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EUROPE & SOUTH-EAST-ASIA

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FOR A GREEN UNIVERSITY
CAMPUS

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” THERE HAS BEEN NOTHING LIKE IT IN TERMS OF ENABLING THE GLOBAL COMMUNITY TO WORK ON AN ISSUE TOGETHER THAT NONE OF US CAN SOLVE ON OUR OWN.”

ANTÓNIO GUTERRES,
UN-SECRETARY-GENERAL 2017

ASEA-UNINET

ACADEMICS ARE EXPECTED TO MAKE CONTRIBUTIONS TO STRENGTHEN THE DEVELOPING COUNTRIES

The ASEAN European Academic University Network (ASEA-UNINET) is a network of universities, consisting of European and South-East Asian universities with the goal of promoting the continuous internationalization of education and research. Every year, more than 100 bilateral and multilateral ASEA-UNINET research projects, international workshops, conferences, summer/winter schools as well as networking events are conducted. There are no limits to the areas of academic cooperation. ASEA-UNINET research projects are interdisciplinary, ranging from Natural sciences, Technologies, Economics, Social sciences and Human Sciences to Medicine and Pharmacy. Besides the scientific focus of ASEA-UNINET, the network is characterized by the very tight personal relations of its participants.

The promotion of scientific, cultural and human relationships as well as personal contacts, scientific findings and collaboration are part of the mission of ASEA-UNINET.

As the global community continues to grapple with growing insecurities and uncertainties - billions continue to live in po-

verty, rising inequalities, conflicts, and glaring disparities in wealth and opportunity, amid climate change threats - the imperatives for sustainability become increasingly pronounced.

Sustainability puts emphasis on managing and promoting socioeconomic development with full consideration of ecological limits. Essentially, it seeks to balance the three dimensions of sustainable development: the economic, social and environmental, creating inclusive societies.

One of the key strategies devised to achieve Global Sustainable Development, emphasizing the United Nations Sustainable Development Goals (SDGs) adopted in 2015, is a revitalized global partnership that produces concrete policies and actions, mobilizes financial resources, and facilitates capacity-building and transfer of technology, particularly toward addressing the needs and priorities in developing countries. Governments, international organizations, business and other non-state actors, including academia, are expected to make contributions to strengthen countries of the Global South's scientific, technological and governance capacities.

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GREEN UNIVERSITY CAMPUS: A CONTRIBUTION TO THE GLOBAL SDGS

Universities in their dual role as organizations and institutions educating our engineers, architects, social scientists, politicians, economists, managers of the future, play a crucial role when it comes to the potential for achieving the Sustainable Development Goals declared by the United Nations in 2015, addressing both countries of the Global North and South. While the scope of impact of each university differs related to the disciplines offered by the university, each university takes responsibility in realizing efficient resource usage, education and business operations with the overall objective to decrease the impact on our

INDICATORS FOR MEASURING THE SUSTAINABILITY OF A UNIVERSITY CAMPUS

Following the UI GreenMetric World University Rankings

The UI GreenMetric World University Rankings ranks universities all over the world by their conditions and policies related to Green Campus and Sustainability. The ratings are based on systematic questionnaires from universities worldwide reporting about efforts being made by the institutions to implement sustainable policies and programs, including social, environmental and economic aspects. The indicators which improve the sustainability of university campuses are separated by the UI GreenMetric World University Rankings in six criteria, which are divided in several sections, defined by specific indicators and weighted in the ranking in percentage of the total points as shown in the graphs on the following pages. The indicators include:

- ▶ **setting and infrastructure**
- ▶ **energy and climate change**
- ▶ **waste**
- ▶ **water**
- ▶ **transportation**
- ▶ **education**

This article presents the criteria and indicators used by UI GreenMetric World University Rankings, which can be used as guide by universities for identifying their potential areas of activity in order to develop a green campus and sustainable university.

SETTING AND INFRASTRUCTURE

The criterion “setting and infrastructure” gives basic information on universities’ consideration towards green environment and a first draft of a University’s level of a “Green Campus”. Universities can enlarge the space for greenery, safeguard the environment and install sustainable energy technologies.



Within this issue, the number of campus sites and total square meters are compared with the percentage of green area of the university. Universities can report the area occupied by buildings (first floor parts), total main buildings area and total area of all floors of universities in order to calculate the smart building implementation percentage. Furthermore universities can identify their park area and area covered in vegetation in the form of forest and planted vegetation such as lawns, gardens, green roofs, internal planting in relation to the total campus area. An increase in energy efficient buildings (smart buildings) can be achieved by useful building services making occupants productive such as illumination, thermal comfort, air quality, physical security, sanitation etc. Smart buildings aim to generate a beneficial environmental impact over the building lifecycle at the lowest cost possible. Furthermore enlarged areas for water absorption such as earth or grass are aimed to be established, besides forest and planted vegetation.

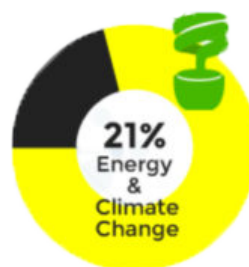


automation and intelligent building programs using networked technology, embedded within architecture to monitor and control elements of the architecture for exchange of information between users, systems and buildings in order to accommodate energy efficient appliances usage.

Another indicator addresses renewable energy policy aiming at increasing the energy used by alternative energy sources at the campus and production of renewable energy itself, such as bio diesel, clean biomass, solar power, wind power and hydropower. Total electricity usage per year at the entire university for all purposes including lighting, heating, cooling, running university laboratories etc. should be decreased and the renewable energy usage ratio should be increased.

The category includes elements of green building implementation reflected in the overall construction and renovation policy such as natural ventilation, encouragement of full-day natural lighting whenever possible during the day time, building energy manager and existence of green buildings.

Greenhouse gas emission (GHG) reduction programs are to be realized, including heat, ventilation, air condition, refrigeration and laboratory gases e.g.



ENERGY AND CLIMATE CHANGE

The criterion of energy and climate change issues indicators relating to energy usage and efficiency.

The first indicator reports on the energy efficient appliances usage instead of conventional appliances (e.g. LED light bulbs, using energy-star-rating for electronic devices) and the implementation of smart,

The total carbon footprint (CO₂ emission in metric tons within a year) can be calculated with the carbon footprint calculator from



■ Separation of waste by students © Politecnico de Milano, Italy

www.carbonfootprint.com, serving as a standard carbon footprint calculator which takes into account all greenhouse gases (CO_2 , N_2O , methane etc.) presented in units of metric tonnes of CO_2 equivalents. This calculator only includes Scope 1, which reports the direct GHG from the combustion of fuels owned or controlled by a company or organization itself, e.g. emissions from combustion in owned or controlled boilers vehicle.

Scope 2 further includes accounts from the generation of purchased electricity, which physically occur at the facility of the generation of the energy (energy plant). Scope 3 emissions even go further and are associated with the extraction, refining, distribution, storage and retail of the fuels. Scope 3 further includes all emissions from your supply chain such as purchased products & services, waste, water and outsourced logistics.

The more Scopes included in the calculation, the more accurate the data will be.

While valuing nature and energy resources at an increased level, the aim of the category is to improve energy efficiency, reduce total energy consumption and reduce the university's carbon footprint.

WASTE

The category of waste deals with the treatment and recycling of waste, representing one of the major factors for creating a sustainable environment. Waste is being generated by university staff as well as students on campus. Actions for a sustainable waste treatment include recycling programs, toxic waste recycling, organic waste treatment, inorganic waste treatment and sewerage disposal.



Following the waste hierarchy, as a first priority, waste should be prevented, followed by the reuse and recycling of waste. Energy recovery and disposal are considered as the very last options. Following this, policies to reduce the use of paper and plastic on campus are aimed to be realized, recycling programs introduced, toxic waste handled appropriately by dealing it separately e.g. by classifying and handing it over to third party or certified handling companies. Organic waste is aimed to be fully composted and compost used internally and externally. Inorganic waste is aimed to be recycled at the best extent possible. Sewerage should best be treated for recycling, before disposal or individual treatment in septic tanks.

WATER

The aim of the category of water is to decrease water usage and increase conservation programs and protect the habitat. This can be achieved by water conservation programs, such as lake management systems, rain harvesting systems and water tanks, water recycling programs

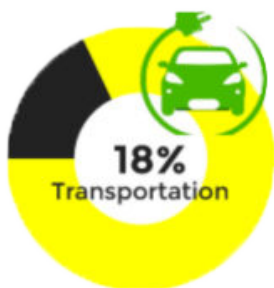


such as the usage of recycled water for toilet flush, car wash, plants irrigation etc., water efficient appliances usage instead of conventional appliances including censored/automated hand washing tap, highly efficient toilet flush etc. and programs to decrease water consumption in total.

TRANSPORTATION

The category of transportation represents an important factor of carbon emissions and pollutant level at universities. The aim is to implement transportation policies encouraging students and staff to walk around campus, use bicycles and environmentally friendly public transportation instead of using private motor vehicles.

Universities can take action by limiting cars owned by a university and cars and motorcycles entering university premises daily, increase the number of campus shuttle operating at the university, restrict parking possibilities and introduce transportation initiatives to limit or decrease private vehicles on campus, such as car sharing, providing a public transport station at the campus and offering services for public transport inside the campus. Further actions to be taken by the university are to support the usage of bicycles and walking by provide bicycle and pedestrian ways and provide bicycles etc. freely by the university.



EDUCATION

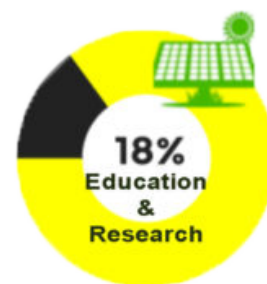
The sixth and last category of education includes the offering of courses related to environment and sustainability, which differs regarding the disciplines offered at universities. In general, it is aimed that courses at least contribute to increase awareness, knowledge or action related to sustainability, as sustainability

is interdisciplinary and touches several areas.

Furthermore, it should be the aim to increase research funds dedicated to environmental and sustainability research as well as the number of scholarly publications and events organized or hosted by university and student organizations related to environment and sustainability.

To enhance the overall understanding and awareness towards sustainability, universities can publish information on latest involvement on green campus, environmental and sustainability programs and call for action on a university-run sustainability website.

*by Universitas Indonesia
GreenMetric University World Rankings*



► <http://greenmetric.ui.ac.id>

IN PRACTICE: UNIVERSITY OF MALAYA

In 2015 University of Malaya (UM, Malaysia) launched the UM Eco-Campus Blueprint (UMECB) as part of an institution-wide drive toward creating a sustainable campus. UMECB is a long-term sustainability commitment which involves university leaders, staff, and students to work as one community in concerted manner and combines the critical elements of research, education, operations & university leadership.

In UM, green campus coordination is mandated to UM Eco-Campus Secretariat with direct support from UM Living Labs (UMLL) Grant Programme.

UM LIVING LABS

UMLL contribute towards minimizing harmful environmental impact on campus by reducing the amount of carbon emission to drive UM to be one of the prominent eco-campus in Malaysia and the world. UMLL enables the integration of Research and Development, deployment of real-time sustainability solutions on the grounds, promoting transdisciplinary research, and most importantly befits the need of community to achieve greater engagement with a more holistic experience for a better campus environment, as one of the first of its kind in Malaysia. In 2018 UMLL was in its fourth cycle, where solutions were applied on a larger scale. It has shown that the direct and indirect monetary gains from the collective initiatives to cut 6,590,000 kg CO₂ Green House Gases (GHG) emissions surmount to more than RM1 million (about 245,000 USD) within a one-year period.

UM ECO-CAMPUS BLUEPRINT

The UMECB is a guideline that puts emphasis on green campus policy, reflected in eight core areas:

- ▶ **Landscape & Biodiversity Management**
- ▶ **Waste Management**

- ▶ **Water Management**
- ▶ **Energy Management**
- ▶ **Transportation System Management**
- ▶ **Green Procurement**
- ▶ **Education Management:**
Environment & Climate Change
- ▶ **Change Management in Governance, Participation, & Communication**

As of 2018, a total of 45 projects have been funded to tailor UM Eco-Campus Core Areas to the needs of Sustainable Development Goals (SDGs), including three pioneer initiatives that have shown remarkable contributions:

- ▶ **UM Zero Waste Campaign (UM ZWC):**
campus integrated waste management
- ▶ **Water Warriors:**
water conservation & revitalization
- ▶ **The RIMBA Project:**
biodiversity & landscape management

*by the Eco-Campus Secretariat
University of Malaya, Malaysia*

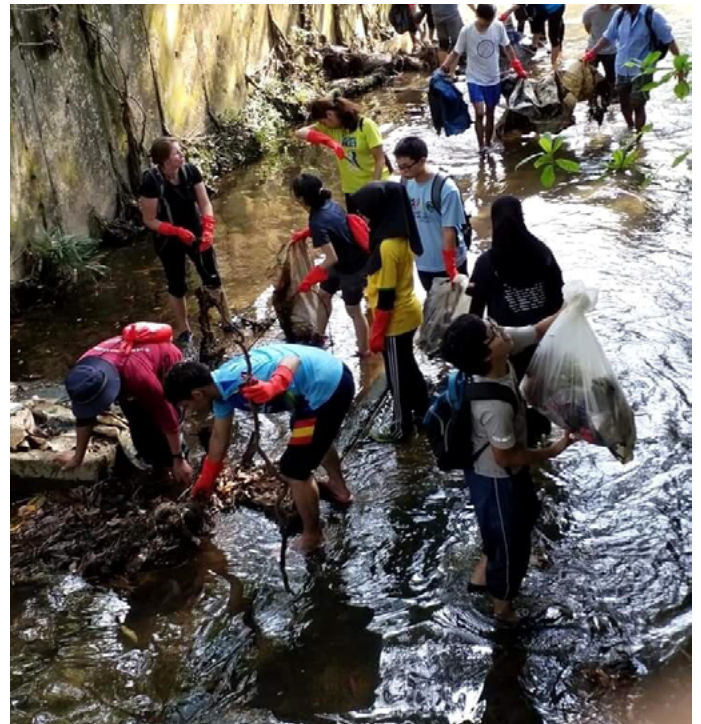
- ▶ www.um.edu.my/about-um/unique/sustainability@um
- ▶ <https://umwaterwarriors.wixsite.com/tasek>
- ▶ <http://umrimba.wixsite.com/umrimbal>



■ UM Zero Waste Campaign Composting Center © UM ZWC



■ Winged-Fruit Tree-Planting initiative © The RIMBA Project



■ UM Water Warriors River Cleanup & Monitoring © Water Warriors

IN PRACTICE: UNIVERSITY OF BRESCIA

The University of Brescia (UNIBS, Italy) dedicates attention to sustainable development in its research and education, construction and management of its campus buildings, the choices of mobility, the use of energy and all natural resources. It aims to raise awareness of the 2030 Agenda of the United Nations and integrates the 17 Sustainable Development Goals into its academic community and to civil society in six thematic sequences: Energy and Emissions, Mobility, University and Residential Buildings, Nature and Ecosystem, Health and Wellness, Culture, Learning and Research.

ENERGY AND EMISSIONS

The UNIBS aims to reduce energy consumption by 1 % per year via interventions on institute buildings with photovoltaic power plant (one), Air Treatment (one) and thermal plants (two). Intervention on lighting devices, and the provision of a monitoring system for electricity consumption in buildings with high energy consumption are planned for the forthcoming year.

MOBILITY

The University strongly supports the use of public transport and all forms of sustainable alternatives, including bike sharing. A key principle of this ambition is to improve campus access across all modes by which people choose to travel, whether this is by public transport, car, cycling or on foot.

UNIVERSITY AND RESIDENTIAL BUILDINGS

The goal of sustainability is also applied to a new focus on students wellbeing: more enjoyable spaces, comfortable and inclusive with particular attention to chromatic choices according to the concepts of chromotherapy. The University's and residential buildings' accessibility should be improved, with some of them, including study rooms, being open 24h per day.

NATURE AND ECOSYSTEMS

In order to strengthen biodiversity, the UNIBS pursues to increase green areas by at least 1 % per year, reduce waste per capita by at least 25 % and overall water consumption by at least 15 % (free water points across the University estate) per year and adopt the ZeroWaste Campus perspective.

HEALTH AND WELLNESS

Smoking and the use of tobacco products is prohibited in all university areas, including outdoors.

CULTURE, LEARNING AND RESEARCH

The UNIBS just launched the «Research and Documentation Center for the Sustainable Development Agenda 2030» in order to carry out and coordinate research pertaining to sustainability and help accelerate progress towards the SDGs together with governments, businesses, and civil society.



www.unibs.it/ateneo/vita-dell-ateneo/seminars-sustainable-development-goals



■ Renewable Energy Installations © University of Brescia, Italy

IN PRACTICE: UNIVERSITI PUTRA MALAYSIA

The University Putra Malaysia (UPM Malaysia) organized the programme «MyTreeVolution, National Forest Restoration Project» together with the Ministry of Higher Education, where 550 trees of Karas species were planted on campus towards green growth to improve sustainability and endurance.

The programme was led by Fellows of the CEO@Faculty Programme 2.0 which comprised a group of lecturers from public universities in Malaysia and aims to raise public awareness of green earth act as a platform for knowledge exchange and collaboration among public universities, government and private agencies.

UPM cooperated with the Team Scomi's CSR of Scomi Group Bhd and the UPM Students' Association. Director of the programme, Dr. Samsuzana Abd Aziz, said, it aims at greening the environment, while all trees planted are monitored periodically with information technology, which is publicly accessible.



by Syifarida Zaki, Universiti Putra Malaysia

■ MyTreeVolution National Forest Restoration Project © UPM

IN PRACTICE: POLITECNICO DI MILANO

Politecnico Di Milano (POLIMI, Italy) pursues to reorganize the sustainability strategy at the University towards a holistic view of commitment to community and campuses, facing new challenges in the quality of life, health and well-being. The sustainability strategy is defined via six objectives, which include the communication of sustainability, engaging the community, CO₂ emissions reduction as well as promoting sustainable mobility, sustainable waste management and circular economy and energy efficiency. A selection of activities realized at POLIMI:

COMMUNICATION - STORYTELLING

In 2017 the POLIMI launched an initiative for «self-mapping» their commitment to the United Nations Sustainable Development Goals through an online survey, in order to integrate sustainability as a pillar in all activities of education, research, management and partnerships. The survey resulted in 119 courses, 160 research projects and activities and 18 institutional activities mapped with the SDGs.

ENGAGING THE COMMUNITY

The honours programme «Engineering for Sustainable Development» is a parallel training programme offered to Masters of Science students with the aim to enhance and develop systemic and cross-discipline skills of future engineers to understand and evaluate global challenges so that they may operate effectively in the field of sustainable development.

SUSTAINABLE MOBILITY

POLIMI promotes sustainable mobility by e.g. improving and facilitating pedestrian mobility on campus, introducing bike parking policies and car sharing agreements for discounted prices and providing electric cars and scooters for internal usage.



■ Renewable Energy Installations © Politecnico di Milano, Italy

CIRCULAR ECONOMY

POLIMI conducts a separate waste collection on campus, several recycling projects and campaigns and supports the reduction of plastic use and water conservation through installation of water houses and fountains on campus and a raingarden. Furthermore, POLIMI launched a Bike Repairing Initiative in 2014.

▶ www.campus-sostenibile.polimi.it

IN PRACTICE: UNIVERSITY OF IOANNINA

The University of Ioannina (UoI, Greece) is a medium-sized public Greek University, located at the outskirts of Ioannina city, including 15 academic Departments on a campus of 3,350 acres and with premises of 225,620 sq.m., 14,988 active students and more than 800 members of academic, research, laboratory and administrative staff. Since 1998, the University of Ioannina (UoI, Greece) has established a system of Integrated management of solid wastes and has developed the full recycling of paper, plastics, metals, glasses, organic parts and electronic materials.

ORGANIC WASTE MANAGEMENT

For food and University restaurants, where 4,500 students and staff members have lunch and dinner daily, the UoI has established a composting system in order to transform the wastes into compost for garden purposes.

LABORATORY WASTE MANAGEMENT SYSTEM

Laboratory waste is an important category of high risk waste, as in most cases it includes chemicals with high toxicity: individual utilized organic solvents (e.g. acetone, dichloromethane), mixtures of organic solvents (e.g. n-hexane-ethyl acetate), aqueous solutions (acids, bases, inorganic salts), aqueous mixtures (e.g. acetonitrile-water), solid wastes, broken glassware, plates, chromatographic materials (silica gel), dehydrating salts (sodium sulfate, calcium chloride) and blemished solid chemicals.

In the University of Ioannina, dangerous wastes are produced, including chemicals, biological wastes, radioactives and glassware.

Since 2003, the UoI has implemented the Laboratory Waste Management System. The laboratory waste is collected in the laboratory space and then stored in temporary containers. A company specialized in the management of laboratory and hazardous waste with qualified staff controls each bucket in accordance with applicable national and European standards and then receives them.

This work analyzes in detail the integrated system and describes all the physicochemical and biological procedures involved in recycling and composting as well as the benefits for campus environment.

The management of the biological and radioactive wastes takes place under the responsibility of each laboratory because of their special removal and destruction regulation provided by legislation. The destruction of glassware takes place in glass crusher, which should be fully free from the presence of organic solvents or other toxic substances.

► <http://users.uoi.gr/deapi>

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