



Environmental Statement 2019

of the University of Bremen



Universität Bremen



Dear University Staff, Dear Interested Readers,

As of 2019, the University of Bremen has successfully been following the EMAS environmental management program for over 15 years. Currently, the focus is on the 17 Sustainable Development Goals (SDGs) established by the United Nations in 2015, the so-called “2030 Agenda”.

The Sustainability Forum deals intensively with the question of how these goals can be implemented at the University of Bremen. The university seeks to incorporate the following goals through its environmental management:

- 3 – Good Health and Well-being;
- 6 – Clean Water and Sanitation;
- 7 – Affordable and Clean Energy;
- 11 – Sustainable Cities and Communities;
- 12 – Responsible Consumption and Production;
- 13 – Climate Action;
- 14 – Life Below Water;
- 15 – Life On Land.

Thus, the university would like to engage in the public debate in the State of Bremen.

Successful completion of the aforementioned goals will bring with it many challenges, especially in regards to the extensive renovation projects underway. For example, when planning new buildings, such as the new natural science “BIOM” building or the new lecture and event center, climate protection must play an important role.

I would like to thank all of our committed employees. Without your efforts, creating a more environmentally friendly campus would not be possible.

A handwritten signature in blue ink, appearing to read 'Mehrtens'.

Dr. Martin Mehrtens
Director of finance and administration of the University of
Bremen





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The University of Bremen

The History of the University of Bremen

Founded in Times of Social Reform

The University of Bremen is a young university. It was founded in 1971 for the purpose of teacher training. What was to become known as the “Bremen Model” was conceived in times of social reform. Its core elements apply to this day and it was these basic principles, which first made the subsequent research success possible: interdisciplinary orientation, research-based learning in teaching projects, practice oriented, and social commitment. Some new guiding principles have been added since: internationalization of teaching and research, equal gender opportunity, and environmental responsibility.

Consolidation in the 80s – Travelling Along the Road to Success

Following the founding of the university — as an “academic complex” on the outskirts of the town — and a number of reforms in the early years, a period of consolidation set in through the nineteen eighties. The University

of Bremen grew in size. New faculties for natural science and engineering were established, the university started a cooperation with the Alfred Wegener Institute for Polar and Ocean Research in Bremerhaven, and the Technology Park was created (1988).

The University of Bremen also began to score its first successes with the establishment of Collaborative Research Centers (in 1988 the University was accepted into the German Research Society – DFG) and the acquisition of substantial external funding. Steadily improving research rankings, growing national and international recognition, and a large number of endowment professorships were the visible fruits of this success.

The university advanced this success further by establishing a set of new guiding principles. Among other things, the university concentrated efforts on the promotion of young research talent and implemented personnel development programs for its young researchers, many of whom were awarded professorships in the wake of the generation change that was taking place.

In addition to all this, teaching and studies at the University of Bremen underwent considerable change: A new admission policy, for instance, with program-specific enrolment requirements, and the swift transition of study programs to bachelor's and master's degrees. The reward for this commitment came with the title "City of Science 2005", awarded to Bremen and Bremerhaven as result of joint efforts in the fields of science, politics, culture, and in the enterprise sector.

Today, some 25,000 people study, teach, research and work at the University of Bremen. It has become the center of science and research in the North West of Germany, particularly renowned for its strengths in the natural and engineering sciences as well as the social sciences and the humanities. The work carried out by its excellent researchers, many of whom of world renown, provides an important stimulus to societal development. Their successes are also reflected in the university's outstanding performance in the Excellence Initiative 2012; however, the university is not content to bathe in past success and simply rest on its laurels. As a "learning organization", it is constantly striving to reassess its role in present and future research and in the academic landscape.

The University at a Glance

(rounded values)

Number of students: 19,500 (51 % female)

Students by faculties

7,700 Natural Sciences and Engineering
11,800 Social Sciences and Humanities

Graduates: 3,300

1,800 bachelor's degree
1,400 bachelor's degree
120 state examinations in law
330 doctorates and habilitations

Employees: 3,500

2,300 academic staff
(320 of which are professors)
1,200 non-academic staff

Budget (in million euros)

330 total
110 third-party funding

International Network

2,300 total international students
1,000 from Europe
750 from Asia
300 from Africa
200 from America

680 partner universities

Prizes

19 ERC grants
6 Leibniz Prizes

Area

Campus total:	462,300 m ²
main useable area:	197,000 m ²
floor area:	136,800 m ²

Source: 2018/19 – Uni in Zahlen

Core Guiding Principles

Interdisciplinarity, practice orientation and social accountability are the decisive factors that shape the university's guiding principles in the areas of teaching and research. Over the years, these founding objectives of the University of Bremen have been expanded by gender equality, ecological accountability, and the internationalization of teaching and research. These main goals of the university were formulated in the year 2000 and are to be understood against this background. Today, some references may seem less up-to-date, other important objectives have been included, and some of the above principles are by now firmly anchored in the university's repertoire.

At the end of 2017, the university defined its future development and concrete objectives for the coming ten years in its policy statement Strategy 2018–2028.

High Quality of Teaching and Research

The highest aims in teaching and research are to provide high quality and specialist competence. To achieve these aims, the University of Bremen a long time ago introduced internal measures for student evaluation of its teaching, as well as external evaluation and accreditation of its study and research programs. Multifaceted specialist competence and fundamental research form the basis for finding interdisciplinary solutions to problems. Fundamental research and applied research mutually enhance each other in the search for new insights.

Practice Orientation and Commitment to Society

At the University of Bremen, science is not confined to an "ivory tower". Rather, it aims at finding concrete and sustainable solutions to societal issues. In its teaching and research, the University of Bremen comes to grips with the practical phenomena of politics, the economy, culture and society as a whole. Examples of this are: environmental protection via resource-efficient production processes, the development and deployment of new technologies in industry and the service sector of the economy, teaching future-oriented qualifications in academic studies and continuing education. Continual contact with the practice and social integration belong to our no-

tion of science, and include lectureships for practitioners, cooperation projects with private enterprises, internships and practical semesters for our students.

The instructional staff and students of the University of Bremen must be dedicated to the fundamental values of democracy, human rights, and social justice, which in many areas have become topics of teaching and research. They will continue in future to focus on the consequences of research for the economy, politics and culture, and on the possibilities for the environmentally-friendly application of research findings (e.g. anticipatory technological and economic policies, no armaments-related research). The university's social commitment begins in the region, i.e. a firm commitment to the sustainable development of the state of Bremen. It also stretches to issues of social justice in general and underdevelopment (North-South divide).

Interdisciplinary Orientation

Technical, social, ecological and cultural issues are multifaceted and often in many ways closely intertwined. They can only be dealt with adequately with cooperation between different disciplines and research institutions. The University of Bremen therefore offers a wide spectrum of subjects in the humanities and social sciences as well as in the natural and engineering sciences. It has created courses of study, research programs as well as research institutions across the disciplines. Studying in teaching projects and learning communication skills and teamwork foster this interdisciplinary cooperation. Students become involved in research at an early stage and studies are progressively research based.

Internationalization of Education and Research

Science traditionally has a global orientation. In today's world, it is only possible to adequately prepare students for future career fields and to research complex topics across national borders via intensive cooperation with international partners. The University of Bremen is committed to the declaration of Bologna, which aims towards the creation of a European university space. It fosters the exchange of students within the frame of international programs and partnerships on all continents of the world. Aspects of internationalization are taken

into account in the development of study programs; for example, new forms of study (delivery of lecture classes in a foreign language, study modules), degree awards like Bachelor and Master, as well as courses of study with an international orientation and stays abroad.

These international study programs are mostly run in cooperation with partner universities in other countries. The cooperation with Jacobs University Bremen will in future open up further possibilities for cross-border teaching and research and strengthen Bremen's position as a scientific hub.

context of an environmental audit, it documents activities in the areas of energy saving, conservation of natural resources via recycling, environmentally compatible working materials and behavioral rules. This has already brought some impressive results. The introduction of an environmental management system will strengthen the University's efforts towards ecological orientation in research, teaching and studies.

(Source: <https://www.uni-bremen.de/en/university/profile/core-guiding-principles.html>)

Equal Gender Opportunity

Women are disadvantaged in research careers. Therefore, with support from the state of Bremen, the university develops measures and programs designed to promote equal opportunity in research and the administration. The University of Bremen has designed organizational forms which enable continual efforts towards the equal treatment of women in teaching and research.

Gender equality is of course not only an issue for universities but for the whole of society. For this reason, questions of gender ratios and equal opportunity are also core topics in teaching and research and are dealt with in cooperation with diverse disciplines.

Environmentally Sustainable Activity

Our lives and livelihoods are increasingly coming under threat from pollution of the air and water and the overexploitation of our natural resources (forests, oil and mineral resources, human health). Research has to come up with adequate cross-border and cross-disciplinary solutions for these problems. The University of Bremen is committed to Agenda 21 and its guiding principle of sustainable (ecologically compatible) development. Within the frame of multiple projects, its researchers carry out research on resource conservation and sustainable development on regional, national and international levels (e.g. in the fields of ocean and climate research). Interdisciplinary aspects of environmental issues are also an integral topic of studies and continuing education.

The University of Bremen also makes its own contribution to ecologically compatible activity: Within the



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University of Bremen (aerial view)

The University in its Context

The environmental management system (EMS) was validated in May 2018 by the EMAS III Regulation (Verordnung (EG) Nr. 1221/2009), which came into force on January 11, 2010 for the University of Bremen located at the Bibliotheksstraße 28359, Bremen. The EMAS Regulation puts a high value on data from the key sectors of energy efficiency, material efficiency, water, waste, biodiversity and emissions in the form of standardized indicators, as long as these sections comply with the essential environmental aspects. In a broad discussion within the environmental committee of the University of Bremen, the key environmental sections were defined: energy efficiency, water, waste, and emissions. In early 2016, “biodiversity” was added as a further essential environmental aspect.

The EMS includes all facilities of the University of Bremen’s campus with a total area of 462,300 m². It includes small streets, parking spaces, greens, and the sports facilities. Public streets are not included. The build-

ings of the University of Bremen have a total floor area of 136,800 m² and a main useable area of 197,000 m².

In terms of organization, the EMS includes all scientific and non-scientific facilities of the University of Bremen. This especially includes the twelve faculties, the central operational units, the central scientific facilities and the entire administration.

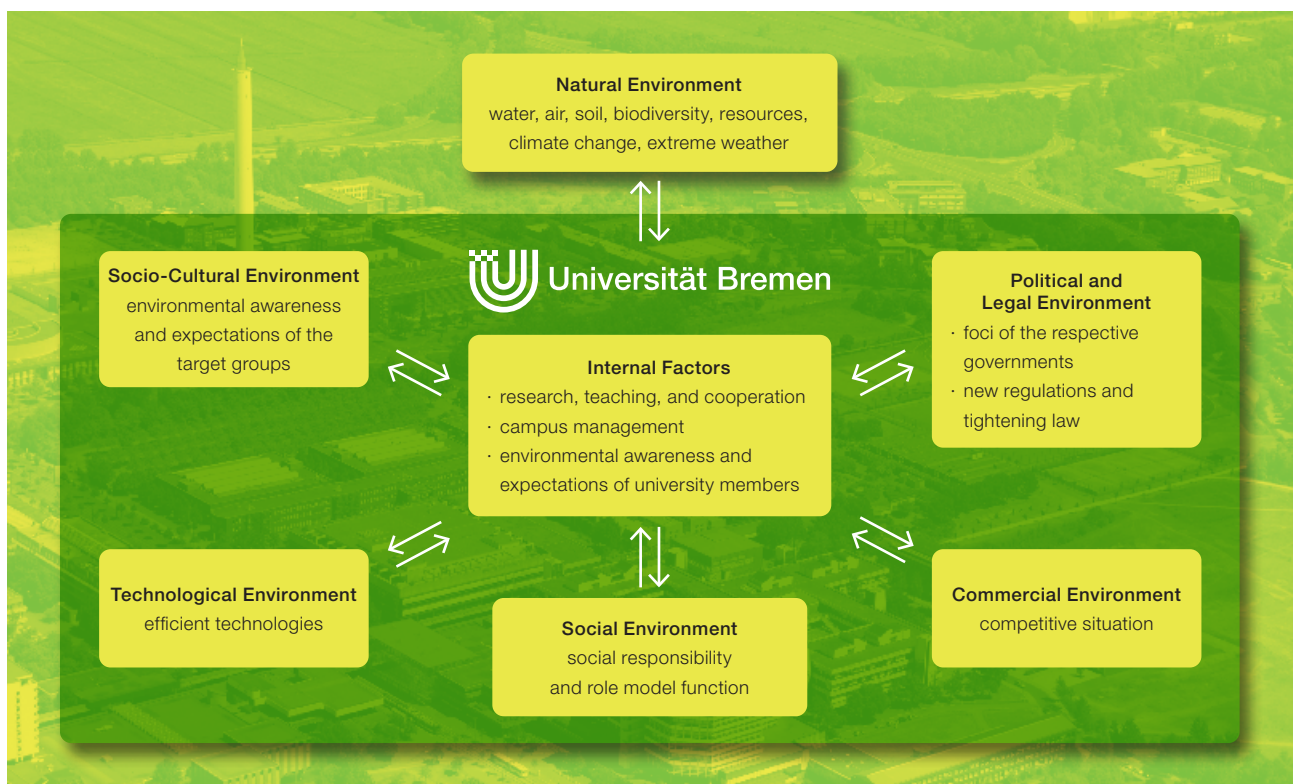
Not included into the EMS are third parties on campus which do not directly belong to the university (e.g. Student Services Organization which runs the cafeterias and student residences, the Bremen State and University Library, and the Bremer Bädergesellschaft which owns the university swimming pool). Also not included are companies and institutes on campus which are strongly connected to the university but have their own management (e.g. BIAS, the Faserinstitut (FIBRE institute), BIBA, the Drop Tower Operation and Service Company (Fallturmgesellschaft),

Microfab). The Faserinstitut has its own EMS, validated by ISO 14001.

The amendment of the EMAS III Commission Regulation (Änderungsverordnung (EU) 2017/1505) requires organizations to determine their organizational context. The diagram below depicts how the EMS's relevant factors are interconnected. Placing external and internal factors in context is a common part of organizational strategies. What is new, however, is the systematic analysis of these factors within the framework of the EMS. By determining internal and external factors and their mutual interactions with the environmental management, organizations can develop a better understanding of their environment, dependencies, and scope. This enables a stronger link

between environmental management and organizational strategy.

Based on the context analysis, a risk and opportunity assessment was carried out.



Context of the University of Bremen

The 17 Sustainable Development Goals of the University of Bremen

Environmental research at the University of Bremen has a long tradition. Based on one of the founding principles consolidating the university's responsibility towards society, the university has devoted itself ever since to researching questions and problems surrounding environmental issues. Moreover, since 1996, as a result of student demands, the university has focused increasingly on resolving internal environmental issues. In 2004, the University of Bremen implemented its environmental management system in accordance with EMAS and has since benefited from an energy saving campaign, corporate mobility management, solar energy, and much more.

Following intensive discussions – leading also to the adoption of the Sustainability and Environmental Guidelines – a Sustainability Forum was established in 2017 as an extension of the already successfully operating environmental committee.

New standards for the integration of sustainability in higher education institutions were put in effect nationwide. In a similar fashion to EMAS, these standards include the establishment of internal structures that focus on sustainability and make proposals to the university management for appropriate goals and measures.

The university executive board has therefore gathered a small inner circle and created the Sustainability Forum. Within this circle, one representative each for research, teaching, operations, governance, transfer, student initiative as well as the environmental officer, and the environmental officer, work together, sometimes consulting expert members of the university working on sustainability-related topics.

The forum's mandate is to coordinate an internal discussion on sustainability while staying connected to other networks working on sustainability at higher education institutions around the country.

The core focus is placed on fulfilling the United Nations 17 Sustainable Development Goals (SDGs). The implementation of the following goals within technical operations can be clearly outlined:

- 3 – Good Health and Well-being,
- 6 – Clean Water and Sanitation,
- 7 – Affordable and Clean Energy,
- 11 – Sustainable Cities and Communities,
- 12 – Responsible Consumption and Production,
- 13 – Climate Action,
- 14 – Life Below Water,
- 15 – Life On Land.

The implementation and visibility of these goals within research and teaching are not as clear and therefore require an extensive discussion within the university.



International Goals

The 2030 Agenda for Sustainable Development

On 25 September 2015, the 2030 Agenda for Sustainable Development was adopted at the UN summit in New York. It takes the form of a pact on the world's future and is intended to help enable all people in the world to live a life of dignity. The 17 development goals in the Agenda link the principle of sustainability with economic, ecological and social development. For the first time ever, poverty reduction and sustainability have been united in a single agenda.

The goals are addressed towards all countries in the international community. All countries are equally called upon to further the 2030 Agenda and work actively on improving the situation of people and of the environment in many important areas by 2030. The current refugee crisis is a stark illustration of how important it is to give all people, everywhere, the chance of a decent life.

The 2030 Agenda aims to

- end poverty and hunger and reduce inequality
- empower people, ensure gender equality and good and healthy lives for all
- promote prosperity for all and make lifestyles sustainable worldwide

- respect the planet's ecological limits: combat climate change, protect ecosystems and use them sustainably
- protect human rights – ensure peace, good governance and access to justice
- build a global partnership

The new Agenda replaces the Millennium Development Goals adopted by the international community at the beginning of the millennium.

The Agenda was drafted with broad civil society participation. It is one of the most ambitious endeavours of our times, and all stakeholders are aware that it can only become reality if everybody pulls together. Governments, civil society, industry, academia, and the general public all need to work together to ensure that there can be sustainable development for all.

(From the website of the Federal Ministry for Economic Cooperation and Development, June 5, 2019, https://www.bmz.de/en/ministry/principles/2030_agenda/index.html)

Environmental Management

Organization of the Environmental Protection System

The University of Bremen's environmental management system (EMS) has been validated by EMAS since 2004. The organization of the environmental protection system is closely intertwined with the entire structure of the university. It is established within the administration, the scientific institutions, and at the faculties. In addition, there are experts within the different staff positions who are directly connected to the university management.

A central element of the EMS is the working group AK EMAS that includes members from the different faculties, research staff, and the staff council. The working group meets regularly and discusses all matters of environmental protection and the EMS. The AK EMAS is a subgroup of the above-mentioned Sustainability Forum.

The organizational structure, including the clear responsibilities of the EMS, are allocated over the whole University of Bremen:

- within the university executive board, whereby the director of finance and administration is taking responsibility for the EMS;
- by the environmental officer who is responsible for the operational development of the EMS;
- in the form of staff positions within occupational safety, health protection, and environmental protection which are either located at the office of the director of finance and administration, the president's office, and/or decentralized within the different faculties;
- in the form of responsibilities supervisors have, especially the professors,
- in the form of responsibilities for operational tasks, which are divided between the administrations of the faculties on the one hand and the scientific institutes on the other hand.

The different procedures for environmentally relevant processes are documented in the environmental manual of the University of Bremen, which can be found at www.ums.uni-bremen.de (the manual is available in German only). All legally required representatives are part of the

organization.

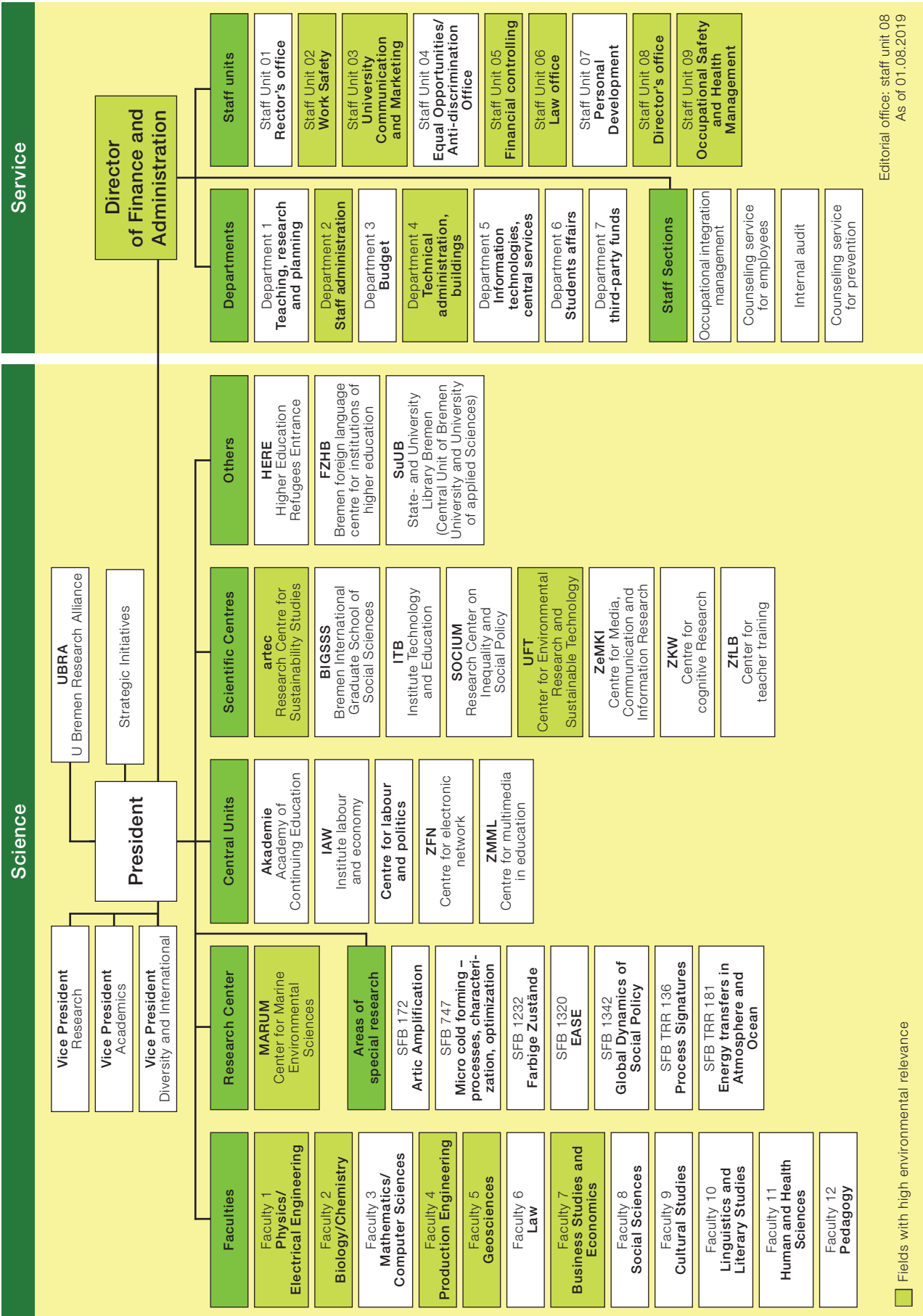
The environmental manual is aimed at all employees and students. It is intended to invite everyone to actively participate in the EMS at the university and to contribute to the improvement of the environmental performance. This continuous improvement, as outlined in the EMS, is only possible with everyone's active participation. Ideas and suggestions are always welcomed by the environmental officer.

Environmental Policy

In early 2010, the university management and the Academic Senate of the University of Bremen established a new environmental policy. The new environmental policy "Nachhaltigkeits- und Umweltleitlinien" (Sustainability and Environmental Guidelines) was compiled by the environmental committee, a working group for the creation of the sustainability report which consists of interested university members and is led by the Vice President Research. These new guidelines were born out of the motivation to create a new suitability report, as well as to broaden the debate around sustainability on campus.

In order to implement the goals and to continually improve environmental protection efforts well beyond the legal requirements, the university has formulated the following guidelines as part of its environmental policy:

Organisation Chart of the University of Bremen



Fields with high environmental relevance

Editorial office: staff unit 08
As of 01.08.2019

Sustainability and Environmental Guidelines of the University of Bremen

Social responsibility and environmentally friendly action are some of the fundamental goals of the University of Bremen. Therefore, they form a central component to all university affairs whether it be teaching, research, or administration.

In order to practically implement these goals, to continually improve environmental protection efforts, to go well above and beyond the legal environmental requirements, and to live up to the university's function as a role model to society, the University of Bremen commits itself to the following sustainability and environmental guidelines:

Securing Performance

As an ambitious higher education institution, the University of Bremen sees itself as having the responsibility to create and provide knowledge and skills. To ensure long-term efficiency, the University of Bremen assumes a responsible cooperation between its members and the available resources. The university management see itself obligated to this cause.

Energy Efficiency and Use of Natural Resources

Reducing the use of natural resources and avoiding negative impacts on the environment and health are key components of the university's sustainability and environmental efforts. The university is prepared to meet the challenge of becoming carbon neutral and increase its energy efficiency.

Health Protection and Education of All University Members

The University of Bremen regularly takes measures to sustain a healthy work and study environment and to support health-promoting behavior for all university members. It actively conveys health-related, social, and cultural initiatives. Additionally, the university enables its members to educate themselves on questions surrounding sustainability development.

Sustainability and Environmental Protection in Research and Teaching

Questions surrounding sustainability and environmental protection are a central part of research and teaching. These issues are explored by many research projects and lectures, and therefore find their way into scientific, societal, and political dialogue. All students have the possibility to participate in bachelor and/or master courses on education for sustainable development.

Participation and Transfer in the Sustainability Context

The university is well aware of its position as a role model and offers public forums for the transfer of knowledge. With its academic competence in research and teaching, the university actively contributes to the protection of the natural environment and to the promotion of sustainable actions.

Institutionalization of Sustainability and Environmental Protection

For the practical implementation of the Sustainability and Environmental Guidelines, the committees and facilities of the University of Bremen support the work in research, teaching, and administration, as well as in the student initiatives. The University of Bremen provides a sustainability and environmental program, which lists and discusses its goals and measures. This program serves as a foundation for a continuous improvement of the sustainability and environmental protection efforts of the University of Bremen.

The Environmental Program and its Goals 2019

Measure	Deadline	In Charge	State
Environmental goal: Further development of the environmentally friendly and safe handling of hazardous substances (1)			
Planning of a Hazardous Substance Day 2018	December 2018	Robert Crueger	Deadline postponed
Creation of a pamphlet about the use of the central hazardous substances register	January 2020	Administrative Unit 02	In planning
Environmental goal: Reducing paper use (2)			
Equipping restrooms with efficient towel distributors that use EU-Eco labeled paper	December 2020	Administrative Department 4	Measures have begun
Posting notes in restrooms reminding users to save paper	December 2019	AK EMAS	Measures have begun (deadline rescheduled)
Environmental goal: Optimizing energy and water consumption (3)			
Replacing all light bulbs with energy efficient LED light bulbs with the goal of reducing electricity by 5 % compared to 2018	July 2020	Administrative Department 4, Technical Facility Management (GBT)	In implementation. Energy use has been already reduced by 26 % in the VWG building.
Energy contracting for the Center for Environmental Research and Sustainable Technology (UFT), Barkhof, NW 1 building	September 2017	Administrative Department 4	Action completed
Replacement of old refrigerators in the UFT and NW 2 building	October 2017	UFT management	In process
Review of a smart controlled ventilation system in selected buildings (taking long-term weather data into consideration)	February 2019	Administrative Department 4	In planning, deadline postponed
Planning and implementation of an energy saving campaign with the goal of reducing energy use in total by 3 % compared to 2018	May 2020	AK EMAS, environmental officer	In preparation
Application for a climate protection management position to implement the climate protection concept	May 2022	Environmental officer	In preparation
Environmental goal: Reduction of staff-related amount of waste (4)			
Employee training on correct waste handling	December 2019	Waste management officer	Initial training took place, project has been extended
Creation of a poster series on correct and environmentally friendly waste handling	January 2019	EMS coordinator	Deadline postponed

Measure	Deadline	In Charge	State
Environmental goal: Further development of emergency preparedness and fire protection (5)			
Optimizing emergency assembly points	February 2020	Administrative Department 4, Brandschutz Nord (fire protection experts)	In planning
Fire safety inspections of natural science buildings with assessment of further safety measures	December 2019	Administrative Department 4, Brandschutz Nord (fire protection experts)	In planning
Implementation of fire safety training in the GW1 building	December 2022	Administrative Department 4	Measures have begun
Environment goal: Optimizing of the university transport links (6)			
Drafting of a mobility concept for the technology park	September 2019	Environmental officer	In planning, deadline postponed
Evaluation of the number of bicycle parking spaces on campus in order to improve the parking situation for bicycles	December 2019	Environmental officer, employees of the Senator for Education and Science	In planning
Environmental goal: Effective communication of occupational health, safety and environmental protection (7)			
Planning and implementation of a "water saving day"	June 2019	Environmental management coordinator	Planning has begun
Planning and implementation of sustainability days within the scope of the "National Days of Sustainability"	May 2018	AK EMAS, Virtual Academy of Sustainability	Measure being currently implemented, 2019 in planning
Planning and implementation of an information day for the technical facility management	February 2018	Administrative Department 4, environmental officer	In planning, deadline postponed
Environmental goal: Consideration of aspects on environmental protection during the planning phase (8)			
Planning of the Marum3 building under considerations of energy efficiency and implementation of the strict legal requirements of Bremen (passive house)	Finished 2019	Administrative Department 4, Senator for Education and Science	Construction starts at the end of 2019
Planning of the energy efficient renovation of the A block of the NW2 building	December 2019	Administrative Department 4	Planning has begun
Environmental goal : Broad inclusion of sustainability aspects in research and teaching (9)			
Sustainable work: holistic approach to ecology and work – strengthen innovation potential (NAGUT) – project: development and regional dissemination of innovations in work ecology	July 2019	artec – Sustainability Research Center	Research program has started
Founding of a Sustainability Forum with members from administration and research	April 2018	artec – Sustainability Research Center	Research program has started

Measure	Deadline	In Charge	State
Organization of a carbon-neutral international conference, the "14 th International Coral Reef Symposium July 2020"	July 2020	Faculty 2 (Biology/Chemistry), Malik Naumann, environmental officer	In planning
Environmental goal: Conservation and promotion of biodiversity (10)			
Construction and distribution of bee hotels on campus	December 2019	NUB, environmental officer	The carpentry made 15 bee hotels that will be distributed in summer
Creation of a tree registry on campus	September 2019	Environmental officer, students of Faculty 2	In planning



Environmental Performance and Environmental Impacts

EMAS provides a tool for organizations to thoroughly analyze and evaluate their environmental performance. It requires institutions to identify how their activities affects the environment, directly and indirectly. The University of Bremen's impact on the environment is regularly evaluated and discussed by environmental experts as well as interested members of the university.

Energy, water consumption, waste generation, emissions, and material efficiency play a crucial role here. As indirect environmental aspects, mobility and research projects were identified. In early 2016, the environmental committee named biological diversity as an additional essential environmental aspect and "conservation and promotion of biodiversity" was defined as a further environmental goal.

Energy Efficiency

Energy supply and the provision of drinking water is managed by the Administrative Department 4 (Technical Administration, Buildings). The Administrative Department 4 is in charge of technical operations as well as all matters related to construction, and is divided into three sub-units, which have the following duties and responsibilities:

The Technical Facility Management (GBT) is in charge of technical operations on campus. Electricity, water, heat, air conditioning, and other utilities are supplied by the Power Supply Center (Energiezentrale). The Power Supply Center is also responsible for the 24-hour emergency call center that coordinates the campus security service and ensures that operations run smoothly and efficiently.

All measures regarding building maintenance, such as service, repairs, modifications, and renovations are conducted either by the university's own workshops or with the help of contractors. Also, cleaning services and the regular care of the outdoor facilities are within the responsibilities of the Administrative Department 4.

Another main responsibility lies in the planning and support of new construction projects and reconstruction

measures. All construction is continually and digitally documented.

With all processes, the Administrative Department 4 is in close contact with users in order to uphold environmental aspects and to avoid direct or indirect environmental impacts as far as possible.

Technical operations and the further expansion of the university carefully planned, ensuring safe and resource-friendly operations. They will be continuously optimized in agreement with economic aspects.

Division of Tasks in Administrative Department 4

Staff positions – Managerial accounting, contract management, environmental management, sewage, CAFM (ticket system), construction revisions.

Unit 40 – "Technical Administration" includes predominantly the energy supply on campus and the maintenance of the university buildings.

Unit 41 – "Buildings" handles not only construction planning, supervision and project management of new construction, conversion, and refurbishment projects in the field of structural engineering, but also the technical building equipment and the pending maintenance measures.

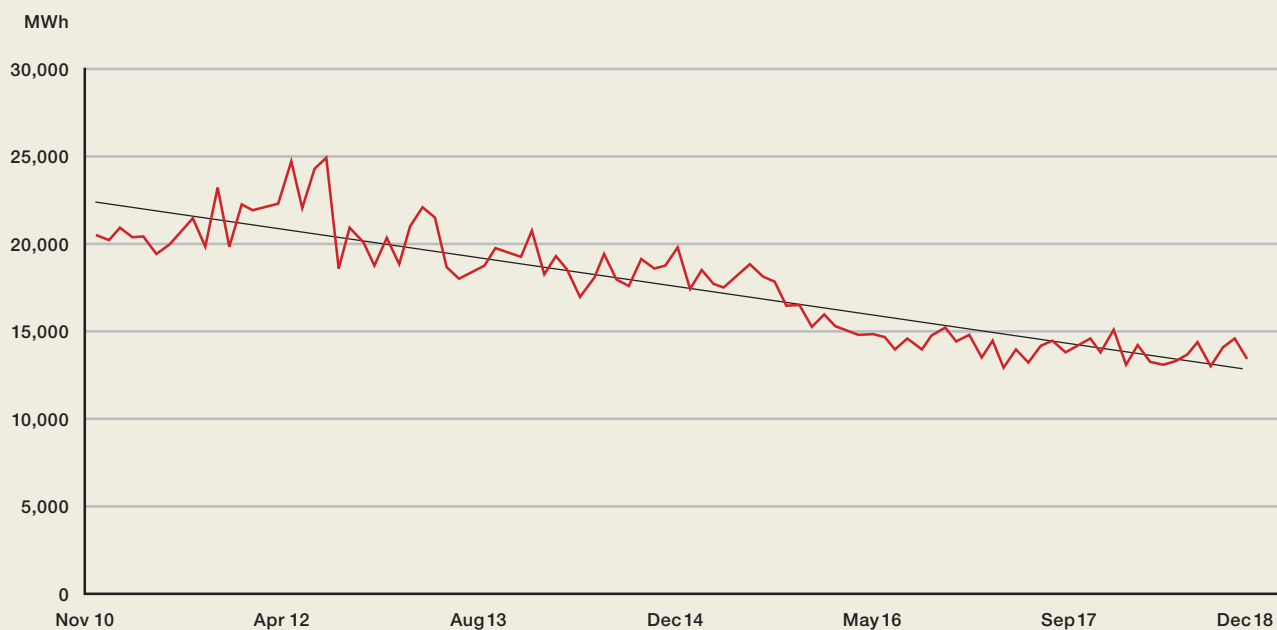
Climate Protection Initiative: Installation of High Efficiency LED Lightings in Several University Buildings

Increasingly, LED panels have replaced conventional lighting in the MZH, GW2, and VWG buildings. These new installations account for just under 30% of energy savings, and have the potential to save a total of 170 tons

of carbon dioxide over their entire lifetime. The diagram below shows the reduction of energy consumption.

The replacement of the light bulbs should continue.

Electricity consumption (in MWh) at the VWG building from
from November 2010 to December 2018



Total Annual Consumption

As of 2018, the energy consumption of the University of Bremen continues to decrease slightly in comparison to the five years before. The effective area of the university increased; and the number of university employees remained constant. With the help of contractors, several buildings such as the NW1 and GW2 buildings were renovated with a focus on energy efficiency.

Heating and Cooling

The University of Bremen receives its heat from a nearby waste-to-energy plant, which also supplies the university with cool air in warmer months with the help of modern absorption chillers.

Renewable Energy

Since early 2009, the University of Bremen has received its energy from an electricity provider that offers 100% renewable energy from sources such as hydro power, biomass, sun, or wind powers. TÜV Nord (Technical Inspection Association North) regularly certifies the quality of this energy.

An employee solar co-op (UniBremenSolar eG) was founded in 2011. The energy produced here flows directly into the university's power grid. More information can be found on the following website: <https://www.uni-bremen.de/unibremensolar.html> (in German only).

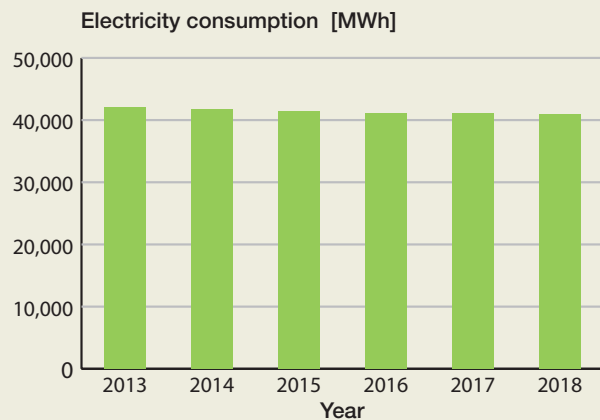
The university receives its heat from a local waste-to-energy plant. The heat is designated zero-emission.

A small amount of propane continues to be used. However, this amount is negligible.

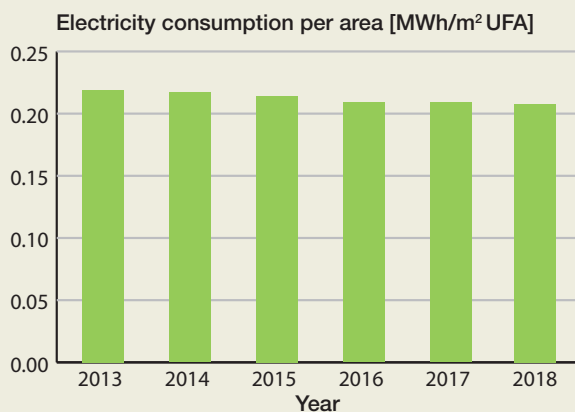
Therefore, all of the university's power sources can be regarded as renewable.



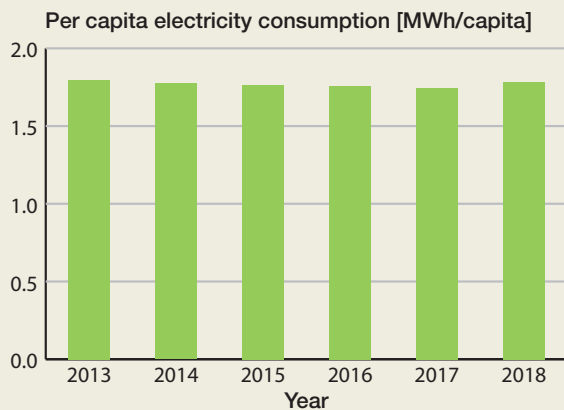
Energy



Electricity consumption at the University of Bremen over time

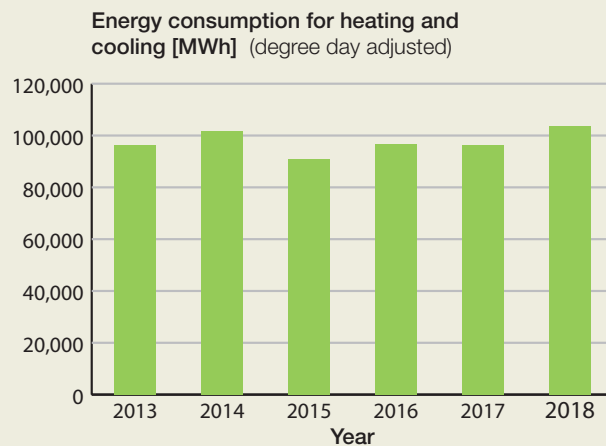


Electricity consumption per UFA = usable floor area

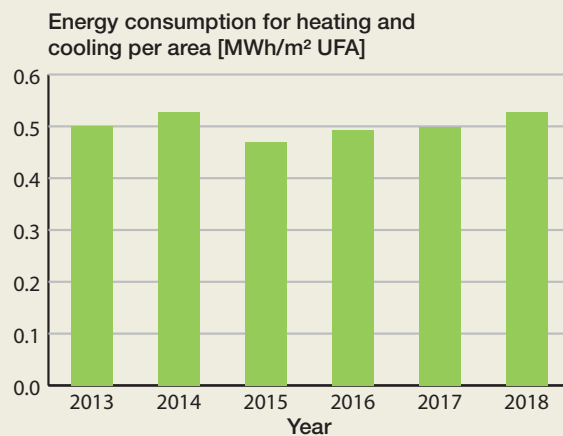


Per capita electricity consumption (university members and students)

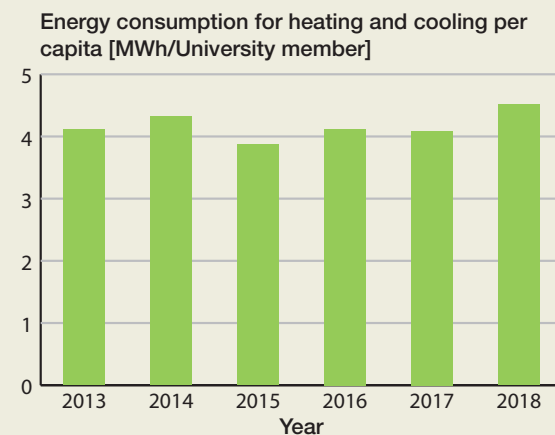
Heating and Cooling



Energy consumption for heating at the University of Bremen over time



Energy consumption for heating per area (UFA)



Per capita energy consumption for heating (university members and students)

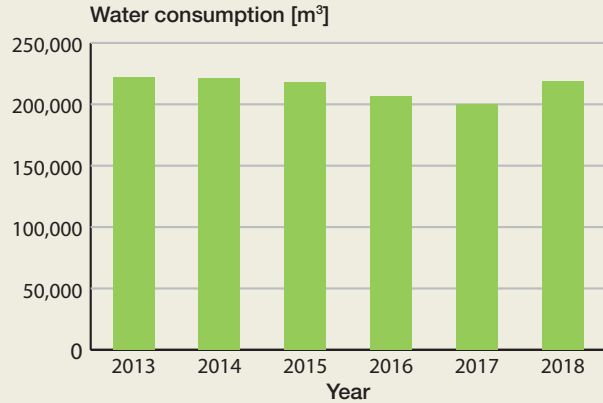
Material Efficiency

In recent years, the University of Bremen has devoted itself to improving its material efficiency and different projects have been working towards this goal. The paper consumption of the university has stabilized for the last ten years (2008–2018) at 22 million pieces a year. Other materials are considered negligible.

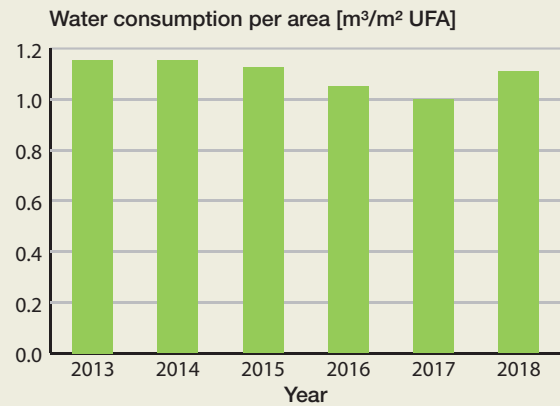
Water

The swb Vertrieb GmbH is fully supplying the University of Bremen with water from groundwater sources. Some ground water is drawn from 12 local deep wells. Additional water is sourced from water works in Schneeren, Liebenau, and Ristedt (run by the “Harzwasserwerken”), waterworks in Panzenberg and Wittkoppen (run by “Trinkwasserverband Verden”), and the waterworks in Wildeshausen (run by “Oldenburg-Ostfriesischer Wasserverband”). The swb procures 15 million cubic meters of groundwater from their wells in Blumenthal, Vegesack, Rönnebeck, Leherheide, Wulsdorf, Bexhövede, and Langen. Groundwater wells in Lower Saxony cover any remaining demand.

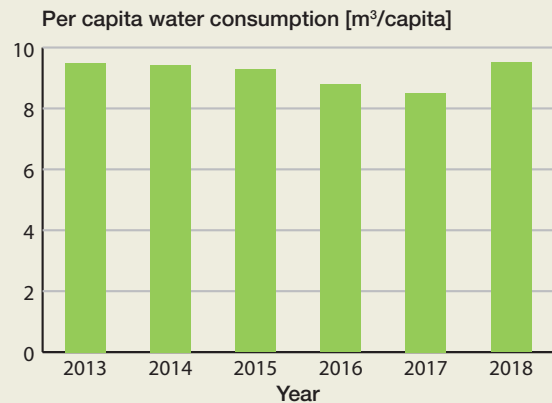
Roughly one third of the drinking water used daily (218,000 m³) on campus is required for cooling purposes. This equals about 1,400 bathtubs of water evaporating every day.



Water consumption at the University of Bremen over time



Water consumption per usable floor area (UFA)



Per capita water consumption (university staff and students)



Waste

The waste management officer is responsible for the collection, recycling, and disposal of waste at the University of Bremen. He is simultaneously the head of the certified waste management facility affiliated with the Unit 02 for Biological safety, Hazardous Materials, Radiation Protection and Disposal ("Biologische Sicherheit, Gefahrstoffe, Strahlenschutz und Entsorgung"). Here, hazardous substances are collected, sorted, and properly disposed of. This service is also provided for external institutions. A specialized vehicle assures safe transportation.

Collection stations are spread throughout the campus in close proximity to almost every building and cater to the specific building's waste requirements. Residual waste, paper, glass, plastic materials, and other recyclable materials are collected separately.

The total amount of waste disposal at the University of Bremen has slightly decreased. In 2019, 377 tons of residual waste and 327 of paper waste were disposed of.

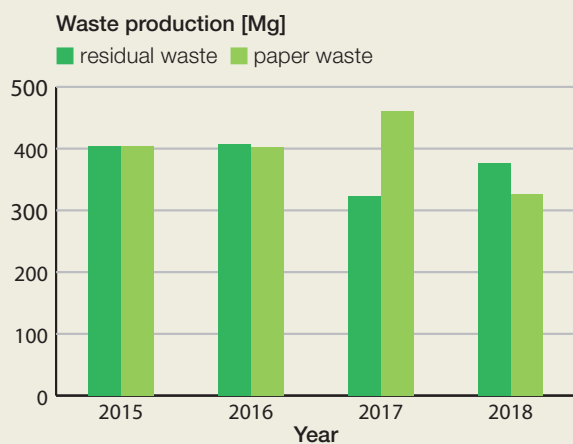
The central responsibility for the disposal of hazardous substances within the University of Bremen also

lies with the waste management officer and at the central waste disposal unit (Zentrale Abfall und Entsorgung). Currently, 50 different types of waste are managed. The waste management officer is also responsible for creating a waste balance, a waste-management concept, and to uphold legal regulations, such as acquiring proper waste disposal verifications.

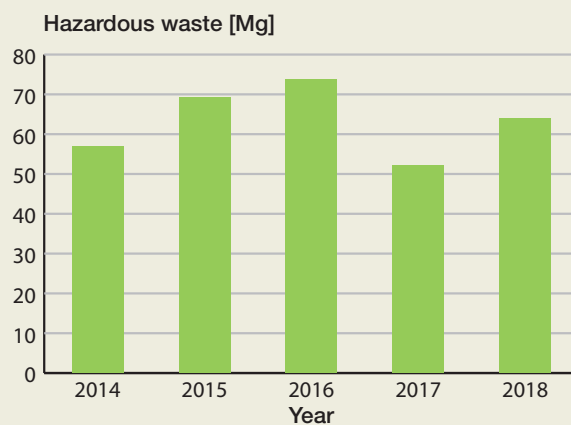
The entire amount of hazardous waste in 2018 was approximately 64 tons. This amount has remained relatively constant over the past years with a slight downward trend. What is special about the university is that its central waste disposal unit is certified as a specialized disposal facility. The hazardous waste is collected in specialized containers and stored appropriately.

Detailed information on hazardous waste and waste disposal in general can be found on the following website: <https://www.uni-bremen.de/arbeitsicherheit/entsorgung/> (in German only). There, you can also find the Guideline for Handling, Collecting and Disposing of Waste at the University of Bremen (Richtlinie zur Handhabung, Sammlung und Abgabe von Abfällen an der Universität Bremen).

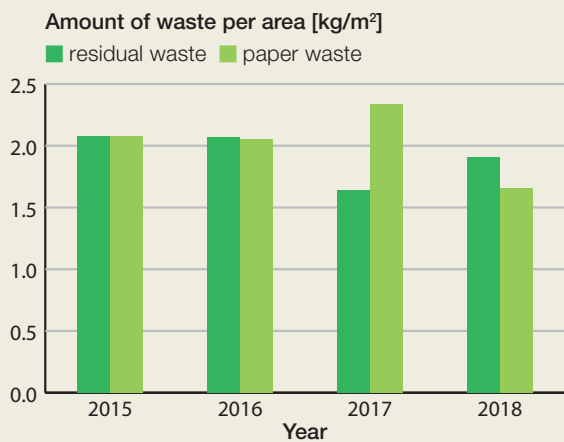
1. Name und Anschrift der Zertifizierungsorganisation 1.1 Name: bregau zert GmbH Umweltgutachterorganisation 1.2 Straße: Mary-Astell-Straße 10 1.3 Staat: Deutschland Bundesland: Bremen Postleitzahl: 28359 Ort: Bremen		2. 	
3. Angaben zum Zertifikat 3.1 Nummer des Zertifikats: BREG2001-3/16 3.2 Erstmalige Zertifizierung <input type="checkbox"/> oder Folgezertifizierung <input checked="" type="checkbox"/> 3.3 Vorgangsnummer nicht erteilt. 3.4 Das Zertifikat beinhaltet 3 Anlagen. 3.5 <input type="checkbox"/> Das Zertifikat wird nur für einen bestimmten Betriebsteil erteilt (siehe Anlage(n) ___). 3.6 <input checked="" type="checkbox"/> Das Zertifikat wird nur für bestimmte Abfallarten, Tätigkeiten oder Standorte erteilt (siehe Anlagen 1-3). 3.7. Das Zertifikat ist gültig bis zum 31.07.2019.			
4. Name und Anschrift des Entsorgungsfachbetriebes (Hauptsitz): 4.1 Name: Universität Bremen – ZAE – Zentrale Abfallentsorgung 4.2 Straße: Leobener Straße – NW 2 4.3 Staat: Deutschland Bundesland: Bremen Postleitzahl: 28359 Ort: Bremen 4.4 Eintrag in das Handels-, Vereins- oder Genossenschaftsregister (sofern ein Eintrag erfolgt ist): -			
5. Der Betrieb ist berechtigt, im Hinblick auf die in der Anlage zu diesem Zertifikat genannten Standorte, Tätigkeiten und Abfallarten das Überwachungszeichen der obengenannten technischen Überwachungsorganisation und die Bezeichnung <p style="text-align: center;">„Entsorgungsfachbetrieb“</p> gemäß § 56 des Kreislaufwirtschaftsgesetzes in Verbindung mit der Entsorgungsfachbetriebsverordnung zu führen.			
6. Prüfungsdatum: <u>19.04.2018</u>		7. Sachverständiger, der die Überprüfung durchgeführt hat: 7.1 Name: Dr. Schrübbers Vorname: Jan 7.2 Unterschrift (nur für die Ausstellung in Papierform): 	
8. Ausstellungsdatum: <u>07.05.2018</u>		9. Leiter/Leiterin der Zertifizierungsorganisation: 9.1 Name: Meiners Vorname: Silja 9.2 Unterschrift (nur für die Ausstellung in Papierform): 	



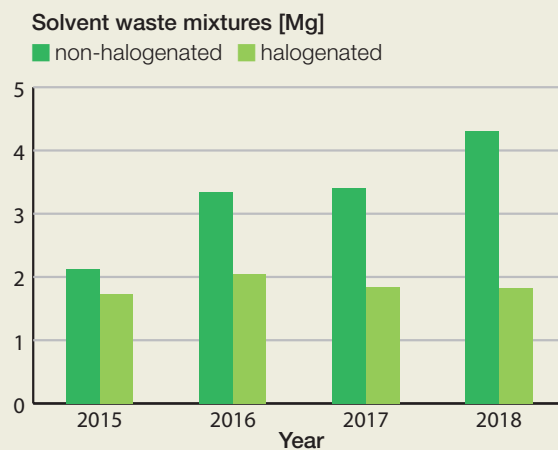
Amount of residual waste and waste paper at the University of Bremen



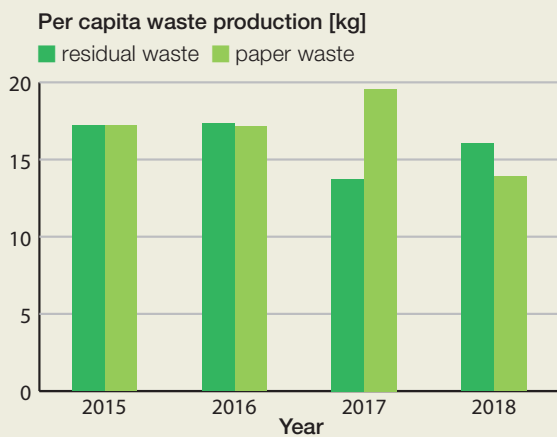
Amount of hazardous waste over time



Overall annual waste production of the University of Bremen



Amount of solvent waste mixtures over time



Per capita waste production (university staff and students)

¹Mg = Megagram (tons)

Biodiversity

Biodiversity – An Essential Part of Environmental Resource Management

Untouched landscapes are necessary to secure the efficiency of ecosystems, to conserve biological diversity, and to provide people with the chance to enjoy and relax in a natural environment within an urban area.

Land use has been chosen as a key indicator for the sustainability assessment of space utilization within the framework of the National Sustainability Strategy and was included in the National Strategy on Biological Diversity. The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety therefore calls on all stakeholders to integrate biodiversity more strongly into their course of action.

This creates new challenges for urban planning, such as restricting building to already urbanized areas, thus minimizing land usage as well as to develop high quality natural areas within cities – gardens, city parks, recreational sport areas, urban forests, and fallow land are all part of this concept. Being part of the city of Bremen, the university campus offers many opportunities for the creation of natural spaces.

EMAS III – Conservation and Promotion of Biodiversity

The environmental management system EMAS III defines biological diversity as a key indicator. Therefore, all EMAS-certified organizations must ensure that their actions have no adverse effects on biodiversity. The University of Bremen is one of the few higher education institutions to have held an EMAS certificate for many years and has worked extensively on improving its environmental performance.

In April 2018, the university's environmental committee unanimously decided to integrate biodiversity as an essential aspect of their work. Consequently, the university has included "protection and maintenance of biodiversity" as a new EMS goal.

We are currently revising the changes to the EMAS Regulation, in particular Annex IV concerning the presentation of the key sectors, which will be legally binding from 2020 onwards. These will be incorporated in our next environmental statement 2020. The key indicator

"biodiversity" will be renamed "land use and biodiversity". This indicator is composed of total land use, sealed ground, seminatural area on and off site.

What is Biodiversity?

The Federal Nature Conservation Act (Bundesnaturschutzgesetz) has defined biodiversity (or biological diversity) as "the diversity of fauna and flora species, including diversity within species and diversity of types of communities and biotopes" Article 7, Para. 1, No. 1 BnatSchG). Biodiversity is an expression in the number, differences, and variability of living organisms. The definition also includes diversity changing over time and space.

Why is Biodiversity Important?

In urban areas, the biodiversity of fauna and flora is greatly reduced. Buildings and sealed ground reduce the necessary natural habitats needed to support a wide range of living organisms. Healthy soils, nutritional resources, drinking water, as well as other ecological services are all fundamental to human life and well-being. In order to uphold biological diversity and the efficiency of the ecosystem, undeveloped areas are essential. Green and open spaces in urbanized settings provide habitat for many animals and plants, and allow residents to experience and enjoy nature.

How Can the Effects on Biodiversity be Measured?

EMAS provides a framework for the measurement of a corporation's impact on biodiversity: "land use of built-up areas in m²". Here, sealed ground should also be included as a variable. The absolute number of m² translates into how the activities of an organization affect the surrounding environment. Universities, schools, and public authorities often use their number of members as a reference number within the equation. The direct environmental impact of land use is a change of local ecosystems, which in most cases means a loss of biological diversity.

Many organizations consider additional variables to better represent and improve their environmental performance. Biodiversity is complex and therefore requires many parameters to be measured accurately. In the

future, the university will continue to include more variables when evaluating the biological diversity of its campus.

How Can Diversity be Promoted in Urbanized Areas?

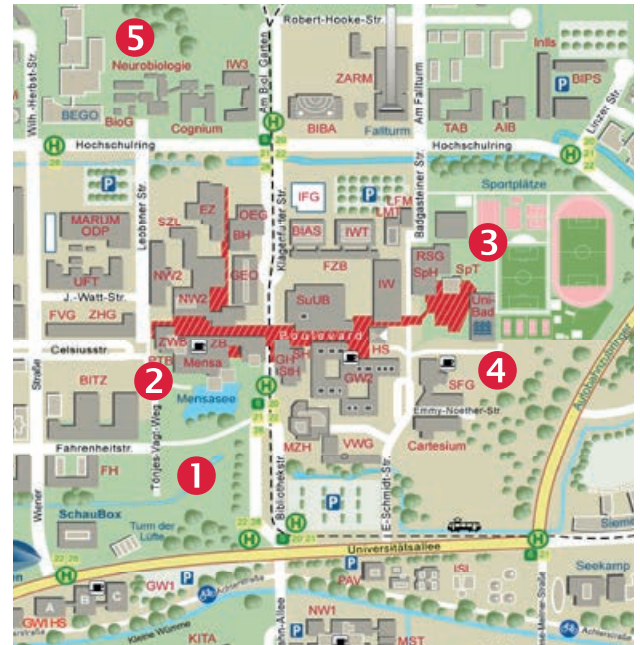
Measures to preserve and promote biodiversity often take place on privately owned land. Artificial landscapes such as lawns that generally do not host a large variety of species can be altered in various ways to support more biodiversity. While creating more heterogeneity in landscapes can make a qualitative improvement, it is difficult to display in numbers.

Similarly, looking only at the number of species or biomass does not encompass the whole complexity of a biodiverse environment, as it is also important to support local and potentially threatened organism communities. For example, fallow land can provide habitat for many pioneer species rarely found in urban areas. The conservation of a variety of landscapes is therefore also an important part of promoting biodiversity.

Through green roofs and facades the built-up area can also be revitalized. By creating many vertical and horizontal green spaces and maintaining sections of unsealed soils, urban areas can be kept lively.

Which Natural Landscapes Can Be Found on Campus? What Has Already Been Done?

The university campus comprises many multi-storied buildings, connecting streets and parking spaces. Unsealed green areas can be found between the buildings and roads. Various measures have been undertaken to improve biodiversity on campus. The largest un-fragmented landscape is the Campus Park with includes a lake, also known as the Mensa Lake (Mensa-See).



1) Campus Park, 2) Mensa Lake, 3) Orchard, 4) Insect Hotel, 5) Natural Garden

The Campus Park

The Campus Park covers an area larger than 20,000 m². It is a large open space, with birch and poplar trees being the most common trees on the south-west part of the park. Next to an adjacent creek, there are many robinias, oaks, and ashes. The park with its adjacent Mensa Lake present an ideal place for rest, recreation, and for conducting events.



The Mensa Lake

Centrally located near the Mensa cafeteria and the Campus Boulevard is a small lake, commonly referred to as the Mensa Lake (Mensa See). On its banks, you will find reeds, rushes, marsh marigolds, and mint, as well as birches, poplars, ashes, and willows. Between March and May, the many plants offer bees plenty of pollen and nectar. Many fish currently live in the lake. However, a few years ago, a large number of water plants have been removed and, unfortunately, the natural balance has been disturbed. Right next to the lake is a small wetland area. A frog population previously established there could not sustain itself. Diversity-enhancing measures are conceivable, but they might be costly and require an analysis of the ecosystem.



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The Orchard

In 2015, ten heirloom fruit trees were planted on the east end of the campus as a part of the BUND's project "Bremen Summt" (Bremen Buzzes). The project was funded by the Heinz Wiekler Stiftung (Heinz Wiekler Foundation). The orchard borders the sports fields, the sports tower, and the swimming pool. Its area covers approximately 1,000 m².

The heirloom apple varieties "Seestermüher Zitronenapfel", "Boskoop", "Roter Boskoop", "Jonagold", and "Goldparmäne" and the heirloom plum varieties "Von Nancy", "Hauszwetsche", and "Königin Viktoria" were planted. Ecologically, fruit trees are very valuable. Their blossoms provide pollen and nectar as well as suitable habitat for many bees, butterflies, and other insect species. Many bird species also profit from the trees as a source of food and for nesting. Surrounding the orchard,

there are many other tree species, shrubberies, and flowering plants. Together, the plant diversity is ecologically very valuable.



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The Insect Hotel and Deadwood

Due to intensive human encroachment on the natural environment, there are only a few natural habitats for insects, such as clay slopes or deadwood. For this reason, this small project was created on campus. On the edge of the campus, a large area of 1.5 hectares of mainly sandy soil offers a diverse habitat for many insects. The northwestern edge of the area is framed by a trench (also used for rainwater retention) and is lined with willows and



© Universität Bremen

alders. A large deadwood tree trunk as well as various constructed insect hotels help many bumblebees, wild bees, wasp species, lacewings, and earwigs with nesting and hibernation. Tunnels have been drilled into the deadwood trunks to offer insects, especially some wild bee species (mason bees), hard-to-find nesting aids.



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The Natural Garden

The natural garden is on the northeastern side of the university campus and is roughly one hectare in size. This garden is characterized through its minimal human intervention. Birch, poplar, and willow trees, as well as brambles and many different grasses can be found here. The biodiversity of flowering plants is rather small and it might be worth considering if more flowering plants should be planted. However, this would mean some preparatory work. But then, with regard to biodiversity, as such untouched natural landscapes occur rarely in an urban setting, it might well be good to leave the garden undisturbed.

Green Facades and Roofs

Many remarkable green spaces can be found on facades and roofs on campus. Wisteria and wild vine, which grow on the walls of the large lecture hall and the IW2 building, offer protection and nutrients to birds and insects. There are small gardens scattered throughout campus, for instance on the library's roof terrace. Along the Campus Boulevard, there are many stone gardens with yellow mountain saxifrage and summer lilac.



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A courtyard within the GW2 building offers a recreational space with shrubberies and other plants. Additionally, many buildings, such as the administration building (VWG), have living roofs with succulents and different grasses.



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Nesting Boxes

Throughout campus, 114 nesting boxes for small birds have been installed and are maintained annually. A special falcon nesting box with a platform is mounted on the upper part of the Drop Tower (Fallturm). The nesting box offers a home for common kestrels and peregrine falcons.



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How Can Biodiversity Be Further Supported and Promoted? Which Measures Can Be Realized?

Bee-Friendly Flower Beds

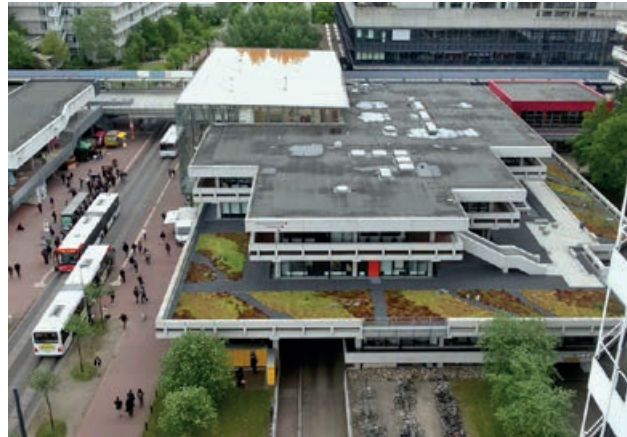
On campus, there are many lawns that could be converted into flower beds for bees. However, since many lawns are used recreationally and flower beds cannot be walked on at all times, not all areas are suitable for this purpose. Behind the sports facilities would potentially be a good place for a larger flowering meadow because the area is little used. Small flower islands could be planted on more popular lawns, such as the Campus Park, to provide more pollen and nectar for bees and other insects.

Natural flowering meadows are biodiverse plant communities that offer a habitat to an even greater number of animals. In comparison to conventional ornamental lawns,

natural meadows are easy to care for and do not need fertilizer or weed killer. Meadows also do not have to be mowed regularly; one or two cuts a year at most would suffice. In order to reduce expenses for seeds and to ensure that local flowers are planted, mowed plant debris containing local seeds can be transferred from a species-rich meadow to the target field. It is recommended that this takes place later in the year to make sure that a large plant diversity will naturally emerge. The "Umweltbetriebe Bremen" manage many of the sidewalks on or surrounding campus. A coordinated effort with them would be beneficial when organizing the mowed lawn debris.

Creating New Green Spaces on Campus

Planting more green walls or living roofs can help improve biodiversity on campus. While choosing suitable plant varieties ecological and aesthetic considerations should be taken into account. For example, sedum planted on living roofs is very drought resistant and beautiful between May and June. A variety of other drought resistant perennial plants can be great choices, especially if they bloom until October. These green living spaces can act as bridges and stepping-stones, connecting parks, gardens and similar landscapes. Having habitats that are less fragmented helps promoting biodiversity.



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Concept for a Greener Campus

When a new building is in planning, the integration of flowering plants green spaces should be part of the concept. The plant varieties are to be chosen in ways that ensure there are blooms throughout spring and early fall. This would further promote efforts to create a more nature-friendly campus.

New Insect Hotels

Additional insect hotels could be built in the university's own carpentry and installed on the sunny areas of the southeast part of campus. In combination with more flowerbeds, these measures are affordable, use little land, and could help boost insect diversity on campus.



© Universität Bremen

Dead Hedges

Along with coarse wood debris, dead hedges offer many organisms unique and essential habitat. Dead hedges can easily be set up by putting two rows of stakes in the ground and putting debris from trees and bushes between the rows. Even simply piling garden debris can give many small mammals, insects, and certain bird species a safe home.

Nesting Boxes for Falcons

Additional nesting boxes for common kestrels could be mounted on the roofs of buildings on the edge of campus. Common kestrels hunt mice, small birds, reptiles and amphibians in a territory that spans over several kilometers. For this reason, common kestrels can be found in open landscapes or around the outer edges of urban areas. The university's close proximity to Blockland, an area that offers an ideal hunting ground, makes its buildings on the outer edge of campus an ideal place for nesting boxes.

NUB – The Nature Conservation Group at the University of Bremen

For two years, the student Nature Conservation Group at the University of Bremen (Naturschutzgruppe an der Universität Bremen – NUB) has been active on campus. Their goals are to protect biodiversity on campus, to promote nature conservation, and to raise awareness about the importance of a healthy environment.

To achieve these goals, the group meets regularly to exchange ideas and to plan and execute different projects. These projects can be divided into two categories: active nature conservation and environmental education.



The NUB introduces itself

Nature conservation is translated into practical measures to protect and foster the biodiversity of flora and fauna. One of the first steps is the recording of species (mapping) living in a specific habitat on campus; in a later step, the aim is to preserve them and improve their habitats.

In order to improve conditions for local birds, this year for the first time, a project has begun mapping the nesting birds on campus. An observation of fauna biodiversity in and around local creeks has been carried out for the second year in a row, and a tree registry is also planned.



Mapping of nesting birds on campus

The NUB planted a series of fruit trees and bushes to provide habitats and food for birds and insects. In the last decades, the number of insects has dramatically decreased by 75%. Wild bees have been especially affected for many reasons, one of them being a lack of habitat. To counter this development, the NUB built and set up many insect hotels around campus. Additionally, the group cares for and regularly plants new plants in a green oasis on the Campus Boulevard. This little garden consists of a small pond, an herb spiral, and some fruit bushes.



Fruit tree on campus

Through all of these initiatives, the NUB hopes to achieve a long-term positive effect on the biodiversity of flora and fauna on campus.

Another essential part of protecting nature is embedding awareness of nature conservation and sustainability in everyday life. Therefore, one of the goals of the group is to draw attention to ecological issues in order to place more attention and importance on them.

One of the more visible ecological problems on campus is litter, cigarette butts in particular. Cigarette butts are especially harmful for the environment due to the fact that they contain many harmful chemicals and their filters decompose into microplastics. Microplastics are a massive problem of our time as they enter groundwater, the ocean, and have also been detected in the tissue of various organisms. The Nature Conservation Group has organized regular clean ups with voluntary students. In order to draw attention to the amount of wrongly discarded cigarette butts, the students collected the butts separately in clear plastic bottles. These bottles were displayed on campus and offered a good starting point for discussions with students. Also, the NUB has handed out free portable, reusable ashtrays. The group plans further projects to raise more awareness of the importance of proper cigarette disposal.

Although, the NUB is mainly active on campus, a few projects were carried out off university grounds. For instance, the NUB offered a one-day hands-on workshop at a Bremen elementary school in Kantstraße, which taught second graders the risks of insecticides in agriculture and habitat fragmentation on the one hand and the important role insects play in working ecosystems on the other.

During the Youth Climate Conference in summer 2018, the NUB offered a workshop on biodiversity with high school students. In an open discussion, the interrelation between biodiversity and climate was explored and a discussion was held on how to protect biodiversity through political action but also through small changes in everyday life.

In the future, the group would like to get in touch with students, hold discussions, strengthen environmental protection at the university further, and together carry out projects on biodiversity protection.



© Universität Bremen/NUB

Caring for the green roofs



© Universität Bremen/NUB

Bee hotels for wild bees



© Universität Bremen/NUB

Cigarette butts collected in a two-hour clean up



© Universität Bremen/NUB

Jugendklimakonferenz (Youth Climate Conference) 2018

Coast, Climate, and Consumerism – Sustainability Research at the University of Bremen

Sigrid Kannengießer

How can coasts be protected from rising sea levels and what problems can arise through coastal conservation projects? How can cities be supplied with sustainable energy? What governance structures are needed for a transition to sustainable energy? What role does consumerism play in sustainable development? The artec Sustainability Research Center is committed to finding answers to these and many other questions relating to sustainability and socio-economic change.

artec is an interdisciplinary research center that looks into questions surrounding sustainability and socio-ecological transformation. Teams of researchers from different disciplines, such as the social sciences, product engineering, and cultural studies, form the core of this research center. Professors, postdoctoral researchers, and many doctoral students at artec working on their dissertations contribute to this work.

Currently, research focuses on the following areas: coastal and marine research; sustainability development, and environmental governance; consumerism and supply systems; gender, diversity, and equality; resilient socio-technical systems and energy; and material flow systems. Questions surrounding different aspects of climate change, climate protection, and climate adjustment are looked into from various perspectives and with different foci.

artec builds on the University of Bremen's critical and interdisciplinary tradition and aligns itself with the efforts to further social justice and sustainable development as were spelled out in the United Nations' Sustainable Development Goals (SDGs) in 2015.

A diversity of methods is utilized to achieve insights into how to create sustainable and forward moving structures. These methods range from semi-structured interviews, life cycle assessments, dynamic modeling, discourse analysis, discussion workshops, to concept-oriented implementation. artec's outlook is interdisciplinary. Scientists of artec collaborate with political and economic institutions to develop possible strategies for

sustainability-oriented social change on a local and global level. Two examples of artec's projects will be outlined in the following:

QUARREE100 is an ambitious project funded by the Federal Ministry for Economic Affairs and Energy and the Federal Ministry of Education and Research. QUARREE100 aims to establish resilient and renewable energy systems within a city district. Six of artec's employees work with a consortium of 20 partners from HEI, private companies, municipal corporations, and development agencies. They work together to find conceptual, systematic, and transformative solutions for a renewable energy transition. An urban district in the city of Heide in Holstein is the site of the experiment. An integrated electricity, heat, and mobility system (sector coupling) is only one of the objectives for research at the site. Another important part of the project is to include the residents of this district. Here, it is equally important to analyze their needs and wishes on the one hand and to engage with them in a discussion on the necessity of a broad energy transformation on the other hand. To facilitate this process an info center in a container was set up as a local contact point. More information on this project can be found on the following website: <https://quarree100.de/en/>.

The project "Epistemic Mobilities and the Governance of Environmental Risks in Island Southeast Asia" (EMER-SA) is an example of the artec's research in the realm of climate change and coastal protection. This project is funded by the DFG and takes place in cooperation with the Leibniz Center for Tropical Marine Research. It analyses patterns of epistemic (im-)mobilities related to sea level change and the contestation processes that define them in and between Jakarta, Metro Manila, and Singapore in archipelagic Southeast Asia. How are standardized policies and practices for living with 'sea change' communicated, translated, and recirculated between local and regional contexts, through trajectories of political legitimization, and for anticipatory social learning? Which different actors and institutions affect the perception of risk in relation to rising sea levels? Why are certain strategies

and standardized practices chosen, legitimized, and then utilized in all three cities?

Whether concerned with energy, coast protection, climate adaptation, or sustainable consumerism, the members of the artec Sustainability Research Center work to study different questions surrounding socio-ecological transformation. They are devoted to developing dialogue, practices, and technologies that contribute to a more sustainable society and to identifying and solving socio-ecological problems.



© Johannes Herbeck

Coastal protection on Pulau Kusu, Singapore



© Johannes Herbeck

Work on the Marina Barrage, Singapore



© Lotta C. Kluger

SDG lecture series

Marine Ecology Research at the UFT and Faculty 2 – The Department of Marine Ecology

Dr. Malik Naumann, Prof. Dr. Wolf

Healthy oceans are essential for the future of humanity. However, they are now more than ever subjected to a great number of man-made stressors. Global threats such as climate change and plastic pollution, as well as local threats such as the eutrophication of coastal waters, are forming an ominous alliance. This is why research on the effects of these many stress factors on marine ecosystems and their organisms, is as vital as the establishment of science-based solutions for minimizing the damage of these ecosystems.

Housed at the UFT (Center for Environmental Research and Sustainable Technology) the Department of Marine Ecology, led by Dr. Christian Wild, concentrates

on these complex issues and conducts experimental lab and field studies (Fig. a and b) on acutely relevant ecological issues. Coastal ecosystems such as rocky shores, sea grass meadows, and especially coral reefs, as well as the organisms that inhabit them, are the focus of their research. Tropical coral reefs belong to the most important, species-rich marine ecosystems. Furthermore, their diverse ecosystem services serve as coastal protection and as a source of food and income, thus, making coral reefs one of the most valuable ecosystems on earth. In a relatively short amount of time, coral reefs and in particular their essential reef-builders, stony corals, have been deeply affected worldwide by increasing local and global threats. They therefore serve as important early warning



Fig. a: Design of a field study with a transparent plastic chamber in order to continuously measure the cycle of materials between the water column and the benthic organism communities of a coral reef in the Red Sea.

systems for researchers on the effects of harmful environmental influences such as ocean warming and acidification caused by global climate change.

The Department of Marine Ecology uses an interdisciplinary approach and established methods in the fields of ecophysiology, biogeochemistry, and microbiology to answer relevant ecological questions. There are three main research areas: The first area focuses on the effect of various biotic and abiotic factors, as well as the effect of potential stressors on physiological processes in keystone species such as sponges, algae, and corals. The second main research area addresses dynamic benthic communities and studies the sensitivity and changes in response to human influences such as climate change, over-fishing, and eutrophication. The research here focuses primarily on the interaction between different functional organism groups in coral reefs, sea grass meadows, rocky shores, and their dynamic and biochemical reaction to environmental change comprise. The third research area concentrates on nutrient and energy cycles. The main focal point is the transport of organic materials and energy between the water column and benthic communities as well as between different benthic ecosystems. Additionally, this research area examines the link between neighboring marine and terrestrial ecosystems and the biogeochemistry of their carbon and nitrogen cycles.

In addition to these various research projects, the Department of Marine Ecology coordinates the 14th International Coral Reef Symposium (ICRS 2020). The ICRS2020 is the most significant international conference on the subject of research, conservation, and management of coral reefs. The International Coral Reef Society holds ICRS conferences only once every four years and attracts more than 2,500 visitors from over 90 different countries, among them many leading researchers, nature conservationists, ocean experts, political decision-makers, and coastal managers. In the last 50 years, there have been many successful ICRS conferences in Asia, Australia, and North America. From July 5 to July 10, 2020, the ICRS conference will take place in Europe for the first time, at the Bremen Exhibition and Conference Center. The University of Bremen will host this major event with the support of the city of Bremen under the headline "Tackling the Challenging Future of Coral Reefs".

The ICRS 2020 will be the key event to develop science-based solutions for the current and future challenges of coral reefs through intensive exchange between research, environmental protection, politics,

and the public. The ICRS 2020 strives to be an environmentally friendly, sustainable, and emission-free major event. It aims to minimize local and global environmental impacts as far as possible and, if unavoidable, to reducing carbon footprints by offsetting them.



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Fig. b: The experimental aquarium complex at the Department of Marine Ecology at the UFT on the University of Bremen campus. The effects of various environmental factors on physiological processes in soft corals are analyzed. This picture was taken in the morning while the aquariums are illuminated by artificial blue light, which imitates the natural lighting conditions at dawn.



The Hoch^N Project – Sustainability at Higher Education Institutions

Merle Tegeler, Prof. Dr. Georg Müller-Christ

Sustainability as a Task for Universities

Sustainability is an urgent social development task that is increasingly coming into public focus. Higher education institutions (HEI) play a vital part in ensuring a sustainable development of our society. In an initial two-year research phase, the HOCH^N network has been working on these issues. HOCH^N is a collaboration of eleven German universities. Additionally, more than 100 German HEI are participating at different levels in HOCH^N's growing sustainability network.

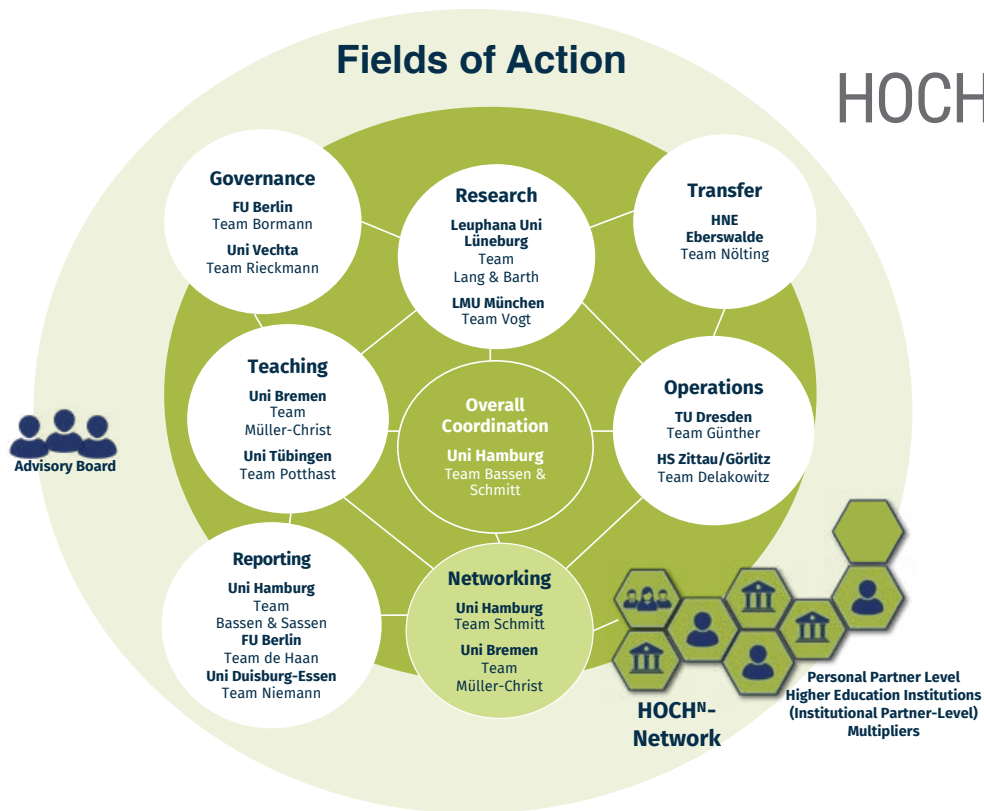
Within this two-year cooperation and during the close nationwide exchange via numerous events, such as practical research sessions, collaboration meetings, or conferences, the added value of HOCH^N has become clear: the exchange with students, (young) scientists, practitioners, and experienced sustainability actors. In this way, it is possible to adopt new perspectives, to develop mutual appreciation beyond hierarchical levels, and to create a trust-based setting for constructive discussions.

The Objectives of HOCH^N

The overriding goal of the joint project “Sustainability at Higher Education Institutions: develop – network – report” (HOCH^N) funded by the Federal Ministry of Education and Research (BMBF) is to promote the sustainable development of the German higher education landscape. Four sub-goals are derived from this:

1. establishment and consolidation of a network for the exchange of experiences
2. development and analysis of a common concept of sustainability
3. promotion of sustainable university development through the implementation of appropriate activities and methods
4. drafting of guidelines for sustainable university development, which are then tested and collated to form an integrated overall guide

By the end of October 2020, the goal of HOCH^N is to create a roadmap for the sustainable university of 2030 as



a vision for the future of sustainable university development.

Project Structure HOCH^N

The teams at the eleven HOCH^N universities have a high proportion of young academics from a broad range of disciplines.

Fields of Action

In the sense of a “whole institution approach”, which encompasses the entire higher education institution, the focus is not only on the core areas of teaching and research, but also on the operational management of higher education institutions. In addition, the project focuses on fields of action in sustainability reporting and governance as cross-disciplinary themes, as well as on transfer.

Guides

Each of the work packages has dealt with a specific topic of university sustainability over the course of the

project: research, teaching, operations, and transfer, supplemented by the cross-disciplinary topics of sustainability reporting and governance. The six HOCH^N guides do not claim to cover the fields of action in full, but rather focus on specific topics and summarize the findings, which have been collected and developed in a structured manner. They accordingly represent a prelude to follow-up discussions in the growing HOCH^N network. They are living documents and the collaborative creation and exchange process during their composition is an important added value. They also make it clear that universities progress by taking many small, often unspectacular steps.

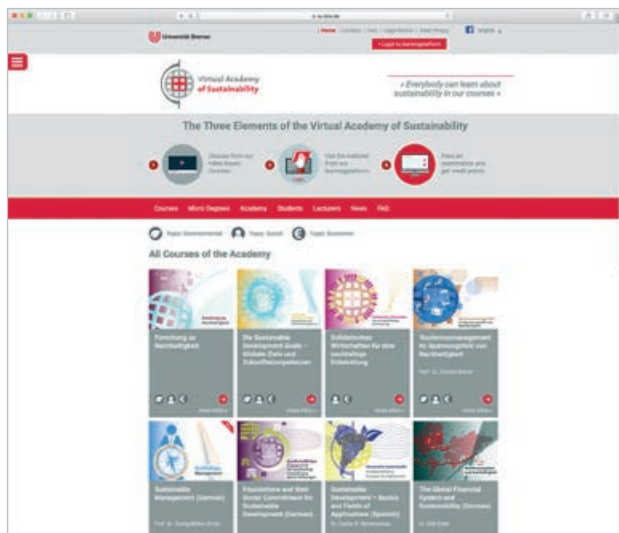
HOCH^N – The University Network

Under the auspices of the universities of Hamburg and Bremen, a constantly growing university network is being established. At the time the beta guides went to press, members of around 100 German universities were already part of this network. In this way, existing experiences and expertise can be made available to the individual universities, stimulating a shared dialogue and enabling them to learn from one another. The HOCH^N sustainability map shows the responsible persons, partner universities, and sustainability initiatives throughout the German higher education sector.

The Virtual Academy of Sustainability: Digital Education for Sustainable Development

Thore Vagts

The Virtual Academy of Sustainability offers free online courses on sustainability. By using online videos as a medium, students throughout Germany and beyond are given the opportunity to educate themselves on subjects related to sustainability. Course content is always available on the website of the virtual academy and on YouTube, and can be studied anytime and anywhere. The course is completed with an electronic exam. The credit points gained by passing the exam can be counted towards general studies or elective courses and can therefore contribute to a degree.



The internet presence of the Virtual Academy of Sustainability
<https://www.va-bne.de/index.php/en/>

Didactic Concept of the Virtual Academy

For some years now, digital learning/teaching has been occupying a new prominent place and has opened up new places of learning at HEI. The Virtual Academy of Sustainability takes part in this institutional change by creating open online content on sustainability. Online educational videos allow students and other interested parties to study at their own pace, be it during the semester or during the semester break. By allowing students to

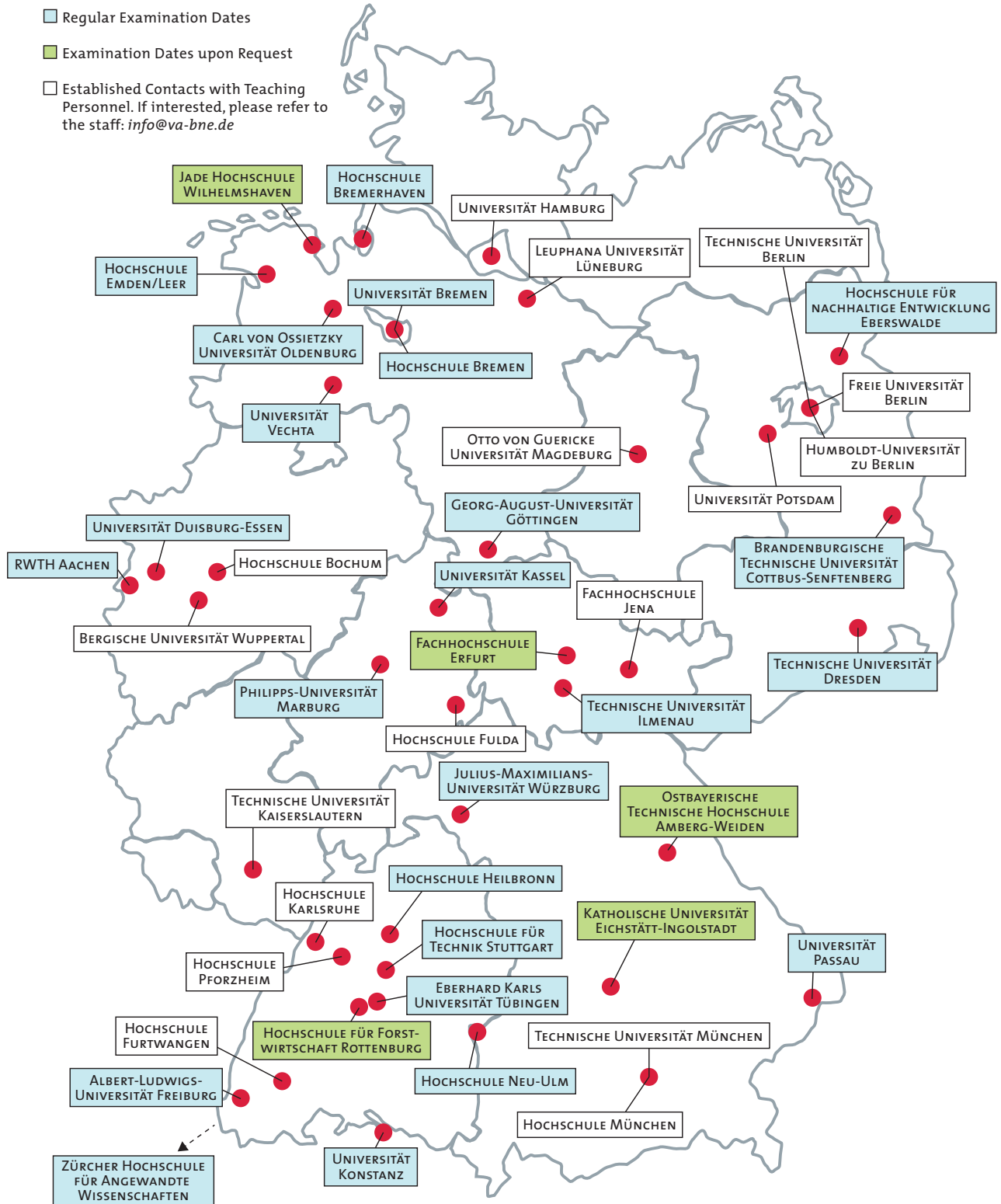
choose their own exam date, the program helps to ease the exam period at the end of the semester.

The overall goal is to teach as many students as possible the theoretical foundations of sustainability. The transparent structure as well as the 18 different courses offered allow an easy introduction to the subject, especially for those who so far have had little or no contact with the topic sustainability.

Network of the Virtual Academy of Sustainability

The Virtual Academy of Sustainability teaching and learning platform is designed for use across HEI and 40 different universities actively participate in Germany and Europe. With the help of modern digital media, the virtual academy is able to reach a large number of students beyond Bremen with information on sustainability. With its range of courses, the academy makes an effective contribution to education for sustainable development (ESD) at German HEI. For this contribution, the Virtual Academy of Sustainability has received several awards from various organizations.

A special feature of the project of the virtual academy at the University of Bremen is that students can receive credit points (ECTS points) after completing courses. These credit points are recognized at over 25 partner universities in Europe. In order to expand the examination network and to be able to cope with the constantly growing number of students, the virtual academy continues to create further strategic partnerships with additional HEI. The team of the Virtual Academy for Sustainability takes care for all the organizational preparation, the setting up, and the follow-up of the examinations. All partner universities have to do, is to integrate the courses within their course catalogue and schedule and supervise exams. Overall, the effort in order to participate in the program remains very low.



The Network of the Virtual Academy of Sustainability, winter semester 2018/2019

Sustainable Development Goals – The Ambivalence of a Global Agenda

Ina Lehmann und Sigrid Kannengießer

By declaring the 2030 Agenda for Sustainable Development in September 2015, the United Nation General assembly signalized that it was time for fundamental changes in politics and society. The resulting 17 Sustainable Development Goals (SDGs) with altogether 169 objectives are the manifestations of new guiding principles. These SDGs are more thorough, concrete, and ambitious than the former Millennium Development Goals. However, they are criticized for being contradictory within themselves and for ignoring the systematic causes of poverty, conflicts, and environmental destruction.

This area of conflict is the central subject of a lecture series by the artec research center, which is going over many semesters, starting in summer 2019. Within this lecture series, lecturers from Bremen and other national and international universities will critically analyze and discuss the necessities, opportunities, and limitations of the 2030 Agenda. The main focus will be the following questions: What problems and possible solutions are outlined in the individual goals? Which potentials, limitations, and ambivalences can be found within the goals and within the implementation of the goals in research, politics, and society?

Is there a need to reform individual goals or all of the 2030 Agenda or does its implementation truly offer the possibility for a sustainable society?

In an opening lecture, the goals will be discussed from a scientific and political perspective. The final lecture will draw a conclusion and provide a constructive outlook.

Legal Compliance and Submission of the Next Environmental Statement

According to the status quo, the University of Bremen's environmental impact complies with environmental legislation and legal requirements in all areas. There are no infringements of legal regulations.

We will present the next updated environmental statement in March 2020. The next consolidated environmental statement will be submitted in March 2022.

Making use of the transition periods, the requirements of the amended EMAS Regulation (EU) 2018/2026, which has now come into effect, will be taken into account in our next updated environmental statement.

Further Information

<https://www.uni-bremen.de/en/>

<https://www.ums.uni-bremen.de>

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Validation

(Declaration of the environmental expert)

The Environmental Verifier

Dr. Georg Sulzer

Hangleite 2, D-84169 Altfraunhofen

Registration Number DE-V-0041, accredited for areas (NACE-Code) 85.42.1 and 72.2

has validated the environmental management system, environmental audit, and its results,
the environmental performance, and the environmental statement of the institution



located at Leobener Straße, 28359 Bremen

on the ground of the NACE Code 85.42 and 72.2 "Higher Education" in accordance with Regulation (EC) No. 1221/2009 as amended by Regulation (EU) 2017/1505 from the European Parliament and the Council from November 25, 2009, allowing voluntary participation by organizations in a Community Eco-Management and Audit Scheme (EMAS III).

On signing this declaration, it is confirmed that

- the appraisal and validation have been carried out in full compliance with the requirements of Regulation (EC) No. 1221/2009, amended by Regulation (EU) 2017/1505;
- the results of the appraisal and validation confirms that there is no evidence of non-compliance with applicable legal requirements relating to the environment,
- the data and information of the updated environmental statement provide a reliable, credible, and correct portrayal of all activities within the scope specified in the environmental statement.

This document is not equivalent to EMAS registration. EMAS registration can only be granted by a Competent Body under Regulation (EC) No 1221/2009 amended by Regulation (EU) No 2017/1505.
This document shall not be used as a standalone piece of public communication.

Altfraunhofen, May, 18, 2019

Dr. Georg Sulzer

Environmental Verifier (Registration No. DE-V-0041)



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