ISCN-GULF Sustainable Campus Charter Report 2015
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Summary

This report describes KTH Royal Institute of Technology’s work with the environment and sustainability during 2015. The report has been compiled for the International Sustainable Campus Network (ISCN). KTH’s Vision 2027 outlines the long-term strategy including the overall objective that KTH will be one of Europe’s leading technical universities within sustainable development and the campus environments should be embodiments of bold, sustainable urban design.

During 2015 many important steps have been taken to improve our work with the environment and sustainability. First of all KTH became certified according to the international environmental management standard ISO 14001. The management system covers KTH’s entire operations which include ten schools at all five campuses and the University Administration. KTH also replaced the environmental policy with KTH’s policy for sustainable development, structured in accordance with the seven core principles of the international standard ISO 26000. Furthermore the environmental goals for 2013-2015 were followed up and deemed fulfilled or partly fulfilled. New sustainability goals have also been set for the coming five years 2016-2020.

In relation to ISCN’s first principle Sustainability Performance of Buildings on Campus KTH had environmental objectives within the areas of buildings, energy, goods and services, chemical products, and waste. Examples of activities during 2015 are: certified with Silver in accordance to Miljöbyggnad (a Swedish system for certification of buildings) for the new school of architecture, large heating and cooling recovery from heat pump system, installation of recycling furniture at several new places, staff training in chemical legislation and risk assessment.

In relation to ISCN’s second principle, Campus-wide Master Planning and Target Setting, KTH has mainly detailed objectives in the KTH Campus plan. These are for example related to resource management, ecology, transportation and innovation. Examples of activities during 2015 are; KTH won the International Sustainable Campus Excellence Award for its campus plans, a comprehensive design program for land and green areas on campus was set: “KTH Campus planning” including e.g. ecology, vegetation, and selection of materials, a new student house with 50 apartments opened, a new entrance for KTH main Campus was designed as a shared space slowing down traffic, and a bike day was held for students and staff.

In relation to ISCN’s third principle Integration of Facilities, Research and Education, KTH has established environmental objectives within the areas of research, education and collaboration. Examples of activities during 2015 include: development and implementation of course modules, teacher lunches and coaching of teachers, updating the web based Toolbox for teachers, arranging KTH-Sustainability Education Day and other seminars, support of student activities and transdisciplinary projects with seed funding, distribution of newsletters and information on upcoming calls within environment and sustainability, active participation in national and international networks and collaboration in partnership agreements.
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1 Introduction

1.1 About KTH

KTH Royal Institute of Technology, founded in 1827, is the largest and oldest technical university in Sweden providing one-third of Sweden’s technical research and technical/engineering education capacity at university level. KTH education and research spans from natural sciences to all branches of engineering also including architecture, industrial economics, urban planning, work science, philosophy and the history of technology. In addition to the research conducted at KTH Schools, several national research centres are hosted by KTH.

KTH is an international university with international research and educational exchange programmes in Europe, USA, Australia and increasingly in Asia. KTH actively participates in various EU research programs and collaborates with Swedish and international aid agencies. Further, KTH has well established and extensive collaboration with Swedish businesses, governments and organizations and has strategic collaboration agreements with several major companies and with Stockholm County Council and the City of Stockholm.

In 2015 KTH had 12,815 full time undergraduate students, 1,839 active postgraduate students and 5,233 employees (3656 full time equivalents). In 2015, KTH’s total revenues amounted to SEK 4,786 million of which circa 22% was government funding for basic education and 24% was grants for research and doctoral programs. External funding from, amongst others, research foundations and the EU accounts for the remaining 54%. KTH has five campuses around Stockholm, with premises and facilities totalling 276,000 square meters.

1.2 Organisation

KTH’s activities are separated into ten different Schools that report directly to the President and are headed by a Dean and a Vice-Dean. Each of these schools has a number of departments, Centres of excellence and undergraduate and postgraduate study programmes.

The President leads operations and reports to the University Board which has 15 members – the chairperson, who should be one of the eight external representatives, three faculty members, the President and three students. The President’s Group deals with strategic educational, research and quality issues and consists of the President, Deputy President, Dean of Faculty, Vice-Dean of Faculty, Vice-President for Research, the University Director and a student representative. The KTH Management Group deals with matters concerning all KTH schools and consists of the President, Deputy President, Dean of Faculty, Vice-Dean of Faculty, Vice-Presidents, University Director, all deans of schools and two student representatives. The Faculty Council is responsible for KTH’s academic education and research. Vice Presidents are appointed by the President for specific areas and tasks. The University Administration handles both administration and service functions for the entire university. In addition, KTH has established five research platforms that coordinate research across schools and traditional disciplines, and these are Energy, ICT, Life Sciences, Materials and Transportation.

1.3 About this report

This report is compiled for the International Sustainable Campus Network, ISCN. It is centred on three principles which ISCN’s work is based upon and structures campus commitments about sustainability into a nested hierarchy encompassing individual buildings, cam-

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1 The International Sustainable Campus Network (ISCN) provides a global forum to support leading colleges, universities, and corporate campuses in the exchange of information, ideas, and best practices for achieving sustainable campus operations and integrating sustainability in research and teaching. Read more: http://www.international-sustainable-campus-network.org/
pus-wide planning and target setting, and integration of research, teaching, outreach and fa-
cilities for sustainability. These three corresponding principles are at the core of this report.

This report concerns 2015 and has been compiled by and Lina Häckner, environmental coor-
dinator and Teresia Sandberg, project leader, at KTH Sustainability Office. The information
and data presented here originates from KTH’s strategic and guiding documents:
- KTH’s Annual Report 2015
- KTH’s Strategic and Action Plan 2013-2016
- Vision 2027
- KTH Campus plan
- KTH’s environmental management system with connected measurements
- KTH-Sustainability’s project plan 2013-2015
- Other supporting documents

KTH has a broad perspective on sustainability as a starting point, including ecological, eco-
nomic and social aspects which are reflected in this report. Some aspects of social and eco-
nomic sustainability related to KTH’s internal activities are not included in this report.
2 Environment and Sustainability

Humanity faces major global challenges. As a technical university, KTH plays an important role to find sustainable solutions to meet these challenges. KTH contributes to sustainable development by providing educational programs, conducting research and through interactions with the surrounding community. Through its activities, KTH impacts the environment directly through the consumption of materials and water, energy and chemicals, travel and transport and construction, and indirectly through purchasing and procurement.

2.1 Overall Visions, Policies and Objectives

Vision 2027 - outlines KTH’s long-term strategy leading up to the university’s 200th anniversary; KTH aim to contribute to a brighter future by finding smart solutions to present and future challenges. At KTH, sustainable development is a common objective for research, education and collaboration with the overall objective that KTH will be one of Europe’s leading technical universities within this area. KTH’s campus environments should be embodiments of bold, sustainable urban design.

KTH’s Strategic Plan for 2013–2016 - a four year plan based upon the targets drawn by Vision 2027. The Strategic Plan and accompanying action plan outlines how KTH should work to meet goals, activities and follow-up measures and describes the importance of the environment and sustainable development for KTH. The strategic plan outlines several environmental and sustainable aims for KTH connected to identity and brand, campus environments and educational programmes. All ten schools and the University administration have also drawn up their own strategic plans using the overall KTH plan as a basis.

KTH’s policy for sustainable development- valid as of February 19 2015, represents a broad perspective of sustainable development and states that KTH shall actively and responsibly contribute to sustainable development through education, research, collaboration, and by reducing our own environmental impact and promote social responsibility. The policy is structured in accordance with the seven core principles of the international standard ISO 26000; Organizational governance, Human rights, Labour practices, The environment, Fair operating practices, Consumer issues, Community involvement and development.

Overall environmental objectives- for the period 2013-2015 KTH had overall environmental objectives in eight areas; education, research, collaboration, transport, energy, chemical products, goods and services, and waste.

KTH Campus plan, a living campus for a sustainable future- sets the long term focus for sustainable campus development over the next 15-20 years. The overall goal is to create a vibrant and sustainable campus characterized by diversity, new operations and activities and increased international exchange. The plan was developed in collaboration between KTH and the landlord Akademiska Hus in a unique and inclusive process with stakeholder participation.

Other relevant policies
KTH’s core values are related to sustainable development, for example human rights and freedom, equality and diversity among employees and students, and a free and open discussion climate. The values that guide KTH’s activities are also expressed in an ethical policy, quality policy and personnel policy.
2.2 KTH’s Environmental Management System

KTH is certified according to the international environmental management standard ISO14001 since August 2015. KTH’s environmental management system covers KTH’s entire operations which include ten schools at all five campuses and the University Administration.

The management system mainly includes KTH policy for sustainable development, an environmental review of KTH’s operations, assessment of environmental impact, environmental objectives and associated action plans, documented procedures, tools for tracking legal and other requirements as well as internal and external audits, annual management reviews, communication and trainings for employees.

The environmental objectives reported in this report were valid from 2013-2015, new overall sustainability objectives for the period 2016-2020 has been set. The new goals cover the areas; education, research, collaboration, work environment, KTH’s campuses, travel, purchasing and procurement, chemical management, capital investments and organisation and management.

Focus areas 2013-2015 in KTH’s environmental management system.

2.3 Laws and Regulations

KTH actively monitor and control laws and regulations. All applicable laws and regulations connected environmental and sustainability are listed in a web-based tool, The Environmental Guide. Every law is accompanied by instructions on how it should be followed and each year a legal audit is undertaken to ensure that KTH complies with all applicable environmental legal and other requirements.

Sweden has legal requirements that also steer the general work; the Higher Education Act\(^2\) sets requirements for promoting sustainable development in higher education and the ordinance on environmental management in government authorities\(^3\) requests certification for


\(^3\) Förordning (2009:907) om miljöledning i statliga myndigheter
authorities with significant environmental impact according to EMAS⁴ or ISO14001. Legal requirements also provide the baseline for 5 of our 8 focus areas, where KTH has environmental objectives. These areas are: education, goods and services, energy, chemical products and waste.

2.4 Organization of KTH’s environmental and sustainability work

KTH’s environmental and sustainability efforts are centrally organized at KTH Sustainability Office at the Department for Building and Environment at the university administration. KTH Sustainability Office works with overall sustainability and environmental issues.

The work is generalized divided into two groups that work closely together and partly overlapping. One group is working with integration of sustainable development in the core activities education, research and collaboration and the other one is working with environmental management and campus. The work connected to core activities is led by the Vice President for Sustainable Development, together with a steering group composed of faculty representatives, student and PhD student representatives and the Environmental Manager. The Vice President and the steering group act as an advisory body to the President and to the Faculty Council. The work with the environmental management system and campus is led by the Environmental Manager.

The environmental management work at KTH’s schools and university administration is managed by Environmental Representatives together with their local management and often an environmental group.

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3 Sustainability Performance of Buildings on Campus

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

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

From ISCN charter instructions

3.1 KTH Objectives relating to principle one

The following environmental objectives at KTH for the period 2013-2015 relate to Sustainability Performance of Buildings on Campus:

- **Buildings:** The highest environmental performance must be sought when constructing or refurbishing facilities and buildings.
- **Energy:** Reduce KTH’s energy use (electricity, district heating and cooling) by 5 percent.
- **Goods and Services:** Improve environmental requirements in the procedures and practices for procurement of goods and services.
- **Chemical Products:** Improve the management of chemicals and ensure safety for both health and the environment.
- **Waste:** Improve the possibilities for sorting waste.

3.2 Examples of activities relating to principle one

Here follows information about relevant environmental objectives from “Report KTH:s overall environmental objectives 2013-2015”.

Goods and services

**Overall environmental objectives 2013-2015**

- Improve environmental requirements in the procedures and practices for procurement of goods and services.
- The highest environmental performance must be sought when constructing or refurbishing facilities and buildings.

*How do we affect?* As a large institution KTH has purchasing power. By imposing requirements during the procurement of goods and services and choosing more eco-friendly options we can help promote the development of green technology and sustainable production. We can also reduce our environmental impact in a range of areas.

**Resultat**

Objectives partially fulfilled. Procedures and working methods have been improved and new environmental requirements has been developed. The number of procurements with environmental requirements have not increased as planned. The qualitative assessment is that sustainability demands receive greater attention.

A new building was certified Miljöbyggnad Gold (2014) and one silver (2015). A renovated building received Miljöbyggnad Silver (2013), but a number of major renovations have not been certified. A variety of other actions and investigations related to the campus environment have been made.

**Examples of what we have done**

- Developed new procedures
- Set environmental requirements in procurements
- Seminar with purchasers on environmental requirements
- Procedures and environmental requirements on new construction and remodeling projects
- Participated in the evaluation of campus in accordance to BREEAM Communities
- Developed design programs / planning for KTH
- Tree inventory conducted
- Cultivation in cultivation boxes for employees

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of procurements with environmental requirements (nr)</td>
<td>14</td>
<td>19</td>
<td>37</td>
<td>9</td>
</tr>
<tr>
<td>Total number of procurements (nr)</td>
<td>47</td>
<td>46</td>
<td>88</td>
<td>34</td>
</tr>
<tr>
<td>Number of procurements with environmental requirements (%)</td>
<td>30%</td>
<td>41%</td>
<td>42%</td>
<td>26%</td>
</tr>
<tr>
<td>Value of procurements with environmental requirements (MSEK)</td>
<td>40</td>
<td>440</td>
<td>56</td>
<td>7</td>
</tr>
<tr>
<td>Total value of procurements (MSEK)</td>
<td>150</td>
<td>570</td>
<td>94</td>
<td>50</td>
</tr>
<tr>
<td>Value of procurements with environmental requirements (%)</td>
<td>27%</td>
<td>77%</td>
<td>60%</td>
<td>14%</td>
</tr>
</tbody>
</table>

New house for education and school office at the School of Architecture and the Built Environment (ABE), Green Building Gold.
Energy

Overall environmental objective 2013-2015
• Reduce KTH’s energy use (electricity, district heating and cooling) by 5 percent.

How do we affect? KTH’s facilities and operational activities consume energy. As KTH does not own its facilities it’s important that we work together with the owner of KTH’s properties on this issue. The main factor that we can influence is how much energy we consume, for example through the use of computers and lighting in our offices and the use of fume hoods and machines in our labs.

Results
Objective fulfilled. The total energy consumption has decreased by 18% compared to 2012. Measured per annual work force the decrease is 20% compared to 2012.

The share of renewable electricity was 99% during the period and renewable heat was between 80-86%

Examples of what we have done
• Extensive heat recovery from the supercomputer Lindgren purchased energy will decrease by 25 percent for the entire KTH campus, which corresponds to approximately 23 700 MWh. The heat pumps driven by renewable energy.
• The landlord has made improvements such as installation of energy glass, extra insulation and energy-optimization
• Developed guidelines for energy savings in offices
• An information campaign on energy savings using decals
• Promotions on the intranet for energy saving events such as Earth Hour
• Several theses completed in collaboration with several parties
• LCA evaluation of available desk lighting

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>MWh</td>
<td>MWh/awf*</td>
<td>kWh/m²</td>
<td>MWh</td>
</tr>
<tr>
<td>Change in energy use compared to 2012 (%)</td>
<td>-18</td>
<td>-20</td>
<td>-22</td>
<td>-14</td>
</tr>
<tr>
<td>Base year</td>
<td>Base year</td>
<td>Base year</td>
<td>Base year</td>
<td>Base year</td>
</tr>
</tbody>
</table>

*annual work force
Chemical Products

**Overall environmental objective 2013-2015**

- Improve the management of chemicals and ensure safety for both health and the environment.

*How do we affect?* KTH’s courses and research involve the handling of a large quantity of chemicals. It’s therefore important that everyone who handles chemicals, both students and teaching staff, handle and store them safely and correctly to reduce risks to the environment and human health.

**Results**

The objective partially fulfilled. Many improvements have created better conditions for a safe chemical management.

Management, procedures and templates have been established, responsibilities clarified and staff trainings conducted as well as risk assessments, chemical inventories and audits.

**Examples of what we have done**

- Focused chemicals audits at chemical-intensive schools.
- Staff training, workshops and information meetings connected to risk assessment.
- Training in legislation, registration and inventory in KLARA, KTH’s web-based chemical register.
- Tested and evaluated a scanner tool for simplified registration of chemicals.
- Established procedures for handling chemicals centrally and locally.
- Developed role descriptions for specific roles within chemical management.
- Clarified responsibilities.
- Developed new templates for example for investigations of carcinogenic, mutagenic and toxic to reproduction.
- Destroyed older unused chemicals.
- Annual chemicals inventory at KTH Schools.
Waste

Overall environmental objective 2013-2015

• Improve the possibilities for sorting waste

How do we affect? The best KTH can do for the environment when it comes to waste is to ensure that no unnecessary waste is generated and to reuse as much as we can. Insofar as possible, the waste that is generated should be recycled and it should be easy to separate different types of waste at KTH facilities.

Results
Objective fulfilled. Sorting possibilities have improved. Receptacles for waste separation have been installed at several schools, but are still not available at all relevant places.

Older chemicals, hazardous wastes, not in use have been destroyed. Procedures have been developed for handling different types of waste such as hazardous waste and antibiotics.

Examples of what we have done
• Installed waste sorting at several schools and is available at ABE, EES, CSC, ICT and UF
• Exhibited and evaluated different receptacles have been exhibited and to find best solutions that work in different places.
• AlbaNova has begun sorting organic waste
• Sale of reusable thermos mug GreenCup for waste reduction
• Projects for reuse and sale of old furniture to reduce waste in a library completed.
• Created procedures for the management of municipal and hazardous waste centrally and locally.
• Created procedures in specific locations where needed, for example, management of antibiotics, computers and radioactive waste
• Launched projects to introduce waste separation in educational settings and section rooms and are ongoing.

The thermos mug GreenCup has been developed in a collaboration between the Royal Institute of Technology, Akademiska Hus and THS Student Union. The cup is intended to reduce waste from paper cups and plastic lids. Over 2000 cups have been sold and over 20,000 refills made at the student union.
### Table 1 – Targets and results related to Principle 1

<table>
<thead>
<tr>
<th>Priority areas</th>
<th>Objectives and targets</th>
<th>Key initiatives</th>
<th>Performance 2015</th>
<th>Performance 2014</th>
<th>Performance 2013</th>
<th>Performance 2012 (base year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buildings</strong></td>
<td>The highest environmental performance must be sought when constructing or refurbishing facilities and buildings.</td>
<td>Environmental certification of one new building. Tree inventory affecting the placement of buildings</td>
<td>Goal partly achieved. Miljöbyggnad Silver in new construction 1/1 Miljöbyggnad in renovation 0/3</td>
<td>Miljöbyggnad Gold certification awarded to one new construction project at KTH Campus. Miljöbyggnad Silver certification awarded to one remodeling project at KTH Campus.</td>
<td>Not measured quantitatively.</td>
<td>Not measured quantitatively.</td>
</tr>
<tr>
<td><strong>Energy</strong></td>
<td>Reduce KTH’s energy use (electricity, district heating and cooling) by 5 percent.</td>
<td>Heating and cooling recovery from heat pump system. Information campaigns. Guidelines for energy savings in the office.</td>
<td>Goal fulfilled. Total consumption of 65 000 MWh, 18% reduction in comparison to 2012 Consumption/annual man power of 18 MWh, 20% reduction in comparison to 2012</td>
<td>Total consumption of 68 000 MWh, 14% reduction in comparison to 2012 Consumption/annual man power of 19 MWh, 17% reduction in comparison to 2012</td>
<td>Total consumption of 73 000 MWh, 8% reduction in comparison to 2012 Consumption/annual man power of 20 MWh, 10% reduction in comparison to 2012</td>
<td>Total consumption of 79 000 MWh. Consumption/annual man power of 22 MWh.</td>
</tr>
<tr>
<td><strong>Goods and services</strong></td>
<td>Improve environmental requirements in the procedures and practices for procurement of goods and services.</td>
<td>Increased involvement by environmental department in procurement processes.</td>
<td>Goal partly fulfilled. Environmental requirements were set at 30% of the number of contracts and 27% based on the total value of all contracts.</td>
<td>Environmental requirements were set at 41% of the number of contracts and 77% based on the total value of all contracts.</td>
<td>Environmental requirements set at 42% of the number of contracts and 60% based on the total value of all contracts.</td>
<td>Environmental requirements set at 26% of the number of contracts and 14% based on the total value of all contracts.</td>
</tr>
<tr>
<td><strong>Chemical products</strong></td>
<td>Improve the management of chemicals and ensure safety for both health and the environment.</td>
<td>Education in chemical legislation and risk assessment. Implementation of bar-code reader for registration of chemicals Destruction of</td>
<td>Goal partly fulfilled. Not measured quantitatively. Improvements in chemical management have been made.</td>
<td>Not measured quantitatively, but management of chemical products is considered to have improved during the year.</td>
<td>Not measured quantitatively.</td>
<td>Not measured quantitatively.</td>
</tr>
</tbody>
</table>
### Waste

<table>
<thead>
<tr>
<th>Old chemicals</th>
<th>Reporting on viability of killing waste.</th>
<th>Recycling furniture installed at several new places. Several waste projects initiated to ensure recycling. Procedures for specific waste types.</th>
<th>Goal fulfilled. Possibilities to sort waste have improved. 1,000 thermos mugs sold and 15,000 refills.</th>
<th>Not measured quantitatively.</th>
<th>Not measured quantitatively.</th>
</tr>
</thead>
</table>

4 Campus-wide Master Planning and Target Setting

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

Sustainable campus development needs to rely on forward-looking planning processes that consider the campus as a whole, and not just individual buildings. These processes can include comprehensive master planning with goals for impact management (for example, limiting use of land and other natural resources and protecting ecosystems), responsible operation (for example encouraging environmentally compatible transport modes and efficiently managing urban flows), and social integration (ensuring user diversity, creating indoor and outdoor spaces for social exchange and shared learning, and supporting ease of access to commerce and services). Such integrated planning can profit from including users and neighbours, and can be strengthened by organization-wide target setting (for example greenhouse gas emission goals). Existing low-carbon lifestyles and practices within individual campuses that foster sustainability, such as easy access for pedestrians, grey water recycling and low levels of resource use and waste generation, need to be identified, expanded and disseminated widely.

From ISCN charter instructions

4.1 KTH Objectives relating to principle two

KTH’s Vision 2027 and Strategic Plan 2013-2016 contain ambitions and goals relating to principle 2: campus environments are embodiments of bold, sustainable urban design and they shall be characterised by leading-edge technology and reflect KTH research in regard to new materials and sustainable development.

Objectives relating to campus-wide master planning and target setting are also included in the KTH Campus Plan and KTH’s overall environmental objectives relating to transport.

KTH campus plan, a living campus for a sustainable future

The plan sets the long term focus for sustainable campus development over the next 15-20 years. The overall goal is to create a vibrant and sustainable campus characterized by diversity, new operations and activities and increased international exchange. The plan was developed in collaboration between KTH and the landlord Akademiska Hus in a unique and inclusive process with stakeholder participation. The plan is divided into six parts in accordance to the categories in BREEAM communities, interpreted to fit KTH Campus.

- **Participation**: the users of the campus are involved in decisions that affect the design, operation and long-term management of the area.
- **Well-being**: the campus is a sustainable, vibrant and safe part of town, with a clear identity. An environment that attracts visitors to stay, over days and throughout the year.
- **Resource management**: available resources on campus are utilized in a sustainable manner. The consumption of energy shall decrease.
• **Ecology:** the campus grounds are used in a sustainable and effective manner. Ecological values are maintained and strengthened. Biological diversity is preserved and developed.

• **Transportation:** campus has an accessible structure to support the use of sustainable transport modes.

• **Innovation:** the conditions for a creative and innovative climate on campus are optimized. New, smart, sustainable solutions are visualized and it is apparent that the work to solve the challenge of today and tomorrow is ongoing.

**Overall environmental objectives 2013-2015**

• **Transport:** Achieve a 10 percent reduction in carbon emissions resulting from business travel compared with the number of employees (annual full-time workforce).
4.2 Examples of activities relating to principle two

Campus area

Several initiatives have been taken to improve and to develop KTH campus into an ecologically, socially and economically sustainable campus.

Examples of campus wide incentives are:

- A new entrance for KTH Campus has been designed as a "shared space" where the available streetscape is shared by all means of transportation on the pedestrians terms. The shared space slows down traffic in the most used space on campus between the subway and the main campus buildings and library etc. The area was constructed in collaboration with the land lord and the city of Stockholm.

- More student housing, to make KTH campus a living environment all day and every day of the year, up to 600 student apartments will be built on campus by 2017. In March a new house, the student house, with 50 apartments at 21-26 square metres was ready for the first tenants, consisting of guest researcher, PhD students and young researchers and master students.

- KTH Campus Planning, a comprehensive design program for land and green areas on campus was set. The program includes for example ecology, vegetation, selection of materials in the outdoor environment as well as streets and entrances. A tree inventory was conducted during 2014 and the results were also incorporated in the program. Trees, mainly old oak trees, of significant ecological value shall be protected. In the program ecological corridors have been identified and examples of activities to strengthen ecological values are the use of detritus boxes, bee and insect boxes and bird feeders.
• Bike day, in August 2015 a bike day was arranged where students and staff could learn more about bike routes, safety and get help with bicycle repairs. We also held a screening of the internationally acclaimed film "Bikes vs Cars" a new film project from director Fredrik Gertten, that looks into and investigates the daily global drama in traffic around the world. The film was complimented with a panel discussion with KTH researchers Teo Enlund, Greger Henriksson and Peter Georén. A homepage with information on safety and travel planning was set up and bicycle pumps on campus were renovated.

Bike Day at KTH Campus, August 2015

• Participation in KTH Campus Fair, a fair for new students, to inform about sustainability and campus development. Meeting new students in person with a large scale model showing campus and planned projects. Student could compete with their best sustainability tips, have a map and ask questions about their campus.
- Urban farming on campus, start of project with farming for employees in six cultivation boxes. The project generated flowers for bees, herbs, pumpkins among other things. The number of boxes will be doubled in 2016 and employees at the university administration will have the opportunity to farm this season.

- The new school of architecture was built and certified with Silver in accordance to Miljöbyggnad, the most common used certification system for buildings in Sweden. Certification in accordance to Miljöbyggnad includes the areas energy, indoor climate and materials and classifications can be Gold, Silver or Bronze. Miljöbyggnad Gold sets higher requirements for energy efficiency and energy sources, content of hazardous substances and documentation of materials as well as the indoor environment considering for example radon and ventilation.\(^5\)

- Higher requirements on the travel agency have been set in procurement, ensuring statistics and also the possibility to climate compensate or create internal fund.

\(^5\) KTH’s operations are conducted within rented premises held mostly by the landlord Akademiska Hus. Akademiska Hus’ ambition is that all of their new buildings at least must meet the requirements for Miljöbyggnad Silver.
Transport

Overall environmental objective 2013-2015

- Achieve a 10 percent reduction in carbon emissions resulting from business travel compared with the number of employees (annual full-time workforce).

*How do we affect?* A major source of carbon dioxide emissions arises from KTH’s business travel, especially from flights.

**Results**

Objective fulfilled. CO2 emissions have decreased by 19% per annual workforce*

Total CO2 emissions from travelling 2015 was 4260 tones. 2012 the emissions were 5110 tons, which means a 17% decrease of.

During the period,
- Train travels have decreased
- Car travels have increased
- Flights have decreased

* Statistics include, flights, car travel (taxi, rental car, mileage), and trains. Flights are based on the travel booked through the travel agency. Some uncertainty in numbers.

**Examples of what we have done**

- New guidelines for meetings and travel have been developed
- Improvement of statistics and more specified statistics broken down by school
- Train is automatically the first choice in the online-bookings system
- Investments in video and teleconference equipment
- Training and information on travel free meetings
- Arranged a Campus Bike Day with e.g. mechanics
- Screening of the film Bikes vs Cars with a following panel discussion with researchers
- Review of air pumps for bicycles on campus

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Per awf</td>
<td>Total</td>
<td>Per awf</td>
</tr>
<tr>
<td>CO₂ (tonnes)</td>
<td>4260</td>
<td>1,17</td>
<td>4230</td>
<td>1,15</td>
</tr>
<tr>
<td>Change in CO₂ compared to 2012 (%)</td>
<td>-17</td>
<td>-19</td>
<td>-17</td>
<td>-20</td>
</tr>
</tbody>
</table>

*annual workforce
Table 2 – Targets and results related to principle 2

<table>
<thead>
<tr>
<th>Priority areas</th>
<th>Objectives and targets</th>
<th>Key initiatives</th>
<th>Performance 2015</th>
<th>Performance 2014</th>
<th>Performance 2013</th>
<th>Performance 2012 (base year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport</td>
<td>Achieve a 10 percent reduction in carbon emissions resulting from business travel compared with the number of employees (annual full-time workforce).</td>
<td>Setting requirements on travel agency in procurement. Education and information on web meetings. Arranging a bike day.</td>
<td>1.17 tonnes CO₂/annual working force Reduction of CO₂ since 2012 19% per annual work force.</td>
<td>1.15 tonnes CO₂/annual working force Reduction of CO₂ since 2012 20% per annual work force.</td>
<td>1.25 tonnes CO₂/annual working force Reduction of CO₂ since 2012 13% per annual work force.</td>
<td>1.44 tonnes CO₂/annual working force Base year</td>
</tr>
</tbody>
</table>
5 Integration of Facilities, Research and Education

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

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

From ISCN charter instructions

5.1 KTH Objectives relating to principle three

KTH’s Vision 2027 and Strategic Plan 2013-2016 contain ambitions and goals relating to principle 3, for example; KTH shall be one of Europe’s leading research universities in environmental sciences and sustainable development. To realise this goal, a double-track strategy is used focusing on integration and specialisation. Sustainability needs to be integrated in education, research, collaboration with industry and society and in administration if we are to develop a sustainable society. While integration is key, there is also need for specialised research, education and administration in order to provide knowledge that is needed for integration. The following objectives at KTH relate to integration of facilities, research and education.

- **Education**: KTH shall work actively to increase teachers’ and students’ knowledge of, and involvement in, issues relating to the environment and sustainable development. In accordance with the Swedish Higher Education Act all of KTH’s programmes must report on how they integrate and develop environment and sustainable development in education.
- **Research**: KTH’s research in the fields of the environment and sustainable development shall increase. KTH shall conduct research for environment and sustainable development at a high international level.
- **Collaboration**: Increase KTH’s visibility and improve collaboration with stakeholders in areas of the environment and sustainable development.

5.2 Examples of activities relating to principle three

Here follows information about relevant environmental objectives from “Report KTH:s overall environmental objectives 2013-2015”. 
Education

Overall environmental objective 2013-2015

- KTH shall work actively to increase teachers’ and students’ knowledge of and involvement in issues relating to the environment and sustainable development.
- In accordance with the Swedish Higher Education Act (högskoleförordning) all of KTH’s programmes must report on how they integrate and develop environment and sustainable development in education.

How do we affect? KTH graduates act as a driving force in social and technological development. The engineers and architects of the future must be able to produce sustainable solutions for a brighter tomorrow. It is therefore important that all undergraduates and postgraduates understand sustainability issues that are of importance to the development of society and the challenges we face.

Results
Objective partly fulfilled. All schools have been working actively to integrate sustainable development in engineering and architecture programs. The pedagogical course Education for sustainable development is given annually. The number of labelled courses tagged under environment or sustainability has increased from 153 to 297 from 2012-2015. A web-based staff training has been developed and implemented as well as other planned activities.

Examples of what we have done
- Developed and worked with action programs for the integration of environment and sustainable development in engineering and architecture programs. Activities have varied between schools.
- Development of new and existing courses and enhanced integration in the programs.
- Evaluation of the fulfillment of targets based on national learning objectives and local action programs.
- Arranged KTH-Sustainability Education Day and other seminars for teachers at KTH.
- Development and implementation of the pedagogical Learning for Sustainable Development (4,5hp).
- Created a web-based toolkit, “Learning for sustainable development”.
- Developed and implemented course Modules in Sustainable Business Development, Introduction to Social Sustainability and Introduction to sustainable development in several engineering programs.
- Coaching of teachers and program directors.
- Courses related to environment and sustainable development are labelled and searchable in catalogues.
- Developed guiding specified learning outcomes for the environment and sustainable development.
Research

Overall environmental objective 2013-2015

• KTH's research in the fields of the environment and sustainable development should increase.
• KTH shall conduct research for environmental and sustainable development at a higher international level.

How do we affect? KTH conducts sustainable development research. Our research findings can contribute important knowledge about the transition to a sustainable society. KTH's aim is therefore to increase its environmental and sustainable development research.

Results

Objective fulfilled. During the period publications have increased, both in number and in relation to the total number of publications. KTH funding from four research councils within environment and sustainable development (Swedish Energy Agency, Formas, Swedish Environmental Protection Agency, Mistra) has increased in total and as a proportion of KTH's total research funding over the period 2012-2015.

KTH has moved up about 50 places in the QS rankings (placed 100-150 in the world), but has fallen in NTU rankings (in the field of Environment / Ecology). Total number and percentage of faculty employments directly related to the environment and sustainable development has been practically constant during the period.

Examples of what we have done

• Network meetings and seminars for KTH researchers
• Distribution of seed money for research projects within sustainable development
• Current research calls within environment and sustainable development has been compiled and sent out
• Arranged meetings for researchers before large calls
• Activities within PhD forums and Stockholm PhD Student Dialogue on Sustainability
• Contributed to the development of postgraduate courses in areas such as social sustainability
• Compiling of postgraduate courses in the area of sustainability
• Mapping and analysis of research at KTH with connection to environment and sustainable development

US President Barack Obama, visiting KTH Royal Institute of Technology in September 2013 on the theme of renewable energy and environmental technology.
Collaboration

Overall environmental objective 2013-2015

• Increase KTH's visibility and improve collaboration with stakeholders in areas of the environment and sustainable development.

How do we affect? In order to contribute to a sustainable society, it is important that KTH's research is of use to and for the benefit of society. KTH therefore places great emphasis on collaborating with stakeholders in society and raising the profile of new research findings.

Results
Objective partly fulfilled. During the period, collaboration agreements on sustainable development have been signed with Akademiska Hus, IVL Swedish Environmental Research Institute and the Stockholm Environment Institute. Several researchers from KTH participate in the government's Scientific Council for Sustainable Development and various analysis groups and advisory committees.

The number of press releases and visibility in the media have been unchanged during the period. The number of subscribers to the external newsletter is constantly increasing. A large number of externally targeted seminars and events have been arranged. KTH Sustainability Research Day has been fully booked with over 300 registered.

Examples of what we have done
• KTH Sustainability Research Day
• AIMday® Sustainable Solutions for Cities
• Photo Exhibition Whole Earth? with connected student events
• Involvement in national, Nordic and international networks
• Distributing internal and external newsletters
• Providing financial support to collaboration projects
• Arranging internal and external seminars and activities
• Support student projects and activities
### Table 3 – Targets and results related to Principle 3

#### Education

<table>
<thead>
<tr>
<th>Objectives and targets</th>
<th>Performance 2015</th>
<th>Key initiatives 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTH shall work actively to increase teachers’ and students’ knowledge of, and involvement in, issues relating to the environment and sustainable development. In accordance with the Swedish Higher Education Act all of KTH’s programmes must report on how they integrate and develop environment and sustainable development in education.</td>
<td>Goal partly fulfilled</td>
<td>Development and implementation of course modules, Teacher lunches and coaching of teachers, Web based Toolbox for teachers, KTH-Sustainability Education Day and other seminars, Support of student activities, A follow-up of all 3 and 5-year educational programs in engineering and architecture, Support educational initiatives with seed funding.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>Performance 2015</th>
<th>Performance 2014</th>
<th>Performance 2013</th>
<th>Performance 2012 (base year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of ESD labelled courses (all educational levels)</td>
<td>297</td>
<td>246</td>
<td>202</td>
<td>153</td>
</tr>
<tr>
<td>No. of Master of Science in Engineering (300 ECTS) programs with ESD in program title</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No. of Master of Science (120 ECTS) programs with ESD in program title</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>No. of teachers receiving final grade in pedagogical course Learning for Sustainable Development (4.5 ECTS)</td>
<td>11</td>
<td>15</td>
<td>17</td>
<td>12</td>
</tr>
</tbody>
</table>
### Alumni satisfaction with their KTH education in their ability to make judgments with regard to sustainable development (%)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>61</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>22</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>No education in ESD</td>
<td>Data not available.</td>
<td>Data not available.</td>
<td>Data not available.</td>
</tr>
</tbody>
</table>

### Alumni working tasks requiring ability to make judgments with regard to sustainable development (%)

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes (to some extent, largely or very much)</td>
<td>74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### No. of student theses with bearing on sustainable development (426 search terms, see appendix 1) / total no. of student theses

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2014</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data not available.</td>
<td>406 (18%)</td>
<td>475 (21%)</td>
<td>470 (20%)</td>
</tr>
</tbody>
</table>

### Research

<table>
<thead>
<tr>
<th>Objectives and targets</th>
<th>Performance 2015</th>
<th>Key initiatives 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTH’s research in the fields of the environment and sustainable development shall increase.</td>
<td>Goal fulfilled.</td>
<td>Arrange meetings for KTH researchers on several themes</td>
</tr>
<tr>
<td>KTH shall conduct research for environment and sustainable development at a high international level.</td>
<td></td>
<td>Support transdisciplinary projects with seed funding</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newsletter including information on upcoming calls within environment and sustainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activities within PhD Students Forum for Sustainability</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Performance 2015</th>
<th>Performance 2014</th>
<th>Performance 2013</th>
<th>Performance 2012 (base year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of published peer review articles with bearing on sustainable development</td>
<td>Data not available.</td>
<td>307 (11%)</td>
<td>269 (11%)</td>
<td>216 (9%)</td>
</tr>
<tr>
<td></td>
<td>No. of citations for a three-year period of articles published the first year of the time period</td>
<td>Field normalized citation rate for a three-year period of articles published the first year of the time period</td>
<td>Number/share of publications among the 10 percent most cited</td>
<td>Number/share of publications that have been published in journals which are among the 20 percent most cited</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Data not available.</td>
<td>Data not available.</td>
<td>44.4/13% (2011-2013)</td>
<td>46.5/15% (2010-2012)</td>
</tr>
<tr>
<td></td>
<td>Data not available.</td>
<td>45/31% (2012-2014)</td>
<td>42/34% (2011-2013)</td>
<td>32/29% (2010-2012)</td>
</tr>
<tr>
<td></td>
<td>Data not available.</td>
<td>79 (28%)</td>
<td>51 (21%)</td>
<td>61 (26%)</td>
</tr>
<tr>
<td></td>
<td>Data not available.</td>
<td>Data not available.</td>
<td>201 (12.2%)</td>
<td>185 (11.1)</td>
</tr>
<tr>
<td>Position</td>
<td>Total (% of all faculty positions)</td>
<td>QS</td>
<td>NTU</td>
<td>CWTS Leiden, publications</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------</td>
<td>------</td>
<td>-----</td>
<td>----------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>101-150</td>
<td>101-150</td>
<td>151-200</td>
</tr>
<tr>
<td>Professor</td>
<td>37 (4.5%)</td>
<td>101-150</td>
<td>288</td>
<td>-</td>
</tr>
<tr>
<td>Adjunct Professor</td>
<td>14 (4.3%)</td>
<td>&gt;300</td>
<td>288</td>
<td>299</td>
</tr>
<tr>
<td>Visiting Professor</td>
<td>7 (10.0%)</td>
<td>Subject not existing anymore</td>
<td>482</td>
<td>-</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>11 (3.3%)</td>
<td>1-20</td>
<td>1-20</td>
<td>24-135</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>1 (1.7%)</td>
<td>1-20</td>
<td>1-20</td>
<td>24-135</td>
</tr>
</tbody>
</table>

KTH’s position in different university rankings. QS, NTU and CWTS Leiden are international rankings for the subject “Environmental sciences” or similar. Swedish EPA is for Swedish governmental authority’s environmental management systems.
## Collaboration

<table>
<thead>
<tr>
<th>Objectives and targets</th>
<th>Performance 2015</th>
<th>Key initiatives 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase KTH’s visibility and improve collaboration with stakeholders in areas of the environment and sustainable development.</td>
<td>Goal partly fulfilled.</td>
<td>Two newsletters, targeting internal and external audience respectively</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Active participation in national and international networks</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Arranging seminars and other meeting places for teachers, researchers and students.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Collaboration in partnership agreements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Providing seed-funding for collaboration projects.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Performance 2015</th>
<th>Performance 2014</th>
<th>Performance 2013</th>
<th>Performance 2012 (base year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of publications that has been co-published between KTH and Swedish non-university organizations (authorities, institutes, organizations, industry etc.)</td>
<td>Data not available.</td>
<td>36</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Hit rate in media for KTH within areas of ESD/total hit rate in media for KTH (ref. Meltwater News PR analysis tool. Newspaper articles, web pages, etc.)</td>
<td>27% (1951/7292)</td>
<td>25% (2084/8235)</td>
<td>31% (2575/8339)</td>
<td>28% (1921/6753)</td>
</tr>
<tr>
<td>No. of press releases in Swedish with bearing on ESD/total no. of press releases in Swedish from KTH (%) (ref. Mynewsdesk, press service tool)</td>
<td>42% (36/85)</td>
<td>39% (35/89)</td>
<td>41% (33/80)</td>
<td>31% (34/110)</td>
</tr>
<tr>
<td>No. of press releases in English with bearing on ESD/total no. of press releases in English from KTH (ref. AlphaGalileo, press service tool)</td>
<td>35% (9/26)</td>
<td>39% (13/33)</td>
<td>35% (13/37)</td>
<td>100% (2/2)</td>
</tr>
</tbody>
</table>