



ISCN
International Sustainable Campus Network

ISCN 2016
Working Group Handbook
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Siena, Italy

CAMPUS SUSTAINABILITY CASE STUDIES FROM AROUND THE WORLD



**62 ABSTRACTS WERE SUBMITTED BY
44 INSTITUTIONS IN 21 COUNTRIES
FOR ISCN 2016**

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ISCN WORKING GROUP OVERVIEW

As part of its mission to support colleges and universities in fulfilling their leadership role for advancing knowledge, technology and tools to create a sustainable future, the ISCN has organized working groups. Three of these working groups focus on exploring critical issues and facilitating the development of resources related to the three ISCN-GULF Sustainable Campus Charter principles, and the fourth working group focuses on strengthening a corporate-university dialogue.

- Working Group 1: Buildings and their sustainable performance
- Working Group 2: Campus-wide planning and target setting
- Working Group 3: Integration of research, teaching and facilities
- Working Group 4: Corporate-University dialogue

These working groups are led by experienced faculty and staff from institutions that participate in the ISCN network and are located all over the world.

For the 2016 ISCN Conference, the overall thematic focus is on “Demonstrating Global Campus Sustainability Leadership”. In order to engage with this topic, ISCN encouraged its members to submit abstracts related to these topics. All of the abstracts submitted are organized by working group in this handbook, and some of these abstracts will be presented at the ISCN’s annual conference in Siena, Italy. We hope these abstracts will continue a dialogue on this year’s conference theme.

The call for abstracts asked for projects on promising research, innovative case studies, student initiatives and/or policy developments that integrate sustainability within universities, between universities, and across sectors.



WORKING GROUP 1:

BUILDINGS AND THEIR SUSTAINABLE PERFORMANCE

INTRODUCTION TO ISCN WORKING GROUP 1

In 1916, the world had a population of 1.7 billion people. A hundred years later it is 7 billion and growing and with that growth has come an increasingly unsustainable demand for natural resources and behaviors that are changing our environment. How we respond now, both in understanding the real impact of human activities on the planet and in developing sustainable alternatives, will determine what we pass on to future generations. Consequently, as a society we need to transform ourselves, moving away from a lifestyle of excessive consumption and comfort, to one motivated by a greater respect for nature and an appreciation of the consequences of the daily choices we make.

A key consideration in this transformation is how we live and work, in particular the physical spaces we build and inhabit.

Though the concept of sustainable building design is hardly new, (for example, in ancient Rome the houses of the wealthy middle class used, out of necessity rather than concern for environmental impacts, passive cooling and heating, while in the 19th century, the magnificent Galleria Vittorio Emanuele II in Milan was built with underground cooling chambers and natural ventilation systems in the roof, to create a comfortable internal environment,) the demands of corporate urbanization in the early part of the 20th century, combined with the development of technologies such as air-conditioning, reflective glass and structural steel, saw the construction of more and more enclosed steel and glass buildings in our major cities. All of these needed energy intensive plant and equipment to light and regulate the internal conditions.

Through the war and particularly in the boom period that followed, industries and cities grew at unprecedented rate and, for the most part, the associated development was undertaken with little consideration for environmental impacts. However, in the latter part of the century, the rising cost of energy and a growing concern for the environment, revived interest in sustainable building design and operations (*Reference: Marble-Institute.com*), to a point where now we increasingly see sustainability as a key element in the process of constructing new buildings and infrastructure.

Universities have and continue to play a key role in this process and it was for this reason ISCN Working Group 1 was established. The Group's primary focus is to create a deeper understanding of the environmental impacts of campus activities that will, in turn, lead to practices that ensure sustainability is an integral part of planning, construction, renovation, and operations. While the immediate economic and reputational benefits of this approach are obvious, perhaps more important is the potential flow on effect to the wider community.

The “green campus” provides a living laboratory where innovation is welcomed; where collaborations between student, academic and practitioner are encouraged; where ideas and behaviors can be tested and refined; and where an institution that is often at the heart of a community, can lead by example and through that build an acceptance of new ways of doing things. To *liberally* paraphrase Vitruvius (*De architectura*, 15BCE), the campus design becomes a “science arising from many other sciences and adorned with much and varied learning...” and that learning can be passed on to help create a better and more sustainable future.

The case studies that follow in the Working Group 1 Chapter are part of *our learning* and are an important contribution to the sustainability curriculum that is being developed and shared by the ISCN.

The Working Group received a number of very good case studies but with limited time available not all could be accepted for presentation at ISCN 2016. However, the following projects are excellent examples of campus sustainability and have been included in this chapter for the information of Working Group 1 members. Contact officer details for these projects have been included.

Co-chairs:

Ying Hua, Associate Professor, Cornell University

Bart Meehan, Visiting Fellow, The Australian National University



KTH Live-In Lab - Testbed for building and housing
technology innovations
Royal Institute of Technology,
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To build a sustainable and resource efficient society, we need to plan for the long-term. We need dynamic cities with flexible buildings that can fulfill the resident preferences of today as well as those of tomorrow. Yet, the current adoption rate of new technologies into the residential and construction industry is too low to meet society's targets with regard to energy efficiency. Greater investments are needed within research, development and commercialization, in order to produce new products and services that decrease resource use in buildings and provide new business opportunities in domestic as well as foreign markets. KTH Live-In Lab is our contribution.

KTH Live-In Lab is an open testbed, working under actual living conditions, for test and verification of innovative products and services for the future of the building industry and residential sector. The testbed consists of three buildings and is home to over 300 students.

The Purpose of KTH Live-In Lab is to facilitate collaboration around defining what the future of residential housing will look like. The overall goal is to accelerate the replacement of dominant polluting technologies with novel, more sustainable, technologies. Through collaborative innovation methods, we look to influence and transform current governance institutions and agencies, i.e. transforming the socio-technical regime.

The Aim of KTH Live-In Lab is to shorten the gap between ideas, or research results, and their subsequent large-scale dissemination. Allowing industry, academia and society to collaborate in an open and neutral testbed can lower and redistribute risk, uncertainty and costs in a way that allows for greater market penetration. The products and services can be tested, not only from a technological standpoint but also from an economical and environmental perspective. Technology-specific models can be tested and developed; rules and norms can be questioned and reworked; all to allow for tomorrow's form of living to be redefined and improved upon. The greater innovation rate, combined with new forms of collaboration, new business models and the more extensive spreading of results, allow companies and researchers to realize their full potential. We are convinced that KTH Live-In Lab will be the node for innovation and validation that the industry is in need of. We see is missing, required by both academia and industry are in need of.

The testbed is open for all who would like to test and validate products or services related to how we produce and use buildings, as well as those interested in new business models and collaboration strategies.

The testbed infrastructure is currently being designed, through collaboration between KTH and the industry, to allow for research on not just the technology of today but also that of tomorrow. We are co-creating everything from interior design to business models, involving all possible players as early as the initial design phase.

In KTH Live-In Lab it is possible to test and conduct research on everything from IoT, building management systems and user behaviour to materials and HVAC-systems. Anything with the capacity to redefine the sustainable home of the future.

For more information, visit www.liveinlab.kth.se

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.





The Methodology LVW of partnership between private sector and public universities in Brazil: investment in within campus infrastructure for sustainable energy (generation and efficiency) and the use of its financial surplus tied to in campus education.

Federal University of Rio de Janeiro, Brazil

The project is related to the Working Group One (WG1) and proposes the development of a public-private partnership to raise funds for Brazil's net of public universities, nowadays with very narrow budgets, to invest in within campus infrastructure for sustainable energy generation and/or energetic efficiency. Today there are 112 public universities in Brazil and according to the model proposed they would be individually open to sign contracts with one (or more) private sector companies. In the model, the private party funds, operates and assumes the financial and operational risks in the venture. The government in the other hand would support the initiative by providing subsidies and/or tax breaks to the private investors. In the methodology presented, the private sponsor provides resources for alternative energy generation (for example, solar panels in parking areas) and/or energetic efficiency within the public university campus' space. The financial surplus resulted from the energy saved would constitute a fund which could only be applied on the universities' professors, students and faculty members training, research and/or education. We find this model a way of leveraging the campus's infrastructure to expand the main purpose of the university with today's budget bindings and constraints: education, research and professional training.

Leadership:

The project demonstrates leadership because it's innovative for the region and constitutes a real solution to the current budget constraints. The first partnership can be signed in the near future and would also serve as a prototype for other universities and college hospitals not only in Brazil.

Transferable Objectives:

The project also aims to work as a laboratory for other universities. Its successful implementation would make the campus a test-bed for other universities in other Emerging Markets. Since conference attendees may have experience on similar projects around the world, we are looking forward to listen and absorb their knowledge.

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Innovative Infrastructure at Universidad Internacional del Ecuador International University of Ecuador

International University of Ecuador (UIDE), is located in Quito, the capital city of Ecuador, declared a World Cultural Heritage Site by UNESCO in 1978. The Galapagos Islands, Ecuadorian insular territories, were also recognized by UNESCO as World Heritage Site in 1978.

UIDE, founded as a university college in 1993 was born with the mission to offer “quality education to successful living”. It is a private-financed institution with a leading international reputation for teaching and research. The main motif of its existence was, is and, will be “quality of education”. Since 2012, UIDE became a member of ISCN and GULF as the only Ecuadorian university with sustainable characteristics and innovative infrastructure. This main campus of UIDE was constructed applying basic principles of sustainability, in the middle of a secondary eucalyptus forest with numerous creeks with primary Andean vegetation.

Leadership:

UIDE have only seven major buildings in the whole campus. Our green areas are greatly respected and are one of the major assets of our campus. Sustainability is also promoted through the use of a rainwater collection system. We also developed a waste-water treatment plan; most of this water is reused in watering our large green fields.

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Green Dormitory Building on Campus and Occupant Interaction: student awareness and behavioral survey Bogazici University

One of the oldest buildings on Bogazici University campus, Hamlin Hall, was built in 1871.

This 8000 m² dormitory consists of living areas for students as well as a cafeteria, study rooms, student clubs, a school supply store, a barber, fast food stand and lodging for the Head of the Dorm.

Hamlin Hall achieved to obtain LEED Gold Certificate, being the first historical green building certificate holder in Turkey.

In order to search for the effects of obtaining green building certificate on visitors and occupants of the building, an awareness questionnaire-based survey was carried out. This survey focused on the awareness of green buildings and environmental lifestyle patterns of students who stay at the Hall and the members of the student clubs who use the facilities. The information obtained from the survey was analysed by using Statistical Package for the Social Sciences (SPSS, version 21.0) statistics program and the results will be presented to the working group as part of a discussion on occupant understanding and behaviour.

Leadership:

Even though there have been extensive studies of the technical performance of green building, there has been limited research into the social interaction between infrastructure and occupants and integration of sustainable lifestyles.

The study reveals the effects of green buildings on behavioural change and integration of social elements into the technical applications. As part of the study, the survey methodology, as well as the collected data will be shared and may be useful in helping other universities to complete similar research projects.

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.





Optimizing source separation of waste in university buildings University of Trento

University buildings are waste generators. A correct management of this characteristic can convert them into material recovery actors. Who is in charge for a correct source separation of waste in university buildings must face with problems that generally are not found at domestic level: need of multilingual communication for users, absence/presence of specific materials, commuting criticalities (users can be resident in areas where source separation is organized differently), emptying of hundreds of internal bins. The experience of the University of Trento in this domain is based on own specific pilot studies developed in recent years. Presently a comprehensive project is in progress based on the equilibrium of modern approaches and traditional strategies. A multi-lingual personalized mobile app is planned for university users; QR codes will be applied to source separation bins to help users beyond the conventional messages that are placed on them; the creation of an inventory of bins will allow monitoring the availability of volumes for a correct internal collection of waste. The target is not only the optimization of source separation of waste overcoming the local efficiency at municipal level (already higher than 70%), but also the development of design criteria suitable for universities with similar characteristics.

Leadership:

The target of the University of Trento is not only the internal optimization of source separation of waste, but also the development of original design criteria that will be made available to the sector through an open access article.

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Tilting the balance with Yale's carbon charge: Driving deeper campus engagement and building broader energy awareness through education, incentives, and action
Yale University

Carbon pricing is an emerging topic of conversation in sustainability, but despite growing corporate efforts, few universities are part of the discussion.

As this trend grows, higher education is well poised to sync with the private sector by putting a price on carbon and shedding light on the path forward. To this end, Yale University is conducting an internal carbon pricing experiment to spark mitigation, research, and innovation with respect to climate change.

With twenty campus buildings participating, the University is using its community and infrastructure as a living laboratory for applied research on economics, policy, and behavior change.

As part of the presentation of this case study, the working group will be provided with information on a framework for approaching carbon pricing at a university and discuss some of the challenges and opportunities schools may face when developing and deploying policy instruments aimed at reducing emissions.

The working group will hear stories on topics such as: the motivation and history behind Yale's effort; price and boundary setting; the mechanisms in play; examples of the energy projects participants are conceiving; and the incredible potential for research opportunities and coalition building. By encouraging others to think about carbon pricing in their own contexts, Yale hopes to inspire other institutions and companies to join the conversation.

As part of the discussion the group will participate in a breakout activity in which participants will be provided with a tree diagram, comprised of a series of yes/no questions, to work through a framework toward examples of carbon pricing models suited to the unique priorities of their campuses, ranging from a green revolving fund financed by a carbon tax to a revenue-neutral scheme.

Leadership:

Yale is the first university to institute a carbon price after feedback from students, faculty, alumni, and staff. By testing multiple models. The University aims not only to identify the best version for its campus, but also to share best practices with others, especially the private sector.

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.





A Systematic Procedure for Investigating the Influence of Occupants' Energy Use Patterns on Building Energy Performance in Perth, Western Australia
Murdoch University

Buildings are responsible for more than 40% of global energy use and as much as one third of global Greenhouse Gas (GHG) emissions. Residential energy consumption accounts for a significant proportion of the energy use by buildings.

In Australia, the residential sector is the second biggest national electricity consumer, therefore reducing energy consumption in this area is an effective way mitigating GHG emission and its possible consequences.

Using benchmark software for house energy rating in Australia, *AccuRate sustainability*, this case study scrutinized the determinants of energy consumption in social dwellings in Perth, Western Australia. The required information on households' socio-economic characteristics, their sensation of thermal comfort during summer and winter in dwellings, their clothing habits, their window opening behaviour and the use of home appliances were obtained through conducting household surveys.

The overall result is nevertheless that residential energy consumption cannot be fully explained by building or household characteristics separately. It was further revealed that unconcerned energy use behaviour and lack of awareness about the consequences of extensive energy consumption are the two key factors that can be improved to assist households to use energy more wisely.

Leadership:

Based on the households' actual energy use patterns perceived through direct observation and the result of analysis, practical guidelines will be developed for more energy efficient behaviour. Variation in households' energy consumption as a result of implementing the proposed framework will be then monitored to ensure the effectiveness of the process.

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.





CLEnergy saving. A new university campus in Turin: turning shadows in lights (and vice versa) University of Torino

The University of Turin (Unito) counts over one hundred buildings in and around the city of Turin, with different architectural features and functions: from historical buildings to a new University Campus, designed by a group of architects led by Norman Foster Associates. This new infrastructure, the Campus Luigi Einaudi (CLE) inaugurated in 2012, has quickly become a new symbol of Turin commercial, intellectual and cultural renaissance.

The campus, conceived to host the Faculties of Political Sciences and Law (about 10000 students and 1000 people in staff) presented immediately light and shadow: physically, as it is completely glass covered, and in a more metaphorical way.

Many problems emerged soon, exemplified by the campus' flashing lights in the evening and night (partly due to safety norms), visible to all citizens, and the high energy cost.

What became known as the "CLE affair", promoted an animated debate involving the University government, students, local administration and citizen associations. Starting from this debate previous efforts toward an *Agenda 21* have been revived and Unito has now adopted a new action plan oriented to environmental and social sustainability.

In particular, the creation of an energy saving plan, with participative processes in finding and elaborating data and defining different kind of actions, trying to transform shadow in light (and vice versa, reducing the excessive costs of lighting and air conditioning), has been established. A thorough review of Unito energy consumption was started in 2015, which exposed several issues: the inhomogeneity of data sets, the lack of tools for data visualization and analysis, the lack, for historical sites, of modern equipment for an efficient management and, finally, the inadequate awareness about sustainability issues.

In the absence of centralized tools for building automation, the first steps to improve energy efficiency required collaboration with the users. For this purpose, an interactive web application has been developed. Starting from historical consumption data, several cases of energy waste have been identified: off-hours lighting, sub-optimal heating and air-conditioning schedules etc. Online Open Data tools and real-time monitoring can also improve users' awareness and their engagement in sustainability,

and support the energy management of large building stocks.

Due to the heterogeneity of its building's stock, the experience at Unito might be representative and susceptible of generalization.

Coauthors: Prof. Egidio Dansero, Prof. Marcello Baricco, University of Torino.

Leadership:

Energy efficiency is one of the main challenges Universities face in their path to sustainability. Our experience demonstrates the complexity of the challenge and the huge distance between architects' goals and the reality of day-to-day practice in the Italian bureaucracy. Effective solutions are bound to inclusively involve all of the University components, from technical staff to students, drawing from their enthusiasm.

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The Hive @NTU, an iconic flipped classroom for the millennials Nanyang Technological University

The NTU Hive building is an iconic architecture that gels well with NTU's innovative new "flipped classroom" model for education of millennials. In this new model of learning, students access course content on their own and the face time with professors in class is devoted to team-based learning. NTU targets to convert at least 150 courses in the first year, with a third of them already completed. About 1,500 courses will be converted within five years using this new pedagogy. It will spend about \$75 million implementing this new approach to learning for preparing students with skills that will give them a competitive edge in the 21st century workplace.

Designed to support this new way of learning, The Hive has done away with traditional classroom layouts with its 56 curvilinear smart tutorial rooms that are equipped with the latest technologies. The smart classrooms come with flexible clustered seating, multiple LCD screens and wireless communication tools to facilitate small group discussions. Here students discuss and debate their ideas in their group before sharing and presenting them with the rest of the class. Final-year business and accountancy student Elysia Tan, 22, enjoys the liveliness of the classes that she has attended at The Hive. "Doing away with the standard lectures and working in smaller groups really inject in me that excitement of coming to class. The flipped classroom allows us to spend more time interacting and exchanging ideas and concepts with our classmates and professors and that really helps in our understanding of the subject."

Designed by top UK designer Thomas Heatherwick, the man behind the London Olympic Cauldron, The Hive will support NTU's ambitions in pushing the frontiers of innovation in learning and sustainable building design. "This is a university building like no other. It defies the norms of traditional university buildings and redefines them with its iconic shape and unusual use of space. Within its iconic shape and classroom structure lies the future of learning in Singapore," said NTU's President, Professor Bertil Andersson. The Hive is designed with environment-friendly features, in line with NTU's sustainability principles, its focus on sustainability research and its ambition to achieve a 35 per cent reduction in energy, water and waste by 2020 under its EcoCampus initiative. One of the building's innovative green features is its unique air-conditioning system viz. Passive Displacement Cooling. It comes with special metal coils with cold water flowing through them. This

cools the wind that enters classrooms and removes hot air quickly through convection. Lined with lush greenery, the building also reduces solar glare and heat. Its inverted shape enables the upper floors to shade the lower levels, further cooling the interior. Other energy-saving and sustainability features include energy-efficient light and motion sensors in classrooms, toilets and staircases as well as rooftop Solar PV integration.

The Hive by the numbers

| | |
|-------------------------|--------------------------------------|
| Site area: | 2,000 square metres |
| Gross floor area: | 15,000 square metres (approximately) |
| Building height: | 8 storeys |
| Construction started: | August 2012 |
| Construction completed: | March 2015 |
| Launch date: | 20 October 2015 |

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.





Green University case action at Mediterranea campus in Reggio Calabria

Mediterranea University of Reggio Calabria

Geomatic Valuation University Laboratory (Ge Va U L) is developing a direct experience of real implementation of sustainability, designing strategy for greening *Mediterranea* University campus, through careful climatic calculation of academic building thermal behavior, and consequent economic and physical cost-effectiveness valuation of interventions for passivation, *id est* for radical enhancement of energy efficiency.

This deep thermal knowledge and cost-effectiveness evaluation have been applied to University Campus Architectures *id est* Buildings or Facilities in Reggio Calabria. Geomatic Valuation University Laboratory (GeVaUL) designed their Greening and Building insulation by ecological cork and bio ecological lime plaster with impressive well-being regulatory power.

Technical Bodies of Central State (Ministry of Industry) and Regional Governments found this approach innovative and appropriate. They are investing in passivation of some University Buildings, by bio - ecological cork chain and natural lime plaster, and providing investment capital. Than real world Bio - Ecological Sustainable Retrofitting Yards have been started for selected University Buildings.

Strategic Plan for Sustainability at *Mediterranea* University

Mediterranea University is located in the North of the rebuilt town of Reggio Calabria. As Polytechnic for the Environment, degree programs, academic courses and single subjects are devoted to implement Sustainability, relating themes of sustainable architecture, landscape, urbanism, and infrastructure foster-up environment treasuring and protection, and green economy development. *Mediterranea* University, as other Universities worldwide, has embraced the imperative mission to reduce energy over consumption and consequent CO₂ emissions. To implement it, a <Strategic Plan for Sustainability at *Mediterranea* University> has been draw-up by GeVaUL. The main goal is to identify programs, measures, actions, procedures, interventions, and real works to promote a 'Rational Use of Energy' and reduce energy over consumption and CO₂ emissions.

The Plan sets in place the University's target reductions in carbon dioxide (CO₂) emissions, according to the European Union and World 2020 strategies, and identifies a framework of actions, over the next years, to get energy and CO₂ savings and to meet international University

targets set by International Green University Network. IGUN requires a new post-carbon investment programme to be implemented. Green University foresees an average target of 33% energy saving compared to the conventionally (un-sustainable) designed University.

Typical energy performance enhancements include:

- More efficient lighting;
- Greater use of day-lighting and sensors;
- More efficient heating and cooling systems;
- Better insulated walls and roofs (passivation);
- More efficient windows and glass panes.

The <Strategic Plan for Sustainability at *Mediterranea* University> is based mainly on the operational steps described below.

Step1. "Physical analysis" activity *i.e.* technical characteristics quantification in terms of: behavioral and metabolism modelling and integrated energy - ecological - economic - financial analysis.

Step2. "Impact" quantification *i.e.* valuation, and spread out of all the activity carried out and consequent design of ecological interventions. The tool adopted is Energy Plus integrated with Design Builder interface.

Step3. "Ecological passivation" *i.e.* building heat dispersion reduction through: - roof insulation; - plaster renovation; - windows replacement; -more efficient window panes and glass wall; - solar control window films application. According to a well-known methodology tested in prototype experimental buildings.

Step4. "Decentralized energy production" ("energy democracy") *i.e.* design and installation of geothermal and photovoltaic systems for energy production as well as for heating and cooling energy. Geothermal energy needs supply, then photovoltaic platform roof installation can be used for geothermal system engine and electrical needs. The deep thermal knowledge and cost-effectiveness valuation have been applied to University campus architectures *i.e.* buildings or facilities. It was designed the Greening and building insulation by ecological cork and bio ecological lime plaster with impressive well-being regulatory power. Real world bio - ecological sustainable retrofitting yards have been started for the selected University buildings.

The first step allows measuring the carbon footprint of the *Mediterranea* University campus to provide a better understanding of the energy consumptions and CO₂ emissions and also to establish a baseline against which progress can be measured. The Plan has the main goal to lower down around 48% of energy consumption and CO₂ emissions. Performance targets are summarized in Table 1.

Table 1. Plan performance targets. Objective: 48% in energy consumption and CO₂ emissions reduction. (Note: Table has been split into two sections. Baseline 2015 and Objective are also the same labels for the lower two data rows.)

| | Total theoretical energy use | | Theoretical energy use per m ² area |
|----------------------|------------------------------|-------------------------------------|--|
| | <i>kWh per year</i> | | <i>kWh/m² per year</i> |
| Baseline 2015 | 1.440.000 | $(1.440.000 \setminus 8.000 = 180)$ | 180 |
| Objective | 691.200 | $(691.200 \setminus 8.000 = 86)$ | 86 |

| | Total theoretical Co ₂ Emissions | | Theoretical Emissions per m ² area |
|--|---|----------------------------------|---|
| | <i>Kgs per year</i> | | <i>Kgs/m² per year</i> |
| | 292.004 | $(292.004 \setminus 8.000 = 36)$ | 36 |
| | 140.161 | $(140.161 \setminus 8.000 = 18)$ | 17 |

The step by step procedure starts with a first experimental example. This example of “sustainable passivation” is the work performed on the Department PAU building, using “green” flat roof thermo-insulation and ventilating-air-entraining by adopting material such as natural bio-ecological cork produced in Italy used to clad the flat roof planks. In prototype experimental building, natural insulation and ventilation reduced the energy consumption and use for winter heating as well as for the more demanding summer air conditioning. After just this first single intervention, the annual energy consumption and CO₂ emissions were reduced by almost 20%. The first positive effect is a considerable reduction in energy management costs. Ecological healthy retrofitting costs a little bit more than BAU pure maintenance. Strategy estimates this extra cost for greening and compares it with energy saving, calculating the pay-back period. By adopting a 20 years cycle for analysis, with a discount rate of 4% for the “Business as Usual” scenario and “Sustainable” scenario, return of additional investment is in just 5 years.

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Note: This project was selected for presentation in the Working Group 1 session at ISCN 2016.

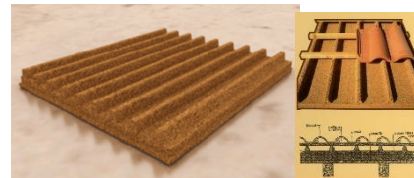
Architecture
Departments at
Mediterranea
University



PAU Department at
Mediterranea
University



Fig. 2. Case Study. Reggio Calabria. *Mediterranea* University. Building Prototype. PAU Department



A



B

Fig 3. Case Study. Reggio Calabria. *Mediterranea* University. Building Prototype. PAU Department. Ventilating and insulating panels made of natural material: cork. A. Ribbed cork panel for winter insulation and summer ventilation (Source: www.lis.it). B. Cork oak forest.



WORKING GROUP 2:

CAMPUS-WIDE PLANNING AND TARGET-SETTING

INTRODUCTION TO ISCN WORKING GROUP 2

As higher education institutions continue to promote sustainability in their overarching goals and visions, target-setting and strategic planning become prominent players in the movement toward more sustainable campuses and communities.

The focus of Working Group 2 is to explore this facet higher education's sustainability. It focuses on the ISCN-GULF Sustainable Campus Charter: *To ensure long-term sustainable campus development, campus-wide master planning, and target-setting should include environmental and social goals.*

Working Group 2 promotes a holistic view of the campus grounded in the mission of higher education institutions—to advance societal change and contribute to solving global challenges, such as sustainability. In Particular, Working Group 2 explores how to address this vision through campus-wide strategic planning and design.

The Working Group received a number of very good case studies but with limited time available not all could be accepted for presentation at ISCN 2016. However, the following projects are excellent examples of campus sustainability and have been included in this chapter for the information of Working Group 2 members. Contact officer details for these projects have been included.

Co-chairs:

Heather Henriksen, Director, Office for Sustainability, Harvard University

Eugenio Morello, Assistant Professor in Urban Design, POLIMI



Sustainability Masterplan for Policies, Plans, Goals, and Actions University of São Paulo

The University of São Paulo (USP) is the largest and one of the most prestigious universities in South America with an academic population of nearly 150,000 people (127,000 students, 17,000 staff members and 6,000 teachers). The USP has 14 campuses around the state of São Paulo and an annual budget of US\$ 250 million, totally funded by the State of São Paulo, Brazil. Almost twenty years ago, USP started to take action in the area of sustainability and in the reduction of its environmental impacts. Due to its immense size and the presence of diverse properties in rural and urban areas, it was necessary to define environmental policies for all campuses prior to decision-making and the establishment of indicators and targets.

Since 2014, USP initiated a comprehensive Sustainability Management Plan. Coordinated by the Superintendence of Environmental Management of the university (SGA), this plan was designed with the following phases:

- 1) Definition of Sustainability Issues Policy for the university (November 2015)
- 2) Definition of Sustainability Issues and Plans (June 2016)
- 3) Sustainability Masterplans with 11 thematic chapters for each campus (July 2017)
- 4) Specific Sustainability Programs of each Faculty or Departments (December 2017)

Although environmental and sustainable actions at USP started up in the 90s, it was only with the creation of the Superintendence of Environmental Management (SGA), that many actions related to sustainability became part of an official program for the entire University. Up until this point, sustainability actions had been compartmentalized, occurring separately at some of the USP's campuses. The USP Sustainability Policy organized the existing actions, the future actions and united a huge contingent of faculties and employees around the environmental cause. With the completion of the first phase it was possible to observe that:

- Greater cohesion is taking place among faculty and staff regarding sustainability issues;
- Faculty and staff now have greater responsibility in their actions related to sustainability;
- After the creation of USP's sustainability policies, a clearer definition occurred, not only of the

university's sustainability issues, but also in defining clear goals, targets and deadlines.

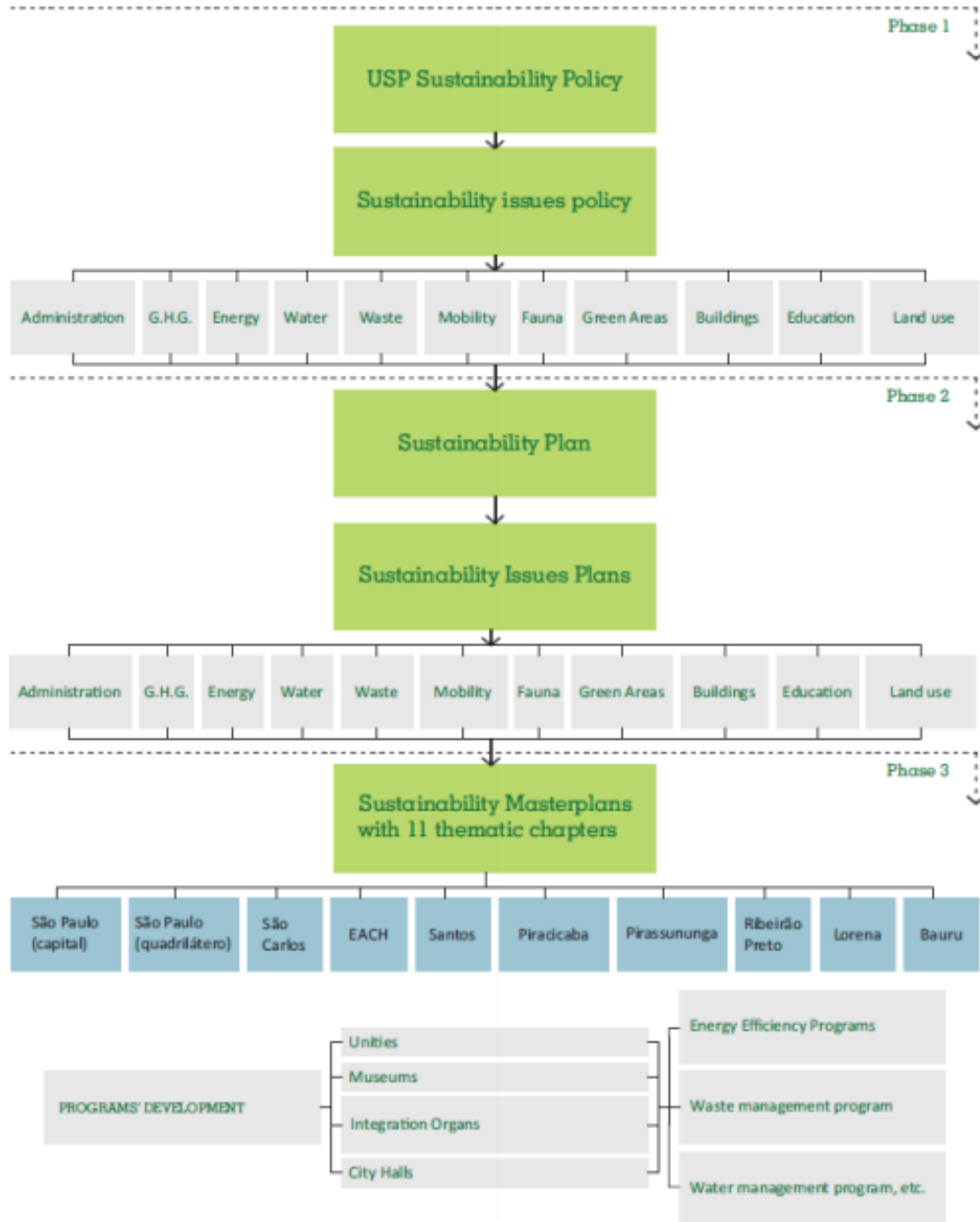
With the completion of the Environmental USP, the University of São Paulo hopes to achieve all goals by its centenary in 2034.

All these actions are ongoing and the deadline for their completion is December 2017. It is an ambitious plan, with almost 1,000 people involved and working in the process. This work intends to present the methodologies developed to achieve the sustainability goals of the University of São Paulo and the results already achieved.

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ENVIRONMENTAL USP





Sustainable University Residence for Foreign Professors Universidad Internacional del Ecuador (UIDE)

Most universities include student residences within their campus compounds, nevertheless, only few of them include projects for short, long-term or even permanent visiting professors. The Direction of Research and Publications of Architecture of UIDE (Universidad Internacional del Ecuador) has developed an innovative plan based on an architectural scheme of one-family dwellings that integrates living, academic and sport activities. This concept allows the architectural module to be flexible to generate a set of residential units that could grow horizontally, vertically and diagonally, adapting to the campus topographic. The main added value of this project lies on sustainable integration of personal and academic experiences by giving the user the right environment to live and work. This prototype unit is based on a simple rectangular shape as a design module, and a regular quadrangular grid as the structural module. This features permit the project to grow in different directions without compromising its structure and design. Just like there is a functional attribute of sustainability in this project, there are also several design qualities of sustainability. The apartments are con-figured to combine passive ventilation, effective sun lighting, rainwater storage and solar energy, among other LEED features, to reach the desired levels of energy efficiency, autonomy and sustainable development.

Leadership:

This project demonstrates leadership since it integrates social, functional and design features of sustainability which may be used in several environmental and topographic conditions on campuses worldwide, with few modification of adaptability. With further study and development, it could be a leading project to be implemented in ISCN campuses.

Transferable Objectives:

Since this is an architectural project for a university campus, many of these general and particular objectives such as providing sustainable residence for professors, applying energy-saving and passive design, and conceptualizing the project with versatility of grow and expansion are very clear goals easy to transfer to the conference attendees, together with all the information and skills within, that may be used on their campuses.

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Showcases in Japan on holistic campus strategic planning National Institute of Technology, Fukushima College

Campus Sustainability Network in Japan (CAS-Net JAPAN) was established in March 2014. I am the Executive Director of CAS-Net JAPAN. CAS-Net JAPAN has published a book named “Good Practices on Campus Sustainability in Japan” this March. The book includes a variety of good examples on campus sustainability. As a showcase on holistic campus strategic planning, I would like to introduce the following four examples in this book which includes 16 good cases.

- Development of Assessment System for Sustainable Campus-ASSC (Hokkaido University)
- 10 years of experience of Student-led EMS (Chiba University)
- Environmental Tax System (Kyoto University)
- Training Project on Regional Rehabilitation for Safer and more Secure Society in Fukushima (National Institute of Technology, Fukushima College)

Each example has its own characteristic based on its background, its location, its history, etc. and is showing its uniqueness which is able to be useful for other higher educational institutions in the world.

Leadership:

This book has firstly collected good practices on campus sustainability in Japan. In that sense, this project has strong leadership in order to guide Japanese universities toward the establishment of sustainable campus.

Transferable Objectives:

The assessment system, the student-led EMS, the environmental tax system and the training project can be applicable to other higher educational institutions.

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Note: This project was selected for presentation in the Working Group 2 session at ISCN 2016.





Supporting the transition towards sustainability in cities and communities through university campus planning and management
Politecnico di Torino

Our society is undergoing profound shifts and changes today – we have seen them affect industries as diverse as music, publishing and transportation. Transition management theories recognize this emerging “New Transformation” as a socio-economic revolution (Loorbach, 2014). The role of university in this transition toward sustainability in cities and urban communities has been already highlighted in literature (e.g. quadruple helix model). However, there is still the need to identify appropriate management models for supporting this transition in cities and university campuses can act as living laboratories for experimenting social innovation and changes.

This paper aims to illustrate and discuss the sustainability governance, planning and management model developed by the Politecnico di Torino. This is named “Green Team” and it is composed by selected members staff from a number of departments, providing an immediate link with updated research in the field.

The Green Team collaborates with a number of existing offices, including ICT, infrastructures and buildings, accounting and it is supported by the Living Lab, established on the base of the WiFi for Energy Project in 2009-2010, which acts as a centre for the monitoring and collection of real time energy consumption and production data. The main strengths of this governance model are highlighted as well as the main results obtained in the first period of activities.

Leadership:

The Green Team provides a new management-governance model, directly linked to research, education and local stakeholders. It leads all activities related to sustainable campus.

Transferable Objectives:

It illustrates a governance model that can be replicated in any other university in the world.

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Related Analysis between Action Plan and Assessment System for physical campus planning Hokkaido University

Recent years, plan forming activities for creating sustainable campus has been increasing along with realization of sustainable campus. But almost these activities are not incorporated PDCA cycle like inspection the practice results of creating sustainable campus, and establish next planning according to these results. Hokkaido University established Action Plan for a Sustainable Campus and Assessment System for Sustainable Campus (ASSC). We used ASSC once a year, and assessed state of progress for development of sustainable campus three times in total during these three years. By checking goal average of classification criteria conformable planning items and verifying the primary factors, we could create next future planning. The planning items of Action Plan are widespread of campus conditions and activities. Even out of those, how to create public space and how to connect with campus and surrounding city like a circulation plan. We are focusing these two items, and checking achievement factors and problems, we could develop design policy and design guideline for both campus and city.

There are few cases using PDCA cycle for developing campus design and holistic activities of sustainable campus. This case study that we will introduce this time, is easy to understand everybody for state of progress in developing stage for sustainable campus. And also it is very clear how to cooperate planning method both campus and urban design.

Transferable Objectives:

We think assessment system for creating sustainable campus is very important and useful not only checking holistic activities for sustainable campus but also planning and design physical campus space and architecture. So this PDCA cycle cooperating action plan and assessment system is useful for all organization that go toward to create sustainable campus.

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The Prize of Collaboration is Resilience. Universities Lead on Inter-Organizational Reuse of surplus assets and equipment Warp It in partnership with University of London

This paper explores a UK case study where Universities have adopted a uniform asset reuse system on a large scale and then encouraged local municipal councils, healthcare, schools and not for profits to participate.

Staff in institutions can give, get and loan surplus assets to other staff within the same organization and also between organizations, creating organization, city, region and country wide asset sharing platforms.

Surplus assets include anything from furniture to fixtures and fittings, office consumable, engineering, medical and lab equipment.

The vision is to connect the public, private, government and not for profit sector to share surplus assets. Where buying new is the last resort and nothing is wasted. A network where reusable items are redistributed for their 2nd and 3rd useful lives. When the items fail they are diverted into repair and reintroduced later.

Since launching in 2011, the system has attracted 50% of the University population and thousands of other organizations, including private sector, central government, hospitals and municipal councils. Avoided impacts are in the order of £5million savings, 2.25 Million KG CO2e avoided, 800 tonnes of waste diverted from landfill. The session is delivered in partnership with University of London.

Leadership:

The Universities have been first to embed the system into practice on campus. This demonstrates to staff circular economy principles must be adopted.

The Universities have made links with each other and external organizations to take advantage of cross organizational trade, influencing sustainability on a city, region and national level.

Transferable Objectives:

The project is scalable in any city. Attendees will get an idea on how they can improve existing or set up new reuse mechanism in the same way. They will also learn tips and tools to help to collaborate with other agencies in the city. Resource materials will be provided.

Breakout Activity:

The breakout activity will be delivered in partnership with University of London and will explore how international campus reuse systems work, with discussion. Attendees will leave with a clear picture of how to improve or build their own system with the pitfalls to avoid and the short cuts to success

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UBC Campus as a Living Laboratory: Lessons Learned from a Decade of Implementation

The University of British Columbia

UBC is a large campus university, hosting around 60,000 staff and students in over 14 million square feet of buildings. Some 20,000 students, faculty, staff and other residents live, work, and learn together at UBC's Vancouver campus, representing a microcosm of many challenges faced by cities around the world.

Over the past decade, UBC has embraced an approach that blends research and operational capital to invest in transforming the built infrastructure of the campus, resulting in over \$80m of investment and a 31% reduction in GHG emissions. The resulting Campus Living Laboratory (CLL) initiative is built around three key elements.

First, all major capital investments are evaluated to identify opportunities for innovative research and demonstration projects. Second, all investment decisions take a full life cycle costing approach in a jurisdiction that imposes a \$55/ton carbon price on all public institutions. Third, a core team at the university provides liaison and engagement services to the private sector in order to build strong innovation partnerships.

Overall, CLL projects support the advancement of UBC's 20-year Sustainability Strategy, which envisions UBC as a thriving living lab that engages a range of partners in testing innovations and demonstrating real-world solutions aimed at improving environmental and human wellbeing.

Drawing on case studies involving green building design, bioenergy systems and distributed power generation, the presentation will highlight lessons from a decade of implementing a living laboratory concept, stimulate a discussion of shared experiences, and ultimately provide participants with a deeper understanding of key considerations around living laboratory implementation at their home campuses.

Leadership:

UBC is recognized as one of the world's leading campuses in terms of reducing emissions and improving the sustainability of a wide range of goods and services that are used in urban centres. CLL projects enable us to innovate and demonstrate solutions and overall provide an example to other urban centres around the world.

Transferable Objectives:

Besides gaining a deeper understanding of a CLL implementation process, participants will learn about a range of open access materials produced through the overall initiative, including guide books that capture lessons from the implementation of energy, food, water and waste systems, and a broader set of curriculum materials which are part of a professional development programme hosted by UBC to support knowledge sharing.

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Note: This project was selected for presentation in the Working Group 2 session at ISCN 2016.





PowerZ: A collective experience to improve energy efficiency @ NTU Nanyang Technological University

NTU's commitment to sustainable development is demonstrated by the EcoCampus Initiative, whose goal is to reduce the consumption of resources (energy, water, waste intensity) by 35% by 2020. EcoCampus aims, among other things, to give students and staff the chance to play an active role in this revolution. The PowerZ app is developed in collaboration with ENGIE Lab Singapore (formerly GDF Suez), a leader in energy services and solutions.

The idea is to involve everyone in increasing the energy efficiency of the campus while having fun at the same time. Bringing together a smartphone virtual experience with practical initiatives on the campus, PowerZ is a team effort, with campus users doing their bit to reduce everyday electricity consumption (e.g. air conditioning) on the campus. Earthlink NTU, the biggest student organization dealing with environmental issues at NTU, is instrumental in the development of PowerZ.

The app has gone through 10 months of development, test bedding and research since September 2014, involving about 1800 students. Based on a sociological and technical analysis, it has been demonstrated that PowerZ raises the general awareness about Energy Efficiency, has the potential to foster sustainable behaviour, and that potentially substantial savings could be achieved.

Leadership:

- Empowering and inspiring students and staff with an innovative gamification tool to save energy with simple, daily activities
- Providing students and staff with information and methods to do so
- Providing a Launchpad for a nationwide/international app for reducing energy consumption and improving thermal comfort

Transferable Objectives:

- Gamification tools can play an important role in engaging people in sustainability
- For the development of such tools, collaborations between a university, a company and a student organisation can be beneficial
- Apps like PowerZ have a great potential for scaling-up

Breakout Activity:

It would be possible to show a video of PowerZ, test out the app in groups/individually and afterwards gather some feedback from the participants. We would be able to showcase the PowerZ Dashboard, with limited functions, to the breakout group.

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Sustainability at Technische Universität Darmstadt – a contribution
towards implementing the turnaround in energy policy
**Technische Universität Darmstadt Directorate for Research and
Technology Transfer**

Holistic campus planning and sustainable urban models—How is your organization demonstrating holistic campus planning and providing opportunities for using the campus as a test-bed for urban modeling?

The Technische Universität Darmstadt aims at becoming a sustainable university in all its sectors. With its pioneer project “EnEff: Stadt Campus Lichtwiese” the university hosts a wide-ranging research project which seeks on realizing the goals of the German “Energiewende” in a smaller urban context. Campus Lichtwiese is one of TU Darmstadt’s two campuses with a huge area of 100 ha, 40 buildings and a complex technical infrastructure. To turn Campus Lichtwiese into a flagship area innovative technologies need to be implemented for energy-supply, load-management and decentralized storage. By introducing an intelligent energy network the University wants to set the right circumstances early on and secure future long-term success. The Campus provides excellent conditions to represent possible changes in smaller urban contexts. It offers:

- A spatial entity (that you rarely find in a comparable urban context)
- One exclusive proprietary (the University itself)
- Autonomous energy-supply by a local block heat and power plant
- A diversity of users (characteristic Campus-uses like offices, laboratories, lecture halls, a canteen and libraries on the one hand but also production-related experimental halls or upcoming residential use)
- An nationally and internationally representative type of University and Science Campus’, evolved in the middle of the last century
- A considerable need for restoration and redensification of the existing building and infrastructure

At first, data representing the status quo at Campus Lichtwiese need to be acquired to subsequently evaluate given potentials to step by step increase the system’s energy efficiency. The key to constantly increase energy efficiency is the reduction of the total energy-use going hand-in-hand with the reduction of CO2 emission and simultaneously cutting the energy import from the public grid.

The main focus is set on electrical and thermal energy supply and the buildings themselves. Departments of Electrical Engineering, Architecture, Mechanical Engineering and Informatics work together hand in hand to reach their common goal. This unique trans-disciplinary and trans-technological approach reflects the major advancement of “EnEff: Stadt Campus Lichtwiese” compared to projects with mono-technological contents. One final target is to establish an on-going energy monitoring which will be based on a sensorial communication network and comprehensive energy regulatory options. New as well as existing buildings will no longer be “simple” passive energy users but will become active participants serving as energy sources or storages within the future local energy supplying system. Important side effects of the project’s analyses are not only permanently less operating costs but also a reduction of arising investment costs for the future system.

The project “EnEff: Stadt Campus Lichtwiese” is an object of study, a suggestion for imitation and further development as well as a multiplier for different urban models, typologies and industries.

The trans-disciplinary and trans-technological approach is a huge challenge—not only technically or structurally but also and particularly socially. There is the urgent need to understand that different disciplines work successfully only if strategies build upon and complement each other. Our project aims to demonstrate this necessity without neglecting the importance of one single discipline.

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Note: This project was selected for presentation in the Working Group 2 session at ISCN 2016.





City within the City Cyprus University of Technology

The Cyprus University of Technology is a newly established university with building facilities mirroring both its speedy development and its sustainable objectives both in combination and in parallel. The decision to situate the institution within the municipality of Lemesos has changed the developmental horizon of the city and has set new guidelines altogether for its future. The university facilities as units and as part of a larger complex host a generous number of users creating a city within the city. Two primary sides have been assigned for the university establishments; the historic city center and a government owned area within 10 minutes walking distance from the city center.

Within this scope the university masterplan was developed as an integral part of the city setting out modern thinking for a greener sustainable future. A holistic approach in designing the new campus was adopted integrating among other bioclimatic principles and new technologies.

Leadership:

The implementation of this project requires the commitment of decision makers and their engagement to set the project on solid grounds and complete it.

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Campus Water, Energy and Environment Nexus (WEEN) Project in CityU for Waste Reduction and Resource Saving City University of Hong Kong

Water, energy and waste are indispensable in human life and therefore, fresh water, supply of energy, and clean environment are identified as key elements for the sustainable development of any nation. City University of Hong Kong has gone to great length in its commitment to sustainable development and so far had great success in the course, however there still remains challenges yet to be faced. In particular, this project highlights the need for better monitoring and data collection to track the effectiveness of the university's efforts and to determine new directives and tasks for improvement; the need for better promotion of the many efforts made around campus as they are not visualized or easily felt unless directly involved with the operations; and the need for greater integration among the sustainability projects and campaigns to paint a larger picture that can hit closer to home within the university community and further extend to urban setting. As one solution to these challenges, the current project suggests the implementation of a water, energy and waste nexus. The proposed platform involves two systems to be integrated on campus: 1) a Smart Bin for upgraded food waste management and tracking; and 2) the implementation of a rooftop rainwater harvesting garden in terms of the cooling effect. Smart Bin is under designing and the cooling effect has been evaluated using the ENVI-met model. Our results show that a temperature drop of 1.3 degree has been observed due to the rainwater layer in the rain garden in the City U. This study provides valuable insight into the applicability of the rainwater harvesting for sustainable water management practice in a highly urbanized city and shows a good example for using the campus as a test-bed for urban modeling.

Leadership:

The central aim of the project is to broaden the opportunities for student's direct involvement into sustainability issues through the student-involved/led research projects that can branch out from the suggested platform. Our vision is to fully utilize the platform as not only a platform to uncover the possibilities toward building a greener campus at CityU but also as an education platform that is deeply integrated into the school's curriculum using the research projects.

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CUHK Green Campus Planning: A Revolutionary Study Commons of University Library Extension, The Chinese University of Hong Kong

Excellence in Sustainable Built Environment

The Library Extension completed in 2012 features a minimalist, sustainable, preservative and conservative design that cleverly integrates a love of nature with respect of history. It echoes with the vision and planning precepts of the Campus Master Plan, and demonstrates how development needs were balanced with preservation concerns. The project involves a 5-storey new extension merging into to the old University Library at an existing open carpark with a sizable basement underneath the University Mall and to create an integrated University Library Complex.

Conserving Places of Value, Preserving the Campus Ecology

The iconic University Mall and Garden dating back to the 1960s are preserved with an innovative design to provide about 4,500 sq.m. of study area and car parking at basement level; the new extension thus maintains a similar height to the original library building and aligns to the iconic axis running along the University Mall. The Mall Garden and Landscape is well preserved with skillful design of skylights under the existing pool. Garden features are also surveyed and restored to their original appearances after the basement construction.

The historical façade of the University Library is preserved to become a feature wall of the atrium space in the new library interior, lighting up by the skylight above, serving as a visual articulation of meeting the Old and the New.

The campus' much loved house swifts, residing previously on the eaves, are migrated also to the south façade with the introduction of artificial nests. Moreover, bird-friendly double glazing glass are also adopted in the extension building to reduce undesirable heat gain and prevents the swifts from unwittingly performing kamikaze.

Place for Education and Research Activities

The project provides generous Learning and Research Commons with advanced IT infrastructure to promote causal interactions and knowledge transfer.

The atrium and glass façade of the Extension connects the interior environment with the campus greeneries. Located in the basement of the Extension is the Learning

Garden, where ample skylights lend sunrays to illuminate the underground study space and enhance the visual openness to the sky. Extensive skylights in the Mall Garden fountains not only flood the underground space with water-diffused light, but also cool the interior and project attractive water reflections on the floor and walls. It creates an amazing and cheerful learning space that students can study under sunlight, water and nature like an outdoor garden.

Green Conscious Building Design

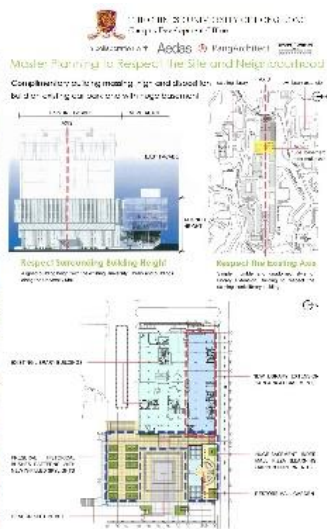
The project is designed for sustainability and energy conscious. While daylight penetration is maximized in the building design, mechanical lighting and air conditioning are closely monitored with environmental sensors. Low / No VOC content building materials and furniture are carefully selected and a paperless study environment is promoted by the advanced IT infrastructure. Green Roof design further facilitates roof farming for the enjoyment of the users.

Achievements



- Green Building Award 2014 – Merit Award (New Buildings Category), Hong Kong Green Building Council
- Special Architectural Award 2013 – Architectural Interior, The Hong Kong Institute of Architects
- Asia Pacific Interior Design Awards 2013 - Best 10 of Public Space Projects.
- HKBEAM Platinum rating, Hong Kong Green Building Council in 2013
- Excellent Class for Indoor Air Quality, Hong Kong Environmental Protection Department in 2014

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Then vs Now

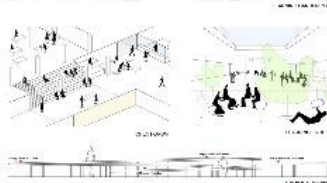
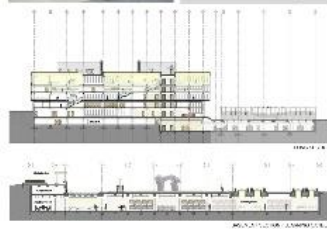



caption: Tsinghua's old Main Building (top) and Library and Old Shop

結合傳統與現代
融會中國與西方

Tsinghua University
1911 - 2011
100 Years of Tsinghua

Traditional & Modern
Culture Integration & Identity





Milano Bicocca makes the difference: a smart path towards sustainability
Milano Bicocca University

Since 2012, Milano Bicocca University is implementing a Carbon Management project, in order to assess the environmental footprint of its activities and to promote actions for emissions reduction.

Bicocca campus is constituted by 28 buildings (290.000 total square meters), with about 33,000 students and 3,000 employees.

The Carbon Footprint estimate is based on energy consumption (thermal and electric energy) of the university buildings, mobility (of students and employees) and waste production. The emissions are calculated in accordance to ISO 14064 first part (GHG inventory for an organization).

The waste production evaluation has allowed to plan a new collection model constituted of specific "separate collection island" placed in strategic positions and the removal of all waste bins from the offices, classrooms and laboratories (with the only exception of paper bins).

This new model for waste management has provided evident positive results since a significant increase from 25 % to 70 % of separate collection has been obtained.

An app for smartphone and tablet (PolApp) has also been realized in order to involve users to participate to the project. PolApp allows to monitor separate collection in real time. Every "island" has an own "Qr code" by which everybody could report quantity and quality of separate collection.

Leadership:

Milano Bicocca University, actively engaged towards environmental, economic and social sustainability, improves the whole campus and places this university among the institutional leaders in disseminating the sustainability culture and best practices among the urban stakeholders, involved in the sustainability management issues.

Transferable Objectives:

The waste management system is potentially transferable to other similar organizations, such as universities, schools and in general public or private companies. The easy implementation, user participation, cost reduction and the environmental benefits - as separate collection improvement and CO2 reduction - are the main features of the ongoing project.

Breakout Activity:

During the European Week for Waste Reduction, Bicocca University realized the event "Bicocca makes the difference" (26/11/2014) in which the new waste system and the app were launched. A photographic contest was also promoted to sensitize users. On march 22nd (International world water day) will be launched the promotion of tap water use, with the installation of water dispenser and the distribution of 6,000 reusable bottles.

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Moving from environment to sustainability at the University of Gothenburg – possibilities, obstacles and challenges

sustainability
University of Gothenburg

In line with global challenges universities in their role as educators of next generation of decision-makers and leaders must take further steps on sustainability. This includes core activities as research and education as well as campus operations and administrative procedures. Environmental concern has for long been on universities agendas but there is still a lack of sustainable social and economics concern; signed agreements as the Global Compact shows intent but no real action. The University of Gothenburg has now started to identify which areas, in connection with the UN Sustainability Development Goals (SDG:s), that have the possibility to enhance and strengthen the sustainability work.

The objectives are to identify activities and proceedings within where relevant researchers, teachers, staff and students might cooperate in order to enhance sustainability at all levels. Another objective is to reflect on potential possibilities, challenges as well as obstacles.

Are the main challenges and obstacles found in the hierarchic structures of universities where academy and administration are regarded as separate, that need to cooperate to reach transformative change? At this moment one encouraging example can be seen in light of the ongoing refugee situation where administration and academia work together to create internships for newly arrived academics. In this presentation we show more examples of identified cooperation possibilities for enhanced sustainability.

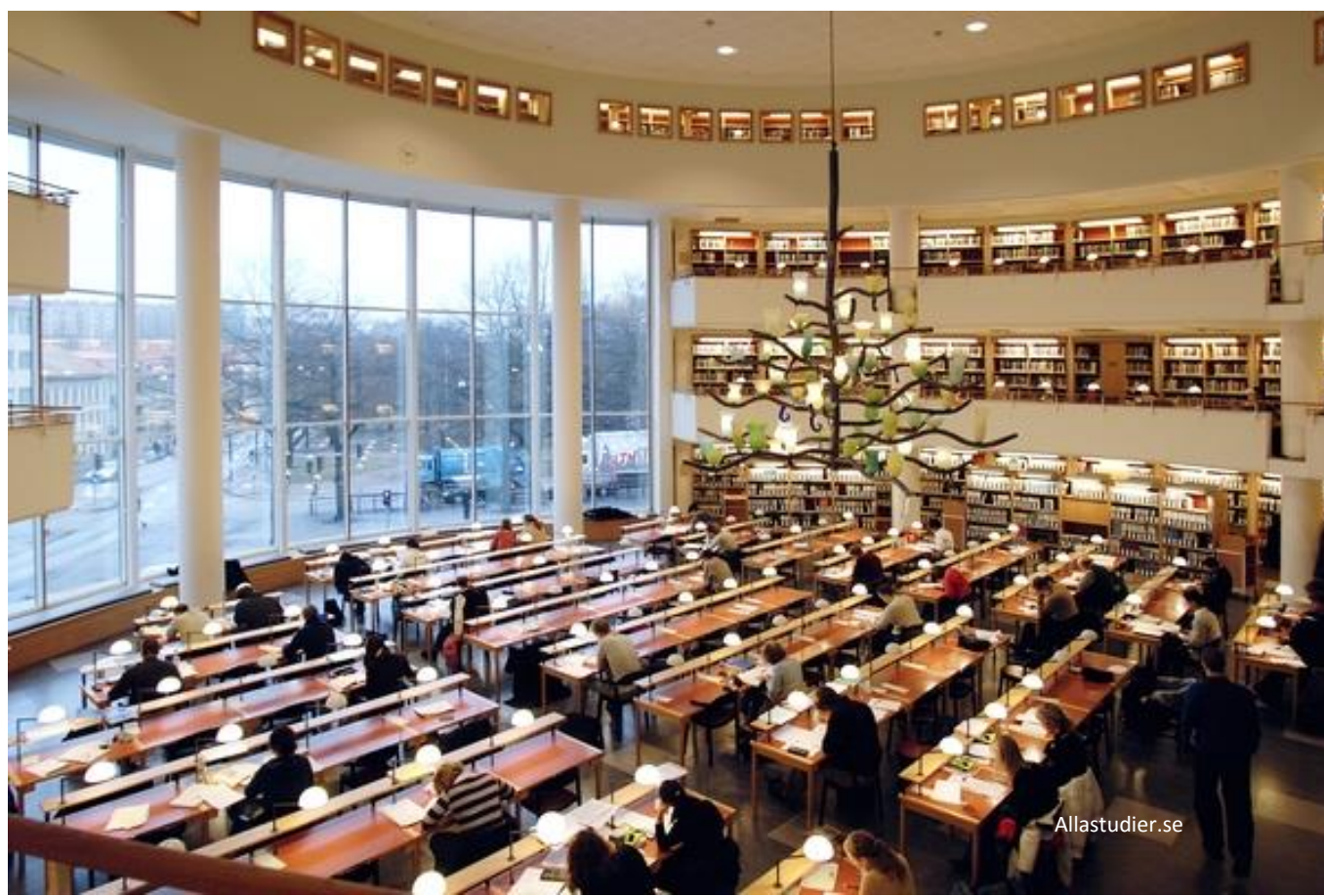
Ullika Lundgren and Eddi Omrcen

Leadership:

The core activities research and teaching has been considered as most important areas for the environmental management system and are even more considered essential for a sustainable development. The university management acknowledge and support the work with extending environmental concern with social and economic responsibility and regards this as a necessary step in line with the universities values.

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Climate Action Planning – What to think about, how to plan University of Gothenburg

University of Gothenburg (UGOT) has implemented its climate strategy 2011-2015. The strategy and the objectives mainly focused on energy efficiency measures and adapting business travels. But there has also been several activities and climate-related efforts in: research and education, purchasing and transportations, computer use and food. There has been a change in policy for buildings and campus planning, and a climate offsetting program has been developed. The overall objective was to reduce CO₂ emissions by the year 2015 by 20 percent compared with 2008 levels. Results from 2015 shows that the total reduction of CO₂ emissions was 18,5 percent.

During 2016 the Climate strategy will be evaluated and the question is how should UGOT continue the systematic and goal directed work with reducing its climate impact and emissions from its operations. But also how could research and education take part in future initiatives. Is there a need for a Climate Action Plan at all? What are the key questions and challenges connected to activities when dealing with scope 1, 2 and 3 measurements? What experiences has UGOT done with its climate related efforts, as well as other universities in the ISCEN network. How should the next steps be planned and managed?

Leadership:

In 2010 the Vice-Chancellor decided that the university should implement its Climate Strategy. The Environmental Unit had the coordinative responsibility and has monitored and evaluated the results and learning experiences. The university management is considering if new climate initiatives should be integrated in other initiatives, and the possibilities to promote and support a more bottom-up process.

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Social Networking between the University and the City University of Torino

In recent years, University is playing a more and more important role as a territorial actor in contemporary cities.

The University of Torino is testing an innovative geo referenced social network called First Life to support the recently inaugurated Campus Luigi Einaudi planning both within the campus area and in its relation with the city. The idea of testing this new technology started from reflections made within a project called *CLE and the territory* which has been organized in order to activate complex socio-spatial dynamics in several fields for promoting sustainability through holistic approach which entails social, economic and environmental perspectives.

The living lab foresees the engagement of students to use First Life (see Fig. 1) to map places and activities related to the way they live the city. Potentialities provided by the platform stand in the social networking functionalities it has.

Differently than in common crowd mapping systems, with First Life is not only possible to collect POI via crowdsourcing. It is aimed at easing collaboration and co-production of services enabling communication channels between users in describing places and activities. Finally, information collected can be considered as a crucial knowledge for urban modeling.

During a workshop organized for university students they started collected POI related to student's daily life. So far, many places have been mapped by them and on the basis of the category, tags and content we are able to identify their uses of urban spaces in and around the Campus Luigi Einaudi, where the experimentation has been carrying on. Notably, the information collected are crucial for two main aspects:

- Firstly, knowing the where of different types of services and activities facilitate the coordination between the people of the university; i.e. if I map the library where is possible to talk, then I will have information about where to organize a study group to discuss (see Fig 2);
- Secondly, from a planning perspective can be of interest knowing how students evaluate different

university services in order to strengthen what is perceived as a weak service and maintain what is evaluate well; i.e. if I know that students eat on the green area of the campus and I know that for them it is a pity not having tables and chairs, then a campus manager would propose a change in the green area providing tables and chairs.

So far, the experimentation has been related to the urban scale of Torino. However, since the mappers where students of the campus the POI are concentrated mostly around the campus area. Next step is to provide an indoor map that will give us more detailed information related to the life within the Campus. For example, professors' offices will be mapped establishing other channel of communication between professors and students.

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Note: This project was selected for presentation in the Working Group 2 session at ISCN 2016.



Fig. 1 Main interface of First Life

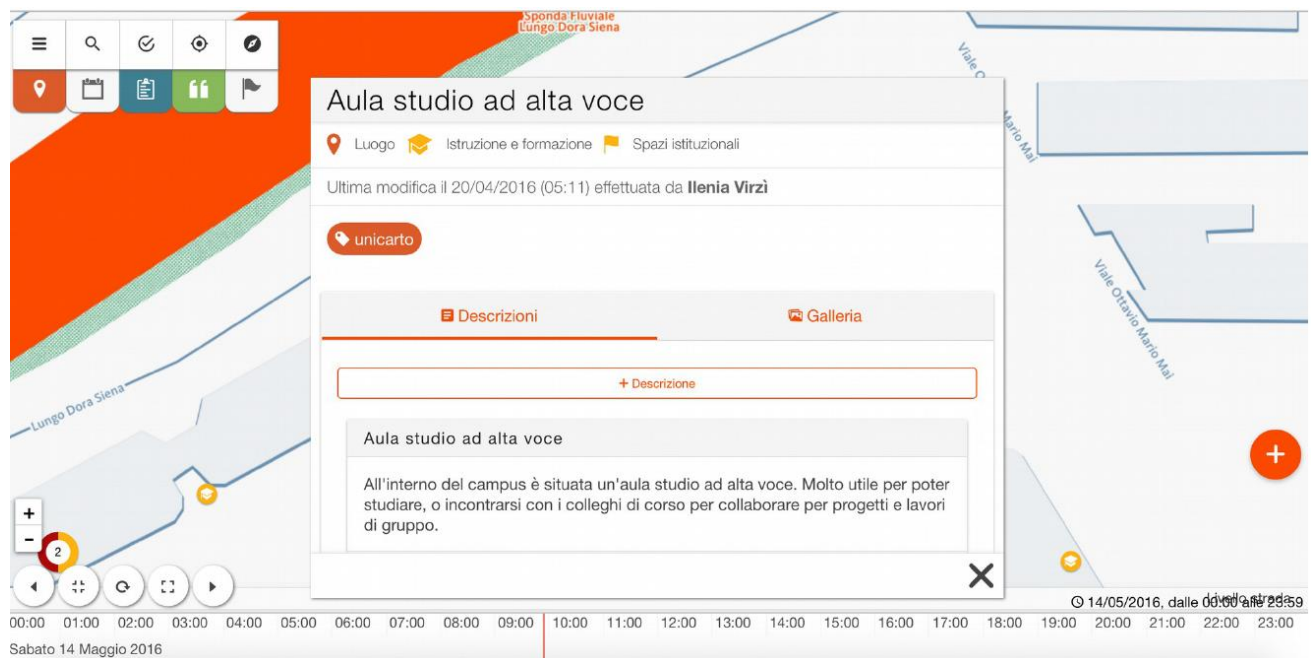


Fig. 2 Example of a mapped POI



The quantification of carbon emissions from the activities of higher education institutions University of Southampton

The calculating and reporting of carbon emissions is becoming an important issue for higher education institutions. Whilst the benefits of emissions reduction are apparent (i.e. reduced utility costs, improved reputation etc.), international pressure is calling for better active emissions management. For many, reduction targets and simple reporting procedures exist for scope 1 (direct) and 2 (electricity, indirect) emissions. However, scope 3 (indirect) emissions are the hardest and costliest to calculate and can represent up to 80% of the footprint. The ability to measure emissions to a sufficient degree of accuracy is key in achieving significant reductions. Difficulties in collecting data which is owned externally, needs extensive measurement, data handling and the time of multiple staff members are often experienced. Although a number of technical guides exist to assist non-expert environment managers, it is apparent that they are unclear, contradicting and unreliable. For these reasons, only singular examples of university carbon footprints exist. This research is concerned with producing a method of quantifying and reporting emissions, sympathetic to the activities of universities whilst avoiding ambiguity and assumptions. Although institutional settings vary greatly, the impact from a diverse array of teaching, research and business activities must be understood.

Leadership:

By having a good understanding of the activities contributing to the carbon footprint, universities can implement effective carbon management policies. A triple bottom line is being increasingly used as a performance metric by industry, prospective students and institutions themselves and engaging with this research promises to demonstrate good sustainability leadership.

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1. Basic Policies

The Environmental Tax System of Kyoto University, which began in FY2008, promoted energy-saving countermeasures in two separate terms: Term I from FY2008 to FY2012 and Term II from FY2013 to FY2015, based on the respective basic policies described below.

- Term I (Period: 5 years, from FY2008 to FY2012)
Implementation of countermeasures considering fair benefits to individual divisions.
- Term II (Period: 3 years, from FY2013 to FY2015)

Preferential implementation and budgeting for highly cost-effective programs, to increase the efficiency of reducing primary energy consumption and CO2 emissions.

2. Collecting and Returning

The Environmental Tax System collects the environmental taxes from the respective divisions in proportion to their energy consumption (4–5%), and an annual budget of approximately 240 million yen, half borne by the divisions and half borne by the expenses of the entire university, is spent on energy-saving countermeasures for hardware. For the divisions, energy-saving countermeasures requiring higher cost than the amount of the taxes collected from them are performed, and budgets are principally allocated to programs with a particularly high energy-saving effect to promote the countermeasures.

3. Effect of Environmental Tax System

Data shows a reduction of energy consumption and CO2 emissions achieved by the program each year based on the Environmental Tax System (and the number of units of major equipment renewed). The primary energy reduction in the years when the program was performed totaled 214,226 GJ/year by simple calculation, equivalent to approximately 9% of the total 2,393,114 GJ/year consumed by the entire university in FY2008 before the commencement of the Environmental Tax System. In addition, the hardware-related countermeasures successfully reduced the primary energy consumption and CO2 emissions by 1% in the consumption rate, which was the target of the university.

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Note: This project was submitted after the abstract submission deadline but ISCN felt that it was important to include it in this handbook.





Economic Profile of Farmers on Disaster Prone Community Pangasinan State University

Climate change has started to significantly affect agriculture and rural landscapes. The Province of Pangasinan including Bayambang is highly vulnerable to natural disaster like flood (NSO, 2010). Farming is one of the sources of income and considering the status of the lands cultivated by the farmers, tenancy and income on invested capital, this study described the economic profile of farmers in Tanolong, identified their needs and at the same time address to the fourth fold program of Pangasinan State University which is the extension and community service through a proposed Contingency Logistic Plan as intervention measures to create awareness and prepare farmers relative to climate change.

The study used the descriptive method of research. It was found out that farmers have minimal capital that resulted to adverse effect on their income; do not own the land cultivated, there is poor production; and decreased the number of harvested crops. The used fertilizers do not guarantee good production of crops. The fruit bearing trees are out of season due to climate change. The crops were damaged by off season-flood and heavy rains. Climate change brought destruction to crops which could not easily adapt to the soil and strange insects appeared

accompanied by disease. Financial management is the primary problem encountered by farmers which include capital and eventually followed by poor production, sales, distribution and inventory management.

Pangasinan State University vision is to become an ASEAN premier state university in 2020. Part of its advocacy is to serve stakeholders which include barangay tanolong as adopted barangay to impart community extension services in particular, the farmers of barangay tanolong. One of the University's Strategic Goals (SG7) is Responsive to Globalization and Diversity; and part of its community extension trust and agenda is livelihood training which is recently conducted at the said barangay. Lately, the administration will be having a Farmer's Training Center where series of seminars and latest technologies as intervention measures could be imparted and reach out farmers.

This includes the proposed Contingency Logistic Plan that serves as the planning framework for the farmers on production, capital flows, control system, communication required in today's farming environment. To teach and

train farmers on the latest technologies to increase their production, sales, income and prepared them to climate change.

Keywords:

Economy, crops, Agriculture, Farmers, Production, Sales, Inventory, Financial Management, Distribution, Contingency Logistic Plan

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Note: This project was submitted after the abstract submission deadline but ISCN felt that it was important to include it in this handbook.



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WORKING GROUP 3:

INTEGRATION OF RESEARCH, TEACHING, AND FACILITIES

INTRODUCTION TO ISCN WORKING GROUP 3

The objective of Working Group 3 is to explore Principle 3 of the ISCN-GULF Sustainable Campus Charter: *To align the organization's core mission with sustainable development, facilities, research, and education should be linked to create a "living laboratory" for sustainability*

Integrated campus sustainability in operations, research, teaching and strategic engagement is an important part of committing to and maintaining sustainability initiatives in higher education institutions. Various approaches to this integration include the concept of using the campus as a living lab to serve as a framework to strategically align coproduction activities temporally and thematically and inform adaptive management practices; incorporating, an environmental management system to provide a useful platform for integration of change concepts and empirical data collected by operations and researchers; and using projects both on campus and within the community to act as shared territories around which actors coalesce and critically reflect. Collaborations often involve relationship building over years, and time scales of academics and other stakeholders often differ (operations and external). Solution-oriented research should also consider future challenges as well as today's. Ultimately, living labs can serve as platforms for social learning and adaptive management over time.

The Working Group received a number of very good case studies but with limited time available not all could be accepted for presentation at ISCN 2016. However, the following projects are excellent examples of campus sustainability and have been included in this chapter for the information of Working Group 3 members. Contact officer details for these projects have been included.

Co-chairs:

Julie Newman, Director, Office of Sustainability, MIT

Maki Ikegami, Coordinator, Hokkaido University



Building a Public Institution Sustainability Program from the Ground Up Central Michigan University -- School of Public Service and Global Citizenship

Universities have often been described as a microcosm of the larger society. A medium-sized public university has as part of its campus all of the elements of a small city. The relatively autonomous governance structure of a public university provides a leadership opportunity to rapidly deploy innovative approaches to sustainability throughout the campus community. By securing both top administrative support and grassroots advocates for a more sustainable university campus, an effective program can be instituted in a relatively short period of time which advances the three sustainability goals of environmental stewardship, sound fiscal management and a better quality of life for students, faculty, staff and community members. The paper reviews the process, challenges and successes in developing a comprehensive sustainability program for a public institution. Lessons learned are transferable to a number of different public and private entities.

Leadership:

This work demonstrates the processes of bringing together administrators, facility managers, faculty and staff to build a synergistic sustainability program on campus.

Transferable Objectives:

- 1.) Development of goals and objectives.
- 2.) Getting managerial buy-in.
- 3.) Implementation across campus and with community partners.
- 4.) Reporting and advertising successes.
- 5.) Technology transfer.

Breakout Activity:

Information sharing and tools to enhance sustainability programs and awareness at our home institutions.

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Sustainable Virtues in De La Salle University – Dasmariñas: A Phenomenological Study De La Salle University – Dasmariñas

This paper used a phenomenological method that centered on the understanding of the prevailing sustainable philosophies, orientations and experiences existing in the locus of study - De La Salle University – Dasmariñas (Philippines). I listened and observed on the thoughts, feelings, and social actions of some selected individuals so that I could come to a greater understanding what sustainable virtues they are practicing in their context, and how their virtues were lived out in our community. I can associate my paper under the strand in sustainability skills and competencies because I explored on the different virtues related to sustainability as lived out in our campus. The findings of this study would make greater impact and guidance to our faculty, staff and students in developing their sustainable virtues.

This process allowed me to see and to reflect thematically on the articulated sustainable virtues emerged out of the lived experiences of my co-researchers and discovered what makes their character traits be employed to our environmental concerns and advocacy.

Key Words: virtue, environmental virtues, phenomenological method

Leadership:

My paper aims to explore on the environmental virtues as lived by some selected individuals in our organization. For our leaders or administrators of the campus, the study may provide relevant insights about the sustainability skills and competencies that may be the basis for formulating new policies and programs.

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Transition UGent: a bottom-up initiative towards a more sustainable university Ghent University

The vibrant think-tank 'Transition UGent' engaged over 250 academics, students and people from the university management in suggesting objectives and actions for the Sustainability Policy of Ghent University (Belgium). Founded in 2012, this bottom-up initiative succeeded to place sustainability high on the policy agenda of our university. Through discussions within 9 working groups and using the transition management method, Transition UGent developed system analyses, sustainability visions and transition paths on 9 fields of Ghent University: mobility, energy, food, waste, nature and green, water, art, education and research. At the moment, many visions and ideas find their way into concrete actions and policies.

In our presentation we will focus on the broad participative process, on the most remarkable structural results (e.g. a formal and ambitious Sustainability Vision and a student-led Sustainability Office) and on recent actions and experiments (e.g. a sustainability assessment on food supply in student restaurants, artistic COP21 activities, ambitious mobility plans, food leftovers projects, an education network on sustainability controversies, a transdisciplinary platform on Sustainable Cities). Finally, we will conclude with some recommendations and reflections on this transition approach, on the important role of 'policy entrepreneurs' and student involvement, on lock-ins and bottlenecks, and on convincing skeptical leaders.

Leadership:

This sustainability initiative demonstrates how frontrunners are able to change dominant discourses around strategic issues at a university. The widespread internal support and the way in which a mixed team of 'policy entrepreneurs' take the lead and create windows of opportunities, seem crucial elements to change the universities' agenda.

Transferable Objectives:

We believe conference attendees may find inspiration in the strengths and weaknesses of the transition management method, in our attempts to couple bottom-up processes to the more conventional top-down approaches, and in the concrete results of Transition UGent (from visions through transition paths to all sorts of actions).

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Note: This project was selected for presentation in the Working Group 3 session at ISCN 2016.





Building the future: more sustainable universities for more sustainable generations
Ca' Foscari University of Venice

Since 2010 Ca' Foscari University of Venice has developed a strong commitment to integrate sustainability in its operations, research and teaching.

In the last three years a positive trend can be seen regarding the increase of research projects, publications and courses related to sustainability issues. In particular, the funds dedicated to sustainability research rose about 5% from 2012 and the number of publications on sustainability increased about 10%. Moreover Ca' Foscari developed new degree and master programmes focus on sustainability increasing also the number of courses offered on these topics. The University promotes the acquisition of sustainable competencies also giving extra curricular credits.

This effort is also supported by initiatives, events and campaigns put in action to sensitize the whole community on sustainable issues and in particular the participation of students in activities, that help them to develop soft skills. Some of the most successful initiatives are those that connect sustainable topics with the art world. These initiatives and events, organized by Sustainable Ca' Foscari, allow to get a wide student involvement from different disciplines, giving them the opportunity to put in practice their own cross competencies by actively working on specific projects.

As more and more companies choose to adopt sustainability as perspective in their strategies and operations, it's especially important to educate future generations in sustainability matter, as it is becoming special factor of competitiveness and innovation.

Green economy is reaching a big role in determining the richness of the country, also in terms of employment creation. Sustainability is an important driver in all sectors and Italy is leading Europe in the green reconversion of labour market: Italian "green workers" hired in 2015 are 294.200, the 59% of labour demand.

Based on an Istat survey in 2014 employees with a green job were about 13% of total national employment and the 40% of them is graduated.

These considerations show that the role of universities is even more crucial in contributing employment creation and therefore they must adjust their programmes in this direction.

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Evaluation of Student Sustainability Attributes Hong Kong University of Science and Technology

Many universities are currently developing curricula based on their understanding on how sustainability knowledge (or “competency”) will serve as a foundation for students to succeed in the future. However, there is little data on the kinds of skills that are most important or relevant in the job market. A few studies have attempted to gain a general sense of how important “sustainability” is to employers, but there is still a gap of understanding as to how the broad concept of sustainability breaks down to component parts that can be developed in a university curriculum. This presentation will describe an on-going research project looking at the value and attractiveness of different sets of sustainability skills and attributes from the eyes of employers. Based on a survey of employers, recruiters, and professionals in the field, the study examines students within a framework that breaks sustainability knowledge into a four-by-four matrix, and then overlays the perceived value of hard skills, soft skills, general knowledge, and emotional maturity. The results of the study are expected to challenge current assumptions of curriculum development and offer an alternative approach to teaching sustainability in the university.

Leadership:

This project will provide an alternative to traditional approaches to understanding sustainability as a topic of study at the university level. Even though the pilot is being launched in Hong Kong, the study is designed to be replicable in cities globally, so that results can be compared and tracked over time.

Transferable Objectives:

Attendees will be able to understand the process by which the concept of “sustainability” can be broken into a series of value sets, which will provide a new way of thinking about how to interact with students, how to utilize the campus as a learning lab, and how to influence curricular development.

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Note: This project was selected for presentation in the Working Group 3 session at ISCN 2016.





Creating a sustainability roadmap for the 40'000 students and staff of Nanyang Technological University Nanyang Technological University

In order to shape its sustainability strategy and develop a comprehensive roadmap for its sustainability programs, NTU has embarked on a development process with three key elements. The first two were addressed with support of Sustainerv, an international consultancy on sustainability.

- First, a comprehensive landscape assessment was undertaken. The goal was to have an overview over the sustainability positioning and the activities of key academic institutions around the world.
- Second, a stakeholder consultation process was conducted to better understand the NTUs ongoing sustainability initiatives and their material aspects.
- Third, a set of strategic focal points and key performance indicators (KPIs) will be created on the above elements (ongoing process).

After the vision, mission and the KPIs have been confirmed by NTU management, the university will be able to measure, monitor and report its sustainability performance in line with global standards such as Global Reporting Initiative (GRI). It will also give NTU a clear vision and roadmap to focus and prioritize its sustainability efforts. Additionally, NTU will have a better understanding where the university needs to speed up its efforts and where substantial progress has already been achieved.

Leadership:

- Empowering and inspiring staff and students with a clear vision, mission and roadmap to further contribute to sustainable development
- Providing the university with a comprehensive framework and guidelines
- Making sustainability an integral part of NTUs everyday activities

Transferable Objectives:

- A strategy planning process facilitated by external consultancy on sustainability provides an opportunity for a balanced and open discussion
- Including various stakeholders is not only enriching, but also necessary for a successful process

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Adopting an Engagement Approach for Sustainability Developments @ CityU City University of Hong Kong

Having a capacity for engagement has been considered as instrumental to effective governance and enhanced corporate social responsibility in education, public sector and business. Previous research suggested that the more dialogic and 'on the ground' the engagement is, the more likely it contributes to sustainable change in human behaviors and organizational culture. CityU adopts a stakeholder engagement approach for cross-area synergy to raise awareness and interest of its sustainability agenda on campus and beyond, as exemplified by the launch of the first CityU Sustainability Summit in 2014 as the academic signature programme in the celebration of the University's 30th anniversary. This presentation will elaborate the concept and strategies of engagement as applied, illustrated with examples of its execution in terms of joint-efforts among faculty, staff and students for sustainability. One of the strategies being the launch and development of Campus Sustainability Fund (CSF), a university-level annual funding vehicle since 2012, as an instrument to integrate research, education and campus management for campus-wide sustainability developments.

Leadership:

Effective governance contributes to smooth targets setting of a university and members can learn from the experiences we shared on the execution of stakeholder engagement approach and how it helps senior management to mobilize faculty, staff, students working together for a common goal of campus-wide sustainability developments.

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Responsible Futures: a collaborative approach to a sustainability vision Anglia Ruskin University

At Anglia Ruskin University we have made a clear and ambitious commitment to equip all our students with the knowledge and understanding, skills and attributes they will need to work and live in a way that safeguards environmental, social and economic wellbeing, both today and in the future. We are doing this by building on our core strengths in teaching and research across all of our faculties, and redeveloping our campus as a showcase of good environmental practice. Most crucially we are also doing this through the co-production of a shared narrative with our students and are being supported in this by the UK National Union of Students. This paper will illustrate how our Responsible Futures programme is building leadership and strategic capacity within our university, advancing the delivery of ESD as part of the formal and informal curriculum and equipping students with a range of personal, interpersonal and specific skills aimed at developing students as critical thinkers and agents of change. It will also provide a reflection on the use of a practical 'workbook' and student-led accreditation process to formally report on process.

Leadership:

This project demonstrates institutional, staff and student leadership. ARU high-level ambitious strategic commitment to sustainability is helping to shape its curriculum, research, physical infrastructure, culture and values. Dedicated staff provide development and capacity building for others and the NUS and SU engender leadership and other skills in the students involved.

Transferable Objectives:

This session will have a practical focus and demonstrate the challenges and success of creating, implementing and measuring progress. These are common objectives relevant to all organizations. In addition, some of the specific actions and outcomes may be transferable across institutions.

Breakout Activity:

How to measure success? The development of meaningful metrics. This session would explore how staff and students can create institutional specific metrics which address their vision and values

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Promoting sustainability learning by mobilizing students' background The University of Tokyo

Student diversity in background is a resource for studying sustainability. Students' background includes prior knowledge, experiences and other cultural factors that affect their way of learning. The paper argues that the various types of contribution (e.g. knowledge source) to the discussion about sustainability issues not only enrich the scenario for solving multi-faceted problems but also progressively enhance students' skills.

Sustainability education is featured by training students with personal skills (for example, critical thinking, systemic thinking, anticipatory competence) and interpersonal skills (like communication, collaboration, negotiation skills). What makes sustainability education different from other types of traditional education is that graduates must be equipped with holistic, interdisciplinary ability to be prepared for future risks and to be adaptive to uncertain changes. Studying in a diverse environment with intensive interactions and learning from both peers and teachers, students have the chance to train themselves in various settings; and moreover, to gradually form an invaluable diverse network for future cooperation. To explain the mechanism, we use theories of constructivism, multiple intelligences and connectivism in teaching and learning.

Leadership:

The paper will help educational practitioners in realizing a good learning resource for taking advantage of every single personal strength for sustainability education. By promoting diversity, students are empowered to be future leaders.

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Student-driven creation and implementation of environmental policy on campus Chalmers University of Technology - Student for Sustainability

This regional example explores the process of creating and implementing a new environmental policy for the student union at Chalmers University of Technology, Gothenburg, Sweden. A student-driven process carried out by members from the non-profit organization Chalmers Students for Sustainability, hereafter referred to as CSS. CSS's main purpose is to promote research, education, cooperation and action for a sustainable development.

In this text we look at the motives behind the project, how it all started and how well the initial aspirations match the final outcomes. We evaluate the organic and somewhat learn-by-doing process of carrying out the project and analyse the implications this might have had on the project as a whole. In summary, we look at lessons learnt for replicating the project at other campuses worldwide and the role that students may have in the general context of improved sustainability performance of their campus, thereby setting a standard for society at large.

Leadership:

This project demonstrates leadership as it is the result of student involvement. It has been driven bottom-up by students at Chalmers University and shows that students can lead change on campus and influence decision-making at high levels. Leading the sustainable development of campus.

Transferable Objectives:

As this project is carried out mainly by CSS, a student-driven organization, it could serve as an example showing that there is both room and need for greater student involvement as well as collaborative projects between students and academia.

Duplicating this project at other universities and academic institutions worldwide should be possible as the main prerequisite for its success is ambitious students.

Breakout Activity:

A breakout activity suitable for this project would be to hold a similar workshop to the ones we used in the project where we gathered different actors from the student union and created the environmental policy and an action plan for how to implement it. This workshop process could be taught.

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Sustainability integration in the Nordic higher education institutions (HEIs) Aalto University

Universities are challenged to take a leadership role in promoting sustainability, and expected to work as examples of sustainable communities. Many Nordic HEIs have made efforts to integrate sustainability into their operations, yet, an overall picture of sustainability implementation in the Nordic HEIs has remained unexplored.

The Nordic HEIs inventoried the status of sustainability by implementing a joint project in Rio+20 framework during 2014-2015. The project included a wide survey on the implementation of Rio+20 goals targeted to university staff, and three interactive workshops. The results of the project provide a general insight on the strengths and weaknesses in the Nordic HEIs' sustainability work, and the views of university staff on how their institutions' promote sustainability in teaching and in the services and facilities at campuses. Additionally, the project addressed the views of university teachers on the development achieved in education for sustainability (ESD) and teaching methods related to ESD during the DESD 2005-2014. Finally, new collaboration areas around sustainability literacy were initiated to assure the continuity of the intensive Nordic university collaboration.

This project encourages universities globally to find areas for collaboration and to strive together to reach more sustainable societies.

Leadership:

Recognizing the weaknesses and obstacles in sustainability work is the essential first step towards a change. The Nordic project aimed at finding best practices and key development areas in the region and communicating the results efficiently in institutional, national, Nordic and global level.

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University Duisburg-Essen's process development towards a tangible sustainable higher education unit The University of Duisburg-Essen

The University of Duisburg-Essen (UDE) – the ninth biggest University within Germany – considers as its duty the provision of local and global sustainability ambitions. In 2013 the rectorate has concluded that the UDE will initialize and establish – as the first university in NRW – an innovative sustainable development process in the fields of education, research, administration and network activities within 5 years, which includes all stakeholders and especially its 44,000 students and all 3,200 staff members.

Process activities at UDE engage all fields of work of a higher education institution and thus provides a basis of a holistic sustainable development up to a sustainable institution in the future. Lecturer, students, employees, society and ministries will be constantly verified and consolidated which activities are necessary to promote sustainable development at UDE. In this connection they structure and follow up action fields of sustainability, such as operational mobility, diversity or inclusion management. To stabilize the process, sustainability guidelines and arrangements will be formulated for the whole unit. One of the measures shall include the implementation of a green office and shall ensure a permanent integration of university administration, especially by usage of data acquisition systems, reporting obligations, etc.

Leadership:

In order to obtain a holistic sustainable development, the support of the highest and middle management level is relevant. With the approval and positive communication of the UDE's sustainable processes towards the employees and stakeholders by the rectorate and supporters, the sustainable development will be entering into the whole UDE.

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Sustainable and Green Campus Initiative Student Behavior Survey Bogazici University

In recent years, there has been an increasing awareness of the need to manage the impact of human activities on the environment. Environmental education and its role in changing the lifestyle and attitudes of students is therefore crucial in altering future consumer behavior. A Sustainable and Green Campus Questionnaire-based survey was carried out at Bogazici University in Istanbul with the participation of nearly 15% of the students; totally 1864 respondents. The survey focused on the pro-environmental consumer behavior and lifestyle patterns of university students. The information obtained from Sustainable and Green Campus Questionnaire was analyzed by using Statistical Package for the Social Sciences (SPSS, version 21.0) statistics program. Questionnaire results are presented in the paper. It is a true challenge to address the student groups with different consumption and lifestyle patterns in order to motivate them towards more sustainable consumer behavior.

Leadership:

The most important social element of a campus life; students are the focus point of the study. Besides the technical applications, the awareness and environmental lifestyles of the students are searched and students' perspective is investigated.

Transferable Objectives:

The survey of the study can be shared.

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Aalto University's Energy Efficiency Team – a team effort how to make a difference Aalto University Campus & Real Estate

How could we raise awareness of sustainability and smart energy use among our faculty, staff and students? How to motivate change in behavior when it comes to energy use?

Electricity and heat comprises nearly half of the operational costs with Aalto University Campus & Real Estate. The energy costs have a decreasing trend line due to the effective work of Aalto CRE team but a special thanks should go to the Energy Efficiency Team.

The EE team consist of motivated individuals from IT, student union, campus services and Aalto CRE. The EE Team was established four years ago. Twice a year the EE team organizes energy workshops for building-specific personnel responsible for energy, property key contacts per each school, janitors and maintenance supervisors. The EE team participates Earth Hour Climate Action and Energy Awareness Week. The EE team efforts are also the display monitors located in the building lobbies and providing real time energy data. In addition, the EE team has launched "How to save energy" guide for quick wins.

In the future the EE team should expand its target area in order to get a larger community involved and to keep up the high spirit.

Leadership:

Aalto EE team's work supports the goal to make Aalto Otaniemi campus energy self-sufficient by the year 2030. An energy self-sufficient campus means a comprehensive energy system, where energy production, transfer, distribution, storage and consumption support each other. EE team's work is sponsored by the top management of Aalto.

Transferable Objectives:

Open energy web site www.openenergy.fi shares information of our campuses and buildings. It includes project plan for the Energy self-sufficient campus 2030, demonstrates documented case studies and explains our energy efficiency improvements. It also illustrates renewable energy sources on map. Open energy data is available for faculty, staff, students and all the other stakeholders.

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Universities should take care for the cultural education of their students pushing them to learn and apply good practices of emission management in the educational environment. This could result in educate them to use the same approach in their private life and, in a long-term perspective, in their work environment too. Thus Universities are of paramount importance and have a key role in trying to solve Climate Change relating problems.

University of Genoa is implementing sustainable policies and concrete actions in order to improve and to teach its students how to lead a sustainable life. The "SUSTAINABLE UNIGE" project was originally employed to deal with the waste management of main bodies like Universities. Therefore, this project results in improving the University environment, upgrading the exiting waste management system with the application of circular economy and the creation of living lab principles.

Thus we are studying and implementing innovative and sharable principles and the results of this work can be applied to other university and larger public structures, the final goals is to transform wastes in resources. The project aim is also to create awareness on how small changes in people life style can generate bigger results particularly in reducing impacts.

Leadership:

This project is focus on solving the problem of waste management, that is generally considered of non-paramount importance by large structures, while it should be one of their main contributions to reduce polluting and preserve resources.

Transferable Objectives:

The object will be to create reproducible methodologies and best practices to implement circular economy principles in the waste management systems of large structures. The aim is also to share useful information, results, advices and new methodology to reduce the loss of reusable materials and resources.

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A Contagious Ambition: The New-Born Italian Network of Sustainable Universities Università Ca' Foscari Venezia

Trailblazer academic institutions from North America started several decades ago in getting together for green-reporting initiatives and shared environmental management practices in their campuses. However, the results were often an ineffective fruit of a tick-the-box philosophy, where different context and leadership powers brought a lack of base-line and gold standards methodologies for campus sustainability implementation, not to mention the not scalable approaches among North Europe and Mediterranean countries' cases. This project aims to fill this gap starting collecting Italian cases that accelerate the progress towards an institutionalised commitment to sustainability. The Italian Network of Sustainable Universities (called RUS) frames current sustainability management models in a country specific context by setting a shared framework for sustainability metrics, data collection quality and quantity, mapping of transferrable sustainable practices, using strategic management tools, periodic meetings among the participants. The final purposes of RUS are the dissemination of the sustainability culture and best practices among Italian universities and the active engagement of all urban stakeholders gravitating around sustainability management issues. The power of such network is to increase the positive impact of single actions into a gradual national commitment towards green growth, contaminating the surrounding urban stakeholders in terms of added values and saved resources.

Leadership:

The initial core of RUS, gathering the most sustainable universities in Italy, will act as a catalyser to gradually engage all Italian universities; The Italian Rectors Network (CRUI) plays the role of patronage, promotion, guarantor and stimulator of new models and methods promoted by RUS.

Transferable Objectives:

If context-related variable may act as barriers for scalable and transferrable solutions, both private and public actors involved in each participant at RUS can give and receive fruitful feedbacks to other universities, twisting the triple-helix model of Industries, Government and Society toward the invoked low-carbon society.

Breakout Activity:

With the design studio methodology, we can explore which are the three main challenges that Universities has to face nowadays and the three main difference with the past needs in University both in terms of its third mission and its physical infrastructure management.

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MAPEX, AN INNOVATIVE TOOL for CSR in the corporate governance: the MAPEX project management of excellence Perfect Union

The MAPEX, project management excellence, INNOVATIVE METHODOLOGY

For a project to qualify as an excellence it must fit into a policy of excellence and imperatively include:

- Common sense and values, including peace and respect for human rights
- respect for the environment,
- Sustainable Prosperity
- Greater social inclusion for all

The MAPEX (project management excellence) includes the design, monitoring and evaluation of the project. It contains all the basics needed to anchor its efforts in the field of excellence. It may be aimed at beginners to professionals, with its clear structure, concise sentences and numerous concrete examples that allow data assimilation. It stands out from other books by its aim for excellence. Indeed, we will have beautiful method, it will always be the values and common sense prevail.

The project logic is then part of a process of active consciousness and thoughtful putting values at the heart of decision making. Also, you should make it a tool helping to build the better world we want to live and put the legacy we want to leave to future generations.

Leadership:

The MAPEX method is a project template accessible to anyone who wants to register their approach in a sustainable center of excellence: policy makers, service instructors, project engineers, project managers, project managers, responsible for evaluating projects to anyone dream whatever field they are (private or public organizations, government, associations, organizations, companies, individuals ...).

It is addressed to all those who have a heart and exceptional values. Far from being self-centered, the project of excellence must have an open mind to think to think of others and to assess the consequences of the acts. The project excellence is particularly interested in direct and indirect consequences of that act.

Transferable Objectives:

Also, you should make an unprecedented tool that would help build the better world we want to live and at the same time lay the foundation of the legacy we want to leave to future generations. Therefore, the logic of the project is

part of a process of active and reflective consciousness that puts the values at the heart of decision making.

Today, this method reveals the secrets of projects included in a sustainable reality step by step for those who want their project falls in a process of sustainable excellence with values of unity, peace, justice of fairness and sharing.

Breakout Activity:

ONE EXAMPLE OF PROJECT OF EXCELLENCE

MAPEX Climate action -FIGHT AGAINST POVERTY - Aims to fight poverty and the conditions that engenders it, like climate change. Climate concerns us all. It affects our lives and can have very negative effects in our economy. The price to be paid gets very high. Do we need a homeopathic solution or a revolution?

Climate change is the result of an increased concentration of greenhouse gases in the atmosphere. Indeed, in recent years we have seen an exponential increase in greenhouse gas emissions because of the irrational activities of humans.

These include:

- Global warming
- Glaciers melting
- Ecosystems destroyed
- Species made extinct
- Droughts
- Respiratory and infectious diseases
- Hurricanes, cyclones and typhoons
- Fewer sources of drinkable water
- Populations affected by this scourge migrating to other areas

It is together that we must act.

Our current climate is becoming more and more unstable and the consequences for the environment are becoming more serious, for present and future generations alike.

Today, more than ever, we have to accelerate our actions. Nowadays, there are more than 805 million people suffering from starvation. So, if we do not reduce our greenhouse gas emissions, we would have to add an extra 600 million people suffering from starvation by 2080. www.perfectunion.fr

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Enabling student-driven change towards sustainability through the Green Office model rootAbility

We would like to express our interest in contributing to the “Towards Carbon Neutral Universities” UNICA workshop presenting the Green Office (GO) Model as an internationally recognized, award-winning good practice. The GO Model aims to develop a platform for students and employees with the goal of reaching higher university sustainability. The theory of this model is based on 6 principles developed by rootAbility, a social business established in 2012 as a spin-off organization from Maastricht University Green Office. The GO principles entail: (1) student and staff engagement, (2) officially mandated institutional commitment, (3) dedicated resources and budget, (4) a real integration into the university structure, (5) the establishment of partnership and collaboration with internal and external stakeholders and (6) a training process for students and staff. The Green Office Model has been propagating rapidly across Europe, becoming a source of inspiration for students and staff to establish new sustainability hubs or Green Offices. Such GOs or Sustainability hubs have been set up at already 22 universities in 4 countries and were recognized with the UNESCO Prize on Education for Sustainable Development in 2015.

Students, staff and faculty work together in these hubs to initiate, facilitate and implement change towards sustainability in education, research, operations, community and governance. In the GO framework, ideas for sustainability and projects are structured and initiated. Consequently, greater awareness, knowledge and connection amongst students and staff have been achieved. The presentation will feature different case studies of GOs to showcase good practices and projects developed.

Case studies of Green Offices in the UK, Germany, the Netherlands and Belgium would be discussed as well as the projects developed as part of Terracini in Transizione at Bologna University and Green Unito at the University of Turin. Several examples of projects aiming at reducing carbon emissions and promoting sustainability awareness will be presented (e.g. energy reductions and renewable energy, sustainable food consumption, mobility, waste management projects, etc.). The

contribution will be a joint effort of rootAbility, Terracini in Transizione and Green Unito. These three initiatives are currently working together to better adapt the GO model to the Italian context and specifically to Bologna and Turin University, with a specific focus of setting up student-led and staff-supported sustainability hubs. The University of Bologna has implemented several sustainability projects and initiatives with the involvement of students, staff and academia such as the Sustainability Action Plan and Terracini Campus Transition initiatives. Green Unito is an interdisciplinary network within the University of Turin with the collaboration of students, researchers, professors and administrative staff. Green Unito has several active projects such as an electrical audit with the student's support and an online platform for energy monitoring. Additionally, Green Unito is developing a best practices handbook in order to improve users' awareness and is organizing conferences on sustainability issues.

Leadership:

Students are involved as leaders and drivers of the sustainability hub and they are supported by the university staff. They are empowered and they develop specific and relevant competences and skills.

Transferable Objectives:

Understanding what is the Green Office model and how can be adapted to their institutions considering the specific challenges, peculiarities and characteristics of their contexts.

Breakout Activity:

The participants will interactively reflect on the challenges and opportunities for developing a sustainability hub in their institutions and they will be invited to find strategies and solutions to increase the collaboration between students, staff and academics in their university in order to promote a sustainability transition.

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Note: This project was selected for presentation in the Working Group 3 session at ISCN 2016.



Building Collaborative Capacity across Faculty, Students and
Community to Advance Sustainability Education
University of Vermont

Global change is increasingly understood as systemic, eco-social and complex. As this conference highlights, these complex challenges require that institutions deepen the capacity to foster leadership and catalyze systemic responses to both local and regional problems. In Vermont students are demanding sustainability education at a time that private and public sector organizations are seeking young professionals with renewed visions for integrating sustainability into their structures and strategies. For such visions to be realized, students will need skills and competencies for working across boundaries and differences ranging from diverse disciplines and methods, to identities and cultures; and many of those skills will come from humanistic perspectives that are often overlooked in favor of technical orientations. This talk will highlight a faculty fellows program from the University of Vermont as a university-wide approach to shifting the curriculum and creating actionable pathways for change including a student-driven general education requirement in sustainability for students of all majors. The presentation will also draw insights from the presenter's work in sustainability and pedagogy of more than 15 years, including a Global South perspective to view the challenges and opportunities of revitalizing global partnerships for sustainable development as called for in SDG 17.

Leadership:

This visionary partnering of faculty fellows across UVM's colleges, programs and regional networks builds a culture of collaboration that captures emerging strategies and opportunities. For example, one outcome is a Masters in Leadership for Sustainability. An additional example from the presenter's international work at Middlebury College will offer insights about enriching global partnerships.

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*Note: This project was selected for presentation in the
Working Group 3 session at ISCN 2016.*





Italian Network of Sustainable Universities and Professional
Development of University Educators. Analysis of Existing and
Hypothesis of Improvement
University of Bari

The fundamental role of higher education in transition for sustainability is indisputable (TILBURY D., 2011; STERLING S. ET AL. 2013; COPERNICUS ALLIANCE, 2013; UNESCO, 2014), but European Universities insisting in professional development of university educator are not numerous (UE4SD, 2014).

In Italy this lack is especially clear (UE4SD, 2015): few university educators are aware of UNECE's competencies of education for sustainable development (2011) and, due to this, there are only few learning initiative around these competencies are available for Italian university educators.

This proposal is focused on RUS (Italian Network of Sustainable University): this new network can be an opportunity to implement initiatives of professional development for university educator.

In detail, Bari University and Engineering School of Bari are doing a study among universities that are part of RUS to understand:

- whether and how the UNECE skills are known among university educators;
- whether and what opportunities for professional development each university offers to its university educator and possibly those of other universities RUS.

The requests of professional development coming from the RUS members is the basis of a proposal for professional and knowledge development of competences for education to sustainable development for university educators of RUS. This professional development proposal will be organize based on the model of European best practices (UE4SD, 2015).

Leadership:

The proposal focuses on the importance to promote professional development paths within Italian university educators for a decisive leadership. Experienced teachers could help students to face problems of global changes consciously, to establish social well-being, to generate resilience. Promoting the acquisition of strong competencies of education for sustainable development in university educators can allow achieving this essential aim.

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Sustainability Labelling of courses and programs - experiences from University of Gothenburg University of Gothenburg

University of Gothenburg (UGOT) has, for many years, had as an objective to increase the integration of sustainable development into education. Since 2006 UGOT has had a specific labelling of courses and programs related to environmental issues. In 2011 the eco-labelling was developed into a sustainability labelling. In 2013 new and clearer criteria was requested from teachers, course managers and the University board of education. In 2014 the University board of education took the decision on 10 new criteria. The purpose of the revision of the criteria was to develop:

- Clearer delineation and focus on the concept of sustainable development (SD);
- Clear criteria for when a course or program should be sustainability labelled;
- Clarity for the students how course or program relates to SD;
- Evident in syllabus on how SD is integrated – must be visible in the learning outcomes;
- Criteria that was perceived as relevant to course managers.

UGOT has stressed on the interdisciplinary approach of the sustainability concept with the help of documents from the United Nations and UNESCO and has focused on the difference between EE (environmental education) and ESD (education for sustainable development). This means that pure environmental courses/programs cannot be labelled unless the complexity of the economy, society/human, nature/environment in a global perspective is handled. Nor can the courses/programs be sustainability labelled if social issues are discussed without relating to natural resources.

In the new criteria we wanted to enrich such content and bring in aspects of natural environment, natural resources and allocation of resources into the discussion to get the students to learn about what is sometimes called Wicked Sustainability Problems. UGOT also wanted to highlight the interdisciplinary perspective and not support that each dimension was handled separately since the learning in ESD means to learn to manage complexity.

Today the courses and programs are labelled if they are: “Sustainability focused” or “Sustainability related”. The results from 2015 show that 8 percent of all courses (200 out of 2504) and 13 percent of all programs (32 out of 243) are sustainability labelled.

In the presentation we will reflect on the experiences, results and effects from the implementation of the labelling process. We will also discuss the possibilities for future use of the labelling of courses and programs.

How this demonstrates leadership:

In 2013 the Deputy Vice-Chancellor for education put strong focus on Sustainable development and the sustainability labelling of courses and programs ended up high on the agenda for the University board of education. The board is now responsible for the further implementation and evaluation of the labelling process.

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Labels: Sustainability focused and
Sustainability related courses and programs.



Improved operations management that supports a sustainable university- case studies from University of Gothenburg

Within the environmental management system (EMS) at University of Gothenburg, operations have been targeted for more than ten years in order to reduce environmental impact. An EMS provides a systematic way of managing an organization's environmental issues and is based on a 'Plan-Do-Check-Act' (PDCA) model developed by Edwards Deming. The EMS gives order and consistency for organizations to address environmental concerns through a systematic approach, the allocation of resources, assignment of responsibility and ongoing evaluation of practices, procedures and processes. The guiding principle of an EMS is "continual environmental improvement") and the EMS serves as a tool to improve environmental performance. The University is both certified in accordance with ISO 14001 and EMAS registered

Within the areas of procurement, waste management, chemical handling and SHE (safety, health and environment) management, targets, plans and web-based support systems have been developed, evaluated and refined and results have been reported showing better management and decreased environmental impact.

The targets have been to reduce the total amount of generated waste and to increase amounts recycled materials. Targets were also to increase the amount of procurements with ethical and environmental demands. To improve chemical handling and SHE management, actions and reporting are supported by easily accessible web based KLARA system (chemicals) and GURIA system (risk, improvements).

The work with targets and plans for these four operation areas have been successful and total amount of waste has decreased with 25 per cent since 2009. During 2015 social, ethical and environmental requirements on contractors were put in 93 percent of the procurements. The chemical handling system KLARA holds 11 000 chemicals at the University and is accessible for laboratory responsibilities as well as for administrative staff.

The successful results of working with clear targets and one University wide action plan for environment and sustainability, affecting 6 000 employees and 37 000 students, is demonstrated in these examples.

How this demonstrates leadership:

Through its environmental management system and the demands for measurable targets the management on different levels; departments, faculty and top management, realized the importance of structured procedures and common systems to support it. There is an overall waste plan, directives for environmentally secured procurement and means to maintain and develop the web systems for SHE management.

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Note: This project was selected for presentation in the Working Group 3 session at ISCN 2016.

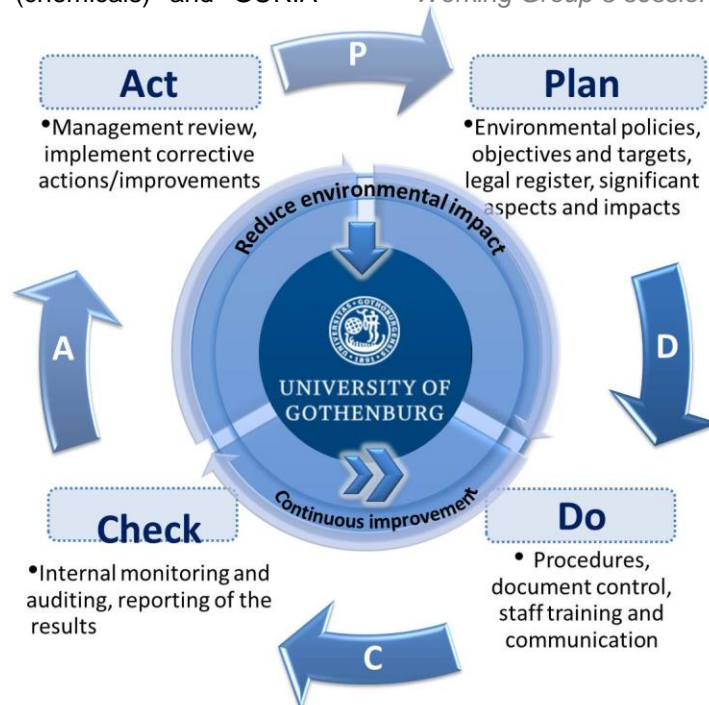


Figure 'Plan-Do-Check-Act' (PDCA) model.

(Source: University of Gothenburg)



Innovative environments for higher education for sustainability: A Campus that connects local, global, virtual and real. Leuphana University Lüneburg

Real-world problems, from loss of biodiversity to epidemics and violent conflicts, manifest globally but strongly affect the lives of people in their local contexts. In order to empower students to address these problems, we need teaching and learning environments that prepare them to address global, real-world challenges in different local contexts. Therefore, we ask, what kind of physical and virtual teaching and learning environment facilitates a comprehensive approach to global and local learning?

The Global Classroom project is collaboration between Arizona State University (USA) and Leuphana University Lüneburg (Germany) funded by Stiftung Mercator. Over three years of implementation and evaluation, we developed a model curriculum for change agents in the global and interconnected world of the 21st century. The curriculum can be visualized as a triangle whose equally long edges represent the three areas of learning (see picture): *Knowing* (Which kinds of knowledge do students need in order to creatively address sustainability challenges?) *Acting* (Which skills and competencies do students need in order to address sustainability challenges?) and *Being* (What kind of mind-set and sense of being-in-the-world do students need in order to address sustainability challenges?).

In order to support this curriculum, we designed a teaching and learning environment that is characterized as self-directed, collaborative, and interdisciplinary. All these dimensions need to align in the design of programs and curricular activities. The Global Classroom teaching-learning environment deliberately utilizes the rich variety of social, cultural, emotional, and physical elements that are provided through the international partnership for class activities. Also, it involves different kinds of relationships between and among students and instructors. Finally, the Global Classroom teaching-learning environment connects the local with the global by making use of virtual and digital technologies. For example, trans-Atlantic students' research projects with businesses and initiatives in Hamburg, Lüneburg and Phoenix extended to and engaged with local communities.

To explore, assess and collect information about problems in the local environment we used experience-based methods. In virtual class settings and intercultural group discussions, the students exchanged local understandings of contexts as well as ways to

conceptualize and address sustainability phenomena on a global scale. Through multiple and interchangeable settings and activities, students developed a comprehensive knowledge base of systemic sustainability challenges and solutions connected to real-world contexts. All activities for exploration, research and exchange were created requiring collaborative skills, self-organization for group work, and open spaces for reflecting on the diversity of dimensions. It also involved varying interdisciplinary team-teaching and coaching situations for instructors.

The trans-Atlantic partnership added to the class the intercultural and global perspective. Real classroom and seminar settings alternated with virtual video conferencing, flipped classroom and online group work. The Global Classroom teaching and learning environment presents a meaningful tools and equipment to organize student research projects internationally, as well as learning opportunities for students to develop a set of professional skills to navigate this type of environment.

Results from the Global Classroom project will be compiled in a resource book in order to support designers and instructors in the envisioning and implementing curricula, as well as designing innovative teaching and learning environments in international higher education for sustainability. Since fall 2015, the curriculum has been transferred in form of a double degree program between Arizona State University and Leuphana University Lüneburg.

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Contact the Global Classroom project and find more information on our website:

globalclassroom@leuphana.de

<http://www.leuphana.de/college-global-classroom>



Leader –Architect, Leader. Analyzing the Iconic Leadership on
Organization Performance. (A Case of Commercial Banks In Kenya)
Mount Kenya University

Leader- architect is what is required in the performance of any organisation. This kind of skill contributes to higher level of performance than any other well-known type of leadership. It's able to create the right mix using the most important business organisation components like formal organisation structure, human and non -human resources, business environment and culture and organization's strategic plan. Creating the right mix is a competency required in today's dynamic and most competitive business environment. There was a positive correlation between performance and leader-architect competency.

Leadership:

This is a demonstration of a competency that is required for excellent performance in a very dynamic and competitive business environment.

Transferable Objectives:

The objective is to create an understanding that it's not just any form of leadership that is required for that outstanding performance but the leader - architect type that is required. one that has the capability of creating the right component mix. This knowledge shall assist organizations in identifying recruiting and retaining those individuals possessing the leader architect competency.

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Strengthening sustainability skills and competencies through the Project Based Learning (PBL) methodology on a Master's Degree on Strategies and Technologies for Development Technical University of Madrid (UPM)

PBL methodology consists of a collaborative and inductive learning system. It is based on a more active student participation involving them in effective search to solve a real problem. As engineering is a discipline where students can learn by doing, PBL has proved to be a highly versatile tool to strengthen knowledge and behavioural skills. In this context, the PBL methodology was used to develop sustainability skill and competences among engineering students.

Within the Master's Degree on Strategies and Technologies for Development (METD) of the Technical University of Madrid (UPM), a conventional semester (7 subjects) has been transformed from specialization in one specific area to a unique comprehensive itinerary introducing the PBL methodology. The following objective was proposed as the challenge to be solved throughout the semester: to develop a programme to improve living conditions of the inhabitants of the Alagoan Semi-arid Region (Brazil) widening the access to basic services. The application of the methodology was supported by a local NGO.

The final semester project report along with outcome rubrics were used for the assessment. Results show the success of the methodology, providing a holistic and experiential learning and improving the capabilities of students to work in multidimensional problems fostering sustainability.

Leadership:

The PBL methodology is usually applied to one individual subject. In this case, PBL was applied to 7 different subjects relating them in a proper way to accomplish the overall objective. This is a unique experience providing students with a comprehensive knowledge on sustainability issues related to basic services on developing countries.

Transferable Objectives:

- To know how to use innovative methodologies to develop sustainability skills and competences
- To strengthen the ability to function on multidisciplinary teams.
- To understand how problems are interrelated on the provision of basic services in developing countries.
- To analyse problems and solutions with a human and sustainable development perspective.

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www.gcrs.ro



Campus Sustainability Fund (CSF): An Instrument to Integrate Education, Research and Campus Operations for Sustainability City University of Hong Kong

The Campus Sustainability Fund (CSF) of City University of Hong Kong (CityU) is the first and the only institutional funding scheme in the higher education sector in Hong Kong with the objective of incentivizing faculty participation and fostering collaboration between faculty, staff and students for a sustainable campus.

Learning by Doing

Since its establishment in 2011, a total of 80 applications have been received and 43 projects have been funded to raise campus awareness in sustainability. Treating the university campus as a laboratory, CSF projects cover themes ranging from environment to culture: air quality, solid waste, energy, food waste, social entrepreneurship, permaculture, biodiversity, building space utilization, sustainable practices in everyday life and cultural resource management. The Fund encourages collaboration between students, faculty and staff in the formation of project teams.

A new category on Enhanced Sustainability Collaboration was introduced in 2015 to encourage faculty to partner with local and overseas universities, government officials, business sector and non-government organizations (NGOs) for strategic collaboration relationships on research, knowledge transfer and student learning activities on sustainability themes.

Raising Campus Awareness

Sustainability Dialogues (a brown-bag seminar series) and Sustainability e-updates (an electronic newsletter) promote interdisciplinary dialogues and raise awareness of sustainability activities in CityU. Information disseminated in the e-updates and discussions in the Dialogues have inspired participants to improve existing projects or develop new initiatives. The forthcoming themes of the Dialogues in 2016-17 include collaborative research on sustainability, space and development, and green catering.

Contact:

Professor Linda Chelan Li, Associate Provost (Strategic Planning), City University of Hong Kong

Note: This project was submitted after the abstract submission deadline but we felt that it was important to include it in this handbook.





www.ita2u.com

WORKING GROUP 4: CORPORATE-UNIVERSITY DIALOGUE

INTRODUCTION TO ISCN WORKING GROUP 4

Working Group 4 strives to develop an understanding of the sustainability-related skills required for leaders in general management positions to ensure that their decisions are based on integrated and holistic thinking, and support the sustainable development of their companies while opening up dialogue and partnerships with higher education institutions.

Initiating the corporate-university dialogue involves a balance between students, community, present, and future sustainability planning and goal-development. This is an important avenue for developing innovative partnerships and future sustainability initiatives in corporate settings as campuses influence students as future workforce to prioritize sustainability in their careers.

The Working Group received a number of very good case studies but with limited time available not all could be accepted for presentation at ISCN 2016. However, the following projects are excellent examples of campus sustainability and have been included in this chapter for the information of Working Group 4 members. Contact officer details for these projects have been included.

Co-chairs:

André Schneider, Vice-President Resources and Infrastructure, EPFL

Göran Finnveden, Vice-President for Sustainable Development, KTH



Transforming DTU into a Smart Campus DTU, Technical University of Denmark

DTU is investing more than 500 million Euro in an ambitious campus transition process. New buildings are raised at DTU and existing buildings are renovated and upgraded. The building projects include all aspects of energy efficiency technologies and are used to demonstrate new building technologies developed by DTU researchers. By providing students and scientists, companies and municipalities access to the campus infrastructure, building management systems and data, the university is re-thinking the role of the campus as a test bed for smart city solutions. One case is discussed: DTU Smart Avenue. On the central campus avenue 106 LED Smart Street Lights with light control and ICT equipment are installed to test and demonstrate Smart City technologies. The Smart Avenue is the first step in the value chain of developing and testing various sensor technologies in a real life environment. The Smart Avenue is used as a test platform for student as part of their academic curriculum. The following topics will also be discussed: What is the living lab contribution in an educational context? How does DTU smart campus contribute to growth in the community?

Leadership:

DTU Smart Campus leads the way for using campus infrastructure as a learning environment and innovation ground.

Transferable Objectives:

Example of course content using smart campus elements

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Note: This project was selected for presentation in the Working Group 4 session at ISCN 2016.





The role of universities in society is undeniable. At universities, the professors, researchers and students are important actors in societal interaction (Andersen 2012). However, in order to enable, encourage and facilitate university society and company interactions, we need intermediaries that engage in catalyzing the process of interaction. The roles of these intermediaries or mediators, as enabling joint practices and knowledge creation among differing cultures, communities or groups have been found to be important (e.g. Jyrämä and Äyväri 2007). This presentation highlights some organizational forms or practices that are created within the Aalto University community. The models for student engagement such as Design factory as a platform for collaboration, IDBM program as building multidisciplinary participation and Aalto Venture program focusing on entrepreneurship as well as university corporate and city partnerships that enable and facilitate interaction between Aalto University and its surrounding society. Different mediator roles are looked by learning and knowledge sharing as well as network management perspectives. The different types of roles are identified and elaborated through case examples. The presentation concludes with identification of some key models, competences and tasks needed for to enable successful university-society joint activity and networking.

Leadership:

It provides views and models on how to create and lead university and society collaboration

Transferable Objectives:

Models for student and research engagement with society

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Frs2013.ursi.fi



Diverting sustainability from romance; sustainable development as a foci for sectoral education Ozyegin University

Real-life problems for undergraduate students start right before the graduation. Graduating candidates need a variety of skills to face the challenging life conditions and the competitive work environment in Turkey. On the other hand, private sector companies can most of the times be hesitant in employing new graduates for their lack of the so-called 'real-life experience'. Trying to bridge this gap, a Sectoral Solutions model have been introduced as of the 2nd year involving 6 different courses with various learning methods ranging from guest speakers, industry analyses, case studies to company practicum projects. These in-classroom experiences are augmented with the second dimension of Sectoral Solutions that takes the students out to the field and allows them to personally experience different industries as well as different functional departments through systematically planned internship opportunities. Integration of the principles of sustainable development is one of the key items aimed to be delivered in this model by taking an embedded approach and including these principles to the extent possible. The courses are mandatory part of the curriculum for Business Students and electives for all other students. Approximately %8 of OZU students are a part of this program, cooperating with 189 companies until now.

Based on Ozyegin University's (OZU) own development strategy, sustainable development principles are targeted as one of the leading foci in its Sectoral Education program model trying to abridge the private sector's requirements for employability skills and consecutively the endorsement of OZU students. Although sustainability context existed from the start of this program, in Fall 2015, an even more thriving change took place by including crosscutting issues (current external industry conditions like migration, resource scarcity, and big data) to sectoral education, students are now able to identify and associate with sectors, these current and critical topics. The tools used are lectures, term projects where student groups have to work on a selected sector of their choice and discuss the crosscutting issue alongside current and future status of the sector. For the Spring 2016 term the crosscutting issue is 'Resource Scarcity'. The project reports prepared are to be edited during summer and be made publicly available. For fall and spring 2015-2016, a total 240 students have been enrolled to the specific course 'Sectoral Solutions, Local Expertise'. With the impact of this year's results, an even more comprehensive approach will be taken.

As is the most recent norm in the business world, OZU believes that the principles of sustainable development should be part of the everyday life of OZU community involving education and research, infrastructure and operations as well as social responsibility efforts. OZUs sectoral education program model serves in this by actually integrating these to the sectors and the business world in general. Emphasized by the recent decisions of Sustainable Development Goals and COP21 on Climate Change, it is time to move forward to undertake a major role as universities. Such complementary and comprehensive programs are good examples of innovative tools of private sector-university partnerships in the endeavor for a sustainable global world.

Leadership:

This program is a first in Turkey and the region. Students are expected to follow this program in alignment with their own undergraduate work but by the time they graduate OZU has engineers, management people, lawyers, architects, etc., all are donated with the current global and local sectoral know-how and this know-how is being transformed to mean and serve under the Sustainable Development Principles.

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Note: This project was selected for presentation in the Working Group 4 session at ISCN 2016.





Students, Entrepreneurship and Startups in Sustainable Development at Aalto University

Aalto University supports the startup and entrepreneurship activities of its students. Many agents of the entrepreneurship ecosystem (including most notably Aalto Entrepreneurship Society, Startup Sauna, Slush conference, Green Campus Hackathons and AppCampus) contribute to the commercialization of innovations in sustainability.

Aaltoes (Aalto University Entrepreneurship Society) was founded to support students that wanted to start companies. Aaltoes organizes accelerator programs for early stage startups, later known as Summer of Startups; brings entrepreneurial role models to inspire and encourage students, organizes pitching evenings, hackathons, workshops and other events, where students and researchers can experiment, look for co-founders and learn by doing.

Aaltoes has a co-working space called as Startup Sauna, which connects the most promising startups from Nordics, Eastern Europe and Russia with experienced serial entrepreneurs, investors and other industry experts, focusing on business development. Startup Sauna is a non-profit organization and its events and programs are free-of-charge.

Startup Sauna Foundation supports the regional startup ecosystem, focusing on:

- Startup Sauna accelerator program for the most promising startups
- Slush conference, currently the leading startup event in Europe
- Startup Life internship program, sending the best students and graduates to intern at the best startups in the world.

Leadership:

The graduates from the student startup ecosystem are currently changing the world with 173 alumni who have raised over \$88 million in funding after graduating the program. Examples of sustainability startups: Ecoisme – Track energy usage, and get alerts about devices left on. Sidewalk – A network of autonomous city delivery robots. Soil Scout – Gain a deeper view! Soil Scout massively optimizes irrigation water and energy usage by providing permanent buried wireless monitoring. EntoCube – a solution for ending world hunger with insects as an alternative animal protein source. The shipping container system mass produces crickets in urban and rural settings anywhere in the world.

Transferable Objectives:

Green Campus Hackathons: The hackathon topics have been e.g. ICT and Big Data for sustainability, utilising real-time energy consumption data from our campus and corporate collaborations. AppCampus is a global mobile applications accelerator program for students. An example of sustainability apps is Kwami – see your energy usage hourly, daily, monthly stats, and you can control your budget, receive high usage alerts, and benchmark yourself.

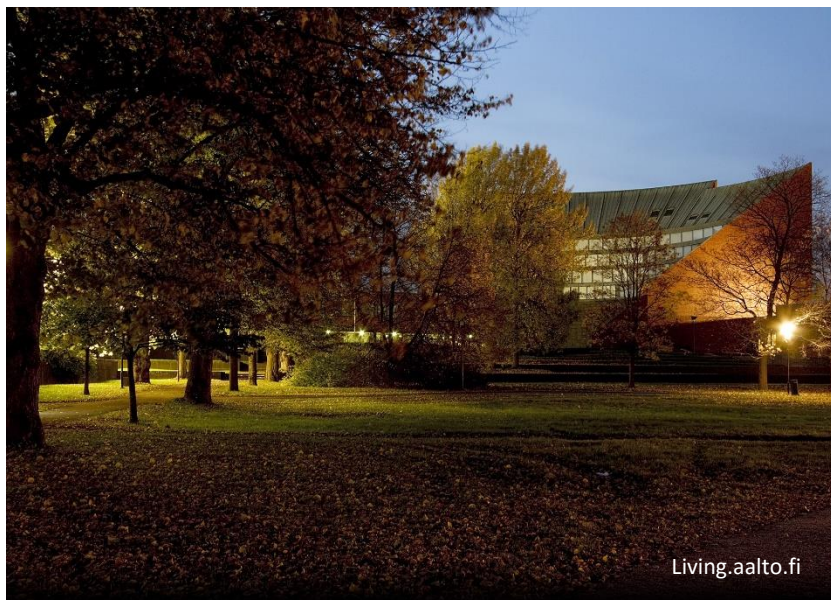
Breakout Activity:

Football

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The Corporate-University Dialogue and Leadership for a Sustainable Development and Future at Aalto University

Aalto University

Aalto University has extensive R&D collaboration programmes based on open innovation, as well as supporting physical, open, thematic collaboration platforms. These all share remarkable emphasis on sustainable development, co-created together with cities and corporate partners. Otaniemi innovation hub: <http://www.espooinnovationgarden.fi/en>

R&D collaboration programmes have brought local universities, corporations and cities together. The most notable of them has been Energizing Urban Ecosystems (EUE) project, built on progressive visions of designing and managing ecologically sustainable, digitalized and innovative living environments, with respect to everyday life, local conditions, local know-how, local values and local culture, with these sustainable aims:

1. Description and visualization of the processes of smart city planning and development.
2. Recognizing and understanding the roles of areas and user groups in sustainable service production and decision-making.
3. Development of services and service architecture by service and experience design methods.
4. Recognition and creation of innovative resources and the development of methods for resource sharing and management.
5. Analysis and development of new business logics and opportunities for value creation over the life cycles of investments in the built environment.
6. Openness, trust and genuine co-learning in an innovation ecosystem within the on-going trans-disciplinary program.

The EUE project has shown that in knowledge intensive sustainable ecosystems require open innovation platforms, open data, citizen inclusion and empowerment and crowdsourcing.

Thematic collaboration platforms within the university campus for company collaboration include Industrial Internet Campus, Health Factory and Bioeconomy research centre Bionova. We have also established a primary and secondary school education model called *School as a Service*, attracting startup and corporate collaborators as well from educational business and technology.

The university welcomes companies and research partners to its **open innovation premises**, supporting

corporate collaboration and also open access to research. All ground floor premises at campus will be turned into open innovation spaces.

Aalto Centre for Entrepreneurship commercializes research innovations developed in Aalto University. Examples related to sustainability are: *BioDustComb* aims to produce biofuel out of forest residues and recycled wood by defibrating and drying. The energy efficient *Carbon Capture Storage* (CCS) enables producing paper filler and coating material from the residues of steel industry, with significant reductions in CO2 emissions.

Small Business Centre is a developmental partner for SMEs and research entrepreneurship and a separate department of Aalto University School of Business. Examples of sustainable research business projects include: *Talsinki Metropolitan Incubation* project aims to facilitate the creation of 30 new joint Baltic knowledge intensive companies and co-operation between them in the Tallinn-Helsinki area through an integrated incubation service that addresses regional startup ecosystem goals and utilizes common resources. The co-operation addresses cleantech and creative industries.

Aalto Start-Up Centre is a professional business accelerator with a combination of commercial, technical and design know-how for growth-oriented entrepreneurs who have an innovative business idea, offering a wide range of development services for entrepreneurship, high-quality business advice, as well as extensive networks of experts. So far over 700 companies have been placed on-track for growth and more than 2500 new jobs created. An example of sustainable innovations in the accelerator programme: *Faraday Fast Rentals & Services* provides companies and drivers with hourly access to premium electric cars via our state-of-the-art, user-centric software, with snap-of-the-fingers convenience. Examples of alumni companies with emphasis on sustainability include: *Aimo Design* creates new scenarios for sustainable life style by design thinking. *Rudanko+Kankkunen Architects* expertise is ecological and socially sustainable design. *Frenn Company* is a new fashion and lifestyle brand designing and producing sustainable menswear.

Presumed success factors for university-corporate co-creation include:

1. A systemic approach to creating regional innovation ecosystems based on the culture of open innovation and knowledge co-creation
2. Experts with an entrepreneurial mindset and multidisciplinary skills
3. A network of partners with diverse complementing competences
4. A tradition of public-private-people partnerships and collaboration

Aalto University operates in a cultural context that has allowed strong open innovation traditions to develop and flourish. This includes the work and inspiration of pioneers of IT such as Linus Torvalds with Linux, and Mårten Mickos and Monty Widenius with MySQL. **The Aalto open innovation initiative** aims to scale innovations also to other physical locations and different business sectors. The initiative is founded on the use of platforms that are created to allow partners—including both local and global corporations—to actively join in co-creation and dialogue, and to engage in processes that is expected to:

- Explore societal challenges
- Examine research interests
- Address corporations' and other organisations' needs for bottom-up projects
- Create corporate projects based on new insights from research.

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Universities as brokering spaces for multi-actor collaboration towards sustainable transformation
Universidad Politécnica de Madrid, España (Technical University of Madrid, Spain)

Sustainability problems are complex problems given that: i) are poorly defined; ii) cover several aspects and affect different stakeholders, both presently and in the future; iii) solutions are not readily defined as to be selected and implemented; and iv) shall be collaboratively created and managed.

In this respect, Universities have a crucial role to play, given their well established roles in education, research and knowledge transfer, all of which is worldwide recognized as relevant for sustainability problems. Moreover, Universities can become a prominent actor addressing sustainability problems, specifically promoting and easing the collaboration of a diversity of academic and not academic actors addressing sustainability problems.

Appropriate sustainable pathways are not readily defined, and even the appropriate knowledge to be applied is neither available. Traditional university research was focused on developing a sound disciplinary knowledge base, which is not enough to cope with complex problems. Instead, new inter-disciplinary knowledge developed by action research is required.

Aware of these conditions, four years ago, the Technical University of Madrid (UPM) created the Innovation and Technology for Development Centre (itdUPM), integrating diverse UPM faculty members as well as non-academic external professionals, with the aim of addressing sustainability problems, carrying out studies, and using action research as its research methodology.

Figure 1 depicts itdUPM sustainability approach, considering the abovementioned aspects. In the horizontal axis, according to Manzini (2015)¹ two complementary aims are represented, from practical solutions of sustainable problems, to positive behavioral societal changes and mindsets. The vertical axis shows the degree of interaction among actors: from actions confined in the University space, to actions where the University Campus is a field of collaboration with public, private and social actors. itdUPM is, nowadays, a vibrant and collaborative inter-disciplinary, multi-actor space appropriate to cope with sustainability problems. The

following four dimensions are the pillars to reach the objectives:

1) The leadership is distributed among members following a collaborative and participative philosophy. The governance processes are contingent, from formal committees to ad hoc procedures, depending on the type of decision.

2) The Center is organized as a horizontal network structure composed of problem focused nodes and a technical “feeder” node devoted to provide external contracts and to care the harmonic development of the Centre. This was endowed with a special status in direct dependence of high authorities of UPM, and allows interdisciplinary research and training as shown in several developed projects, and the six editions of a master in technologies for human development.

3) The work is done in close collaboration with external people and organizations. An example of this is the partnership facilitated by the itdUPM to develop sustainable solutions for access to energy in humanitarian crises. Currently being piloted with UNHCR at the Shire refugee camps in Ethiopia, the partners include Iberdrola, Philips, Acciona Microenergy Foundation and the Spanish Agency for International Cooperation and Development (AECID).

4) The main incentive for people to participate in the center is the ecosystem created. Students, faculty, and external collaborators work on sustainability through real experiences, in a collaborative environment, and within an extraordinary positive working atmosphere. To do so, workshops aimed at creating confidence and right understanding among participants were organized. And recently, a new physical facility was built with a twofold objective: to develop multi-disciplinary research and innovation projects and to facilitate meeting and working activities.

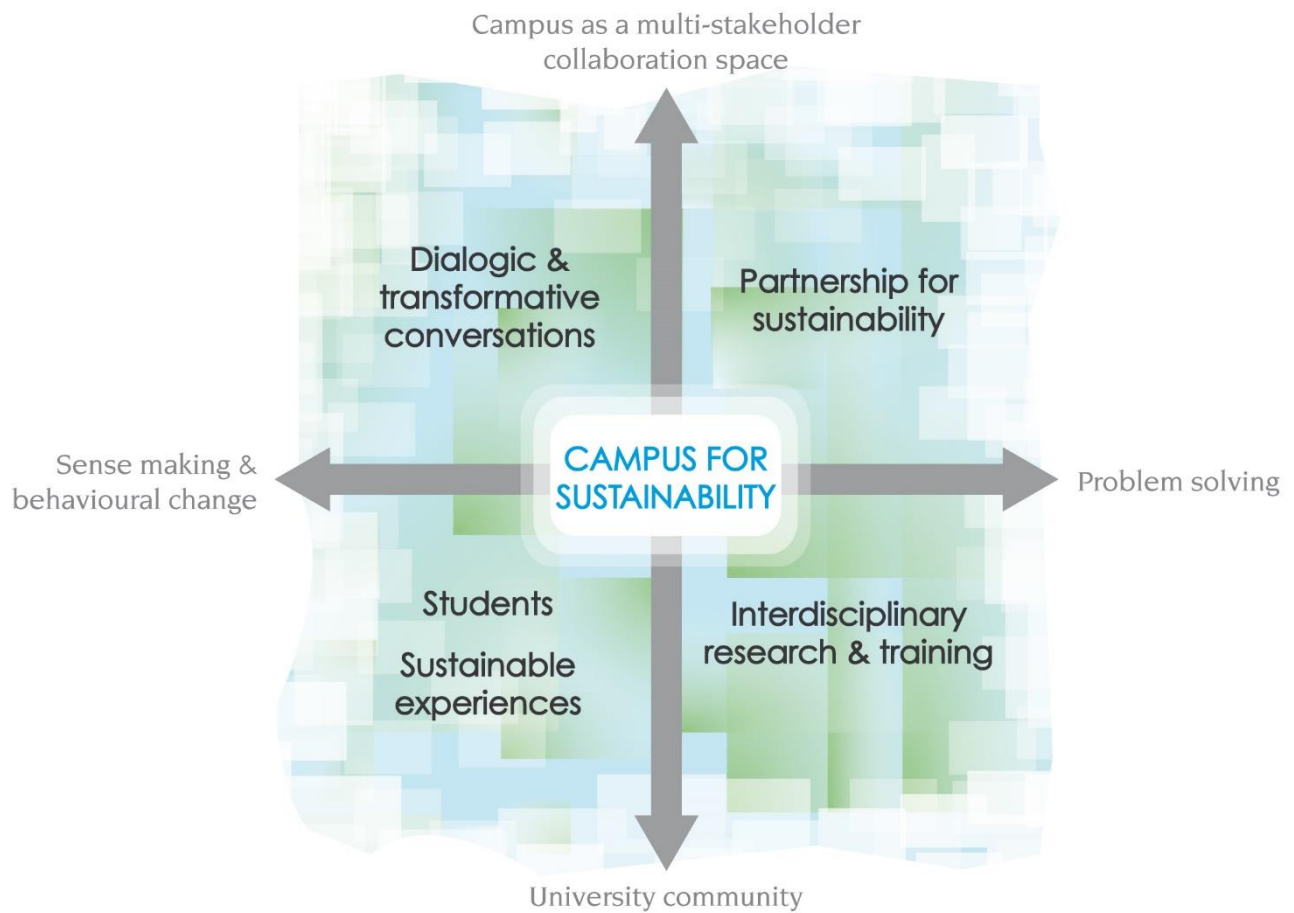
More information on: <http://www.itd.upm.es>

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Note: This project was selected for presentation in the Working Group 4 session at ISCN 2016.

¹ Manzini, E. (2015). Design, when everybody designs. *The Mit Press*.



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