel as willing participants in this grand campus-wide initiative, then they will drag their feet and little will get done.

In every institution there can be found people with a deep-seated concern for environmental matters and who are motivated to take action. These people should be identified and asked to participate in the process from the beginning. They will later also help when it comes time to involving their colleagues in sustainability actions.

Another group to be taken into account is the staff's Union or representatives, or whichever organisation is present to represent the rights of the HEI's personnel. Their involvement in the process will help stay any official complaints by staff members later on about interference in their workload.

c. The Student Body

Of particular importance in an HEI is the student body as they usually form the largest proportion of the institution's population. On the subject of youth participation Agenda 21 states (Chapter 25):

> *"The involvement of today's youth in environment and development decision-making and in the implementation of programmes is critical to the long-term success of Agenda 21.*
>
> *It is imperative that youth (…) participate actively in all relevant levels of decision-making processes because it affects their lives today and has implications for their futures. In addition to their intellectual contribution and their ability to mobilise support, they bring unique perspectives that need to be taken into account."*

An HEI might think it not worth the cost and effort to involve its student body in these measures because "*they will be gone in a few years after all, and we will have to start all over with the new students!*". Involving and training the student body in these measures is definitely an on-going process, it cannot be done just the once.

But a program that does not involve the student body would be incomplete. There is also the fact that one of HEIs' key roles in society is to prepare our youth to be the citizens of tomorrow. Students may graduate from an HEI having received an excellent education and a diploma to prove it, but without an understanding about the social, ethical and environmental context in which they will live and work in, then their education has been incomplete. And who better to export an HEI's philosophy on social and environmental matters out into society than these new citizens?

Students are young, creative and full of energy. Most of today's youth is conscious of the importance of environmental initiatives and are willing to help out to "*make the world a better place*". A key student component that needs to be included in the development and implementation of sustainability measures are representatives from the Student Unions. The student unions will be able to help mobilise the student body and get them to participate in sustainability actions. They can help organise campaigns, contests, courses on sustainability measures etc., and they can be counted on to pass on the information to new members as they arrive to replace those who are departing and thus guarantee continuity.

3. Strategic Plan for Sustainability and Energy Efficiency

Sustainability and energy efficiency measures cannot be implemented randomly by just anyone on campus with an interest in the topic. It should be something that is a part of the HEI's institutional strategy and be accepted as a key element of the HEI's vision and mission. Any institution serious about implementing sustainability measures and "greening" its campus must develop a Strategic Plan for sustainability, and this in turn should include a Strategic Plan on Energy Efficiency detailing a roadmap of measures to be implemented over the next X years (frequently 5) with specified benchmarks in order to be able to evaluate the institution's progress as the plan unfolds.

a. Sustainable University Model

In 2006 Velazquez et al. published a model for a sustainable university using empirical data collected from some 80 HEIs around the world[2]. The model depicts a structured framework composed of four phases in a strategic management process, and involved the entire HEI community (Fig. 1).

2. Velazquez, Munguia, Platt, Taddei (2006). Journal of Cleaner Production 14, pp 810-819.

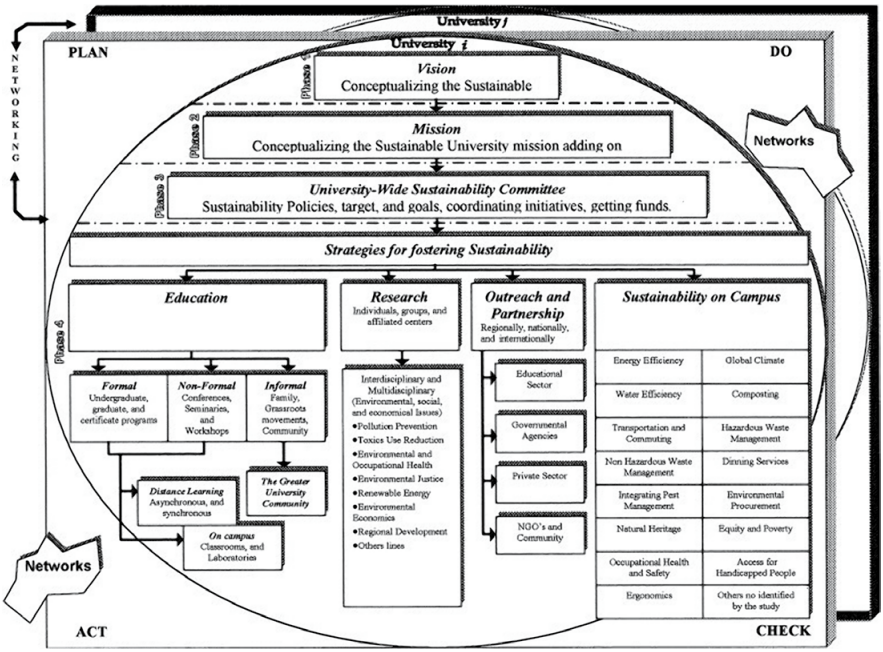

Figure 1. Organisational Structure of a Sustainable University (Velazquez et al. 2006)

The model is organised in four consecutive phases which are linked in a logical sequence from strategic to operational (Velazquez et al. 2006). The implementation of the sustainability plan is done along four diverse strategies, each with a set of specific initiatives.

Phase one consists in **developing a sustainability vision for the university**. Because sustainability can mean different things to different people, this phase includes the institution defining its own concept of what being a sustainable university is all about, adapted to its own circumstances.

Phase two takes this vision and uses it as the basis to **develop the institution's mission statement** which should successfully transmit

the vision's inspiration and motivation. This statement will answer the three key questions of who? what? and why? It should also lay a foundation for future action plans.

Phases one and two can be accomplished by a small group of people. In **Phase three** the number of people involved increases as a **Sustainability Committee** is established. This committee is the decision-making body and will enable the creation and implementation of campus-wide policies, objectives and targets. It will also provide support for the people responsible for the various sustainability initiatives by "*disseminating and receiving information, coordinating initiatives, avoiding overlapping efforts, obtaining funds and ensuring that policies are effectively implemented.*" The committee should include representatives of all the different sections of the university community: students (through the student union for example), professors, technical and administrative staff. Ideally it should also include a representative from outside the university who can serve as an intermediary with the rest of the local population. The **creation of sustainability policies**, including an overall sustainability strategy for the university, should be one of the committee's most important tasks. Ideally these policies should inspire behavioural changes in the university community for a maximum impact.

Phase four of the model is centred on the development and implementation of the **Sustainability Strategies**. These should cover all aspects of the university and can be organised into four groups (Fig. 1): education, research, outreach and partnership, and sustainability on campus. This last group, sustainability on campus, is where most of the work is done to "green" the campus by improving energy efficiency, water efficiency, waste management, recycling, transportation etc.

Velazquez's model isn't meant to be a rigid structure to be followed to the letter, but a framework an institution can use as a basis to build its own structure and plan. The implementation of the model requires a lot of effort by the entire community, particularly the key players, and it is not a one time thing. Indeed, the model is meant to be implemented according to the PDCA management method (plan-do-check-act), also known as the Deming cycle. This is an iterative cycle of four basic steps: Plan the action by establishing the objectives and processes necessary to achieve them; Do or implement the plan; Check the results of the implementation by collecting data as it is being implemented and finally Act to improve the plan (apply any necessary corrections etc.) based on the observations made when checking the results. Once the HEI has designed and begun implementing its sustainability strategies, it will have to set up regular controls and audits and based on the results of these implement corrective or improvement measures for the following cycle.

b. Strategic Plans

The key to successfully implementing a sustainability model such as the one described above rests in involving the right people and starting from a solid base with a strong, coherent strategic plan. There should be an overall Strategic Sustainability Plan as well as more detailed ones for certain specific aspects, such as for example a Strategic Energy Efficiency plan.

It is not the purpose of this document to go into detail on the best method of writing a strategic plan – there are after all many excellent resources for that available online – but simply to mention that having one is an essential good practice for implementing Sustainability and Energy Efficiency measures.

Strategic plans provide a template for creating and implementing the desired goals and measures as well as the corresponding guidelines. Having one also indicates that the higher administration of the institution is committed to the issues it presents. The goals presented in the strategic plan change from one institution to another, the important thing is that they be real and achievable. It is necessary to provide a timeline that includes both short- and long-term goals in order to have a sense of achievement as each short-term goal is accomplished, and continue to have something to work towards with the long-term goals.

In the online resources section at the end of this document we have provided the addresses of several websites with basic guidelines on how to write a sustainability strategy or plan.

4. Sustainability and Energy Efficiency Units on campus

a. Role of Sustainability and Energy Efficiency Units

When it comes time to implementing the Strategic Plans, and develop Sustainability and Energy Efficiency projects on campus, it is important for there to be a clear and strong coordination on this. Too often separate initiatives are launched by various actors in an HEI, but without central coordination (or even basic communication between them at times), these efforts don't always have the expected impact, and sometimes results in duplicated efforts.

For this it has been considered recommendable for HEIs to set up and support an especially dedicated Unit or Office for Sustainability and Energy Efficiency. These units would be for example responsible for coordinating the work done by campus stakeholders to implement the actions laid out in the strategic plans. They would also be the main contact point on campus to request information on Sustainability and Energy Efficiency matters.

Among other things, these Units could promote cooperation between researchers and between researchers and the Private Sector on Energy projects. They could promote campus operations and launch outreach and engagement activities with campus stakeholders. The Units could plan and implement Energy Audits of campus buildings to identify areas of improvement. They could also support the university faculty in introducing these issues into the academic curriculum, as well as organise training courses and meetings on Energy for campus staff. And finally, as the voice for the university on Sustainability and Energy matters, they could be a primary contact for policy makers and advise and promote sensible solutions at local and national levels.

b. Visibility

To be fully effective with campus outreach, and increase the impact, the Sustainability and Energy Efficiency Units need to have a solid communication plan and a clear and direct online presence. This usually involved having their own page on the university website with all the relevant information and useful links.

Awareness-raising campaigns need to be launched, and all the relevant stakeholders identified and targeted so that ensuing activities will involve the entire HEI community in Energy Efficiency policies.

5. Some examples of areas to be targeted when preparing to improve Campus Sustainability and Energy Efficiency

There are many different aspects of university life and structures that could be targeted to improve Campus Sustainability and Energy Efficiency. The list below only involves a few examples and is not meant to be exhaustive.

a. Related to buildings (windows, lighting, building design)
   i. Perform Energy Consumption Studies or Energy Audits to identify potential areas or improvement or Good Practices to be shared
   ii. Do Analyses of Building Structures to see how they could be refurbished to be more sustainable and energy efficient.
   iii. Plan construction of any new infrastructures with Sustainability and Energy Efficiency already in mind
   iv. Use energy saving bulbs for lighting (both indoor and street)
b. Related to technology used
   i. Efficient heating/cooling systems
   ii. Automatic switches to disconnect heating/cooling at the end of the day
   iii. ICT labs properly set up and monitored
   iv. Require all new equipment purchased to meet energy efficiency standards
c. Grounds maintenance and gardens
   i. Use of efficient irrigation measures
   ii. Water recycling
d. Transportation
   i. Promote use of public transportation among campus stakeholders

e. Renewable Energy Sources
   i. Promote use of renewable energy sources
   ii. Set up renewable energy systems wherever possible on Campus
f. Waste Management
   i. Efficient Waste Management
   ii. Recycling programmes
g. Work with campus stakeholders to promote simple things everyone can do:
   - Switch off lights when leaving a room.
   - Switch PC monitors to power save mode.
   - Switch off computers at the end of the day.
   - Unplug unused computers and mobile phone chargers.
   - Report dripping faucets or other energy waste to Maintenance.
   - Reduce use of paper by only printing what's strictly necessary, and whenever possible double-sided and on recycled paper.
   - Use public transportation.
   - Inform Sustainability Office of any problems that arise.

6. Conclusions

Achieving the status of "sustainable university" or "green campus" is not something an HEI will reach in a single attempt. Sustainability is not just an end result; it is a continual process of improvement, a philosophy, a way of life for the university community.

Any Sustainability Plan developed for an HEI should include a plan for Energy Efficiency as well, with targets in energy conservation to be reached at various time intervals. This plan should be contrasted with achieved results at regular intervals and updated, with results disseminated widely to the campus population. Its implementation should be coordinated by a highly visible Sustainability & Energy Efficiency Unit or Office who can promote this to all campus stakeholders.

Useful online resources

Many free materials, guidelines and courses are readily available online.
A few examples:
http://www.useefficiency.eu/en/about-use-eff-project
http://www2.schneider-electric.com/sites/corporate/en/products-services/training/energy-university/energy-efficiency.page
https://practicegreenhealth.org/topics/energy-water-and-climate/energy/best-practices-energy-efficiency

Sustainability plans:

Green Plus – Sustainability Plans:
http://gogreenplus.org/nuts-and-bolts-guide/performance-nuts-and-bolts-guide/sustainability-management/sustainability-plans/

GreenBiz.com – Creating an Effective Plan for Your Sustainability Efforts:
http://www.greenbiz.com/blog/2006/11/28/creating-effective-plan-your-sustainability-efforts

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