In brief: Sustainability at ETH Zurich

Founded in 1855, the Swiss Federal Institute of Technology in Zurich (ETH Zurich) is consistently ranked among the leading universities of the world. With more than 25,000 people studying, researching, teaching, and working at ETH Zurich, it is not only one of the major universities in Switzerland, but also one of the biggest employers in the region. Aware of its responsibility towards students, employees, and society, the university integrates the principles of sustainable development in its core activities of research and education, as well as on campus, and in dialog with society.

Sustainability Report 2015/2016

This report reviews the progress that ETH Zurich has made in contributing to sustainable development. Covering the reporting period 2015/2016, it also highlights the challenges the university is facing and monitors the current status of sustainability goals. This is the fourth of ETH Zurich’s biennial Sustainability Reports. It is in accordance with the guidelines of the Global Reporting Initiative (GRI) and the ISCN/GULF Sustainable Campus Charter reporting frameworks. It targets internal as well as external audiences: students and employees of ETH Zurich, but also the interested public and representatives from politics, administration, civil society, and the corporate sector. Not every aspect of ETH Zurich’s sustainability-related activities and achievements can be covered in this report, which is why the report focuses on the most material issues (see page 9). The Sustainability Report and its Annex are only available online and in English.

For more information, please refer to:
www.sustainability.ethz.ch

Annual Report 2016

For the first time, the university’s Sustainability Report is jointly published with university’s Annual Report. The Annual Report 2016 discloses details of the university’s performance and services rendered. Since 2015, the Annual Report has appeared in a new format consisting of a status report, which summarizes key events and developments at the university, and a second, detailed annual financial statement in line with the International Public Sector Accounting Standards (IPSAS). The Annual Report briefly outlines the university’s approach to sustainability, but leaves the details to the Sustainability Report. It is available in German, English, and French.

For more information, please refer to:
www.ethz.ch/annual-report

Cover

The cover page shows ETH Zurich’s award-winning House of Natural Resources (HoNR) at Campus Hönggerberg. In operation since 2015, it incorporates innovative technologies and pioneering structural elements. Read more about this sustainable campus development project on page 64 of this report.
Welcome by the President

With the looming challenges of sustainability, mankind is facing unprecedented and highly complex questions. At ETH Zurich, we are convinced that universities have a significant potential, and hence a pivotal responsibility, to tackle these challenges and develop sustainable solutions for the benefit of society. In this endeavor, we can draw on the intrinsic commitment of our researchers and our partners in Zurich, all over Switzerland, and abroad.

Our approach to addressing sustainability is an integrated one. In accordance with our core activities as a university, our approach is defined by four strategic fields of action: Research, Education, Campus, and Dialog with society. Our Sustainability Report is structured accordingly, into four chapters:

In the chapter on Research, we show how we provide the best possible conditions for our researchers to tackle the major challenges of sustainable development. Established in 2015, the new Institute for Science, Technology and Policy (ISTP) is just one example for the initiative that our researchers put forth to find solutions on the interface between research and policy. Less than two years after its inauguration, the Wyss Translational Center has proven in quite remarkable fashion how the transfer of knowledge and technology for the benefit of society can be accelerated successfully. And in terms of the transfer to the economy, members of our community were as prolific as ever, establishing a record high of 50 spin-off companies within the reporting period 2015/2016. Many of them operate to support sustainable development.

The chapter on Education talks about our students and the role they will be playing as the generation of the future. We firmly believe that imparting scientific and technical expertise to our students is our major responsibility as a university. At the same time, we need to encourage them to think independently, which is why we launched the Critical Thinking Initiative. In its context, we organized the first ETH Week in 2015. The new teaching format, which is open to students from all departments, addresses major societal topics such as food or water. We want to build further on this format to convey the importance of problem-oriented and interdisciplinary teamwork. With the Student Project House, another promising enterprise is in the making.

The third chapter, Campus, addresses the three-fold social, environmental, and economic aspects of campus life. We conducted a comprehensive Employee Survey in 2016 to identify strengths and weaknesses from the viewpoint of those who make ETH Zurich a leading university in the world. The first evaluation of the Gender Action Plan that we launched in 2014 has shown that we have yet to achieve our full potential when it comes to representation of women on all levels of the academic profession. Another deficit is our growing environmental footprint, mainly driven by the greenhouse gases emitted through the international air travel of our researchers. For our financial reporting, we introduced the International Public Sector Accounting Standards (IPSAS) in 2015, making our financial accounting even more transparent.

The final chapter, entitled Dialog, demonstrates our performance with regards to the dissemination of knowledge for the benefit of the wider public and decision-makers in Switzerland and beyond. Together with the University of Zurich, we organized the fourth “Scientifica – Zurich Science Days” with 25,000 thousand visitors in 2015. In 2016, we celebrated the tenth anniversary of our leading format for public outreach, “Treffpunkt Science City”. In the same year, we achieved record attendance at the fourth Industry Day, with more than 550 guests following our invitation to the halls of our university. We also organized the Cybathlon, the first international competition for people with disabilities supported by modern assistive technology – just one example that illustrates how our research contributes to the social dimension of sustainability.

Though we have already achieved much, we must not stand still and rest on our success. Sustainability concerns all of us. We need the motivation of all members of our community, the support of the Swiss Confederation, and the vital exchange with our partners all over the world, for example, in the International Sustainable Campus Network (ISCN) or the International Alliance of Research Universities (IARU).

We compiled this report to keep track of our efforts and challenges. Monitoring our sustainability goals helps us to identify the deficits we want to address. As this report is in accordance with the reporting frameworks of the Global Reporting Initiative (GRI) and the ISCN/GULF Sustainable Campus Charter, it covers a broad range of aspects related to sustainable development.

We would like to invite you to study our report critically and give us your feedback.

Lino Guzzella
President of ETH Zurich
Sustainability at ETH Zurich – our approach

Since its foundation in 1855, ETH Zurich has been a place where tradition and innovation are intrinsically linked. The university’s lasting success can be attributed to a culture of empowerment fostered throughout its history and the ability to anticipate and adapt to new requirements.

Sustainability has a long tradition at ETH Zurich, not only in education and research, but in all aspects of university life. The university’s comprehensive approach to sustainability in its three-fold environmental, social, and economic aspects has guided its strategic development throughout, including in the building of new infrastructure, the promotion of equal opportunities, or the transparency in its financial reporting.

ETH Zurich believes that universities have not only a great opportunity, but also a responsibility towards society to develop innovative solutions for challenges facing mankind, support their implementation, and thereby help prepare the path for a sustainable development of present and future generations.

Four fields of action for sustainable development

ETH Zurich is committed to sustainability in its core areas of Research, Education, Campus, and Dialog with society. For each of these four areas, the university has defined a strategic field of action (see next page).

Managing sustainability

The President of ETH Zurich is responsible for the strategic orientation of sustainability at ETH Zurich. Management and implementation fall under the responsibility of the staff unit ETH Sustainability, and the Safety, Security, Health and Environment (SSHE) department. If not covered in this report, corresponding activities are disclosed in complementary sources, such as the SSHE’s annual report or the respective websites.

ETH Sustainability is the university’s sustainability office and supports initiatives, projects, and individuals who contribute to enhancing sustainability at the university. In the organizational structure of ETH Zurich, ETH Sustainability is embedded as a staff unit directly reporting to the President.

The unit is directed by a Steering Committee comprising the Associate Vice President for Sustainability (Chair), the Vice President for Research and Corporate Relations, and six ETH Zurich professors who conduct research in fields related to sustainability.

The SSHE department is responsible for safety and security as well as the health of the members of ETH Zurich. Reporting directly to the Vice President for Human Resources and Infrastructure, SSHE advises and trains members of ETH Zurich on how to deal with risks and hazards in order to protect people, infrastructure, and the environment and assists in realizing corresponding measures. The SSHE department also coordinates the Environmental Commission of ETH Zurich, which is responsible for the operative realization of environmental management at ETH Zurich.

Sustainability reporting

The university’s commitment to sustainability is reflected in the evolution of its reporting tradition: In 2002, ETH Zurich published its first Energy Report. From 2005 onwards, the report merged into a more comprehensive Environmental Report. Since 2009/2010, ETH Zurich has covered all three dimensions of sustainable development in its biennial Sustainability Report: social, environmental, and economic aspects. This is ETH Zurich’s fourth Sustainability Report, and it covers the reporting period 2015/2016. For the first time, it is jointly published with the university’s Annual Report.

Globally engaged for sustainability

ETH Zurich combines strong connections at the regional and national levels with a global outlook and network. To promote sustainable development in Switzerland and beyond, ETH Zurich maintains strong links with international partner institutions and actively contributes to the exchange in global alliances such as the International Alliance of Research Universities (IARU), the International Sustainable Campus Network (ISCN), or the Global University Leaders Forum (GULF) of the World Economic Forum (WEF).
On campus, ETH Zurich lives and promotes the principles of sustainable development with respect to social, environmental, and financial aspects. As an employer, it aims to provide the best possible working conditions, including the maintenance of a participatory, respectful, and diverse environment. In its operations, the university is keen to serve as a “living lab” to develop, implement, and test pioneering solutions to preserve natural resources and reduce its environmental impact. And finally, as a publicly funded university, ETH Zurich places great value on transparent budgeting and controlling, financial accountability, and risk management.

For more information, please refer to page 36 of this report.

Four fields of action for sustainable development

In accordance with its core activities as a university, ETH Zurich’s approach to sustainability is defined by four strategic fields of action. This Sustainability Report is structured accordingly, with each chapter covering one of the fields:

1 RESEARCH

With its research activities, ETH Zurich provides the scientific and technical know-how for a sustainable development of society. In order to underline and maintain this commitment, ETH Zurich has defined sustainability as one of the five thematic focal areas in its strategic development plans for 2013–2016 and 2017–2020. Besides the broad spectrum of cutting-edge research conducted in its departments, ETH Zurich can build on the interdisciplinary expertise of the various competence centers to address the grand challenges of society, such as future cities and sustainable design of living spaces, natural resources, food security, energy supply, or climate change.

For more information, please refer to page 12 of this report.

2 EDUCATION

ETH Zurich trains the next generation of professionals and experts to actively incorporate aspects of sustainability in their professional lives. Over the course of the last decades, ETH Zurich has not only developed internationally recognized degree programs, courses, and other teaching formats, but also founded new departments and institutes to impart sustainability-specific knowledge to its students. ETH Zurich further aims to instill intellectual agility by giving its students the tools to address socially and ethically relevant aspects with confidence during their student life, in their professional careers, and as responsible members of society.

For more information, please refer to page 24 of this report.

3 CAMPUS

On campus, ETH Zurich lives and promotes the principles of sustainable development with respect to social, environmental, and financial aspects. As an employer, it aims to provide the best possible working conditions, including the maintenance of a participatory, respectful, and diverse environment. In its operations, the university is keen to serve as a “living lab” to develop, implement, and test pioneering solutions to preserve natural resources and reduce its environmental impact. And finally, as a publicly funded university, ETH Zurich places great value on transparent budgeting and controlling, financial accountability, and risk management.

For more information, please refer to page 36 of this report.

4 DIALOG

ETH Zurich actively informs the wider public about the latest findings of its researchers. It provides its expertise to make important contributions to the public debate in matters concerning sustainable development. In accordance with its performance mandate, ETH Zurich has developed a range of dialog formats and public outreach activities devoted to making scientific insights accessible in a comprehensible manner to society at large. The university also performs a series of services for the Federal Government, providing its expertise to inform decision-making based on scientific facts.

For more information, please refer to page 66 of this report.
Methodology and scope of reporting

With this report, ETH Zurich publishes its fourth Sustainability Report in accordance with the requirements of the Global Reporting Initiative (GRI) and the ISCN/GULF Sustainable Campus Charter reporting frameworks. Both the previous report (2013/2014) and the present one (2015/2016) were prepared in accordance with the G4 Guidelines (Core option) of GRI, which implies engagement with external and internal stakeholders in the reporting process as well as a comprehensive materiality assessment. → G4-32

Engaging stakeholders

ETH Zurich contributes to sustainable development in many ways. The choice of contributions covered in the Sustainability Report is reflective of the university’s stakeholder expectations towards ETH Zurich. A series of interviews was conducted with 21 representatives of internal and external stakeholder groups. The integration of their perspectives into the reporting process not only offered the opportunity for refining and validating the reporting focus, but also invited critical reflection on the university’s sustainability strategy, previous achievements, and sustainability goals.

Defining the scope

As part of adapting to the G4 Guidelines of GRI, ETH Zurich published its first “materiality matrix” in the Sustainability Report 2013/2014. As a result of the stakeholder interviews, the matrix illustrates aspects assessed as “material” from the viewpoint of internal stakeholders (x-axis) and external stakeholders (y-axis). Aspects located in the four upper right fields of the matrix were identified as the most relevant ones and were indicative for the scope and structure of the report. Aspects situated outside the four fields were not considered in the report. Aside from the changes mentioned on page 10, the Sustainability Report 2015/2016 adheres to scope and structure of the previous report. Unless stated otherwise, information disclosed in this report refers to the two main locations of ETH Zurich in the City of Zurich: Campus Zentrum and Campus Hönggerberg. → G4-17 → G4-18
Changes since the last report
The present report features four chapters, compared to five in the previous report for 2013/2014. The chapter “People at ETH Zurich” of the previous report was integrated into the “Campus” chapter in the new report. The main reasons for this change are the joint publication with ETH Zurich’s Annual Report and the orientation towards the four strategic fields of action for sustainable development (see “Sustainability at ETH Zurich – our approach”). For a more intuitive understanding, some of the aspects were relabeled (e.g., “Quality of research” became “Research environment”). Last, most of the institution-specific information, for example regarding finances, risk management, governance, and compliance, will be reported not in the Sustainability Report 2015/2016, but in the jointly published Annual Report 2016 of ETH Zurich.

How to navigate the report
Indicators and principles
In accordance with the reporting frameworks of the Global Reporting Initiative (GRI) and the ISCN/GULF Sustainable Campus Charter, the report includes references at the given sections and at the beginning of each chapter respectively.

GRI Disclosures
The G4 Guidelines of GRI cover a broad range of sustainability metrics related to environmental, social, and economic performance. This report covers obligatory “General Standard Disclosures” (labeled → G4-1 through → G4-56), which require the reporting organization to disclose on issues such as strategy, stakeholder engagement, report profile, ethics, or integrity. “Specific Standard Disclosures” (e.g., → G4-EN15) are relevant for the concrete case of ETH Zurich, covering topics identified during the methodological process described above, including, for example, employee turnover, disclosure on waste disposal practices, or CO₂ emissions. For every aspect represented in the materiality matrix (see page 9), the report discloses the management approach the university uses to address, manage, and evaluate the aspect (indicated as → G4-OMx). ISCN/GULF Sustainable Campus Charter
This complementary reporting framework focuses on sustainability metrics specific to universities according to the three overarching principles of the International Sustainable Campus Network (ISCN): (1) buildings and their sustainable impacts, (2) campus-wide planning and target-setting, and (3) integration of research, teaching, facilities, and outreach.

Further information on the reporting frameworks and their references can be found on pages 76–77 and in the Online Annex.

Sustainability goals
Concrete and measurable goals are essential for benchmarking, monitoring, and progress. In line with Principle 2 of the ISCN/GULF Sustainable Campus Charter, this report gives updates on goal achievements within the reporting period 2015/2016. This report contains 45 goals in 15 categories, the bulk of which are environmental goals (e.g., energy, mobility, waste, etc.), which were identified by the university’s Environmental Commission. All other goals were either derived from the Objective Agreement with the ETH Board, the strategic management and supervisory body of the ETH Domain, or in coordination with the responsible units at ETH Zurich (i.e., diversity, talent retention and development). There are two types of goals: permanent and time-constrained goals. Goals are permanent in the sense that they call for maintaining the status quo or continuous improvement rather than complete achievement. Time-constrained goals have specific time horizons or threshold values. Goals achieved in the last reporting period are no longer listed in this report.

Permanent goals are either

- ON TRACK
- NOT ON TRACK

Time-constrained goals are either

- ACHIEVED
- IN PROGRESS

- NOT ACHIEVED

Highlights and Insights
Noteworthy developments or achievements during the reporting period 2015/2016 have been given special attention by showcasing them in “Highlight” boxes. The four chapters conclude with so-called “Insights” portraying especially interesting lighthouse projects, innovative teaching formats, campus developments, or other success stories.

Stakeholder perspectives
Stakeholder perspectives, which were collected in the course of the reporting process, give the reader an impression of the positions and expectations of ETH Zurich’s internal and external stakeholders.
This chapter discusses the research environment that ETH Zurich provides for its researchers, the research being conducted for sustainable development, and the transfer of knowledge for the benefit of society. The chapter concludes with an Insight presenting a lighthouse research project on electricity storage.

The chapter covers Principle 3 of the ISCN/GULF Sustainable Campus Charter.

The Singapore-ETH Centre (SEC) aims to strengthen the capacity of Singapore and Switzerland to research, understand, and actively respond to the challenges of global environmental sustainability. The Value Lab Asia at the SEC is a central infrastructure for research, education and communication. It is a collaborative, digitally augmented environment that serves a wide range of applications, such as participatory urban planning and design, stakeholder communication, information visualisation and discovery, remote teaching and conferencing. It includes a 33-megapixel video wall, three large displays with touch overlays, a number of smaller, mobile multi-touch enabled displays, and extensive video conferencing capabilities. The Value Lab Asia borrows many of the concepts of the Value Lab Zurich, its companion space on Campus Hönggerberg in Zurich.
Research environment

For the university’s researchers to unfold their full potential, ETH Zurich must provide the best possible working conditions and an inspiring climate. The sustainability of ETH Zurich’s success in this regard depends on the ability to make space for creativity and innovation. Freedom and individual responsibility, as well as the cultivation of an atmosphere of trust and empowerment, have been cornerstones of ETH Zurich’s progress since its early beginnings. With its flexible organizational structures and its active promotion of integrated and interdisciplinary thinking, the university can anticipate and adapt to arising challenges. Over the course of the years, various initiatives, competence centers, and networks have been established to encourage cooperation across disciplines and institutions, in Switzerland and abroad. ETH Zurich fosters a network of strategic alliances, bilateral agreements, and international projects in search of solutions to global challenges. The university’s scientific achievements underline the success of this approach. Within the reporting period 2015/2016, ETH Zurich maintained its leading position in terms of securing internationally renowned research grants, in terms of its position in global university rankings, and in terms of the quality of scientific output produced by its researchers.

Cross-disciplinary research in competence centers

Complementing its disciplinary research focus, ETH Zurich promotes cross-disciplinary research in 14 competence centers that operate either within ETH Zurich, in collaboration with other universities and institutions, or within the ETH Domain (see below). Competence centers are networks in which researchers from various fields coordinate their scientific work, in some cases with external partners, while pursuing common strategic aims.

Strong involvement in NCCRs

In addition to the engagement in the competence centers, ETH Zurich’s researchers are actively involved in the National Centres of Competence in Research (NCCRs) of the Swiss National Science Foundation (SNSF). NCCRs promote long-term research projects in areas of vital strategic importance for the development of science in Switzerland, for the economy of the country, and for society. They improve the research landscape in Switzerland, promote research of outstanding and internationally recognized quality, enable knowledge and technology transfer, offer training, and foster the promotion of women in research. In seven NCCRs, ETH Zurich is the Leading House or Co-Leading House (see below).

For additional information, please refer to the chapters “Research” and “Honours and awards” in the Annual Report.

Competence centers at ETH Zurich

<table>
<thead>
<tr>
<th>Competence centers at ETH Zurich</th>
<th>Competence centers in collaboration with other universities and institutions</th>
<th>Competence centers of the ETH Domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Science Center (ESC)</td>
<td>Center for Climate Systems Modeling (CCSM)</td>
<td>National Competence Center in Biomedical Imaging (NCCBi)</td>
</tr>
<tr>
<td>Education (EdueETH)</td>
<td>Competence Center for Personalized Medicine (CC-PM)</td>
<td>Competence Center Energy and Mobility (CCEM-CHI)</td>
</tr>
<tr>
<td>Competence Center for Materials and Processes (CC-MaP)</td>
<td>Zurich-Basel Plant Science Center (PSI)</td>
<td>Competence Center Environment and Sustainability (CCES)</td>
</tr>
<tr>
<td>Risk Center</td>
<td>Neuroscience Center Zurich (ZN2)</td>
<td>Competence Center for Materials Science and Technology (CCSM)</td>
</tr>
<tr>
<td>World Food System Center (WFSC)</td>
<td>Center for Experimental and Clinical Imaging Technologies (EXCITE) Zurich</td>
<td></td>
</tr>
</tbody>
</table>

FOR ADDITIONAL INFORMATION, PLEASE REFER TO THE CHAPTERS “RESEARCH” AND “HONOURS AND AWARDS” IN THE ANNUAL REPORT.
**Goals: Ethics**

Evaluate scientific programs or projects in which humans are the object of research for their compliance with legal and ethical rules.

**ON TRACK** In 2015 and 2016, 74 and 85 projects and programs were evaluated by the ETH Ethics Commission, respectively.

**ON TRACK** In recent years, ETH Zurich has pushed ahead with expanding its core competencies in Life Sciences, and this has led, among other things, to a growing requirement for animal testing. As a guideline for the conscientious and ethical treatment of these animals, the Executive Board of ETH Zurich issued a “Policy on Experimental Animal Research” in 2012.

Conduct research in compliance with “Code of Conduct for Scientific Cooperation” of ETH Zurich.

**ON TRACK** Consolidated with inputs from 47 units of ETH Zurich, the Executive Board adopted the "Code of Conduct for Scientific Cooperation", which defines the university’s understanding of the ethical conduct of research within ETH Zurich and with partners beyond.

**Ethics Commission and the Code of Conduct for Scientific Cooperation**

Ethical conduct and research integrity are important pillars of the university’s identity. Managed by the Office of Research, ETH Zurich maintains an Ethics Commission that consists of ten professors and senior scientists from various departments as well as external experts. The Ethics Commission evaluates scientific programs or projects in which humans are the object of research for their compliance with legal and ethical rules. Within the reporting period 2015/2016, the Ethics Commission evaluated a total of 159 projects and programs. To ensure ETH Zurich upholds its standards in light of the increasing internationalization of research activities, the Executive Board of ETH Zurich adopted the "Code of Conduct for Scientific Cooperation" in August 2014. For a two-year test phase, researchers from ETH Zurich were of the competence centers, programs, and other initiatives.

**ON TRACK** Four of the 14 competence centers provide a platform for researchers at ETH Zurich to engage in projects in the university’s core areas of sustainable development research (world food system, energy and mobility, environment and sustainability, and climate system modeling).

**ON TRACK** ETH Zurich is the Leading House of three Swiss Competence Centers for Energy Research (SCCERs), which are coordinated by the Swiss Commission for Technology and Innovation (CTI) in cooperation with the Swiss National Science Foundation (SNSF). Researchers of ETH Zurich participate in all of the eight SCCERs.

**ON TRACK** With the newly founded Institute of Science, Technology and Policy (ISTP, established in 2015), the Swiss School of Public Governance (SSPG, established in 2016), and the Swiss Polar Institute (SPI, established in 2016, Leading House EPEF), three new institutions are working on matters relevant for sustainable development, the former two of them conducting research at the interface of research and policy.

**Goal: Research**

Strengthen collaboration between engineering and natural science disciplines with the humanities and social and management sciences in fields relevant for sustainable development.

**ON TRACK** Beyond their departmental affiliations, many researchers at ETH Zurich are actively engaged in inter- and transdisciplinary research projects in the context of competence centers, programs, and other initiatives.

**ON TRACK** ETH Zurich is the Leading House of three Swiss Competence Centers for Energy Research (SCCERs), which are coordinated by the Swiss Commission for Technology and Innovation (CTI) in cooperation with the Swiss National Science Foundation (SNSF). Researchers of ETH Zurich participate in all of the eight SCCERs.

Research for sustainable development

The complexity of the challenges related to sustainable development call for comprehensive research approaches and skills. ETH Zurich, where disciplinary expertise is combined with inter- and transdisciplinary experience under one roof, has the potential to be at the forefront of developing pioneering solutions to these challenges at the regional, national, and international levels. As a world leading university, ETH Zurich is eager to provide the infrastructure and framework conditions to match the strong motivation and drive of its researchers. This means not only well-equipped departments and institutes, but also the establishment of competence centers, the participation in national programs, or other initiatives beyond the own institution. Committed to focus on mankind’s most urgent problems, ETH Zurich has defined in its strategic development plan core research themes of sustainable development: future cities, natural resources, world food system, energy, and climate change. Each of these themes is addressed both on the level of the departments but also in corresponding research centers, such as the World Food System Center (WFSC), the Energy Science Center (ESC), or the Center for Climate Systems Modeling (C2SM). ETH Zurich further facilitates the interaction with stakeholders outside the university, such as policy-makers, the public administration, businesses, NGOs, and the general public. Overall, this stakeholder involvement is a key requirement for sustainable development research to yield applied solutions.

Towards the future of energy

In the context of its Energy Strategy 2050, the Federal Government has mandated the Swiss Commission for Technology and Innovation (CTI) and the Swiss National Science Foundation (SNSF) to establish eight energy competence centers – the Swiss Competence Centers for Energy Research (SCCERs). Launched in 2014, researchers of ETH Zurich participate in all of the eight SCCERs. Three of the eight are operated by ETH Zurich as the Leading House: "Supply of Electricity" (SCCER-SoE), "Efficiency of Industrial Processes" (SCCER-EIP), and "Efficient Technologies and Systems for Mobility" (SCCER-Mobility). After the successful completion of the first phase (2013–2016), more than 100 million CHF in federal funding has been allocated to cover the capacity requirements of all SCCERs in the second phase (2017–2020).

For example, within the framework of the National Research Program “Energy Turnaround” (NRP 70) of the Swiss National Science Foundation (SNSF), researchers at ETH Zurich’s Energy Science Center (ESC) are working on the project “Integration of sustainable multi-energy-hub systems at neighborhood scale (IMES).” Their work aims at developing and providing a comprehensive simulation approach for decentralized power production that simultaneously tackles technical, economic, and social issues. Under the coordination of a joint umbrella project, five teams are working together to establish a new methodology to evaluate decentralized power production solutions and formulate techno-economic decision guidelines for the implementation of decentralized power production while integrating renewable energy sources, natural gas-based micro-cogeneration, and storage (power-to-gas and batteries).

Researchers at the SCCER Supply of Electricity (SoE) carry out innovative and sustainable research in the areas of geo-energy and hydropower.
Working together for sustainable food

For more than half of the world population, rice is the most important food staple. Currently, flooded rice cultivation accounts for 80 percent of the global rice harvest. This method is problematic not only because of the large amounts of water it requires, but also because of the greenhouse gases it produces. In a multidisciplinary systems approach, the “BasmaSus” research project, based in the Sustainable Agroecosystems Group at ETH Zurich and funded through the Coop Research Program of the World Food System Center (WFSC), aims to study the economic, environmental and social sustainability impact of alternative organic cultivation methods on rice production, both in terms of crop yield and greenhouse gas emissions. The project was initiated by the Reismühle Brunnen, a manufacturing company of the Swiss retailer Coop, and implemented by Helvetas Swiss Intercooperation and Intercooperation Social Development India, with the support of Coop’s sustainability fund. In addition to the aforementioned partners, the research is conducted in collaboration with Wageningen University in the Netherlands and the Govind Ballabh Pant University of Agriculture and Technology in Uttarakhand, India. Outcomes of the project will directly benefit the livelihood of smallholder farmers, the industry partners, and the extension specialists, while novel scientific methodologies in agricultural sustainability research will be tested and advanced.

STAKEHOLDER PERSPECTIVES

With the international recognition that it enjoys, ETH Zurich is an important flagship of the Swiss educational landscape. Therefore, it is particularly important that ETH Zurich addresses the global issues of sustainability in its research activities. ETH Zurich has the potential to strengthen and advance research for sustainability to find innovative solutions in fields such as energy, mobility, or consumption, which ultimately allow us to protect the natural resources. That is not only important for the environment, but also guarantees our well-being.

State Councillor Brigitte Häsler-Koller
President of the Science, Education and Culture Committee SECC (WBK) in the Council of States

Computing for the climate

The Center for Climate Systems Modeling (C2SM) combines the climate modeling and data analysis expertise of ETH Zurich, MeteoSwiss, Empa, WSL, and Agroscope in order to better understand and predict weather and climate as well as their impacts on natural systems and human societies. Within the context of the “Platform for Advanced Scientific Computing” (PASC), researchers engaged in the C2SM aim to prepare climate codes for the next generation of high-performance computers to exploit the emerging computing capabilities and thereby continue to contribute at the highest level to climate system science. The C2SM’s involvement in PASC strongly relies on the active collaboration between ETH Zurich and MeteoSwiss together with the Swiss National Supercomputing Center (CSCS) in Lugano.

Bridging research and policy

Beyond the work at the competence centers, ETH Zurich founded two new research and education institutions in 2015 and 2016 respectively: the Institute of Science, Technology and Policy (ISTP) and the Swiss School of Public Governance (SSPG). The ISTP stands at the interface between university and politics, working to increase the policy relevance of scientific research at ETH Zurich. ISTP supports innovative trans-disciplinary research collaboration and promotes the exchange between researchers, policy-makers, and society. The SSPG, in turn, identifies potential for improving governance and leadership in public administration, leveraging the strengths of ETH Zurich’s multiple departments.

Research at ISTP started in 2016 within the framework of the “ISTP Research Incubator Initiative”. The two initial interdisciplinary research groups were formed to address the topics of mobility and urbanization. Researchers involved at the “Urbanization Research Incubator” (URI) come from the fields of architecture, economics, energy engineering, political science, and security policy. The URI is concerned with the rapid growth of medium-sized cities in developing countries and focuses on the interconnected challenges of reducing social inequality, improving public infrastructure, and increasing safety. The research focuses on the cities of Cape Town, Johannesburg, Bogotá, Barranquilla, Cali, and Medellin.

Named after Piz Daint, a prominent peak in Grisons that overlooks the Fuorn pass, this supercomputer is a Cray XC30 system used by many C2SM-community members for high-performance yet energy-efficient computing.
Knowledge transfer

Besides research and education, the core task of ETH Zurich under its legal charter is knowledge and technology transfer. For the most part funded by the Federal Government, the university assumes this responsibility with regard to translating generated knowledge and technologies for the benefit of society. It is important to maintain ecosystems for discovery, innovation, and entrepreneurship, which are key factors in ensuring that the best ideas materialize and yield a positive impact for society and sustainable development. Various offices and programs implemented at or in conjunction with ETH Zurich facilitate this knowledge transfer. Central aspects of this transfer are training and placement of graduates, collaborations and partnerships with the private sector, the securing and licensing of intellectual property rights (e.g., patents), and the establishment of spin-off companies.

→ G4-DMA

For additional information, please refer to the chapters “Research”, “Industry and society”, and “Honours and awards” in the Annual Report.

HIGHLIGHT

With the generous financial support of Swiss entrepreneur and philanthropist Hansjörg Wyss, ETH Zurich and the University of Zurich founded the Wyss Translational Center (Wyss Zurich) in 2015. The main idea behind the initiative is to ensure that knowledge from basic and pre-clinical research can be applied in practice more quickly and will thus have a positive impact on society. In the emerging fields of Regenerative Medicine and Robotics, Wyss Zurich aims at an efficient translation into new medical therapies and innovative products. The center will remove disciplinary and institutional barriers and unite researchers across various disciplines, ranging from engineering and medicine through to materials science, stem cell research, and robotics. “By bridging the gap between research and the market – the so-called ‘valley of death’ – Wyss Zurich enables future entrepreneurs to build sustainable companies”, summarizes Roland Siegwart, Professor for Autonomous Systems at ETH Zurich and Founding Co-Director of Wyss Zurich.

Learn more about the Wyss Zurich: www.wysszurich.uzh.ch

Speeding up the knowledge transfer

Researchers of the project “denovoSkin” developed personalized skin grafts to treat skin defects, such as through severe burns. With the help of Wyss Zurich, the team advances the product development and prepares for market authorization.

The 2016 ‘Spark Award’ recognizing ETH Zurich’s most promising invention of the year was awarded for the development of a new breast cancer examination method that uses ultrasound instead of radiation. The photo shows keynote speaker Manuel Aschwanden (light blue) with the two winners Sergio Sanabria and Orçun Göksel and ETH Vice-President Detlef Günther (from left to right).

Spin-off companies founded at ETH Zurich

Spin-off companies founded at ETH Zurich in 2016. 25 spin-off companies. 8 in Information and Communications Technology, 6 in Mechanical Engineering and Aerospace, 4 in Biotechnology and Pharma, 2 in Advanced Materials, 1 in Chemical Processes and Compounds, 1 in Consulting and Services, 1 in Electrical Engineering and Electronics, 1 in Micro- and Nanotechnology.

The 2016 ‘Spark Award’ recognizing ETH Zurich’s most promising invention of the year was awarded for the development of a new breast cancer examination method that uses ultrasound instead of radiation. The photo shows keynote speaker Manuel Aschwanden (light blue) with the two winners Sergio Sanabria and Orçun Göksel and ETH Vice-President Detlef Günther (from left to right).
Overview of plant types

Plant type

1) 1 MW = 1000 kW, 2) approximate 22–23 heat in Switzerland’s many mountain caverns. Just hot air

More than compression:

Insight

100–1000 in MW 1) Power

Pressure seal

Efficiency

75–80 in %

Investment costs

600–2000 in CHF./kW 2)

Electricity generation

7

Compressor driven by excess power, e.g. solar or wind energy.

4

The thermal energy storage solution consists of an aluminum-silicon phase-change material and a bed of pebbles. When power is needed, the compressed air is heated in the thermal energy storage unit and expanded in a turbine connected to an electricity generator.

Electricity generation

The cool compressed air (26 °C) leaves the cavern and is reheated in the thermal storage unit.

Heat in Switzerland’s many mountain caverns. Adiabatic compression: A massive plug seals one end of the cavern; on the other, a turbine driven by pressurized air is connected to a generator.

However, though good for the global climate, this trend creates headaches for grid operators. Infeed of solar and wind power fluctuates according to the weather, making it difficult to balance loads across electricity networks. This has spurred the search for efficient storage solutions – and one idea is currently being tested by a group of researchers headed by Dr. Andreas Haselbacher, Senior Research Scientist at the Professorship of Renewable Energy Carriers at the ETH’s Institute of Energy Technology.

In a nutshell, the concept of advanced adiabatic compressed air energy storage (AA-CAES) is straightforward: A compressor, driven by an electric motor powered by off-peak or renewable power, raises the air pressure in a sealed-off underground reservoir (e.g., a tunnel or cavern) to up to 100 bar. This would cause the compressed air to heat up to more than 800 °C – much higher than typical tunnel or cavern construction materials can handle. The solution is to store the heat contained in the compressed air in a thermal energy storage unit, thereby reducing the temperature of the compressed air to no more than 30 °C. The thermal energy storage solution consists of an aluminum-silicon phase-change material and a bed of pebbles. When power is needed, the compressed air is heated in the thermal energy storage unit and expanded in a turbine connected to an electricity generator.

Much like pumped hydro storage, but with a smaller ecological footprint, this concept would allow peak loads to be met with using off-peak or renewable energy stored at an efficiency of 70 to 75 percent. “That makes AA-CAES the only large-scale energy storage concept right now with the potential to complement pumped hydro energy storage in Switzerland”, Haselbacher notes. Since his research group is looking not just at technological feasibility, but also at the economic competitiveness, he is especially pleased that pebbles, so plentiful and cheap, make such an excellent storage medium.

Also abundant in the Swiss Alps are caverns and shafts left over from the nation’s many tunnel-building projects as well as its Cold-War-era underground fortresses and military infrastructure. This reduces the need to excavate suitable caverns, though existing ones may need to be expanded for larger compressed air storage plants. At the pilot plant in a disused tunneling shaft near Biasca, Ticino, the pressure of several hundred meters of solid rock above the tunnel prevents the compressed air from escaping – another advantage compared to CAES projects at Huntorf near Bremen, Germany (321 MW) and McIntosh, Alabama, USA (110 MW). These projects use caverns flushed from salt deposits. Such caverns are not feasible in Switzerland because salt deposits are not just hot air

Adiabatic compression: More than just hot air

With the increasing infeed of green power, the issue of grid stability and storage is becoming more and more urgent. ETH researchers are experimenting how excess energy can be stored as compressed air and heat in Switzerland’s many mountain caverns.

Renewable energy, especially from wind and solar, has seen massive growth in Europe over the past decade. Globally, 2015 was a boom year for renewables: Half a million new solar panels were installed every day, China alone set up two new nuclear reactors, and grid planning”, says Haselbacher. For more information about the project, please visit: www.ethz.ch/adiabatic-compression

The insight

China alone set up two new solar panels were installed every day, China alone set up two new nuclear reactors, and grid planning”, says Haselbacher. For more information about the project, please visit: www.ethz.ch/adiabatic-compression

Haselbacher and his team are now looking at market criteria and studying the design required for such a plant to operate profitably. Their project on “Electricity Storage via Adiabatic Air Compression” is funded by the Swiss National Science Foundation under the National Research Programme 70 “Energy Turnaround”, which seeks sustainable solutions for the future of Switzerland’s energy system. This means looking at the big picture, both in theory and in practice, and to include societal relevance and market maturity.

The ETH researchers cooperate closely with the Swiss federal administration’s Commission for Technology and Innovation in the framework of the Swiss Competence Centers for Energy Research on Heat and Electricity Storage. The project consortium is complemented by EPFL Lausanne, the Paul Scherrer Institute, the University of Applied Sciences and Arts of Southern Switzerland, as well as corporate partner ALACAES, who not only facilitated the work at their Biasca test facility, but have also invested significant effort and funds of their own in the project. “It’s a great example of cross-cutting research that involves disciplines as diverse as materials science, plant engineering, and grid planning,” says Haselbacher.
This chapter describes the educational environment that ETH Zurich maintains and further develops using comprehensive feedback and the latest technologies. It also presents the university’s educational portfolio for sustainable development. The chapter concludes with an Insight to the ETH Week, an innovative teaching format launched in 2015.

The chapter covers Principle 3 of the ISCN/GULF Sustainable Campus Charter.

The “Innovation Project” taught at the Department of Mechanical and Process Engineering challenged 500 undergraduate students to develop a mechatronic system in teams of five to six students. Training the students in product design and development, their task consisted of building an unmanned rescue device which can operate on a multi-story building. A total of 90 teams were supported by 30 student coaches from more advanced semesters, with the coaches themselves participating in a course on “Leading Engineering Projects and Coaching Design Teams”. The underlying teaching concept was awarded with the KITE Award in 2016.
Creating and maintaining an inspiring study environment is one of the major challenges of higher educational institutions. When framework conditions are conducive, students can excel to achieve their full potential. Therefore, ETH Zurich dedicates a substantial share of its efforts to critical reflection on its educational programs, and to the constant development of innovative teaching. The growing number of enrolled students at all levels of education shows that ETH Zurich is attractive for Bachelor, Master, and doctoral students. At the same time, the university uses extensive student evaluations and graduate feedback to develop the educational environment further. In 2016, ETH Zurich adopted a new teaching policy including comprehensive quality criteria for teaching.

A growing community
ETH Zurich’s student numbers have seen a growth of roughly 70 percent since 2000. As these numbers clearly show, ETH Zurich has continuously attracted talented students from all over the world to join its vibrant community. In 2015 and 2016, the student body consisted of individuals from more than 120 countries. In 2015, 19,233 students were enrolled in Bachelor, Master, and doctoral programs; in 2016, that figure increased slightly to 19,815. With 4026 doctoral students registered in 2015, ETH Zurich reached an all-time high on this level. Over the years, ETH Zurich’s Mechanical Engineering degree program has stabilized its leading position in terms of new entries. Confirming the trend of the previous years, Computer Science now ranks second, right before Architecture, with Health Sciences and Technology in fourth place. About 95 percent of all Bachelor degree graduates continue their studies with a Master degree program at ETH Zurich.

Bringing in student feedback
In 2015, ETH Zurich conducted its first ever survey among Bachelor and Master students to ask how satisfied they were with their studies. The 2015 Student Satisfaction Survey found that 82 percent of students at ETH Zurich were ‘satisfied’ or ‘very satisfied’ with their studies and the services provided by the university. The survey found that students appreciated the overall teaching and learning atmosphere, the fairness of performance assessments, and the respectful interaction with teaching staff at ETH Zurich. Guidance and support services were valued by the majority of respondents, while the biggest deficits were seen in the area of physical infrastructure (e.g., too few study spaces, lockers, or electrical sockets).

Quality assurance for teaching
In 2016, ETH Zurich adopted its new ‘Teaching Policy’, setting out the guiding values that shape ETH Zurich’s understanding of quality in the area of teaching. The guiding values are defined as follows: (1) unity of teaching and research, (2) unity of knowledge, thought, and action, (3) performance orientation, and (4) personal responsibility. The Teaching Policy is also the basis for the university’s “Quality Criteria for Teaching”. They, in turn, set out the quality criteria for degree programs and courses, and ETH Zurich’s expectations towards all those engaged in the teaching process, including students, assistants, lecturers, and administrative and technical staff. These criteria also serve as a guideline for employee recruitment, management, and development.

ETH Zurich Sustainability Report 2015/2016
STAKEHOLDER PERSPECTIVES
Our planet is finite, yet our ability to innovate and look ahead is not. Possibilities are indeed infinite, as long as we prepare the next generation to be confident, collaborative, creative, and curious. Investing in fabulous learning environments that prepare our young talents to be the leaders our fragile planet requires is not just a good investment. It is the best insurance we all can get.

Mathis Wackernagel
President of the Global Footprint Network and alumnus of ETH Zurich

Degrees

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor degrees</td>
<td>-</td>
<td>1964</td>
<td>1971</td>
</tr>
<tr>
<td>Architecture and</td>
<td>-</td>
<td>335</td>
<td>319</td>
</tr>
<tr>
<td>Building Sciences</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Sciences</td>
<td>-</td>
<td>491</td>
<td>524</td>
</tr>
<tr>
<td>Natural Sciences and Mathematics</td>
<td>-</td>
<td>402</td>
<td>358</td>
</tr>
<tr>
<td>System-oriented Natural Sciences</td>
<td>-</td>
<td>326</td>
<td>356</td>
</tr>
<tr>
<td>Management and Social Sciences</td>
<td>-</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Master degrees and diplomas</td>
<td>1341</td>
<td>1979</td>
<td>2015</td>
</tr>
<tr>
<td>Architecture and Building Sciences</td>
<td>322</td>
<td>404</td>
<td>397</td>
</tr>
<tr>
<td>Engineering Sciences</td>
<td>258</td>
<td>608</td>
<td>491</td>
</tr>
<tr>
<td>Natural Sciences and Mathematics</td>
<td>317</td>
<td>512</td>
<td>527</td>
</tr>
<tr>
<td>System-oriented Natural Sciences</td>
<td>231</td>
<td>293</td>
<td>319</td>
</tr>
<tr>
<td>Management and Social Sciences</td>
<td>213</td>
<td>72</td>
<td>85</td>
</tr>
<tr>
<td>Doctorates</td>
<td>523</td>
<td>718</td>
<td>851</td>
</tr>
</tbody>
</table>
Innovation for teaching and learning

As a leading institution of higher education for technology, ETH Zurich has a vested interest in being at the forefront of educational innovation, especially where it can generate significant added value for the development of students’ professional skills. The Educational Development and Technology (LET) unit, which reports directly to the Rector, promotes excellence in teaching through high-quality service, a focused IT support portfolio, and a framework conducive to the development of teaching innovation. Innovedum, for example, is a fund established by the Rector with a volume of more than 2 million CHF per year. The fund – its name is a portmanteau of the words “Innovation” and “Education” – supports bottom-up initiatives that contribute to the development of quality education at ETH Zurich in the long term. A recent evaluation of the projects funded through Innovedum since 2004 has shown that many of them are still running, underlining the overall sustainability of the selected initiatives.

New roadmap for continuing education

ETH Zurich provides research-based continuing education for companies, specialists, and managers with an academic background who are working in business, public administration, or the higher education sector. As lifelong learning is becoming indispensable in light of technological advancements, ETH Zurich has adopted a new roadmap in 2016 to define its strategic approach for continuing education. Among other aspects, the roadmap underlines the potential of continuing education as a way of enhancing the university’s reputation, the focus on strategic topics such as medicine, the evaluation and quality assurance of the courses, or the need to offer the right incentives to ensure that faculty provides offerings that respond to these needs. The continuing education portfolio at ETH Zurich currently comprises 17 Masters of Advances Studies (MAS, MBA), seven Diploma of Advanced Studies (DAS), 13 Certificates of Advanced Studies (CAS), and about 150 continuing education courses lasting between one and ten days.

Goals: Education

Continue recruitment measures for the best students nationally and internationally

- **ON TRACK** With its “ETHunterwegs” program, ETH Zurich reaches out to thousands of potential students in high schools all over Switzerland. At the annual “ETH Study Weeks”, high school students receive insights on current research conducted at the university. ETH Zurich also offers a comprehensive overview of its academic programs at two “Study Information Days” in cooperation with the University of Zurich and EPFL, respectively. The university is represented at educational fairs in Switzerland and abroad.

- **ON TRACK** In 2015 and 2016, ETH Zurich opened its doors for the “Nationaler Zukunftstag” (National Future Day), and invited school children from the region to experience life as a researcher for a day. The 2015 edition focused on breaking down stereotypical views on seemingly gender-specific professions to encourage girls to study MINT subjects.

Promote the education of exceptional personalities on all levels that are in high demand in science, business, and society

- **ON TRACK** According to an internal student survey conducted in early 2015, 82 percent of all students rated their education as satisfactory or ‘very satisfactory’. Five percent were ‘unsatisfied’ or ‘very unsatisfied’. In a study from 2013, the Swiss Federal Statistical Office found that 87 percent of the graduates qualify their education as ‘good’ or ‘very good’. 94 percent were employed within less than one year of their graduation. An additional three percent were not seeking employment.

Support particularly gifted master students by providing grants to incoming students

- **ON TRACK** With the Excellence Scholarship and Opportunity Program (ESOP), outstanding students receive special mentoring for the duration of their studies and a grant that covers the costs of studies and living during their Master degree program (4½ years in 2015). With the Master Scholarship Program (MSP), students receive a partial grant for the duration of their studies as well as the opportunity to work as assistants. Various other scholarship opportunities are offered by the Departments of Civil, Environmental and Geomatic Engineering (D-BAUG), Chemistry and Applied Biosciences (D-CHAB), and Mechanical and Process Engineering (D-MAT).

Extend dual-mode teaching, i.e., the combination of in-classroom teaching and e-learning, as well as further methods of self-study

- **ON TRACK** Educational developers have been appointed in 12 of the 16 departments at ETH Zurich. The three most recent departments to have joined the network are the Departments for Management, Technology and Economics (D-MTEC), Computer Science (D-INFK), and Information Technology and Engineering (D-ITET).

- **ON TRACK** In 2015/2016, 33 new Innovedum projects were started. The running projects were funded with 2.9 million CHF in total. The number of applications increased by 65 percent over the previous reporting period 2013/2014.

Improve mentoring relations through the appointment of additional assistants and full professorships

- **NOT ON TRACK** The ratio between students and faculty at ETH Zurich is much larger than at other leading universities. Although ETH Zurich has established a large number of new professorships and assistant professorships, the increasing student numbers drive the ratio significantly, so that the situation is not substantially improving overall. To ensure a high quality of education despite growing student numbers, ETH Zurich is not only appointing new professors, but is also increasing the number of senior scientists.

For additional information, please refer to the chapter “Teaching” of the Annual Report.

The ETH Zurich EduApp is a mobile application that serves students to navigate through everyday university life and allows them to interact with their professors and lecturers during the courses.
Rewarding Innovation, Effectiveness, and Sustainability in Teaching

For the first time in 2016, the university’s Lecturers’ Conference (KdL) awarded the KITE Award to honor outstanding teaching concepts at ETH Zurich. An acronym for "Key Innovation in Teaching at ETH Zurich", the KITE Award distinguishes faculty approaches that raise the quality of teaching, for example, by integrating methods from across disciplinary boundaries. For the first KITE Award, 24 projects from 12 departments were nominated, three of which were selected for the final round. The committee recognized Professor Mirko Meboldt from the Department of Mechanical and Process Engineering (D-MAVT) for the concept underlying his "Innovation Project", which challenged 500 first-semester students to develop a mechatronic system in 90 teams of five to six students. The teams were supported by 30 student coaches from more advanced semesters, with the coaches themselves participating in a course on "Leading Engineering Projects and Coaching Design Teams". The other two finalists were Professor Gisbert Schneider of the Department of Chemistry and Applied Biosciences (D-CHAB) with his course series in "Computer-Assisted Drug Design" and Professor Renate Schubert of the Department for Humanities, Social and Political Sciences (D-GESS) with her re-designed "Economics" course. “All lecturers are expected to continuously improve the effectiveness of their teaching at ETH Zurich. The KITE Award has been established to honor these efforts, to promote innovative ideas and to celebrate outstanding teaching concepts”, explains Edoardo Mazza, Professor for Mechanics and President of the Lecturers’ Conference at ETH Zurich.

Learn more about the KITE Award: www.ethz.ch/kite

Education for sustainable development

Graduates of ETH Zurich take on key positions in various segments of society. It is hence of utmost importance that the education of this generation of future leaders should look beyond their specialist expertise. In all of its educational offerings, ETH Zurich stresses the relevance of the capacity for system-oriented, independent, and critical thinking. The university aims to instill intellectual agility, a responsible approach to taking action, and the ability to address socially relevant aspects guided by ethics and the principles of sustainable development. With its comprehensive “Critical Thinking Initiative”, educational offerings in various departments and degree programs, as well as the development of innovative formats, ETH Zurich is making education for sustainable development accessible to all members of its community. Complementing the institutional efforts, the student-organized “Sustainability Week” is a prime example of a grassroots initiative designed to raise the visibility and awareness of matters of sustainability.

Critical Thinking Initiative

ETH Zurich’s most recent and comprehensive endeavor in developing the university’s educational environment is the launch of the Critical Thinking Initiative. This initiative aims to train ETH Zurich students to think critically and independently. During the course of their education, they should not only acquire methodological competencies, technical skills, and professional knowledge, but also be given the opportunity to address interdisciplinary and system-oriented issues in intercultural teams. They will be trained to communicate confidently in several languages and interact with different interest groups. The Critical Thinking Initiative was defined in consultation with various stakeholders and departments at ETH Zurich and was launched in late 2013. As part of this initiative, a wide range of departmental and cross-departmental projects and formats are being set up, such as the Student Project House (pilot station opened in 2016) or the ETH Week (launched in 2015; see Insight at the end of this chapter). One of the initiative’s first projects was the “Annual Program”, which provides up-to-date information on innovative learning formats and courses, and any broader offerings that help to foster a culture of critical thinking and analysis, inter- and transdisciplinary exchange, and responsible action.

Education for sustainable development in departments and degree programs

The university’s traditional commitment to sustainability has catalyzed institutional developments as well as the development of courses and programs. One prominent example is the Department of Environmental System Sciences (D-USYS), where system-oriented education programs fostering sustainable development can boast of a 30-year world-class track record. Other examples include the Master of Science in Energy Science and Technology (MEST) degree at the Department of Information Technology and Electrical Engineering (D-ITET), or the newly established Masters programs at the Institute of Science, Technology and Policy (ISTP). Attended by up to 200 students from all disciplines, the course on “Corporate Sustainability”, taught by members of the Group for Sustainability and Technology at the Department of Management, Technology and Economics (D-MTEC), is yet another successful example of education for sustainable development. ETH Zurich also offers a broad range of extracurricular summer and winter school programs dealing with topics on energy supply or aspects of the world food system, or the project platform ETH Seed Sustainability. Sustainable development is also addressed in ETH Zurich’s continuing education portfolio, such as in the Masters of Advanced Studies (MAS) in Development and Cooperation, Future Transport Systems, or Nutrition and Health.
Learning from pioneers

The event series “Pioneers in Sustainability” gives insights into the lives of people who have successfully combined their professional career with a commitment to sustainable development. After two inspiring events with Mathis Wacker-nagel, the founder of the Global Footprint Network, and Reto Ringger, the founder of the Global Balance Bank, the co-founder of Zurich-based label FREITAG, Markus Freitag, was the third guest of the series in 2015. In 2016, Bea Johnson, author of “Zero Waste Home” visited ETH Zurich to present her approach to consumption and waste, which has sparked a global following. The event series is well perceived with up to 250 guests from ETH Zurich and beyond.

STAKEHOLDER PERSPECTIVES

Scientific research requires not just technical expertise, but also critical thinking, because research constantly challenges existing doctrines and contemporary paradigms. Without this attitude, our thinking will be subject to ideologies or dogmas.

Gerd Folkers
Professor of Science Studies and head of the Critical Thinking Initiative

Award-winning student engagement for sustainable development

Widely recognized since its launch in 2013, the annual “Sustainability Week” has become the largest student-run sustainability program in Switzerland. Initially set up by students of ETH Zurich and the neighboring University of Zurich, the organizing team of the third (2015) and fourth (2016) editions consisted of students from all five universities in the Canton of Zurich, including the Zurich University of the Arts (ZHdK), the Zurich University of Applied Sciences (ZHAW), and the Zurich University of Teacher Education (PHZH). Since 2013, the Sustainability Week has not only attracted more than 7000 visitors in more than 100 creative events, workshops, and other activities, but it has also contributed to concrete sustainability outcomes at the participating universities. The University of Zurich, for example, established a sustainability office and appointed a sustainability delegate as a result of the bottom-up initiative. In 2016, the Sustainability Week organizers were honored with the “Award for Student Leadership” of the International Sustainable Campus Network (ISCN).

Goals: Sustainability education

Offer a diverse summer and winter school program on sustainable development at ETH Zurich

■ ON TRACK. In 2015 and 2016, ETH Zurich hosted and co-organized a variety of summer and winter schools covering specific sustainable development themes such as the World Food Systems Summer School, the Plant Science Center Summer School, the Climate-KIC Summer School, the Markets in the Tropics Summer School, the Swiss Competence Center in Energy Research (SCCER) Summer School, the Swiss Climate Summer Schools, the Engineering for Development (E4D) Winter School, or the CCES Winter School.

Improve the ability of doctoral students to interact with non-academic stakeholders and provide recommendations for research topics

■ ON TRACK. The CCES Winter School took place in 2015 and 2016 and hosted a total of 51 doctoral students and post-docs. It focused on training scientists to conduct a fruitful dialog with stakeholders and institutions outside the scientific community.

Provide a platform for students to tackle sustainability-specific questions with practice partners from public and private sectors

■ ON TRACK. In 2015 and 2016, seven Bachelor and Master theses were written and finalized within the project platform ETH Seed Sustainability. Of the Master theses, four had an interdisciplinary research design. This further expanded the implications reported to the practice partners.

Offer innovative activities and events for students and other members of ETH Zurich to learn about sustainability

■ ON TRACK. The event series “Pioneers in Sustainability” was launched in 2013 and continues to attract people from various backgrounds, with more than 250 guests in 2016.

■ ON TRACK. At the 2015 edition of the “Long Night of the Carer”, a high-profile expert panel discussed the factors that make it possible to combine professional success with a contribution to sustainable development. Two panel discussions were held at ETH Zurich and the University of Zurich, respectively.

■ ON TRACK. Within the reporting period, the “Netzwerk Nachhaltigkeit” organized two excursions to highlight two exemplary projects related to campus sustainability. One excursion guided the participants behind the scenes of the ETH Polyterrasse canteen, where the “Sustainable Catering” project had been conducted. For the second excursion, the participants visited the Campus Oriental of ZHAW in Wädenswil, where they got a first-hand impression of successful sustainability science communication.

Develop an overview that describes cross-departmental sustainability and critical thinking-related educational activities at ETH Zurich

■ ON TRACK. In the context of the Critical Thinking Initiative, ETH Zurich published Annual Programs in both 2015 and 2016. The printed program was very well received by students, who discovered and attended interesting new lectures, and by the university’s lecturers, who were inspired to develop new courses and offerings. An additional source of information is the sustainability website of ETH Zurich.
ETH Week: What a difference a week makes

Sometimes, thinking outside the box and beyond disciplinary boundaries is a skill that is best taught outside of the classroom. At ETH Week 2016, students took on the challenge of water and the many ways it impacts our daily lives.

Traditional teaching formats in classrooms and lecture halls are increasingly complemented by new educational approaches. And in times of e-learning and livestreamed lectures, with more and more knowledge available on the web, some may think that the idea of the university as a physical campus is obsolete. However, as any alumnus will attest, there are certain skill sets that can only be acquired through interaction with others at university. Higher education isn’t just about studying the curriculum – it’s also about developing critical judgment skills and broadening your horizon through encounters with individuals from other fields of study in settings outside of the classroom.

One opportunity to do so in Zurich is ETH Week, an innovative learning format that gives students the chance to practice collaborative problem-solving, design thinking, and teamwork across disciplinary boundaries. For six days, the participants tackle key global issues with input and some help from distinguished academic experts, business leaders, journalists, policymakers, and representatives of NGOs. In 2016, the topic of the second ETH Week was “Challenging Water”. Water resource management, hydropower systems, and water for agriculture were just a few of the aspects to be tackled over the course of the week.

From Sunday to Friday, 11 to 16 September, students from all 16 ETH departments, representing 24 nations, were divided into 18 groups and tasked with collaborative problem-solving. Activities included eleven field trips and a knowledge fair to meet with and interview 30 water experts. They provided first-hand information from science, industry, or administration and an occasion for students to hone their skills in interviewing specialists and structuring the collected material. Each group then identified a specific challenge and formulated a problem statement, which was subsequently improved with further professional assistance from water experts and “design thinking facilitators”.

Over the course of the week, the teams tracked their own progress. Several feedback loops with ETH professors, external advisors and within the team produced ever more specific problem statements and the first prototype for a related solution. Gradually, participants were guided through the basic process of every research design and project plan: From brainstorming and rough sketches, guided by literature research and expert interviews, they progressed to the research and test phase, in which experts offered further feedback to help them hone their problem statement and solution prototype to even finer detail.

One group worked on ways to assist Swiss NGOs in providing potable water to Haiti, where waterborne diseases caused by pathogen contamination are endemic. Their approach was to create an artificial water cycle through solar heating, evaporation, and condensation. The Stayhot project focused on waste water from bathtubs and showers, which is usually drained or flushed at high temperatures. With a heat exchanger, personal energy use from this aspect of daily life can be reduced to 300 kWh per person annually.

Among the eminent authorities who met with the students were ETH Rector Sarah Springman, several professors from ETH Zurich and other institutions, including the Swiss Federal Institute of Aquatic Science and Technology (EAWAG), as well as business leaders whose companies work with water, but also an artist, a theologian, and a long-distance swimmer, who presented completely different perspectives on the element that more than others, sustains life on Earth. “ETH Week is a wonderful opportunity for students from all subject areas to tackle important societal issues and look for solutions together. They learn new approaches and, most importantly, critical thinking, which they will need later in the workplace”, says Rector Sarah Springman.

ETH Week is part of the ETH Critical Thinking Initiative, which encourages independent work and reflection when faced with complex and systemic challenges. As an innovative teaching concept, its purpose is to train future change agents by encouraging design thinking and concepts outside the box. The next ETH Week takes place from 10 to 15 September 2017. It will look at manufacturing processes and their societal impact.

For more information about ETH Week, please visit: www.ethz.ch/ethweek
This chapter outlines how ETH Zurich integrates the principles of sustainable development on campus, with respect to social, environmental, and economic terms. It provides information on employees’ working environments and conditions, developments with regards to the university’s environmental impact, and details on financial policies. The chapter concludes with an Insight on two sustainable campus development projects at Campus Hönggerberg.

The chapter covers Principle 1 and 2 of the ISCN/GULF Sustainable Campus Charter.

In 2016, ETH Zurich counted a total of 11,157 employees. The same year, 15,405 students (without doctoral students) were enrolled at the university. Historically and all the more today, ETH Zurich has been a hub of people from all over the world. Aware of its responsibility towards its students, employees, and society, ETH Zurich lives and promotes the principles of sustainable development with respect to social, environmental, and financial aspects.

**People**
- Participation: 38
- Employee retention and turnover: 39
- Diversity: 42
- Attractive employment conditions: 44

**Environment**
- Sustainable campus development: 48
- Energy: 50
- Mobility and emissions: 54
- Paper consumption: 58
- Recycling and waste: 59
- Food: 61

**Governance and Finance**
- Finances: 62

**Insight:** “Innovative construction: All under one roof” 64
Participation

Actively encouraging the expression of opinions is part of ETH Zurich’s institutional identity and is a key factor behind the high level of motivation among all members of the university. ETH Zurich greatly values this open exchange. A variety of boards, university groups, and commissions act as bodies to discuss, elaborate, and represent the matters and concerns of students and employees at ETH Zurich in a participatory environment. In 2016, a working group of the University Assembly published a comprehensive report outlining all regulated participatory mechanisms that are currently in place at ETH Zurich. → G4-DMA

University Assembly: Representation and participation

Based on the principle of equal representation, the University Assembly (HV) is made up of representatives of the Lecturers’ Conference (VKhD), the Academic Association of Scientific Staff (AVETH), the Association of ETH Students (VSETH), the Staff Commission (PeKo), and a number of (permanent) guests, for example, from the Corporate Communications department of ETH Zurich or the ETH Board. In 2015 and 2016, the University Assembly issued 15 official statements to various decision-making bodies and other units or representatives of ETH Zurich on issues as diverse as the university’s strategy development, web communication guidelines, or revisions of the Federal Act on the Federal Institutes of Technology (FIT).

STAKEHOLDER PERSPECTIVES Participation makes possible the integration of opinions of those ultimately affected by the decisions. In the best case, this leads to an outcome that brings added value to all. As students, we are particularly dependent of participatory mechanisms, because we need to be in the position to shape our studies and the learning environment ourselves.

Lukas Möller
President of the Association of Students at ETH Zurich (VSETH)

Commissions: Advising the Executive Board

Besides the representative bodies mentioned above, a total of eight permanent commissions act as advisory bodies to the Executive Board of ETH Zurich: the Strategy Commission, the Teaching Commission, the Research Commission, the ICT Commission, the Risk Management Commission, the Investment Commission, the Ethics Commission, and the Environmental Commission.

For a comprehensive overview of internal and external stakeholder dialog channels, please refer to pages 70–71 of this report.

Employee retention and turnover

Excellent employees – from professor to administrative staff – are not only ETH Zurich’s major asset, but they are also the core precondition for the university to fulfill its mandate and achieve its strategic goals. In 2016, ETH Zurich counted a total of 11,157 employees. Historically and all the more today, the university has been a hub for people from all over the world. Since this remains a central factor of its continuous success, ETH Zurich must ensure that working conditions match needs and requirements on all levels of employment. These vary depending on the stage of the career, and according to whether people are working in research, administration, or technical fields. As research innovation needs constant influx, momentum, and steady development, it is not unusual for universities to experience high levels of employee fluctuation. Especially at the early stages of an academic career, researcher mobility is becoming increasingly relevant. At ETH Zurich, a significant share of mid-career researchers (assistants and scientific staff) are employed in temporary positions related to a specific stage of their academic path or a research grant. Young talents are supported and prepared for the global stage in academia and beyond. Technical and IT or laboratory staff, in turn, may unfold their full potential in the longer term, growing in experience and institution specific expertise. For them, ETH Zurich offers a wide range of development possibilities, including advanced training or internal mobility.

Retention and turnover

Looking at all employees at ETH Zurich, turnover rates have ranged between 5.4 percent (in 2013) and 6.6 percent (in 2012) over the course of the last three reporting periods (since 2011), with 5.7 percent in 2015 and 6.3 percent in 2016. In both 2015 and 2016, retention rates were highest among assistant professors and professors. In the same period, retention rates were lowest among senior assistants and administrative staff. As to the female employees, retention rates were highest among professors and among senior scientists in 2016. The lowest rates were among female assistant professors in 2015, and among female scientific staff in 2016.

Employee age pyramid for 2015 (2016) – headcount → G4-LA12

In 2015 (2016), the university had a total of 11,157 employees. Historically and all the more today, the university has been a hub for people from all over the world. Since this remains a central factor of its continuous success, ETH Zurich must ensure that working conditions match needs and requirements on all levels of employment. These vary depending on the stage of the career, and according to whether people are working in research, administration, or technical fields. As research innovation needs constant influx, momentum, and steady development, it is not unusual for universities to experience high levels of employee fluctuation. Especially at the early stages of an academic career, researcher mobility is becoming increasingly relevant. At ETH Zurich, a significant share of mid-career researchers (assistants and scientific staff) are employed in temporary positions related to a specific stage of their academic path or a research grant. Young talents are supported and prepared for the global stage in academia and beyond. Technical and IT or laboratory staff, in turn, may unfold their full potential in the longer term, growing in experience and institution specific expertise. For them, ETH Zurich offers a wide range of development possibilities, including advanced training or internal mobility.

Retention and turnover

Looking at all employees at ETH Zurich, turnover rates have ranged between 5.4 percent (in 2013) and 6.6 percent (in 2012) over the course of the last three reporting periods (since 2011), with 5.7 percent in 2015 and 6.3 percent in 2016. In both 2015 and 2016, retention rates were highest among assistant professors and professors. In the same period, retention rates were lowest among senior assistants and administrative staff. As to the female employees, retention rates were highest among professors and among senior scientists in 2016. The lowest rates were among female assistant professors in 2015, and among female scientific staff in 2016.
Promising perspectives for partners

ETH Zurich's ability to recruit leading researchers as professors is not just a matter of providing generous resources for research and teaching. The university also devotes attention to partners, children, and support with integration in general (i.e., housing, schooling, childcare). Of the 64 professors appointed in the reporting period 2015/2016, 43 came from abroad (67 percent). 53 of all new professors (83 percent) moved to Zurich with a partner, and 27 with children (42 percent). Especially for those coming from abroad, ETH Zurich’s "Dual Career Advice" provided useful support for the professional integration of the partners, helping a total of 31 partners entering the Swiss job market. To increase the network and the range of opportunities beyond academia, ETH Zurich joined the International Dual Career Network (IDCN) in 2014.

STAKEHOLDER PERSPECTIVES

We need to make sure that we can attract and develop the best-qualified people at ETH Zurich. One important aspect is to create awareness for personnel development and to offer an interesting service portfolio and job opportunities to pursue a successful career inside or outside of ETH Zurich. Another aspect is enabling supervisors to engage and support their team members in personnel development.

Martin Ghisletti
Human Resources, Head of ETH Personnel and Organizational Development

Goals: Talent retention and development

Recruit and support of the best scientists to ensure highest quality of research and teaching

Recruit and support of the best scientists to ensure highest quality of research and teaching. ETH Zurich recruited 64 new professors, 43 of which came from abroad (total in 2016: 402 professors and 90 assistant professors). Various offices and services are in place to support newly arrived professors in administrative matters and help them integrate and take on their core activities as smoothly as possible. The Dual Career Advice office at the Office for Faculty Affairs, for example, assisted 31 partners entering the Swiss job market during the reporting period.

Support employee development through comprehensive personnel development measures

Support employee development through comprehensive personnel development measures.

Supporting life-long learning

ETH Zurich offers and finances a variety of internally and externally conducted measures for personnel development. Over the years, demand for these offerings – designed to enhance leadership skills as well as technical, methodological, and social skills – has increased steadily. One example is the course on time management, which teaches employees how to deal with stressful situations, set realistic goals, and prioritize their tasks. During the reporting period, 2274 employees participated in courses on leadership, project management, professional development, and working techniques, which is around 15 percent less than in the previous reporting period. In the same period, the number of internal trainings has increased from 72 to 80. A total of 80 internal trainings and seven short-term lunch events were conducted over the two reporting years.

Support employee development through comprehensive personnel development measures

ON TRACK In 2015 and 2016, 144 and 1330 employees, respectively, participated in at least one course on leadership, project management, professional development, and working techniques. A total of 80 internal trainings and seven short-term lunch events were conducted over the two reporting years.

ON TRACK In 2015 and 2016, 222,000 CHF and 190,000 CHF respectively were spent on external professional development offerings. 71 and 104 employees took part in these offerings in 2015 and 2016, respectively.

Supporting life-long learning

ETH Zurich offers and finances a variety of internally and externally conducted measures for personnel development.

The comprehensive support and provided by the Dual Career Advice office focuses on professional integration as well as on private integration in Switzerland.

Summary of employee turnover rates 2015/2016

Employee turnover in 2015

<table>
<thead>
<tr>
<th>New entries from outside</th>
<th>Persons leaving</th>
<th>No of employees</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Contract</td>
<td>Notice given</td>
</tr>
<tr>
<td>Total ETH Zurich</td>
<td>4955</td>
<td>4298</td>
<td>3552</td>
</tr>
<tr>
<td>Professors</td>
<td>8</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Assistant professors</td>
<td>10</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Senior assistants</td>
<td>52</td>
<td>109</td>
<td>65</td>
</tr>
<tr>
<td>Assistants</td>
<td>1676</td>
<td>1176</td>
<td>858</td>
</tr>
<tr>
<td>Scientific staff</td>
<td>31</td>
<td>89</td>
<td>73</td>
</tr>
<tr>
<td>Senior scientific and senior scientific staff (permanent contracts)</td>
<td>0</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Scientific staff (hourly wages)</td>
<td>2421</td>
<td>2353</td>
<td>2263</td>
</tr>
<tr>
<td>Technical and IT staff</td>
<td>254</td>
<td>198</td>
<td>112</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>303</td>
<td>269</td>
<td>176</td>
</tr>
</tbody>
</table>

Employee turnover in 2016

<table>
<thead>
<tr>
<th>New entries from outside</th>
<th>Persons leaving</th>
<th>No of employees</th>
<th>Turnover</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Contract</td>
<td>Notice given</td>
</tr>
<tr>
<td>Total ETH Zurich</td>
<td>4661</td>
<td>4483</td>
<td>3764</td>
</tr>
<tr>
<td>Professors</td>
<td>11</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Assistant professors</td>
<td>14</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Senior assistants</td>
<td>62</td>
<td>117</td>
<td>83</td>
</tr>
<tr>
<td>Assistants</td>
<td>1664</td>
<td>1264</td>
<td>936</td>
</tr>
<tr>
<td>Scientific staff</td>
<td>53</td>
<td>93</td>
<td>73</td>
</tr>
<tr>
<td>Senior scientific and senior scientific staff (permanent contracts)</td>
<td>2</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Scientific staff (hourly wages)</td>
<td>2515</td>
<td>2466</td>
<td>2386</td>
</tr>
<tr>
<td>Technical and IT staff</td>
<td>248</td>
<td>232</td>
<td>152</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>292</td>
<td>286</td>
<td>145</td>
</tr>
</tbody>
</table>

1 including deaths and dismissals
2 by employee
3 excluding contractual expiration
4 does not include externally employed dual professors
Diversity

The wide array of people from different backgrounds makes ETH Zurich a unique place for working and studying. For life on campus, this diversity brings a remarkable added value. Where people of different ages, genders, cultures, or religions come together, the result is much more than just a collection of individuals, but a setting rich in perspectives and opinions. While this is beneficial in general, diversity can also evoke challenges, tensions, and even conflicts. As an employer and institution of higher education, ETH Zurich emphasizes that any form of discrimination will not be tolerated. Although the university fosters an environment in which mutual coexistence brings added value for all, it operates a number of services, helplines, and offices that serve as contact points in case of threats and violence, sexual harassment, bullying, or other misconduct. When employees were asked to assess their working situation, 'Diversity' was rated the second most important factor, according to the 2016 Employee Survey of ETH Zurich.

Nationally rooted, internationally integrated

As a technical university in a small country, ETH Zurich can only compete with the world’s best by establishing international links, by recruiting its researchers worldwide, and by remaining attractive to students from abroad. Among its students and employees are citizens from more than 120 countries. In 2015 and 2016, 52 percent of all employees and 66 percent of all professors (and 79 percent of all assistant professors) at ETH Zurich came from outside of Switzerland. The share of foreigners among all employees increased by 12 percent between 2006 and 2016. Around 38 percent of all students were from abroad in 2015 and 2016. While the share of foreign professors is increasing, more than 80 percent of the Bachelor students in the reporting period were Swiss, underscoring the university’s national rootedness and the knowledge transfer to Swiss society and industry (all numbers in headcount).

<table>
<thead>
<tr>
<th>Headcount</th>
<th>2000</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of students</td>
<td>10,693</td>
<td>19,233</td>
<td>19,815</td>
</tr>
<tr>
<td>Percentage women</td>
<td>25.1%</td>
<td>30.5%</td>
<td>31.1%</td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>20.3%</td>
<td>37.6%</td>
<td>38.2%</td>
</tr>
<tr>
<td>Bachelor students</td>
<td>8706</td>
<td>8934</td>
<td></td>
</tr>
<tr>
<td>Percentage women</td>
<td>30.0%</td>
<td>36.7%</td>
<td></td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>19.0%</td>
<td>19.3%</td>
<td></td>
</tr>
<tr>
<td>Master students</td>
<td>5647</td>
<td>5936</td>
<td></td>
</tr>
<tr>
<td>Percentage women</td>
<td>29.9%</td>
<td>35.5%</td>
<td></td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>38.9%</td>
<td>40.4%</td>
<td></td>
</tr>
<tr>
<td>Doctoral students</td>
<td>4026</td>
<td>4010</td>
<td></td>
</tr>
<tr>
<td>Percentage women</td>
<td>30.1%</td>
<td>31.2%</td>
<td></td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>69.6%</td>
<td>70.8%</td>
<td></td>
</tr>
<tr>
<td>MAS / MBA Students</td>
<td>440</td>
<td>435</td>
<td></td>
</tr>
<tr>
<td>Percentage women</td>
<td>40.3%</td>
<td>66.3%</td>
<td></td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>40.5%</td>
<td>66.9%</td>
<td></td>
</tr>
<tr>
<td>Visiting / Exchange students</td>
<td>416</td>
<td>609</td>
<td></td>
</tr>
<tr>
<td>Percentage women</td>
<td>32.1%</td>
<td>36.3%</td>
<td></td>
</tr>
<tr>
<td>Percentage foreigners</td>
<td>94.0%</td>
<td>93.8%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employee headcount</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Employees</td>
<td>11,116</td>
<td>11,197</td>
</tr>
<tr>
<td>Men</td>
<td>7264</td>
<td>7298</td>
</tr>
<tr>
<td>Women</td>
<td>3852</td>
<td>3859</td>
</tr>
<tr>
<td>Percentage women</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>Permanent contract (all)</td>
<td>3218</td>
<td>3300</td>
</tr>
<tr>
<td>Permanent contract (men)</td>
<td>1918</td>
<td>1978</td>
</tr>
<tr>
<td>Permanent contract (women)</td>
<td>1300</td>
<td>1322</td>
</tr>
<tr>
<td>Part-time employment (all)</td>
<td>4073</td>
<td>4063</td>
</tr>
<tr>
<td>Part-time employment (men)</td>
<td>2127</td>
<td>2113</td>
</tr>
<tr>
<td>Part-time employment (women)</td>
<td>1946</td>
<td>1950</td>
</tr>
<tr>
<td>Professors1</td>
<td>462</td>
<td>462</td>
</tr>
<tr>
<td>Men</td>
<td>355</td>
<td>356</td>
</tr>
<tr>
<td>Women</td>
<td>47</td>
<td>46</td>
</tr>
<tr>
<td>Percentage women</td>
<td>12%</td>
<td>11%</td>
</tr>
<tr>
<td>Assistant professors</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>Men</td>
<td>68</td>
<td>69</td>
</tr>
<tr>
<td>Women</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Percentage women</td>
<td>22%</td>
<td>23%</td>
</tr>
<tr>
<td>Senior assistants</td>
<td>432</td>
<td>439</td>
</tr>
<tr>
<td>Men</td>
<td>340</td>
<td>348</td>
</tr>
<tr>
<td>Women</td>
<td>92</td>
<td>91</td>
</tr>
<tr>
<td>Percentage women</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>Assistants</td>
<td>4896</td>
<td>4899</td>
</tr>
<tr>
<td>Men</td>
<td>3401</td>
<td>3370</td>
</tr>
<tr>
<td>Women</td>
<td>1495</td>
<td>1499</td>
</tr>
<tr>
<td>Percentage women</td>
<td>31%</td>
<td>31%</td>
</tr>
</tbody>
</table>

1 Does not include dual professors, externally employed professors within the ETH Domain as well as part-time employed professors.

<table>
<thead>
<tr>
<th>Scientific staff</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>184</td>
<td>209</td>
</tr>
<tr>
<td>Women</td>
<td>81</td>
<td>87</td>
</tr>
<tr>
<td>Percentage women</td>
<td>31%</td>
<td>30%</td>
</tr>
<tr>
<td>Senior scientists and senior scientific staff</td>
<td>277</td>
<td>272</td>
</tr>
<tr>
<td>Permanent contracts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>234</td>
<td>222</td>
</tr>
<tr>
<td>Percentage women</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>Scientific staff (hourly wages)</td>
<td>1627</td>
<td>1383</td>
</tr>
<tr>
<td>Men</td>
<td>933</td>
<td>819</td>
</tr>
<tr>
<td>Women</td>
<td>694</td>
<td>564</td>
</tr>
<tr>
<td>Percentage women</td>
<td>44%</td>
<td>46%</td>
</tr>
<tr>
<td>Technical and IT staff</td>
<td>1688</td>
<td>1717</td>
</tr>
<tr>
<td>Men</td>
<td>1206</td>
<td>1337</td>
</tr>
<tr>
<td>Women</td>
<td>382</td>
<td>380</td>
</tr>
<tr>
<td>Percentage women</td>
<td>23%</td>
<td>22%</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>1644</td>
<td>1691</td>
</tr>
<tr>
<td>Men</td>
<td>447</td>
<td>486</td>
</tr>
<tr>
<td>Women</td>
<td>1197</td>
<td>1205</td>
</tr>
<tr>
<td>Percentage women</td>
<td>73%</td>
<td>71%</td>
</tr>
</tbody>
</table>
Women still underrepresented at ETH Zurich
In addition to embracing the international diversity represented at ETH Zurich, a great deal of attention is devoted to finding a more equal balance of genders among students and at all levels of employment. ETH Zurich recognizes the historical underrepresentation of women and is actively addressing the need for a more balanced ratio between males and females. As part of this effort, the university defines targets and develops strategies with concrete policies and activities. Target values as defined in the objective agreement of ETH Zurich with the ETH Board for the period of 2013 to 2016 are shown in the adjacent goals table. By the end of that period, the actual proportion of women at all levels of employment at ETH Zurich with the ETH Board for the period of 2013 to 2016 are shown in the adjacent goals table. By the end of that period, the actual proportion of women at all levels of employment at ETH Zurich was still below the defined targets.

Preserve diversity among students and employees of ETH Zurich

- **ON TRACK** In 2015 and 2016, 52 percent of employees at ETH Zurich came from foreign countries, which is 12 percent more than 2006. Among all employees, the share of women stood at 35 percent in 2015 and 2016. Within the student body, which comprises more than 120 nationalities, foreigners accounted for 38 percent in 2015 and 2016. The share of female students in 2015 was at 30 percent, and at 31 percent in 2016 (all numbers in headcount, rounded).

- **ON TRACK** By the end of that period, the actual proportion of women at all levels of employment was still below the defined targets.

Increase gender balance at all levels of the academic career. The objective agreement between ETH Zurich and the ETH Board 2013-2016 defines the following targets for increasing the number of females:

- **NOT ACHIEVED** 15 percent female professors: The share of females among professors stood at 13.6 percent in 2015 and 13.8 percent in 2016 (professors in 2015: 11.8 percent; assistant professors in 2015: 22.2 percent; professors in 2016: 11.6 percent; assistant professors in 2016: 23.3 percent).

- **NOT ACHIEVED** 30 percent female scientific staff (in FTE): The share of females among scientific staff stood at 28.7 percent in 2015 and 28.8 percent in 2016.

- **NOT ACHIEVED** 25 percent female technical and IT staff (in FTE): The share of females among technical and IT staff stood at 20.0 percent in 2015 and 18.9 percent in 2016. For administrative staff, the share of females stood at 71.1 percent and 69.5 percent for 2015 and 2016, respectively.

- **NOT ACHIEVED** 35 percent female students (in headcount): The share of females among students (Bachelor, Master, Doctoral, Visiting/Exchange, and MAS/MBA students) stood at 30.5 percent in 2015 and 31.1 percent in 2016.

Status of the Gender Action Plan
Given the modest developments in equal gender representation, ETH Zurich’s Executive Board adopted the Gender Action Plan (GAP) in 2014. The GAP specifies in a binding manner how to achieve a gender balance in the long term and assigns clear responsibilities for implementation. With the GAP, ETH Zurich focuses on four areas of action: (1) Careers and Career Development in Academia, (2) Integration of Gender-Specific Aspects in Research and Teaching, (3) Facilitation of Work/Life Balance, and (4) Fighting Sexual Harassment and Discrimination on the Basis of Gender. Two years after its adoption, the implementation of the GAP was evaluated in 2016. While the number of female students and employees has not changed considerably, the evaluation underlines that awareness of gender-related issues in departments has increased positively, contributing to an overall cultural change in the institution. Since 2014, some departments have launched measures of their own, for example, to facilitate the Work/Life Balance. The Department of Humanities, Social and Political Sciences (D-GESS) has drawn together a shared budget to give additional support to doctoral students who have children. The idea is to eliminate a false incentive to employ candidates without children. In 2016, the Department of Earth Sciences (D-ERDW) launched a “family office” that has both a work space and a play area and is meant to support parents when childcare becomes unavailable at short notice. On the level of the university, “Robert Gnehm Grants”, launched in late 2016, support conference attendance of researchers with young children.

STAKEHOLDER PERSPECTIVES
Numerous studies have shown that diversity increases the innovation potential of teams. Where multiple perspectives come together, highly interesting and promising opportunities emerge.

Renate Schubert
Professor for Economics and Associate Vice President for Equal Opportunities

In light of the current global refugee crisis, the Association of Students at ETH Zurich (VSETH) launched a pilot program inviting refugees living in the larger Zurich area to experience student life at ETH Zurich. With support from the ETH Zurich Executive Board and responsible units of the university administration, 40 refugees with prior academic experience – mostly in Syria, Afghanistan, and Eritrea – were selected from more than 120 applicants to attend courses at ETH Zurich during fall semester 2016. To make the most out of their “Discovery Semester”, fellow students from corresponding fields of study were assigned to the refugees as mentors to support them along the way, not only in terms of course selection or administrative aspects, but also in terms of giving insight to regular study opportunities. “As VSETH, we also organized a number of social events for the refugees and mentors to build friendships even beyond the classrooms”, adds Varinia Sutter, responsible at VSETH for the coordination of the Discovery Semester.

The first batch of Discovery Semester participants with their mentors during a social event organized by the VSETH.

Learn more about the Discovery Semester: www.ethz.ch/discovery-semester
Attractive employment conditions

Without the passion and commitment of its employees, ETH Zurich could not be one of the world’s top universities. For the university, this implies that the provision of a progressive working environment and competitive employment conditions must play a substantial role in its efforts. Beyond the framework conditions, ETH Zurich offers its employees a wide range of additional benefits and services, including childcare offerings. The Employee Survey 2016 conducted by ETH Zurich provided insights into employee satisfaction and highlighted those aspects of their working life that they felt needed improvement. → G4-DMA

Working conditions inducing performance

All employment contracts at ETH Zurich are subject to public law: the Federal Personnel Act, the Federal Act on the Federal Institutes of Technology (FIT Act), the Personnel Ordinance for the ETH Domain (PO), and the Ordinance on the Scientific Personnel of the Swiss Federal Institute of Technology in Zurich. ETH Zurich employees have individual employment contracts that are mostly permanent for technical, administrative, and IT employees and fixed-term for employees in research. Extra hours and overtime are compensated with equivalent time off. As a matter of principle, it is possible to take both paid and unpaid leave. Mothers are entitled to four months of paid maternity leave, irrespective of the time already worked at ETH Zurich. If both parents have children, in 2014, ETH Zurich launched “Hello Kids!”, the service point for employees and students in matters related to childcare. By 2016, the service point had responded to more than 200 requests. Additional services and benefits for employees

Beyond guaranteeing the best possible standard for general employment conditions, ETH Zurich is constantly developing its portfolio in terms of additional services and benefits. Among others, ETH Zurich’s employees enjoy special conditions and discounts for the use of public transport (for people with more than 50 percent employment and a minimum of a six month working contract), childcare, continuing education and language courses, memberships in the Academic Sports Association (ASVZ), or car-sharing subscriptions. → G4-LA2

Childcare on campus

Being able to combine work and family life is essential not only when it comes to recruiting the best employees, but also for encouraging equal opportunities in the workplace. Therefore the university offers a wide and flexible range of offers to employees who have children. In 2014, ETH Zurich opened seven daycare centers, “kihz Feyerabend”, was opened in 2016. It is located in the ground floor of the new HWA building on Campus Hönggerberg. In the same building, the kihz Foundation started “kihz Flex” as a pilot for one year to evaluate the demand for flexible short-term childcare. Extra premiums for service anniversaries can be granted. For employees with more than 50 percent employment, ETH Zurich covers family allowances additional to the cantonal family allowances. Employees of ETH Zurich pay into the federal PUBLICA pension fund within the defined contribution plan. All employees with a minimum weekly working time of eight hours are insured against the consequences of accidents both during and outside work within the Swiss Accident Insurance Company (SUVA). → G4-LA2

Employee Survey 2016

In 2016, over 8500 employees at ETH Zurich were asked for the fourth time to assess their working situation and their image of ETH Zurich. With 4758 participants responding to the online survey (response rate of 55.5 percent), the results provide a good basis for a well-founded representation of the overall mood. The survey found 71 percent of the employees to be ‘very satisfied’ or ‘largely satisfied’ with their work situation, 19 percent tend to be ‘satisfied’, seven percent tend to be ‘dissatisfied’. Four percent of the respondents indicated that they are ‘largely or very dissatisfied’ with the current work situation at ETH Zurich. Ratings differ largely across the different levels of employment, ranging from professors and doctoral students to technical and administrative staff. On average, the topics ‘attractiveness/image’ (e.g., “ETH Zurich is an attractive employer”) and ‘diversity’ (e.g., “My work environment is free of discrimination which demeans a person’s worth”) received the highest ratings. The lowest ratings were given to the topics ‘workload’ (e.g., “I am frequently interrupted at work”) and ‘cooperation’ (e.g., “If there are problems during everyday work, I know where to turn”). Based on the results of the survey and in order to improve working conditions and the development of the university, the Executive Board of ETH Zurich decided on measures in four areas: working environment (e.g., team-building workshops), health (e.g., facilitating the use of a home office), leadership and development (e.g., regular status updates), and the use of salary scales for doctoral students (e.g., consideration of teaching activities).
Sustainable campus development

At a vibrant university like ETH Zurich, demand for space is constantly changing. The growing number of students and employees is one driver of spatial development. The changing spatial requirements for teaching and research in light of new technologies, research foci, and teaching formats also contribute to this need. These requirements shape ETH Zurich’s long-term real estate planning and its need for new buildings. ETH Zurich favors versatile buildings that can be readily adapted to new developments and changing requirements. Moreover, it is essential to safeguard the quality of the existing building stock and retain its value. At the end of 2015, ETH Zurich’s real estate portfolio comprised a total of 199 properties and around 462,000 square meters of main usable space. The main locations, Campus Zentrum (91 buildings) and Campus Hönggerberg (44 buildings), account for almost 90 percent of this space. In addition to those two main campuses in Zurich, ETH Zurich operates various satellite facilities in Switzerland and abroad.

Spatial development strategy

The university’s spatial and structural development will be focused on the two main locations, which offer a full range of teaching, research, and service facilities, both providing a shared space for multiple departments (15 departments in Zurich and one in Basell). Since the historic structures of the city and district make for constrained development opportunities on Campus Zentrum, ETH Zurich has earmarked Campus Hönggerberg to meet the bulk of its future spatial requirements. Both main locations follow the spatial planning principle of “internal development before external development”. The resulting densification is efficient both scientifically and economically, as it stimulates the interdisciplinary and creative exchange of ideas between researchers while promoting the shared use of teaching and research infrastructure.

On Campus Zentrum, the new development will focus on the Schmelzberg site. By 2022 at the earliest, a new building for teaching, research, and cooperation in medicine will be built. A cantonal design plan is being developed which ties in with that of the University Hospital and the University of Zurich, and facilitates the coordinated spatial planning of the whole district.

On Campus Hönggerberg, ETH Zurich is looking to densify within its current boundaries to create an attractive multi-use campus for teaching, research, and leisure activities that does not extend into the surrounding landscape. In terms of architecture, the vision for “Campus Hönggerberg 2040” is expressed in the form of a “compact island with portal buildings and appropriate height development”. As the current upper limit for construction at Campus Hönggerberg will already have been reached by 2020, the existing building specifications will need to be revised. As the basis for this adaptation, ETH Zurich has worked closely with the City and Canton of Zurich to develop a Master Plan that builds on the Science City Master Plan of 2005.

Reducing the footprint of buildings

ETH Zurich has gone to great lengths to optimize the environmental efficiency of its buildings. As part of this effort, the standard for energy efficient and ecologically designed buildings, MINERGIE®-ECO, was first applied to the Information and Science Laboratory at Campus Hönggerberg in 2008. Moving forward, ETH Zurich aims to meet the certification of MINERGIE®-ECO for all new buildings and MINERGIE® certification for renovations.

Among the certified new buildings completed within the reporting period 2015/2016 were the HWO and HWW buildings, which together comprise roughly 910 residential units for students and other members of ETH Zurich on the south-western edge of Campus Hönggerberg (both leasehold) and another certified building is the HCP, which provides 154 offices and 230 workstations for interdisciplinary work to the Department of Materials (D-MATL), the Department of Health Sciences and Technology (D-HEST), and the Institute for Microbiology, part of the Department of Biology (D-BIOL).

In early 2016, ETH Zurich’s two new laboratory building projects, the BSS in Basel and the GLC in Zurich, received “Gold” pre-certificates from the Swiss Sustainable Building Council (SGNI). In addition to ecological, economic, and socio-cultural aspects, the standard takes into account the technical, process-specific, and location-specific qualities of a building. The two buildings are scheduled to be opened in 2020.

STAKEHOLDER PERSPECTIVES

We spend 87 percent of our lives in buildings. User-oriented and sustainable construction and operations of buildings can actively promote health, work performance, and job satisfaction. Developing the campus infrastructure on the basis of sustainability principles serves ETH Zurich in the long term and helps us avoid unwanted legacies.

Dominik Brem

Responsible for sustainability and scientific concepts at ETH Zurich’s Public Real Estate Management

In the Zurich region: Lindau-Eschikon, Rüschlikon, Schwerzenbach, Switzerland and other countries: Ascona, Basel, Castasegna, Chamau, Lugano, and Singapore.
Goals: Building efficiency

Implement MINERGY®-ECO standard (or similar) in new buildings and MINERGY® standard (or similar) for renovations

ON TRACK In addition to the MINERGY®-ECO and MINERGY® standards, the SGNI sustainability standard is implemented for laboratory buildings.

In major investment projects, assess costs, energy usage, and emissions over the entire life cycle of the investment. In newly constructed buildings, only state-of-the-art construction standards and energy-efficient construction types are used

ON TRACK Life cycle costs are calculated for bigger projects (new buildings) already in the phase of the architecture competition, by analyzing the different project proposals. Calculations are repeated and monitored along the project realization.

Increase the use of rain water in building projects

NOT ON TRACK Project was suspended in 2015/2016 and will be restarted in 2017.

Energy

The increasing number of students and employees along with new infrastructure requirements for research and education are significant drivers of ETH Zurich’s overall energy needs. Balancing this development with the increasing need for energy is a key challenge that ETH Zurich is facing as an institution with a strong commitment to sustainability. Guided by the university’s comprehensive Energy Concept (“Energieleitbild”, adopted in 2013) and in close coordination between all relevant units and decision-making bodies, ETH Zurich is constantly improving its energy efficiency. The university’s energy-related flagship project is the “Anergy Grid” at Campus Hönggerberg, which is working on ways to revolutionize the heating and cooling system on the campus in the medium and long term. As an institution of the ETH Domain, ETH Zurich is involved in the Federal Administration’s action plan: “The Confederation: Exemplary in Energy”, under which ETH Zurich is committed to the implementation of 39 environmental measures related to energy efficiency.

Energy demand

Direct energy used by ETH Zurich (defined as fuels like natural gas, oil, woodchips burned in own facilities, and production from photovoltaic cells) was 30.2 GWh in 2015 and 33.9 GWh in 2016. Compared to the last reporting period (2013: 31.9 GWh), this is equivalent to an increase of roughly 6 percent. Indirect energy use (defined as electricity and district heating from outside providers) was 135.3 GWh in 2015 and 134.8 GWh in 2016, which is almost identical to indirect energy use in the last reporting period (2013: 134.6 GWh).

The total energy used (electricity and heating) by ETH Zurich was 163.5 GWh in 2015 and 164.7 GWh in 2016. Of this energy, 25.1 GWh in 2015 and 26.8 GWh in 2016 were sold as heating energy to third parties. According to the Swiss Federal Office of Energy SFOE, the energy sold in both years is equivalent to the annual energy consumption of 17,300 households in Switzerland.

Over the past decade, the total electricity demand of ETH Zurich has slightly increased, mainly due to operational costs related to the constant growth in numbers of students and employees along with new infrastructure requirements for research and education. The energy demand increased by 12 percent between 2013 and 2016, compared to the last reporting period (2013: 147.6 GWh).

Environmental statistics

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total energy demand</td>
<td>113.7</td>
<td>111.8</td>
<td>111.6</td>
<td>113.0</td>
<td>111.9</td>
<td>114.4</td>
<td>116.7</td>
</tr>
<tr>
<td>Share from renewable sources (in %)</td>
<td>89</td>
<td>23</td>
<td>24</td>
<td>42</td>
<td>95</td>
<td>98</td>
<td>100</td>
</tr>
<tr>
<td>Total produced on site</td>
<td>2.3</td>
<td>1.1</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Production from combined heat and power unit (until 2013)</td>
<td>2.1</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Production from photovoltaic cells</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Total electricity purchased (ewz/ekz)</td>
<td>110.8</td>
<td>109.9</td>
<td>111.6</td>
<td>112.8</td>
<td>111.6</td>
<td>114.4</td>
<td>115.5</td>
</tr>
<tr>
<td>Electricity purchased for buildings</td>
<td>14.6</td>
<td>18.5</td>
<td>101.5</td>
<td>103.2</td>
<td>104.9</td>
<td>117.2</td>
<td>116.0</td>
</tr>
<tr>
<td>Electricity purchased for Walche heat pump</td>
<td>14.2</td>
<td>11.4</td>
<td>10.1</td>
<td>9.6</td>
<td>6.8</td>
<td>7.2</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Heating (in GWh)

| Total heat demand of ETH Zurich (net energy) | 51.2 | 45.3 | 50.7 | 53.9 | 45.6 | 48.9 | 49.2 |
| Share from renewable sources (in %) | 50 | 63 | 42 | 55 | 59 | 54 | 50 |
| Total heat produced (net energy) | 81.9 | 70.7 | 77.9 | 84.1 | 48.5 | 74.0 | 75.8 |
| Sold heat to third-parties (net energy) | -30.8 | -25.4 | -27.2 | -29.2 | -22.9 | -25.1 | -26.8 |
| Total heat produced (net energy incl. external purchasers) | 81.9 | 70.7 | 77.9 | 83.1 | 68.5 | 74.0 | 75.8 |
| District heating | 11.7 | 11.2 | 21.6 | 21.6 | 17.8 | 20.9 | 19.2 |
| Walche heat pump | 33.9 | 31.5 | 27.3 | 26.3 | 19.4 | 20.2 | 24.6 |
| Fossil fuels
| Gas (excluding gas for CHP electricity) | 38.5 | 28.4 | 25.5 | 31.2 | 27.4 | 27.4 | 33.7 |
| Oil | 0 | 4.2 | 9.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-fossil fuels
| Wood chips | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 |
| From heat recovery | 6.4 | 7.9 | 8.9 | 11.8 | 11.9 | 10.0 | 7.5 |
| Losses during conversion | -9.5 | -11.1 | -11.8 | -8.4 | -8.4 | -7.1 | -10.0 |
| Total heat demand/FTE (kWh/FTE) | 9369.3 | 8554.9 | 8732.5 | 8789.4 | 8186.6 | 7901.9 | 7823.4 |

Relative amounts

| Electricity demand (kWh/FTE) | 6167.1 | 5806.7 | 5826.2 | 5780.7 | 5772.3 | 5671.6 | 5393.2 |
| Gas demand/energy-consuming area (kWh/m²) | 9367.3 | 8554.9 | 8732.5 | 8789.4 | 8186.6 | 7901.9 | 7823.4 |
| Total energy demand (kWh/m²) | 242.0 | 233.9 | 241.1 | 242.7 | 242.7 | 238.5 | 233.5 |
| Emissions of CO₂ (in tonnes CO₂eq)
| Total CO₂eq emissions | 27,860 | 26,241 | 28,623 | 26,658 | 27,344 | 29,111 | 27,215 |
| Direct CO₂eq emissions (Scope 1) | 7804 | 4937 | 4055 | 5620 | 5521 | 6656 | 6899 |
| Gas and district heating | 5 | 0.5 | 1109 | 2088 | 11 | 5 | 0.6 |
| Oil | 0 | 1109 | 2088 | 11 | 5 | 0.5 | 161.7 |
| Fossil fuels
| Gas (excluding gas for CHP electricity) | 38.5 | 26.6 | 25.5 | 31.2 | 27.4 | 27.4 | 33.7 |
| Oil | 0 | 4.2 | 9.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-fossil fuels
| Wood chips | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 |
| From heat recovery | 6.4 | 7.9 | 8.9 | 11.8 | 11.9 | 10.0 | 7.5 |
| Losses during conversion | -9.5 | -11.1 | -11.8 | -8.4 | -8.4 | -7.1 | -10.0 |

Based on the SFOE study “Typischer Haushalt-Größenvorlauf”, Pflaznitzer 2013, the average energy consumption of a typical household in Switzerland is assessed as 2030 kWh.
employees, and electricity-intensive activities related to education and research. The share of total heating demand, in turn, has decreased due to the comparably warm winters, renovations of old buildings, and the operation of newly established efficient buildings with high standards.

The normalized energy demand (by energy-consuming area) was 239 kWh/m² in 2015 and 224 kWh/m² in 2016 (rounded). Per fulltime employees and students, it was 7902 kWh in 2015 and 7823 kWh in 2016 (rounded). While normalized energy demand by energy-consuming area has remained stable over the past decade, a significant improvement can be identified at the level of the normalized energy demand by fulltime equivalent: between 2010 (9370 kWh/FTE) and 2016, there has been a decrease of roughly 20 percent.

Anergy Grid at Campus Hönggerberg

With the Anergy Grid, ETH Zurich is building a dynamic underground storage system in an effort to significantly reduce CO₂ emissions from heating and cooling at Campus Hönggerberg. While the technology used is by no means new, the size and complexity of this project are unparalleled. The first phase of construction began in 2003 and was completed in 2012. The project aims to decrease the CO₂ emissions from an initial value of 9200 metric tonnes CO₂ per year (baseline 2006) to 4600 metric tonnes CO₂ per year (50 percent of 2006). The target value will most probably be achieved by 2020. The figure on page 53 vividly contrasts the impact of the Anergy Grid with a “business-as-usual” forecast, accounting for planned renovations and infrastructural developments on Campus Hönggerberg.

VBE action plan and progress reporting

As an institution of the ETH Domain, ETH Zurich is involved in the action plan “The Confederation: Exemplary in Energy” (VBEI), along with the Federal Administration and the enterprises affiliated with the Confederation, i.e., Swiss Post, SBB, Skyguide, and Swisscom. In adherence to this action plan, ETH Zurich is committed to the implementation of 39 environmental measures related to energy efficiency. The VBE stipulates that the institutions involved must become 25 percent more energy efficient by 2020 (compared to 2006). The VBE was launched in 2014. Since then, annual progress reports have been published, which are available at www.energie-vorbild.admin.ch.

Total energy demand per FTE (final energy) → G4-ENS

Total energy demand per energy-consuming-area (final energy) → G4-ENS

CO₂ emissions from heating and cooling at Campus Hönggerberg

in metric tonnes CO₂ per year
Goals: Energy

Continue to encourage energy-related dialog with employees, students, and the public

ON TRACK The university’s Safety, Security, Health and Environment (SSHE) department has broadly promoted ETH Zurich’s comprehensive guideline document “Our commitment”, which outlines the policies and measures for energy efficient behavior at the university. The website documenting the operational environmental management has been updated with additional information on energy and other related aspects (see www.ethz.ch/umwelt).

For operation of the energy supply system at Campus Hönggerberg (Energy Grid), ETH Zurich will use energy from sources that comply with high ecological standards

ON TRACK Within the reporting period, more than 4 GWh/ year of “nature-made star” (certified renewable) electricity was purchased for the supply of the Energy Grid and ETH Campus Hönggerberg.

Optimize heat recovery from chillers plants

NOT ON TRACK Heat recovery has decreased by 25 percent, from a total of 20.85 GWh in the previous reporting period (2013/2014) to a total of 16.9 GWh in the current reporting period (2015/2015), with 9.1 GWh in 2015 and 6.5 GWh in 2016. Reasons for this decrease were temporary outages or reparations.

Implement first phase of "Master Plan for Energy Concept" at Campus Zentrum

ON TRACK Further scenarios for the master plan were assessed and developed during the reporting period 2015/2016. The submission for the cooling network in Campus Zentrum will be submitted in early 2017 and implemented in 2018. The feasibility study for the use of lake water for cooling purposes was finalized, together with the partners University Hospital and University of Zurich. The Walche heat pump will be shut down by 2017.

Implement new "Energy Concept for Operational Optimization" by 2020

ACHIEVED In February 2015, a new position for operational optimization (Fachstelle Betriebsoptimierung) was established at the Facility Management department. The concept has been implemented in the management process and has been operational since 2016, ahead of schedule.

Mobility and emissions

Global warming is one of the most pressing challenges of sustainability. While climate change is one of the university’s core research topics, ETH Zurich is critically monitoring its own carbon footprint. The university’s biggest challenge is posed by the increasing CO₂ emissions caused through international air travel. This trend exemplifies a conflict of objectives: As ETH Zurich goes to great lengths to decrease its environmental footprint, international partnerships are pivotal for the advancement of science and technology. To cope with this dilemma, ETH Zurich actively promotes the use of alternatives to international networking, such as video conferencing and the provision of the respective infrastructure. In 2016, the university also launched a mobility platform with the aim of developing and coordinating a comprehensive mobility management strategy for ETH Zurich. ➔ G4-DM

Carbon accounting

As part of its environmental management, ETH Zurich collects information on its CO₂ footprint on an annual basis. Following the categories of the Green House Gas (GHG) Protocol, ETH Zurich reports direct and indirect emissions grouped into three “Scopes”: Scope 1 emissions refer to direct greenhouse gas emissions from owned or controlled sources. Scope 2 emissions are indirect greenhouse gas emissions from the generation of purchased energy. Scope 3 includes all other indirect greenhouse gas emissions that are generated in the value chain, including both upstream and downstream emissions.

The increase in absolute terms is primarily a result of spatial developments and the constant increase in employee and student numbers over the past decade.

Scope 1: Direct greenhouse gas emissions

In 2015 and 2016, Scope 1 emissions (mainly from fossil fuels like natural gas burned in our facilities) were 7174 and 7578 t CO₂ eq respectively. Compared to the previous reporting period (2013: 5693 t CO₂ eq and 2014: 6043 t CO₂ eq), the total Scope 1 emissions increased by 26 percent. ➔ G4-EN15

Scope 2: Indirect greenhouse gas emissions

In 2015 and 2016, Scope 2 emissions (mainly from purchased current) were 1555 and 1563 t CO₂ eq, respectively. Compared to the previous reporting period (2013: 1585 t CO₂ eq and 2014: 1471 t CO₂ eq), the total Scope 2 emissions increased by 2 percent. ➔ G4-EN15

Scope 3: Other indirect greenhouse gas emissions

In 2015 and 2016, Scope 3 emissions (mainly from commuter traffic, business travel, and emissions from car fuel of ETH Zurich’s own car fleet) were 20,382 and 18,074 t CO₂ eq, respectively. The accounts for business travel do not include students, but only employees and invited guests of ETH Zurich. ➔ G4-EN17

ETH Zurich is not only one of the largest universities in Switzerland, but also one of the major employers in the Zurich area. More than 25,000 students and employees commute to, from, and between the various campuses and sites of the university on a daily basis. As three out of four use public transport, the emissions associated with their commutes are rather modest. In contrast, the emissions caused by business travel (in particular international air travel) accounted for almost 60 percent of the university’s total CO₂ footprint in 2016. Sustainability being a fundamental principle of campus development and operations, the university launched a Mobility Platform in 2016 with the aim of setting up a comprehensive mobility management strategy for the university. Operating as a hub for all questions related to mobility, it addresses three major types of mobility: (1) campus mobility, (2) business travel, and (3) logistics. “If we want to harmonize the conservation of resources with campus development, we need to develop holistic and sustainable solutions for mobility”, explains Ulrich Weidmann, Vice President for Human Resources and Infrastructure, who initiated the Mobility Platform.

Learn more about the Mobility Platform: www.ethz.ch/mobility

3 All emission specific measurements were documented and verified with SALOVEDA software according to the Green House Gas (GHG) protocol. Emissions from purchased electricity were assessed through documentation of the supplier.
Goal: Emissions

Reduce direct CO₂ emissions on Campus Hönggerberg by 50 percent by 2020 (4,000 t CO₂eq per year) through the implementation of the "Energy Concept Campus Hönggerberg" based on geothermal storage systems (base year 2006)

Business travel in detail

By far the main driver of ETH Zurich’s Scope 3 emissions is business travel (18,378 t CO₂eq in 2015 and 16,070 t CO₂eq in 2016). It currently represents 59 percent of ETH Zurich’s total CO₂ emissions. In 2016, 94 percent of all business travel emissions were caused by international air travel, while the remaining five percent were caused by car and one percent by train travel. The most frequent long-distance flight destinations (2016).

Absolute increase, relative decrease

Over the course of the last ten years, absolute CO₂ emissions caused through car and train travel have remained relatively stable. Absolute CO₂ emissions caused by air travel, in turn, have steadily increased by 27 percent between 2006 (12,704 t CO₂eq) and 2015 (17,472 t CO₂eq). However, there was a significant 13 percent decrease in absolute CO₂ emissions related to international air travel between 2015 and 2016 (15,161 t CO₂eq). In relative terms, CO₂ emissions associated with international air travel decreased by 24 percent between 2010 and 2016, from 1 t CO₂eq to 0.76 t CO₂eq per full-time equivalent.

NOTE Around 30 percent of all flights associated with ETH Zurich’s employees and invited guests (not students) are documented in the AirPlus tool. The calculation of ETH Zurich’s overall air travel related CO₂ emissions is thus based on an extrapolation of the documented 2500 annual flights (on average). Emission factors for air travel, train travel, and car travel have been adjusted since the last report, including a retroactive estimation. Therefore, numbers may vary between this report and previous reports: Until 2013, the emission factor for air travel was assessed as 230 g CO₂eq/km. As the air travel data provided through the AirPlus tool and Mobilo tool allows for a more precise estimation accounting for travel distance, destination, and varying Radiative Force Indices (RFI), an ETH Zurich-specific emission factor of 272 g CO₂eq/km since 2014 was defined. On the basis of a new estimate of the Swiss Federal Railways (SBB), emissions factors for train travel have been adjusted from 40.5 g to 25.4 g CO₂eq/km, accounting for both national and international train travel. Due to an increase in efficiency, the emissions factor for car travel has been adjusted from 210 g CO₂eq per passenger kilometer to 197 g CO₂eq per passenger kilometer (estimates based on 1.6 passengers per car).

Goals: Mobility

Limit air travel and promote the use of alternatives to international networking

Optimize public transportation between Campus Zentrum and Campus Hönggerberg

Other emissions

ETH Zurich closely monitors volatile organic compound (VOC) emissions caused by its laboratory activities. In 2015, VOC emissions amounted to 52.7 t CO₂eq. Since 2006, the total use of solvents has increased by 54 percent, causing a total of 92.1 t CO₂eq in 2015. Emissions caused by printing, estimated at roughly 290 t CO₂eq per year (Scope 3), are compensated through the acquisition of CO₂ certificates of the British Standards Institute (BSI), which in turn invests in projects for sustainable energy production.
Goals: Paper consumption

Paper consumption

Despite the ongoing process of digitalization, the consumption of large quantities of paper remains common practice at universities. To mitigate the environmental impact, ETH Zurich focuses both on reducing the quantity of paper consumed and on lowering the environmental impact of the paper that is used. Where possible, ETH Zurich encourages the use of electronic documents. → G4-DMA

Cutting use of paper

In 2015, 34.7 million pages were printed on campus. That amounts to a decrease of 42 percent since 2007 (60.3 million pages). Per fulltime equivalent, the decrease between 2007 and 2015 is at 63 percent. Over the course of the last decade, ETH Zurich has been using very high shares of recycled and Forest Stewardship Council (FSC) certified paper, reaching a total of 99.7 percent in 2015, compared to 98.5 percent in 2007. The paper use indicated above is calculated on the basis of orders through ETH Zurich’s Office Supplies Shop and the Printing Center. → G4-EN12

Reduce paper consumption continuously

| ON TRACK | The absolute use of paper has decreased by 42 percent since 2007, and by 63 percent per fulltime equivalent. |

Increase the proportion of recycled paper

| ON TRACK | In 2015, 99.7 percent of the paper used on campus was recycled or certified by the Forest Stewardship Council (FSC). |

Roll out new ETH Print Service to increase printing efficiency

| IN PROGRESS | By the end of 2016, a total of 579 printers equipped with the pull-print-option were available for use on campus. The number of printed pages per capita has decreased from 300 pages in 2014 to 230 pages in 2016. Eighty percent of all print jobs were printed double sided. The share of color prints was at 60 percent in 2016. |

Expand eco-friendly stationery assortment

| IN PROGRESS | Starting from 2017, the previously used grey recycling paper will be substituted with white ISO certified recycling paper that complies with all relevant eco-labels, including FSC and "Der blaue Engel". |

Goals: Recycling and waste

Recycling and waste

Within its various facilities and diverse activities, ETH Zurich generates a significant volume of waste. With a view to the environmental impact associated with waste, ETH Zurich is committed to developing sustainable solutions to waste management. Wherever feasible, the university aims to divert as much as possible of this waste away from mainstream disposal into recycling streams. The importance that ETH Zurich devotes to this matter is also reflected in the various awareness campaigns organized on campus, such as the "Recycling Days" or the "Waste Disposal Week", the latter of which was organized in 2016 for the first time. → G4-DMA

Redirecting waste stream

The overall goal of directing 50 percent of the waste volume into recycling streams was not achieved by the end of 2016. Depending on the building area and the corresponding material consumption requirements, the recycling quota varied between 17 and 100 percent. Considering the total waste volume of 2292 t in 2015 and 2016, university-wide recycling quotas of 47 percent (1087 t) and 37 percent (740 t) were reported. The remaining non-recyclable operational waste (1205 t in 2015 and 1264 t in 2016) was combusted. The waste volume generated at ETH Zurich has been slowly increasing over the past years due to the steady growth in student and employee numbers. → G4-EN12

Disposing of hazardous waste

In dealing with hazardous waste, ETH Zurich takes strict safety precautions. Special training is given to ensure that employees and students have a clear understanding of disposal practices and can implement them safely. In 2015 and 2016, ETH Zurich disposed of 101.9 and 112.0 t of hazardous waste. Of this total volume, 63.0 t and 65.8 t were solvents.

Goals: Waste

Host "Recycling Days" on campus

| ON TRACK | ETH Zurich’s Facility Management department hosted "Recycling Days" on campus in both 2015 and 2016. The first campus-wide “Waste Disposal Week” was held in 2016. |

Direct 50 percent of total waste materials to a recycling stream

| NOT ON TRACK | The target of 50 percent for ETH Zurich as a whole was not achieved by the end of 2016. Within the reporting period, the recycling quota varied between 17 and 100 percent – depending on the building area – resulting in an overall quota of 47 percent in 2015 and 37 percent in 2016. |

Establish a concept for recycling data media, hardware, and other IT infrastructure

| ACHIEVED | Decommissioned IT equipment is warehoused and can be purchased by employees. Remaining equipment is prepared for external sale by a broker. |
First campus-wide Waste Disposal Week

In their various daily activities on campus, more than 25,000 members of the growing ETH community generate an increasing volume of waste ranging from paper and PET bottles to electronic devices or laboratory chemicals. For ecological and economic reasons, but also in light of spatial constraints, ETH Zurich operates an efficient system of waste management, as outlined in the university’s comprehensive Waste Disposal Concept. The responsible unit, the university’s Facility Management department, has organized “Recycling Days” in selected building areas since 2013. In 2016, the department organized the first campus-wide “Waste Disposal Week”, during which a total of almost 80 tonnes of waste were collected, including almost 15 tonnes of metal waste and 13 tonnes of electronic waste. “We organized the week to raise awareness of the limited room available and to create more space by clearing out unused equipment and waste. We received very positive feedback for the campaign”, concludes Kurt Spring, Project Specialist at the Facility Management department of ETH Zurich.

Learn more about the Waste Disposal Week: www.ethz.ch/waste-disposal-week

---

Food

While the implications of nutrition on individual health are taken for granted, there is less awareness of the effect that food has on the environment. As the production and consumption of food is an essential contributor to the global carbon footprint, it plays an increasingly important role in ETH Zurich’s sustainability approach. In close exchange with the catering companies on campus and other relevant units such as the university’s Catering Commission, the university is developing solutions backed by its core competencies in education and research. → GuEn32

Sustainable Catering at ETH Zurich

The average of more than 8000 main meals served on a daily basis in all restaurants on campus make the university’s system catering a considerable contributor to the overall carbon footprint of ETH Zurich. According to estimates, each meal is associated with 3 kg CO2eq on average. Looking at 200 days of full operation per year, the overall CO2 emissions through catering at ETH Zurich correspond to 4800 tonnes CO2eq per year. Against this backdrop, ETH Zurich designed the internationally noted “Sustainable Catering” project that temporarily transformed major campus canteens into “living labs”. This project involved multiple university stakeholders, from students to members of the Executive Board, and was coordinated by ETH Seed Sustainability together with the World Food System Center. The aim was to test solutions to minimize environmental impact while safeguarding sales and consumer health. During its four phases, the project integrated consumer behavior studies and life cycle assessments. The results were translated into caterer recommendations, including (a) the promotion of climate-friendly meal choices, (b) the measurement and reduction of food waste generated by guests, (c) the fostering of healthy and sustainable diets, and (d) recommendations for academic institutions regarding a voluntary, systemic framework for reducing greenhouse gas emissions. The latter includes target-setting for campus caterers and a standardized monitoring and incentive scheme.

STAKEHOLDER PERSPECTIVES

Our nutrition causes a fair amount of greenhouse gases and other environmental impacts.

As those responsible for catering, we understand ourselves as ambassadors for our customers. With our sustainability-related activities, we would like to raise their awareness of the fact that they can help decrease the environmental impact with their food choices.

Marcel Zurbuchen
Coordinator Partner Organisations, Financial Services

Food

Development of a general set of criteria for assessing the climate-friendliness of offerings in the catering industry

ACHIEVED: During the fourth phase of the “Sustainable Catering” project, recommendations on how to measure the CO2 equivalent footprint of menus were elaborated. These recommendations are part of a systemic framework to reduce emissions caused by the catering industry.

---

HIGHLIGHT

Caretakers Thomas Wick (left) and Roger Peter of the Facility Management department during the Waste Disposal Week 2016.
Governance and Finance

Finances

ETH Zurich operates a sustainable financial policy. It has a financial plan covering a period of several years, and takes a long-term approach to balance sheet management to ensure that it can meet its existing obligations. The university uses the third-party funding it attracts to expand its research activities or to implement planned investments and research projects more quickly. In doing so, ETH Zurich safeguards its freedom in teaching and research as well as the strategic and financial scope it has within the limits of the federal financial contribution (global budget). The ETH Domain is managed on the basis of the performance mandate, the term and content of which are tailored to the funding approved by the Federal Government. The ETH Board allocates the funds to the two Federal Institutes of Technology in Zurich and Lausanne and the four research institutions under the objective agreements derived from the performance mandate. The share of the federal financial contribution (global budget) granted to ETH Zurich amounted to 1224 million CHF (2015) and 1247 million CHF (2016). This amounts to 74 percent of the total income in 2015 (1651 million CHF) and 73 percent of the total income in 2016 (1700 million CHF).

Asset management

With its publicly funded budget granted by the Federal Government, the Swiss National Science Foundation, and the European Union, ETH Zurich’s financing model differs significantly from the Anglo-Saxon “private university” model. None of the public funds ETH Zurich is entrusted with are invested on the market. The financial assets held are obtained in particular by funds collected from third parties that will not be used immediately. Based on the applicable treasury agreement and the investment guidelines stipulated by the ETH Board, these funds are placed in the market or with the Federal Government. The third-party funds placed in the market are managed by Swiss banks under asset management mandates. The associated profits amount to less than one percent of the university’s total annual revenue. Therefore, this represents a small impact when compared to the systemic impact of major institutional investors (e.g., pension funds). ETH Zurich’s Vice President for Finance and Controlling oversees asset management in coordination with the university’s Investment Commission, which consists of professors and other executive staff of ETH Zurich. Sustainability-related aspects are taken into account in asset management decisions.

Increasing accuracy and confidence alike

Since 1 January 2015, ETH Zurich’s annual financial statements have been prepared in alignment with the International Public Sector Accounting Standards (IPSASs), as is the case with all institutions of the ETH Domain. These internationally recognized standards aim to improve the quality, transparency, and comparability of financial accounting and reporting. Income and costs have since been recognized in the period in which economic resources are created (revenue) or consumed (expenses) (accrual accounting), rather than solely at the date when ETH Zurich receives the funds (cash accounting). This is particularly relevant for research projects spanning several years or long-term infrastructure investments, and will allow a more effective communication with the Federal Council and Parliament. It also enhances public transparency on how ETH Zurich uses the entrusted funds.

Guide for Sustainable Procurement

A considerable share of the university’s expenses are used for procurement of goods and services. Acting as a role model, ETH Zurich launched a “Guide for Sustainable Procurement” covering economic, environmental, and social criteria as part of its comprehensive Procurement Policy. The guide contains a checklist evaluating goods along the entire life cycle, from raw material extraction and production, use, and maintenance to recycling and disposal. The guide also gives an overview of procurement areas as diverse as facility management, office supplies, vehicles, air travel, ICT, or catering. It indicates the relevant contact persons within ETH Zurich and lists recommended quality criteria, i.e., labels.

For additional information, please refer to the chapters “Governance and sustainability”, “Finance”, and “Annual financial statements” of the Annual Report.
Innovative construction: All under one roof

Two new buildings on Campus Hönggerberg demonstrate a commitment to sustainable architecture and construction, and illustrate how ETH researchers work together to pool their assets and make efficient use of existing resources.

Since the turn of the millennium, the student body at ETH has grown by 70 percent. To deal with this surge, the university is developing its campus on the Hönggerberg outside the city center. Two new building projects – the House of Natural Resources (HoNR) and the Arch_Tec_Lab – showcase sustainable construction. When it comes to stewardship of resources, ETH researchers practice what they preach. Their sustainable building concepts are tested on campus as a way of transferring sustainability know-how to the broader public in the form of a “living lab”.

Though Campus Hönggerberg is expansive, the planners of the Institute for Technology in Architecture (ITA) condensed the space there by building the Arch_Tec_Lab, a zero-emissions research and administration center, on top of an underground parking garage. Among the ITA’s research topics are innovative uses of digitalization and robotics in construction. Thus, the research group was equally interested in the process of building and in the structure of the building itself.

Despite its impressive design, many visitors will not even notice the sweeping roof of the ITA’s new home. From the outside, it’s not immediately visible; but at the upper level of the Arch_Tec_Lab, the sight is breathtaking. The self-supporting structure of the building holds up the entire roof, assembled from 168 separate wood lattice girders, without central load-bearing struts, creating a versatile space that can be adapted and repurposed to meet new requirements for decades to come. Currently, it houses the Robotic Fabrication Laboratory as well as offices and classrooms.

This big roof also symbolizes the transdisciplinary approach of the research community assembled beneath it. The complex 2300-m² free-form structure was designed and constructed with the help of computer algorithms and robots that assembled 48,624 wooden elements to precise specifications, showcasing how close integration of the planning and construction phases opens up new possibilities. Digitalization can bridge a divide between planning and artisanship, according to Prof. Sacha Menz of the Department of Architecture and Building Process: “Plans and building data must also take into account the construction phase. All parties involved, from the architect and the engineers to the contractor, will have to rethink the way they go about their work.”

A second showcase for ETH expertise on Campus Hönggerberg is the House of Natural Resources (HoNR), an annex to the Laboratory of Hydraulics, Hydrology and Glaciology (VAW). Here, too, wood figures prominently – as the building’s name suggests, the focus is squarely on the construction material. In recent years, timber has become an increasingly popular structural material as a renewable, climate-friendly resource, and due to advances in CNC technology, wooden beams and joists can be cut with utmost precision.

The HoNR features several innovative elements that could set new standards in timber frame construction. The first is the choice of material: Though wooden buildings elements are usually made from conifers, the HoNR was largely built from wood from deciduous trees; while the former are easier to work, broadleaf trees are becoming increasingly prevalent in Swiss forests due to climate change.

The second pioneering element is the construction itself. The structural “skeleton” consists of ash-wood columns and beams from spruce and ash. Cables running through the beams provide safety and stability; fixed sensors monitor the cables’ tension. The floor is a unique composite slab made of concrete and Swiss beech-wood. The four-centimeter thick wood plate, which serves as formwork and as steel reinforcement for the concrete, is rigidly joined through notches cut into the beech-wood plates with a 16-centimeter-thick concrete slab, giving it similar characteristics to those of reinforced concrete flat slabs. All walls are non-load bearing and can be positioned as required, allowing for a flexible floor plan. An adaptive solar facade supplies power for heat and cooling.

The HoNR has won the European forestry and timber industry’s Schweighofer Prize as well as the Prix Lignum for innovative, high-grade use of beech-wood in buildings. Research continues as researchers monitor the behavior of the timber frame. Prof. Andrea Frangi of the Institute of Structural Engineering, who focuses on timber structures at the ETH Department of Civil, Environmental and Geomatic Engineering, says: “There is a great potential for building with wood in Switzerland. Hopefully, our ideas will be taken up by the construction sector and developed into new projects.”

For more information about the two buildings, please visit www.ita.arch.ethz.ch/archteclab.html and www.honr.ethz.ch.

The computer-assisted design, preparation, and assembly of the Arch_Tec_Lab roof required seamless integration between the planning and building phases.
This chapter underlines the value that ETH Zurich attaches to the dialog with society and describes the various channels of interaction the university uses to maintain this exchange. It also shows how ETH Zurich partners with decision-makers from the public and the private sector in Switzerland and beyond. The chapter concludes with an Insight on the first Cybathlon, the internationally perceived competition for people with disabilities supported by modern assistive technology.

The chapter covers Principle 3 of the ISCN/GULF Sustainable Campus Charter.
Informing the interested public

The transfer of knowledge and technology for the benefit of society at large is one of ETH Zurich’s core mandates. In line with this responsibility, ETH Zurich has developed various channels and formats to provide information in an objective and comprehensible way. Newly developed formats like the “Cybathlon” or the established “Treffpunkt Science City” are very well received and provide a valuable platform for the enrichment of the wider public and researchers alike.

Scientifica 2015: Drawn to the light

Building on previous successes since 2011, the fourth edition of Scientifica attracted more than 25,000 visitors to attend the two-day program jointly organized by ETH Zurich and the University of Zurich. True to its theme of “Light”, the 2015 edition of Scientifica illuminated a wide range of related research issues with over 60 exhibition stands, panel discussions, Science Cafés, and around 50 special events, including science slams, science shows, and talks.

Zukunftsblog: Leading the digital debate

With more than 70 contributing authors, the Zukunftsblog has become a highly recognized online resource for the broad communication of research findings on the university’s core research themes in the field of sustainable development: future cities, natural resources, the world food system, energy, and climate change. The roughly 100 contributions per year are written by professors and students of ETH Zurich, as well as by guest authors from politics, public administration, business, or NGOs. As a result of an online survey among German science blogs, ETH Zurich’s Zukunftsblog was awarded the 2nd place in the “Science Blog of the Year 2016” competition.

Visitor tours: Discovering ETH Zurich

Upon request, ETH Zurich offers guided tours for groups who are interested in learning more about the institution and its history. In 2016, the Office for Events and Services organized roughly 170 guided campus tours for more than 4000 people from all over the world. In addition, on Tuesday evenings during the semester, visitors can attend free tours like “Hello Albert Einstein” – perhaps the most prominent alumnus of ETH Zurich – or a site visit to the pioneering “Arch_Tec_Lab” on Campus Hönggerberg, to discover the future of architecture.

Ten years of Treffpunkt Science City

Since its launch in 2006, Treffpunkt Science City has developed into a real success story as the biggest of ETH Zurich’s public outreach formats. This continuously developed program, consisting of lectures, exhibitions, talks, and laboratory visits for all age groups, attracted up to 20,000 visitors from the wider public to the university campus in 2016 alone. With two editions every year, Treffpunkt Science City provides firsthand information on research and technology in areas of societal relevance, such as mobility, health, or the use of natural resources. Since 2016, all lectures and talks are recorded and made available online. The rich online content has been well-received, and has since been streamed more than 10,000 times. “We are delighted to see how the free educational offerings provided by Treffpunkt Science City are continuously appreciated, by young and old alike”, says Inge Keller-Hoehl, Program Manager of Treffpunkt Science City.

Learn more about Treffpunkt Science City: www.treffpunkt.ethz.ch

Goals: Dialog

By maintaining various channels of dialog, strengthen public understanding of the importance of fundamental and engineering sciences for politics, business, and society

ON TRACK Various formats are in place and under development to support the dialog with decision-makers, the interested public, and other stakeholders inside and outside of ETH Zurich (see table on pages 70–71).

Provide services for the benefit of the whole country by fulfilling diverse national tasks

ON TRACK ETH Zurich directs its scientific and technical expertise to public service tasks on behalf of the Federal Government, including the Swiss Seismological Service (SED), the Swiss Economic Institute (KOF), the Center for Security Studies (CSS), the Centro Svizzero di Calcolo Scientifico (CSCS), the ETH Library, the Centro Stefano Franscini, Atlas der Schweiz, and the National Center for Climate Services (NCCS), and contributes to the maintenance of Swiss cultural goods, including the Collection of Prints and Drawings, the Archives of Contemporary History, the gta Archive, the Warmer Deochlin Library Foundation, and the Thomas Mann and Max Frisch Archives.
## Summary of channels for internal and external dialog

<table>
<thead>
<tr>
<th>Dialog mechanism (frequency)</th>
<th>Stakeholder groups</th>
<th>Topics addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ETH-Rat Dialog-Meetings – ETH Board Dialog-Meetings (annually)</strong></td>
<td>Members of the ETH Board, Executive Board of ETH Zurich</td>
<td>Dialog between the ETH Board and the Executive Board of ETH Zurich on strategic planning</td>
</tr>
<tr>
<td><strong>Deutschsprachige Universitätssprecherkonferenz (DUSK) – Conference of the Heads of Department</strong></td>
<td>Heads of the 16 departments of ETH Zurich, director CSCS, director CCES and other permanent guests</td>
<td>Information exchange between the Executive Board of ETH Zurich and the Heads of Department</td>
</tr>
<tr>
<td><strong>Gesamtkonferenz der Lehrkörper – General Faculty Conference (annually)</strong></td>
<td>All lecturers of ETH Zurich</td>
<td>Advising the Executive Board of ETH Zurich with regards to educational matters, strategic issues, or organizational decisions</td>
</tr>
<tr>
<td><strong>Konferenz der Lehrkörpers inkl. Ausschuss der Konferenz der Lehrkörpers (KdL) – Lecturers’ Conference (annual meetings and based on demand)</strong></td>
<td>Members of the Lecturer’s Conference (KdL), the Academic Association of Scientific Staff (AVETH), the Association of ETH Students (VSETH) and the Staff Commission (PaHa)</td>
<td>The University Assembly provides advice to the Executive Board of ETH Zurich and advisory opinions to the ETH Board</td>
</tr>
<tr>
<td><strong>Studentskonferenz – Conference of the Directors of Study</strong></td>
<td>Directors of Studies of all study programs</td>
<td>Exchange about study programs, curricula, and exam regulations. Advising the Rector of ETH Zurich</td>
</tr>
<tr>
<td><strong>Dialog mechanisms for selected stakeholders</strong></td>
<td><strong>Industry Day (annually)</strong></td>
<td>Industry representatives</td>
</tr>
<tr>
<td><strong>Partnership Councils (based on demand)</strong></td>
<td>Decision-makers from public and private sector</td>
<td>Supporting some of ETH Zurich’s competence centers by integrating practitioner perspectives and ensuring the dissemination of research findings</td>
</tr>
<tr>
<td><strong>Lokaltermine des Präsidiums (annually)</strong></td>
<td>Selected decision-makers from public and private sector, donors</td>
<td>Topics of common interest for ETH Zurich and the private sector</td>
</tr>
<tr>
<td><strong>Diverse alumni specific activities and events (based on demand)</strong></td>
<td>Alumni</td>
<td>Networking and career support</td>
</tr>
</tbody>
</table>

### ETH Zurich Sustainability Report 2015/2016

**Conference of the Directors of Study**

*Studienkonferenz –* (annual meetings and based on demand)

- Directors of Studies of all study programs
- Exchange about study programs, curricula, and exam regulations.
- Advising the Rector of ETH Zurich

**Deutschsprachige Universitätssprecherkonferenz (DUSK)**

*Conference of the Heads of Department* (at least one time per semester, additional meetings based on demand)

- Heads of the 16 departments of ETH Zurich, director CSCS, director CCES and other permanent guests
- Information exchange between the Executive Board of ETH Zurich and the Heads of Department

**Gesamtkonferenz der Lehrkörper – General Faculty Conference (annually)**

*All lecturers of ETH Zurich*

- Advising the Executive Board of ETH Zurich with regards to educational matters, strategic issues, or organizational decisions

**Konferenz der Lehrkörper inkl. Ausschuss der Konferenz der Lehrkörper (KdL)**

*Lecturers’ Conference (annual meetings and based on demand)*

- Members of the Lecturer’s Conference (KdL), the Academic Association of Scientific Staff (AVETH), the Association of ETH Students (VSETH) and the Staff Commission (PaHa)
- The University Assembly provides advice to the Executive Board of ETH Zurich and advisory opinions to the ETH Board

**Studentskonferenz – Conference of the Directors of Study**

*Three meetings per semester and based on demand*

- Directors of Studies of all study programs
- Exchange about study programs, curricula, and exam regulations.
- Advising the Rector of ETH Zurich

**Dialog mechanisms for selected stakeholders**

*Industry Day (annually)*

- Industry representatives
- Topics of common interest for ETH Zurich and the Industry sector

*Partnership Councils (based on demand)*

- Decision-makers from public and private sector
- Supporting some of ETH Zurich’s competence centers by integrating practitioner perspectives and ensuring the dissemination of research findings

*Lokaltermine des Präsidiums (annually)*

- Selected decision-makers from public and private sector, donors
- Topics of common interest for ETH Zurich and the private sector

*Diverse alumni specific activities and events (based on demand)*

- Alumni
- Networking and career support

---

2 In addition to the online communication on the level of the institution, other units of ETH Zurich maintain their own channels.
Informing decision-makers

ETH Zurich is a crucial partner for decision-makers from the public and private sectors in Switzerland and beyond. In this role, the university acts as a highly esteemed partner on the one hand, but also as a bearer of great responsibility. Contributions to public debates or recommendations to inform decision-making must meet the highest standards of scientific rigor and must be independent of political circumstances. ETH Zurich regularly organizes events aimed at decision-makers and maintains various channels of exchange.

Science meets industry

Since 2013, the annual “Industry Day” has showcased the research activities of ETH Zurich and offered a platform for industry representatives to engage with the university’s leading researchers. The prospect of gaining firsthand information on future research directions and innovation on topics like nutrition, energy, systems biology, or personalized medicine has attracted a broad range of industry experts, with a record high of 550 participants in 2016.

Directions in climate change research

First organized in 2013, the “Klimarunde” climate talks at ETH Zurich are an annual venue for climate experts to meet for debates and encounters with decision-makers from various sectors. The program is twofold: The “Tischgespräche” (table talks) are mini-symposia, with experts in climatology and related disciplines making themselves available for meetings with visitors, while the “Podiumsgespräche” (panel talks) follow a more traditional format of panelists engaged in debate over various technical issues and innovations affecting the climate, such as energy, building technology, or transportation, as well as societal aspects, including policy-making and governance. In 2015, the overarching theme was “Vision Zero: Pathways to a CO₂ neutral society”. The 2016 edition of the Klimarunde was headlined “The Globalized Climate Change: How is it affecting us?”.

Science meets policy

Co-organized by the Swiss Academy of Sciences (SCNAT) and the Competence Center Environment and Sustainability (CCES) of the ETH Domain, a high-profile stakeholder workshop was organized to analyze the science-policy interface. Participants at the event, which took place at ETH Zurich in November 2015, included 45 personalities from politics, public administration, business, science, and from the science-policy interface itself. The workshop aimed at identifying strategies and institutional prerequisites for improving the dialog between science and politics, particularly with respect to complex scientific issues. Landmark decisions in favor of the energy transition in Switzerland served as case studies that focused the group discussions on catalysts of successful interaction, as well as obstacles to knowledge transfer.

For additional information, please refer to the chapter “Industry and society” of the Annual Report.

STAKEHOLDER PERSPECTIVES

Scientific findings generated at ETH Zurich and other universities are the indispensable foundation for solutions of the pressing problems of our times. They facilitate the fact-based assessment of decision-making options, and foster innovation. In that sense, they contribute substantially to social, economic, and environmental development.

Corine Mauch
Mayor of Zurich and alumna of ETH Zurich
Cybathlon: Overcoming barriers with hi-tech

At the Cybathlon, pilots and their research teams competed in obstacle courses representing the everyday challenges that people with disabilities must overcome.

The crowd cheered as Florian Hauser of Swiss team HSR Enhanced crossed the finish line of the Cybathlon’s motorized wheelchair race, having pulled ahead on the final stretch. “I felt a huge burden falling off my shoulders”, recalls the Swiss pilot, who was paralyzed by a traffic accident in 2014. “The HSR Enhanced team invested thousands of hours of work in this project, so winning the race allowed me to give them something back.”

For people with physical disabilities, life often presents an obstacle course. Traversing uneven surfaces is a challenge, and even a small flight of stairs is insurmountable for most wheelchairs. Everyday tasks, such as hanging laundry on a clothesline, can be frustrating for those with impaired motor skills. Fortunately, in an age of rapid technological progress, many of these barriers are manageable with technical assistance. Bionic-assistive technology and high-performance wheelchairs, exoskeletons, or powered prostheses, while not yet broadly available, show how high-end research can massively improve activities of daily life for people who are often disadvantaged in society. The Cybathlon is thus a chance not only to showcase the latest gadgets, but also to underscore the social dimension of sustainability by bringing together able-bodied and disabled people as a way of raising awareness that society has yet to become truly inclusive. In this sense, the sporting event was designed to stimulate critical debate on disability, inclusion, and equal opportunities for all.

Professor Robert Riener of the ETH Sensory-Motor Systems Lab had the idea several years ago. After intensive preparations, the first Cybathlon was held on 8 October 2016 at the sold-out SWISS Arena in Zurich, home of the EHC Kloten ice hockey team, to an audience of 4600 – and 150 journalists. The event was made possible with the assistance of over 600 volunteers and organizers. Riener and his team study sensory-motor interactions between humans and machines and apply their research to the fields of medical rehabilitation and sports. Riener himself specializes in human motor learning, biomechanics, virtual reality, and rehabilitation robotics. As such, he found that a series of technical challenges, presented as a competition for human athletes using various forms of assistance, would be a great opportunity for developers to showcase the state of the art in a competitive setting with direct practical relevance to the “obstacle course” of daily life.

The Cybathlon was organized into six disciplines. In the Brain-Computer Interface Race (BCI), pilots to control avatars in a specially developed computer game. In the future, people with quadriplegia should be able to control devices such as computers, robotic arms, or wheelchairs with BCIs. In the Functional Electrical Stimulation (FES) Bike Race, the pedals are moved by muscle power generated by artificial stimuli to the nerves.

While direct interfaces between the nervous system and a device are new, the use of prosthetic limbs goes back thousands of years. In the Powered Arm Prosthesis Race, pilots with one or both arms amputated above or below the elbow competed in groups of four each to complete a series of complex manipulation tasks, including the abovementioned clothes-peg challenge. Trials at the Powered Leg Prosthetics Race included balancing along a girder, navigating “stepping stones”, and traversing slopes and inclines.

Even more futuristic are the full-body suits featured in the Powered Exoskeleton Race. Such exoskeletons are currently employed mostly for physical therapy of paraplegic patients. And Florian Hauser, winner of the Powered Wheelchair Race, is already looking forward to the 2020 Cybathlon, which will again take place in Zurich and include further disciplines: “They say ‘never change a winning team’. For me as a pilot, it’s great to have an active role in the advancement of technology.”

Riener is also excited to host the next Cybathlon, and is keen to see which technical advances will be made in the meantime. Portability and mobility are gaining importance with advanced energy storage and supply solutions. “As more and more devices are powered, it’s important that they understand what the wearer wants them to do, and we see important developments in this area of interfaces and controls between human cognition and technology.”

For more information about the Cybathlon, please visit: www.cybathlon.ethz.ch
### GRI Content Index

The following GRI Content Index provides an overview of ETH Zurich’s Sustainability Report 2015/2016 and the GRI disclosure items addressed. It serves as a compass and helps finding relevant information.


### General Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-1</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Organizational Profile

| G4-3   | Front inside cover |
| G4-5   | Annex: p. 5       |
| G4-6   | 48, Annex: p. 5   |
| G4-7   | Annual Report: p. 68-71 |
| G4-8   | 48, Annex: p. 5   |
| G4-9   | 26, 39, 62, Annual Report: p. 77-109 |
| 04-10  | 63            |
| G4-11  | Annex: p. 5     |
| G4-12  | Annex: p. 5     |
| G4-13  | Annex: p. 4     |
| G4-14  | Annual Report: p. 72-73 |
| G4-15  | Annex: p. 10    |
| G4-16  | Annex: p. 6-7    |

#### Identified Material Aspects and Boundaries

| G4-17  | 8             |
| G4-18  | 8, Sustainability Report 13/14: p. 11-16 |
| G4-19  | 9             |
| 04-20  | Annex: p. 7   |
| 04-21  | Annex: p. 7   |
| 04-22  | 56, Annex: p. 7 |
| 04-23  | Annex: p. 7   |

### Stakeholder Engagement

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-24</td>
<td>70-71, Sustainability Report 13/14: p. 13</td>
</tr>
<tr>
<td>G4-25</td>
<td>Sustainability Report 13/14: p. 12</td>
</tr>
<tr>
<td>G4-26</td>
<td>70-71</td>
</tr>
<tr>
<td>G4-27</td>
<td>70-71, Sustainability Report 13/14: p. 14</td>
</tr>
<tr>
<td>G4-28</td>
<td>Front inside cover, 78</td>
</tr>
<tr>
<td>G4-29</td>
<td>10, Annex: p. 8</td>
</tr>
<tr>
<td>G4-30</td>
<td>Front inside cover, 78</td>
</tr>
<tr>
<td>G4-31</td>
<td>78</td>
</tr>
<tr>
<td>G4-32</td>
<td>8</td>
</tr>
<tr>
<td>G4-33</td>
<td>Annex: p. 8</td>
</tr>
</tbody>
</table>

### Education

| G4-34  | Annual Report: p. 68-71 |

### Ethics and Integrity

| G4-56  | 16 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-PR5</td>
<td>27</td>
</tr>
</tbody>
</table>

### CAMPUS

| G4-EN3 | 50, 51, Annex: p. 10 |
| G4-EN6 | 52, Annex: p. 10 |

### Governance

| G4-19 | 8, Sustainability Report 13/14: p. 11-16 |
| G4-19 | 9 |
| 04-20 | Annex: p. 7 |
| 04-21 | Annex: p. 7 |
| 04-22 | 56, Annex: p. 7 |
| 04-23 | Annex: p. 7 |

### Ethics and Integrity

| G4-56  | 16 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-PR5</td>
<td>27</td>
</tr>
</tbody>
</table>

### Education

| G4-EN3 | 50, 51, Annex: p. 10 |
| G4-EN6 | 52, Annex: p. 10 |

### Paper consumption, GRI Aspect: Materials

| G4-EN2 | 58 |

### Recycling and waste, GRI Aspect: Effluents and Waste

| G4-EN2 | 58 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-EN3</td>
<td>55-60</td>
</tr>
</tbody>
</table>

### Food, GRI Aspect: -

| G4-EN3 | 55-60 |

### Finance, GRI Aspect: Economic Performance

| G4-EC4 | 62, Annual Report: p. 78-80 |

### DIALOG

| G4-EN2 | 58 |

### Informing the interested public, GRI Aspect: -

| G4-EN2 | 58 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-EN2</td>
<td>58</td>
</tr>
</tbody>
</table>

### Informing decision-makers, GRI Aspect: -

| G4-EN2 | 58 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-EN2</td>
<td>58</td>
</tr>
</tbody>
</table>

### DIALOG

| G4-EN2 | 58 |

### Informing the interested public, GRI Aspect: -

| G4-EN2 | 58 |

### Specific Standard Disclosures

<table>
<thead>
<tr>
<th>GRI No.</th>
<th>See page(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G4-EN2</td>
<td>58</td>
</tr>
</tbody>
</table>

### Informing decision-makers, GRI Aspect: -

| G4-EN2 | 58 |
ETH Zurich Sustainability Report 2015/2016