Developing Skills for Future Leaders

2015 Sustainable Campus Best Practices from ISCN and GULF Schools

Report presented at the Global University Leaders Forum (GULF) session of the World Economic Forum Annual Meeting 2015, Davos-Klosters, Switzerland

ISCN
International Sustainable Campus Network

In collaboration with **GULF**, the Global University Leaders Forum of the WEF.

Table of Contents

Foreword

The world is at a critical juncture where social, environmental and economic problems require transformative solutions. There is no more time for delay. That is why I am pleased to support the International Sustainable Campus Network's new report for the World Economic Forum meeting in 2015.

The world's leading universities have a critical role to play in solving these types of complex problems, not only through the discovery of technological solutions, but also through the education of future business leaders.

As the President and CEO of the World Business Council for Sustainable Development (WBCSD), I am often asked if business can be a positive force for transformation. I say, "Yes" – and the WBCSD and our member companies have backed this up with Action2020.org. Action2020 is a global platform for sustainability in action. It's the roadmap for how business can positively influence environmental and social trends while strengthening their own resilience to issues like climate change, demographic dynamics and skills shortages.

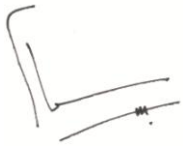
To facilitate the implementation of Action2020, companies also need a new kind of leader, a role that demands new skills and the ability to work with, and leverage, collaborative, multi-stakeholder networks.

Business schools have an important role to play in educating future leaders. Encouragingly, business education for sustainability is part of graduate and undergraduate curriculums of most business schools. There are also a variety of initiatives to support this trend such as the UN Global Compact's Principles for Responsible Management Education (PRME), and the BloombergBusinessWeek ranking of Green MBA programs. But too few business schools take sustainability seriously enough, and the result is that many continue to teach business-as-usual plus a limited amount of exposure to sustainability. That is just not sufficient.

At WBCSD, we encourage business faculties to integrate sustainability into the core of their strategy and operations. We also emphasize the critical engagement of other faculties such as engineering, psychology, law, natural sciences, among others. Sustainability leadership requires transdisciplinary skills.

To ensure that this happens, the WBCSD is looking forward to a dialog with leading universities, especially the members of the International Sustainable Campus Network, to identify the right skill sets of future leaders, and to ensure the core integration of sustainability into all academic curricula.

Sincerely,



Peter Bakker
President and CEO
World Business Council for Sustainable Development

Executive Summary

Meeting our generation's current needs without degrading the outlook for future generations is a challenging endeavor in our changing world of steady population growth and rapid urbanization. Sustainable development has been recognized as an urgent topic across all of our society, including the corporate world where it is often addressed under the ESG label (Environmental, Social, and Governance issues).

In last year's Global Risks Report published by the World Economic Forum, seven of the ten most severe risks identified pertained to environmental, social, and governance issues: water crises, failed climate change mitigation and adaptation, more extreme weather events, income disparities, food crises, political and social instability, and global governance failure. We expect that this year's edition of the Global Risks Report will have similar conclusions.

Finding practical, applicable solutions to issues of this magnitude requires the best of today's knowledge base coupled with the ability to implement large changes in public policy and industry, and it needs future leaders who are aware of the challenges and equipped to manage disruptive change. Academic institutions have much to offer in enhancing knowledge and preparing leaders of tomorrow. They can play a creative role best in a context of strong collaboration—collaboration between schools and with other organizations, including corporate partners.

To further such collaboration and experience exchange, this report summarizes cases of best practice initiatives that increase students' awareness and skill sets on sustainability issues. The cases were contributed by member schools of the International Sustainable Campus Network (ISCN) and the World Economic Forum's Global University Leaders Forum (GULF), which have partnered in developing and disseminating the ISCN-GULF Sustainable Campus Charter.

The foreword to this report, written by Peter Bakker, President and CEO of the World Business Council for Sustainable Development, and the discussion of the ISCN University-Corporate Dialogue Initiative in the next chapter illustrate that universities and the private sector have much to gain from dialogues about which sustainability skills need to be developed in future business leaders, and how this can be achieved. This will allow both sides to enhance their contributions to a sustainable future. The case summaries presented in this report are intended to inspire further academic-private sector dialogues, and to enhance experience exchanges between leading schools around the world.

Buildings That Teach

Awareness and skills on sustainability can be supported by an organization's infrastructure itself, in addition to the work performed in it. Cases include the House of Natural Resources, a showcase building by **ETH Zurich** that demonstrates the potential of innovative, sustainable, and reliable timber buildings. The project raises awareness of timber-based sustainable building design, including a number of structural systems implemented for the first time in an actual building. The **Johns Hopkins University** Undergraduate Teaching Building ignites dialogues between students, faculty, and staff on sustainability by linking built and natural environments and deliberately balancing automatic efficiency systems with explicit user education and notification. **Keio University** encourages students from different fields to participate in multidisciplinary teams using its Co-Evolving House, a net-zero energy building equipped with smart technologies, as a research site. This experimental construction is designed to adapt to inhabitants' lifestyles and to visualize environmental information for them. Supporting "visual literacy"

on building sustainability is also a key goal of the **University of Melbourne**'s new School of Design building. With pedagogy as its driving design philosophy, the building provides displays on sustainability features of different types of indoor spaces and allows its users to witness how the building interacts with its environment through all its façades. The **University of British Columbia**'s Centre for Interactive Research on Sustainability (CIRS) embodies the principles of regenerative, net-positive sustainability and acts as a research platform that enables students, faculty, partners and community members to advance sustainable building and urban development practices, from the work/live space through the neighborhood scale.

Campus as a Laboratory

Beyond individual buildings, an entire campus can be used in an integrated, systematic way as a test bed for innovations and to create research and teaching opportunities. Cases include the Campus as Lab program at **Princeton University**, which includes a research seed fund to encourage faculty to carry out sustainability research onsite with students from across academic divisions. For example, Princeton's cogeneration plant serves as laboratory for coursework on energy efficiency and water conservation. The EcoCampus initiative at **Nanyang Technological University** aims to transform its campus into a testing ground for green technologies. The initiative integrates corporate partnerships and student engagements, and will cut energy and water use as well as carbon footprint and waste on campus by more than a third. The Living Laboratory for Sustainability program at the **University of Cambridge** provides opportunities for staff and students to use the estate to test and research environmental issues. In the process, it also benefits operations, for example, by reviewing best practices on building post-occupancy evaluation. The **University of Cape Town** has incorporated evaluation of the university's own carbon footprint into coursework, challenging students to develop recommendations for reductions. This includes interviews students conduct with data holders in the administration, which also increase staff awareness on sustainability. The **University of Liechtenstein**'s UniGO sustainability program uses the whole university as a research and teaching opportunity. The program aims at better understanding the university as a learning organization, improving students' understanding of organizational sustainability transformation.

Teaching by Example

Another set of initiatives also links education and research with campus operations, but with a stronger emphasis on practical implementation. Cases include the Scotty Goes Green Office Certification Program at **Carnegie Mellon University**. Using the school's Scottish terrier mascot as its brand, the program certifies offices within the university that demonstrate environmental practices. The program engages students and provides them with experience for later use in the workplace. The Green University initiatives at **Chulalongkorn University** include shade improvement on campus by developing green areas, some of which are achieved via student and staff participation in tree-planting activities as part of the university's "Happiness" strategy. The Council for Student Sustainability Leaders at **Harvard University** advises University officials on Harvard's sustainability commitment including its University-wide Sustainability Plan. The students receive unparalleled small-group access to international thought-leaders, such as Christiana Figueres, the Executive Secretary of the United Nations Framework Convention on Climate Change. The SUSTAIN IT! Initiative at **Freie Universität Berlin** enables students to gain hands-on experience with greening the university, including action days for planting spring flowers on campus or avoiding take-out paper coffee cups. It also contributes to sustainability curriculum development. The **University of Oxford** involves students in implementing the University's sustainability strategy. They volunteer and receive training as Green Impact Project Assistants who engage staff on sustainability issues, or Student Switch Off Ambassadors who motivate their peers to save energy.

Cross-Curricular Integration

"Chinese walls" between disciplines can be major stumbling blocks to innovative and applicable sustainability research and education, and cutting-edge sustainability degree programs alone don't ensure that every student leaving the university has a meaningful understanding of sustainable development. Overcoming such hurdles, **Anglia Ruskin University** has made the commitment that "sustainability will be a feature of all our students' experience." Its Education for Sustainability (EfS) team works with course leaders across all faculties to embed sustainability in their curriculum, monitored through the Academic Office and course approval process. Sustainable Ca'Foscari aims to include sustainability in all activities at **Ca'Foscari University**. This includes its Sustainable Competencies Project, which targets the student body as a whole and offers them the opportunity to gain an extracurricular credit, as well as supporting students who volunteer with nonprofits. As a joint initiative between two neighboring schools, **EPFL**, which specializes in engineering and architecture, and the **University of Lausanne** (UNIL), which is active in humanities and social sciences, are partnering on an interdisciplinary, mandatory Global Issues curriculum. Each course is co-taught by a social science teacher from UNIL and an engineering science teacher from EPFL. The goal of the Energy Studies Minor at **MIT** is to integrate undergraduate energy education across all schools, departments, and programs that MIT offers. Now the third largest minor at MIT, the program equips students with the skills needed to make well-informed decisions on energy and sustainability. At the **National University of Singapore**, sustainability education is not restricted to the classroom but interwoven throughout daily life. Living-learning residential sustainability programs provide lectures, tutorials, and seminars, as well as project mentoring by industry or academic professionals.

Holistic Approaches to Sustainability Topics

Programs that address topical or regional sustainability issues in a holistic manner that cuts across traditional disciplines provide critical educational opportunities, in addition to innovative, applicable solutions. At **De La Salle University – Dasmarinas** the Cavite Development Research Program applies a 50-year horizon for understanding sustainability issues pertaining to agriculture, eco-tourism, governance and cultural heritage in the Province of Cavite, where the school is located. **Georgetown University** has created the Georgetown University Energy Price to tap the imagination, creativity, and competitive spirit of communities around the country. This $5 million prize has already supported around 100 communities in energy-efficiency planning. The **Korea Advanced Institute of Science and Technology** (KAIST) has joined forces with the fossil fuel provider Saudi Aramco to establish a joint center on CO_2 management, where researchers and students from multi-disciplinary backgrounds develop integrative solutions to reduce anthropogenic CO_2 emissions. An interdisciplinary seminar series at the **University of Gothenburg** is dedicated to multiple perspectives on climate change. Topics discussed include issues of food, health, nuclear power, divestment of university funds from the fossil fuel sector, and linkages between climate adaptation and gender. In response to **Yale University**'s 2010–2013 Sustainability Strategic Plan, a course enabled students to develop a Yale Sustainable Stormwater Management Plan 2013–2016 in consultation with Yale staff. This generated a campus-wide policy document, and gave the students invaluable hands-on experience for life after graduation.

We are looking forward to continuing exchanges on innovative solutions that increase the sustainability awareness and skills of future leaders at the next ISCN Conference, hosted June 17–19, 2015, by the University of Hong Kong.

ISCN University-Corporate Dialogue Initiative

The ISCN University-Corporate Dialogues Initiative is working to understand and develop the sustainability-related skills that leaders in general management positions need to make integrated and holistic decisions that support the sustainable development of their companies. While the educational needs of sustainability professionals and technical sustainability experts are well supported by higher education offerings, there are fewer resources available to develop these skills for a broader group of future leaders. To address this gap, business schools, as well as schools focused on engineering, natural science, and social science education, must incorporate sustainability topics more deeply into the education of each student.

The leading universities that participate in the ISCN have many resources to offer that enhance students' sustainability awareness and skills, some of which are summarized in this report. By discussing with corporate leaders which skill sets they think are essential for future high-potential managers, we will ensure that academic and corporate representatives have a shared understanding of what both sides can offer and what they need concerning a talent pool equipped to handle sustainability challenges.

The need for holistic systems thinking

Once we understand which skill sets future business leaders need to make sustainable and holistic decisions, we can identify and fill the gaps in our universities' educational offerings. While there are numerous and slightly different definitions of sustainable development, all of them require that we understand the world as an interconnected system, linking, for example, pollution from North America to air quality in Asia, or pesticides sprayed in Argentina to the health of fish stock off the coast of Australia. All sustainability skills need to be rooted in this kind of systems thinking, which evaluates synergies and trade-offs.

Similar interconnections are highly relevant in today's corporate environment. Companies constantly need to evaluate decisions against competing interests, such as employee requests for enhanced health insurance or retirement benefits that may come at a significant cost to other corporate stakeholders, or new eco-friendly product lines that may increase cost but also meet consumers' demand. How does a corporate executive evaluate these trade-offs and make decisions that include all social, environmental, and economic factors in a balanced and holistic manner?

Determining necessary skills for sustainable decision making

To understand more precisely which sustainability-related skills can help the leaders of tomorrow make more systemic and sustainable decisions, there are numerous starting points available for consideration. They include the Sustainability Literacy Test, a survey initiative on sustainability competences by students that could be further developed with a focus on management-relevant sustainability skills sets, and suggested skill sets that can serve as starting points for further development, such as the one highlighted by Businesses for Social Responsibility in their report "Sustainability and Leadership Competencies for Business Leaders."

We plan to prepare an overview of similar studies and frameworks, and to collect information from key stakeholder organizations regarding the skill sets they feel enable holistic and sustainability-focused decision making. We anticipate that the resulting list will include skills addressing at a minimum the following areas:

1) What is sustainability? What is systemic thinking?
2) Key elements of sustainability literacy
3) Main issues and trends that hinder sustainable development
4) Personal engagement in sustainability

A concrete skill set covering such and related areas, depending on the studies' overview and first stakeholder inputs, will then be developed and validated with business representatives who have visibility and/or responsibility in hiring future leaders for their companies.

Filling relevant skills gaps

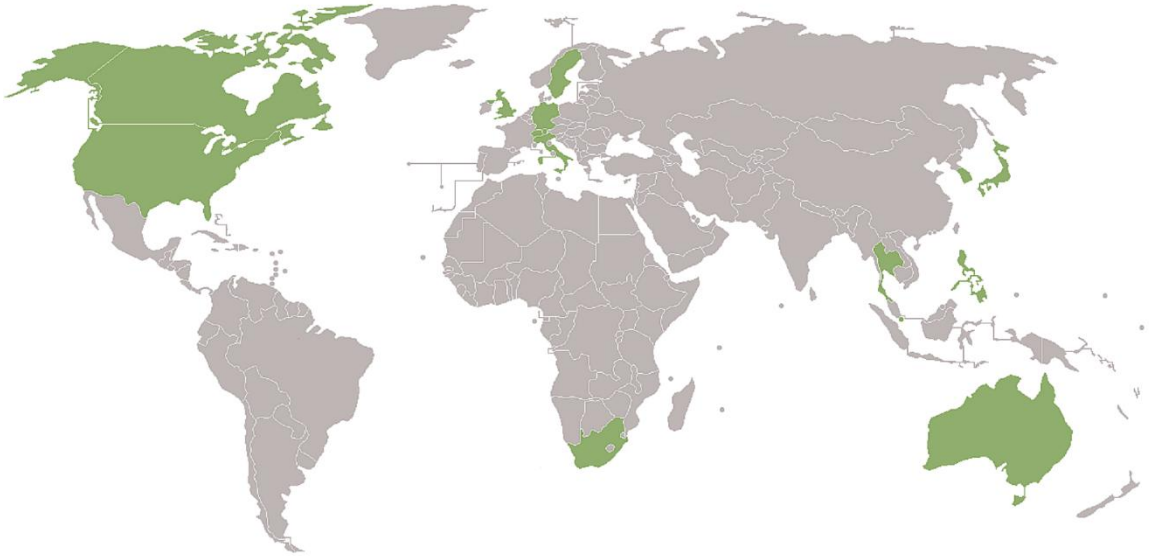
We will then clarify how the skills we've identified as necessary to support sustainable development decisions can be taught and transferred through university programs. This could include teaching elements/sequences for use in dedicated sustainability courses or other existing curricula, templates for Massively Open Online Courses ("MOOCs"), or frameworks for interdisciplinary research and demonstration projects. The case examples from ISCN member schools summarized in this report provide a foundation upon which such enhanced educational offerings could be built.

Finally, based on the validation of the skill set with business representatives, we aim to develop use cases for these types of skills in actual business settings to illustrate the positive impact that teaching this skill set can have on the employability of our students.

The ISCN University-Corporate Dialogue Initiative is led by André Schneider, Vice President Resources and Infrastructure, EPFL, and its members include: Angelo Riccaboni, Rector, University of Siena; Joseph Mullinix, Deputy President Administration, National University of Singapore; Eugenio Morello, Assistant Professor Urban Design, and Raffaela Cagliano, Professor School of Management, Politecnico di Milano; Joy Lam, Sustainability Office, The University of Hong Kong; and Matthew Gardner and Bernd Kasemir, ISCN Secretariat Team at Sustainserv, Boston.

25 Schools Contributing Best Practice Cases

from 15 countries on 5 continents



- Anglia Ruskin University
- Ca' Foscari University of Venice
- Carnegie Mellon University
- Chulalongkorn University
- De La Salle University - Dasmarinas
- Ecole Polytechnique Fédérale de Lausanne (EPFL) *
- Swiss Federal Institute of Technology (ETH Zurich)
- Freie Universität Berlin
- Georgetown University
- Harvard University
- Johns Hopkins University
- Keio University
- Korea Advanced Institute of Science and Technology (KAIST)
- Massachusetts Institute of Technology (MIT)
- Nanyang Technological University
- National University of Singapore (NUS)
- Princeton University
- University of British Columbia
- University of Cambridge
- University of Cape Town
- University of Gothenburg
- University of Lausanne *
- University of Liechtenstein
- University of Melbourne
- University of Oxford
- Yale University

* Joint submission

ISCN and GULF member ISCN member GULF member

Chapter 1:
Buildings that Teach

ETH Zurich

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

2015 ISCN-GULF Best Practice Case Study

ETH House of Natural Resources

The ETH House of Natural Resources is a showcase building for the implementation of hardwood in a sustainable, efficient and reliable timber construction, located in Switzerland.

Overview:

The building incorporates many innovative aspects, in addition to the structure in hardwood, such as a high-end monitoring concept and a test setup for innovative façade and glazing technologies. The structural behavior of the innovative structural system will be studied in full detail via full-scale tests in the laboratory and on the actual construction site, as well as through extensive monitoring during the construction and operation phase. The gained knowledge will be exploited to further improve the efficiency of these structural systems and to further unlock the full potential of timber structures.

ETH House of Natural Resources

Communication:

The results of this research project will be used to develop advanced numerical and analytical models to facilitate the design of innovative, sustainable and reliable timber buildings. The advantages of the implementation of hardwood are made visible to researchers and practitioners and will lead to a faster implementation of hardwood in other building projects.

Lessons Learned:

In the ETH House of Natural Resources several structural systems are implemented for the very first time in an actual building. This requires extra understanding, patience and effort from all parties involved. The first experiences gained with the new systems give an insight about the special requirements and help to build a basis for the development optimized processes.

Contact:

Claude Leyder
PhD Student / Research assistant
ETH Zurich
leyder@ibk.baug.ethz.ch

ISCN International Sustainable Campus Network

Johns Hopkins University

2015 ISCN-GULF Best Practice Case Study

Undergraduate Teaching Laboratories

The 105,000 square foot multidisciplinary teaching and research laboratory facility for the Natural Sciences Department is an addition to the existing Mudd Building for biology research on the Homewood Campus of Johns Hopkins University in Maryland, USA.

Overview:

The Johns Hopkins University Undergraduate Teaching Laboratories Building simply and skillfully unifies the built and natural environments, resulting in a facility that showcases energy efficiency, sustainable site development, and interior environmental quality.

Undergraduate teaching laboratories

The building gently curves to embrace the wooded hillside, providing unobstructed north facing views to deliberately connect the labs with the external landscape. The area immediately adjacent to the building also serves as a rain garden which captures the site and roof water runoff to maximize groundwater recharge and act as a buffer for downstream water bodies connected to the Chesapeake Bay Watershed.

Laboratory buildings traditionally use a lot of energy. One of the early sustainability goals for the UTL was to reduce the energy use by more than 50% from the average of other laboratory buildings on campus. To achieve this goal, the building integrates a highly efficient and innovative ventilation system which achieves a high level of energy savings while also maintaining a high level of safety.

The building has already achieved enough LEED points to achieve Gold certification and is poised to achieve Platinum, the highest level of LEED certification and the first that JHU would boast.

Communication:

The UTL building has already won several design awards and has been featured on various tours. Its design has ignited campus dialogue among students, operations staff, safety officers, faculty and researchers with regard to its energy efficiency measures, innovative use of materials and deliberate consideration of the surrounding environment.

In order to ensure occupant comfort and safety while achieving exemplary energy efficiency, students and staff are trained to lower fume hood sashes, and clean hoods to utilize lab decommissioning switches. The University is also integrating a comprehensive signage program to educate users on the building's general and specific sustainability features.

Lessons Learned:

- Establish sustainability goals at the earliest stage of the project.
- Use a design team with extensive laboratory design experience.
- Establish an integrated design team with architects, engineers and contractors working together to achieve common goals.
- Use of energy efficient measures with a high degree of user participation paired with education and training.
- Using the LEED rating system early and often as a design tool and checklist.
- Use of automatic energy efficient systems with appropriate user education and notification.
- Use of robust and durable materials.
- Evaluate true materials needs to reduce embodied energy, such as polished concrete instead of VCT and other floor coverings, or exposed structure and utilities.
- Use materials creatively, such as light colored finishes that enhance ambient light levels.
- Innovative Pedagogy: views of the landscape encourage student's connection with nature to help influence how they might integrate nature and natural systems into their present and future work.

Contact:

Ashley Pennington
Senior Program Manager
Johns Hopkins University
apennin3@jhu.edu

Keio University

2015 ISCN-GULF Best Practice Case Study

Keio Co-Evolving House

The Keio Co-Evolution House, originally constructed as part of an experimental research and demonstration initiative for the "Net-zero Energy House of 2030" program under Japan's Ministry of Economy, Trade and Industry, is an experimental construction of a net-zero energy house equipped with smart technologies.

Overview:
The overall objective is to develop a smart, evolving system that can adapt to lifestyles and behaviors of inhabitants to save energy. It aims to realize Life Cycle Carbon Minus housing, enhance the health of inhabitants, and to offer a solution to global environmental issues in Asia.

The Keio Co-Evolving House

Achievements and current development:

1) Working on quick housing construction using parametric 3D models of large panel CLT (cross-laminated timber material that reduces life-cycle carbon dioxide emissions)
2) Analyzing relationships between health, comfort, lifestyle, behavior and energy consumption using data from short-stay experiments
3) Optimizing the demand and supply of electricity by changing the balance of AC and DC power demand
4) Enhancing house design and interior configuration assisted by environmental simulations and building information modeling
5) Utilizing method for smart water saving and maintenance of the green wall through water saving devices and rainwater tank for irrigation

A multidisciplinary joint research team was established between the Graduate School of Media and Governance (SFC), where cutting-edge research on various environment-related issues is carried out, and the Faculty of Science and Technology. Students specializing in different fields are encouraged to work together to seek possibilities of applying their studies and research in society.

Communication:

In January 2014, the projected was presented at the "ENEMANE House 2014" exhibition where reactions and comments from 6,745 visitors were gathered during the three-day exhibition. 12 articles in newspapers and magazines, 14 reports on websites were published, and it was presented in 3 additional exhibitions through presentation panels displaying the model house. The input received has helped us to identify specific themes for further technological development and has become a driving force to broadly organize the research consortium. As a result, 16 companies are now participating in this three-year research project.

Lessons Learned:

Although still at an early stage, the project has already received huge interest and produced positive outcomes.

Research based on many kinds of data relating to the lifestyle and behavior of building users creates opportunities for collaboration with the academic and industrial sectors. The work has created a large R&D consortium with more than 30 companies who are generating new ideas on lifestyles and the efficiency of housing technologies, and the collaboration is beneficial to all involved.

Making connections between building information modeling and home energy management systems has been an effective and important way to combine environmental factors of houses with lifestyle or behavioral factors of inhabitants. With this in mind, the goal is to achieve more impressive ways to visualize the environmental information in a house, and more interactive and smart control of devices in order to create integrated systems that can co-evolve with the users of the building.

Contact:

Yasushi IKEDA
Professor of Graduate School of Media and Governance
Keio University
yasushi@sfc.keio.ac.jp

University of Melbourne

THE UNIVERSITY OF MELBOURNE

2015 ISCN-GULF Best Practice Case Study

Melbourne School of Design

The new Melbourne School of Design, located at the centre of the University of Melbourne's Parkville campus in Australia, is the University's first 6-Star Green Star building and is already inspiring students and industry through this achievement. This new academic centre for the built environment will continue to inspire, making its performance transparent and open to research.

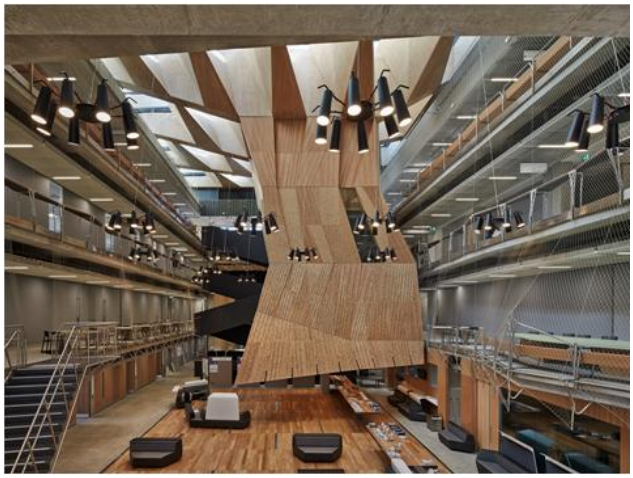
The building's driving design philosophy is pedagogy – the science and art of education. The facility showcases how the passive and active elements of the building work together to provide comfortable, healthy and attractive places for people that are cost effective to operate.

The building has been designed to connect to its users (The Faculty of Architecture, Building & Planning and Melbourne Sustainable Society Institute), from the information provision to the design of the circulation to allow people to enjoy the light, timber, and atmosphere of the building. There are many informal spaces where students can sit, study, read, contemplate and converse. With the levels of monitoring (energy, water, CO_2, humidity, temperature and flux), reporting and sensors in the building students can learn how the building performs at different times of the year, with different levels of occupancy. The entire design and construction process has been carefully documented and recorded and members of the design team have given lectures to students of the Faculty of Architecture, Building & Planning on the design and construction process involved in creating the building and the lessons that have been learned. This information is also being shared with the wider architectural and construction communities.

Melbourne School of Design

ISCN International Sustainable Campus Network

The new University of Melbourne's Melbourne School of Design will foster visual literacy through the integration and provision of information on the green features of the building such as: a 750,000 litre water tank for use in chillers, toilets, irrigation and precinct use; natural ventilation; LED lighting throughout; and high levels of natural light, views and displacement ventilation. This is combined with the ability to see these features through exposed services and integrated sensors to allow stakeholders and students to witness how they perform. Students are able to look in detail at four different spaces – teaching, theatre, meeting and exhibition – and all four façades, enabling them to understand what is coming in through the walls, affecting the fresh air, temperature and humidity. The hard and soft landscape has been integrated closely with the architecture creating great places for students to meet, whilst minimizing local heat island effects.



Melbourne School of Design

Buildings don't just need to be structures that keep users comfortable and provide a work space, they can be places that teach, entice, inspire. Just thinking through how things are connected, the use of spaces for interactions, casual encounters, adding value through view, connection to nature can support increased productivity, creativity, idea development, problem resolution and occupant well-being. The building can teach through overt use of and display of its systems, though effective monitoring and use of that information together with user input to build an effective relationship with the building. A building is only as good as the opportunities it provides through its location, placement and design to support and enhance the ability for all its stakeholders to thrive. The great opportunity for the Melbourne School of Design is not just to teach and inspire the next generation of architects and construction professionals about best practice sustainable design but also for buildings like the MSD to showcase how buildings can foster learning for the whole University.

Contact:
Chris White
Executive Director, Facilities and Sustainability
University of Melbourne
cwwhite@unimelb.edu.au

University of British Columbia

2015 ISCN-GULF Best Practice Case Study

Centre for Interactive Research on Sustainability

Adding to over 20-years of sustainability achievement at the University of British Columbia, the Centre for Interactive Research on Sustainability is one of North America's most innovative high-performance buildings that, as UBC's first living lab project, acts a research centre as well as a research platform that enables students, faculty, partners and community members to advance sustainable building and urban development practices, from the work/live space through the neighborhood scale.

Overview:

At the University of British Columbia (UBC), we are committed to using the campus as a societal test-bed, exploring a regenerative approach to environmental and human wellbeing.

The Centre for Interactive Research on Sustainability (CIRS) exemplifies this commitment by enabling innovations related to sustainable building and urban development and by accelerating the adoption of these practices in society. As an interdisciplinary research centre, CIRS is home to multiple research groups that advance sustainability research, education and operations. The CIRS building, designed according to principles of regenerative design, is itself along with the inhabitants the subject of ongoing research projects.

UBC's Centre for Interactive Research on Sustainability (CIRS)

The building's robust network of sensors and controls facilitates performance tracking, reporting, continuous optimization protocols and collection of research data. Student inhabitants benefit from working and studying in the very building on which they conduct applied research.

Buildings like CIRS – that embody the principles of regenerative, net-positive sustainability – are deeply transformative, catalyzing sustainability innovations and the establishment of higher sustainability goals.

While green buildings try to reduce harmful environmental impacts, regenerative buildings seek to improve both environmental and human wellbeing of the communities they are situated within.

Communication

CIRS models best practices in engagement and collaboration, enabling partners to reach common sustainability goals and develop a multitude of innovative strategies, technologies and policies that serve as springboards for commercialization and application at local, regional and global levels.

In addition to traditional academic publications, CIRS produces materials such as design guidelines and case studies that stimulate further discourse across the public and private sectors.

CIRS helped inform the dialogue around the future of sustainability at UBC that led to the development of UBC's new 20-year Sustainability Strategy that envisions regenerative sustainability embedded across the university's entire campus, throughout operations, infrastructure, teaching, learning and research and the UBC community.

Lessons Learned

1. There is a vast interest in closer collaboration across the academic and industry divide. Such collaboration can provide applied research opportunities and is of great interest to students, faculty and private partners as they can use research findings to deliver more innovative projects that can change the world. Such research capacity in not available in the private sector alone.
2. As a living lab, CIRS goes a step beyond pure laboratory environment by enabling research testing in an operational, inhabited and complex setting thus delivering more realistic conditions for assessments.
3. CIRS directly contributes to decision-making feedback loops – considering UBC's ownership of the very building that research is conducted on, the university is able to continually assess, apply findings and ultimately improve building performance. These findings can then be shared with external communities. For example, several models that were used to design the building have been improved, resulting in the improvement of overall building performance and better data for future projects.

Contact

Victoria Smith
Director, Communications and Community Engagement
UBC Sustainability Initiative
victoria.smith@ubc.ca

Chapter 2:
Campus as a Laboratory

Princeton University

2015 ISCN-GULF Best Practice Case Study

The Princeton Campus as Living Lab: A Pathway Toward Integrating Sustainability into Research & Education

The "Campus as Lab" initiative at Princeton University, USA, takes meaningful steps toward integrating campus sustainability into research and education across disciplines to solve pressing global human and environmental challenges.

Overview:

Princeton University's greatest sustainability contribution resides in educating its students and creating new knowledge. Over 250 courses identified as sustainability-related are now offered across Princeton's curriculum. With the campus serving as a living laboratory all students have the opportunity to investigate the complexities of meaningful sustainability impact.

In 2008, Princeton launched its first Sustainability Plan and is on track to achieving its CO_2 emissions reduction goal of 1990 levels by 2020, regardless of significant growth in built space and with no purchase of offsets. At that time a pilot term fund for campus-based projects and research was established. Since then, the pilot fund has supported over 60 faculty projects and student or staff campus-based initiatives. For example, Princeton's state-of-the-art cogeneration plant serves as a laboratory for coursework focused on energy efficiency and water conservation, while students and faculty study renewable energy optimization using its 5.3 megawatt solar array. Campus green roof systems and a restored stream corridor have each been the focus of senior thesis research.

Given the success of the 2008 pilot fund, in 2014 a renewed research seed fund for Campus as Lab Innovation was launched to encourage faculty to carry out sustainability research onsite with undergraduate and graduate students from across Princeton's academic divisions. Four new projects were funded to investigate topics ranging from low-cost campus sensor networks to comprehensive watershed modeling. The success of the pilot fund and the renewed seed fund suggests high faculty and student interest in onsite sustainability research programs.

Princeton campus

Communication:

Given its focus on studying sustainability onsite and across disciplines, the Campus as Lab Innovation Fund provides a formal platform for dialogue bridging academics and operations, whether in the classroom or through collaborative research. Through partnerships with non-profit and public entities conversations have also extended into the greater Princeton community of which the University is a part, environmentally, socially and economically.

Additionally, a permanent exhibit space in the university student center, drawing thousands of campus and community members weekly, encourages discourse by featuring campus-as-lab interactive displays designed collaboratively by students, faculty and staff.

Lessons learned:

It is the responsibility of major research institutions to demonstrate meaningful impact when it comes to addressing humanity's greatest challenges, and to assure that even the most resource-constrained campuses have access to sound information. We acknowledge that campuses acting independently on behalf of sustainability have limited impact, but collectively higher education can influence national culture and policy. The Campus as Lab approach provides a powerful platform for meaningful local and collective impact.

Providing dedicated seed funding for faculty to apply their research expertise to the campus setting is critically important, particularly when external research funding is constrained.

Innovative approaches to collaboration across academic and operational units on campuses are necessary. Clear and active communication channels as well as dedicated administrative support linking campus operational opportunities with academic pursuits, are a prerequisite to success.

Baseline and ongoing monitoring of campus environmental conditions is critically important both when considering long-term campus planning efforts, as well as for supporting more advanced academic research.

Contact:

Shana Weber
Director, Office of Sustainability
Princeton University
shanaw@princeton.edu

Nanyang Technological University

2015 ISCN-GULF Best Practice Case Study

EcoCampus @NTU

A fast-rising university that ranks among the world's top 40, Nanyang Technological University (NTU Singapore) is ramping up its efforts to transform into one of the most environmentally friendly university campuses in the world.

Under the new EcoCampus initiative, NTU aims to achieve a bold 35 per cent reduction in its energy and water usage, carbon footprint and waste output by year 2020.

The EcoCampus initiative is a natural progression for the university, as NTU is already an internationally recognized leader for sustainability research, having attracted more than S$1.2 billion in competitive research funding in the area.

Sustainability is high on the university's priorities. It is one of the five major research areas or "peaks of excellence" in which NTU aims to make a global mark. Currently, NTU has a number of world-class energy-related research institutes and academic centers of excellence such as the Earth Observatory of Singapore (EOS), the Energy Research Institute @NTU (ERIAN) and the Nanyang Environment and Water Research Institute (NEWRI).

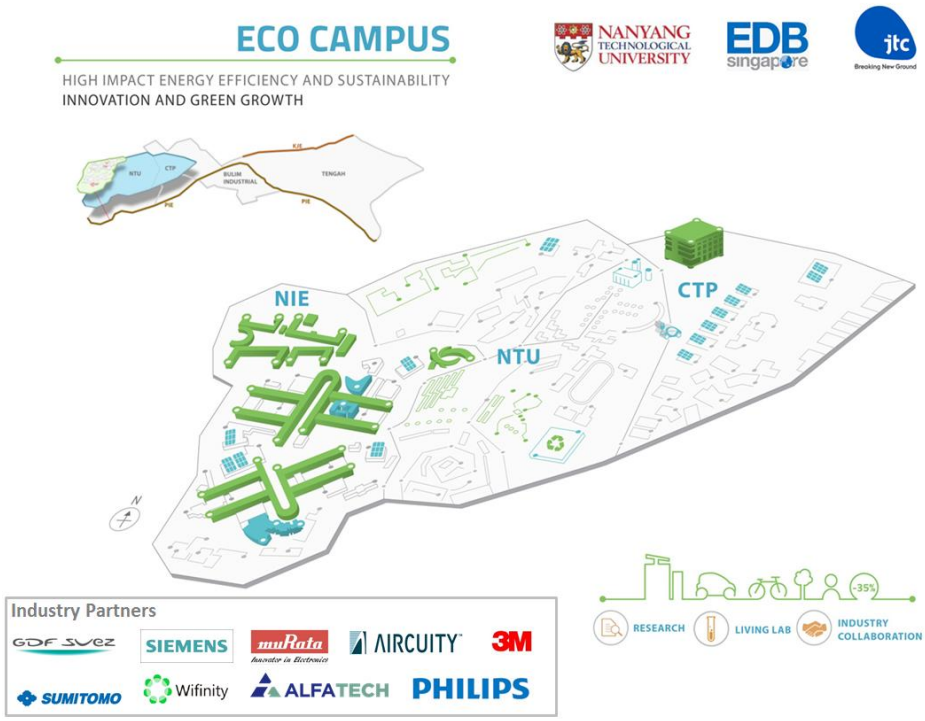
In addition, NTU's Sustainable Earth Office is leading the university's initiatives to spearhead sustainability in research, education, collaborative projects, commercialization and outreach.

NTU's EcoCampus initiative, anchored at the Sustainable Earth Office, will leverage on the research centers and also explore synergies with industry partners to advance sustainability research and create a global leadership position for Singapore in sustainability.

In partnership with Singapore's Economic Development Board (EDB) and JTC Corporation, the EcoCampus initiative will transform NTU's 200-hectare campus into a super test bed for research projects in cutting-edge green technologies. They range from smart building systems and renewable energy, to electric transportation and water conservation technologies, complementing the vibrant sustainability R&D community in the adjoining 50-hectare CleanTech Park developed by JTC Corporation.

The three underlying thrusts for EcoCampus are:

1. Research, Development, Demonstration and Deployment for innovative technologies in the energy efficiency and sustainability domain
2. Living lab philosophy using own buildings and infrastructure for technology test-bedding
3. Industry collaboration as a corner-stone for green-growth and sustainable development



The initiative will focus on buildings and campus-level sustainability solutions that can be adopted in upcoming developments. The effort will be centered on six key areas: Information Management, Green Buildings, Renewable Energy, Transportation, Waste & Water, and User Behavior for Energy Efficiency. It will also focus on research and development of technologies that can be demonstrated and potentially commercialized in the near future.

Besides offering a platform for companies to jointly research and develop new solutions, EcoCampus will also provide a plethora of learning opportunities for NTU students, staff and the public. The projects under EcoCampus will engage undergraduates and Master's students as well drive PhD topics around innovative technology improvements.

The EcoCampus is also reaching out to other university programs, secondary schools, and government agencies to facilitate education in the field of Clean Technology and Sustainability within an immersive learning environment. These programs serve as a deep investment for Singaporeans of all ages and education levels and will help facilitate Singapore's growth as a hub for education and knowledge exchange related to Sustainability.

Contact:

Nilesh Y Jadhav
Program Director, EcoCampus
Nanyang Technological University
nilesh@ntu.edu.sg

Professor Alexander Zehnder
Chair, Sustainable Earth Office
Nanyang Technological University
AZEHNDER@ntu.edu.sg

University of Cambridge

2015 ISCN-GULF Best Practice Case Study

Living Laboratory for Sustainability

The Living Laboratory for Sustainability's goal is to improve the sustainability of the University by providing opportunities for staff and students to use the estate to test and research environmental problems and enhance the educational experience of students.

Overview:
The Living Lab, funded by Santander, seeks to involve students from diverse academic backgrounds to create dynamic solutions to the environmental sustainability challenges the University faces. It also looks to be a platform for academic and estate staff to suggest and steer research on the University estate, and to be a tool for Estate Management to improve the environmental practices of the University.

The objectives of the Living Lab are to:

Living Lab

- Improve the sustainability of the University by using the estate to test and research real world environmental problems.
- Support students in developing knowledge and skills and gaining experience in environmental sustainability projects.
- Promote interdisciplinary teamwork by enabling students from different disciplines to work together on sustainability projects and share their perspectives in seminars or informal collaborative discussions.
- Ensure that the learning from the projects directly influences University operations.

The Living Lab achieves its aims through developing projects that connect students, academics and Estate Management staff. This collaboration leads to innovative research and practical projects that enhance the sustainability of the University. It not only provides an opportunity for students and staff to research ways to reduce environmental impacts, but an opportunity for staff and students to engage with the operation of their university.

Communication:

The project has inspired dialogue between students, academics and Estate Management staff on real-life environmental sustainability problems. For example, one project reviewed past approaches to post-occupancy evaluation (POE), researched best practice in this area and made recommendations for how POE should be undertaken in the future at the University of Cambridge. This project facilitated cross-institutional dialogue between academics, building users and Estate Management staff. Another example is a project by a PhD student, whose research aims to understand the complex nature of energy consumption, behavior and comfort practices and the ways these form, interact and change in a workplace environment. This research will help the University understand how best use technology such as real-time energy displays and what supporting materials is needed to make it most effective in changing behavior and reducing energy use in building s.

Lessons learned:

Over the past two years the Living Lab has grown and adapted to the University and some of the lessons that have been learned are included below:

- The Living Lab Advisory Group was essential in helping to shape the program to fit the needs of the University. The group provided guidance and expert advice that led to the current structure of the program.
- The project empowers staff and students as they have a platform to research environmental sustainability matters and feed into environmental sustainability practices at the University.
- Develop innovative projects to connect multidisciplinary students and staff around sustainability.
- Communicate the results of successful projects and research through web content and dissemination materials and events. A challenge is to make sure that the results from research projects fed back into the University. Bringing key staff members onboard to be closely involved from the onset of projects has mitigated this difficulty.

Further information is available at www.environment.admin.cam.ac.uk/getting-involved/living-laboratory-sustainability.

Contact:

Joanna Chamberlain
Head of Environment and Energy
University of Cambridge
Joanna.chamberlain@admin.cam.ac.uk

University of Cape Town

2015 ISCN-GULF Best Practice Case Study

Integrating Carbon Footprinting into the Curriculum at the University of Cape Town

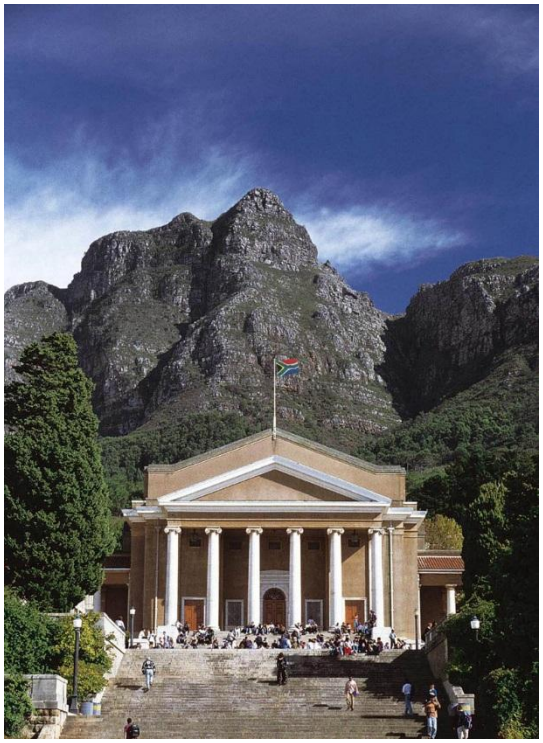
A Sustainability focus has been incorporated into the team project of the third year IT Management course at University of Cape Town (UCT) challenging students to measure the university's carbon footprint and make recommendations on how to minimize it. The project reflects the confluence of two faculties: Science (represented by students majoring in Information Systems and Computer Science) and Commerce (where the research and lecturing elements are nurtured).

Overview:

The university's commitment to sustainability is inspired by the strategic vision led by the Vice-Chancellor, Dr. Max Price, to produce a socially-responsive campus; his signature to the ISCN charter is testimony to this commitment.

To this end, the university needs to report on a regular basis on a range of Sustainability metrics. Although the campus does not have a Sustainability Office, a network has arisen of consultants, researchers, lecturers, students and administrative staff committed to Sustainability.

Seeing a carbon footprint as a proxy for Sustainability, this network decided to integrate carbon footprinting into the curriculum, with third year students engaged in the challenge of collating annual GHG emissions. Teams were allocated various scopes and needed to not only calculate emissions but also present recommendations for their reduction in a summative assessment.



University of Cape Town campus

The semester-long “Green Information Systems” course in the Department of Information Systems in the Faculty of Commerce provides an opportunity for students to increase awareness of climate change issues while simultaneously enhancing their graduate attributes.

Communication:

The project is transformative, in that it serves to bridge the two pillars of theory and practice as it uses reflective learning to assist the students in negotiating experiences and the experiential learning that occurs in project-based learning.

The project fosters graduate attributes such as intellectual autonomy and ethical and professional habits of mind.

In addition, the project cultivates spaces for double loop learning, which goes beyond basic problem solving towards a critical reflection on existing behavior patterns, as well as for creative, innovative and lateral thinking.

Lessons learned:

Our process has evolved over the past four years. The project team found it useful to begin with a set of lectures placing the project in broader context of sustainability. We followed this with a Carbon Footprint seminar bringing in a GHG Protocol specialist and UCT Sustainability Coordinator.

With adequate guidance at the outset, students were able to quickly become familiar with the GHG Protocol and move quickly into the research phase.

We found value in having a sustainability coordinator available to guide student groups, direct them to available information, and provide institutional knowledge.

Another lesson learned over time is that iterations of students interviewing data holders in the University Administration has led the administrators to begin to take the issue more seriously - these data holders have begun to see themselves as integral to campus greening efforts.

Finally, research surveys conducted by students on campus have helped to raise awareness of sustainability issues among both staff and students.

Contact:

Carolyn McGibbon
PhD Associate
Centre for IT and National Development in Africa (CITANDA)
University of Cape Town
Carolyn.McGibbon@uct.ac.za

University of Liechtenstein

2015 ISCN-GULF Best Practice Case Study

uniGO – University of Liechtenstein Green Organization

UniGO is an action research based university wide sustainability program aimed at organizational change manifested in practical improvements across facility performance, student and staff behavior and choices, teaching, research and community outreach.

Overview:

UniGO is an action research triggered University wide sustainability initiative founded on organizational reflection. It sets out to improve our understanding of organizational sustainability transformations, and to investigate how such transformations can be supported by the organization as a whole and aims to be applicable to other universities und comparable organizations. It was initially funded by the university administered competitive internal research fund, in a project entitled "Sustainability Aware Business Process Management", an initiative by two Chairs in two separate faculties: Sustainable Spatial Development and Business Process Management.

UniGO is specifically intended to base sustainability action on better understanding the University of Liechtenstein as a learning organization embarked on its own transformation in an effort to become a "Green Organization".

UniGO studies the phenomenon of sustainability transformation from different perspectives, including the potentials proffered by information technologies for environmentalism, the role of process change for implementing sustainable work practices, or aspects of resource flow, energy consumption and generation, spatial transparency and intelligence, and the transformation and elimination of waste and emissions.

University of Liechtenstein campus

Communication:

UniGO (uni.li/go) has triggered and reinforced substantial community wide dialog, UniMoMo, a comprehensive mobility program, a Master of Architecture Research project triggered groundswell effort to turn the facility itself into a renewable energy generator, to transform the kitchen and cafeteria services, and to eliminate waste. A dynamic e-communities/intranet program has been rolled out and is being used as dynamic platform for exchange. The entire year of 2015 is being dedicated to the theme of 'Sufficiency' in teaching, research and practice across the university's most populous department, mobilizing active partners in all other faculties and academic and administrative divisions. It is being monitored and studied in fresh reflective research efforts, to understand how thematic, strongly value based topics can influence teaching and learning, affect understanding through transformational cues, and apply this insight to stronger frameworks of research, learning and reflective practice.

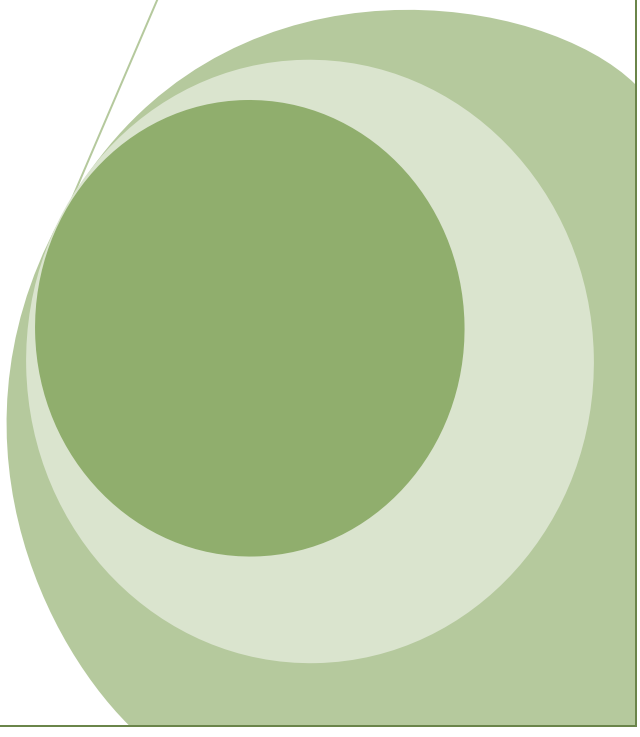
Lessons learned:

Universities are task and performance oriented, hierarchically structured organizations. Bottom-up initiatives benefit from substantial and clear leadership, reinforcement from legitimate change agents, and monitoring frameworks that are engaging, empowering and enduring. Their absence or mixed cues can stymie positive change. The dimensions of community, resources, energy, space, and information technology can be well connected to arrive at solutions. It is critical to mobilize both research and teaching resources to this end, and match these to administrative performance cues as well as social/behavioral triggers. Spatial settings can reinforce understanding and behavior. External 'value partners' in the form of business, industrial, community and cultural institutions can be key in comparing and aligning approaches.

Contact:

Peter Droege
Professor, Chair of Sustainable Spatial Development
University of Liechtenstein
peter.droege@uni.li

Chapter 3:
Teaching by Example



Carnegie Mellon University

2015 ISCN-GULF Best Practice Case Study

Scotty Goes Green: Carnegie Mellon Green Office Certificate Program

The Scotty Goes Green Office Certification Program engages Carnegie Mellon faculty and staff in a voluntary, self-guided initiative that promotes a high standard for environmental practices at Carnegie Mellon University (CMU).

Overview:
The Scotty Goes Green program supports and promotes offices that are taking steps toward reducing their environmental footprint.

A series of checklists and tools help to guide offices through three levels of certification. The program operates through a network of Green Workplace representatives in offices across campus and provides a framework for sustainability.

The goals of the program are to:

- Engage faculty and staff in activities that will help to make CMU a leader in campus sustainability
- Recognize and reward leadership in sustainability
- Educate participants about how and why to take action
- Support the Pittsburgh 2030 District: Oakland
- Further integrate sustainability into campus culture
- Conserve water, save energy, minimize waste and save money

Students have been an integral part of researching, branding, planning and reviewing the Scotty Goes Green Office Certification program.

Since its launch on September 2, 2014, over 500 participants from 35 offices have signed onto the program. The first office to achieve Bronze Certification was the Civil and Environmental Engineering Department, with assistance from their graduate students.

By setting an example, the Scotty Goes Green Program is training in action for students that they can take with them into their workforce after they graduate.

Communication:

The Campus Affairs Administration supports this program and is encouraging participation in all administrative departments. By setting an example in our daily operations, Carnegie Mellon University can demonstrate to students how to operate in our offices sustainably and efficiently.

A Pre-Audit requires input from office staff and a meeting with the university environmental coordinator. These meetings have resulted in unprecedented communication opportunities to discuss sustainable practices in various departments not previously included in this conversation.

We are extensively publicizing our program through various campus media outlets as part of our informal education on sustainability.

Lessons learned:

The Scotty Goes Green Office Certification program has created a structure for people to take sustainable actions in the workplace, while having some fun. People appreciate individual recognition, incentives and a good challenge.

By using our campus mascot the Scottish terrier as our brand, we made Scotty Dog pins that say "Scotties Leave Small Footprints". Each person in the office will receive a pin when they reach the Bronze Level Certification. When people wear the pin, it will start conversations about sustainability and pride in sharing our accomplishments.

This program allows staff to see that they are already using green practices in their office settings and giving them the opportunity to learn about further actions.

Fostering these green office practices may expand sustainable changes to other processes in the workplace and at home.

Contact:

Barbara Kviz
Environmental Coordinator
Carnegie Mellon University
bk11@cmu.edu

Chulalongkorn University

2015 ISCN-GULF Best Practice Case Study

Green University Policy

In order to achieve one of its strategic goals of becoming ***"a welcoming home to all members of Chulalongkorn University"*** Chulalongkorn University has been implementing a "Green University" policy since 2004. In the early phase, the university developed green areas around the campus to provide more shade and function as a watershed when there was flooding. In an attempt to reduce air pollution and save energy, it initiated an environmentally friendly on-campus electric shuttle bus service for the Chulalongkorn University community.

Chulalongkorn University campus

During 2008 – 2012, the "Green University" policy broadened to include additional fruitful projects. Car park facilities were built adjoining the main public roads so that the number of cars entering the campus was reduced. To protect commuters from weather conditions in Thailand's tropical climate, the university built more covered walkways to encourage people to walk rather than drive vehicles on campus, and bicycles were provided to departments and faculties for use on campus instead of cars or motorcycles. Dilapidated buildings were removed and turned into green gardens and outdoor activity spaces. A number of recycle projects were promoted and developed for different on-campus waste materials such as paper, plastic, food waste etc. The use of foam containers was strictly prohibited at all of the university's canteens.

Now, the "Green University" policy has developed into a "Sustainable University" policy aiming to strengthen the previous initiatives while furthering the new sustainable projects. The university is focusing on research and study to find sustainable ways to protect the University's environment, save energy and promote environmental awareness among students and staff.

Over the past years, Chulalongkorn University has developed a number of sustainable projects in which our students and staff taken part; the following are cases that have been outstanding and successful.

Chula Loves the Earth

There are many projects in which students are involved. Among the most prominent of them is the **"Chula Loves the Earth"** project first launched in 2009. It is a campaign following Chulalongkorn University's "Happiness" strategy the objective of which is to encourage students and staff to join a tree-planting activity on campus that will create green areas within the university and contribute to the reduction of global warming. During the current year of 2014, a total of over 15, 000 trees were planted on the campus grounds. The event also introduced a bicycle-sharing program to promote bicycle riding on campus. The bicycles are available at seven stations on campus and in nearby areas.

Mahathirarachanusorn Building

The University has initiated a project to improve the energy efficiency of buildings on campus. One of the most successful of these improvements was at the Mahathirarachanusorn Building, where the university's central library is located. The project involved adapting the building to make it more energy efficient and to promote energy efficiency overall within the university. The solution for the building incorporates six measures: a controlled chilled water pumping system, installation of a Building Automation System (BAS), installation of fresh-air handling units, changing reading lamps with t5 bulbs and installing bookshelf lighting sensors, improving the building envelope to reduce OTTV and RTTV and installation of energy-efficient water taps. As a result, the university's energy budget was reduced and it provided a model for the conditioning of other campus buildings to conserve energy.

Sichang Study

At Chulalongkorn University, more than 500 subjects are taught related to the environment and sustainability, ranging from Understanding Environment, Development and Sustainability, Advanced Issues in Environment, Development and Sustainability to the **Sichang Study**, which provides knowledge of an integrated community study in Koh Sichang District, where CU's Aquatic Resources Research Institute is located. Detailed study of the Koh Sichang's community embraces integrated coastal zone management for sustainable development, socio-economic-environment relationships and the use of science and technology in the community.

Koh Sichang District

In terms of research, as of 2014 there are more than 200 projects related to energy, sustainability and the environment. One successful research-derived project which has been applied to the University's waste management is the use of a Continuous Stirred Tank Reactor to turn food waste into biogas. The gas produced is being sent for use in several canteens on campus.

Contact:

Boonchai Stitmannaithum
Chulalongkorn University
Boonchai.S@chula.ac.th

Harvard University

2015 ISCN-GULF Best Practice Case Study

Council for Student Sustainability Leaders

This case study highlights the Council for Student Sustainability Leaders (CSSL), a student leadership initiative that brings environmental student leaders together from across Harvard's 12 Schools to collaborate across disciplines in order to generate forward-looking solutions.

- CSSL participants advise University officials on its sustainability commitment, including the development of our University-wide Sustainability Plan.
- The students receive unparalleled access to international thought leaders through small-group meetings with world leaders including the Executive Secretary of the United Nations Framework Convention on Climate Change, Christiana Figueres, and Former Minister of Environment and Forests of India, Jairam Ramesh.
- Learning enrichment and professional development programming is focused on solution-oriented leadership.
- Combined with the Student Sustainability Grant program, which provides seed funding for creative ideas, CSSL engages students in tackling on-campus challenges.

Overview:

The Harvard Council of Student Sustainability Leaders (CSSL) is a student leadership initiative designed to provide educational and professional development opportunities to the undergraduate and graduate student environmental community—those students committed to personal and institutional action on sustainability—and to provide an opportunity for those students to advise the University on the continual improvement of its sustainability initiatives.

Harvard Council for Student Sustainability Leaders

CSSL connects undergraduate and graduate student leaders across fields, disciplines, and Harvard's 12 Schools to collaborate in generating forward-looking solutions, advising the University on the evolution of its sustainability efforts, and participating in opportunities that further develop them as leaders that will go on to create sustainable change in the world.

CSSL participants advise University officials on its sustainability commitment, providing feedback on strategic projects and driving creation of new ideas that can be tested on campus. The Office for Sustainability provides the students with unparalleled access to international thought leaders through small-group meetings with world leaders visiting Harvard's campus including the Executive Secretary of the United Nations Framework Convention on Climate Change Christian Figueres, and Former Minister

of Environment and Forests of India, Jairam Ramesh. Learning enrichment and professional development programming is focused on solution-oriented leadership and includes workshops and trainings that deepen their skill base and engagement with sustainability issues across a wide range of disciplines.

Combined with the Student Sustainability Grant program, which provides seed funding for creative ideas, CSSL engages students in tackling on-campus challenges. Examples of funded projects include student research on cooperation and how it relates to sustainability that was published in the journal Nature, innovative solutions to public challenges including stormwater and food access, addressing major energy concerns on campus with a project to automate shutoff of lab equipment, and contributing to sustainable transportation networks on campus through development of a bike share program.

CSSL develops student environmental leaders to be liaisons to the larger student body and their individual Schools and as a result the group has elevated awareness among the student body about institutional sustainability issues at Harvard. Participants helped co-develop the Harvard Sustainability Plan and are now working on suggestions for achieving goals in target categories. Additionally, they have represented the student voice at municipal meetings, including the City of Cambridge bike planning workshops. A summary report that CSSL produces at the end of every year is provided to senior leadership and as a result, the student voice is strongly represented to senior leadership.

Many of Harvard's CSSL leaders have gone on to play key leadership roles in their Schools or as alumni in their professional lives. For example, Austin Blackmon, former co-chair of CSSL, is the incoming Chief of Energy and Environment for the City of Boston and his CSSL experience was mentioned in the press release announcing his appointment.

Lessons Learned:

Facilitate Collaboration: It is essential to create spaces that bring students, faculty, and staff together across a wide range of disciplines or sectors so they can appreciate multiple perspectives needed to approach problems, and can work together to generate more effective solutions. In the private sector or higher education, the lesson learned is that you must facilitate opportunities for collaboration across sectors, across departments, or across teams.

Leadership Development: Learning enrichment and professional development programming must be provided to deepen the skill base and level of experience of students (or employees) so they can more thoughtfully and effectively respond to challenges.

Creative Change Agents: We encourage solutions-oriented leadership with seed funding that helps inspire action on creative ideas and encourages the entrepreneurial thinking – fail fast and fix the mistakes for future projects – that is essential for engaging in sustainability moving forward. Once ideas are sparked and funded, it is helpful to work directly with students on projects by providing mentoring and networking with key decision makers (for example, facilities directors or building managers when a project impacts a building).

Contact:

Heather Henriksen
Director, Office for Sustainability
Harvard University
heather_henriksen@harvard.edu

Freie Universität Berlin

2015 ISCN-GULF Best Practice Case Study

SUSTAIN IT!

SUSTAIN IT! is a joint initiative of students and employees from different faculties, the research center for environmental politics (FFU), as well as the steering unit for sustainability and energy, contributing to the "greening" of Freie Universität Berlin.

Overview:

Founded in 2010, SUSTAIN IT! has been raising awareness for sustainability issues on and off campus via a broad portfolio of actions. Special focus lies on participatory and dialog-oriented methods that facilitate the active collaboration of students and university members. The initiative provides students with the space to realize ideas and to collect hands-on experiences in project and event management. Through their projects, students naturally gather knowledge on sustainability topics. The collaboration is mutually beneficial – the team structure is non-hierarchal, everyone can contribute their strengths and learn from the vast experiences of other members. During the campus-wide action days in 2011 and 2012 SUSTAIN IT! offered 42 events around the core topics of sustainable development (sustainable usage of energy, sustainable agriculture or conservation biology). Since 2013 SUSTAIN IT! organizes lecture series and project courses in cooperation with the environmental policy research center.

SUSTAIN IT Network Café

The initiative also aims at implementing education for sustainable development (ESD) topics and methods in the curriculum as well as in campus management. Two major achievements of 2014 were the development of sustainability concept for the university and the facilitation of an interactive project course.

Communication:

The outreach activities of the initiative meet students and employees in different contexts, approaching them in their daily business and in different fields of interest – be it in seminars, action days for planting spring flowers on campus, or for avoiding the use of coffee to-go cups, in lecture series with external experts, during excursions to the universities roof-top solar panels, or in our very own (uni) urban gardening project. During the campus days about 2000 participants were reached and all events were

organized in cooperation with 35 regional partners from diverse backgrounds (WWF, BUND Jugend, Slow Food, enterprises, and student initiatives).

Lessons Learned:

The theme of the initiative is “from knowledge to action”, which we achieve by applying interactive and participatory methods used in ESD. For SUSTAIN IT!, transdisciplinary cooperation between people from different walks of life has been a big source of inspiration, motivation, and success. It has been particularly helpful when reaching out to a diverse target group as in the case of a university campus community with more than 33,000 students and 5,100 employees. The most important lessons learned are:

- Meet and talk to people where they are to find out what bothers them.
- Encourage them to translate their knowledge into action by providing easily applicable solutions.
- Provide a space for realizing ideas.
- Engage with different stakeholders on and off campus (the SUSTAIN IT! network comprises over 40 partners in politics, business. and civil society).
- Be authentic, sincere, transparent, and invite people to co-create.

Contact:

Karola Braun Wanke
Coordinator, SUSTAIN IT!
Freie Universität Berlin
karola.braun-wanke@fu-berlin.de

University of Oxford

2015 ISCN-GULF Best Practice Case Study

Green Impact and Student Switch Off

The University of Oxford has two main strategic projects which involve students in the University's sustainability strategy: Green Impact a staff led awards scheme set around a workbook full of environmental criteria and Student Switch Off an inter-collegiate energy-saving competition operated by the National Union of Students (NUS).

Overview:
Engagement plays an integral part in the ability of the University to reach all of its sustainable objectives – with 22,100 students and 11,804 staff, their actions really do add up.

Green Impact brings together staff and students and facilitates collaboration to bring about long-term sustainability improvements through Green Impact Project Assistants (GIPAs). GIPAs are students that volunteer to work with a staff departmental team. GIPAs receive training on how best to engage with staff and communicate sustainability within the organization. This is a valuable role within the Green Impact teams, allowing students to engage in a dialogue with staff and influence the design of the program, whilst gaining new skills. Students also have the opportunity to train as student auditors to review the returns of the departments.

Green Impact at University of Oxford

The second strategy is the ever popular Student Switch Off. This encourages pro-environmental behavior change via social media and peer-to-peer communications. Central to this strategy are the Student Switch Off Ambassadors. At the beginning of the academic year they attend interactive training sessions where they learn about effective communication and how to motivate their peers to save energy.

Students not only gain practical knowledge and understanding of sustainability issues but also

transferable skills including: leadership, communication, public speaking, time and event management and problem solving.

Communication:

Both schemes use peer to peer communication intertwined with cross stakeholder communications creating a diverse mix. All spurred on by a bit of competition.

An example of the beneficial relationships and communication comes from Oxford University student Katrin Dulitz. Katrin was highly commended at the national Green Impact Special Awards. A team representative from the Department of Chemistry said, “Katrin worked very hard over the past year to make a valuable contribution to our Green Impact team. She made some innovative suggestions which we’ve introduced. To have Katrin’s enthusiasm recognized not only in Oxford but nationally made me very proud. It will give us the impetus to drive our Team onwards towards the Silver Award over the next year.”

Lessons Learned:

Both Green Impact and Student Switch Off had a very successful first year and results for 2014/15 are promising.

- Provide practical opportunities for students to apply their training and develop their knowledge, it is a win-win for everyone involved.
- Utilize peer to peer communications to encourage normalization of behaviors.
- Use support networks to share knowledge, experience and resources.
- Allow localized management and focus of the project to encourage ownership, for example allowing them to complete a given task in a way that fits with them.
- Utilize a program which allows development and has a cyclic pattern to allow continual improvement which assists with embedding practices.
- Celebrate and recognize achievements with awards.

Contact:

Jennifer Hurst
Environmental Sustainability Projects Manager
University of Oxford
jennifer.hurst@admin.ox.ac.uk

Chapter 4:
Cross-Curricular Integration

Anglia Ruskin University

2015 ISCN-GULF Best Practice Case Study

Sustainability Integration

Anglia Ruskin University (ARU) takes its name from John Ruskin (1819-1900) widely considered as the leading art critic of the 19th century. Ruskin was also a hugely influential social entrepreneur and his work is recognized today as fundamentally relating to sustainability; particularly in terms of fairness and equality, social justice and the protection of the environment. It is therefore fitting that the modern Anglia Ruskin University, an institution with over 30,000 students on its roll, sees its key contribution as "the enhancement of social, cultural and economic well-being" (Anglia Ruskin Corporate Plan 2011-14).

In order to recognize this vision ARU has made a corporate commitment to ensure that "sustainability will be a feature of all our students' experience". It is doing so in three main ways:

1. A commitment to making sustainability a part of every student's formal and informal curriculum – Led by the Education for Sustainability Team
2. A commitment to internationally recognized research in sustainability – led by the Global Sustainability Research Institute
3. Striving to exceed national and sector benchmarks for the sustainability of its buildings and processes – led by the Environment Team

Much of what a University does, particularly in a UK post 1992 University, is in support of students learning and the Education for Sustainability team lead on the embedding of sustainability across all five faculties. The driver for action related to embedding sustainability within the formal curriculum at Anglia Ruskin has been shaped by the University's Learning, Teaching and Assessment Strategy and University Academic regulations. Together these set out the requirements for sustainability to becomes part of all courses and in disciplines which range from performing arts, through international business and allied health to fields which are highly technical and scientific and heavily regulated by professional bodies. Progress is monitored through the Academic Office and course approval process.

There is a growing recognition of Education for Sustainability (EfS) as not only a key enabler for sustainability but also as an integral element of quality education. At ARU the integration between sustainability and high quality learning and teaching is undertaken on a course by course basis, through engagement in conversation between course leaders and the EfS team. Conversations encourage staff to look for the intersections between discipline expertise and sustainability and to highlight the specific

and generic skills a graduate of any particular discipline can bring to the sustainability 'table'. In addition the development of a unique sustainability masters course (MSC Sustainability) not only provides students with a deep understanding of sustainability debates but champions good practice in sustainability learning and teaching throughout the university and the wider academic community. Emphasizing that academic expertise alone is not sufficient for graduates to meet the complex sustainability challenges we face the course has been developed and is delivered by the Global Sustainability Institute (GSI) in partnership with two educational charities, the internationally renowned Eden Project, which provides an inspirational and transformational learning environment for the students and Change Agents UK who focus on the transferrable sustainability skills which link strongly to graduate employability. The GSI ensures students learning is research led as well as providing a focus for Action Research as part of its Education for Sustainability Research theme. The course is therefore both a recipient of and a subject for sustainability research. The link between GSI research and sustainability is further strengthened through number of co-curricular and extra curricula learning. These include: a twice yearly *So What!* magazine which showcases GSI research and other topical sustainability related issues. Student summer interns who become part of the GSI research community during the summer break gaining valuable sustainability knowledge and experience of research; and community based activities such as the Festival of Science and International Community Experience.

Encouraging and supporting students to engage with sustainability more widely through work placements, volunteering and various employability activities is the responsibility of the University Student Services team while the Student Union lead on coordination of the National Union of Students 'Green Impact' activities which relate to the auditing of staff's efforts to reduce the environmental impact of their work activities, as well as promoting student led environmental activities and societies. Finally the University's People Strategy (Human Resources) has responsibility for overseeing the provision of support for academic and support staff in how to incorporate sustainability into their work and teaching.

The Anglia Ruskin Sustainability Team includes a senior manager, the pro-Vice Chancellor with responsibility for sustainability, the curriculum lead (Director of EfS), Director of the Global Sustainability Research Institute, Head of Environmental Management and Student Union President. Membership of sustainability networks have also helped advance the integration of sustainability into all aspects of student experience, providing examples of good practice and the sharing of knowledge and expertise. These networks include ISCN, which provide and international perspective on the sustainability in HE agenda, The Higher Education Academy's (HEA) Change Program, the Green Academy and the Environmental Association of University and Colleges (EAUC).

Contact:
Dr Alison Greig
Director of Education for Sustainability
Anglia Ruskin University
Alison.Greig@anglia.ac.uk

Ca' Foscari University of Venice

2015 ISCN-GULF Best Practice Case Study

Sustainable Ca' Foscari

Sustainable Ca' Foscari is the program launched by Ca' Foscari University of Venice with the aim to include sustainability in every university's activities, integrate it into existing processes and actively involve staff, students, community and institutions.

Overview:

Sustainable Ca' Foscari started in 2010 with the Carbon Management project in collaboration with the Italian Ministry of the Environment. Among the results of this project there is the development of the Carbon Footprint Calculator, an interactive tool with which the Ca' Foscari community can assess their own environmental impact measured in CO_2 equivalent with the aim of building a sustainability consciousness and spreading of sustainable behaviors. Regarding the teaching, Sustainable Ca' Foscari launched the Sustainability Competencies Project. This scheme aims to promote the development of topics surrounding sustainability in all its aspects and proposes to widen the culture of sustainability in participants. The acquisition of sustainability competencies targets the student body as a whole, is on a voluntary basis and results in 1 extracurricular credit for the student. 1221 students participated in the project in the 2013/2014 academic year.

Students on campus

Similarly to teaching, the university decided to increase research on sustainable topics that cross over into all the fields of study offered. This commitment saw the University support the startup of projects which closely examined the theme of sustainability from a scientific point of view and which explored diverse analytical perspectives. The number of specific research projects has risen significantly over the years and existing competencies held by faculty have been put to full use.

Communication:

Ca' Foscari adopts a sustainable perspective in all its activities and operations, not only teaching and research, in order to continuously expose the staff, faculty and students. The institution fostered the sharing of technologies and different scientific approaches. What resulted was the creation of multidisciplinary synergetic relations which matched study programs offered with research in sustainability.

To increase awareness of the University's civic role Ca' Foscari has launched specific projects to enter the sphere of territorial welfare. It is in this way that the Ca' Foscari Social Project was inaugurated with a view to putting together and satisfying the different needs manifested by non-profit associations with students and staff desiring to do volunteer work. Another project is the University for Volunteer Work with the aim to provide operators from volunteer associations with specific training to better prepare them to carry out their work.

Lessons Learned:

We learned that the engagement of the students is fundamental. To do this it is important to create many opportunities in different fields. Through the student engagement we realize that sustainability is a concept applicable in different spheres and that does not regard only the environment, but especially we build a basic knowledge of sustainability.

To incentivize the research on sustainable topics, a wide involvement of professors, researchers and PHDs is necessary, creating different opportunities to present and highlight the results of the research projects.

In the end we continually stimulate our suppliers, requiring products to be more sustainable, and above all, engage them in various projects, seminars and events.

Contact:

Chiara Mio
Full Professor
Ca' Foscari University of Venice
sustainability@unive.it

EPFL and University of Lausanne

2015 ISCN-GULF Best Practice Case Study

Joint Sustainability on Lausanne Campus

The city of Lausanne, Switzerland, enjoys two outstanding universities. Active in the humanities and social sciences is the University of Lausanne (UNIL). The Federal Institute of Technology Lausanne (EPFL) on the other hand, specializes in architecture and engineering.

EPFL and UNIL have collaborated academically for over 10 years to connect engineering sciences with social and human sciences, and integrate sustainability in the education program. Unipoly, a joint student association, helps to make these ideas real on the campus.

Overview:

EPFL and UNIL are on a quest to integrate sustainable development education across their board university campuses by seeking to broaden its students' awareness and understanding of the complex issues within which they will be developing solutions, as well as by learning to integrate economic, social, cultural, technological or environmental concerns into their work.

The College of Humanities (CDH) is the driver of this strategy. Founded in 2004, it seeks to foster in students the ability to realize tasks and problems characterized by increasing complexity in situations that involve ever more numerous and diverse stakeholders – including the developer to the end-user, and innovation to its consequences in social, economic, political, cultural, and environmental contexts.

unipoly.epfl.ch

Integral to all study plans at EPFL are the 120 social and human sciences (SHS) courses, taught by the UNIL CDH faculty. From the first year of a Bachelor's degree to the first year of a Master's degree, these courses are credited and mandatory for all students. A few examples of these courses are: Sustainable Development, Growth and Sustainable Development; Environmental Ethics; Social and Political Ethics; Health, Populations, and Society.

During the 2012-2013 period, an ambitious new initiative has been under intense preparation: the compulsory Global Issues curriculum, replacing first-year SHS courses as of January 2014. In this new curriculum, a human sciences professor from UNIL teams up with an engineering sciences professor from EPFL to deliver a course covering six topics: Food, Communication, Climate, Energy, Mobility and Health. Thus far, 1'700 students have participated in these courses.

Since 2002, Unipoly, a student association, has actively promoting sustainability on both campuses UNIL and EPFL. Unipoly has developed various programs and activities, with success stories like:

Weekly Market with local, fresh and seasonal, as well as bread, cheese, etc. on campuses of UNIL and EPFL

Beekeeping - Rooftop honey production and awareness of the problems faced by beekeeping and the importance of bees in the ecosystem.

Gardening - Bringing awareness of the different modes of food production by installing a vegetable garden on campus.

Freegan / Disco Soup - Providing awareness of the problem of waste and overconsumption of food

Meatless day – introducing a meatless day to spread awareness of the impacts of producing and consuming meat.

Communication:

The meeting of teachers from both institutions will promote interdisciplinary, essential component of sustainable development issues. New research and education program are born of this collaboration and bring a solid basis for the future of sustainability on the campuses. UNIPOLY, a joint student association helps fulfill these developments.

Lessons Learned:

The institutional integration of sustainability in the university is crucial to sustain dedicated education and research program. Great transdisciplinarity is necessary to properly address the issue of sustainable development at the academic level.

Contact:

Philippe Vollichard
Sustainability Manager
EPFL
philippe.vollichard@epfl.ch

Delphine Douçot
Deputy Vice-Rector Campus and Sustainability
University of Lausanne
Delphine.Doucot@unil.ch

Massachusetts Institute of Technology

2015 ISCN-GULF Best Practice Case Study

MIT Energy Studies Minor

The goal of MIT's Energy Studies Minor is to produce multi-dimensional graduates with both subject-specific knowledge and integrative understanding across a variety of energy issues.

Overview:
Transforming the world's energy systems is a complex challenge, requiring a new kind of expertise. Energy permeates almost all disciplines at MIT. MIT's unique approach is to integrate undergraduate energy education across all the schools, all the departments, and all the programs that MIT offers.


MIT Energy Studies

The Energy Studies Minor does this through a coherent program of subjects that provide single-discipline, multi-disciplinary, and interdisciplinary perspectives on energy. Entering students are offered a variety of hands-on subjects and opportunities to engage in the complex reality of energy.

The heart of the Minor is a core of foundational subjects in the domains of energy science, technology and social science. Students deepen and integrate these perspectives through a variety of electives, and have a variety of options to pursue a capstone experience to bring all parts of their energy studies together. The Minor embraces a highly pragmatic purpose: ensure that people can make well-informed choices and decisions that increase the sustainability of our energy systems.

Communication:
MIT undergraduates are “converting” to energy. As they encounter a wealth of energy-oriented classes, research possibilities, and extracurricular activities, plus a community dedicated to addressing the energy challenge, students are adopting energy as a central and sometimes dominant theme in their education.

The MIT Energy Initiative (MITEI) launched this specialized course of studies in 2009, and three energy minor students graduated in spring 2010. The curriculum consisted of a handful of courses in the foundational areas of energy science, social science, and energy technology/engineering, and 24 electives.

Five years later, the foundational course offerings, especially in social science, have swelled, along with electives, and the Energy Studies Minor is celebrating its largest class ever—35 students. “That’s a lovely growth trajectory,” says Amanda Graham, director of the MITEI Education Office. It is now the third largest minor at MIT, after economics and management/management science.

There is also the “Discover Energy” FPOP, MITEI’s freshman pre-orientation program. Filling nearly all available slots, 22 entering first-year undergraduates arrived in August 2014 to learn about the energy arena at MIT, engaging in seminars, tours, hands-on activities, and discussion with faculty members, current students and staff, and alumni.

Undergraduate research opportunities (UROPs) in energy supported through MITEI have also shown steady growth, rising from eight in 2008 to 47 in 2014. “What impresses me is the diversity of disciplines represented in [all of MIT’s energy-related UROP] research,” says Michael Bergren, associate dean of academic and research initiatives. “We’re seeing projects not just in engineering fields, but in the sciences and social sciences such as architecture, economics, and policy. These UROPs raise visibility across the entire MIT community about the significance of energy research, and undergraduates see they can make an impact on real energy problems.”

A shared pursuit and purpose

The idea of making an impact resonates with many undergraduates, as does joining a community with a shared purpose. By pursuing energy, they can do both at the same time—an insight some students come to early on. With the rapid expansion of formal and informal opportunities for energy education and research at MIT, and a swelling legion of energy-focused students and faculty, "energy has become engrained in undergraduate culture and intertwined with every discipline,” says an Energy Minor student. “We’re becoming a vibrant community inspired by what we can do with energy.”

Lessons Learned:

- Integrate and complement rather than replace or compete
- Deploy a highly pragmatic purpose: ensure that people can make well-informed choices and decisions that increase the sustainability of our energy systems
- A focus on integrating energy studies into the curriculum can lead to student success:
  “makes me a better engineer”
  “most integrative thing I did at MIT”
  “my future employer found it very attractive”
- Students need community building opportunities, ample and often – and so do faculty (this is as much an opportunity as a challenge)

What are our challenges?

- Multidisciplinarity is hard to sustain at the individual class level: Need multiple single course options for each domain to keep minor at a manageable size
- Ambitious advising strategy had to evolve, simplify
- Can be challenging to measure integrative learning; and impacts of project-based learning
- Remains the only fully MIT-wide undergrad minor.

Contact:

Julie Newman
Director, Office of Sustainability
MIT
j_newman@mit.edu

Steve Lanou
Deputy Director, Office of Sustainability
MIT
slanou@mit.edu

National University of Singapore

2015 ISCN-GULF Best Practice Case Study

Cultivating sustainability culture and leadership through student living-learning programs

Residential Colleges (RC) were introduced to the National University of Singapore in 2011, to provide an added dimension to undergraduate campus living. Incoming freshmen take some classes at the RCs as part of university-level degree requirements, and also participate in extracurricular activities. At two RCs namely Tembusu College and Ridge View Residential College (RVRC), the sustainability theme underpins the interdisciplinary learning experience.

Overview:

At Tembusu College where the Rector is Prof Tommy Koh, Singapore's Ambassador-At-Large and UN's Champion of the Earth awardee in 2006, the curriculum offerings include courses in climate change and food politics. Learning is not just restricted to the classroom but interwoven throughout daily life. The five student living clusters - Shan, Ora, Tancho, Gaja, and Ponya — are named after endangered animal species to reflect the College's commitment to caring for the environment. There are regular forums and talks centered on the science, economics and international politics of climate change, natural history and the like.

RVRC students in deep discussion with their mentor on project proposal at the College Networking event.

At RVRC, the residential learning curriculum goes a step further to weave in industry perspectives on sustainability to complement its academic, co-academic and living learning. Freshmen attend compulsory lectures, tutorials and seminars to build multi-disciplinary knowledge on sustainability through intellectual inquiry and experiential learning in the first semester; this is followed by project work on a sustainability topic in the second semester, mentored by industry or academic professionals. Sustainability is not only an academic concept introduced to students but it is also a practice that students are expected to embrace. This ranges from simple daily tasks and

activities to field trips that expose students to heritage, farming and environmental sustainability as well as panel discussions with experts and industry practitioners sharing about sustainability efforts. For students who express keen passion and penchant for innovation, they are provided guidance by mentors and resources to translate abstract ideas into concrete projects.

Lessons learned:

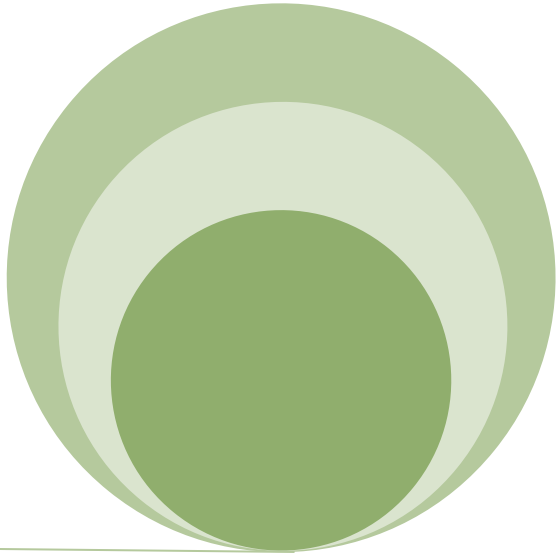
Embedding sustainability in university curriculum can go beyond the formal classroom setting. NUS is piloting a model that integrates intellectual, affective, social, community (and industry) elements in a seamless and meaningful manner for the students through a residential learning environment. As with all pilot program, it requires a good degree of clarity, coherence and communication. It can be a challenging yet enriching journey for all stakeholders.

Contact:

KC Lee (Dr)
Director of Studies
Ridge View Residential College, NUS
rvrleekc@nus.edu.sg

Amy Ho
Director of Environmental Sustainability
NUS
amy.ho@nus.edu.sg

Chapter 5:
Holistic Approaches to Sustainability Topics



De La Salle University - Dasmarinas

2015 ISCN-GULF Best Practice Case Study

Cavite Development Research Program

The Philippines is considered to be one of the most vulnerable countries in the world from climate change impacts. It has become imperative, therefore, for academic institutions in the Philippines to assist the national and local governments in incorporating adaptive and mitigating measures to create disaster risk resilient communities.

The Province of Cavite, where De La Salle University – Dasmarinas (DLSU-D) is located, has shown tremendous growths in terms of population, industrialization, and land conversions during the last decade. These developments, if not properly managed, may lead to ecological destruction and depletion of resources. In coordination with the provincial government of Cavite together with its city and municipal governments, DLSU-D has embarked on a 50-year Cavite Development Research Program (CDRP) which focuses on environmental issues, corporate and social entrepreneurship, and the socio-anthropological dimensions of Cavite, with the aim of improving governance and promoting innovative education toward a sustainable province.

The CRDP seeks to propose sustainable solutions on the areas of water, food security, waste disposal, land use management, traffic, housing needs and adequate infrastructure which will promote sustainable development that is crucial to the province and its people.

Mission:

CDRP proposes to organize quality faculty and student researches into four inter-related mission areas to benefit the province of Cavite's quest for sustainable economic, social and environmental development:

- **Agriculture, land use and environmental impacts**: This focuses on land use, agricultural and industrial activities on the environment including emissions and carbon neutral strategies;
- **Eco-tourism and enterprise development:** Evaluates entrepreneurial product innovations, environmental friendly tourism measures and corporate social responsibility; and
- **Good governance and cultural heritage analysis:** Looks at ways to improve governance structure and provide better understanding of historical perspectives of Cavite province.

Approach:

DLSU-D pursues a learner-centered, collaborative, cross-disciplinary and stakeholder-driven approach in the conduct of its CDRP researches. This method of engagement creates a culture of participation and empowerment and is sustainable, and provides an intellectually and culturally vibrant environment for

academics and students in which teaching and research in the engineering field can proceed as effectively and efficiently as possible.

Centennial Botanic Garden

As a campus-based alternative classroom of the future, the De La Salle University – Dasmarinas (DLSU-D) Centennial Botanic Garden is an exemplar of an innovative venue of teaching and serving as a research center and repository of endemic, threatened and native plant species of the Philippines. The Garden also provides a free area where students and student organizations can rest, study, hold meetings and conduct activities.

The Botanic Garden

Purpose:

1. **SCIENTIFIC RESEARCH**. The Botanic Garden serves as a center where plants are collected and grown for botanical research, breeding studies, plant exchange and experimentation of economically or ornamentally important plants. It also serves as a repository of plant specimens (living or otherwise), which will be constantly maintained and expanded where scholarly student research be produced.
2. **EDUCATIONAL FUNCTION.** The Botanic Garden is aimed to stimulate public curiosity and interest about plant life and their importance to human being. Laboratory works are done within the Garden. Animals and insects are observed and studied in the Garden. Lectures, demonstrations, seminars, special exhibition and guided tours are made available in the Garden.
3. **AESTHETIC AND RECREATIONAL FUNCTION**. The Botanical Garden is promoted as a place where visitor can enjoy the beauty of God's creation.
4. **CONSERVATION FUNCTION**. The Botanical Garden functions as repository for representative specimens of Philippine endemic and endangered species.
5. **STUDENT SERVICE**. The Garden is available to students as a meeting place, study area and activity and recreational area.

Communication:

Due to these initiatives, DLSU-D was awarded National winner in the National Search for Most Sustainable and Eco-friendly School in the Philippines and the First Dark Green School accredited by the Philippine Network of Educators on Environment.

Contact:

Willington Onuh
Asst. Vice-Chancellor for Research
De La Salle University - Dasmarinas
willingtonoonuh@dlsud.edu.ph

Marlon C. Pareja
Director, Environmental Resources Management Center
De La Salle University - Dasmarinas
mcpareja@dlsud.edu.ph

Georgetown University

2015 ISCN-GULF Best Practice Case Study

Sustainability at Georgetown University

Georgetown University is committed to addressing critical sustainability challenges in our local and global communities. Through approaches that reflect our Jesuit heritage, our core mission of creating knowledge and our commitment to justice and the common good, we seek to foster a deeper understanding of the environment and sustainability issues throughout the education experience. We are pursuing broad-based, practical approaches to sustainability, including an ambitious commitment to cut our carbon footprint in half by 2020. With the support of a $20m gift, we have launched the *Georgetown Environment Initiative,* a university-wide effort to advance the interdisciplinary study of the environment. We have also launched a $5m *Georgetown University Energy Prize* to tap the imagination, creativity, and spirit of competition among communities across the country to develop innovative solutions for energy efficiency.

We are implementing real-world sustainability solutions, using the campus as a living laboratory and developing a long-term sustainability strategy to guide our work. Sustainability is integrated throughout the education experience of our students, the scholarly inquiry of our faculty, and our commitment to serving the common good.

Some examples include:

- The environmental law program, the Georgetown Climate Center and the Institute for Public Representation environment clinic at the Georgetown University Law Center;
- Research and coursework on the interactions between environment and health at Georgetown University Medical Center;
- The Science, Technology and International Affairs Program at the School of Foreign Service;
- The Center for Business and Public Policy at the McDonough School of Business, which offers a focus on energy and environmental policy;
- The Environmental and Regulatory Policy Program at the Georgetown Public Policy Institute;
- Faculty research in ecology, evolution & behavior as well as the Environmental Biology major within the Department of Biology;
- The Center for the Environment (CFE) administers the Environmental Studies minor, supports adjunct-taught courses, sponsors prominent speakers, and publishes the student-produced Georgetown University Journal of the Environment (GUJOE).

The Georgetown Environment Initiative

The Georgetown Environment Initiative (GEI) is a university-wide effort to advance the interdisciplinary study of the environment, and to deepen our understanding and ability to address the challenges we face as stewards of the planet's natural resources.

Founded in 2012 through a $20 million gift, GEI is a strategic pillar for environmental scholarship at

Georgetown, and builds on our existing strengths in the field. GEI is guided by a set of core principles that demonstrate our commitment to integrating sustainability throughout the education experience:

- Depth and Innovation in Faculty Scholarship
- Scholarship, Teaching and Learning across Disciplines
- Academic Excellence
- Innovative Academic Programs
- Collaboration and Teamwork
- Educating the Whole Person
- Social Justice
- Impact
- Sustainability Driven

Georgetown University Energy Prize

The Georgetown University Energy Prize (GUEP) is a $5 million prize designed to tap the imagination, creativity and spirit of competition among communities across the country to develop innovative solutions for energy efficiency. The prize is spearheaded by Georgetown's Program on Science in the Public Interest, the Georgetown Environment Initiative, and the McDonough School of Business Global Social Enterprise Initiative.

The prize invites cities and counties in the U.S. with a population from 5,000 to 250,000 to submit detailed, long-term energy-saving plans. Over the next two years, semi-finalists will compete to reduce their utility-supplied energy consumption, and a winning community will ultimately be selected based on their energy-saving performance, innovation of approach, quality of outreach, sustainability and replicability.

Meaningful Impact

Since its launch in April, 2014, the GUEP has supported nearly 100 communities in energy-efficiency planning; has brought together federal agencies, global NGOs, and major corporations with community leaders in small to mid-sized municipalities from across America to plan new approaches to energy efficiency; and is supporting the development of replicable new approaches to community-wide energy efficiency.

The communities participating in the prize have the potential save more than $1 billion in energy costs and cut millions of tons of CO_2 emissions, and are pilot-testing scalable models for energy conservation that can be replicated in communities across the country.

Contact:

Audrey Stewart, MCRP
Director, Office of Sustainability
Planning and Facilities Management
Georgetown University
sustainability@georgetown.edu.

Korea Advanced Institute of Science and Technology

2015 ISCN-GULF Best Practice Case Study

Saudi Aramco-KAIST CO_2 Management Center

Overview:

KAIST has joined forces with Saudi Aramco, the world's leading fossil-fuel provider, to establish a joint research center on CO_2 management. The goal is to develop fundamental understandings and integrative solutions to reduce anthropogenic CO_2 emission, which is seen as the main culprit for climate change. The Saudi Aramco-KAIST CO_2 Management Center, housed on the KAIST campus, is currently sponsoring sixteen research projects involving more than 30 PhD-level researchers and over 100 students. The research projects provide requisite technical and financial supports for developing creative and impactful solutions that are fundamental as well as applied. Our research portfolio includes materials for more energy-efficient CO_2 capture, catalysts and processes for converting CO_2 into valuable products, novel storage methods, and system-level analyses of major CO_2 emitting industries to suggest industry-specific CO_2 reduction strategies. The center activity also includes analyzing impact of potential government or industry-wide policies in the face of various uncertainties, which are technological and economic as well as political. Besides the research activities, the center has also sponsored a seminar series and workshops throughout the year to raise awareness of the importance of CO_2 management in building a sustainable future, in light of the world becoming ever more energy-intensive.

KAIST Campus

Communication:

From the outset, the center is intended to be 'multi-disciplinary' bringing together a number of academic disciplines including chemistry, material science, chemical engineering, mechanical engineering and civil/environmental engineering. It has prompted researchers and students of highly different backgrounds and skill sets to come together and join forces to develop integrative solutions to

real problems of critical importance to the world's sustainability. Carbon management is a problem that requires continuous dialogues and close collaborations among researchers, company managers, politicians, and community citizens; the center has played and will continue to expand its role in bringing all the stakeholders to the common ground.

Lessons learned:

All significant challenges concerning sustainability stretch beyond the boundaries of nations, disciplines, and sectors. Hence, developing effective long-term solutions demand that academic institutions, governments, and private sectors across different nations work together. Only then can dialogues and discussions of substantive weight and breadth occur. The aforementioned collaboration between the two very different (yet excellent in their own rights) institutions, Saudi Aramco, the world's biggest fossil fuel provider, KAIST, one of the world's best research-oriented universities, has generated much publicity and positive driving force for addressing this important problem. It is thought to be a good partnership as KAIST can provide elite research workforces and facilities while Saudi Aramco can efficiently bring developed solutions to practice. Participation by additional parties, such as the two nations' governments and various international organizations, should follow in due time. The lesson is that strong and sincere commitments by significant parties of involved sectors to work together can quickly raise global awareness of sustainability and generate positive impacts.

Contact:

Sung Mo Kang
President
Korea Advanced Institute of Science and Technology
president@kaist.ac.kr

University of Gothenburg

2015 ISCN-GULF Best Practice Case Study

We affect the climate – interdisciplinary seminars to raise awareness

As part of a comprehensive Climate strategy, the University of Gothenburg launched an interdisciplinary Climate seminar series in 2011 to raise awareness of climate change among students and staff.

Overview:

In 2010, the University of Gothenburg adopted a Climate strategy with the main objective to reduce total carbon dioxide emissions by the year 2015, by at least 20 percent compared with 2008 levels. This is being achieved mainly through energy efficiency measures, and by adapting business travel in line with climatic and environmental considerations. Embracing the university's natural potential as a driving force for sustainability through research, education and the invaluable asset of its students, a climate seminar series was launched in 2011. The purpose of the seminars is to highlight the importance of research and interdisciplinary dialogue to understand and ultimately deal successfully with climate change.

Gender and Adaption to Climate Change seminar

From 2011 to 2014, 17 seminars have taken place involving a total of nearly 50 presenters. The presenters consist mainly of researchers from the University of Gothenburg but researchers from Chalmers University of Technology have also been engaged as well as practitioners from public administration and media. The seminars are interdisciplinary involving researchers from different fields and address a wide variety of topics all related to climate change, such as food, politics, media, gender, health and nuclear power. About 1,800 students and staff members have taken part of the seminars.

Communication:

Seminar themes have been linked to university operations and campus, and students have been involved in presentations and panel discussions. In a seminar on Climate and health, the student group Sahlgrenska students for sustainability from the university's medical faculty were invited to present their initiative Meatfree Mondays and discuss the connection between climate change and health through meat consumption. In another seminar, students from the campaign Fossil free were invited to discuss

the matter of divesting the university's funds in the fossil fuel industry, together with researchers in the fields of Practical Philosophy and Technology as well as University representatives.

Lessons Learned:

The University of Gothenburg has a unique breadth in research and education. This can be a challenge in coordinating action for sustainability, but proves to be a huge asset in addressing sustainability challenges such as climate change. In the Climate seminars, researchers from different faculties and with different scientific frames of reference meet and discuss common issues, contributing to valuable insights and new perspectives in the audience as well as for the lecturers. Many times the researchers are not known to each other although they touch upon similar issues in their research. The seminars contribute to foster collaboration across the 8 faculties and 38 institutions of the University of Gothenburg. Attracting students from the entire university, they contribute to a systemic perspective and holistic knowledge for the leaders and practitioners of tomorrow.

Contact:

Ellen Lagrell
Climate Strategy Coordinator
University of Gothenburg
ellen.lagrell@gu.se

Yale University

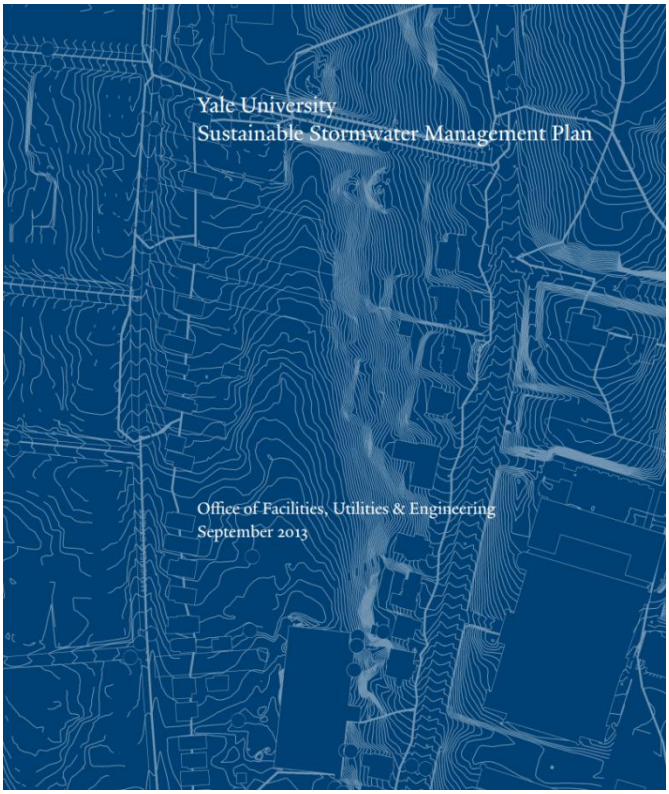
2015 ISCN-GULF Best Practice Case Study

Sustainable Stormwater Management Plan 2013-2016

Collaborative development of a university-wide policy document on sustainable stormwater management that engaged graduate students at the Yale School of Forestry & Environmental Studies and a course, "Payments for Ecosystem Services: Are Investments in Green Infrastructure a Viable Ecosystem Services Approach for Stormwater Management at Yale?," which generated essential research and content for the University's plan.

Overview:

In response to a goal set in the Yale 2010-2013 Sustainability Strategic Plan, Yale University Facilities engaged two School of Forestry & Environmental Studies graduate students to spearhead the development of a Yale Sustainable Stormwater Management Plan. During the fall 2012 semester, the students generated a stormwater runoff model. In the spring 2013 semester, Professors Brad Gentry and Mark Ashton offered a course designed to explore sustainable stormwater management and how it might be implemented at Yale. The course investigated theory and best practices across a range of municipalities and universities and applied the findings to the Yale campus. This work, combined with research and analysis of Yale's specific circumstances provided accurate and insightful information for the Sustainable Stormwater Plan's principles, strategies, and goals.



Sustainable Stormwater Management Plan

The students in Professor Gentry and Ashton's course each delivered research papers that became an integral part of the Plan as referenced appendices to the primary text. The two students who developed the original model were TAs for the course and ultimately wrote the Sustainable Stormwater Management Plan in consultation with Yale Facilities staff members. The resulting Plan documents Yale's existing stormwater assets and describes sustainable stormwater strategies with a focus on green infrastructure.

The Yale Sustainable Stormwater Management Plan was completed in June and published in September 2013. http://www.facilities.yale.edu/publications/MN045850.Stormwater.WEB.lmr.pdf

Communication:

In accordance with the Yale Sustainable Stormwater Management Plan, Yale Facilities hired students in the summer of 2013 to conduct a downspout disconnection survey of Yale's campus. Using a GIS platform they prioritized disconnection opportunities to guide future green infrastructure installations. Students then used the survey for proposed projects on the Yale campus in a course called *Watershed Cycles and Processes* and made their projects construction-ready with guidance from professionals. Two students also completed an independent study to design a rain garden to capture water from a downspout disconnection and collaborated with Facilities staff to install the rain garden in the fall of 2014. http://environment.yale.edu/news/article/planting-green-infrastructure-outside-the-classroom-literally/

Lessons Learned:

It is advantageous to both students and university staff to engage in research collaborations to develop policies appropriate for campus. Collaborations not only provide value to the operations of the university but also empower students. The students are ultimately held responsible to deliver a product to an identified client but also receive guidance from their professors on best practices. Students gain hands-on experience that is invaluable for life after graduation. In this case, an academic partnership with Facilities provided the opportunity for a fruitful collaboration: a campus-wide policy document (the Yale Sustainable Stormwater Management Plan), an important reference document (the Downspout Disconnection Survey), a visible demonstration project (the Sage Hall Rain Garden), and an ongoing relationship for future projects.

Contact:

Virginia Chapman
Director, Office of Sustainability
Yale University
virginia.chapman@yale.edu

Appendix

ISCN-GULF Sustainable Campus Charter

The signatories of the ISCN/GULF Sustainable Campus Charter acknowledge that organizations of research and higher education have a unique role to play in developing the technologies, strategies, citizens, and leaders required for a more sustainable future. Signature of the present charter represents an organization's public commitment to aligning its operations, research, and teaching with the goal of sustainability. The signatories commit to:

- implement the three ISCN/GULF sustainable campus principles described below,
- set concrete and measurable goals for each of the three principles, and strive to achieve them,
- and report regularly and publicly on their organizations' performance in this regard.

Principle 1: To demonstrate respect for nature and society, sustainability considerations should be an integral part of planning, construction, renovation, and operation of buildings on campus.

A sustainable campus infrastructure is governed by respect for natural resources and social responsibility, and embraces the principle of a low carbon economy. Concrete goals embodied in individual buildings can include minimizing environmental impacts (such as energy and water consumption or waste), furthering equal access (such as nondiscrimination of the disabled), and optimizing the integration of the built and natural environments. To ensure buildings on campus can meet these goals in the long term, and in a flexible manner, useful processes include participatory planning (integrating end-users such as faculty, staff, and students) and life-cycle costing (taking into account future cost-savings from sustainable construction).

Principle 2: To ensure long-term sustainable campus development, campus-wide master planning and target-setting should include environmental and social goals.

Sustainable campus development needs to rely on forward-looking planning processes that consider the campus as a whole, and not just individual buildings. These processes can include comprehensive master planning with goals for impact management (for example, limiting use of land and other natural resources and protecting ecosystems), responsible operation (for example encouraging environmentally compatible transport modes and efficiently managing urban flows), and social integration (ensuring user diversity, creating indoor and outdoor spaces for social exchange and shared learning, and supporting ease of access to commerce and services). Such integrated planning can profit from including users and neighbors, and can be strengthened by organization-wide target setting (for example greenhouse gas emission goals).

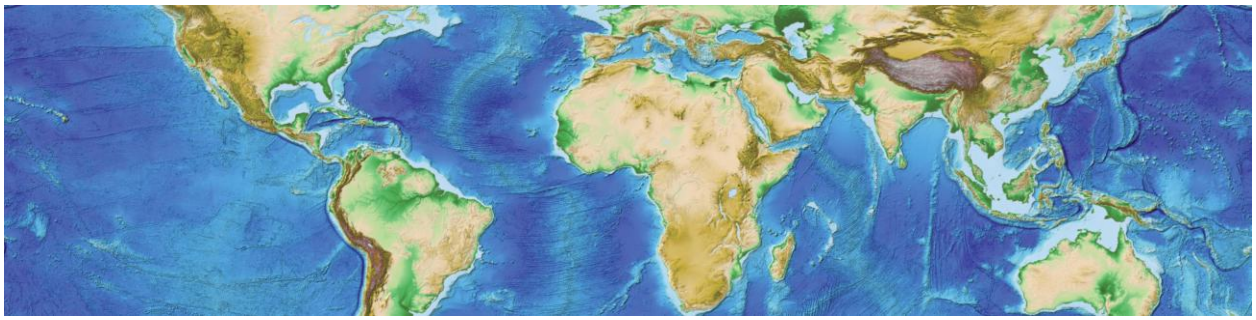
Principle 3: To align the organization's core mission with sustainable development, facilities, research, and education should be linked to create a "living laboratory" for sustainability.

On a sustainable campus, the built environment, operational systems, research, scholarship, and education are linked as a "living laboratory" for sustainability. Users (such as students, faculty, and staff) have access to research, teaching, and learning opportunities on connections between environmental, social, and economic issues. Campus sustainability programs have concrete goals and can bring together campus residents with external partners, such as industry, government, or organized civil society. Beyond exploring a sustainable future in general, such programs can address issues pertinent to research and higher education (such as environmental impacts of research facilities, participatory teaching, or research that transcends disciplines). Institutional commitments (such as a sustainability policy) and dedicated resources (such as a person or team in the administration focused on this task) contribute to success.

As signatories to the ISCN/GULF Charter, we strive to share our goals and experiences on sustainable campus initiatives amongst our peers and other stakeholders. A key instrument for this is our regular reporting on progress under this Charter, which will be supported by the Charter stewardship (provided by the GULF group) and the Charter secretariat function (provided by the ISCN).

Signatory's organization:	Signatory's name/function:	Date:
……	……	……

ISCN Members



The ISCN is presently comprised of 68 member institutions representing 20 countries on 5 continents.

AMERICAS

Ball State University
Boston Architectural College
Brown University
Carnegie Mellon University
Chatham University
Columbia University
Federal University of Rio de Janeiro
Georgetown University
Harvard University
Johns Hopkins University
Massachusetts Institute of Technology
Monterrey Institute for Technology and Higher Education
Pontifical Catholic University of Peru
Stanford University
The University of British Columbia
Universidad Internacional del Ecuador
University of Pennsylvania
Yale University

EUROPE

Aalto University
Anglia Ruskin University
Cyprus University of Technology
Ecole Polytechnique Fédérale de Lausanne (EPFL)
Eindhoven University of Technology
Freie Universität Berlin
Institut Européen d'Administration des Affaires (INSEAD)
Koç University
KTH Royal Institute of Technology
Lappeenranta University of Technology (LUT)
London School of Economics
Norwegian University of Science and Technology
Politecnico di Milano
Stuttgart University of Applied Sciences
Swiss Federal Institute of Technology (ETH Zurich)
Technical University of Denmark
Technische Universität Darmstadt
Universita Ca'Foscari Venezia
Università degli studi di Milano (UNIMI)
Université Libre de Bruxelles
University of Edinburgh
University of Gothenburg
University of Lausanne
University of Liechtenstein
University of Luxembourg
University of Oxford
University of Salerno
University of Siena
University of Zagreb

AFRICA

Covenant University
University of Cape Town

ASIA

Chulalongkorn University
De La Salle University - Dasmarinas
Hokkaido University
Indian Institute of Technology Madras
Keio University
Nanyang Technological University
National University of Singapore
Osaka University
Peking University
RMIT International University Vietnam
Shandong Jiaotong University
Thammasat University
The University of Hong Kong
Tsinghua University
The University of Malaya
Universiti Malaysia Sabah

AUSTRALIA

The University of Melbourne
The University of Western Australia

The ISCN Membership Directory is available at: http://www.international-sustainable-campus-network.org

About the ISCN

The International Sustainable Campus Network (ISCN) provides a global forum to support leading colleges, universities, and corporate campuses in the exchange of information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability in research and teaching.

The ISCN is managed by the network's Secretariat, operated by Sustainserv, Inc., and its strategic development is guided by a Steering Committee including representatives of the five schools who generously host the ISCN:

NUS National University of Singapore

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

UNIVERSITY OF HONG KONG

NANYANG TECHNOLOGICAL UNIVERSITY

Joining the ISCN

For an organization to join the ISCN, its president, vice-chancellor, rector, or CEO has to sign the ISCN-GULF Sustainable Campus Charter document. By that, he or she is committing their organization to uphold the Charter's three principles focused on sustainability with relation to individual buildings, campus-wide programs, and an integrated "living laboratory" approach that connects facilities with education, research, and outreach.

Contact

ISCN Secretariat
c/o Sustainserv, Inc.
31 State ST., 10th floor
Boston, MA 02109, USA
Phone: +1 617 330 5001
Email: secretariat@isc-netwrok.org
www.isc-network.org

This report may be cited as: ISCN Secretariat, *Developing Skills for Future Leaders – 2015 Sustainable Campus Best Practices from ISCN and GULF Schools,* Boston, MA: International Sustainable Campus Network (ISCN).