Bridges for sustainability…

…created through the initiatives of the Swiss Federal Institute of Technology Zurich…

As one of the leading international universities for technology and the natural sciences, the Swiss Federal Institute of Technology, ETH Zurich, has committed itself to enhance its reputation as an international centre of excellence in the fields of energy, the environment and sustainability. Around 400 professors teach over 15,000 students from approximately 80 countries. 21 Nobel Laureates have studied, taught or conducted research at ETH Zurich, underlining the reputation of the institute.

This school of science and engineering has a long tradition of building bridges out of stone, concrete or steel for the means of transportation. Today's challenge, however, is to build bridges of a very different, even more ambitious kind. Scientists, decision-makers, corporate partners, and representatives from society join forces to find sustainable solutions to the world's most serious environmental problems including climate change, resource depletion or water problems, economic problems resulting from bankrupt banks, troubled growth perspectives or persistent poverty. The following examples highlight ETH's commitment to sustainability.

Innovation boost to tackle climate change

While the heads of state were negotiating to reach a substantial climate agreement in Copenhagen last year, the EU stepped forward to lead the way in developing innovations to tackle climate change. In December 2009 The European Institute of Innovation and Technology (EIT) launched the new 'Climate Knowledge and Innovation Community' (Climate-KIC), a groundbreaking new research, innovation and education initiative aimed at finding answers to the various challenges of climate change. As one of the key partners of a pan-European consortium encompassing 16 world-class partners from academia and the private and public sectors, ETH Zurich will help to implement this new and unique network. Several 100 million euros are to be

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Fig. 1: Demonstrating the latest innovation in automotive engineering, ETH Zurich together with external partners built the most fuel-efficient vehicle in the world. PAC-Car II is equipped with a fuel cell to convert hydrogen into electricity to power its electric motors; it has a range of 5385 km with a hydrogen equivalent of 1 litre of petrol: www.paccar.ethz.ch. Climate KIC: www.climate-kic.org

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Fig. 2: "The African Dams Project" (ADAPT) is investigating the impact of hydropower production on the water system in the Zambezi River basin and its most important wetlands – the Kafue Flats. Together with local partners and governmental authorities, decision-making tools are being developed to improve integrated river basin management: www.cces.ethz.ch/projects/nature/adapt

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Fig. 3: The "ClimPol" project addresses barriers that hinder the implementation of climate policies. In order to bridge the gap, ClimPol analyses the behaviour of states, industry, agriculture and forestry institutions, as well as private households. The project gives recommendations for successful implementation on a political level: www.cces.ethz.ch/projects/clench/CLIMPOL

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Fig. 4: Together with the Municipality of Urnäsch in the Swiss Canton Appenzell Ausserrhoden, ETH Zurich conducted a transdisciplinary case study that investigated the potential for sustainable development in the region. The process triggered the construction of a family holiday village – the centrepiece of a development plan that won an award at the 2008 European Village Renewal Competition: www.uns.ethz.ch/translab/cs_actual

spent over the next four years on a variety of innovation and education programmes – a maximum of 25% requested from the EIT; the partners themselves plan to contribute roughly three times the EIT amount.

Climate-KIC will build on successful projects and provide the vision, technologies, people and partnerships required for Europe to make a step change in its ability to mitigate and adapt to the challenges of climate change. It will create new jobs, strengthen industrial and regional competitiveness, and catalyse the development of self-sustaining clusters of research and innovation excellence. ETH Zurich can build on its longstanding expertise in climate change science and technology (eg. in the field of mobility, Fig. 1) and is currently establishing one of the five European KIC co-location centres.

Linking scientists from different disciplines, academic institutions, and cultures

Environmental sustainability at ETH Zurich is also promoted in various research projects and courses, in competence centres and institutes.

A prime example of environmentally oriented sustainability centres is the Competence Centre Environment and Sustainability (CCES). The CCES was established in 2006 as a centre of excellence for the ETH Domain to instigate and finance large-scale collaborative research projects in five fields of sustainable significance: climate and environmental change; natural resources; natural hazards and risk; food, environment and health; and sustainable land use. More than 600 scientists and engineers participate in large research consortia. The CCES support is being used to successfully leverage matching contributions, with an overall volume of over CHF100m for research and development activities; projects such as ClimPol and ADAPT, (Figs. 2, 3) illustrate the success of interdisciplinary and international cooperation. To achieve both an excellent scientific impact and at the same time a sustainable influence on socioeconomic implementation, a significant proportion of the CCES's activities support the dialogue with stakeholders from the public administration, politics, and society. Educational activities such as CCES@School focus on reaching out to students in secondary classes.

Sustainability issues related to environmental, socio-political and economic aspects are the key focus of the Institute for Environmental Decisions (IED) at ETH Zurich. The IED strives to support decision-makers by identifying barriers to sustainable

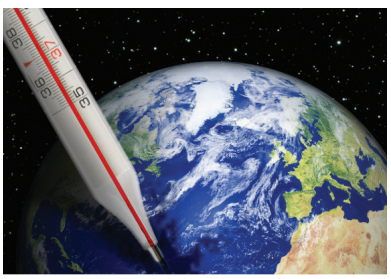

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Fig. 6: As an honest broker, ETH Zurich invites the general public to take part in a trialogue through various events and a climate blog. It is the first science blog of its kind in Switzerland, also involving authorities from outside the scientific community. At www.klimablog.ethz.ch not only are professors and students blogging, but also representatives from politics, industry, culture and society

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Fig. 5: There are no limits to sustainable building, even in the middle of a glacial landscape. A prime example of this is the "New Monte Rosa Hut Project" (2883 m a.s.l.), a joint venture between ETH Zurich and the Swiss Alpine Club SAC. The new hut was officially opened in autumn 2009 and is designed to achieve a self-sufficiency rate of at least a 90 percent, thus setting a global milestone in energy-efficient building: www.neuemonterosahuette.ch

decisions and designing strategies to reduce them. Projects like the ETH Case Study (Fig. 4) underline both the importance of integrating transdisiplinary lectures in academic curricula and the need for close cooperation with local stakeholders to achieve progress in sustainable development. The Energy Science Centre (ESC) provides an umbrella for activities in both research and teaching at ETH Zurich in the field of energy science and technology. It also serves as a platform for interactions with stakeholders from industry and the government, as well as political and societal opinion leaders. By constantly pushing the boundaries of technology, projects like the New Monte Rosa Hut (Fig. 5) are striking new paths for sustainable development. At the same time, with key academic and non-academic partners, they are lighthouses for successful cooperation.

Opening the ivory tower

Excellent research and innovative technologies are needed to support sustainable development, but new communication strategies are becoming more and more important to disseminate, magnify and implement scientific results. Therefore, ETH Zurich calls for a 'trialogue' involving science, industry and society. Science has a special task here: as a pioneering thinker, it must assume the role of honest broker. In this function as a fair and impartial mediator, scientists should seek new forms of communication. By opening the ivory tower, scientists should contribute to solution-oriented knowledge to bridge ideological divides. At the same time, science should present alternative ways forward with their advantages and disadvantages rather than rigid prescriptions. "Building on firm foundations in education and research, ETH Zurich is contributing towards solving complex problems in society," says President Ralph Eichler. "But as a top university, one of our main tasks is also to provide sophisticated answers, not only slogans." This is why ETH Zurich has embarked on a pilot project to open the ivory tower: since November 2009, 15 professors, five students, and 17 representatives from industry, the national parliament, and NGOs have started to communicate on the ETH climate blog – not only to bridge a 150-year-old research and education culture with society's needs of the 21st Century but also to find joint solutions to the world's most serious environmental problems (see Fig. 6).

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