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The UN Sustainable Development Goals Report 2019

KTH Royal Institute of Technology

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Message from the Vice President of Sustainability and Sustainability Manager

In 2015, governments around the world adopted the new Agenda 2030 and 17 Sustainable Development Goals (SDGs), also known as the “Global Goals.” These goals have a very broad acceptance and legitimacy. The goals cover issues of basic needs, distribution in society, technological development, and ecological aspects. The Sustainable Development Goals provide a description of what society wants to achieve with a sustainable development and can therefore be seen as a definition of sustainable development and an agenda for research, policy and industry.

Sweden has a long tradition of contributing to sustainable development. The first UN conference on environment was held in Stockholm 1972 and Sweden wants to be a leading country in the work for Agenda 2030. Universities have a unique position and a responsibility to contribute to Agenda 2030. Universities can contribute through research, education, public outreach and our own operations should be aligned with the SDGs. As one of the leading technical universities in Europe, KTH has a responsibility to uphold and is committed and driven to lead by example.

KTH contributes to sustainable development by educating, researching and collaborating with the surrounding society. Through its operations, KTH affects the environment through consumption of materials and water, energy and chemical use, travel and transport and construction, as well as indirectly in procurement and purchasing and in the investment of capital. KTH has an important role in the work of pushing for sustainable societal development in order to actively contribute to Agenda 2030 and that the 17 global goals are achieved.

KTH's Sustainable Development Policy and Sustainability Objectives have clear links to the UN's Sustainable Development Goals. In Sweden, there is a unique and long tradition working with environmental management in the public sector. The Government must take the initiative in environmental and sustainability work. Today, 187 government agencies are covered by ordinance [SFS 2009: 907 on environmental management in government agencies](#), which means that they must introduce and develop environmental management systems and every year follow up and report the results of the work. As a public agency, KTH upholds the responsibility and commitments taken by Sweden. When KTH works with its sustainability objectives that relate to education, research, joint collaborations, buildings, campus areas etc., it also contributes to the SDGs. KTH's environmental management system is ISO 14001:2015 certified. The International standard supports KTH efforts to improve the environmental impacts of our processes, services and other activities. This in turn supports the national and international targets set out to reduce climate change.

Within KTH, there is a commitment and leadership to develop and improve the current environmental and sustainability work. It gives KTH new opportunities to meet the demands of the outside world based on the UN's global goals. KTH will during the next year 2020, establish new sustainability objectives and activities for the period 2021-2025. The objectives will be in line with KTH's ambitions in the climate area and follow the societal transition that is taking place to a sustainable and climate-neutral society. This means that KTH will continue to drive the work forward by:

- Integrate ecological, economic and social sustainability at all levels into strategic and operational activities.
- Have an activity that is characterized by openness, democracy and respect for people's equal value and for people's living conditions.
- Offer education of the highest quality that equips the professionals of the future with knowledge, commitment, critical thinking and practical tools that enable them to contribute to a sustainable society.
- Produce research of the highest quality that contributes with sustainable and innovative solutions to societal challenges.
- Encourage, educate and create conditions for employees and students to contribute to sustainable development in and outside the business.
- Create benefits by disseminating and supporting applications of technology, methods and approaches and actively participate in the public debate to contribute to sustainable development.
- Have an identity and brand associated with sustainable development.
- Constantly improve the internal management system that aims to improve KTH's environmental and sustainability performance.

- In order to protect the environment, take measures to prevent the environmental impact from one's own operations.
- Work with partners who contribute to sustainable development and work for sustainable development in collaboration with local and global actors.

In this report, the first where KTH examines the connections between our core business and operations to the SDGs we highlight some of the many activities within research, education, public outreach and operations at KTH that contribute the achievement of Agenda 2030. Many of the cases apply for multiple SDGs.

1 No Poverty

End poverty in all its forms everywhere

The right to education is recognized as a human right in several international conventions including the International Covenant on Economic, Social and Cultural Rights, which includes an obligation to develop equitable access to higher education. KTH supports equitable access to education and encourages project initiatives and innovation through financing and programs.

The right to education and Student financial support

KTH attracts students from many different backgrounds, coming from a disadvantaged background should not be an obstacle to receiving an education at KTH. Students from Sweden and EU are not required to pay tuition fees. For students required to pay tuition fees there are a range of KTH and external scholarships available.

Students from Sweden can receive grants and loans while they study. The Swedish Board of Student Finance (CSN) is the government agency that manages Swedish student finance. For non-Swedish students there are different types of Scholarships-

KTH Scholarships and Funds

[KTH Scholarship](#) covers the full tuition fee of a one or two year master's programme. In order to get a scholarship the applicants are required to describe how they will use their education at KTH to contribute to sustainable development. 28 students were awarded KTH Scholarships in 2019. In addition, 12 students received [KTH One Year Scholarship](#). One student of Molecular Techniques and Life Sciences received the [KTH Joint Programme Scholarship](#). All of the students are enrolled in programs with the regular tuition fee (155000 SEK/year) except for Architectural students (260 000SEK/year) and the Molecular Techniques and Life Sciences (200 000SEK/year).

[KTH Opportunities Fund](#) – offers scholarships to KTH students at both undergraduate and master's level, as well as to PhD-students. Students can apply for a scholarship to fund projects, internships and research connected to their studies. Applicants must connect projects to Agenda 2030 and the global sustainable development goals. 240 000 sek in scholarships were awarded to 12 projects in 2019.

IT training at KTH for non-EU migrants

[IT training at KTH for non-EU migrants](#) is funded by the Marianne and Marcus Wallenberg Foundation and in cooperation with the recruitment company Novare Potential. The commissioned education program involves 3 to 5 months of intensive studies in computer programming to train new arrivals to Sweden who come from countries outside the EU with the aim of becoming employable in the Swedish IT sector. The program is a commissioned education and is outside of KTH's regular programs and courses.

2 Zero Hunger

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Through research, operations and on campus food services, KTH works with students, staff and food providers to support a fair and sustainable food system.

KTH Sustainable Food Network

[KTH Sustainable Food Network](#) was formed in 2019 with the goal of developing sustainable food systems and products with positive impact on health and well-being. The highly interdisciplinary

network engages and aligns the education, research and outreach at KTH towards a resource efficient and fair food system, encompassing the entire value chain. Faculty staff of different disciplines, as well as stakeholders from food industry, authorities and civil society are involved in the network.

MatLust

During 2019, the KTH Lean Centre competence centre has conducted the contract courses Lean Production and Lean Leadership, with participants from some 40 organisations. In the five-year EU project [MatLust](#), the Lean Centre is responsible for the lean programme, where companies receive both knowledge and tools to develop their activities to become more sustainable, efficient, learning and profitable. The purpose of MatLust is to strengthen growth and sustainability in the food industry in the Stockholm region. MatLust offers free development programs, activities, networks and other forms of support to small and medium-sized companies. Through the investment in Södertälje Science Park, of which MatLust is a part, Södertälje becomes a knowledge centre and a creative meeting place for food and sustainability.

Biotechnology Master's programme

Biotechnology is a rapidly growing subject area that combines knowledge of organisms with technology to use cells in new ways. It is used, for example, for research on diseases, to create new materials and to develop crops that can withstand a changing climate. [The Master of Science in Biotechnology](#) at KTH gives you knowledge that can revolutionize areas such as medicine, materials and food. The combination of biology and technology means new opportunities to solve challenges in health, the environment and how we can use nature's own processes for sustainable production of various products.

Sustainable food production and consumption course

The course [Sustainable food production and consumption](#) describes alternative food systems and their complexity in connection with the assessment of their sustainability and demonstrates the “trade-offs” of sustainability between contrasting systems (ie local vs. global, extensive vs. intensive). Topics covered are: agroecology, food and agriculture systems, nutritional cycles, effects on sustainability, life cycle analysis, climate change, ecosystem services, biodiversity, effects of land and water use, food security and sovereignty, trade, GMOs.

Procurement of food and food services

KTH has a [procedure for environmental requirements in purchasing and procurement](#). The routine states that the environmental impact of goods and services should be taken into account from a life cycle perspective, from the purchase of goods and services to the removal of returned products and waste.

To support colleagues in creating sustainable meetings and catering KTH has [Guidelines for Sustainable events](#) and Catering which includes food choices.

Campus Food Waste

During the year, KTH has collaborated with the Students for Sustainability Council, which is a group under The Student Union (THS) comprising students who have come together to promote environmental and sustainability work at KTH. For example, the students have worked with the restaurants on campus regarding their handling of food waste and disposable plastic materials.

Sustainable, healthy and affordable food choices on campus

THS restaurants run by the Student union offer affordable food for students and are not driven by profits. The ambition is to provide healthy balanced meals where large portions of the ingredients are locally and sustainably sourced.

[Restauranglabbet](#) – The Restaurant Lab uses skills and creativity for the ever-changing menu depending on what ingredients are available that day. The chefs create delicious meals with great focus on sustainability through the whole value chain. The Restaurant Lab is also a live-in-lab on KTH Campus that works for accelerated innovation within sustainable food and food industry. Through circular design-driven processes and full-scale testbeds they crossbreed academia and business towards Agenda 2030.

3 Good Health And Well-Being

Ensure healthy lives and promote well-being for all at all ages.

KTH research and education within Life Science focuses on enhancing the scientific and technological progress in life science, health and care.

KTH Life Science Technology Platform

[The Life Science Technology Platform](#) connects seven thematic research areas that mostly concerns human health and the healthcare system, but also adjacent areas, e. g. environment and sustainability. The common denominator of all research is the contribution to human wellbeing. Research areas: Bioimaging, Biomolecular Tools and Biomaterials, Infrastructure in Health, Mathematical and Computational Sciences, Medical devices, MicroNanoBio, Fundamental Research in Life Science

Science for Life Laboratory, SciLifeLab

[SciLifeLab](#), Science for Life Laboratory, is an institution for the advancement of molecular biosciences in Sweden. Life science is a field of high strategic importance for Sweden, as it impacts the development of healthcare, industry, agriculture and our environment globally. SciLifeLab began in 2010 as a joint effort between four universities: KTH Royal Institute of Technology, Karolinska Institutet, Stockholm University and Uppsala University. Today, SciLifeLab support research activities at all major Swedish universities. In addition to the academic projects, the research infrastructure has also provided services to health and medical care and to industry.

Education for good health and well-being at KTH

KTH offers a strong constellation of education that cover global challenges in the broader areas of health, environment and materials. Among them are courses and programmes that address health and aging population, sustainable production and working life, food production and clean water. Under graduate programmes that contribute to good health and wellbeing include: [Biotechnology and Medical technology](#). Master's programmes at KTH include: [Macromolecular Materials](#), [Medical Biotechnology](#), [Medical Engineering](#), [Molecular Science and Engineering](#), [Molecular Techniques in Life Science](#), [Polymer Technology](#), Sports Technology, [Work and Health](#).

Medical technology for a sustainable world

[Medical technology programme](#) focuses on learning to promote understanding and solutions for several of the global goals for sustainable development, especially the goal of Health and Well-being. Students also learn about economic and social aspects of technology and ethical issues around technology and healthcare, so that they can ensure that care is organized in an economically and socially sustainable way. Upon completion, students have the necessary tools to begin a career that will contribute to the development of sustainable healthcare, both in Sweden and in other countries where the need is even greater.

EIT Health

During 2019, [EIT Health](#), the decision was taken to finance a new Master's programme in innovative technology for a healthy living environment, starting in the autumn term of 2020. The programme will be led by KTH in collaboration with five other universities. The doctoral programme BEHealsy, in the

field of biomedical engineering and health systems, which is led by KTH, took place during 2019 and will also continue next year.

Staff working environment and wellness at KTH

KTH takes a holistic perspective on the work environment. At KTH, the term "work environment" means both the physical and psychosocial work environment as well as factors that actively contribute to the sustainable development of society. KTH regards [healthcare and wellness](#) as an important issue since good employee health means they are better prepared to meet the demands of working life. Your health is not only a personal affair, but also a shared resource, which is decisive for the organisation's performance. KTH offers all employees among other things: occupational healthcare, rehabilitation support, crisis support and stress management. As an employer KTH is legally required to supply aids to vision, such as glasses if an employee have trouble with their vision. As well, all employee are given a healthcare allowance of maximum 3000 SEK per calendar year as well as the right to exercise during paid working hours through use of a weekly health and wellness hour.

4 Quality Education

Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

KTH's steering documents determine that sustainable development must permeate all study programmes. KTH's overall sustainability goals include specific objectives for education (KTH Intranet). Education is directly linked to the global target 4.7, which states that all students should receive sufficient knowledge of sustainable development, but above all, the teaching at KTH affects every one of the sustainable development goals. At KTH, our aim is to integrate sustainable development into all of our educational programs, including doctoral programs. The number of courses specifically marked as related to the fields of the environment or sustainably has increased from 672 to 738 between 2018 and 2019.

Raising Visibility of Education and sustainable development at KTH

All students should receive sufficient knowledge of sustainable development, but above all, the teaching at KTH addresses all of the sustainable development goals. To highlight how programme content is connected to the SDGs, information has been included in all programme descriptions regarding how the programmes relate to the sustainable development goals. There are also some programmes that have specific focus on sustainable development. The number of first-cycle and second-cycle study programmes with a focus on the environment and sustainable development is the same as in recent years, with two Master of Science in Engineering programmes, ten master's programmes and one doctoral programme.

STEM and education for sustainable development

[The KTH Department of Learning in STEM](#) works with various aspects of education for sustainable development and education leadership, for example through research and development and by educating, supporting and collaborating with teachers and education program directors. A current project in collaboration with the KTH Sustainability Office evaluates the integration of sustainable development in all education programs at KTH. KTH uses the CDIO framework with particular focus on enhancing the integration of sustainable development.

Vetenskapshus/ The House of Science

About 80,000 school students and teachers pass through the [House of Science](#) each year with the purpose of inspiring and creating interest and knowledge in an environment that demonstrates science, technology and mathematics. Within the theme of environment and sustainability, there are several different school programs for different ages, where both biology and chemistry as well as

technology are used. Supervised activities for students include building and measuring Grätzel solar cells, working with wind turbine models and thinking about raw materials and products and how to reuse and recycle these. Other activities also address the issue of how food choices affect the environment. The House of Science is a centre jointly owned by KTH and Stockholm University.

Accelerating the Implementation of Sustainable Development in the Curriculum

In 2019, KTH co-hosted the symposium “[Accelerating the Implementation of Sustainable Development in the Curriculum](#)” which was open to all universities and colleges in Sweden. The conference addressed the integration of sustainable development in education at higher education institutions and was an opportunity for knowledge exchange and development.

Pedagogical development- Developing skills for teaching sustainable development

To ensure quality education for our students, KTH develops our teachers’ skills for teaching sustainable development. The pedagogical development course [Learning for Sustainable Development \(4.5 credits\)](#) is offered annually for teachers at KTH and other universities. In addition to this course, sustainable development is covered in the following higher education pedagogical courses:

- Basic Communication and Teaching (3 credits)
- Leading educational development (3 credits)
- Gender and gender equality in higher technical education (4.5 credits)
- Teaching and Learning for Challenge Driven Education in a Global Context (3 credits)
- Global Competence for Teachers in Higher Education (3 credits).

5 Gender Equality

Achieve gender equality and empower all women and girls

KTH values are based on democracy, equal value of persons, human rights and freedoms and a free and open discussion. Equality between women and men and distancing oneself from all forms of discrimination are both an issue of quality and an obvious part of KTH's values. Gender equality and diversity among employees and students is also an important resource for KTH.

The research and collaboration programme on gender-based violence

KTH, alongside Karolinska Institutet and Malmö University, has initiated a [research and collaboration programme](#) intended to combat sexual harassment and gender-based vulnerability. The goal is to establish research-based knowledge about inclusive working and study environments as well as a sustainable organisation for the prevention of sexual harassment and gender-based vulnerability in the academic world. The programme will ultimately help to strengthen and intensify the work on the university's organisational culture, with the focus on quality, sustainable development, the working environment, leadership, gender equality and equal opportunities. The programme includes a national study regarding the prevalence of sexual harassment throughout the Swedish higher education sector, the development of new research-based knowledge about sexual harassment, as well as the development of common platforms for research collaborations and the process of change.

Gender Equality in education at KTH

In 2019, ongoing pilot projects regarding gender mainstreaming in mechanical engineering and vehicle engineering have continued and been developed. Development work within the programme leading to the Degree of Master of Science in Engineering with a major in industrial economics contributed e.g. to a number of films, which were shown as a basis for discussions in the programme-related course. Within several programmes, modules in respect of diversity and inclusion continue to be implemented.

In addition to modules, several courses at KTH are offered for students and graduate students which focus on strengthening gender equality including:

- Leadership in cross cultural contexts
- Gender Structures and Gender Equality in Technology Work-Life
- Leadership and Power in Industrial Organisations: Perspectives of Gender and Diversity
- Leading Educational Development
- Practical Gender Equality and Diversity Work in Scientific, Technical and Industrial Environments
- Architecture and Gender: Introduktion
- Gender and Technology

Tekla Festival

[The Tekla Festival](#) is an annual activity that started after KTH awarded world-famous musical artist Robyn its Great Prize in 2013. Robyn wanted to use Tekla to inspire girls to take an interest in technology, a historically male-dominated sector. The festival is targeted at girls aged 11 – 15. Tekla aims to amass knowledge and experience of inspiring girls to explore technology. It does this by empowering them to build, create and test in an environment where all roles are open to them. For its first four years, the festival was held at KTH in central Stockholm. To reach a greater number of technology-oriented girls, Tekla moved to KTH Södertälje in 2019.

Tekla Internationally

KTH and the Swedish Institute initiated a collaboration centered on an international launch of Tekla. This involved the Swedish embassy in Washington DC. A further four destinations were visited in autumn 2019 and spring 2020. A final call to South Africa (planned for the spring) was postponed owing to the coronavirus pandemic.

Equal opportunities at KTH

This includes various initiatives intended to create equal opportunities in terms of salary, power and career. One example is the continued work on faculty development from a Gender equality and diversity perspective. KTH needs to have equal processes in respect of recruitment, assessment and employment, as well as the preconditions for equal resource allocation. The FFA group (responsible for future faculty) has worked from an early stage on faculty regeneration with a focus on [gender mainstreaming](#). The members of the group comprise Deputy Heads of Schools or Heads of Schools from all the Schools, and are headed by the Dean.

Integration of Gender equality and diversity perspectives

Examples of processes in which Gender equality and diversity perspectives have been integrated or developed in 2019 include:

- Continual follow-up and the quality dialogue. In the analyses, aspects regarding gender equality and sustainable development are integral parts.
- The Swedish Discrimination Act's requirements regarding active anti-discrimination measures have been integrated into the continual follow-up process
- Handling cases of sexual harassment against students
- Continued development of the local Gender equality and diversity groups and other structures for Gender equality and diversity work in the Schools, within joint operational support and within the Student Union

Leading Educational Development

The course “[Leading Educational Development](#)”, which is gender integrated, is offered every year. A new course in higher education teaching, “[Gender Theory and Gender Equality in Higher Technical Education](#)”, was conducted in 2019. This course is an important in the development work for increased gender awareness in all of KTH’s courses. The participating teachers acquire knowledge in the field of gender and education, as well as theoretical scientific knowledge that will help them in their own work regarding course arrangements. Gender research from various parts of KTH has also been included in the course. The examination contains elements where the teachers have to apply the new knowledge in analyses of their own courses.

Governance at KTH - KTH Equality Office

KTH’s work for gender equality is led by a Vice President who has support from an Equality Office. [KTH’s Equality Office](#) is a permanent unit whose function is to coordinate and support KTH’s overall work with Gender equality, diversity and equal conditions. The Equality Office with employees and a Vice President work with programs, and trainings related to diversity, equity, inclusion and human rights on campus. KTH has two main assignments regarding gender equality, diversity and equal conditions at the university. The first is the assignment based on the Discrimination Act and the seven grounds of discrimination. The second assignment is Gender Equality Integration, where universities and colleges must develop a plan for how the higher education institution intends to develop the work with gender equality integration. The Gender Equality Policy goals thus constitute the external framework for this assignment, to which KTH must contribute in its organized work for increased gender equality. The goal of gender equality policy is that women and men should have the same power to shape society and their own lives.

6 Clean Water And Sanitation

Ensure availability and sustainable management of water and sanitation for all

Through research and education in engineering, environmental science and public health KTH supports the development of knowledge and skills to achieve clean water and sanitation for all.

WaterCentre@KTH

The [WaterCentre@KTH](#) is a wide cross-disciplinary collaborative effort based at KTH Royal Institute of Technology. The centre’s mission is to bring about water innovations for a sustainable future of the Earth. The centre believes in the meeting of experts, practitioners, and policymakers. It connect scientists that never would have met and offer an arena for joint knowledge creation with industry, government and civil society. Several researchers and research projects are related to climate adaptation, climate risks including rising sea levels and flood risk management working together with municipalities in Sweden and abroad. One example concerns the project “Robust decisions for managing climate risk in Sweden” which is done in cooperation with several municipalities and counties and is funded by the Swedish Civil Contingencies Agency.

Environmental Engineering and Sustainable Infrastructure Master’s Programmes

Our society has major challenges in managing a changing climate, developing and securing good water quality. The master’s programme in [Environmental Engineering and Sustainable Infrastructure](#) offers seven different competence profiles including: Water Technology; Environmental Geotechnology and Hydrogeology; Water and Wastewater Technology; Environmental Information Analysis and Management; Sustainable Infrastructure and Environmental Systems Analysis; Sustainable Societies. There are individual courses within the programme focusing on water technology and water and wastewater engineering such as “Water and Wastewater Handling” which describe different systems for handling and distribution of water and wastewater, criteria for evaluation, and principles and fundamentals of biological, chemical and separation methods. Study visits at plants for wastewater treatment and water treatment are included in this course.

Industrial and Environmental Biotechnology Programme

The Biotechnology sector is considered to be one of the main players in the development of a sustainable society and able to tackle current and future societal challenges. The master's programme in [Industrial and Environmental Biotechnology](#) prepares students for careers focusing on the development of more effective and environmentally friendly production of commodities. The programme provides knowledge and understanding about how biological processes and cellular components are used to create new technologies, industrial processes and biotechnological products. Knowledge is acquired on how microorganisms are orchestrated to remove contaminants from water and soil or to produce biomolecules that can serve as raw materials. Microorganisms are used to design and create effective and sustainable production of products from food ingredients to detergents, paper and textiles. Sustainability is a key aspect that features in all areas of biotechnology and that continuously combines science and technology to improve, simplify or streamline industrial manufacturing of products or services.

Albano campus new water systems

In Stockholm, a cohesive university area is emerging that extends from Stockholm University in the north, via KTH over to Hagastaden with Karolinska Institutet in the west. The development of the [Albano campus](#) into a modern and competitive university environment takes place in harmony with nature and with the goal of becoming a role model in sustainable urban development. Several sustainable efforts are being pursued, including the creation of new water systems to utilize stormwater and improve the microclimate and outdoor environments that are designed to strengthen the distribution routes for plants and animals. The development project is a collaboration between Akademiska Hus, Stockholm University, KTH, Svenska Bostäder and the City of Stockholm.

7 Affordable And Clean Energy

Ensure access to affordable, reliable, sustainable and modern energy

Research and Education at KTH in the field of Energy Science and Engineering aim to gain new knowledge, and to develop technologies and systems that will allow the implementation of a sustainable global energy system with respect to both natural resources and environment. KTH offers 23 programmes with energy including the master's programmes. Energy research is conducted in a number of KTH schools, programmes and specialised research centres.

KTH's Energy Platform

KTH's [platform for research in energy](#) was created to support and catalyze interdisciplinary research in the energy field. An important goal is to facilitate interaction between expertise at KTH and external partners within academia, public organisations and companies with an interest in Energy research. Students and researchers are engaged in the global innovation effort to bring forward new solutions that mitigate the threat of climate change and resource scarcity. KTH energy research and innovation is embedded in various disciplines from nano technology to economy. Research and innovation ranges

- from new nuclear reactors to more efficient solar cells,
- from smart grids to efficient heat pumps,
- from bio fuels to batteries,
- from turbo machinery to fusion reactors.

The long term vision is to develop energy systems that eliminate the contribution to climate change while at the same time safeguarding ecosystem functions and providing people around the world with energy for their basic needs.

Using the sustainable development goals for shaping holistic energy programs, projects and policies
The SDGs provide a comprehensive, and internationally agreed, lens to understand and communicate cross-sectoral implications of energy policies, programs and projects. The aim of [this research project](#) is to create a framework for using the details of 169 Targets of the SDGs for shaping holistic energy programs, projects and policies.

Electric Power Engineering Master's Programme

[The Master's programme Electric Power Engineering](#) addresses the global demand for affordable and sustainable resources that has created a large need for electrical engineers and researchers to provide electricity and to build new smart solutions that enable a more sustainable energy management. Electric power is one of the key areas for achieving our sustainability goals. One illustration of this is that a reduction in emissions and energy consumption often results in more demands and more utilisation of electric power, typically when changing from fossil to electric power. The first year of the programme includes technology complementary courses that provide environmental, societal, and philosophical perspectives to electric power engineering. The master's programme in Electric Power Engineering covers the following areas: modelling of electrotechnical equipment, power electronics, electrical machines, power system operation and control, power system planning and electricity markets, management in power systems.

Sustainable Energy Engineering Master's Programme

[The master's programme in Sustainable Energy Engineering](#) provides state-of-the-art education in the fields of solar energy, power generation, energy utilisation, and transformation of energy systems. Also, cross-cutting and interdisciplinary challenges address multiple impacts such as land use and climate change in an integrated holistic approach. After completion of the programme, students will have a broad knowledge of energy engineering, and have acquired skills in managing complex problems, taking into account lifecycle perspective. The aim is to educate leaders and developers for future innovation in energy.

KTH Energy Dialogue

[The KTH Energy Dialogue 2019](#) offered insights from a wide area of research: disruptive business models, cyber-attacks and transparent solar-cells were all covered throughout the day. The dialogue aims to find solutions to achieve climate goals. The Dialogue creates a dynamic meeting and networking place for academia, industry and policymakers with the purpose to address challenges and visions for sustainable transformation of urban energy systems.

Renewable energy and energy efficiency in facilities on Campus

[KTH sustainability objective regarding KTH's Campuses](#) states that "The highest environmental performance must be sought when constructing or renovating facilities and buildings."

In accordance to KTH's sustainability objective, relevant new buildings on campus are built according to the environmental building standard Miljöbyggnad that includes requirements regarding renewable energy and energy efficiency. KTH's property owners comply with the Construction industry's building rules and follow Swedish legislation regarding energy declarations and energy mapping. For each campus area, KTH's property owner Akademiska Hus has separate energy plans.

KTH's property owner Akademiska hus also has a sustainability goal of halving the amount of energy purchased between 2000-2025. In addition, Akademiska hus has climate targets on:

- Climate-neutral property management until 2025
- Climate-neutral internal operations until 2025
- Climate-neutral project activities until 2045

8 Decent Work And Economic Growth

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

KTH takes a holistic perspective on the work environment. At KTH, the term "work environment" means both the physical and psychosocial work environment as well as factors that actively contribute to the sustainable development of society.

The Department of Industrial Economics and Organization (INDEK)

[The Department of Industrial Economics and Organization \(INDEK\)](#) is the intersection of management and economics, technology and science at KTH. INDEK addresses SDG 8 by investigations of the future of work and re-skilling approaches as well as policy-oriented research related to the policy of innovation and growth. The department is organized into three units:

- Management & Technology (MT)
- Sustainability, Industrial Dynamics and Entrepreneurship (SIDE)
- Accounting, Finance, Economics and Organization (AFC)

Technology, Work and Health Master's Programme

Functional and well-designed work systems, organisations and work environments are essential for a healthy and productive working life, and professionals with knowledge in proactive occupational safety and health management play a vital role. In the [Technology, Work and Health programme](#), students learn how to plan, design and analyse work environments, from the perspectives of sustainable work and organisational performance. Work is an integral part of people's lives and an essential determinant of health. Thus, the programme also relates to SDG #3: Good health and well-being. Work-related accidents and diseases are common in all countries, and students in this programme gain a broad understanding of worker's health: that of blue- and white-collar workers, of all genders, ages and socioeconomic classes.

Working environment at KTH

[Work environment](#) means all factors, physical, organizational and social, that affect employees and students at KTH, such as attitudes, leadership, behaviour towards each other, premises, equipment, furnishings, chemical products, working methods, work organization, cooperation, social interaction and the possibility of recovery and personal development.

Trade unions

There are [four trade unions at KTH](#) that support KTH staff and faculty to monitor their interests in the workplace and assist with negotiations and contacts with the employer. The union representatives elected by the annual meeting also work in general bodies where various issues are discussed. This can apply to the work environment, gender equality, collaboration, local agreements and more.

Preventing discrimination in the workplace

Discrimination on the workplace is forbidden according to Swedish law, KTH follows the Swedish legislation. This area is a very important and prioritized part of KTH's work within work environment. KTH has several documents that address working environments:

- HR policy: https://intra.kth.se/polopoly_fs/1.662200!/HR-policy%20for%20KTH%20V-2018-0156.pdf

- Guidelines on gender equality, diversity and equal opportunities:
https://intra.kth.se/polopoly_fs/1.665581!/Guidelines%20Gender%20equality%20diversity%20and%20
- Code of Conduct for employees and fellow workers:
https://intra.kth.se/polopoly_fs/1.673163!/Code%20of%20Conduct1%20V-2018-0689.pdf
- Routines for reports and investigation of discrimination and degrading treatment:
https://intra.kth.se/polopoly_fs/1.661782!/Discrimination%2C%20harassment%2C%20sexual%20harassment%20Statutory%20requirements%20and%20KTH%20responsibility%20V-2018-0634%203.pdf

9 Industry, Innovation And Infrastructure

Build resilient infrastructure, promote sustainable industrialisation and foster innovation

Investment and development of infrastructure structures within transport, irrigation, energy, information and communication are key for the achievement of The Sustainable Development Goals. The development of knowledge and skills within technology and innovation at KTH, often in collaboration with industry supports sustainable development, including economic growth, social inclusion and environmental balance.

Effect of AI on Sustainable Development Goals

The emergence of artificial intelligence (AI) and its progressively wider impact on many sectors requires an assessment of its effect on the achievement of the Sustainable Development Goals (SDGs). Using a consensus-based expert-elicitation process, KTH researchers cooperated with Max Tegmark and other researchers from New Zealand, Germany and Spain to find that AI can enable the accomplishment of 134 targets across all the goals, but it may also inhibit 59 targets. [Read the full study in Nature.](#)

KTH Industrial Transformation Platform

[KTH's Industrial Transformation Platform](#) was created to support and catalyze interdisciplinary research in the field of industrial transformation and industrialization of new products and services for a sustainable society. An important goal is to facilitate interaction between expertise at KTH and external partners within academia, public organisations and companies with an interest in research about Industrial Transformation.

Programme Industrial technology and sustainability

The programme [Industrial technology and sustainability](#) teaches students to understand and develop solutions for several of the SDGs, including the goals of Sustainable Industry, Innovations and Infrastructure as well as Sustainable Consumption and Production and Decent Working Conditions and Economic Growth. Students learn about sustainability from an industrial perspective, for the environment, work and competitiveness. The students learn and receive instruction in communication, argumentation, debates and negotiation, for example about which sustainability aspects a business should measure or debate about future technology and work in industry. These skills are crucial for collaboration and required to solve complex problems.

Entrepreneurship and Innovation Management Master's Programme

The master's programme in [Entrepreneurship and Innovation Management](#) is designed to give students a focused, relevant and utilisable body of knowledge in this diverse and modern field. The programme is ideally suited for those with an interest in starting and managing innovative projects or new economic endeavours. The programme helps to improve employment opportunities, particularly for young people who have business ideas by teaching and coaching students in creativity, innovation, entrepreneurship and how to identify business opportunities. To promote sustainable

industrialisation, this programme provides knowledge in the field of industrial dynamics with an emphasis on innovation and entrepreneurship aiming towards technical creativity. Moreover, students will get an opportunity to learn about the responsible consumption of natural resources and production by the application of creative ideas, entrepreneurial approaches and innovative management.

Transformation Day 2019

The platforms for Industrial Transformation and Transport invited to [Transformation Day](#), a joint day focusing on transformation of the automotive industry and transport systems. The discussions focused on how KTH contributes to the industry's conversion of products, business models, production and methods regarding vehicles and infrastructure. At KTH, we want to create a common image for how we can focus our research and our commitment to offer key competence in the process of transition for a sustainable society.

KTH Innovation

In 2019, [KTH Innovation](#) initiated work to identify how ideas in the innovation support process relate to the UN Sustainable Development Goals, aiming to increase the number of ideas that contribute to sustainable development. The project included allowing idea owners to map their ideas against the UN goals as a way of identifying impacts and motivating them to make choices that lead to a more sustainable business model at an early stage in their development.

SKOPAS

In 2019 the KTH spinoff [SKOPAS](#) was accepted into the yearlong KTH Innovation pre-incubator program. Every year, hundreds of millions of batteries are sold worldwide. Most are not recycled. By using carbon made from natural, bio-based materials in a new generation of batteries, so called hybrid electrochemical capacitors, SKOPAS develops energy storage solutions that are both green and clean. Their batteries will use no materials that are rare or toxic, like lithium, but will simply put be made of only water with a little bit of salt and carbon, in a biodegradable shell. In the future, this kind of battery could be used in for example wireless payment solutions that need to be charged very quickly, or to store energy from solar cells in your home.

10 Reduced Inequalities

Reduce inequality within and among countries

As part of KTH's core values of democracy, the equal value of human beings, human rights and freedom and free and open discussion, KTH works to reduce discrimination and to promote equality and diversity at KTH and in society through research, education and operations.

Real Estate and Construction Management

The [Department of Real Estate and Construction Management](#) has social sustainability as one focus aspect in their research. The main focus areas related to social sustainability are:

- housing owners' strategies for building social sustainability (rental policies, owner incentives, financial viability from a societal point of view)
- conversion of rental apartments to housing cooperatives and private ownership in low-income areas including legal aspects, feasibility, integration, prices and neighbourhood effects
- sustainable renovation strategies in 1960s housing areas
- urban development work in a segregated city with filtered housing areas
- municipal housing social programs; effects of rental policies on discrimination and segregation
- gender aspects in real estate management (collaboration with Malmö University).

Sustainable Urban Planning and Design

The master's programme in [Sustainable Urban Planning and Design](#) focuses on the interrelationship between the built environment and social, economic and institutional forces. The programme develops professionals with a profound and broad understanding of the multiple factors in sustainable urban development. Students are trained to alter planning and design practices to respond to the environmental conditions and societal needs of the future. Equity and equality are core qualities of sustainable societies, involving, for example, equal access to housing, public services and transport systems. The causes and consequences of inequality are analysed in courses such as Introduction to Urban Economics and Planning Theory and Urban Governance, and students will learn to address equality issues in urban planning and design in project courses.

Planning for Environmental Justice in Social-Ecological Systems

The course [Planning for Environmental Justice in Social-Ecological Systems](#) focuses on environmental justice regarding access to and use of ecological resources. The course illustrates and discusses the ecological resource base needed to support urban structures and a consumption-intensive lifestyle, as well as how natural resources and negative environmental impacts are distributed among different groups in society.

JUSTAINABILITY

In the face of multiple and overlapping global crises, demonstrated by an intricate blending of socio-ecological problems, [JUSTAINABILITY](#) focuses on grassroots organizations and local communities worldwide, who resist contamination, expropriation, and exploitation while experimenting with alternative sustainabilities. Those experiences have contributed to an accumulation of transformative knowledge that allows us to understand and react to the multiple crises in different ways. Strengthened both with academic and practitioner partners in 8 countries (Brazil, India, Italy, Portugal, Spain, South Africa, Sweden and Turkey), JUSTAINABILITY aims (a) to recover and understand the envisioned alternative sustainabilites, (b) to catalyze the interaction of their proponents, and (c) to legitimize and incorporate grassroots knowledge and experiences in the collective search for transformations to sustainability.

Measures against Discrimination

KTH is an administrative authority, as such the basic provisions for the employment of teachers and students are prescribed in the legal regulations for central government sector employment and in general labour law legislation. According to the Instrument of Government (1974:152), administrative authorities shall take into account everyone's equality under the law and shall observe objectivity and impartiality. The law also states that central government sector appointments shall be based on reasonable grounds such as length of service and expertise. Additional provisions are found in the Public Employment Act (1994:260) and in the regulations on application in the Employment Ordinance (1994:373). There are also specific regulations for public higher education in the Higher Education Act (1992:1434) and the Higher Education Ordinance (1993:100). Provisions may also be found in the Discrimination Act (2008:567), the Administration Act (2017:900) and the Language Act (2009:600). [Active measures at KTH](#) - In cases of perceived discrimination, employees may make a complaint directly to the Discrimination Ombuds Office. This complaint to the Discrimination Ombuds Office may be made parallel with [a complaint to KTH](#).

Linnaeus-Palme

[Linnaeus-Palme](#) is a SIDA-financed exchange programme with the focus on stimulating bilateral exchanges between universities and other educational institutions in Sweden and developing countries. KTH was awarded two Linnaeus Palme projects for 2019, for student and teacher exchanges in the fields of energy engineering and health informatics.

11 Sustainable Cities And Communities

Make cities inclusive, safe, resilient and sustainable

KTH's campuses are situated in the region of Stockholm Sweden, one of the fastest growing urban centers in Europe. Education, research and collaboration with local communities at KTH has the opportunity to help form inclusive, sustainable and smart cities that support rural-urban linkages that are socially, environmentally and economically beneficial, and respectful of basic human rights.

Research for new transport solutions

The strategic research area [TRENOP](#), research for new transport solutions, has announced six new faculty positions, one of which in the field of railway systems is already in place. A national agenda, Green Infrastructure Material Innovations, has been established, enabling structural support for innovation projects in the field of transport infrastructure. The project ELISA aims to demonstrate how smart ports (automation within transport, smart roads, AI can support sustainability in critical infrastructure.

GrönBostad Stockholm (Green Housing Stockholm)

The aim of EU project [GrönBostad](#) Stockholm (Green Housing Stockholm) is to strengthen the collaborative structures within housing construction in the Stockholm region, at the same time as creating better conditions and opportunities for SMEs to enter into these collaborations with innovative and environmentally friendly products and services. Grön BoStad Stockholm is a collaborative project that contributes to sustainable urban development, reduced segregation and the transition to a low-carbon economy.

Albano is Sweden's first campus area to be Citylab certified

On the [Albano campus](#), 70,000 square meters of new university premises, 1,000 student and research housing as well as landscaped parks, shops and restaurants are being built. The area will be the first campus environment in Sweden to be certified according to Citylab which, unlike other environmental certifications, does not only apply to an individual building but covers an entire urban development project. Albano stands out as an urban development project on the cutting edge of sustainable urban development. The development of the Albano campus into a modern and competitive university environment takes place in harmony with nature and with the goal of becoming a role model in sustainable urban development. Several sustainable efforts are being made, including strengthening the possibility of increased species richness for, for example, pollinators and birds. New water systems are being created to take care of stormwater, improve the microclimate and outdoor environments that are designed to strengthen the distribution routes for plants and animals.

KTH Campuses and Public access

Apart from research and education there are many central functions common to all of KTH's five campuses: Student health, Library, Info Centre, Sports centre and Housing agency. The public and local communities have free access to the university libraries, buildings of cultural historical value, concerts with the academic orchestra, open lectures and KTH Campus guided tours in art, architecture and history. Events at the old Nuclear Reactor hall and Open laboratories. Art collections can be viewed in buildings open to the public. The campus green spaces are also used by the public, with outdoor seatings, outdoor gym, and access to the National Park, urban gardens and beehives.

12 Responsible Consumption and Production

Ensure sustainable consumption and production patterns

At KTH, research and education for responsible consumption and production focuses on areas such as logistics, system knowledge, process development, optimization, quality improvement, and design and product development. Strong ties to business, industry and civil society leads naturally to excellent conditions to create sustainable manufacturing industries and sustainable consumption practices.

MISTRA Sustainable Consumption

KTH is host to [MISTRA Sustainable Consumption](#) a research programme between academia and partners from business, the public sector and civil society participate in the program organizations. The aim is to stimulate a transition to sustainable consumption by generating in-depth knowledge on how niche sustainable consumption practices can become mainstream in the areas of food, vacation and furnishing. The programme examines niche sustainable consumption practices and develop roadmaps for how they can be scaled up and mainstreamed by policy makers, business, civil society organizations and citizen consumers.

The vision is that by 2030 sustainable consumption practises have become mainstream in Sweden, to a significant extent catalysed by our programme through knowledge generation and practical change. This transition has by 2030 contributed to a better quality of life, and equity, within and across borders, and have made Sweden – its companies, governmental bodies, and civil society – an internationally recognized example showing that sustainable prosperity is possible.

KTH's investment in sustainable production in Södertälje

In June 2014, an agreement was presented between KTH, the Swedish Government, the Municipality of Södertälje, Scania, AstraZeneca and the company Acturum regarding an education and research initiative in Södertälje. One of the aims of the initiative is to strengthen the competitiveness of Swedish industry through cutting-edge education and research. The research profile for the department's sustainable production development in Södertälje has three different specialisations: production management, industrial reliability and production logistics. The agreement includes an investment in four new educational programmes, with the aim of doubling the number of educational places on [KTH's campus in Södertälje](#) in the long term.

Sustainable Production Development Master's Programme

The master's programme in [Sustainable Production Development](#) fosters knowledge and skills of graduates that contribute to a renewal of industrial production. Advanced knowledge and skills in the design and development of production systems are needed in order to address emerging challenges. Rational and cost-effective production systems have been key to industrialisation and wealth for decades. However, the area is experiencing change and pressure in different dimensions, which are altering the role of production systems. Requirements of more renewable energy use and circular material flow, increased digitalisation and automation, new manufacturing technologies, as well as service integration and the emergence of new business models are among the phenomena shaping production system development and change. Based on a systemic understanding and courses run in close collaboration with manufacturing companies, programme graduates will be prepared for leading the development and design of production systems, as a part of the solution towards a sustainable society, attractive workplaces and competitive industries. This programme is closely linked to the growing research activities at KTH Södertälje and the industry in the regions.

EIT Raw Materials

Within [EIT Raw Materials](#), the main focus is now on courses and study programmes with a particular focus on sustainability issues, such as life cycle analysis, recycling and replacement of critical raw materials.

KTH Waste project

A waste project aimed at improving and achieving a uniform [sorting of waste](#) at source system for the whole of KTH has continued during 2019. The project includes the introduction of sorting food waste and packaging. Most of the teaching premises on all the campuses have received uniform sorting at source facilities during the year. At most Schools, food waste and paper packaging waste sorting has been launched. The introduction of uniform signage and information about sorting at source has also taken place during the year.

Reuse and Purchasing at KTH

The School of Industrial Engineering and Management (ITM) has worked actively to coordinate reuse and purchasing aimed at [reducing the amount of waste](#), for example through the purchase of uniform waste receptacles. During the year, the KTH Sustainability Office has been involved more actively in the procurement process, to support the setting of environmental and sustainability requirements in procurements. The work regarding the following up of stipulated requirements has commenced.

13 Climate Action

Take urgent action to combat climate change and its impacts

Higher education institutions (HEIs) have a central role in efforts to combat climate change. KTH has an important task to contribute through our education, research and external engagement and collaborations, but we also need to contribute by reducing the impact of our own operations. We work actively to reduce our own climate impact but allocating resources so that we can achieve these targets and conduct follow-ups.

Electrical Engineering

The department of Electrical Engineering are conducting research where climate is central in some research questions, e.g.: How do we adapt the electric power grid so that it can handle 100% renewable energy sources from hydro, wind and solar power? How can we balance the level of automation and control of power systems, needed for stability, cost efficiency and reducing climate impact with the costs and risks associated with increased computing and communication? The research contributes both to SDG 7 and SDG 13. The department also contributes to SDG 13 by researching electrification of the transport sector with new core knowledge and innovative solutions from several areas within EE such as electrical machines, power electronics and electronic systems.

Sustainable Development, Environmental Science and Engineering (SEED)

[The Department of Sustainable Development, Environmental Science and Engineering \(SEED\)](#) has developed environmental declarations for building materials for new buildings. There is a new regulation on climate declaration for buildings, which shall be effective by 2022 and where SEED has been highly involved in designing the method that should be used (simplified lifecycle analysis). The increased political will to introduce regulation to promote the reduction of climate impact from construction of new buildings was largely due to a series of LCA studies of buildings performed by SEED in cooperation with IVL, Sveriges Byggindustrier and a large number of construction sector stakeholders. SEED is currently commissioned to write a road map for the development of this regulation in Sweden and collaborate with the Nordic countries to promote Nordic harmonization on this topic.

Civil and Architectural Engineering

The master's programme in [Civil and Architectural Engineering](#) train students in design and also in how to build our future homes and infrastructure, as well as roads, bridges or tunnels, with all the challenges related to sustainability and the real demands of society. The programme also focuses on how a structure performs throughout its entire service life, not just during the building phase. Students work on developing and designing buildings and infrastructure with regard to human conditions and needs, and society's objectives for economically, socially and ecologically sustainable development. Some examples are the use of energy from wastewater to heat houses, the development and usage of vacuum insulation panels for isolation of houses, and planning construction process where we take in account all aspects such technical, environmental, economic, social and aesthetic.

Transport and Geoinformation Technology Master's Programme

The main focus areas of the Master's programme [Transport and Geoinformation Technology](#) are crucial infrastructures in the creation of sustainable cities, countries and communities in general.

Functional and well-developed transport systems are essential in a sustainable and prosperous society. Planning, building and maintenance of such a system demand knowledge of transport and geoinformation technologies, as well as an understanding of how new technologies and policies are adopted, how they interact and how they affect our daily activities.

Climate and Economic Research in Organisations project (CERO)

Within the framework of the Travel-free Meetings in Public Authorities project (REMM), KTH has continued working on the Climate and Economic Research in Organisations project (CERO) in a collaboration between the KTH Sustainability Office and an academic researcher at the School of Architecture and Built Environment. The project includes both financial and environmental analyses of business trips and commuter travel as well as workshops. A travel habits survey was conducted, where KTH's employees answered an online questionnaire about their travel to and from work and about their business trips. The results have formed the basis for the ongoing work aimed at reducing emissions from KTH's travel. An action programme has been developed in collaboration with a number of departments within joint operational support.

The Climate pot

[A climate pot](#) was introduced in 2019 with the aim of encouraging reduced air travel by earmarking funds from each School's basic funding for 2020 for projects that reduce KTH's emissions and help KTH to achieve its sustainability goals. The size of the climate pot allocated to each School is based on the School's travel.

The Climate Framework

In 2019, KTH and Chalmers University initiated [The Climate Framework](#) for Swedish Higher Education Institutes (HEIs) which 38 HEIs have signed. The initiative was presented with The ISCN award for Whole Systems Approach to sustainable development. Working together with The Higher Education sector in Sweden a ground-breaking climate framework was created to guide the development of individual climate strategies aiming to bring institutions into line with national and international commitments including the Paris Agreement's 1.5C warming limit and the Swedish national target to become climate neutral by 2045. This national agenda has the objective to both reduce direct emissions of all Swedish Higher Education Institutions (HEIs) as a collective and to ensure that Swedish HEIs integrate climate action in education, research and external collaboration. This is a whole-system approach as well as a whole nation project. The signatories include all types of HEIs including large comprehensive universities, large specialized universities, medium sized University colleges, and several smaller specialized HEIs in all areas. It also includes both private and public HEIs.

KTH's Climate objectives and measures

In accordance with The Climate Framework, KTH developed [climate objectives and measures](#) during 2019. The climate objectives and measures will directly affect KTH's employees and students, as well as KTH's property owners, business partners, financiers and other external partners where so is relevant. Objectives and overall measures address the areas that have a major impact from a climate strategy perspective. It concerns KTH's activities: education, research and collaboration, and the impact from its own activities through e.g. waste management, travel and procurement.

In addition, Many of [KTH's Sustainability Objectives](#) related to the campus have implications for climate change including energy use, waste management and transport to and within our campuses. The Objective related to [transportation](#) concerns emissions of carbon dioxide from air transports. The target related to investments has been operationalized as a near complete divestment from companies related to fossil fuels. The target on procurement includes climate aspects. The overall environmental management system can therefore be seen as part of the climate action plan for the university.

14 Life Below Water

Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Through education, research and supporting collaborative management and conservation can universities contribute to protecting and preserving aquatic ecosystems. KTH is also active in developing sustainable use of marine resources for food, materials and energy.

WaterCentre@KTH – Innovations for the Blue Planet

[The Water Centre at KTH](#) is relevant for both SDG 6 and 14. It is a broad collaborative effort based at KTH Royal Institute of Technology. It's mission is to bring about water innovations for a sustainable future of the Earth based on meetings of experts, practitioners, and policymakers. WaterCentre's research focuses on four themes that combine the wide expertise at KTH around society's challenges with water: Circular, Decentralised, Digitalised and Marine. The centre connects scientists within IT/ICT, Marine science, Water science and treatment and Water system and management and offer an arena for joint knowledge creation with industry, government and civil society.

Environmental Genomics study

The research group of [Environmental Genomics](#) study how complex communities of microorganisms influence human health and play important roles for earth's geochemical cycles. Recent advances in high-throughput biology techniques make it possible to study the genetic potential and functional activities of natural microbial communities without the need for culturing. The major focus is the Baltic Sea, where the work follows two major trajectories:

1. To model the microbial ecological network that underpins the pronounced season dynamics in microbial community composition of surface waters.
2. To reconstruct the genomes of the most abundant microbial players.

Kristineberg Center for Marine Research and Innovation

The research and innovation platform [Kristineberg Center](#) is a collaboration between the University of Gothenburg, Chalmers, KTH Royal Institute of Technology, IVL Swedish Environmental Research Institute, RISE and Municipality of Lysekil. At Kristineberg Center there is marine university education and research focusing on ocean acidification, microlitter and innovation.

15 Life On Land

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss

KTH contributes to sustainably managed terrestrial ecosystems through education and research but also through the management of our Campus environments together with the land owners.

CoNature – embedding nature protected areas to support ecosystem services at the landscape scale

The [CoNature](#) project explores the potential of nature-protected areas to support biodiversity and ecosystem service benefits at a landscape scale. This is done by: i) developing an assessment system for ecological and social boundaries and bridging elements in landscape transition zones, ii) evaluating this system in an urban landscape and iii) formulating guidelines for how to better connect protected areas to their surrounding by interventions in the transition zones and wider landscape.

Sustainable Urban Planning and Design

The master's programme in [Sustainable Urban Planning and Design](#) focuses on the interrelationship between the built environment and social, economic and institutional forces and is relevant for several SDGs including SDG 15. The programme develops professionals with a profound and broad understanding of the multiple factors in sustainable urban development. Students are trained to alter planning and design practices to respond to the environmental conditions and societal needs of the future. To minimise the environmental impact of urban development, innovative solutions are required. Through exercises and lectures, students will be encouraged to incorporate new technologies, sustainable materials and green solutions, as well as strategies that reduce the need for urban expansion in their proposals to enhance ecosystem services and sustainable management of natural resources.

Campus plan 2018-2023

KTH and the main landlord Akademiska hus have developed a strategy for the development of KTH's various campuses for the period 2018-2023. [The campus plan](#) for KTH is a guideline for continued development of sustainable and inclusive campuses that we can all be proud of. One of the focus areas of the Campus is Ecosystem services and optimized spaces. The aim is to ensure that multifunctional spaces secure ecosystem services, maintaining and/or creating resilience by developing spaces such as parks and green corridors and utilizing stormwater. Spaces should preserve and strengthen ecosystem services and climate adaption and developing ecological values. Based on previous inventories of trees and insects, the KTH campus is developing green spaces for greater biodiversity.

16 Peace, Justice And Strong Institutions

Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Peaceful, just and inclusive societies are necessary to achieve the UN Sustainable Development Goals (SDGs). Effective and inclusive public institutions are needed to further Agenda 2030 and the SDGs. Governments, civil society and communities must work together to implement lasting solutions, and universities such as KTH must support this working by example and by providing expertise and knowledge as a basis for well-grounded policy and decision making.

KTH's organisation

The University Board is the top executive unit. The chair of the board is together with other societal representatives appointed by the government. Other members of board are the president of KTH, faculty members elected by the faculty and student representatives appointed by the student union. Union representatives can participate and express their opinions. The president's strategic council includes all heads of schools, all vice-presidents, the deputy president, the university director, the dean and pro-dean of the faculty which are elected by the faculty and student representatives. There are currently six vice-presidents appointed by the president for specific tasks including one for sustainable development and one for gender equality and values.

KTH working with government

KTH's researchers are involved in several investigations and delegations that support the government's work. This includes, the [Government's Innovation Council](#), [the Government's Scientific Council for Sustainable Development](#), [the Climate Policy Council](#), [the Collaboration program for Health and Life science](#), [The delegation for circular economy](#) and [the Agenda 2030 delegation which delivered](#) its final report to the Government in 2019 with proposals and assessments for Sweden's continued implementation of Agenda 2030 for sustainable development.

Official remittance and consultation responses

Before the Swedish government takes a position on a proposal, proposals are sent for consultation to authorities, organizations and other stakeholders. All answers and other remittances in connection with the referral are included in the basis for the decisions that follow the referral. As a public University KTH is a remittance body to the government when it comes to investigations, legislation, policies and strategies in sustainable development. Remittance and consultative responses are [recorded and open to the public](#). Examples include [Revised Climate and Energy Strategy 2020-2045 for Stockholm County](#), [Longer trucks on the Swedish road network - for more sustainable transport](#), and the [Agenda 2030 delegation final report](#).

Making Universities Matter: A Knowledge Platform on the Role of Universities in Society

Within this knowledge platform, [Making Universities Matter](#) sets out to understand how universities arrange their activities and how they are aligned with different interests in society. The platform studies how the blend of missions and tasks of universities has evolved over time, and will relate that mix to institutional specificities such as state governance and how universities interact with students, scientific communities, and stakeholders in industry, government and civil society. It also seeks to elucidate cross-national differences and similarities in the institutionalization (and change) of universities: in Sweden and other countries in Europe, and through relevant comparisons with the evolution of university roles in North America and Asia. The platform also aims to engage in policy debates on universities, providing with policy relevant briefs and serving as a forum for topical discussion.

Real Estate Planning and Land Law

One clearly and legally bounded area is the property unit, which aside from land can also include buildings and facilities. The owner has certain property rights with regard to that property unit. But various other rights can be connected to the property, such as the right of common (allmansrätt), the right of way, the right to hunt and fish, and utility easement. The Division of [Real Estate Planning and Land Law](#) engages in teaching and research on how rights associated with land use and real property can be established and/or adapted in order to facilitate desirable societal development. For example the construction of buildings with complementary infrastructure, or the conservation and protection of valuable natural areas.

17 Partnerships For The Goals

Strengthen the means of implementation and revitalise the global partnership for sustainable development

KTH is part of various regional, national and international networks and partnerships that work with sustainability issues through exchange of knowledge, experiences and resources. These networks span academia, industry and civil society. Multilevel partnerships are key to implementing the goals of Agenda 2030.

Examples of our partnerships include:

- [OpenLab](#) is a challenge-driven innovation environment for collaboration between the City of Stockholm, Region Stockholm, the County Administrative Board of Stockholm County, Karolinska Institutet, Stockholm University, Södertörn University and KTH. The core of the activities is interdisciplinary and multidisciplinary second-cycle courses as part of a collaboration between the participating universities and other institutions of higher education. In addition, OpenLab conducts workshops and other activities where different parties meet, under new forms and ways, in order to develop proposals to deal with the challenges facing the region.
- KTH has a longstanding strategic partnership of [SEI Stockholm Environment Institute](#) an NGO Think Tank within environmental and sustainable development. SEI is an international research institute focusing on policy and the application of integrated knowledge within environmental and development issues. The institute works to reduce the gap between

research and decision-making. KTH's Vice President for Sustainable Development is on the board of SEI and there are 10 researchers from the institute affiliated with KTH.

- KTH has continued to participate in the UN's 10-year framework programme for sustainable consumption and production with a focus on procurements.
- MLUH – Miljöledare I universitet och högskolor. MLUH - Environmental leaders within universities and colleges is a Swedish network working to strengthen and develop environmental management systems environmental management in Sweden. The network meets for annual conferences and works continuously throughout the year on key issues. In 2019 the network was integral to the creation of The Climate Framework for HEI's in Sweden.
- The project [Frontrunners for Sustainable Innovation](#) has collaborations taking place along with test and demo environments OpenLab, Kista Science City, Urban ICT Arena and Södertälje Science Park. The project focuses on KTH's research and education, together with SMEs, contributing to solutions to societal challenges through digitalisation, life sciences and environmental and climate technology. The project addresses sustainability issues in line with Stockholm's objective of being a smart sustainable and connected world-class city in 2040.
- KTH is a member of the [Sustainable Development Solutions Network Northern Europe \(SDSN NE\)](#) which is a regional SDSN network for Northern Europe and part of the global SDSN. The SDSN NE pools knowledge, experience and capacities of the regions' academic, business and civil society actors and strives to promote the national and regional sustainable development of Northern Europe, as well as the region's efforts for sustainable development worldwide.
- KTH is co-host of [ISCN - International Sustainable Campus Network](#). The mission of the International Sustainable Campus Network is to provide 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.
- By establishing [KTH Global Development Hub \(GDH\)](#), KTH is developing coordinated education and innovation activities for global development. We are creating a new cooperation model to find solutions for locally formulated challenges. We are working on an educational method that develops skills, new business models, technologies and services that solve social challenges with relevance in both Sweden and Africa. The initiative is scalable and aims to inspire others. The primary impact of the implementation of GDH are students with skills and confidence to solve societal challenges, bridging the gap of disparate backgrounds, living conditions and cultural context, collaborating for a sustainable global future

Times Higher Education Impact Rankings

KTH Royal Institute of technology is currently ranked No. 77th in the Times Higher Education Impact Rankings. The ranking assesses the social and economic impact of higher education institutions, using the UN's 17 Sustainable Development Goals as criteria. KTH's standing in the Impact rankings is an acknowledgement of our commitment to sustainability and contributions to sustainable development through research, teaching, collaboration and operations.

Among the 17 SDGs, KTH placed 52nd in Sustainable Energy for All; 55th in Sustainable cities and Society; 13th in Sustainable Consumption and Production; and 51th in Climate Action and 14th in Partnerships for the goals.

About This Report

In this report, we highlight some of the many research, education, outreach and operational activities at KTH that contribute to the achievement of the United Nations Sustainable Development Goals. This report is the first where KTH examines the connections between our core business and operations to the sustainable development goals. The report will be further developed in the future. Comments and suggestions are welcome!

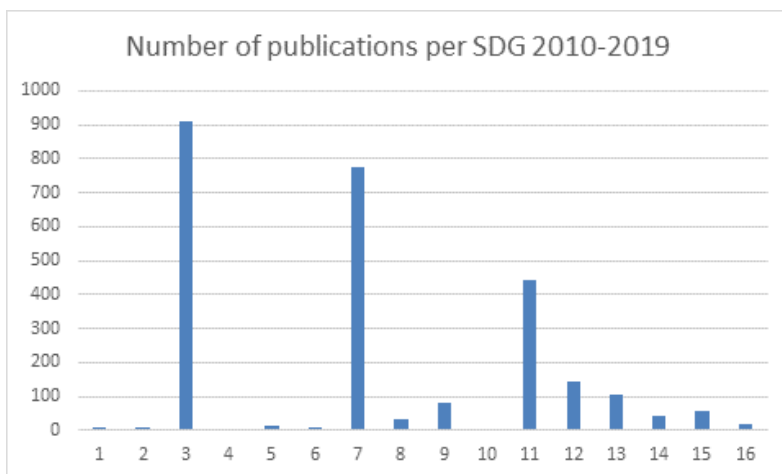
The report was developed by Erica-Dawn Egan, Sustainability Strategist at KTH Sustainability Office with the help of colleagues in many different parts of KTH. It is based on KTH's Annual Report, KTH's Sustainability Objectives report, website review and review of articles and other sources.

Bibliometrics

According to a report recently published by the Swedish Foundation for International Cooperation in Research and Higher Education (STINT), 19 % of all publications from KTH 2015-2019 related to one or several SDGs (4.287 SDG-publications of total 22.020 publications, the Elsevier methodology was used on Scopus data). This comprises 4,7% of the total SDG-publications from Sweden (4.287 KTH, 91.956 Sweden).

Another bibliometric analysis conducted by KTH with the Elsevier methodology on the Web of Science database captures fewer publications but gives us complementary information. KTH has according to this analysis in total published 2350 articles that relate to one or several of the SDG:s in the years 2010-2019. Among those, SDG 3 Good health and well-being has most hits, followed by SDG 7 Affordable and clean energy, and SDG 11 Sustainable Cities and Communities (see figure).

The mean field normalized journal impact of these publications are 1,30, and 57 % are internationally co-published.



Figur 1: KTH articles published per SDG 2010-2019