ANNUAL REPORT

[2009]

THE AGS

The Alliance for Global Sustainability

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Welcome

from the AGS Governing Board Chair 2009

One of the outstanding achievements of AGS in its early years was to increase awareness about sustainability within our four schools. Through projects funded by AGS, many faculty and doctoral students were drawn into a new kind of interdisciplinary research aimed at finding solutions to some of the world's most pressing problems. And through educational courses such as the 'Youth Encounter with Sustainability', students were confronted, often for the first time, with the complexity of real-world problems, and motivated to pursue careers related to sustainability.

Twelve years on, we no longer need AGS to convince our faculty and students about the urgency of making progress towards sustainability. Sustainability has become core business in all our schools, and we have exciting new programmes that are tackling different aspects of sustainability at a scale that was unimaginable for AGS. While these new developments are very positive, they do raise an important question: does AGS still have a role?

I see two strong reasons why AGS should continue. The first is that many important problems related to sustainability have a strongly regional dimension. Consider, for example, the implications of an ageing society for sustainability. In Europe, Japan and the US, the proportion of the population over 65 is rapidly increasing. This demographic change poses huge problems for the affected countries, and raises many important questions requiring research. How do we design sustainable cities for elderly people? How can modern technologies be used to improve the quality of life of elderly people and allow them to continue as productive members of the workforce? How can pensions and health care be financed in an ageing society? As a mature partnership of four leading universities, the AGS could take a leading role in investigating these questions, conducting comparative studies of how problems are tackled in Japan, Europe and the USA, and finding the solutions that work best in different regions.

A second important argument for AGS concerns the opportunities it provides for students. Students have always been an important part of AGS, and have been responsible for many intiatives. One of these is the World Student Community for Sustainable Development, which was formed as a spin-off from AGS graduate courses (YES courses). I was very pleased the WSC-SD chose to organize its 2009 annual conference in close association with the AGS Annual Meeting. The enthusiasm and dedication of the students contributed greatly to the success of both events.

Together with key partners from business and industry, public administration, and civil society, the AGS will strive to provide forward-looking perspectives on sustainability challenges and anticipate solutions to guide today's decision makers.

Prof. Ralph Eichler
President of ETH Zurich

Ralph Eichler is the President of ETH Zurich since September 2007. He has been professor for Experimental Physics at the ETH since 1993, and was Director of the Paul Scherrer Institute from 2002 to 2007.

Introduction

from the AGS Executive Board Chair 2009

Peter J. Edwards
AGS Faculty Coordinator at ETH

Peter J. Edwards is the professor of plant ecology at the Institute of Integrative Biology, in the Department of Environmental Science at the ETH, and he is the AGS Faculty Coordinator at the ETH.

Dr. Edward's main research focuses include: increasing understanding of biological invasions, conservation of species, and sustainable management of ecosystems.

Societies will have to change dramatically if the world is to have a sustainable future. Many argue that universities have a special role to play in this quest for sustainability, not only providing the essential information upon which policy makers can base their decisions, but acting as honest brokers in clarifying the implications of different policy options. Others go even further, maintaining that universities must become engines of change, taking advantage of their political and economic neutrality to influence policy more directly. Whichever view individual scientists may take, they are increasingly required to communicate their knowledge and understanding to stakeholders, and participate in a continuing dialogue between science and society. To do this effectively calls for new skills and new forms of communication. Thus, the changing role of universities also implies a cultural change within universities.

Since its inception, AGS has had the mission to communicate the results of its research as widely as possible. However, some observers have criticised our past efforts, arguing that AGS should do more to articulate research findings and conclusions to decision-makers and the broader public. The AGS has an excellent track record in getting the attention of its affiliated business leaders. What remains is to extend that capability outside the AGS, identifying key steps for society, business, and academia to take together toward a more sustainable future.

Outreach was a dominant theme for AGS in 2009. During the year, faculty from the AGS universities worked closely with teams from the World Business Council for Sustainable Development in the WBCSD project 'Vision 2050', aimed at understanding the challenges of sustainability from a business perspective. AGS also launched a quarterly email newsletter aimed at informing the AGS network about activities and publications, and introduced a new series of accessible reports. In addition, it continues to support its two established outlets, the Springer AGS book series and the IR3S journal *Sustainability Science*. In October 2009, AGS ran an international workshop in Zurich entitled '*From outreach to partnership: defining the role of universities in achieving sustainability*'. Finally, a key forum for AGS research and outreach is the Annual Meeting, which brings AGS researchers together with industry, public, and non-profit stakeholders. We believe that the AGS Annual Meeting will be increasingly recognized as "the place to be," where new ideas and initiatives related to sustainability are presented and debated.

Over the years, the AGS has enormously benefited from the advice of its International Advisory Board members. We thank them all, and mention here specifically three long-standing members who retired from the board in 2009:

* Professor *Jakob Nüesch,* president of ETH Zurich from 1990 to 1997, was one of the founders of AGS in 1997, jointly with the presidents of MIT and Tokyo University. His profound belief that scientists at the world's leading universities can and must take a lead in guiding societies towards sustainability was an inspiration to all who worked with him in AGS.

* Dr. *Hans Ruedi Zulliger,* together with his wife, has consistently supported the cause of global sustainability both through his Foundation Third Millenium – which amongst many other initiatives supports the chair of Sustainability and Technology at the ETH Zurich – and his personal commitment. Believing that one should lead by example, he and his wife have succeeded in reducing their own annual energy consumption below the 2000W target.

* Ms. *Margot Wallström* was environmental commissioner and later was deputy head of the European Commission. Margot has supported issues in sustainability through her leadership in the European Commission and at her request the AGS provided advice in structuring the Environmental Technology Action Plan.

We thank them sincerely for their support of the AGS.

The AGS has the strategic goal to strengthen university education on sustainability, and in this report we describe a few of the ongoing activities at the AGS universities. The AGS has always benefited enormously from the ideas and enthusiasm of its students, and this report highlights their activities in 2009.

It was my pleasure to chair the AGS Executive Board during 2009, and hand on in March 2010 to my colleague Akimasa Sumi, who later in this report presents his vision of the great challenges of moving the world towards sustainability.

Universities as a Role Model for a Sustainable Society

Keynote speech at the AGS Annual Meeting 2009

The role of universities in tackling sustainability has never been more important than it is today. Traditionally, universities have disseminated information through research and publications, from which scientists and policy-makers have freely selected information, technologies, and methods. In the 21st century this situation is no longer adequate: universities should not just be knowledge providers, they should be the engines for social and political change. Because of their political and economic neutrality, universities can be more proactive in influencing change.

As part of the effort to define the new roles of universities, the first G8 University Summit was held in the summer of 2008 with the participation of 35 universities from both G8 and non-G8 countries. At the summit, it was discussed how universities can act effectively to implement change. It was widely acknowledged that no single institution can capture the complexity of global sustainability. Despite a number of research networks already organized in this area, the participants of the G8 University Summit agreed that we need to go a step further and integrate these networks into a *Network of Networks,* which is now being promoted under the leadership of the University of Tokyo. The process of establishing a Network of Networks will help align research activities, thereby improving mutual communication.

But networking alone cannot solve all problems. Because of the dramatic increase of knowledge generated by universities during the 20th century, the amount of information available today exceeds our capacity for individual understanding. This phenomenon has led to a compartmentalization of academic pursuits into narrowly defined areas of expertise and created a situation where increasing knowledge is leading us into chaos, rather than helping us solve problems. For academia to be useful to society, accumulated knowledge must be organized and integrated through a process which I call Structuring of Knowledge. Based on this concept, I am now proposing a higher level of integration: Structuring of Actions.

It is important to recognize that 2050, by which time we are to reduce the emission of greenhouse gases substantially, will come sooner than we realize. Countless activities and efforts toward the establishment of global sustainability are conducted around the globe. There are national-, state-, and municipality-level actions occurring globally, many universities are taking the lead in generating sustainable campuses and, of course, individuals are also taking steps toward sustainability. But, changing infrastructure takes time and the actions we are working toward today will take years to successfully incorporate into politics and society. Structuring of Actions shortens this lead-time, by analyzing the actions of individuals and various institutions, understanding necessary elements of those actions and then integrating them in a fashion that is best suited to achieving our ultimate goal of establishing a global society.

In summary, never has the role of universities in promoting global sustainability been more significant. But universities must be more proactive, serving as hubs for actions at all levels and taking advantage of political and economic neutrality to become engines for change.

Hiroshi Komiyama
President of the University of Tokyo until March 2009

Hiroshi Komiyama has been President of the University of Tokyo since 2005 and served as Executive Director of the Integrated System for Sustainability Science (IR3S), established in 2005.

He has strongly supported the AGS since it started and contributed as Faculty Coordinator from 2000 to 2002.

A Tribute to Professor Hiroshi Komiyama

our former AGS University of Tokyo Coordinator, as he leaves the Presidency of the University of Tokyo

The AGS is a strong partnership of four educational institutions, bridging Switzerland, Sweden, USA, and Japan. At the heart of this collaboration are the faculty coordinators for each institution who have made long-standing strong commitments to the AGS vision. Each of us is dedicated to making our universities more international through the building of models for cross-continental and cross-disciplinary work that tackles the important problems for the future sustainability of our world. Since the AGS' founding in 1996, Professor Hiroshi Komiyama of the Department of Chemical Engineering at The University of Tokyo has been our counterpart in AGS, becoming coordinator in 2000. He has consistently provided intellectual leadership related to the environment and sustainability. His many publications, including *"Vision 2050: Roadmap for a Sustainable Earth"*, *"Structuring Knowledge* (知識の構造化)*"*, *"Technology to Sustain the Earth* (地球持続の技術)*"*, and *"Answering to the Issues of Global Warming* (地球温暖化問題に答え)*"*, show not only his strong intellectual leadership in the evolving discipline of Sustainability Science, but his purposeful dedication to the future of the earth. His work on the "Networks of Networks" concept and his leadership in the Japanese initiative to launch the G8 University Leaders Summit has been masterful.

So it was no surprise to his fellow coordinators that their long-term friend and collaborator should rise in the leadership of the University of Tokyo to be the President from 2005 to 2009. His work in this position has greatly impacted the university and helped to evolve the AGS along with it. Hiroshi is someone who leads by example: those who attended the AGS Annual Meeting at MIT in 2008 will treasure the memory of him describing, with obvious relish, his efforts to improve the sustainability of the Komiyama household.

Now Hiroshi as you have stepped down as President we say "well done, dear friend" for all you have accomplished. We greatly value the wonderful interactions over the years and we look forward to many more years of accomplishment and leadership from you.

David H. Marks
Professor at MIT and MIT AGS Coordinator

Sumi Akimasa
Professor at The University of Tokyo and UT AGS Coordinator

Peter J. Edwards
Professor at ETH and ETH AGS Coordinator

Greg Morrison
Professor at Chalmers and Chalmers AGS Coordinator

Prof. Ralph Eichler presents Prof. Komiyama a cow bell as a token of thanks from the AGS

Prof. Komiyama presents the Network of Networks concept at the AGS Annual Meeting 2009

The AGS sustainability agenda

What are the big sustainability challenges?

Personal statement by Akimasa Sumi, AGS Executive Board chair in 2010, and director of IR3S/TIGS at The University of Tokyo

What is "Sustainability"? I often ask this question to myself. It is obvious that our life is limited, therefore, we are not sustainable. We must consider our sustainability in a wider context such as our family or our country and think of the meaning of our existence on this planet.

We do not live alone. We exist in a stream of life from the past to the future. The human race was born and has evolved on Earth, and Earth, in turn, has evolved from the Universe. Therefore, we have to regard ourselves as historical entities and remember that we are responsible for the future. It is always important to study the past when we learn new things.

When we survey the environment in its entirety, numerous issues surround us and the solutions seem few and far between. In such difficult situations, it is easy to be captured in a 'trap of pessimism'. Pessimism itself is not entirely bad because when we look upon the future as a challenge, we pay more attention to the risks involved. However, the drawback of pessimism is losing motivation to overcome these issues. We should remember that we have suffered many troubles through the entire history of the human race. In other words, there has been no easy time for human beings, and we have learnt to fight for survival. We have strengthened our knowledge during this fight. Science and technology are examples of this accumulated knowledge. Using information accrued from scientific experimentation and thought and applying technology, we have solved many problems and as a result, many people in developed countries are now leading comfortable lives. However, it should be remembered that difficulties are co-evolving with the development of our society. Our present situation is different from that in the past. Although new technologies have solved many existing issues, some of them have also created new problems.

Since the Industrial Revolution, mankind has been seeking wealth and prosperity by making maximum use of energy and natural resources. Nature was believed to have an infinite capacity to process waste energy and resources. It was thought that whatever the burden, nature would renew and repair all our actions, and while the domain of human activity remained small, this was indeed true. However, we have learned that proper disposal of waste is a necessity. As the global reach of mankinds' activity has expanded, the limits of nature and possible growth have surfaced.

Today, we are acting for our well-being under various constraints imposed by current situations. Since it is obvious that energy and natural resources are limited and the capacity of our environment is finite, the main constraints at present are limitations to the use of energy, materials and the environment. However, constraints are a "mother of innovation". If there are no problems, we tend to be lazy and we don't think, so there is no development. Therefore, it is our task to keep proposing strategies and pathways to a new society.

Akimasa Sumi
Professor and Director of the Center for Climate System Research at The University of Tokyo.

Throughout Prof. Sumi's professional career he has also served as a leading member of various committees, such as: the Joint Scientific Committee of WCRP; the CLIVAR Monsoon Panel and Scientific Steering Groups; the TOGA-COARE Science Group and TOGA-Scientific Steering Groups; Vice Chairman of the TAO Implementation Panel.

Currently, Dr. Sumi continues on as a Board Member of the Meteorological Society of Japan, Program Scientist of ADEOS-2, a member of JOINT TRMM Science Team, and as Faculty Coordinator of The University of Tokyo for AGS.

Sustainability under Rapid Demographic Change

an AGS initiative

Greg Morrison, Professor at Chalmers University of Technology, opening the Extended Life Seminar, 2 December 2009.

Greg Morrison is professor in water systems engineering at Chalmers University of Technology.

His published research interests include constructed wetland systems for the treatment of stormwater, metals in urban runoff and ecosystem service values for water attributes. He is also head of Water Environment Technology which is a leading water research group, with European and National projects in collaboration with the water industry.

Dr. Morrison is coordinator for Chalmers-AGS and has been in that position since the entry of Chalmers into the AGS in 2001.

Extended life is a new global phenomenon occurring in the same time frame as the push for a carbon-neutral society. The demographic structure of most developed countries is changing dramatically as a result of people living longer but having fewer children. By 2050, over a third of the populations of Europe and Japan will be over 65[1]. Many East Asian countries, including China and India, are also rapidly ageing – by 2050, 65% of the world's population over the age of 65 will be in Asia[2].

These demographic changes pose huge challenges for sustainable development, and raise many important questions that require research. At the same time, Europe, the USA and East Asia already have mainly urban populations. Immigrants enter urban areas, young people move from villages to the city in search of economic opportunity, and rural populations are shrinking. If the world is to mitigate the worst effects of climate change, carbon emissions from urban areas must be substantially reduced by 2050, and transformations in use of natural resources and ecosystem services must be achieved.

Some possible questions include:

* How do we design low carbon, sustainable cities for an ageing society?
* How can modern technologies be used to improve the quality of life of elderly people and allow them to continue as productive members of the workforce?
* How can an ageing workforce produce the innovation and skills needed for the transformations society needs to take towards sustainability?
* How can pensions and health care be financed in an ageing society?

Finding solutions will need international transdisciplinary groups (faculty, industry, policy makers, civil society and other stakeholders) that draw together intellectual expertise and agents of change, to generate new insights from multiregional and multicultural comparisons of ongoing research.

The AGS plans to explore the links between the ageing society, sustainability, and ongoing research areas at each university, to frame some ideas for interesting research projects for which funding can be sought, and to build consensus recommendations for decision-makers. All the AGS universities have research groups working on aspects relevant to the ageing society and sustainability, for example technology and housing innovations for extended lifespans. They all also have expertise in assessing the impacts of new technologies, and in the broader area of urban futures and low carbon cities. The AGS has already started to make links between the interdisciplinary expertise on urban development in the AGS universities, and this AGS initiative will bring these groups together with the researchers in gerontology to get added value out of finding synergies and new creative solutions between the different approaches.

[1] Japan National Institute of Population and Social Security Research (2000). Population Projections for Japan 2001-2050. http://www.ipss.go.jp/pp-newest/e/ppfj02/top.html

EC (2008) Demography Report 2008: Meeting Social Needs in an Ageing Society. Commission Staff Working Document. SEC(2008) 2911

[2] United Nations Department of Economic and Social Affairs/Population Division. *World Population Prospects: The 2004 Revision, Volume III: Analytical Report*

AGS Initiative on Urban Futures

Urban areas around the world are vital centers of culture, leadership, and opportunity. Many cities are growing at a dramatic rate, especially in developing countries, and the world's urban population – already more than 50% of the global population – is forecast to reach 80-85% by 2030. How do we create sustainable urban futures for 6 billion? Although rapid urban development often leads to severe environmental and social problems, it could prove to be an outstanding opportunity to achieve greater sustainability. Cities, properly managed, can be transformative arenas in which natural resources are used more efficiently and economically, contributing to a high quality of life for everyone. Reinventing cities offers one of the most effective ways of reducing human impacts upon the environment and achieving greater sustainability. Accomplishing this will require breakthroughs in technology, planning and the governance of cities.

The AGS engaged researchers from all partner universities throughout the disciplines in an integrative exploration of the Urban Futures challenge by holding five intensive seminars during 2008 and 2009. Each seminar offered a distinctive view of urban futures. All the themes were explored in the AGS Annual Meeting in Zurich in January 2009.

Some of the issues raised:

★ In the developing world, cities are places of economic and social opportunity, they generate jobs, provide options for investment, and offer hope for change. Cities are the major contributors to national GDP. However, poor immigrants searching for these opportunities are creating huge slum populations on unserviced, environmentally vulnerable land, and a surging informal sector. How can cities provide the institutions and formal economic opportunities that enable these populations to gain education and social inclusion?

★ Globally, two thirds of energy consumption occurs in urban areas, and the energy consumption of urban populations in developing countries is soaring, tightly linked to economic growth. To mitigate climate change, urban areas in all countries must drastically reduce the carbon emissions of their building stock and transport systems. Change must be based on a range of currently available bridging technologies built on existing infrastructure, and incorporate forward-thinking design.

★ Cities can be seen as habitats, resource sinks, cultural centres, economic hubs, designed spaces, networks, political powers, and ecosystems. All too often, these different aspects are studied in isolation, but to achieve sustainable development we need to integrate these different models. All the seminars emphasised how the urban futures challenge must be tackled with an integrated, interdisciplinary research approach. Equally, solutions will only be identified and implemented if researchers interact closely together with decision-makers and partners in society.

The AGS will continue looking into the challenges and opportunities of urban futures, identifying potential pathways by which AGS researchers can provide significant contributions, as well as identifying important stakeholders that could contribute to this research.

SEMINAR AND REPORTS

Webcasts, reports, presentations, and expert profiles from the AGS Urban Futures seminar series at http://www.theags.org/research/urbanfutures

★ *Evolution of Sustainable Human Settlements.* Chalmers University of Technology, Sweden, April 2008

★ *Understanding the Dimensions of Urban Futures Research: Tackling Complex Reality.* ETH Zurich, Switzerland, November 2008

★ *Integrating Sustainability into African Urban Growth.* Cape Town, South Africa, November 2008

★ *MIT Green Islands Workshop: Focusing MIT Research on Sustainable Regions.* Cambridge, USA, November 2008

★ *Urban Futures: the Challenge of Sustainability.* AGS Annual Meeting 2009, ETH Zurich, January 2009

★ *International Workshop on Sustainable City-region.* Bali, Indonesia, February 2009

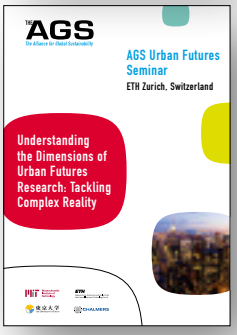
PUBLICATIONS

Download publications at http://theags.org/publications

★ *Urban Futures: the Challenge of Sustainability.* Report of the AGS Annual Meeting 2009.

★ *International Workshop on Sustainable City-regions.* Proceedings of the AGS IR3S workshop.

★ *Understanding the Dimensions of Urban Futures Research: Tackling Complex Reality.* Report of the AGS at ETH Urban Futures seminar.



The AGS Urban Futures seminar series

Report of the International Workshop on Sustainable City-regions

An international workshop convened by the AGS at The University of Tokyo, the Integrated Research System for Sustainability Science (IR3S), and Udayana University in Bali, concluded the AGS series of seminars on the Urban Futures initiative in 2009. The meeting brought together for the first time researchers in Asia interested in the interaction between urban and rural areas.

A mosaic of urban-rural land uses is a common phenomenon in the fringe areas of Asian large cities. The word desakota (a combination of two Indonesian words: desa for village, kota for town) has been coined to refer to these urban fringe regions. Asian cities have applied planning measures based on the theory of clearly separating the city from surrounding rural areas — so-called modern city planning concepts such as zoning, greenbelt, and compact city – but in most cases failed to successfully control urban developments, resulting in a disordered mixture of urban and rural land uses on the urban fringe.

Under the AGS, the University of Tokyo is focusing on the Asian city-region and playing a leading role in developing a new concept for sustainable city regions for Asia, through a new approach to the integration of urban and rural areas, in which increased urban-rural interactions are expected to contribute to establishing sustainable urban communities in Asia. At the workshop, this topic was discussed in four sessions that addressed urban-rural systems, city regional forms, water management, and culture and settlements.

The rural and urban divide can be deconstructed by focusing on the institutions in this zone. The social networks and institutions that control flows of people, capital, energy, food, materials and wastes between urban and rural areas include private companies, NPOs/NGOs, public government departments, and social networks that sustain the informal sector and rural-urban population flows. Often, the formal institutional structures designed to maintain green spaces and ecosystem services in the urban fringe fail to achieve their goal, whereas pockets of informal land uses and unregulated land contribute significantly to local food production and natural resource management.

In rapidly expanding Southeast Asian cities such as Bangkok and Metro Manila, large parcels of farmland on the urban fringe are being divided into exclusive blocks of housing developments, which become gated communities separated by high walls from the outer world. Within these subdivisions, green spaces accessible only to local residents are mandated by law, whilst the agricultural fields outside the walls are ignored by the local residents. Research shows that the official green spaces are poorly used and often abandoned, whereas the numerous vacant open lots are occupied by “caretakers”, unofficially recognized by the absentee landowners and the homeowners association, who produce significant amounts of vegetables that are bought and consumed by local residents.

Discussions addressed how to preserve and revitalize peri-urban agriculture as a key component of sustainable city regions. All over Asia, peri-urban farmlands are vulnerable to urbanization pressure. Farmland in the urban fringe can be protected with new land tax systems and strong local governance to implement farmland preservation policies. Agricultural landscapes can also be sustained and revitalized through the use of new agricultural technologies, for example bio-ethanol production from rice in Japan.

How to distinguish between cultural landscapes that should be preserved and those that have to be transformed? In Indonesia, there is increasing awareness of the importance of cultural landscape preservation; however much effort is still needed from all stakeholders, including citizens, politicians and international agencies. Participants agreed that we need to take bottom-up approaches to preserve cultural landscapes, involving local people who have managed such landscapes as their daily living space.

Participants affirmed the importance of local activity and governance for realizing multifunctional and well ordered city forms for Asian city regions, with new land use control concepts based on the local situation. Panelists and audiences agreed that although there are a lot of difficulties in each Asian city related to the current institutional gaps between the urban and rural systems, we have to develop more concrete visions of urban-rural fusion as well as indicators to measure urban-rural relationships.

For example, current Chinese strategic and regional planning systems try to achieve a holistic planning approach, but the relationships in spatial planning between urban and rural areas are still weak. How can master, regional, and local scale plans be connected smoothly so as to operate an effective land use control? Local governments in China have very diverse attitudes to environmental protection and sustainable development. Multi-scale incentive mechanisms are needed to bridge the gap between national government policies and local government strategies.

One workshop conclusion was that Asian countries, including Japan, should replace the planning doctrine followed so far, which distinguishes sharply between urban and rural areas, and reassess planning systems in an effort to build desirable urban-rural partnerships and uphold diversity in the urban fringes.

The second workshop will be held in Tainan on Taiwan on 24 and 25 February 2010.

Panel discussion at the Sustainable City Regions seminar in Bali

Energy Flagship Activities

Near-Term Pathways to a Sustainable Energy Future

The AGS Energy Pathways Program has continued to focus on the strategic integration of new, clean and low-carbon technologies in 2009. The AGS partners' activities encompassed a broad range of activities including top-down planning and policies surrounding regional carbon capture and storage, legal and regulatory challenges to achieving stringent climate change reduction and adaptation targets, bottom-up integration of renewables, with smart grids and electricity storage including electric vehicles, and a range of technology studies in both developed and developing country contexts.

PATHWAYS TO SUSTAINABLE EUROPEAN ENERGY SYSTEMS

Led by Chalmers, in 2009 the European Pathways project looked at a variety of topics. In addition to its core work of analyzing Northern Europe's electricity alternatives through a new modeling platform that spans investments, scheduling and grid operations, the team also explored the legal challenges surrounding Carbon Capture and Storage; the cost and emissions contribution of biomass co-firing of advanced natural gas power plants; a new methodological approach for estimating building efficiency retrofits; and the path dependencies associated with public infrastructure versus private development approaches to infrastructure transformation.

FUTURE VEHICLE TECHNOLOGIES, FUELS AND FLEETS

Collaborative research by MIT's Sloan Automotive Laboratory, and the Swiss Competence Centre Energy and Mobility (CCEM) at the Paul Scherrer Institute, continued with a renewed interest in electric transportation, and the comparative dynamics of vehicle fleet turnover in Europe and North America. The Sloan Automotive team followed up their 2008 technology-focused report "On the Road 2035" with a second report "An Action Plan for Cars" which focuses on the combined contribution of fuel economy standards, feebates, and fuel taxation with education and informational initiatives. Policies, education and information initiatives must be carried in parallel with R&D if alternative vehicle technologies and fuels are to be delivered at scale.

MIT-PORTUGAL PROGRAM SUSTAINABLE ENERGY AND MOBILITY SYSTEMS RESEARCH

The MIT-Portugal Program's main research program is the Green Islands Project. Working with the Regional Government of the Azores, researchers at MIT, Lisbon, Porto and Coimbra are looking at how to integrate renewables, efficient buildings, and smart grids for each of the Azores's nine islands in the mid-Atlantic. The collaborative effort also includes research in sustainable mobility and urban and rural planning. Other MIT-Portugal Program activities include urban metabolism, mobility and building stock transitions for Lisbon and Porto. With the assistance of the AGS, the MIT-Portugal Program is launching two new research networks on sustainable cities, and sustainable energy and mobility systems.

LOW CARBON SOCIETY SCENARIOS TOWARD 2050 (IR3S)

The University of Tokyo continues its efforts through the IR3S on sustainable societies, including a public session of the Energy Sustainability Forum in October 2009 involving University of Tokyo and MIT speakers which focused on the challenges of climate change mitigation and adaptation in the highly uncertain policy environment surrounding COP15 in Copenhagen. In addition, multi-disciplinary AGS-supported research activities at the University of Tokyo included wind energy and coal-fired power generation developments in India, the impacts of palm oil plantations in Malaysia, traffic management in Asian developing countries, and traditional biomass use in Japan.

New report from EU Pathways "Scenarios for assessing investments in industry"

Urban Futures

The Challenge of Sustainability

AGS Annual Meeting 2009 at the ETH Zurich

The AGS Annual Meeting is a place for stimulating discussions, exchanging ideas, and establishing collaborations

Poster session

The AGS Annual Meeting 2009 held at the ETH in Zurich, Switzerland, in January, focused on the challenges posed by the dramatic growth in urban populations worldwide. Although this growth presents many acute problems, it is also a unique opportunity to move towards a more sustainable use of natural resources. As the former director-general of UNEP, Klaus Toepfer, once remarked, *'The battle for sustainable development will be won or lost in the cities'*. With this idea in mind, two propositions guided the planning of the conference:

* that cities, properly managed, can be transformative arenas in which natural resources are used more efficiently, contributing to a high quality of life for everyone, and
* that reinventing cities offers one of the most effective ways to reduce human impacts upon the environment and achieve greater sustainability.

The 360 participants from 32 countries explored the dimensions of the challenge in keynote talks, panel discussions, workshops and poster sessions. Topics included energy governance, urban ecology, architecture for the open city, size, shape and sustainability of cities, options for pro-poor urban development, transforming the building stock for sustainability, and whether more mobility increases happiness. The poster session with 126 posters highlighted a wide range of innovative solutions to questions of energy, mobility, water and urban agriculture, policy and governance, sustainable construction, education for sustainable development, and urban sustainability indicators.

Lars Reutersward, Director of the Global Division of UN-Habitat, graphically illustrated the consequences of the ongoing dramatic increase in slum populations worldwide, and pointed out that this does not have to continue – solutions are available. This point was demonstrated by the ETH North-South Centre panel speakers who are working in developing countries. But we cannot simply do more of the same urban development, and UN-Habitat needs universities to provide critical analysis and effective models for more sustainable urban planning. Several speakers urged that urban designers need to rethink land use, and try to create compact, efficient cities. Kees Christiaanse, ETH architect, acknowledged that architects cannot design social cohesion. But they can design breeding grounds for social sustainability, an idea which is fundamental to the concept of the 'open city'. Flexible designs and plans allow neighbourhoods to develop in an inclusive way, rather than building inequity into the city structure.

Speakers from the AGS partner universities showed how research programs at each university are tackling the challenge, including research for sustainable urban futures, and pathways to sustainable energy systems. The energy panelists were united in their message. Globally, most energy is consumed in cities. If we are to reach a low carbon society for all in time to avoid the worst effects of climate change, we need an urgent and massive transformation not only in our urban infrastructure and technology, but also significant economic and social changes in our use of energy. AGS speakers emphasised that the urban futures challenge must be tackled with an integrated, interdisciplinary research approach. This requires not only engineers, designers, and natural scientists, but social scientists, political experts, and external partners, to find a common understanding of shared problems, and jointly agree and collaborate on new ways to find solutions. Solutions will only be identified and implemented if researchers work closely together with external partners. Interactive tools and spaces enable participatory interactions and synergies with researchers, planners, local populations, government decision makers, and industry leaders.

The AGS was called upon to initiate new activities aimed at developing pathways towards low carbon societies that bring in developing and emerging countries, particularly China and India. The Alliance could provide a more holistic approach to energy by improving design and planning methods and indicators, structuring energy information, exchanging models, and developing systemic approaches.

The conference offered a forum for perspectives from public and private stakeholders as well as academia, ranging from UN perspectives on challenges and opportunities for academia, to visions from a leading company implementing sustainable city development projects worldwide, to the initiator of an NGO creating self-help communities using innovative bottom-up construction methods. The conference was greatly enriched by the participation of students from all over the world, and by the participation of researchers from developing countries, including 10 sponsored by the ETH from a competitive selection process.

The Annual Meeting was held in conjunction with the Student Summit for Sustainability, who greatly enriched the program and the conference with provocative speakers and the presence of 86 students from all over the world.

Urban Futures
The Challenge of Sustainability
(continued)

POSTERS AND WEBCASTS

The talks, posters, and report of the Annual Meeting 2009 are all available as webcasts and pdf downloads at www.agsam2009.ethz.ch

COMMENTS FROM PARTICIPANTS

"It was a very stimulating and enriching experience. The perspective of inclusive planning of cities and how to achieve the sustainable city concept is very pertinent to my country (India). The message I took home: recognise the role of research institutions in shaping the future of cities!"

Sponsored participant from Indian NGO

"Many presenters pointed to the need of linking urban material cycles, especially nutrient cycles, to the rural cycles (especially agriculture). This questions the adequacy of northern countries' sanitation and waste water treatment infrastructure and offers new possibilities for developing smarter systems in regions of the world where these investments and choices are still to be made. The presentation by Roland Schertenleib showing the advantages of decentralized systems based on greater levels of recycling was very enlightening. The question remains of what we can do in northern countries to improve this situation."

Student participant from ETH

"The conference theme was very challenging and it was just wonderful to listen to all the eminent speakers. I particularly enjoyed Prof. Bish Sanyal's elaborative and yet realistic perspective on size, shape and sustainability of cities."

Sponsored participant from Tanzanian environmental consultancy

"Kees Christiaanse's "Open City" talk impressed me most. He was one of the very few who did not focus on isolated questions concerning energy demand, but brought in a broader perspective of a future city. After two decades of focusing on technological solutions (e.g. energy saving and efficiency efforts) but still facing an increasing demand of energy and mobility it is time to broaden the focus and look on the human beings and their needs and wishes."

Swiss student participant

ENERGY PANEL EXPERTS

Filip Johnsson from Chalmers University of Technology

Ernest J. Moniz from the MIT Energy Initiative

Keisake Hanaki from The University of Tokyo

Konstantinos Bolouchos from the ETH Energy Science Center

Daniel Favnat from EFFL

From Outreach to Partnership

Defining the role of universities in achieving sustainability

AGS workshop at the ETH Zurich, 15 October 2009

The Alliance for Global Sustainability convened a workshop to discuss how universities and researchers can improve their partnerships with non-academic stakeholders in order to drive progress towards sustainability. The workshop was hosted by the ETH Domain Competence Centre for Environment and Sustainability with ETH Sustainability. 70 participants from the AGS universities, together with invited participants from external partner organisations, discussed how researchers and external partners can better initiate and maintain partnerships that really implement the results of vitally needed research on environment and sustainability. The group discussions were followed by a panel debate with representatives from Swiss research management and industry and NGO partners.

The workshop recommendations covered new research models, new teaching models, better ways of doing outreach within existing research project management, and new roles for competence centers within universities. Participants felt that to really get incentives for change we need a cultural change within universities, as well as working on more capacity for better partnerships. An example of a lesson learned is that researchers must be clear about their goals vis-à-vis external partners, so that the exchange can bring greater value to both rather than just eating up more time and capacity. Working together with groups and organisations that "bridge" science and policy can enhance the capacity to make an impact.

A key issue at the workshop was how the academic system of incentives and rewards for research can be adapted to stimulate more partnerships with non-academic partners and more interdisciplinary research. University structures can create barriers that hinder interdisciplinary collaborations. The academic research evaluation system with peer review and bibliometric indicators has a number of weaknesses that discourage research on sustainability issues and fail to assess the social relevance of research. Possible alterations include extended peer review formats and additional evaluation criteria. However, a panelist pointed out that any additions to academic evaluations are highly controversial, and the international trend is moving towards measures of academic excellence at the expense of measures of relevance. Change is being driven more by funding programs such as Mistra and the Swiss NFPs, which have a significant influence on research relevance and interdisciplinarity.

The workshop also highlighted the role of students and young faculty. Universities need to equip students to take on meaningful roles in innovation, entrepreneurship, and management that accounts for the economic, social and environmental dimensions of sustainability. This can be done through new models of teaching that emphasise real world problems, working with stakeholders, and mutual learning, and through training for interdisciplinary skills, and for skills and confidence to work at the policy-science or management-science interface.

The results of the workshop have been compiled into a draft working paper co-authored by the workshop participants.

NEXT STEPS

The AGS will use the insights from the workshop to improve its outreach and interaction with industry, government, and civil society.

At the ETH, the workshop was the start of a dialogue on how to improve outreach and partnership in ETH research, and will be taken forward with further meetings and initiatives. The CCES projects on environmental policy, resource management, and environmental risks, are now in the middle of their research phases, and are producing highly relevant research results. The centre has successfully launched cooperative interdisciplinary research within the ETH domain, uniting more than 600 researchers in 17 large projects and two technology platforms. The next step will be to improve the partnerships between these research efforts and stakeholders in society. Other competence centres at ETH Zurich, such as the Energy Science Center and the North South Centre, are also further developing their capacities.

The University of Tokyo has highlighted partnerships between academia and society as one of the red threads through the presentations and workshops at the AGS Annual Meeting in March 2010 in Tokyo.

Panel discussion with Thomas Vellacott (WWF Switzerland), Rene Schwarzenbach (CCES and ETH Board), Barbara Haering (ETH Board and environmental consultant), moderator, Janet Hering (Eawag director), Tony Kaiser (CEO of Alstom Power)

The AGS Book Series

Science and Technology: Tools for Sustainable Development

Joanne Kauffman, book series editor

Now in its seventh year, the AGS Book Series, "Science and Technology: Tools for Sustainable Development", published by Springer, includes 17 books that reflect the substantial investment that AGS sponsors have made into research undertaken by the AGS.

The series provides accounts by authoritative scholars of the results of cutting edge research into emerging barriers to sustainable development, and methodologies and tools to help governments, industry, and civil society overcome them. The work presented in the series draws mainly on results of the research being carried out in the AGS. The level of presentation is for graduate students in natural, social and engineering sciences as well as policy and decision-makers around the world in government, industry, and civil society.

The book series exemplifies the AGS goals for international research on critical environment and sustainability issues and for outreach to make the findings of that research available to a broad audience.

NEW TITLES IN 2009

Management of Health Risk from Environment and Food

*E*dited by Hajime Sato

This book describes a five-country comparison of the policy and politics of health risk management, with a focus on asbestos and BSE. The case studies and policy analysis are thorough and clear. The concluding chapter offers a primer on the opportunities and challenges of policy-making to protect public health and the environment under conditions of scientific, economic and political uncertainty. The authors identify weaknesses inherent in such policy-making arenas and they point to means to overcome them. While drawn from the specific risks considered in the research project, the lessons learned and potential remedies identified will prove useful guidance to policy-makers and regulators concerned with the broad spectrum of issues that affect sustainability of societies regionally and globally.

The book is based on research on the "Strategic Management of Health Risks" initially supported by the AGS between 2005 and 2009, and expanded by grants from additional funding sources including the Japan Society for the Promotion of Science, the Daiwa Anglo-Japanese Foundation and the Japan Study and Butler University Holcomb Awards Committee. This project and its publication are exemplary both in terms of the international community of scholars that participated in this endeavor as well as the multiple funding sources and international universities supporting the work.

Proceedings of the Ninth International Symposium on the Highway and Urban Environment

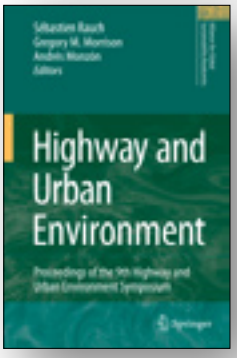
Edited by Greg Morrison and Sebastien Rauch

The 9th Highway and Urban Environment Symposium (9HUES) was held in Madrid, Spain 9-11 June 2008. HUES is run by Chalmers University of Technology within the AGS.

9HUES was held at TRANSYT – Universidad Politécnica de Madrid to provide a professional and scientific forum on global exemples of science required to support pathways to a positive and sustainable future in the highway and urban environment.

This volume contains papers grouped by topic on sustainable mobility and management; air pollution, trace elements in the environment, urban water contamination, contaminated sites and treatment, urban climate and climate change.

The third book in the 2009 series is an addition to the existing volumes on ecologically sustainable product design. Edited by *Wolfgang Wimmer et al.,* the book describes the application of AGS-supported research on eco-design to the electronics industry, and will be available in early 2010.



List of titles in the AGS Book-series is available at http://theags.org/publications/book-series/ags-book-series

Authors: How to publish in the AGS Book Series?

AGS faculty are invited to publish in the AGS book series. Please contact the AGS book series editor Dr. Joanne M. Kauffman at kauffman@alum.mit.edu

Vision 2050:

World Business Council on Sustainable Development collaboration

During 2009 the AGS provided scientific support for WBCSD in its Vision 2050 project. This included advice to working groups and attending workshops. Eoin O Broin from Chalmers worked with the WBCSD Geneva office in the report writing group during the final months of preparation.

The key messages of the *Vision 2050 – the new agenda for business* report are:

★ 29 companies across 14 industries engaged in dialogue with 200 companies and experts in some 20 countries agree that business as usual is not an option for a sustainable future.

★ *Vision 2050* outlines a pathway to reach a sustainable global society by 2050, in which the earth's 9 billion people live well and within the limits of the planet.

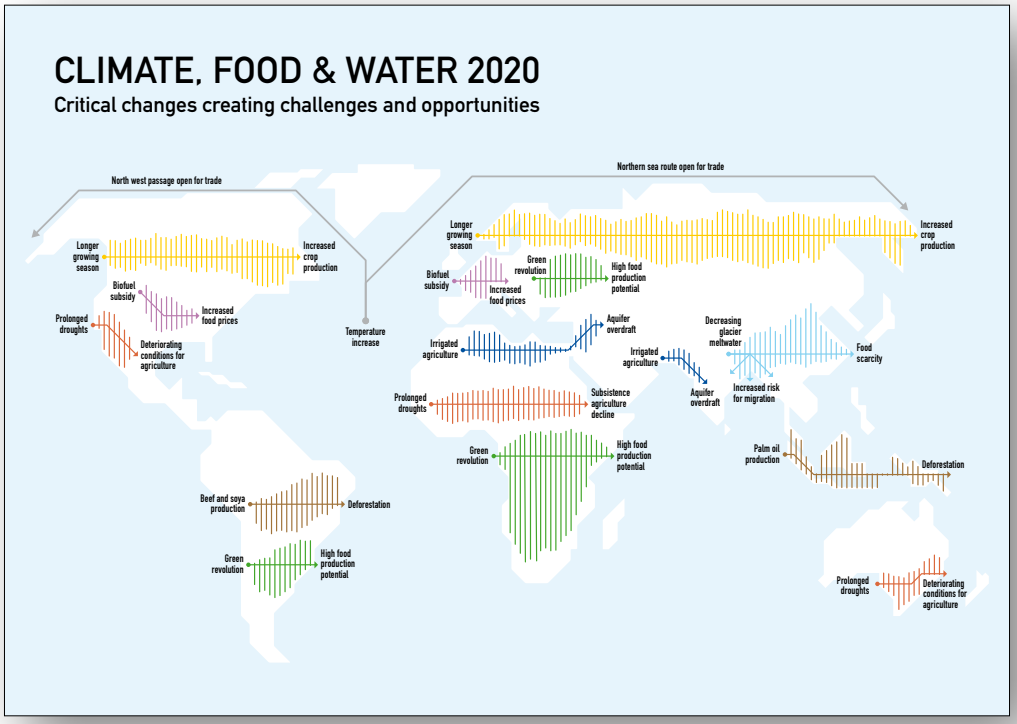
★ Achieving *Vision 2050* will require a radical but feasible transformation of global markets, governance and infrastructure, and a re-thinking of our ideas of growth and progress.

★ Investment in infrastructure, technology and human services driven by sustainability and resource efficiency could reach US$ 3-10 trillion per annum in 2050, creating new opportunities for business to thrive and grow.

★ The world already has the knowledge, science, technologies, skills and financial resources needed to achieve *Vision 2050,* but time is short. Concerted global action must be made in the next decade to bring these capabilities and resources together for getting on the path to sustainability.

★ Business-as-usual is sending us on a trajectory to consume 2.3 planet's worth of ecological resources in 2050. The pathway outlined will enable us to live within the limits of one planet limiting the destruction of key ecosystem services – including climate, forest, fisheries and farmlands – and easing human hardship.

★ *Vision 2050* calls for a new agenda for business: to work with government and society worldwide to transform markets and competition. Prices must be rationalized to include such externalities as key ecosystem services so that sustainability can be a true competitive advantage across all industries and regions.



Sustainability Science Journal

Recent news and progress

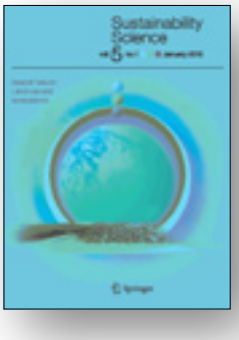
Sustainability Science, published by Springer Japan, is the official journal of the Integrated Research System on Sustainability Science (IR3S) at the University of Tokyo and the United Nations University. It launched its inaugural issue in October 2006 with 10 full length articles on topics such as recent worldwide sustainability science initiatives, sustainable development approaches in Asia, and case studies on China. The University of Tokyo's partnerships with AGS and other institutions made clear the need for strengthening the concept of sustainability science and providing a forum for researchers to share their work, and this was the main purpose of starting this journal.

Since 2006 the journal has published six more issues, including four special features, each one increasing in popularity according to online statistics. The majority of contributing authors are still from Japan and the US, but to date authors from 20 countries have contributed to nearly 100 research papers.

Sustainability Science showcases research that applies scientific analysis to identify root causes and address practical problems in meeting fundamental human needs while preserving ecosystems. This means trying to understand relationships between human society and the natural environment on global, social and individual scales. Whether research is problem focused or attempts to further our understanding of underlying relationships, the defining feature of published papers is the cross-cutting perspective they take – across disciplines and scales of time and space.

With a field of study that is growing exponentially in published papers, the journal aims to attract the best submissions that will make *Sustainability Science* a high impact journal. These papers should offer new, holistic explanations in reference to current sustainability issues. Topics may include the following:

* Frameworks for sustainable policy making
* Historical account of environmental disasters
* Human and resource social-ecological systems
* Steps for poverty alleviation
* Putting the brake on overconsumption
* Land and resource management
* Sustainability science methods and design
* Psychology of transition management



The Editor-in-Chief of Sustainability Science is Prof. Kazuhiko Takeuchi and the Managing Editor is Dr. Fukuya Iino. For more details see www.springer.com/11625

Education and student initiatives

Introduction

The AGS has the strategic goal to strengthen university education on sustainability. Each AGS partner university is committed to incorporating sustainability into their curriculum, and has increased its individual activity in the area of sustainability education. For the past decade, the AGS has enhanced these individual efforts in three ways: involving students in multinational research projects; convening intensive educational seminars on sustainability that welcome students from all partner schools (as well as others); and supporting international student initiatives in global sustainability, particularly the World Student Community for Sustainable Development and its AGS university groups. The AGS will continue to enrich student education by supporting student participation in AGS annual meetings, technical workshops and research projects, and intensive courses on sustainability for graduate students building on the successful models of the YES and IPoS courses.

The AGS recognizes the educational, practical, and symbolic value of setting an example through its own activities. The AGS is committed to improving its performance with regard to sustainability and to promoting – in collaboration with other groups – the sustainable management of university campuses. Each partner university uses its own approach to improve the sustainability of its own operations and infrastructure. In the same spirit, AGS seeks to reduce the environmental impact of its meetings and other activities. For the AGS Annual Meeting 2009, two ETH students produced a report on the environmental impact and designed communication measures and decision guides to help organise more sustainable conferences. The AGS will seek to implement these recommendations in future events.

Education for sustainability at ETH

ETH bachelors and masters courses include a range of minors and individual courses specifically related to sustainability issues and coupled human-environmental systems, as well as the majors covering the broader environmental, economic and social contexts. For example, in the last semester, courses addressed climate change (climate science, governance, politics and technology), world food supply and agricultural markets, environmental governance and international politics, sustainable management of agro- and forest ecosystems, ecosystem services, sustainable construction, sustainable product design, sustainable technologies in energy, mobility, and many more.

A number of very successful interdisciplinary and international masters courses have been launched in the last two years, to compliment the existing courses. For example, the Energy Science and Technology MSc, and the MAS Sustainable Water Resources, MAS Urban Design, and MAS Natural Hazards Management are attended by top students from all over the world.

ETH Zurich aims to train ETH students to be "change agents" – students who can work for change in a complex, rapidly changing environment and society. They need skills in problem solving and analysis, communication, presentation and negotiation, risk analysis and system dynamics, as well as solid academic knowledge. For this, new teaching models are being introduced and adapted, including case studies, focus projects, seed sustainability projects in collaboration with partners from industry and society, and design studios in real life situations. An example from 2009 was the CLIMPOL case study project in which student teams in partnership with the local government, energy companies, and local population of Urnäsch, Appenzell, Switzerland, analysed regional energy production and developed strategies for future sustainable energy supply and demand, including the potential for renewable energies.

LEARNING AND DOING OUTSIDE THE FORMAL CURRICULUM

Many student initiatives drive sustainability issues at the ETH. A few highlights from this year:

Implementing Sustainability in Conferences – what was the sustainability footprint of the AGS Annual Meeting 2009?

Franziska Elmer and Annina Brunner, ETH students

How much CO_2 and waste does a four-day international conference produce? What difference does vegetarian catering make? How can the AGS organise an Annual Meeting with a smaller environmental footprint and a stronger commitment to the sustainability values that distinguish the AGS? Two ETH Zurich Bachelor students took up this challenge with great commitment, and contributed to the decision-making and communications of the conference organisation. The project was part of the Ecoworks initiative at ETH.

In the report "Implementing Sustainability in Conferences", Annina and Franziska have carried out a careful investigation of the sustainability impacts of the AGS Annual Meeting 2009. As well as analysing the sustainability impacts of the travel, hotel use, catering and printing, the report describes communication measures for conference participants such as how to calculate compensation measures for a printed abstracts book, and provides recommendations for what steps conference organizers can take to improve the sustainability footprint of their conference.

We recommend these guidelines for conference organizers at the ETH and other AGS universities, and ETH Sustainability is working on getting them implemented at the ETH.

"Implementing Sustainability in Conferences" report is available for download at http://theags.org/publications/reports-and-papers

Education for sustainability at ETH

(continued)

Websites: www.ecoworks.ch and www.sustainability.mit.edu

ECOWORKS AND MIT GENERATOR – SHARING EXPERIENCES OF TAKING ACTION ON CAMPUS

Marc Vogt and Martin Räber, ETH Ecoworks coordination

Ecoworks generates and supports ideas and projects that reduce the CO2 emissions and improve the environmental impact of ETH Zurich. The Ecoworks concept has a lot in commmon with the MIT Generator. MIT Generator has the goal of making the MIT campus a learning laboratory for energy, environment, and sustainability. It runs events in which students pitch and join working groups to carry out projects that generate change on the MIT campus. The Ecoworks and MIT Generator managers and students shared their experiences and lessons with others in a workshop at the AGS Annual Meeting 2009. They posed the questions "How to launch such a project?", "How to share it?" and "How to sustain it?" The participants agreed that students are important drivers of ideas or initiatives for change on campus. To succeed in making a change, these need to be supported by staff and faculty. Results must be made visible within the university, and shared as best practices with others. Staff, students and faculty have different incentives and possibilites for participating, and the coordinators task is to balance the participation fairly, keep the ideas fresh, and sustain the momentum to a successful end. In 2010, Ecoworks will build on its success to run bigger projects with higher impact.

NEWS IN BRIEF: YES COURSES ARE NOW DIRECTED BY ACTIS GMBH – ACTIVATING TALENT IN SUSTAINABILITY

Website: www.actis-education.ch

Youth Encounter on Sustainability – YES – courses bring together inspiring groups of upper level university students from many different disciplines, cultures and nationalities to learn together in a unique environment. They aim to sensitize participants to the complex issues of sustainable development in a global context, through two weeks of intensive course work, field trips, workshops, group work, discussions and practical learning experiences, combined with social and cultural activities.

The YES courses and programs are now directed by ACTIS GmbH – Activating Talent in Sustainability – a Swiss organisation founded in early 2009 with the purpose of taking over full operation of the YES courses and associated activities. The ACTIS core staff have been responsible for running the program since its creation. ACTIS was created as an "ETH spin-off" organisation due to the strong involvement of the ETH Zurich in the establishment and operation of the YES courses from 2000 to 2008. The AGS is the main collaborating organisation for the YES programs. Regional YES courses are held in collaboration with local partner organizations. In the past courses have been hosted in partnership with UNEP in Nairobi, INCAE Business School and CATIE in Costa Rica, Hosei University in Japan, Egerton University in Kenya, the International Water Center in Australia (an alliance between the University of Queensland, Monash University, Griffith University and the University of Western Australia), and the Wadi Environmental Science Center in Egypt. The international group of Faculty for the YES courses is drawn from the AGS partner universities, as well as from regional public and private partner organizations.

Education for sustainability at MIT

At MIT, key activities include 1) the Martin Family Society of Fellows for Sustainability, 2) an established freshman introduction to environmental science, and 3) increased embedding of sustainability into business and energy curricula. Two current examples are the new energy minor and the S-Lab.

NEW ENERGY MINOR AT MIT

As of Fall 2009 MIT undergraduate students have a new academic option available to them: a minor in energy, which can be combined with any major subject. The new minor is designed to be inherently cross-disciplinary, encompassing all of MIT's five schools and balancing three areas: energy science, energy technology and engineering, and energy social sciences including policy and economics. Students will confront a wide range of energy challenges including energy-related climate change, pollution, and associated poverty issues, as well as courses on energy efficiency and sustainable sources of energy.

Seven new undergraduate classes were created, and three existing classes were significantly revised. The energy minor provides a complement to any major in any of MIT's five schools. A new Energy Minor Oversight Committee, with representation from the five schools, was formed to directly manage the program. This broad structure and new reporting system makes MIT's program unusual, if not unique, in higher education, says Dr. Amanda Graham, head of the MITEI education office. A survey of students earlier this year found a high level of interest in the energy minor, with 19 percent of sophomores and 23 percent of juniors saying they had some interest in it.

For more information on the MIT Energy Minor go to http://web.mit.edu/mitei/education/minor.html

THE MIT S-LAB

Sarah Slaughter, Senior Lecturer,
Sloan School of Management at MIT

The Sloan School of Management at MIT offers a course that specifically addresses how organizations of all kinds – including traditional manufacturing firms, those that extract resources, a huge variety of new start-ups, nonprofits, and governmental organizations of all types – are tackling the massive challenges of sustainability. The course includes the S-Lab, where teams of students focus on "live" projects with an organization that has requested help in thinking through a challenge or opportunity related to sustainability. The goal of S-Lab is to provide students with an opportunity to apply the concepts, theories and tools through working with host organizations on their actual sustainability projects. Each team professionally and effectively delivers analysis, advice and recommendations that are immediately useful to the host organization and advance the field of sustainability as a whole. The teams make a formal presentation to the host organization at the end of the project and provide them with a final report, including supporting written analysis and data as appropriate, and present a project poster for the MIT and wider community.

The host organizations often incorporate the S-Lab team results into their policies and procedures, reflecting the real-time value of the topic for their organization. Host organizations have also followed up on the S-Lab results through additional collaboration with MIT faculty and staff, including subsequent course-based projects, internships, and research programs.

More information is available at http://actionlearning.mit.edu/s-lab/index.php

Education for sustainability at The University of Tokyo

Satoyama module at IPoS 2009

More information about the IPoS course at www.ipos.k.u-tokyo.ac.jp

Read more about the GPSS sustainability education approach and curriculum at http://www.sustainability.k.u-tokyo.ac.jp/

Onuki, M. & Mino, T. (2009) Sustainability education and a new master's degree, the master of sustainability science: the Graduate Program in Sustainability Science *(GPSS) at the University of Tokyo.* Sustainability Science, *4, 55-59.*

GRADUATE PROGRAM IN SUSTAINABILITY SCIENCE (GPSS)

The University of Tokyo started its Graduate Program in Sustainability Science (GPSS), offering a master of sustainability science degree, in 2007. The GPSS curriculum consists of: (1) knowledge and concept oriented courses, which cover sustainability-related subjects from a holistic viewpoint; (2) experiential learning and skills oriented practical courses, which offer practical exercises to acquire the skills and sensibility required of future leaders; and (3) the Master's thesis, for which students are encouraged to address complex sustainability problems through a transdisciplinary approach. Sustainability science is not a discipline that can be defined simply by the subjects it deals with, but is an academic field characterized by core principles that include holistic thinking, transdisciplinarity, and respect for diversity. The GPSS has been designed so that students may gain the capacity to understand and practice these principles.

UT-AIT INTENSIVE PROGRAM ON SUSTAINABILITY

The "Intensive Program on Sustainability (IPoS)" is a short-term educational course on Asian and global sustainability, which provides an opportunity for international students (especially from Asian nations) to obtain a deeper appreciation for global sustainability in the Asian region and experiences of tackling sustainability issues in multicultural and international scenes. Understanding of "sustainability" is especially important for rapidly expanding Asian economies, so this program looks at Asia as a key region in achieving global sustainability. On the one hand, solutions to Asia's regional problems are an essential requisite for global sustainability. On the other hand, Asian traditions and perspectives can contribute much more to global sustainability if they are better understood in other parts of the world. In this program, participants lodge together, study through experience-based learning that includes lectures, group discussions, field works and student presentations, and cultivate friendships across different nationalities and academic backgrounds. IPoS started in 2004 as a challenge under the AGS to promote Asian regional education on sustainability, through the collaboration between the University of Tokyo and the Asian Institute of Technology (AIT).

In 2009, IPoS accepted 24 students to two sessions from The University of Tokyo, AIT, AGS member universities, IR3S partner universities (Hokkaido University, Ibaraki University, and Osaka University), Australian National University, National Cheng Kung University and National Taiwan University.

IPOS 2009 – "FOOD, ENERGY AND WATER"

The IPoS 2009 summer session was held in Rayong Province, Thailand, on August 1-12. The committee recognized the importance of water in considering food and energy issues and set the theme of IPoS 2009 as "Food, Energy and Water". Food, energy and water are closely related with each other. Water and energy are necessary for food production. Energy can be produced either by growing crops (as energy crops) using water or by using water in hydropower stations. Using large amounts of energy, fresh water can be gained from seawater through desalination, and agricultural water use can be avoided by importing food from other countries (the virtual water trade). In this way, relationships among food, energy and water are very complicated and differ from place to place depending on local conditions.

Through this theme, IPoS 2009 tried to let students notice that there are different dimensions to sustainability issues in the world, different framings and different disciplines, and then tried to foster their capability for multicultural and multi- and trans-disciplinary collaboration.

Though the process through which the students with such multi-cultural and multi-disciplinary backgrounds worked together to solve sustainability issues was very hard, the outcome obtained from the active and exciting discussion was very great.

NISSAN WORKSHOP 2009

Most of the students of the summer IPoS course came back to strengthen their friendships, collaboration, and understanding at the Nissan Workshop in December in Yokosuka, Japan. The theme "Sustainable mobility with zero emission vehicles" challenged the students to think about best scenarios and design proposals for how zero emission vehicles could create sustainable mobility in different kind of cities – under different levels of density, compactness, and transport nodes.

Education for sustainability at Chalmers

Chalmers activities are focused on education for sustainable development (ESD) as a support for the UN Decade on Education for Sustainable Development through UNESCO Professor John Holmberg. Further, a coordinated effort with the Technical University of Delft and University Polytechnic Catalonia-Barcelona includes *The Observatory,* a ranking and information report on the progress of European universities in engineering ESD.

COOPERATIVE ACTIVITIES WITH STUDENTS

Chalmers students for sustainability (CSS) and the World Student Community for Sustainable Development

The Observatory has been published out of Chalmers as an assessment of the progress of engineering education for sustainable development in higher education. Previous reports have been in cooperation with UPC in Barcelona and Delft Technical University. In 2009 Chalmers-AGS and CSS launched a project to provide a new form for the Observatory. Here the students will use their international network to provide a complete global assessment on education for sustainable development exemplified by new ideas and initiatives.

NORESD Competition is a student initiative to promote ideas exemplifying sustainability that can be converted into action. Chalmers-AGS has supported the planning phase during 2009. The Chalmers-AGS has also supported the attendance of students at the annual meeting in Boston and provided stipends for student travel to IPos and YES courses.

CARL JUSTIN KAMP JOINED THE NOBEL LAUREATE MEETING, IN LINDAU, GERMANY

The 59th Meeting of Nobel Laureates in Lindau, Germany was held June 28th–July 3rd with the focus area of chemistry. 580 graduate students from 67 countries spent the week with 23 Nobel Laureates from chemistry, physics and physiology/medicine. The schedule was packed with fascinating lectures, smaller discussion groups, cultural and social events, as well as 2 panel discussions on 'The role and future of chemistry for renewable energy', and 'Global warming and sustainability' with participants including R. Pachauri (IPCC), B. Lomborg, T. Stocker and W. Woomaw. Although the Nobel Prize is awarded to individuals at the top of seemingly narrow scientific fields, the Lindau meeting articulated that multidisciplinary and international approaches are vital in solving large-scale problems, thus motivating the need for groups such as the AGS.

Carl Justin Kamp (WSC-SD, AGS Chalmers) with Dr. Peter Agre, Nobel Prize Chemistry 2003

The World Student Community for Sustainable Development (WSC-SD)

WSC-SD e-book titled RE:SOLUTIONS

Winner of Mondialogo Prize: Marcus Högberg, Chalmers University of Technology and Benny, University of Gadjah Mada, Yogyakarta, Indonesia

More information about us:

Download the ebook and the WSC-SD prospectus at *http://wscsd.org/*

Read the WSC-SD blog from the Climate Summit at *www.cop15.wscsd.org*

The World Student Community for Sustainable Development is a worldwide network of motivated students dedicated to sustainable development through the creation and implementation of both local and global projects. Students from the AGS universities are fortunate to have opportunities for multidisciplinary, international and intergenerational knowledge transfer. The lack of such opportunities in other countries contributes to the vast inequality between educational institutions worldwide. Through sharing resources such as access to top academics in sustainability-related areas, financial support, various types of exchange programs, and most importantly transferable student innovations, we aim to make a difference worldwide. We currently have 4000 members in over 60 countries in student communities, individual members and partner organizations. We assembled a WSC-SD Advisory Board who met for the first time at the AGS AM in Zurich. In countless projects done by both the WSCSD as a whole and by our members, 2009 has been a year of progress for our organization. Here are a few highlights:

WSC-SD ACTIVITIES AT THE UN COP15 CLIMATE SUMMIT IN COPENHAGEN

The COP15 was a unique opportunity to address one of the most urgent challenges of recent human history: climate change. We aimed to observe and learn about the negotiation processes and the translation of scientific knowledge into policy-making, and to hammer through our key message that students are essential actors in providing concrete solutions and carrying out projects that have a positive impact on tackling climate change. A team of 40 WSC-SD and AGS students actively reported through the weblog on the negotiations, on side events and the civil society perspective, and showcased climate-oriented, student-led projects. At our side event and our participation in two others hosted by 350.org and PlanetCall, we focused on the role of youth as a catalyst of change, as a challenger of status-quo politics and as a provider of fresh social and technical solutions.

'RE:SOLUTIONS – 21 YOUNG LEADERS ON CLIMATE CHANGE'

Our flagship project during COP15 was the release of the eBook 'Re:solutions'. The book, with a foreword by Bill McKibben, showcases a selection of 21 innovative student projects on climate change. The projects all have a real, positive impact on tackling climate change, and show the results of successful interdisciplinary collaboration. The book is intended to inspire thought-leaders in business, academia, politics and civil society to support student leadership on climate change. The first digital copy was handed to Tim Flannery, author and chairman of the Copenhagen Climate Council.

MONDIALOGO PRIZE

WSC-SD members from Gadjah Mada University in Yogyakarta, Indonesia, and from Chalmers University in Sweden won the Mondialogo prize sponsored by UNESCO and Daimler for their work on 'Zero Waste Production Systems in Small/Medium Industrial Clusters' – a system for local energy production with bio-digesters to produce biogas.

MEMBER STUDENT COMMUNITIES

- Chalmers Students for Sustainability (CSS) – Chalmers University of Technology, Sweden
- [project21] – ETH Zurich, Switzerland
- Unipoly – EPFL, Switzerland
- Society for Sustainable Development – University of St Andrews, Scotland
- AGS-University of Tokyo Students Community (AGS-UTSC) – The University of Tokyo, Japan
- Students for Global Sustainability (SfGS-UoN) – University of Nairobi, Kenya
- Association pour le Developpement Durable (UY1-ADD) – Universite Yaoundé 1, Cameroon
- Quark Society – American University of Cairo, Egypt
- Sustainability@MIT – Massachusetts Institute of Technology, USA
- University of Regina Students for Sustainability (URSS) – University of Regina, Canada

PARTNER STUDENT COMMUNITIES

- Corporación Grupo Tayrona – Bogota, Colombia
- BME University Green Association (EZK) – Budapest University of Technology and Economics, Hungary
- Students for Global Democracy – Kampala, Uganda
- WSC-SD Fort Hare – University of Fort Hare, South Africa
- Oikos Monrovia – University of Liberia, Liberia

WSC-SD Student Summit for Sustainability S³ 2009

The Realistic Side of the World – Sustainable Development and the Role of Economic and Political Institutions

The seventh annual meeting of the World Student Community for Sustainable Development (WSC-SD), organized by [project 21], was held in Switzerland from January 25th to February 1st 2009. During these days, over 90 students from around the world learned about and reflected upon the global institutions driving the world and their relationship to sustainability, and engaged together in imagining alternative paths for the future. The WSC-SD is the student counterpart of the AGS. Over the last years, however, it has only been very loosely connected to the work of the AGS; to bring the two organizations closer together again, their annual meetings were held together this year.

The first part of S3 was designed so that it was completely interlinked with the AGS Annual Meeting 2009, and S3 provided to all participants exciting and provocative plenary keynotes on the S3 topics. After the AGS meeting, the students retreated to a quieter place in Kreuzlingen, and for four days plunged deeper into the conference subjects, working closely with the experts who stayed in residence together with the students.

With the three conference topics – geopolitics, financial markets and non-monetary incentives – we looked at sustainability from a non-mainstream point of view. The presentations and workshops, ranging from peak oil to community currencies, open source software and open access publishing, hit directly on the theme in some unexpected ways. During the summit the participants gained new insights and a broader understanding of the "incentive structures" driving our world. This is of crucial importance if we want to achieve a sustainable development and put our individual action in the right perspective.

The students raised sponsorship to fund the meeting. Sponsors included Stiftung Mercator, a range of Swiss companies and organisations, Stena AB and Vattenfall, as well as the AGS core and AGS universities.

In 2010, the WSC-SD will hold a student meeting in parallel with the AGS annual meeting in Tokyo, and the 2010 S3 will be held in Bogota, Colombia, centered on the effects of climate change on the world's poor population and students' roles and responsibilities.

[PROJECT 21] – THE ORGANIZERS VIEWPOINT

"The conference strengthened our initial urge to question the rules of the systems in which we operate and are asked to perform. The experts were not invited for their title but because they are people who have had the courage to question these illusions. They were able to show us how to do that and to demonstrate that alternative systems can offer hopeful answers to a lot of the issues that preoccupy us. A strong feeling emerged of being one group working on a better future."

"When we started the planning the financial crisis had not started or been anticipated. However, we were convinced that there was something deeply wrong within financial markets. We did not expect to be proven right so soon!"

SUS+ AT THE S3 2009

"We had lots of great opportunities to share ideas and make new networks with professors, researchers, and students from all over the world. We learned how to act together to make a sustainable society through the keynote presentations, movies, the discussions with the speakers and with the shared student community. As AGS-UTSC are organizing the student meeting focusing on Asian sustainability issues during the AGS-AM 2010 in Tokyo, it was also an excellent opportunity to learn how to organise an exciting program of different kinds of activities."

CHALMERS STUDENTS FOR SUSTAINABILITY AT THE S3 2009

"As well as supporting our 16 students to go to Zurich by train, we were able to raise sponsorship for four participants from developing countries, and we think this sets a standard for how student organizations from industrialized countries should try to act when participating in international meetings."

President Ralph Eichler and journal editor Ulrich Poeschl discuss open access publishing

Andrea Riemer from the Austrian Academy of Defense talked about petro-imperialism

All presentations were recorded and are accessible at www.wscsd.org/s3zurich

AGS and WSC-SD students report from the COP-15 Climate Summit

WSC-SD members at the COP15 meeting in Copenhagen,Denmark

Chalmers student Rasmus Einarsson and Kristina Sahleström, giving presentation at the EU pavillion

Read the reports from the COP-15 at http://agscop15.wordpress.com/ and http://cop15.wscsd.org/

Climate change is influencing all of us! The urgent need for action is a highly prioritized concern for the growing generation. They realize that the challenges facing the global community associated with climate change, and how these issues are being dealt with, will affect today's young people as they grow into adulthood.

Young people have been present at climate negotiations since the Rio Earth Summit in 1992, and their actions have resulted in widespread media coverage and the mobilization of thousands of their peers. It is estimated that 200 young people participated at COP-13 (Bali, 2007), 500 at COP-14 (Poznan, 2008), and more than 1500 young people attended the COP-15 in Copenhagen in December 2009! The COP-15 thus provided a platform with great opportunities for youth debate to be brought to the public arena.

A team of 40 WSC-SD and AGS students actively reported through the WSC-SD and AGS weblogs and the blogs of the AGS universities. Read about their huge store of impressions and encounters, emotions swinging from inspiration to despair and frustration, impromptu encounters with delegates, experts, and indigenous people. Hoping for a FAB – a Fair, Ambitious and legally Binding – climate treaty.

In the end, COP 15 did not result in a single, legally binding document; but it did produce three key points:

- It raised climate change to the highest level of government
- The Copenhagen Accord reflects a political consensus on the long-term, global response to climate change
- The negotiations brought a set of decisions to implement rapid climate action near to completion

"COP15 sometimes appeared to me to have been like a tug-of-war between youngsters in order to know who's the best and strongest, without a clear consensus. The final agreement states that all parties have the right to decide on their own if (and when?) they will accept the Copenhagen Accord text – or not. The 'good bit' is that the accord delivers a solid grounding for later discussions."

Katja Halbritter, ETH Zurich

"COP15 was a festival of ideas about a future low-carbon society and an economy built on a responsible and egualitarian use of natural resources. This surge of creativity has now to be used at the scale of influence of each one of us, in order to make a step forward. As Camus put it "the real generosity towards the future is to give everything to the present."

Franziska Aemisegger, ETH Zurich

"It has been a tremendous experience to listen to the presentations, sessions and negotiations. The COP15 was really a one-time opportunity for global dialogue and for establishment of a global partnership for collaboration."

Marcus Högberg, Chalmers

"Despite all the disappointments, I've had one really positive experience in Copenhagen: Probably for the first time in history, big finance (the Institutional Investors Group on Climate Change) and environmental NGOs came up with an almost identical demand to our politicians."

Tim Schloendorn, ETH Zurich

"I have always been heavily involved in outreach and educational efforts regarding science and climate change understanding; much of my interaction with the youth population both in and outside of the traditional school education system. I dream of the day we reach a critical mass of youth, Generation 'S' for sustainability, but will it be too late for much of the planet 10-15 years down the road by the time that generation has voting and life decision power?"

Kat Potter, Sustainability@MIT

"What strikes me is all the young people here, the people that are the future, all with the same agenda: a sustainable future for all. To be a part of this is enormously gratifying and inspirational"

Johan Torén, Chalmers Students for Sustainability

"We wanted to stimulate the young generations' ideas for how to achieve a low carbon society. We students from very different countries and academic backgrounds have established a network between us, which has opened a door for future cooperation."

Fang-Ting, Makoto, Akira, Yasuaki, Marcos, Takako and Takara, AGS-UTSC students

"The fact of the matter is however, that citizens have traveled from across the world with the expectation that they would be able to attend this conference that is deciding their future only to be turned away in the conference's final moments. This conference has cost them weeks of time (longer if you include planning time), thousands of dollars, and resulted in an estimated total of 120,000 tonnes of CO_2 (I extrapolated this for the actual number of attendants based on the UNFCCC's estimate for 15,000 attendants). To put it in perspective, the nation of Somalia emits roughly 50,000 tonnes per year."

Aaron Thom, Sustainability@MIT

[project 21]

Students for Sustainability at the ETH Zurich and Zurich University

[project 21] is an interdisciplinary group of students from the ETH Zurich and Zurich University. We engage in discussions, projects and actions for sustainable development. We focus on long-term thinking and a responsible and sensible way of dealing with social, economic and ecological resources.

Beside organizing the Student Summit for Sustainability (S3) 2009, we have worked on a plenitude of projects and events.

★ The current edition of our semester magazine "Studio!Sus" covers sustainability aspects of nutrition.

★ In collaboration with the Alternative Bank of Switzerland (ABS) we introduced the first student bank account focused on sustainability criteria.

★ With the goal of raising awareness for digital sustainability we have organized an event series at the student bar on the topic of creative commons and open access.

★ We are again organizing Linux days where we offer background information and installation support for open source software.

★ In our movie series "A Precious Planet" we showed films which depict the beauty but also the fragility of mother earth, followed with discussions.

★ We hosted the largest Swiss flag at ETH so that it could be filled with the wishes of the Swiss population to our leaders at the COP-15 Climate Summit.

Pascal Mages
[project 21] team

[project21] student magazine on sustainability and nutrition

ETH climate flag, expressing wishes from the Swiss population to the Swiss delegation at the COP-15

Read more on our homepage at www.project21.ch

Sustainability@MIT

Sustainability symposium 2009

MIT Generator, fall 2009

Sustainability@MIT has been very busy in 2009! We organised a range of events, and our members are working on many projects with the MIT Energy Initiative's "Walk the Talk" task force, including campus energy consumption mapping, energy retrofits, behavior change, green procurement procedures, department operations and curriculum audits. We also got much more organized and accessible to the public, renovated our homepage, http://sustainability.mit.edu, and have ensured better continuity after existing members graduate and become alumni.

Some highlights in 2009:

★ StuffFest builds on our FreeMeet concept. At the end of each academic year, we have a designated area set aside in each dorm where students can leave unwanted but usable items, mainly clothing, and other students can take whatever they wish. The clothes that remain go to charity – this year it was 3,783 pounds of clothing!

★ Our flagship fall event is the MIT Generator at which over a dozen groups working on curriculum development, research, and campus greening projects at MIT promote their work and recruit new students to participate.

★ The Sus@MIT group SACS is installing a prototype solar air conditioner + water heater unit on the roof of a campus building. This group combined technologies to create a new system design, has won grants and competitions outside MIT, and has garnered the support of MIT Facilities. SACS aims to reduce energy consumption of buildings on campus, demonstrate and promote the technology, illustrate MIT's leadership in green energy development, and serve as an educational program for MIT students and faculty.

★ The Food Initiative subgroup developed a Sustainable Catering Guide summarizing what to request from caterers, and a list of caterers near MIT who implement sustainable practices and/or are open to creating sustainable events.

★ Sustainability@MIT and partners hosted the MIT Sustainability Symposium in April 2009, which brought together hundreds of participants from academic, public, and private sectors for a discussion-based conference that featured 30 speakers from various backgrounds. We also invited a range of inspiring speakers during the year.

Aaron Thom
Sustainability@MIT president in 2009

Read more at
http://sustainability.mit.edu

SUS+ at The University of Tokyo

At SUS+ (SUS-plus) we connect and motivate students who are interested in the range of issues related to sustainability at the University of Tokyo. We have 30 active members in five working groups, and another 100 alumni members on our mailing list, mainly graduate students. We chose SUS+ as a nickname for the AGS-The University of Tokyo Student Community to highlight our focus on SUStainability and our aim to be a positive community that brings something more, better and greater (plus!) to global sustainability. We hope that AGS professors and researchers respond positively to our new nickname, and communicate lightheartedly with us.

WORKING GROUP ACTIVITIES IN 2009

★ The Climate Change Working Group (CCWG) organized the exhibition "Scientific views on Climate Change" at the May Festival of the University of Tokyo, with posters and movies that summarize and examine the scientific discussion on climate change. At the COP15 Climate Summit we organised a student workshop "Long-term Cooperation Initiatives towards a Low Carbon Society". With students from The University of Tokyo, the University of Copenhagen, the Australian National University, and the other AGS schools, we had a lively exchange of ideas on how to reach a low carbon society. We also wrote for the AGS COP-15 weblog.

★ The Sustainability Education Working Group (SUS-EDU) is dedicated to spreading the concept of sustainability within higher education. We see many opportunities for students to approach social issues in the university, and in 2009 we hosted the workshop "My workstyle" for a more sustainable society, exchanged with a pioneer in Finnish education, hosted workshops, a "Learning Theatre" (movie workshop), and participated in the student summit on ESD in Sweden.

★ Energy Working Group (UT Energy Club g-Enesis) members returned from the MIT Energy Conference 2009 updated on energy issues and how to manage a student energy club. We used our interdisciplinary expertise to design a Japanese Green New Deal Policy by applying the quantitative method, and submitted proposals to the Japanese Ministry of the Environment and the Eco Japan Cup contest. One project won the excellence prize, and we presented at Eco-Products 2009 – one of the biggest environmental exhibitions in Japan.

★ The Water Working Group restarted activities with the aim of deepening understanding and widening our views about water. At monthly study meetings and a field trip, we discuss water from our different disciplinary viewpoints – including urban engineering, agriculture and law – and stimulate and motivate each other to consider water management issues more deeply.

★ SUS+Global is a new working group for international students at Todai to exchange sustainability issues from different countries, values, and disciplines. We try to structure these issues to find underlying sustainability problems. SUS+Global is hosting the WSC-SD student meeting at the AGS AM 2010.

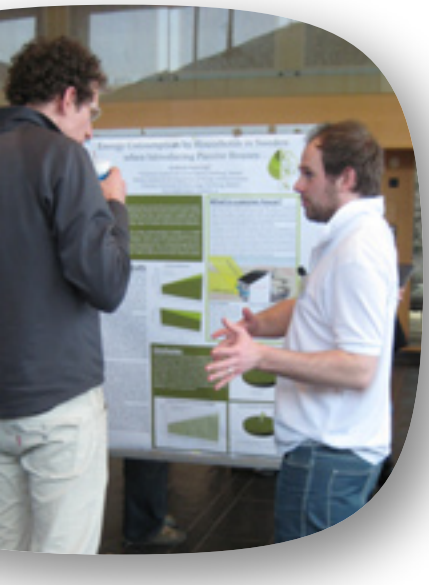
Yoshimasa Takahashi
Student, UT-SC

Student workshop on sustainability

Read more at http://ags-utsc.org

Chalmers Students for Sustainability (CSS)

Filip Johnsson at the CSS seminar.



Andreas Hanning, presenting his poster on passive house

Read more on our homepage at http://css.chs.chalmers.se/

Chalmers Students for Sustainability (CSS) is an organization for undergraduate, graduate and PhD students at Chalmers who want to contribute to a sustainable future. We run projects and campaigns, study visits, lectures and social events at Chalmers, and collaborate with other organizations in Sweden and abroad. CSS has grown considerably during the last year and there is a will and interest of students to be active in sustainability issues at Chalmers. CSS contributions at Chalmers in 2009 have included the Chalmers advisory group environmental coordinator, a joint meeting with the sustainability group at SKF in order to set up a long term collaboration, and presentations on CSS to all the new students at Chalmers.

HIGHTLIGHTS IN 2009

★ At the CSS "A Day for a Sustainable Future" Seminar in March we presented CSS, the WSC-SD, the AGS, and Chalmers Energy Academy to new students and faculty – with a free lunch for the first 100 people to show up. We continued with talks and debate on Sustainable Energy Futures with invited speakers talking about solar energy, wind power, biogas, alternative transport fuels and carbon capture and storage. We invited experts from the Swedish Gas Association on solar energy, Volvo AG and Volvo Aero, Vattenfall-Nuclear Power, and Chalmers and Uppsala universities.

★ The CSS concept "Internal Education" in 2009 included short seminars at CSS member meetings, where CSS members gave short seminar presentations and then hosted discussions. Topics included the UN-HABITAT project at Chalmers, Environmental Ethics, Education for Sustainable Development, Sustainable Development from a human ecologist's point of view, and more.

★ From the S3 in January onwards, the CSS worked to organise the WSC-SD Focus Meeting on Education for Sustainable Development at Chalmers in October 2009. The ESD09 was a student-run conference to discuss ESD from a student point of view. We hosted 25 students at Chalmers, including participants from countries such as South Africa, Kenya, Germany, Estonia, Ireland, The Netherlands, Tajikistan, China, and El Salvador, to name just a few.

★ CSS members participated with CSS ideas on sustainability at the makeITfair in Amsterdam, the Netherlands, and the Youth Conference on European Life Sciences Careers in Frankfurt, Germany.

★ CSS members with other WSC-SD students won the Mondialogo prize and co-organised the WSC-SD student exhibit, side event, and other activities at the COP-15 in Copenhagen in December. We reported from the COP-15 for the WSC-SD blog and the AGS COP-15 weblog.

Andreas Hanning
Chairman of the CSS board for 2009

AGS Annual Meeting 2009 at ETH in Zurich

Focus Centre at ETH

ETH Sustainability

Key note speaker Moritz Leuenberger, Swiss Federal Councilor, at the one day symposium "Climate change – in what direction is Switzerland heading?"

The ETH student teams reported live from the COP15 on the ETH Climate Blog

The strategy and development plan for 2008 – 2011 highlights ETH Zurich's commitment to sustainability and related social issues. One of its primary goals is to enhance ETH's reputation as an international center of excellence in the fields of energy, the environment and sustainability.

The foundation for this commitment was laid more than 20 years ago, with the establishment of the Department of Environmental Sciences. Since then, sustainability has become an issue at the highest echelons of ETH Zurich. By creating a coordination office reporting directly to the President, ETH wants to bring together the numerous actors and initiatives in this area, and stimulate new projects and activities. Dr. Christine Bratrich took on the position of director of ETH Sustainability in October 2008. After her first year in office, she can look back on a long list of achievements and successfully implemented projects.

The symposium *"Climate change – in what direction is Switzerland heading?"* co-organized with the Competence Center Environment and Sustainability, attracted an audience of around a thousand participants from a wide diversity of institutions including academia, government, industry, NGOs as well as the interested public. Keynote speaker Federal Councilor Moritz Leuenberger highlighted the importance of reducing CO_2 emissions through individual reductions in energy usage to halt the negative consequences of climate change.

In time with this event, ETH Sustainability together with the presidential office launched an unique initiative: the first Climate Blog of a Swiss university. The blog provides a forum for 20 ETH Zurich professors as well as external guests to share their views, solutions and concerns about the current state of our climate. Furthermore, four ETH Zurich students attended the COP15 in Copenhagen to report live on the blog about their experiences and impressions of the political discussions and negotiations. They made contact with other AGS students, thereby strengthening the bonds between these universities.

While these projects focus more on knowledge-transfer, the ecoworks project is all about action. Ecoworks, ETH Zurich's own CO_2 compensation project platform, was launched in November 2009 by the ETH environmental officer and ETH Sustainability. Ecoworks generates and supports ideas and projects that reduce the CO_2 emissions and improve the environmental impact of ETH Zurich. The projects are initiated through bottom-up ideas generated from students, staff or faculty and implemented on campus. The ecoworks website (www.ecoworks.ch) gathers ideas and links students and ETH staff or faculty who can help implement the idea. For example – a program now shuts down computers overnight in workstations of the Environmental Sciences building. "eaternity" is an information campaign and special menu to help reduce CO_2 emissions. It was launched in time for the COP-15 in the ETH student canteen, and shows how changing the food we eat can significantly reduce CO_2 emissions. Another of the Ecoworks projects in 2009 looked at the AGS Annual Meeting.

One of the major success factors in all the projects and initiatives carried out by ETH Sustainability was the involvement of ETH Zurich internal and external partners. Their valuable input has made all the difference and contributed to one of ETH Sustainability's main goals: to boost action for and awareness of sustainable development as well as to publicize its efforts to a broader audience.

In the last year, ETH Sustainability has launched or been a partner in twelve projects ranging from setting up a new homepage (www.sustainability.ethz.ch) to participating in the European Institute of Technology's Climate Knowledge and Innovation Community.

Christine Bratrich and Catherine Lippuner
ETH Sustainability

Focus Center at the Massachusetts Institute of Technology (MIT)

The AGS Focus Center at MIT is co-located with the MIT Energy Initiative (MITEI). Several AGS activities are pursued cooperatively with MITEI. The most significant events this year have been in the area of education, with the inauguration of a new undergraduate minor in energy at MIT, and the continued success of the Sustainability Laboratory ("S-Lab") at the MIT Sloan School of Management.

RESEARCH

The MIT Portugal Project has been especially active this year, building on the success of the Green Islands program on sustainability for bounded geographic regions. The Green Islands initiative is part of the AGS Urban Futures collaboration. The objective of the Program is to explore what sustainability might demand and look like in a "relatively" closed system, such as an island or a discrete urban area. At MIT the project is beginning to converge with other work on sustainable cities, particularly in areas of energy and transport. An MIT group is working with Singapore on sustainability policies and practices. MIT projects in Cyprus, Singapore, and Abu Dhabi in a wide range of disciplines are also contributing to the growing body of understanding of sustainable cities.

EDUCATION

This year under the guidance of MITEI's Education Task Force, MIT established a minor in energy education for undergraduates.

For 2009-10, 22 graduate students were named to the Martin Family Society of Fellows in Sustainability. They represent a wide range of interests in science, engineering, biology, and the humanities and social sciences. In addition to granting graduate student fellowship for the past 11 years, the Martin Society now offers research opportunities for undergraduates through MIT's Undergraduate Research Opportunity Program (UROP). Nominated by faculty members, each Martin UROP is paired with an interested graduate student who is either a current or former Martin graduate Fellow, and works with the graduate student on his or her research. The goal of the program is to provide new opportunities for undergraduates to gain research experience in sustainability areas, and foster semester- or year-long mentoring relationships between Martin graduate Fellows and Martin UROPs.

OUTREACH

AGS activities have been featured in the MITEI newsletter. 14 MIT students affiliated with the Portugal project, the MIT Energy Club, sustainability@MIT, and other research and student groups, attended the AGS Annual Meeting and the WSC-SD Student Summit hosted by ETH in Zurich in January 2009. MIT-AGS also enabled two students active in the MIT sustainability community to attend the COP 15. A contingent of MIT-AGS affiliated faculty and staff participated in the AGS workshop "From Outreach to Partnership" hosted by ETH in October 2009.

Focus Centre at The University of Tokyo

Read more at
http://en.ags.dir.u-tpkyo.ac.jp/

AGS Club Strategic Sustainability Seminars

The AGS focus centre of the University of Tokyo (Todai-AGS) emphasizes the integration of disciplines within the University of Tokyo to promote sustainable science. It aims to establish a network between universities, government and society in cooperation with the Integrated Research System for Sustainability Science (IR3S), where a structuring of knowledge and action is being pursued. In 2009, Todai-AGS co-organized an international conference in Bali, Indonesia, in addition to ongoing research, education, and outreach activities.

RESEARCH

As part of the AGS Urban Futures Initiative, Todai-AGS co-sponsored the "International Workshop on Sustainable City-regions" from February 23 to 24, 2009, in Bali, Indonesia, with Udayana University, the Todai Global Center of Excellence for Sustainable Urban Regeneration, and TIGS/IR3S at the University of Tokyo. The participants actively discussed different aspects of sustainability in city regions in four sessions over two days.

For the 2010 fiscal year, the Todai-AGS research grant program will support 51 projects on various aspects of sustainability including sustainable production processes, energy, climate science, agriculture, water, food, cities, mobility, forestry, risk management, policy, consensus building, and networking. The number of selected projects has substantially increased from the past year.

EDUCATION

The Intensive Program on Sustainability (IPoS), co-organized by Asian Institute of Technology, and supported by Nissan Science Foundation, aims to share the ideas of sustainability amongst students in Asian countries. Since its launch in 2004, IPoS has been achieving successful educational outcomes with student participants from all parts of Asia, and some from all over the world. In 2009, 23 students from 14 countries participated in the summer session in Rayong, Thailand, and the follow-up session in Japan.

Todai-AGS supports the activities of AGS-UTSC (SUS+), the University of Tokyo Student Community, on climate change, energy, water, and sustainability education, as well as offering student travel grants for the AGS Annual Meeting 2009 in Zurich, Switzerland, and the COP-15 Climate Summit in Copenhagen, Denmark. AGS-UTSC annual reunions offer opportunities for both students and alumni actively working in the various fields to keep up their connections.

OUTREACH

The AGS Club was started in 2007 to promote cooperation between the academia and business communities towards achieving sustainable development. At the AGS Club Strategic Sustainability Seminars, Todai faculty members give lectures on subjects that respond to the needs of the club members with various backgrounds. The topics covered in 2009 included technology to support sustainability, food safety, climate change, renewable energy, food and health, city and transportation, and sustainable resource use. In October 2009, the club members were invited by Sumitomo Osaka Cement Company Ltd., one of the AGS Club members, to their eco-friendly cement plant in Tochigi Prefecture. The company describe the facility as a waste-free plant, due to their system of recycling wastes from one process to another within the plant.

OTHER ACTIVITIES

Todai AGS offered grants for research projects and activities within the Todai Sustainable Campus Project (TSCP) to promote sustainability on campus.

Focus Centre at Chalmers

During 2009 the Chalmers-AGS office coordinated and held a workshop within the area of sustainability and the ageing society. This is an initiative supported by the Alliance Governing Board with the aim to develop new ideas. The Chalmers workshop was titled: Urban futures for an extended life – the sustainability and technology implications of centenarians. Both key societal and academic persons were invited with presentations and a moderated panel. The following recommendations were made to the AGS by the workshop panel:

SHAPE RESEARCH ON THE SOCIAL SUSTAINABILITY IMPLICATIONS OF EXTENDED LIFE

With changing demographics the employed workforce in developed regions will continue to diminish and the healthy aged will become an important intellectual resource for society. Embedded in this is the issue of loneliness, which is already a serious problem. This implies the design and planning of homes as a workplace and social setting, presenting new human-human perspectives for the technical innovations in care and ICT which are being developed at the AGS universities.

INITIATE RESEARCH ON THE SUSTAINABILITY OF TECHNOLOGIES AND INFRASTRUCTURES RELEVANT TO AN EXTENDED LIFE IN AN INCREASINGLY URBAN FUTURE

Research on the management of space and infrastructures will help provide affordable and low carbon footprint energy, sustainable water and hygiene systems, low congestion transport systems (with the automobile a continued feature of the transport mix). Research on cars for the increasingly mobile aged should focus on small, safe, intelligent and sustainable. Safety is a particular issue with the need for development of technologies including aids for the elderly driver and protection against injury for a frail but healthy skeleton.

COORDINATE A GLOBAL INITIATIVE ON SUSTAINABILITY AND EXTENDED LIFE

Improved nutrition and health seem to be major determinants of the non-linear relationship between life expectancy and the degree of globalization in most countries. The AGS should link ongoing sustainability and extended life research to understand causal links and more complex systems relationships at a planetary level. The nature of the causal chain/circle; sustainability-extended life-globalisation, is new and not understood.

Companies and other societal actors attending the workshop included Automotive Sweden, Autoliv, Bil Sweden, Framtiden, Doro, EoN, Red Cross, SCA.

Extended Life Seminar, 2 December 2009

Financial report

The expenditure of the AGS can be broken down into research, education and outreach. The Focus Centres are primarily in charge of promoting activities on the regional level.

FINANCIAL REPORT OF THE AGS FOCUS CENTRES

The table below shows how much funding was spent by each AFC for AGS related activities.

Financial report	Q1	Q2	Q3	Q4	Q1-Q4
CHALMERS					
Administration and overhead	86,725	70,599	52,310	38,974	248,608
Research	0	81,159	76,353	55,531	213,044
Education	6,708	2,810	1,437	1,258	12,212
Outreach	14,293	2,007	10,286	11,892	38,479
Membership fee	0	0	0	100,000	100,000
Total Chalmers	107,726	156,575	140,386	207,655	612,342
ETH					
Administration	18,078	10,062	10,210	10,060	48,410
Research	0	0	0	0	0
Education	3,480	787	1,456	825	6,548
Outreach	10,878	5,693	0	4,661	21,232
Membership fee	0	0	0	100,000	100,000
Total ETH	32,436	16,542	11,666	15,546	176,190
UT					
Administration and overhead	38,011	40,299	34,843	40,988	154,141
Research	19,920	28	263	121,674	141,885
Education	11,114	165	36,445	90,603	138,327
Outreach	22,796	17,660	8,367	11,093	59,916
Membership fee	0	0	0	100,000	100,000
Total UT	91,841	58,152	79,918	264,358	494,269
MIT					
Administration and overhead	45,000	5,500	5,500	5,500	61,500
Research	0	0	0	0	0
Education	0	0	0	0	0
Outreach	0	0	17,000	0	17,000
Membership fee	0	0	0	100,000	100,000
Total MIT	45,000	5,500	22,500	105,500	178,500
GRAND TOTAL	277,003	236,769	254,452	593,059	1,461,301

Financial statement and assets

FINANCIAL STATEMENT OF THE AGS CORE FUNDS

Core funds allocated for cooperative activities in 2009.

Financial statement 2009 (USD)								
CORE EXPENSES		Budget	Expenses	From core account	Paid to Chalmers	Paid to ETH	Paid to MIT	Paid to UT
Research	Urban Futures follow up	10,000	0	0	0	0	0	0
	Seed funding	50,000	0	0	0	0	0	0
	Project inventory	15,000	15,000	15,000	0	0	0	0
Education	Education projects	40,000	40,000	40,000	10,000	10,000	10,000	10,000
Outreach	Communication	38,000	36,706	36,706	0	0	0	0
	Annual meeting	90,000	90,000	90,000	0	90,000	0	0
	Publication and marketing	63,000	48,000	48,000	0	0	0	0
Adminis-tration	Administrative support	83,650	83,694	83,694	0	0	0	0
	Meeting and fundraising	19,000	19,000	19,000	0	0	0	0
TOTAL		408,650	332,400	332,400	10,000	100,000	10,000	10,000
Expenses not paid 2009			11,615					
GRAND TOTAL		408,650	344,015					

Core assets 2008-12-31 (USD)		1,062,738
Revenues 2009	Membership Chalmers	100,000
	Membership ETH	100,000
	Membership MIT	100,000
	Membership UT (paid in 2008)	0
Cost and interest	Interest	0
	Tax	0
	Extra from 2008	131
	Total expenses paid	-332,400
Assets	Bank statement 2009-12-31	1,030,470
	Expenses not paid 2009	-11,615
	Total asset 2009-12-31	1,018,855

1 USD = 7.2 SEK = 0.97 SFr = 92.46 YEN (31 Dec 2009)

AGS Organisation

The AGS is governed by the Alliance Governing Board (AGB) which has overall responsibility for the strategy and the fundraising policy.

The AGS strategy and activities are implemented by the Executive Board (EB). The AGB and EB have equal membership from each of the four universities, and rotate the chair of both Boards. In addition, each of the four universities supports a local team organising AGS activities at each individual AGS focus centre.

The Alliance Focus Centres (AFCs) enable the AGS to be a network of networks, by bringing in the partners of each university in their own regions and in countries of the global south.

The AGB and EB are advised by the International Advisory Board (IAB). The IAB is comprised of leaders from industry and the public sector who provide critical and constructive feedback to the AGS and monitor the relevance of AGS efforts and the implementation of its strategy. The IAB is an important partner in AGS efforts, ensuring relevance and focus.

AGS GOVERNING BOARD (AGB)

Prof. Ralph Eichler	President, ETH Zurich
Prof. Junichi Hamada	President, University of Tokyo
Prof. Susan Hockfield	President, Massachusetts Institute of Technology
Prof. Karin Markides	President, Chalmers University of Technology

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The AGS brings leading technical universities together with industry and government to confront some of the world's greatest environmental challenges.

www.theags.org

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