

Operational Sustainability in Higher Education

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Sustainability at universities: develop – network – report (HOCH^M)

Operational Sustainability in Higher Education



The contents of the guide “Operational Sustainability in Higher Education” were developed as part of the joint project “Sustainability at Universities: Develop – Network – Report” (HOCH^N) in cooperation with the Technische Universität Dresden and the Hochschule Zittau/Görlitz. This publication is a beta version which will be integrated into a complete guideline following a test phase. The project is funded by the Federal Ministry of Education and Research / Bundesministerium für Bildung und Forschung (BMBF) under the registration number FKZ13NKE007 within the framework program Research for Sustainable Development (RSA).



Technische Universität Dresden

Prof. Dr. Edeltraud Günther, Dr. Anne-Karen Hüske,
Dr. Nicolas Roos

Faculty of Economics
Chair of Business Administration, Operational
Environmental Economics and PRISMA – Centre
for Sustainability Assessment and Policy

Münchner Platz 1/3
01062 Dresden

ema@mailbox.tu-dresden.de

Hochschule Zittau/Görlitz

Prof. Dr. Bernd Delakowitz, M. A. Andreas Bulcsu,
M. Sc. Eric Schön

Faculty of Natural and Environmental Sciences

Theodor-Körner-Allee 16
02763 Zittau



Operational Sustainability in Higher Education

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Summary

The operation of state-run higher education institutions (HEIs) is subject to various legal and financial restrictions. Legal requirements are addressed through the management and administration of HEIs and include strict requirements for procurement, contracting of services, building and energy management, waste management, handling of chemicals and hazardous materials, human resources management, and occupational health and safety. Budgetary allocations, as a basis for the provision of human and material resources, are often linked in scope and duration to higher education development plans of the federal states and are increasingly based on the fulfilment of (indicator-based) agreements. Against this background, the scope for implementing sustainability aspects in the operation of HEIs and in campus life is only possible to the extent that HEIs commit to this internally, for example within the framework of strategies and guidelines (“whole institution approach”). In addition, regulations specific to individual federal states additionally restrict the autonomy of HEIs, for example through centralized real estate and construction management, including necessary operations thereof. Despite the aforementioned restrictions, this guideline attempts to identify obstacles as well as drivers and concrete measures in the Operations work package that can be used to successfully anchor processes for the development, implementation, and establishment of sustainability at HEIs. For this purpose, the identified fields of action are sustainable...

- procurement,
- waste management,
- mobility,
- building and energy management,
- controlling,
- research operations,
- event management,
- employment relations, and
- communication.

First, the affected groups of people are addressed, the particular relevance and resulting goals for higher education operations are shown, obstacles and drivers as well as measures for implementation are presented, and are then underpinned with examples from academic practice. It becomes apparent that sustainable higher education operations must think beyond the short-term time horizon and, for example, take into account lifecycle-based approaches in procurement and contracting, as well as in building and energy management, instead of exclu-

sively price-performance specifications. The legal framework does not stand in the way of such an approach, but actually promotes it to some extent. The guideline offers examples which, due to their reference to sustainability, can also be expected to result in cost savings in the medium term, for example through reduced energy consumption or lower maintenance and repair requirements. Sustainable waste management presupposes the consistent implementation of closed-loop recycling management – which is also required by law – but this can in some cases lead to conflicting goals in teaching and even more so in research, for example in the case of highly material- and energy-intensive test arrangements. The same applies to the handling of chemicals and hazardous substances.

The guideline also proves, conceptually and with examples, that sustainable mobility is possible at institutions of higher education and is particularly welcomed by students. In almost all fields of action, it is shown that a major obstacle in the implementation of sustainability-related action is insufficient knowledge of the existing opportunities, a lack of transparency in internal and external communication, and often a lack of acceptance among stakeholders. Higher education institutions are called upon to face the resulting challenges and – for example as part of the future project phase of the HOCH^N joint project – to reduce individual obstacles, raise awareness, and increase the motivation of those working in higher education and of external partners through partial practical testing of the implementation measures proposed in the guideline.





Introduction

Sustainability as a task for higher education institutions

Sustainability is an urgent developmental task for our society, and is attracting increasing attention. Like all other organisations within our society, higher education institutions are called upon to deal with the associated challenges. How can complex organisations such as higher education institutions succeed in initiating and maintaining the process of

An approach to the understanding of sustainability in terms of terminology within the HOCH^N network can be found on Page 14.

sustainable development within their own institutions and making it a permanent part of their operations? How can it be ensured that as many stakeholders as possible get involved in sustainable development? For these questions there is no ready-made formula, no instruction manual, no checklist that would be equally helpful for all higher education institutions or could be used by all in the same way – higher education institutions are too different, for example with regard to their legal form (private or public), their type (university, university of applied sciences), their location (rural area or metropolitan region) or size (small and specialised or large and comprehensive). In addition, higher education institutions are influenced by external framework conditions that promote aspects of sustainability to varying degrees, depending on the federal state in which they are located.

The HOCH^N network looked at these questions in an initial two-year research phase (11.2016–10.2018). This guide is one of a total of six HOCH^N guides which were first available as beta versions and represented the initial results of the work which has been undertaken. In the subsequent second phase of the project, the guidelines were tested by the eleven partners in the network at various higher education institutions. Some findings from the trial phase have been incorporated in this second and final edition of the guides. In addition to the research work carried out by the eleven German higher education institutions in the network, the HOCH^N project consists of a growing sustainability network of German higher education institutions, in which so far partners from around 140 higher education institutions have been exchanging information.

The four-year cooperation and the close nationwide dialogue involving a range of event formats such as practical research sessions, collaborative meetings and network hubs have revealed the actual value provided by HOCH^N: the exchange of ideas among students, (young) academics, practitioners and experienced actors in the field of sustainability. This makes it possible to adopt new points of view, develop mutual appreciation independent of hierarchical levels and create a forum for constructive discussions.

HOCH^N – the research project

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 the sustainable development of higher education institutions through the implementation of appropriate activities and methods
4. Drafting of guidelines for sustainable development at higher education institutions in order to create an integrated overall guide

By the end of October 2020 the objective of HOCH^N is to create a roadmap for the sustainable higher education institution of 2030 as a vision for the future of sustainable development in higher education.

The HOCH^N project structure

Eleven funded higher education institutions are networked in the working constellations shown in Figure 1.

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

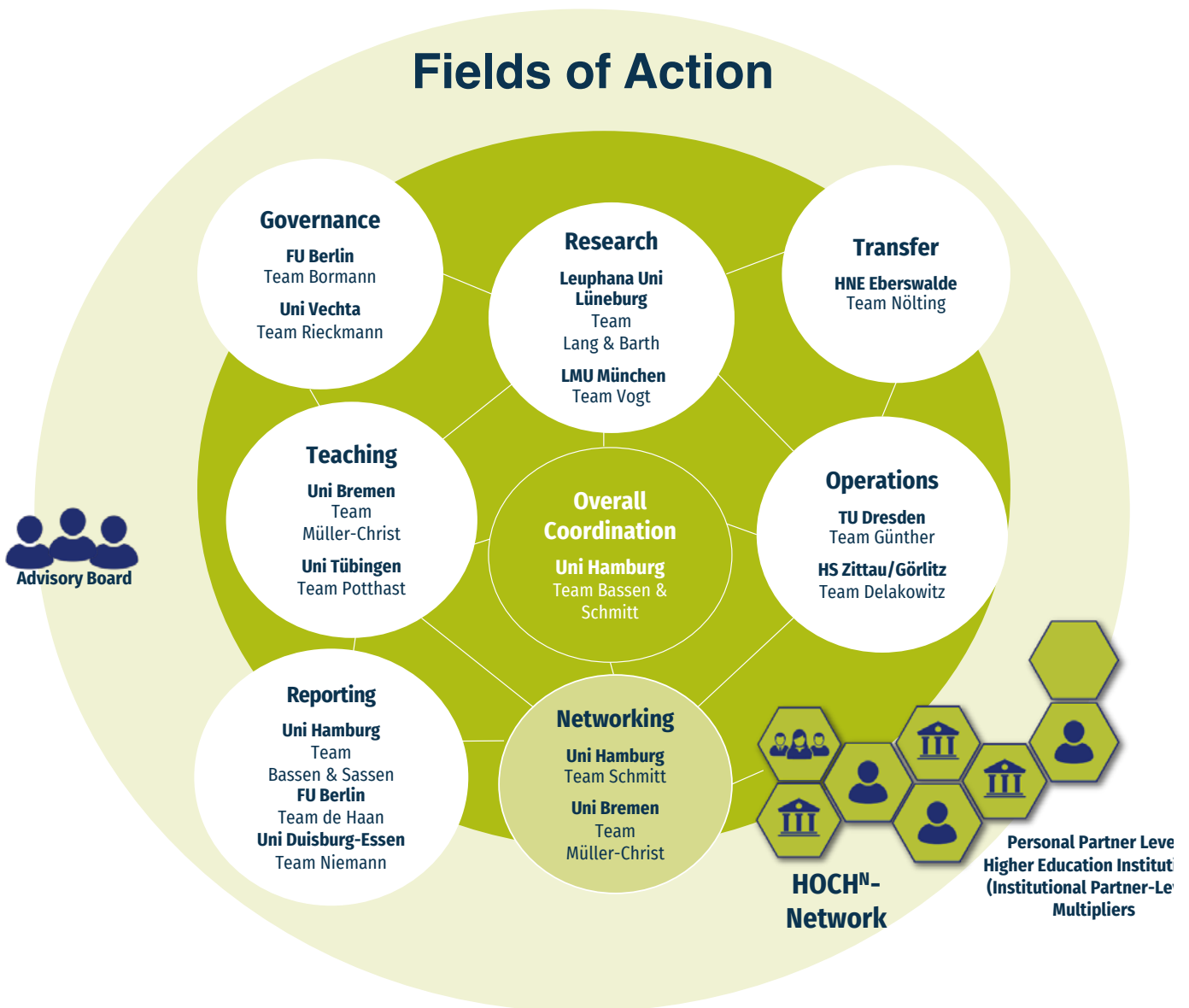


Fig. 1: Overall structure of HOCH^N (Universität Hamburg)

are members of the network:

- Freie Universität Berlin
- Universität Bremen
- Technische Universität Dresden
- Universität Duisburg-Essen
- Hochschule für nachhaltige Entwicklung Eberswalde
- Universität Hamburg
- Leuphana Universität Lüneburg
- Ludwig-Maximilians-Universität München
- Eberhard Karls Universität Tübingen
- Universität Vechta
- Hochschule Zittau/Görlitz

The HOCH^N project is supported by an international advisory board. In addition the Institute for Higher Educational Development (Institut für Hochschulentwicklung – HIS-HE) is a cooperation partner in the operational field.

Fields of action

In the sense of a whole institution approach encompassing 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 knowledge transfer.

▶ <http://www.hoch-n.org/4-partner/fachbeirat>

Guides

In the course of the project each of the work packages has dealt with a specific aspect of sustainability at higher education institutions: research, teaching, operation and knowledge transfer, supplemented by the cross-disciplinary topics of sustainability reporting and governance. The six HOCH^N guides were initially available as beta versions. They were prepared in parallel with the start-up, research and networking activities of the first two funding years, and then piloted and revised in the two years following publication. They do not claim to cover the various fields of action in full, but instead focus on specific topics and summarise the findings which have been collected and developed in a structured manner. They accordingly represent a starting point for follow-up discussions in the growing HOCH^N network. They are practical documents in which the process of shared creation and dialogue generates the real added value. They also make it clear that higher education institutions progress by taking many small, often unspectacular steps.

The target groups of the individual HOCH^N guides are all those who wish to promote sustainable development at their own higher education institution and require a low-threshold entry into the various fields of action. At the same time the varying basic conditions of Germany's highly diverse higher education landscape need to be taken into account, so that all institutions can find useful ideas and suggestions for their own situation. The HOCH^N network aims to promote this important dialogue as a nationwide platform for the sustainable development of higher education institutions. In addition, since they create an overview of the framework conditions and actions which a sustainable higher education institution requires, the guides are aimed at all stakeholders in higher education institutions.

HOCH^N – the higher education institution network

Under the auspices of the universities of Hamburg and Bremen a constantly growing network of higher education institutions is being established. At the time this definitive edition of the individual guides went to press, members of around 140 German higher education institutions were already part of this network. In this way, existing experiences and expertise can be made available to the individual higher education institutions, stimulating a shared dialogue and enabling them to learn from one another. The HOCH^N sustainability map provides information on the individuals involved, partner higher education institutions and sustainability initiatives throughout the field of higher education in Germany.

Future prospects – what are the next steps?

An individual consideration of the various fields of action represents a pragmatic starting point. However, there are strong interdependencies between the various fields of action, and a whole institution approach also and especially involves addressing and orchestrating the interfaces between the individual fields of action and themes of sustainable development. The second project phase (11.2018–10.2020) therefore focused on taking these interfaces into account, enriching them with empirical knowledge and presenting them on the basis of concrete practical examples. In addition to piloting and revising the individual guides, the aim is to offer an integrated, digital overall format that invites their application and further shared development. As a result, from the autumn of 2020 a HOCH^N wiki will be available as a common online platform open for use by all interested parties.



Photo: Markus Scholz/scholzfoto.de

In HOCH^N, I experience an inspiring collaboration which is making incredibly rapid progress: it's really exemplary in terms of not only content but also its organisation and working methods.

Dipl.-Ing. Cornelia Reimoser
Headquarters of the Fraunhofer Gesellschaft
Member of the HOCH^N advisory board

Join HOCH^N!

We are looking forward to further HEI partners joining the HOCH^N network. Participating in our events will provide you the opportunity to get actively involved in important processes. Further information:

- ▶ <https://www.hoch-n.uni-hamburg.de/en/5-mitmachen.html>
- <http://hoch-n.org/landkarte>
- netzwerk@hoch-n.org

In addition to the guides and other materials, the HOCH^N wiki also contains the “Sustainable Higher Education Landscape 2030” roadmap. The roadmap identifies perspectives, potentials and concrete implementation paths on how to strengthen and achieve a sustainability transformation of German higher education institutions by 2030. In order to maintain and expand the activities and networks begun within HOCH^N beyond the immediate project period, DG HochN, the Deutsche Gesellschaft für Nachhaltigkeit an Hochschulen e.V. (German Association for Sustainability at Higher Education Institutions) was founded in April 2020. DG Hoch^N provides the arena for further implementation and anchoring of the UNESCO programme “Education for Sustainable Development 2030” in Germany’s higher education system on the basis of previous results.

Acknowledgements

A project for the sustainable development of higher education institutions in this form would not have been feasible without the BMBF and its nationwide start-up financing. As a learning higher education institution network, the task of establishing permanent structures still lies ahead of us until attitudes in the higher education

landscape have changed in such a way that sustainability processes are regarded as permanent functional tasks for which personnel resources need to be made available. We would like to thank in particular Dr. Karl Eugen Huthmacher, Eckart Lilienthal, Florian Frank, Cornelia Möller and Dr. Martin Schulte from the BMBF’s Department 7: Providing for the Future – Research for Fundamentals and Sustainability. Thanks to their valuable support so far and the possibility of first consolidating the wide range of findings and results and then – in a second funding phase – testing them for their practical application, they have made a major contribution to sustainable development at higher education institutions.

We would also like to take this opportunity to express our special thanks to our project sponsor, the VDI Technology Center, and in particular Svetlana Thaller-Honold, Christiane Ploetz and Helene Leneschmidt. As reliable partners they are contributing significantly to a change of perspective in the world of higher education.

Special thanks are also due to the members of the HOCH^N Advisory Board (<https://www.hoch-n.uni-hamburg.de/1-projekt/fachbeirat.html>), who have contributed to the HOCH^N network in a variety of ways, both in an advisory capacity and in helping to shape it.

We look forward to continuing our cooperation with the many stakeholders who are dedicated to the development of sustainable higher education in Germany and beyond.

If the programme didn’t already exist, we would have to invent something like HOCH^N.

Prof. Dr. (mult.) Dr. h. c. (mult.) Walter Leal
HAW Hamburg / Member of the HOCH^N advisory board



Photo: H. Thämnitz



The understanding of sustainability by the joint project HOCH^N

Background

Many stakeholders of Higher Education Institutions in Germany deal with the topic of sustainability in research, teaching and practical operations. To date, however, there has been insufficient consensus on how the demands for sustainability arising from social responsibility should be understood, shaped and implemented in the context of Higher Education Institutions. This can be seen, for example, in the current debate on the relationship between freedom and sustainability-related responsibility of science.

Within the framework of the joint project, the HOCH^N collaboration has set itself the goal of developing a shared, university-specific concept of sustainability which was conceived in a participatory process by the eleven collaborating Higher Education Institutions. It is based on the interim results of the HOCH^N collaboration, the understanding of sustainability of the individual partner Higher Education Institutions within the joint project, the basic concept of sustainability anchored in many international resolutions, and an evaluation of the relevant literature.

The understanding of sustainability is based on conceptual coherence and attempts to work out the normative implications of sustainability in the context of Higher Education Institutions. It offers an orientation framework for the overall institutional integration and implementation of sustainability as an ethical principle in the theory and practice of research, teaching, operations, governance and transfer at Higher Education Institutions in Germany. It by no means precludes individual Higher Education Institutions with their own individual focal points from setting their own priorities and practices. Rather the diversity provided by different understandings of sustainability can be regarded as a positive factor, since sustainability should ideally take into account the respective contexts, framework conditions and protagonists of the individual Higher Education Institutions. However, precisely because there are different approaches, conceptual clarification fulfils the important function of contextually clarifying the scope for interpretation, commonalities and open questions, and making them more concrete for implementation.

The understanding of sustainability provides the basis for the effective implementation of actions at Higher Education Institutions which are regarded as indispensable for

any major societal transformation and for the execution of the Federal Government's national action plan 'Education for Sustainable Development' (ESD). The extended version of the understanding of sustainability with explanations on the fields of action of research, teaching, operations, governance and transfer as well as on the literature used can be found here: <http://www.hoch-n.org/2-handlungsfelder/04-forschung.html> (in German)

The target group

This understanding of sustainability is primarily aimed at members of Higher Education Institutions, especially those wishing to deal with the subject of sustainability and to shape change processes. Internal stakeholder groups include, for example, representatives of university management, academics, teachers, students, administrative staff and sustainability officers. The following are considered to be stakeholders external to the university: representatives of state and federal ministries, the German Rectors' Conference and the Conference of Ministers of Culture, politics and civil society.

The basic understanding of sustainability in the context of Higher Education Institutions

Sustainability is a normative principle that can be described as a scale for global and intergenerational justice in the face of the challenges posed by current changes in the earth's system. In ethical-political terms, sustainable development is not an externally defined and prescribed goal, but an open search process with heterogeneous target components, which is therefore pluralistic and culturally variable. Its object is long-term responsibility for ensuring environmental viability, social justice and economic performance. It aims to strengthen the cultural competencies for shaping societal life. Its systematically integrated implementation is regarded as the need for comprehensive societal transformation. The core of which is a change in the relationship between human beings and nature.

The task of Higher Education Institutions is to deal theoretically, conceptually, methodically, critically and reflectively with the processes and conditions of societal transformation. Furthermore, it is also a matter of how

the ethical dimension of science (in the fields of action research, teaching and operations) can be respected and implemented.

Postmodern science requires methodical and critical reflection on the significance of normative perspectives. Therefore, ethics analyses the manifold reasons, goals, motivations and resistances of good and just action. In doing so, it is not limited to prescribing ready-made solutions. Rather, it first wants to stimulate reflection and thereby enable freedom. The freedom of science is therefore always to be interpreted as a mandate to independently reflect on its goals in the service of a sustainable society.

The need for ethical reflection and orientation arises above all in situations of radical change. This is the case today with regard to the profound change in values and the global, national and regional challenges for sustainable development (e.g. climate change). Therefore, the principle of sustainability can be considered both as an socio-ecological and economic challenge, as well as a cultural task in order to preserve the natural foundations of life for all people, including future generations (cf. Brundtland Commission; Art. 20a GG; SDGs), and the appreciation and protection of the intrinsic value of nature with its biological diversity (cf. Federal Nature Conservation Act § 1).

Higher Education Institutions, as central actors in societal discourse, need to be really dedicated to this topic. Within this context and following the joint HRK/DUK declaration (2010) “Higher Education Institutions for Sustainable Development” (orig. Hochschulen für nachhaltige Entwicklung) and the HRK recommendation (2018) “For a Culture of Sustainability at Higher Education Institutions” (orig. Für eine Kultur von Nachhaltigkeit an Hochschulen), the collaborators of the joint project HOCH^N take sustainability as a profile-forming and connecting central idea. With this common goal Higher Education Institutions can contribute to the transformation for a sustainable society and the responsible use of planetary resources.

Due to their ethical and socio-political position, Higher Education Institutions have an inherent responsibility to engage with a societal transformation towards greater sustainability. They can contribute empirical and theoretical knowledge, methodological expertise and the ability to analyse. To do justice to the normative content of sustainability means to think methodically about problems in societies, to pose relevant questions regard-

ing the relationship between humans and nature, and to learn to thinking and acting in interdisciplinary contexts. It is a matter of determining how sustainable solutions for dealing with the great challenges of our time can be found globally, nationally and regionally, and then be implemented on a long-term basis at the institutional level. Thereby it is constitutive for ethics to also take a systemic view of obstacles on the way to sustainability. In doing so, it can not only generate target knowledge, but also impart knowledge of design and transformation.

Those involved in the joint project HOCH^N are striving to implement sustainability in the fields of action of research, teaching, operations, governance and transfer at their own institutions. Therefore, contributing to the practical implementation of aforementioned goals, as well as inducing a continuous improvement process and representing a reliable pioneering role.

Stakeholders of the joint project HOCH^N oblige to foster the understanding and implementation of sustainability at their own Higher Education Institutions. Thus Higher Education Institutions contribute to the world wide action plan 'Education for Sustainable Development' of the UN (2015–2019) to which Germany is committed with a national action plan. Additionally, the Higher Education Institutions contribute to the perception, further development and enhancement of both the United Nations 'Sustainable Development Goals' and Germany's sustainability strategy. This is reasonable, since the SDGs do not adequately address central global challenges (such as increasing resource consumption and population growth, externalisation of socio-ecological costs or conflicts of objectives between economic growth and ecological limits).

The Higher Education Institutions are willing to ensure adequate in- and external transparency, to promote continuous, open and reflective improvement processes, to support dialogue with various stakeholders from Higher Education Institutions and to facilitate exchange with society. Therefore, it may prove expedient to analyse the status quo, provide transparent and regular information on their sustainability activities and to communicate these. Sustainability reporting designed in this way helps to reflect the Higher Education Institution's understanding of sustainability, its specific goals and measures, as well as to enter into an exchange with stakeholders.

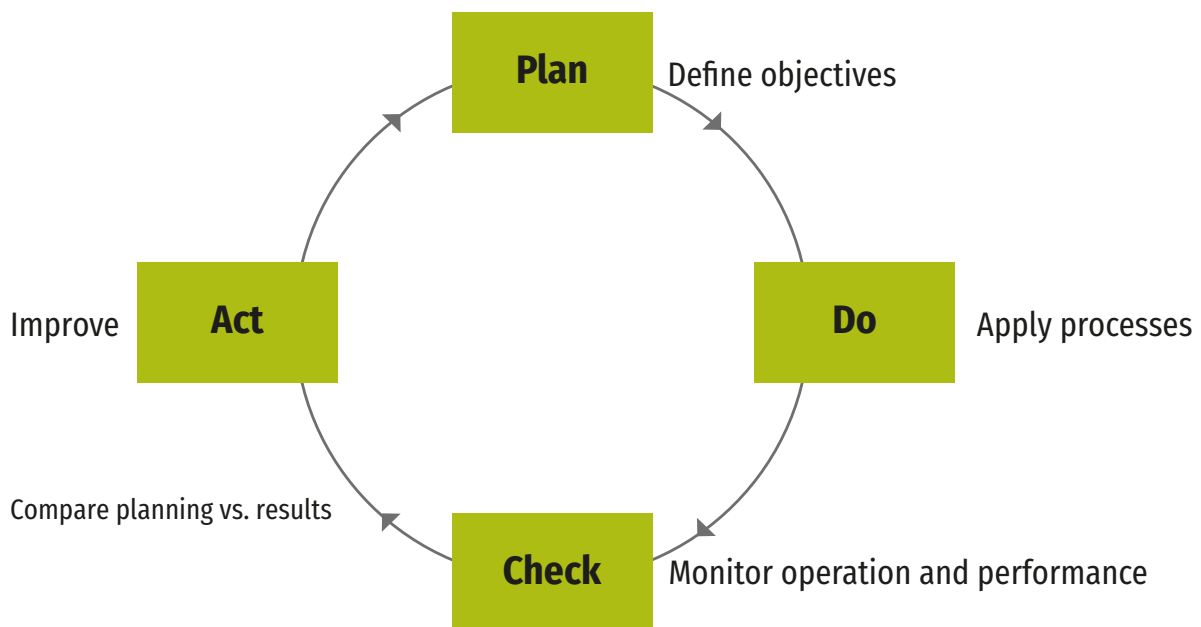


HOCH^N: Importance and relevance of sustainability in higher education

Sustainability in higher education has been relevant since the 1990s, since HEIs are obliged by the legal requirements of the European Union (EU), the German government, and the federal states to address issues of occupational health and safety and environmental protection in their operations. These include, for example, waste and wastewater disposal, the safe handling of hazardous substances and, in particular, emission reduction and work safety. In order to fulfil these tasks, it was and is essential to define responsibilities and competences, such as internal officers responsible for work safety and environmental protection as well as for waste manage-

Universities of Paderborn, Bielefeld, Lüneburg, and the Technical Universities of Berlin and Dresden, to name but a few.³ Currently, 20 German HEIs have implemented an EMS according to EMAS or ISO 14001.⁴ In addition to their operational ecological relevance, EMSs are increasingly gaining strategic importance for decisions and processes within the framework of sustainable university operations. In doing so, they are guided by the process of continuous improvement according to the Plan-Do-Check-Act (PDCA) cycle, also known as the Deming Cycle in reference to its author (see Figure 1: PDCA cycle).⁵

Figure 2: PDCA-Zyklus⁶



ment and the safe handling of hazardous substances.¹ Beyond legal compliance, significant, but still largely voluntary due to the frequent lack of binding general conditions in higher education policy, is the recording and controlling (monitoring and steering) of environmental aspects (such as emission, consumption, and disposal ratios), which are closely linked to resource-conscious, – efficient, cycle – and substitution-based management.²

For an efficient organization of sustainability in university operations, validated environmental management systems (EMS) based on the EU Eco-Audit Regulation and the Eco-Management and Audit Scheme (EMAS) became relevant from 1999 onwards and have been implemented at the University of Applied Sciences Zittau/Görlitz, the

The realization of sustainability principles in university operations is therefore important to establish strategic and operational objectives, structures, and processes, for example to minimize waste, wastewater, and emissions, and to ensure an efficient use of materials, water, or energy.⁷ Operational sustainability is particularly relevant for the ecological sustainability dimension. Ecologically motivated efficiency measures can result in financial savings and thus also have an economically sustainable impact. Sustainable university operations also create new synergies and interfaces with other organizational entities of the HEI, such as the administrative departments, and have

¹ Vgl. Müller, J., 2000, S. 1

² Vgl. Michelsen, G., 2000, S. 21

³ Vgl. Müller, J., 2000, S. 3

⁴ Siehe Institut für Hochschulentwicklung, 2018

⁵ Vgl. Paeger, J., 2010, S. 12

⁶ Nach Paeger, J., 2010, S. 12; Im Original: Deming, W. E., 1982, S. 88.

⁷ Vgl. Bayerisches Staatsministerium für Umwelt, Gesundheit und Verbraucherschutz, 2005, S. 3, S. 18 ff

an integrative effect throughout the entire HEI along a participatory and holistic understanding of sustainability.⁸

Special attention should be given to the role model and multiplier effect that a sustainably organized operation also generates for teaching and research environments. Positive experiences of students during a sustainability-focused campus life as well as daily teaching and research routine that integrate sustainability principles can be just as meaningful for strengthening sustainable thinking and acting that goes beyond the academic curriculum.⁹

The implementation of a holistic, whole-institution approach (WIA) must take into account the participation of external stakeholders and university partners such as the students' association, the municipality, the community, suppliers, and service partners. Together, staff and external stakeholders must design and continuously develop the operational fields in an ecologically, socially, and economically sustainable way.¹⁰ Very important for sustainable WIA and more effective than individual actions or projects are the fundamental strategic commitment and the support of the HEI leadership through appropriate governance structures, in order to enable the anchoring of HEI-specific, operational sustainability themes, such as

in the mission statement of an HEI, its strategies, and its objectives. Sustainability reporting has the task of communicating the sustainability policy of a higher education institution to the public by means of a transparent format (see Sustainability Reporting Guidelines). The consistent gathering and compilation of operationally related data within the framework of a reporting system makes it possible to identify opportunities for improvement and thus creates the basis for decision-makers to steer the progress of the sustainability policy. The following table summarizes the essential aspects and measures that make a decisive contribution to sustainability in the operation of HEIs and can be regarded as "drivers". These are contrasted with obstacles that can be considered as challenges and opportunities for improvement. The following list offers a broad overview of possible challenges and chances for the implementation of a sustainable HEI management. Furthermore, numerous other peculiarities of the individual higher education contexts can have a promoting or hindering effect on the sustainability process. A key task is to recognize and benefit from these factors in order to find suitable solutions for the individual HEI. A standardized approach that applies equally to all higher education institutions does not and cannot exist. The barriers and drivers presented below are not necessarily complementary: Not every success factor offers strategies for overcoming barriers. However, every strategy for overcoming barriers constitutes a potential success factor.

8 Vgl. Delakowitz, B. et. al., 2005, S. 22-23

9 Vgl. Viebahn, P. & Matthies, M., 2000, S. 3-4

10 Vgl. Kummert, K. et al., 2013

Sustainable university operations – obstacles and drivers

Obstacles ¹¹	Drivers ¹²
<ul style="list-style-type: none"> • lack of support from government/authorities • lack of or inadequate legal requirements (federal, state, HEI) • lack of support and cooperation from governance and management • insufficient staff and financial resources • lack of continuity, lack of or insufficient awareness • insufficient commitment and acceptance • lack of internal and external communication • lack of controls (systems) and incentives (systems) • non-observance of new innovations and solutions • insufficient user behavior • inadequate waste prevention or recycling strategies 	<ul style="list-style-type: none"> • support and commitment from the university governance • commitment to a sustainable approach within operations in the mission statement, strategies, programs, or objectives • defined responsibilities • implementation of norms and guidelines (ISO, EMAS) • continuous education and training on operational sustainability themes • continuous exchange of information and participatory involvement • procurement/tendering of products/services via (legally compliant) sustainability principles • thinking along circular economy principles • raising awareness and motivation for sustainable behavior • recording operational sustainability performance • implementing performance measurement

11 Siehe Leal Filho, W. et al., 2017, S. 93-99; Hemmnisse aus dem Englischen übersetzt, sinngemäß zusammengefasst, ergänzt und angepasst nach den Gegebenheiten an Hochschulen in Deutschland

12 Schön, E., 2018, S. 23

The following sections give the reader a deeper insight into how sustainability can be realized in the operation of universities. Topics addressed in the introduction include:

- procurement
- waste management
- mobility
- building and energy management
- controlling
- research operations
- event management
- employment relations
- communication

Reference is made with regard to:

- affected group of people/stakeholders
- relevance
- objectives
- barriers and drivers
- measures and implementation
- good practice
- further information and links

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Subject areas

Sustainable higher education development is a dynamic process driven by stakeholders at universities, including administration, as well as various stakeholder groups and partners in society. The following is therefore merely meant to provide a snapshot and does not claim to be exhaustive.

HOCH^N: Sustainable Procurement

Target audience

This article is aimed at central and decentralized procurers, purchasers, e. g. secretaries, and persons who tender for and procure products, goods, and services as part of their university affiliation and activities. It is also aimed at employees of the academic administration who are responsible for the allocation of funds, such as the Dean's Council.

Relevance

When procuring materials, products, and services, sustainability-oriented HEIs increasingly consider environmental, social, and ethical aspects as important decision-making criteria.¹³ Accordingly, goods and services should have the following characteristics: environmentally and socially compatible, durable, low-waste, recycled and/or recyclable, made from renewable raw materials, energy-efficient, climate-neutral, produced regionally and/or organically as far as possible, and fairly traded or transported.¹⁴

Sustainable procurement at HEIs is relevant due to the level of funding and the sheer volume it entails. Consistent demand for sustainable products and services contributes to the protection of natural resources and acts as an innovation driver for these very goods and services. However, sustainable procurement can also be a trigger for a holistic shift in thinking towards a sustainable campus.¹⁵

Sustainable procurement and the associated compliance with environmental and energy efficiency criteria as well as threshold values are of legal relevance, especially for products and services with high energy consumption needs as well as for substances and compounds that are classified as hazardous according to the regulation of certain chemicals.¹⁶ ¹⁷ According to legal obligations, sustainable procurement at HEIs must also con-

sider the requirements of the German Closed Substance Cycle Waste Management Act, in particular § 45 ("Obligations of the public sector") and take into account the endurance, repair-friendliness, and reusability or recyclability of products. In addition, legally compliant procurement requires products and services that generate less waste or emissions compared to other products.¹⁸ In addition, since 2016, the German Public Procurement Ordinance (VgV) has stipulated that environment related aspects must be taken into account in the performance and functional requirements in the subject matter of contracts. It should be noted that the environmental criteria are related to the subject matter of the contract and are proportionate to the contract value and procurement objective, which in turn is relativized by the cost aspect.

Environmental requirements must also apply to the manufacturing process and the life cycle (production and supply chain). The sustainability requirements do not have to be reflected in the material properties of the contract item and can be connected to defined product criteria and certificates.¹⁹ Therefore, higher education institutions should define criteria for sustainable procurement in processes of needs assessment and planning as well as for tenders and contract awards and codify them, for example in an internal procurement guideline. This is because procurement law only regulates how the administrative procedure of procurements must proceed and not which products and services are to be procured.

Sustainable procurement can be economically relevant if sustainability criteria are defined in the specifications and award criteria and only bids that meet these criteria are received. Even if the most cost-effective bid is then awarded the contract, the sustainability requirement is met.²⁰ However, if conventional products/services are compared with sustainable ones, the latter may initially be more expensive than the former. The additional sustainability performance could, however, partially justify the additional costs. In the case of sustainable material and technical products, higher costs can often be incurred during the initial purchase. In the use phase, however, the consumption costs of sustainable products are often lower, as savings potentials, e. g. in energy, waste, and consumables, can then be taken advantage of. Through sustainable procurement, further direct price advantages

¹³ Vgl. Bundesministerium für Arbeit und Soziales, 2011, S. 6-8

¹⁴ Vgl. Fachagentur Nachhaltende Rohstoffe e. V. (Hrsg.), 2017, S. 6; 19

¹⁵ Vgl. Fraunhofer-Gesellschaft, Helmholtz-Gemeinschaft, Leibniz-Gemeinschaft (Hrsg.), 2016, S. 2

¹⁶ Vgl. Umweltbundesamt (Hrsg.), 2016, S. 26; 27

¹⁷ Siehe Bundesministerium der Justiz und für Verbraucherschutz, 18.7.2017 I 2745, VgV, § 67

¹⁸ Siehe Bundesministerium der Justiz und für Verbraucherschutz, 20.7.2017 I 2808, KrWG, § 45

¹⁹ Vgl. Umweltbundesamt (Hrsg.), 2017, S. 19

²⁰ Vgl. Fachagentur Nachhaltende Rohstoffe e. V. (Hrsg.), 2017, S. 16; 91

can be achieved in the use phase, for example through recycled paper, refill packs, or remanufactured ink and toner cartridges.

The communication of these causal relationships is of extraordinary importance for the persons acting in procurement at an HEI and has been or is often underestimated and neglected.²¹ Very often, the premises of exclusive “cost-effectiveness” and/or experience-based functionality and practicability are deeply rooted and make a reorientation in terms of sustainability difficult. The goal of sustainable procurement is therefore not necessarily achieved by establishing a top-down controlled procedure, for example by modifying procurement guidelines or being adapted within the university operations. Rather, the aforementioned interrelationships must be explained to the persons involved in procurement in a communicative and continuous exchange process in an argumentative and comprehensible manner in order to trigger a process of rethinking and motivation.

A study published by the city of Berlin also proves that sustainable products can be more cost-effective over their life cycle than conventional variants for 10 out of 15 product groups. These included office lighting, computers, buildings, copying and printing paper, multifunctional devices, and cleaning agents.²² According to the Federal Ministry of the Interior (BMI), sustainably procuring universities should also place a high relevance on the following product groups, which can be purchased in compliance with sustainability criteria (such as the Blue Angel, a label for wood from sustainable forestry (FSC)):²³

- Clothing and textiles (e.g. work wear for technical staff)
- Lighting (e.g. LED lamps for indoor and outdoor use)
- Operating supplies (e.g. lubricants, solvents)
- Office supplies (e.g. pens etc.)
- Office furniture (e.g. desks, chairs, cupboards, shelves)
- Office equipment (e.g. printers, copiers, and accessories)
- Vehicle fleet (e.g. company cars)
- Gardening equipment and machinery
- Natural Gas (e.g. for heat supply)
- Hand drying systems
- Hygiene and cleaning articles (e.g. soaps, toilet paper, etc.)
- Information and computer technology (e.g. computers, monitors, notebooks)

- Varnishes, paints, adhesives
- Food and catering (e.g. coffee, tea, milk, snacks)
- Paper products (e.g. printing, copying)
- Pest control (e.g. pesticides, herbicides)
- Grit
- Electricity

Sustainable procurement can also be relevant to health, as low-emission printers and copiers, for example, improve the indoor climate and protect the health of employees.²⁴

Sustainable procurement is socially and societally relevant, as HEIs in particular have an important role model function for their employees and for society in general.²⁵ Informed and involved students, employees, and external stakeholders are also important multipliers within an HEI and beyond in private, professional, and societal life. Finally, the image and marketing of an HEI can be strengthened, which can bring advantages as a business hub and through stable student enrollments.²⁶

In summary, sustainable procurement, i.e., the consideration of life cycle costs of materials, products, and services, can be relevant for the environmental impact, health, and economic efficiency of an HEI in the medium and long run. If HEIs increase their sustainable procurement and thereby increase quantitative output, i.e. demand, of sustainable products and services, this could reduce costs that were previously higher than for conventional goods and services due to lower sales.²⁷ Increased demand from HEIs for sustainable products and services thus contributes to changing medium- and long-term patterns of production and consumption in a sustainable way.²⁸

However, it should also be noted that many HEIs have limited scope for design and decision-making in procurement, as in several German federal states the procurement and/or awarding of services, particularly in the area of real estate and building management, is (partially) centralized and the autonomy of HEIs in this regard is therefore limited.

Goals

For sustainable procurement, higher education institutions (HEIs) can establish objectives such as those listed below by involving decision makers and defining procurement guidelines.

²¹ Vgl. Umweltbundesamt (Hrsg.), 2016, S. 13-14

²² Vgl. Fachagentur Nachwachsende Rohstoffe e.V. (Hrsg.), 2017, S. 17

²³ Siehe Bundesministerium des Inneren – Beschaffungsamt – Kompetenzstelle für nachhaltige Beschaffung, 2017

²⁴ Vgl. Umweltbundesamt (Hrsg.), 2016, S. 13-14

²⁵ Vgl. Umweltbundesamt (Hrsg.), 2016, S. 15

²⁶ Vgl. Umweltbundesamt (Hrsg.), 2016, S.13

²⁷ Vgl. Umweltbundesamt (Hrsg.), 2016, S. 13-14

²⁸ Vgl. Europäische Kommission, 2011, S. 38

- Procurement and use of:
 - Long-lasting and repair-friendly products and the associated long periods of use instead of new purchases at shorter intervals.
 - Products and services that are environmentally or socially responsible, low-waste, recycled, made from renewable raw materials, energy-efficient, climate-neutral, fairly and/or regionally traded or organically produced.
 - Products that result in less waste or less polluting waste compared to other products.
- Regional value creation
- Analysis and recording of the procurement process
- Control and improvement of the procurement process
- Awareness raising for procurers
- Sustainability reporting
- Legal compliance

Drivers and obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Central procurement of products/services by central state authorities (in Saxony e.g. SIB) • Limited scope for action and decision-making by higher education institutions in internal and, in particular, centralized procurement • Focus on acquisition costs instead of life-cycle costs • Additional time and personnel expenditure for sustainability-oriented procurement • Lack of or insufficient acceptance of new sustainability-related criteria and regulations (internal procurement guidelines) by decision makers • Lack of knowledge among decision makers 	<ul style="list-style-type: none"> • Consideration of legal framework conditions (in Germany e.g. §45 KrWG, VOL, VHB, internal procurement guidelines, EU requirements). • Cost savings for long-life products and products with low waste and maintenance requirements • Energy efficiency in the procurement of energy-efficient equipment • Definition and integration of qualitative and quantitative sustainability criteria in (legally compliant) internal procurement guidelines • Designing the procurement process together with the relevant stakeholders (including faculties/departments), suppliers, service providers, and authorities

Checklist/suggestions for sustainable procurement		Reference to
strategic	Positioning and support of the HEI's management for sustainable procurement in <input type="checkbox"/> mission statements, <input type="checkbox"/> strategies, <input type="checkbox"/> programs, <input type="checkbox"/> objectives, and <input type="checkbox"/> actions <ul style="list-style-type: none"> • State and municipal regulations that require compliance and social standards can be a basis for argumentation vis-à-vis university administrations 	Governance
strategic	<input type="checkbox"/> Formulation of the HEI's own understanding of sustainable procurement	Governance
strategic	<input type="checkbox"/> Formulation of an internal procurement guideline with explicit specifications on product and selection criteria as well as performance specifications e.g.: <ul style="list-style-type: none"> • Procurement responsibility of the public sector according to § 45 KrWG: <ul style="list-style-type: none"> • Durability, ease of repair, and reusability • Minimum proportions of renewable raw materials, recycled materials, and bioplastics for products and packaging • 100 percent recycled paper 	Governance
strategic	<input type="checkbox"/> Establish sustainability criteria with the help of certifications and labels: <ul style="list-style-type: none"> • https://label-online.de/ provides an overview of labels, what they mean, and what quality they distinguish for the German context • https://www.siegelklarheit.de supports sustainable purchasing and analyzes the following areas: <ul style="list-style-type: none"> • Water, soil, energy, climate, chemicals, waste, air pollution, biodiversity, ecosystems, environmental management, use of materials, and quality • The German Federal Environment Agency has developed a list of sustainability criteria for the following areas: construction, office equipment, office consumables, vehicles, buildings, food and catering, vehicles, buildings, furniture, data centers, cleaning/hygiene, • textiles, waste disposal, electricity, and heat supply: https://www.umweltbundesamt.de/themen/wirtschaft-konsum/umweltfreundliche-beschaffung/ 	Governance

strategic	<input type="checkbox"/> Formulation of exclusion criteria (what must not be purchased in the context of sustainable procurement)	Governance
strategic	<input type="checkbox"/> Consideration of sustainable procurement criteria when assessing and planning requirements as well as calls for tenders and awarding of contracts	Governance
strategic	<input type="checkbox"/> Establishment of HEI-specific tendering standards for sustainable procurement, e.g. based on the recommendations of https://www.umweltbundesamt.de/themen/wirtschaft-konsum/umweltfreundliche-beschaffung/empfehlungen-fuer-ihre-ausschreibung	Governance
operational	<input type="checkbox"/> Enforce sustainable procurement at all levels and inform, motivate, and train the affected group of people (central and decentralized buyers, such as secretariats, and student bodies) In addition, sensitized persons with financial responsibility, such as Dean's Councils, can oversee and positively influence sustainable purchasing. (" sustainable procurement officers ")	Transfer
operational	<input type="checkbox"/> Provide procurers and consumers access to sustainable products and product tenders, e.g. via: <ul style="list-style-type: none"> • Ordering software, ideally via university ERP software • Online ordering from suppliers specializing in sustainability and from specific sustainability-based products 	Transfer
operational	<input type="checkbox"/> Avoidance of multiple procurement through transparency and new utilization models (technology & material sharing, chemical leasing). <input type="checkbox"/> Linking optimized inventory data with procurement data	Governance
operational	<input type="checkbox"/> Order print jobs for print media (posters, brochures, etc.) from environmentally and sustainability-oriented printers (e.g. if they value recycled paper, organic inks, green electricity, climate neutrality, and low waste). <input type="checkbox"/> To strengthen regionality and short supply chains, regional service providers should be commissioned.	Governance
operational	<input type="checkbox"/> Initiate stakeholder dialogue with suppliers and procurers. <ul style="list-style-type: none"> • Procurers can communicate their needs, and there is an exchange of information, experience, and new developments on sustainability in procurement. • Market and product knowledge exchange can promote sustainable procurement • Consider regionality, transparency, and procurement responsibility in framework contracts 	Transfer

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HOCH^N: Sustainable Waste Management

Target audience

This section addresses all members of the HEI, since everyone can contribute to waste avoidance, recycling, and thus to reducing waste disposal. Of particular importance in sustainable disposal is the staffing of “waste officers”, who are often the same person as the occupational safety specialist.

Relevance

Waste includes all substances or objects that an owner discards, wants to discard, or must discard.²⁹ They can be designated and differentiated according to the type and classification of their hazardousness.³⁰ The Ordinance on the List of Wastes (AVV) specifies two-, four-, and six-digit waste codes with waste designations for specific sectors and groups. Higher education institutions as disposal operators must comply with a legal obligation to keep records on the quantity, type, origin, collection frequency, transport, and recovery or disposal method of the waste.³¹ For hazardous waste, e.g. from chemical laboratories, there is also an obligation to provide evidence before disposal begins and about its execution, as well as about the whereabouts of disposed waste where appropriate.³²

As waste producers and disposers, HEIs and their members must make a significant contribution to avoiding waste, preparing it for reuse, and recycling it in accordance with the precautionary and sustainability principle and the legal requirements of Section 6 (1); (2) of the German Recycling and Waste Management Act (KrWG). If these measures are not effective, energy recovery must be ensured. In principle, priority should be given to those measures within the order of priority that best ensure the protection of people and the environment.

In this context, it is indispensable that the personnel of an HEI responsible for waste management network and interact with the area of “procurement”.³³ After all, everything that is procured must also be disposed of after a period of use, usually modified in terms of materials or energy. Indirectly, HEIs not only contribute to waste avoidance, but also to saving water, energy, and raw materials that would otherwise have been used in the production and supply chains. Through waste avoidance and reduction, higher education institutions or the

²⁹ KrWG § 3 (1)

³⁰ AVV § 1

³¹ KrWG § 49 (1)

³² KrWG § 50 (1)

³³ KrWG § 45 (1)

state-specific authorities entrusted with waste disposal benefit from the minimization of their disposal efforts and costs (e. g. through registration and record-keeping obligations and transport).

In addition to the German Closed Substance Cycle Waste Management Act (Kreislaufwirtschaftsgesetz), the Commercial Waste Ordinance (Gewerbeabfallverordnung), which regulates the handling of commercial municipal waste as well as construction and demolition waste, is also relevant for the area of non-hazardous waste. The aim of the Commercial Waste Ordinance is to strengthen the waste hierarchy. This is anchored in the priority of material recycling over energy recovery of waste and the restriction of mixed waste collection. By implementing the obligation to separate paper/cardboard, plastics, glass, metals, wood, used textiles, and bio-waste in accordance with the Commercial Waste Ordinance, universities can also make a contribution to the circular economy. Due to their low waste volumes, HEIs also make a contribution to society as a whole by reducing air and wastewater emissions during disposal processes. Sustainable waste management at HEIs is therefore related to the protection of people and the environment, to a life-cycle view of materials and objects that can become waste, and to resource-conserving and low-emission production and disposal processes from primary to secondary raw material recovery from waste. Sustainability in waste management at HEIs means – beyond legal compliance – generally minimizing the use of materials and energy, so that as little waste as possible is produced after as long a period of use as possible, or the energy used is “thrown away”. Sustainable waste management at HEIs also promotes the circular economy in order to view and use waste as a new resource (secondary mate-

rial) for products and energy. When dealing with hazardous waste, sustainable waste management protects staff and students by actively identifying and minimizing risks, thereby preventing health hazards and waste disposal.

Goals

For a sustainable waste management, HEIs can set the following targets and set them out in specific waste management policies:

- Legal compliance,
- Optimization of use (e. g. of chemicals and consumables),
- Avoidance, separation/recycling of waste, and saving on disposal costs,
- Use and procurement of durable and repair-friendly products and the associated long periods of use instead of new purchases at short intervals.
- Use of waste materials as secondary materials (circular economy) – can only be influenced indirectly.
- Transparent, legally compliant disposal processes/services as a basis for health-preventive handling of waste and hazardous waste, such as corrosive chemicals,
- (Substance) substitution testing and feedback with “procurement”,
- Cyclical assessment of the functionality of waste management (e. g. in the context of EMS audits)
- Clear definition of responsibilities in waste management logistics,
- Risk identification/minimization (e. g. risk assessments, operating instructions),
- Formal and non-formal education, awareness raising, and sensitization of persons concerned,
- Role model and multiplier effects, and
- Sustainability reporting on waste management

Drivers and obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Limiting legal requirements (“everything is already regulated”) • Limited influence due to federal regulations (centralized disposal) • High demands for hazardous substances • Lack of resources in terms of sustainability • Lack of acceptance by stakeholders 	<ul style="list-style-type: none"> • Prevention measures • Management of chemicals and hazardous substances • Awareness for a sustainable use and efficient consumption

Checklist/suggestions for a sustainable waste management		Reference to
Strategic	<input type="checkbox"/> HEI mission statement on responsible consumption and waste management	Governance
Strategic	<input type="checkbox"/> Defining structures and processes for waste management (e.g. waste officers, safety experts, guidelines, etc.)	Governance
Strategic	<input type="checkbox"/> Define measures for proactive waste prevention (waste prevention and recycling strategy)	Governance
Strategic	<input type="checkbox"/> Anchoring responsibility according to § 45 KrWG (circular economy law) in procurement responsibilities	Governance
Strategic	<input type="checkbox"/> Extending leasing, contract terms, and usage cycles (e.g. IT & printing technology)	Governance
Operational	<input type="checkbox"/> Donations of depreciated/retired technology to charitable institutions or take-back agreements in the framework contracts with external companies	Governance
Operational	<input type="checkbox"/> Consideration and pricing of disposal in procurement standards <ul style="list-style-type: none"> • Avoid unnecessary packaging and transport • Give preference to regional products • Give preference to products made from renewable raw materials – where possible • Buy low plastic/recycled products • Avoid disposable products (plates, cutlery, bottles, cups, etc.) • Give preference to durable, repair-friendly, recyclable products • Minimize and substitute hazardous substances/hazardous chemicals (required by occupational health and safety legislation) 	Governance
Operational	<input type="checkbox"/> Establishment of waste separation and collection structures and uniform labeling for residual waste (household and municipal waste). <ul style="list-style-type: none"> • Green dot/yellow bin • Organic waste • Paper and cardboard • Waste glass • Batteries • Ink and toner cartridges 	Governance
Operational	<input type="checkbox"/> Cleaning service managers may only dispose of correctly separated waste <ul style="list-style-type: none"> • Determination by HEI administration • Incorporation in internal waste guidelines 	Governance
Operational	<input type="checkbox"/> Apply waste-awareness in conference and event organization (guidelines) <ul style="list-style-type: none"> • Use reusable tableware (plates, cups, cutlery) • Offer unpackaged food (observe hygiene guidelines) • Consider the necessity of print media (folders, flyers, program etc.) • Ensure waste separation • Choose regional services and seasonal catering 	Governance
Operational	<input type="checkbox"/> Increase recycling structures and processes <ul style="list-style-type: none"> • Sell only returnable bottles • Offer reusable coffee-to-go cups • Avoid disposable packaging • Set up tap water dispensers 	Governance
Operational	<input type="checkbox"/> Avoid the use of beverage and snack vending machines. <ul style="list-style-type: none"> • Place vending machines in central locations on campus where the demand can be estimated to be high. This results in cost savings for energy, disposal, maintenance, filling, and other related services. 	Governance

Operational	<input type="checkbox"/> Implement paperless course evaluation. Introduction of software for digital teaching evaluation will bring: <ul style="list-style-type: none"> • Cost, resource, and energy savings for paper, toner, printing, and copies • User-friendly evaluations and data collection 	Teaching
Operational	<input type="checkbox"/> Offer repair cafés to foster awareness of reducing consumption and stakeholder outreach of HEI's activities	Transfer
Operational	<input type="checkbox"/> Collecting campaigns for special waste (electronics, batteries, etc.)	Transfer, Reporting
Operational	<input type="checkbox"/> Implementing recycling programs, e. g.: <ul style="list-style-type: none"> • KIMTECH* Disposable Glove and Protective Clothing Recycling Program (www.terracycle.de) 	Governance, Reporting
Operational	<input type="checkbox"/> Cooperation with technology manufacturers on take-back and recycling.	Transfer, Governance
Operational	<input type="checkbox"/> Implement central waste registration through waste officers <ul style="list-style-type: none"> • Determine waste generation and categories • Continuously define avoidance potential • Realize avoidance 	Reporting, Governance
Operational	<input type="checkbox"/> Implement central registration of hazardous substances <ul style="list-style-type: none"> • Introduce and implement a software-supported database which records substances, quantities, locations, potential hazards, substitutability, and disposal costs. 	Reporting, Governance
Operational	<input type="checkbox"/> Implement or participate in a chemicals exchange program <ul style="list-style-type: none"> • identify where analogous (hazardous) substances are used via a central hazardous substances register • reduce quantities and multiple stocks through organized exchange with other HEI research institutions 	Reporting, Governance
Operational	<input type="checkbox"/> Awareness and training for principles of Green Chemistry: <ul style="list-style-type: none"> • see: https://www.acs.org/content/acs/en/greenchemistry/what-is-green-chemistry/principles/12-principles-of-green-chemistry.html 	Teaching, Research

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HOCH^N: Sustainable Mobility

Target audience

This contribution is made for those responsible for strategic planning and implementation of mobility issues at the HEI. This section addresses both personnel responsible for mobility, such as fleet managers, as well as administrative staff who are involved in accounting and reporting. It is also suitable for academics, technical and administrative staff, as well as all higher education staff whose awareness of the use of sustainable transport solutions should be raised.

General relevance

The internal transport of the HEI through its vehicle fleet as well as the mobility of students and employees, both in the context of providing their service and completing their studies as well as their commutes, can be responsible for significant shares of the environmental impact of an HEI. Depending on the size, structure, and location of the institution or campus, there can be considerable differences in the environmental impacts and their distribution among the individual segments. This leads to the necessity of balancing these environmental impacts with comparable delimitations and, if necessary, defining and implementing measures to reduce them. Basically, a distinction must be drawn between the environmental impact of operating the vehicle fleet, the environmental impact of business trips by employees and, where applicable, students, as well as the environmental impact of commuting by employees and students.

Transport fleet – Relevance

The transport fleet of an HEI mostly fulfills general supply and disposal tasks, transports people, and is available for business trips of the HEI administration. Examples are:

- Removal of residual materials (e.g. scrap metal)
- Delivery of consumables (e.g. gas bottles)
- Transport tasks in research projects (e.g. components to project partners)
- Transporting people on excursions
- Picking up guests (e.g. from the airport)
- official journeys by the administration

Depending on the structure of the HEI, the transport fleet can also be used for official journeys by the whole staff. According to the Greenhouse Gas Protocol, the emissions of the vehicle fleet belong to Scope 1, the direct emissions. In this area, the HEI administration has the most direct influence on the environmental effects of mobility due to its direct impact on operations and investments in the fleet.

Fleet – Goals

The emissions of the vehicle fleet can be determined from the data on travel performance and fuel consumption of the vehicle fleet. In the example of the TU Dresden, the calculations showed that the vehicle fleet was only responsible for about 1% of the transport-related CO₂-equivalent emissions. The other 99% resulted from business trips and commuting by employees and students. Nevertheless, a sustainable orientation of the fleet development could contribute to the sustainable development of the overall balance of the HEI. An analysis of the environmental impact of operating the vehicle fleet and a forecast of its development is helpful. Based on these analyses, objectives for the further development of the vehicle fleet can be developed with expected financial expenditures.

Fleet – Drivers and Obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Lack of resources (personnel and financial means) • Inadequate system for recording emissions and consumption • Lack of acceptance and knowledge of alternative forms of propulsion • Lack of prioritization of sustainability 	<ul style="list-style-type: none"> • Embedding of sustainability in the strategy • Availability of resources for implementing new technologies (e.g. charging infrastructure) • Acceptance and transport efficiency

Checklist/suggestions for a sustainable fleet management		Reference to
strategic	<input type="checkbox"/> Structures and processes for assessing and evaluating the use of fleet vehicles and fuel consumption	Governance, Reporting
strategic	<input type="checkbox"/> Definition and control of mobility-related sustainability targets by the assessment of energy consumption and greenhouse gas emissions	Governance, Reporting
operational	<input type="checkbox"/> Raising awareness for energy-efficient driving through training courses	Transfer, Teaching
operational	<input type="checkbox"/> Consideration of sustainability aspects in procurement according to utilization requirements. <ul style="list-style-type: none"> • Reduction of mileage through logistics optimization • Waste reduction and recycling in maintenance 	Transfer, Governance

Business trips – Relevance

Business trips are extremely important for HEIs. Networking within the scope of conferences and symposia, the mutual exchange of lecturers, and workshops within the context of research projects involving national and international cooperation are part of the higher education sector’s activities. While measures in the transport sector aim at reducing transport performance, questions arise in the HE field as to whether reducing the transport performance of employees should be the goal, or whether high mobility is a quality feature of a university with strong networks. Modern communication technologies for web conferences or virtual meetings will be listed as an optional solution. Virtual meetings make project collaboration between geographically distant HEIs feasible; however, the completion of projects from start to finish without any face-to-face meetings is uncommon. However, the climate impact of a single flight to the USA from Europe can exceed those of travel to domestic destinations several times over.

Goals

For the evaluation of business trips, TU Dresden uses the electronic data of the travel cost center. The analysis of the business trips carried out in 2016 showed that of the approx. 19,000 business trips accounted for, 44 % were carried out by car, 28 % by train, 23 % by plane, 3 % by public transport, 2 % by long-distance bus, and 0.3 % by bicycle. It is striking that 71 % of the passenger kilometers were covered and 84 % of the CO₂ equivalent emissions were released during the 23 % represented by air travel. Overall, business trips are the cause of 44 % of TU Dresden’s mobility-related CO₂ equivalent emissions, with business flights responsible for 37 % of TU Dresden’s mobility-related CO₂ equivalent emissions. Business travel generates a significant proportion of the environmental impact of an HEI’s activities. In the search for approaches to reduce these environmental impacts, a challenge is presented in the fact that international exchange is one of the tasks and quality features of an HEI. The usefulness of individual flights can be debated, with the final decision-making authority resting with the personnel involved, making it difficult to constrain. The objective should focus on the creation of consciousness among the involved parties and an environmentally friendly management of unavoidable traffic.

Business trips – Drivers and Obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Bureaucratic management procedures • Decision-making autonomy for employees • Insufficient knowledge on the environmental impacts of transport model • Insufficient recording and evaluation approaches 	<ul style="list-style-type: none"> • Knowledge transfer on the environmental impacts of transport means • Providing knowledge on possible sustainable travel alternatives • Consideration of business trips in the sustainability assessment

Checklist/suggestions for sustainable business trips		Reference to
strategic	<input type="checkbox"/> Raising awareness about the different environmental impacts of different modes of transport. <ul style="list-style-type: none"> • Consideration of sustainability aspects in guidelines for requesting and approving business travel. • Inclusion of the topic in balance sheets and environmental reports. 	Governance, Teaching, Reporting
strategic	<input type="checkbox"/> Replacing travel with modern communications	Reporting
operational	<input type="checkbox"/> Creation of favorable train tickets to shift short travel and car trips to public transport.	Governance, Reporting
operational	<input type="checkbox"/> Consideration of environmentally compatible arrival and departure options for participants at events.	Governance

Job routes – Relevance

The CO₂ balances for HEIs often define their boundaries with the exclusion of the upstream Scope 3 emissions of commuter traffic. This can be explained on the grounds that students' and employees' transport choices are their private business and not the HEI's responsibility. On the other hand, the HEI can have considerable influence on the mode of commuter traffic used by shaping the framework conditions and thus achieving positive environmental effects.

Goals

An analysis of commuter traffic at TU Dresden has revealed considerable differences in the traffic behavior of students and employees.

Students: On the one hand, socio-demographic characteristics are important for the special features of student mobility. Students are younger, have lower disposable incomes, and, accordingly, less access to cars than the average employee. In addition, student mobility is influenced by the location and infrastructural factors of the HEI. The size of the city, the location of the HEI, the location-specific distribution of housing, and the availability of public transport are of major importance for students' choice of transport. The constraints set by the

HEI can also have a significant influence. For example, the semester ticket in Dresden, which is compulsory for all students and gives students access to all public transport offers in Dresden as well as most trains throughout Saxony, means that around 60 % of students travel to the university by public transport and only 4 % by private car.

Employees: Naturally, the transport behavior of staff at the HEI differs from that of students. This is due to differences in socio-demographic data, distribution of residence, car availability, and the absence of a semester ticket. However, an analysis of the commutes of HEI employees in Dresden also revealed that their transport behavior differs significantly from the transport behavior of the general population of working people within the city. This is due to differences in the age distribution, the distribution of residence, and the transport connections of HEIs compared to other workplaces. These boundary conditions result in the necessity to base the definition of goals and measures in the mobility sector on an analysis of the specific transport behaviors of students and employees of an HEI. This cannot be done on the basis of general mobility indicators, but only on the basis of local surveys. Modal split values or emission values can thus be set as objectives.

Job routes – Drivers and obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Ambiguous competences at the administration level (real estate, personnel, financing) • Lack of cooperation (city administration, transport companies, real estate management) • Insufficient awareness of the environmental impacts of the means of transport • Lack of assessment approaches 	<ul style="list-style-type: none"> • Consideration in sustainability assessment • Providing information on the environmental impacts of transport modes • Communicating information on possible transport alternatives

Checklist/suggestions for sustainable job routes		Reference to
strategic	<input type="checkbox"/> Design of a “mobility of short distances” through compact campus locations with integrated service facilities (e.g. canteen, day care center)	Governance
strategic	<input type="checkbox"/> Implementing a corporate mobility management/corporate mobility concept <ul style="list-style-type: none"> • Further improvement of public transport services • Improve the attractiveness and stronger promotion of the Job Ticket 	Governance
operational	<input type="checkbox"/> Raising awareness <ul style="list-style-type: none"> • Offer of car sharing/car-pooling platforms • Comprehensive parking space management (public and commercial) • Mobility information communicated through “mobility days” 	Governance, Transfer
operational	<input type="checkbox"/> Improving emission-free mobility <ul style="list-style-type: none"> • Improving the network of (cycle) paths on campus • Improving bicycle parking facilities • Introduction of winter maintenance on (cycle) paths on campus • Improving the lighting of the path network on campus • Bicycle sharing systems 	Governance, Transfer, Reporting

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HOCH^N: Sustainable Energy Management

Target audience

This contribution is aimed at personnel active in technical facility management who are operationally involved in the procurement and management of energy supply and consumption. Furthermore, information for management employees regarding the use of energy is also provided.

General Relevance

Building and energy management at HEIs essentially involves the construction and maintenance of infrastructure necessary for carrying out the core tasks of “teaching and research”. The complexity of the building systems creates living and working spaces that guarantee comfort, health, and productivity of the users and thus makes an important contribution to cooperation. In particular, sustainable building management includes ecological, economic, and social aspects that are given equal consideration in order to counter problems such as resource scarcity and climate change. Especially due to the intensive use of material and monetary resources, the considerable energy and material flows during operation, and the resulting environmental impacts, it is important to address the issues of sustainability in building and energy management.

In Germany, the building sector accounts for about 30 % of greenhouse gas emissions, about 40 % of the demand for primary resources and energy, and about 50 % of waste generation.³⁴ This makes building-related expenditures the second-highest cost factor in the administrative budget after personnel costs, with a high potential for saving resources at the federal and state levels by improving the sustainability performance of buildings and energy systems. Due to rising energy prices, dwindling resources, and legal requirements to reduce climate-damaging emissions, energy management is expected to be an important issue for universities for the foreseeable future. Above all, monetary motivations and requirements such as energy certificates, updates to the EnEV (Energy Saving Ordinance), and adjustments to the EEG (Renewable Energies Act) and EEWärmeG (Renewable Energies for Heating Act) are motivating factors.

Building Management – Relevance

In order for buildings to be considered ecologically sustainable (“green building”), there are certificates such as the German DGNB³⁵ (Deutsche Gesellschaft für Nachhalt-

³⁴ Vgl. K. Kummert et al. (Hrsg.), Nachhaltiges Facility Management I, Springer-Verlag Berlin Heidelberg 2013, S.66

³⁵ Vgl. DGNB, <http://www.dgnb.de>.

tiges Bauen) and BNB (Bewertungssystem Nachhaltiges Bauen), the British BREEAM DE³⁶ (Building Research Establishment Environmental Assessment Method), and the American LEED^{37 38} (Leadership in Energy and Environmental Design). All certification labels include defined sustainability criteria that have an impact on the building and energy management.

The content of these standards varies rather widely overall and is focused primarily on the design of new buildings. They can only be applied to existing buildings with the individual certification variants (LEED-Existing Buildings, DGNB-Inventary, BREEAM-In Use, etc.).³⁹ According to an estimate by the BMWi, up to 50 % of the approx. 19 million existing buildings will have to be refurbished within the next 20 years⁴⁰ (without specifying the depth of refurbishment). This sector thus offers high potential for reducing energy consumption. Comparable scenarios can be observed at German universities. However, due to the poor data availability for non-residential buildings, no statements can be made on concrete refurbishment requirements.⁴¹

Building Management – Goals

- Cost optimization
- Achieving the best possible quality
- Securing the core tasks of an HEI (teaching and research)
- Operational safety through maintenance and management
- Incorporation of sustainability aspects in planning and implementation
- Reduction of resource consumption

Sustainable building and energy management must focus on the energy-saving and resource-conserving operation of university infrastructure. In this context, consideration of life cycles is mandatory and includes the planning, construction, use, and modernization, as well as the deconstruction⁴² of buildings.

Building Management – Relevance

Technical facility management encompasses all services required to operate and manage the structural and technical systems of a building.⁴³

This also includes aspects such as the operation, monitoring, control, and optimization of facilities and systems. However, universities have a large number of different technical systems and different requirements for sustainable operation.

A widespread problem is the consideration of sustainability performance based purely on technical or monetary aspects. However, the behavior of building users is an essential component in terms of sustainable operation. Even buildings which meet the highest criteria can fail to meet their high standards if improper or suboptimal user behavior becomes the norm.⁴⁴ The targeted communication of information and the inclusion of users, for example through training courses, can bring about a positive change in user behavior. A sustainable motivation to save energy costs can be achieved by giving the users a share of the energy costs saved or, in the other direction, making them responsible for covering additional consumption costs. Good experiences with such an incentive system have been made, for example, by the Free University of Berlin⁴⁵ in the form of a bonus-malus system and the Albert-Ludwigs University of Freiburg.

The area of operational management is supported by computational energy controlling (periodic comparisons of energy consumption) and thus allows conclusions to be drawn about, for example, technical problems, incorrect control settings, maintenance and servicing requirements, plant malfunctions, or incorrect operational activities.⁴⁶ In this context, the recording intervals play an important role. The closer the measurements (readings) are planned, the faster it is possible to respond to changes in the consumption data.

Building management – Goals

- Maintenance of the structural and technical systems of a university
- Optimization of existing systems in terms of sustainable operation
- Recording of consumption values (conclusions on malfunctions, incorrect operation, etc.)
- Sensitization of users for sustainable operation

³⁶ Vgl. BREEAM DE, <https://www.breeam.com/location/>

³⁷ Vgl. USGBC, <http://www.usgbc.org>.

³⁸ Vgl. USGBC, <https://www.baulinks.de/webplugin/2015/1297.php4>

³⁹ Vgl. K. Kummert et al. (Hrsg.), *Nachhaltiges Facility Management I*, Springer-Verlag Berlin Heidelberg 2013, S.66 ff.

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⁴⁴ Vgl. O.T. Masoso, L.J. Grobler; The dark side of occupants behaviour on building energy use, *Energy Build.* (2010) 173–177.

⁴⁵ https://www.fu-berlin.de/sites/nachhaltigkeit/02_energieklimaschutz/60_praemiensystem/index.html

⁴⁶ *dto.*, S. 23 ff.

Area management – Relevance

The recording of existing space, including specific information (e. g. usage requirements, resource consumption), is a basic prerequisite for space management at HEIs. Space requirements are also recorded and managed for students, staff, and third-party funded personnel. Furthermore, space management deals with the administration of available space in relation to utilization and exploitation. The optimal utilization of the limited space available, the effort to manage it through internal control measures, and ensuring its use are further important tasks. Space management has many interfaces with other areas of building and energy management. These include:

- User orientation: space requirements calculations per teaching unit/department, occupancy planning, etc.
- Facility orientation: space and technology requirements, etc.
- Real estate orientation: rents, occupancy control, vacancies, etc.
- Service orientation: room occupancy times, conferences, etc.⁴⁷

Space management – Goals⁴⁸

- Creation of space distribution appropriate to use
- Provision of high-quality space
- Ensuring the space requirements of teaching, research, and administration
- Optimization of energy and material flows

Relevant issues for building, technical facility management, and area management

Basics of data acquisition (cadaster)

The basis for all areas of building and energy management is the recording of buildings, technical (energy) consumers, and areas in the form of a cadaster. This cadaster serves as a basis for further planning. The registration of large consumers, especially, facilitates the elaboration of measures to reduce harmful environmental effects. Data collection, the basis for effective (energy) controlling (e. g. meter infrastructure). Changes in these structures have to be made if the data collection is too inaccurate or the possibility of allocations is insufficient. Subsequent processing and evaluation of the data material is mandatory. Likewise, the formation of comparable and area-related characteristic values is necessary. Depending on the data situation, individual building parts should

be evaluated separately, especially if they are shared by different users, e. g. different faculties. For the energetic evaluation of buildings, the comparison with consumption data or determined reference values is necessary to obtain qualitative criteria. When comparing different buildings, it is important to ensure that uniform framework conditions for an evaluation (key figures) have been defined (usable and reference areas, uniform climate adjustments, operational energy consumption, etc.).

Derivation of measures

Based on the energy assessments, the planning and implementation of savings measures is possible. The strategic planning should be centrally coordinated within the framework of a holistic institutional approach and supported by a priority list (planning). Performance reviews of the measures are important aspects for a presentation of their effectiveness. In the case of renovation and new construction measures, the requirements of the Energy Saving Ordinance must be observed. Further energy saving measures have to be planned in advance and could lead to additional costs. By means of an amortization calculation, refinancing models that are usually designed for the long term and include savings potentials and expected energy price increases can be expediated and, thus, support the planned measures.

Obstacles and drivers

Sustainable energy management is embedded in the organization (structures) and the business (operational scope for action) of any HEI. Structural obstacles and drivers for the implementation of sustainable energy management can be identified at these two levels.

⁴⁷ http://www.wissenschaftsmanagement-online.de/sites/www.wissenschaftsmanagement-online.de/files/migrated_wimoarticle/03_HISForumHSBau_09_TOP3.pdf (13.02.2018)

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Obstacles	Drivers
<ul style="list-style-type: none"> • Federal regulations (ownership, investments, etc.) • missing internal HEI guidelines • bureaucracy (public procurement processes, etc.) • lack of awareness on sustainability in awarding contracts • lack of resources for the optimization of infrastructure • high investment demand for building concepts and smart facilities • no sustainable user behavior • limited possibilities to influence energy saving measures due to specific regulations • building structures impede or prevent conversion to sustainable technologies • resource requirements for area recording • insufficient energy-specific data • limited land use 	<ul style="list-style-type: none"> • legal requirements (EnEV, EEG, EEWärmeG, KWKG, EnWG, etc.) • support by management and administrative levels • information on technologies and savings potentials • transparent information policy • introduction of a fixed and constant budget for sustainability • life cycle calculations over the entire useful life of buildings • specification of sustainability goals in energy management. • involvement of users and responsible persons • targeted resources and incentives/rewards for environmentally conscious behavior • user networking

Checklist/suggestions for sustainable building and energy management		Reference to
	Definition of sustainability related policies, objectives, structures, and processes in HEI's mission statement	Governance, Reporting
strategic	Facility Management	Governance, Transfer
	<input type="checkbox"/> Defining the HEI infrastructure according to sustainability aspects (basic evaluation) <input type="checkbox"/> Analysis of current and future requirements for buildings and infrastructures (development perspectives, space requirements, future developments, etc.) <input type="checkbox"/> Stakeholder dialogue for planning and communicating future demands <input type="checkbox"/> Planning of future repurposing of buildings <input type="checkbox"/> Life cycle evaluation of properties and buildings <input type="checkbox"/> Application of new construction measures <input type="checkbox"/> Compliance with regulatory standards <input type="checkbox"/> Sustainability assessment <ul style="list-style-type: none"> • Facility Certification System of the German Sustainable Construction Council / Deutsche Gesellschaft für Nachhaltiges Bauen (BMUB) e. V. 2015 • Sustainable Construction Rating System (SCRS) Facility Certification System of Deutsche Gesellschaft für Nachhaltiges Bauen (DGNB) (German Sustainable Building Council) 	
strategic	Technical Facility Management	Governance
	<input type="checkbox"/> Generation of heat/cold through state-of-the-art systems (heat recovery, geothermal, combined heat and power, etc.) <input type="checkbox"/> Building automation systems to prevent undesirable user behavior <input type="checkbox"/> Systems for waste separation (see section on waste management)	
strategic	Energy Management	Governance, Teaching, Transfer
	<input type="checkbox"/> Energy assessment (data collection, evaluation, creation of KPIs) <input type="checkbox"/> Energy evaluation of buildings <input type="checkbox"/> Energy-saving objectives and processes <input type="checkbox"/> User-awareness creation through information	

strategic	Space Management		Governance
	<input type="checkbox"/> Assessing areas through a cadaster <input type="checkbox"/> Definition and planning of requirements for land use		
	<input type="checkbox"/> Implementation of an energy assessment system <input type="checkbox"/> Assessment of measures on the basis of the collected data <ul style="list-style-type: none"> • Life cycle calculations on savings potentials (electricity, gas, CO₂, water, waste, etc.) over the entire useful life of buildings 		Reporting

HOCH^N: Sustainable accounting

Target audience

This contribution addresses managers in HEIs as well as operational experts involved in operational performance assessments. Furthermore, the information presented refers to both users and operators of HEIs.

Relevance

Indicator-based performance measurement has an important influence on sustainable HEI operations. By collecting relevant metrics, conclusions can be drawn about opportunities for optimization and relevant governance processes can be steered. Here, a distinct gateway function becomes visible, which is especially important in terms of sustainability reporting and provides a holistic embedding of the perspective of HEI operations in the institutional context. Particularly at the management level, the implementation and (performance) assessment of sustainable policy within the framework of operational processes is an important steering function.

Goals

Performance indicator mapping in the field of management accounting aims to create a comprehensive overview of the important aspects of higher education operations. The core of the mapping consists of depicting processes that are essential for the operation of HEIs. It provides readers with an overview of the most important metrics, which are reduced in complexity and focused on the essential processes of higher education operations:

- Procurement
- Real estate management
- Waste disposal
- Research operations
- Marketing
- Mobility
- Employment arrangements

Drivers and Obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • Short-term scheduling • Bureaucratic governance processes and vague lines of responsibility • A lack of sensitivity to sustainability at management level 	<ul style="list-style-type: none"> • Management tier support • Availability of resources for recording emissions and usage • Embedding sustainable development within policy

Implementation

The allocation of indicators to fields of action at the value chain levels follows the principle of reduced complexity and simplified practicability. Furthermore, the indicators listed enable a close affiliation to other existing performance metrics, such as the German Sustainability Code (DNK) or the Global Reporting Initiative (GRI).

Checklist for sustainable accounting measures

Energy

Total energy procurement in MWh (primary energy consumption)

Share of renewable energy, MWh (%)

Self-generated renewable energy in MWh

Water

Total water withdrawal in m³

Amount of waste water in m³

Resources

Total consumption of printer and copier paper (tons)

Proportion of recycled paper with Blauem Engel (%)

Share of FSC/PEFC-certified paper (%)

Suppliers

Percentage of suppliers that were inspected with regard to fair labor practices, such as fair pay

Number of sustainability-related supply criteria

Operation area

Energy

Consumption of electrical heating and cooling energy in the year (MWh)

Consumption of district heating for heating and cooling energy in the year (MWh)

Gas consumption for heating and cooling energy per year (m³)

Consumption of oil for heating and cooling energy per year (liters)

Electricity & heating intensity of buildings in relation to floor space (MWh)

Efficiency measures/resources and Climate protection

Measures to reduce energy consumption

Occupational Safety & Wellbeing

Results of employee satisfaction surveys

Accident statistics and consequences by type and gender

Number of health-promoting offers

Waste disposal area

Waste

Absolute waste quantities by waste type:

- Household-type commercial waste
- Biodegradable waste
- Plastic packaging
- Paper and cardboard
- Electronic waste
- Laboratory chemicals
- Toner/printer cartridges
- Batteries
- Hazardous goods / Special waste

Waste quantities according to the Waste Catalogue Ordinance

Water

Percentage and total volume of recycled and reused water (m³)

Total volume of wastewater discharge by quality and place of discharge (m³)

Communication area

Transparency

Number of research projects carried out in cooperation with companies

Number of publicly accessible reporting formats that inform about the sustainability performance of the university

Number of sustainability-related events

Mobility Area**CO₂ emissions generated by service vehicle fleet (tons) per year**

Number of service vehicles in the fleet by drive type (electric & combustion engine)

Fuel consumption of vehicles in the fleet per year (liters)

Distance traveled by company vehicles per year (km)

Distance traveled on business trips by train (km) per year

Distance traveled for business trips by airplane (km) per year

Number of semester and job tickets for local public transport

Number of campus bicycles for students and employees

Personnel area**Occupational health and environment**

Measures for preventive health care at the workplace

Total sick days of all employees

Human resources development

Average annual number of hours for training and education per employee by gender and employee category

Promotion of young scientists: Number of doctorates, habilitations, and professorships

Number of measures to promote family-friendly workplace models

Employment relationships

Staff turnover rate of academic and non-academic staff

Budget-financed academic staff

Third-party funded academic staff

Non-academic staff

Average length of contract (academic and non-scientific staff)

Number of complaints regarding working practices that were submitted through formal complaints procedures

Diversity

Average age of academic and non-scientific employees

Number of measures to integrate people with disabilities in the workplace per employee

Number of measures to improve internationality per employee

Accounting**Number of sustainability-related certifications and audits**

Measures to record employee satisfaction

Number of measures for stakeholder participation

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HOCH^N: Sustainable Research Operations

Target audience

This contribution addresses laboratory users and employees. It also addresses procurement managers for commodities and consumables in laboratories and experimental facilities, as well as workshop and plant managers in key responsibility roles.

Relevance

Research and education represent primary tasks of an HEI. In addition to the sustainable research activities, which are meaningful as part of the overall framework (but are dealt with in another work package, see the guidelines on research and transfer), attention should also be paid to operational processes that support researchers. These functions, which belong to the general operational processes, comprise the provision of resources to perform and assure research activities at HEIs and to fulfill legal and further claims. Research operations thus cover supporting functions within the framework of university-specific service provision. Unlike teaching activities, the focus of research operations centers on resource-intensive settings such as laboratories and experimental facilities (e.g. high-voltage laboratories in electrical engineering) and workshops. Promoting awareness for research operations that conserve resources and produce as few emissions as possible (without contradicting the freedom principle) is complex. As a challenge of communication, it requires an open discussion on potentials and new approaches as well as reciprocal communication between researchers and those responsible for resources.

Goals

Sustainable research operations aim to reduce both consumption and emissions, as well as (hazardous) waste, in order to avoid negative environmental impacts. Conditions that are important for the success of sustainable research operations are outlined in the following. These factors, which are critical to achieving the desired results, are assigned to various fields of action. By means of individual modules, these are defined and explained in greater detail along the lines of specific measures. This information primarily focuses on organizational and management-related topics.

Obstacles and Drivers

Obstacles	Drivers
<ul style="list-style-type: none"> • lack of awareness and prioritization of sustainability • differences between laboratories or research facilities in terms of their structure and size • no recording of emissions and resource consumption 	<ul style="list-style-type: none"> • determination of competencies and responsibilities • application of a code of conduct • formulate an approach to morally charged goods (e.g. military) • ethical reflection of research results

Checklist/suggestions for sustainable research operations		Reference to
strategic	<input type="checkbox"/> Implementation of guidelines on awareness for the responsible use of equipment and resources in laboratories <input type="checkbox"/> Structures and processes to comply with legal and internal standards for work safety <input type="checkbox"/> Trainings and information on sustainability related research operations	Governance, Teaching
strategic	<input type="checkbox"/> Planning of operation and utilization levels of equipment to reduce energy consumption and emissions <input type="checkbox"/> Application of sustainability and life cycle guidelines in the procurement of equipment (maintenance, etc.) <input type="checkbox"/> Procurement of sustainable laboratory supplies	Governance
operational	<input type="checkbox"/> Structures and processes of shared, optimized use of appliances to reduce energy consumption <input type="checkbox"/> Information and instruction regarding the correct use of research devices and consumables (see waste management)	Governance
operational	<input type="checkbox"/> Identification of appliances with waste-heat generation <input type="checkbox"/> Implementation of timers for ventilation and air-conditioning systems <input type="checkbox"/> Application of an expiry date database	Governance

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HOCH^N: Sustainable Event Management

Target audience

The instructions for planning, hosting, and evaluating events are aimed at persons in charge of organizing events at the department, division, or faculty, although can also be integrated within the framework of an HEI-wide event management program.

Relevance

Sustainable event management at HEIs aims to proactively plan, conduct, and evaluate responsible behavior in economic, ecological, and social matters concerning the planning and implementation of various event formats, such as conferences, congresses, or meetings (hereinafter referred to as events). A consequent implementation on the basis of a content management system or inter-university guidelines promotes an interdisciplinary consciousness for sustainable development. The implementation of sustainable events as a “whole institution approach” serves to link together research, teaching, and operations and provides for the transfer (multiplier effect) of the concept that sustainability is an integral part of education for sustainable development (ESD).

Goals

Sustainable event management encompasses the following target dimensions: Economy: compensation of higher costs through increased reputation of a successful program. Ecology: Minimal ecological impact, preservation of resources. Social: Generating additional value through responsibility on a regional and global level. In the event sector, sustainability refers to a wide range of activities that have to balance or consider sometimes contradictory needs:

- Waste management (e.g. waste avoidance, waste reduction, waste separation, reuse)
- Procurement of products/services (e.g. sustainability label, regional sourcing)
- Catering (e.g. seasonal, regional, climate-friendly)
- Energy and climate (e.g. energy consumption, CO₂ compensation)
- Mobility (e.g. route planning, accessibility)
- Communication (e.g. digital information provision, universal access presentation)
- Social aspects (e.g. fair remuneration of employees, health aspects e.g. breaks/exercise offers, consideration of the needs of the participants)

Drivers and Obstacles

Obstacles	Drivers
<ul style="list-style-type: none"> • limited applicability for different events in terms of size and scale • heterogeneity of key sustainability aspects at events • system boundaries for responsibility • organizational parameters: e.g. no waste separation • cost-benefit ratio of certifications in contrast to the purpose of the event 	<ul style="list-style-type: none"> • Guidelines for event managers regarding sustainability • visualizing objectives and priorities • communicating personal responsibility to participants

Checklist/suggestions for sustainable event management		Reference to
before and during the event	<input type="checkbox"/> Route planning <ul style="list-style-type: none"> • Ensure easy accessibility of the venue by public transport • Provide maps and route description to the event location • Information on public transport at the venue: travel times & prices • Universal access travel and access points 	Transfer
	<input type="checkbox"/> General conditions <ul style="list-style-type: none"> • Consideration of other events in the same period (possibly use synergies) • Planning: duration, timing with arrival and departure by public transport and train, accommodation options close to the venue • Ask participants to travel to and from the event in a climate-friendly way • Enable virtual participation 	Transfer
	<input type="checkbox"/> Advertising material <ul style="list-style-type: none"> • Digital information provision: Accessibility • Use recycled paper (Blauer Engel) 	Reporting

before and during the event	<input type="checkbox"/> Compensation <ul style="list-style-type: none"> • CO₂ compensation: Mobility – record the participants’ modes of arrival and departure • Incentive systems: discounts for public transport tickets/ crediting of entrance fees 	Transfer
	<input type="checkbox"/> Contracts with suppliers <ul style="list-style-type: none"> • Make take-back agreements with caterers • Apply sustainability aspects in contracts 	Transfer
	<input type="checkbox"/> Local and global economic impact <ul style="list-style-type: none"> • Preference for regional suppliers • Proactive waste prevention (see waste management) • Staff training & awareness raising for sustainability issues 	Transfer
before and during the event	<input type="checkbox"/> Operation <ul style="list-style-type: none"> • Consider weather conditions, no continuous operation: light, heat, cooling • Energy-efficient room selection • Avoid summer/winter months if possible (because of energy demand) 	Governance
	<input type="checkbox"/> Accommodation <ul style="list-style-type: none"> • Promote reservations in environmentally friendly hotels with universal access and short distances to the venue 	Transfer
	<input type="checkbox"/> Education for sustainable development (ESD) <ul style="list-style-type: none"> • Provide up-to-date information on sustainability issues regarding the event • Take local culture into account • Information on environmental behavior during the event • Live up to the role model function 	Teaching
before and during the event	<input type="checkbox"/> Food and Beverages <ul style="list-style-type: none"> • Use of tap water instead of bottled water • Pay attention to regionality and seasonality • Communicate a one cup/glass per person policy • Offer small portions (non-portion packs) • Vegetarian and/or vegan options • Low sugar and non-alcoholic options • Use reusable dishes; alternatively, offer food without dishes (finger food) • Display list of ingredients (allergy information, etc.) • Keep food warm in insulated containers without electricity 	Transfer
after the event	<input type="checkbox"/> Emissions Compensate for CO ₂ emissions: take your own measures, enter into cooperative agreements, or make monetary compensations (on average approx. €20 per ton of CO ₂)	Reporting

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HOCH^N: Socially Responsible Working Conditions

Target audience

The content of this topic addresses personnel executives at all management levels, in particular professors, faculties, or departments, but also higher education personnel administration as well as the staff units and officials concerned.

Relevance

With growing pressure to attract well-educated employees, the choice of an HEI as a place to work can depend significantly on good employment conditions. Thus, an important task is to enhance the attractiveness of academic employment conditions according to the needs and lifestyles of academic staff. This comprises both measures aimed at increasing the general attractiveness of the HEI as an employer as well as particular supporting activities, such as strengthening family-friendly employment relationships.

Goals

Potential objectives of attractive employment conditions comprise aspects such as:

- Greater job satisfaction and management culture on behalf of the employees
- Increased motivation, workforce performance, and morale
- Greater employee satisfaction, loyalty, and identification (with the organization & the job) / reduced staff fluctuation due to dissatisfaction
- Improved work-life balance & reputation as a responsible workplace
- Reduced levels of stress & burnout
- Reduced probability of mental health issues (depression; anxiety) among employees
- Decrease in (absolute) absence times as a result of sickness, job turnover, or work-related accidents

Obstacles and drivers

Obstacles	Drivers
<ul style="list-style-type: none"> • low support on the employer side • change costs for introduction/ conversion; no subsidies • no anchoring in organizational culture • lack of communication • inflexible workload and times • mandatory participation in activities 	<ul style="list-style-type: none"> • embedding in organizational culture, policies and/or norms. • support for employees by managers • voluntary nature of the measures • further education and training for interested employees • internal networking with organizational units and external partners

Checklist for implementing social responsibility into academic working

There are a variety of factors that influence employee satisfaction among academic staff. The following recommendations for action can provide helpful hints for implementation social responsibility. The main focus is on operational projects that can be implemented directly at the faculties or departments and do not require approval

by management. The temporary nature of employment contracts is not considered. The following section names challenges and provides advice on how to overcome them in order to remove obstacles to job satisfaction among academic staff (including PhD students and postdocs).

Strategic	Operational	Reference to
<ul style="list-style-type: none"> • define job descriptions 	<ul style="list-style-type: none"> • transparent range of tasks • establish orientation programs 	<ul style="list-style-type: none"> • Governance
<ul style="list-style-type: none"> • foster interdisciplinary formal and non-formal exchange formats 	<ul style="list-style-type: none"> • implementation of feedback opportunities • implementation of mentoring programs 	<ul style="list-style-type: none"> • Governance • Reporting
<ul style="list-style-type: none"> • emphasize the binding nature of care agreements 	<ul style="list-style-type: none"> • define voluntary supervision contracts • define milestones and work plans • enable supervision times 	<ul style="list-style-type: none"> • Reporting
<ul style="list-style-type: none"> • incentives for voluntary engagement • reduce bureaucracy 	<ul style="list-style-type: none"> • appreciation management and rewards for voluntary activities and academic performance 	<ul style="list-style-type: none"> • Transfer
<ul style="list-style-type: none"> • development prospects and planning security for employees 	<ul style="list-style-type: none"> • information on scientific and non-scientific career paths • career plans and training for employees and supervisors • transparent development perspectives at an early stage 	<ul style="list-style-type: none"> • Transfer

In line with the general employment conditions for academic staff, measures to improve the balance between family and work are a central social responsibility of the HEI for internal stakeholders.

Family-friendly employment includes supportive activities at the strategic, operational, and organizational-cultural levels designed to promote a balance between work and family responsibilities. This includes, for example, flexible working hours or the provision of services. An important criterion for the design of family-friendly employment relationships at HEIs is the consideration of demographic developments, as the demand for elderly care must increasingly be taken into account as well. Making working hours more flexible to support employees' caregiving responsibilities is a focus in this context, with the aim of supporting employees' efforts to take on family responsibilities by adapting the workplace, time, and nature of their work.

The main focus here is on working-time arrangements with an appropriate workload that can be geared to the employee's personal situation. Allowing employees to work flextime models such as part-time work, job sharing, or home office work, as well as flexible work schedules,

provide opportunities within the framework of employment. This is especially important in light of the growing social responsibility of organizations to promote voluntary work and volunteering as socially desirable behavior. However, this does forego contractual factors, in particular serial fixed-term employment.

Flexible working

The following areas can serve for the taking on of social responsibility with regard to family commitments, whereby the central regulatory framework conditions can be found in the listed guidelines:

- ✓ German Caregiver Leave Act (Pflegezeitgesetz)
- ✓ German Act on Family Care Leave (Familienpflegezeitgesetz)
- ✓ German Law for a Better Compatibility of Family, Care, and Work
- ✓ German TV-L (TV-L) exemption regulations- Leave regulations of the Federal States
- ✓ German WissZeitVG
- ✓ Intra-organization regulations regarding the duration of minimum contracts
- ✓ Internal organizational regulations on part-time work, flexible working hours, remote work, and home office

Checklist/suggestions for socially responsible working conditions		Reference to
General Conditions	<input type="checkbox"/> Establishing family-friendly work and employment relationships in the organization <ul style="list-style-type: none"> • Embedding in strategy and at institutional level • Use of monitoring/key figures • Create dialogue & exchange platforms • Liabilities and rules: Guiding principles & corporate agreements • Implementation of a generation management • Designation of personnel responsibilities • Enable family-sensitive career opportunities and personnel development paths 	Governance, Reporting
Employment Arrangements	<input type="checkbox"/> Designing family-friendly working and employment conditions <ul style="list-style-type: none"> • Conduct needs analyses • Possibility of tenure clock-stopping • Family-friendly scheduling of meetings • Teamwork planning • Cooperation structures with local care facilities and state run institutions • Re-employment programs • Creating emergency care facilities 	Governance
Communication	<input type="checkbox"/> Internal (and external) presentation of family-friendly work and employment benefits <ul style="list-style-type: none"> • Raising awareness of acceptance among managers and employees • Networking and training of relevant institutional actors • Provision of information for those affected and their managers • Local alliances with partners from municipalities, associations, or churches • Arrangement of external services 	Transfer

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HOCH^N: Sustainable Communication

Target audience

This article refers to higher education managers, sustainability coordinators, and persons in charge of public relations who deal with the communication of sustainability efforts at HEIs. Furthermore, information is to be collected and evaluated by technical administrations and administrative staff in order to communicate this information in adequate formats to HEIs (internally) and stakeholders (externally).

Relevance

In recent years, communication on environmental and sustainability issues has grown in importance for organizations and businesses. Changes are also evident at HEIs. Many HEIs address sustainable themes and provide sustainability reports informing about their performance in the field of sustainability. Among other factors, this can be attributed to increased public interest and governmental awareness, as well as increasing legal requirements, e. g. the German Energy Saving Ordinance (EnEV), Renewable Energy Sources Act (EEG), etc. The consequence is that organizations are reporting more and more frequently about the ecological, economic, and social impacts of their activities, goods, and services and how they reduce, for example, harmful environmental effects.

A sustainable program of communication can be used to actively involve stakeholders and to target sustainability-relevant issues at an HEI. In the context of a communication concept, the awareness and sensitization of internal and external stakeholders as well as their inclusion through participatory measures constitute a strong foundation for the transformation of HEIs. Participation also includes the possibility of communicating inter- and transdisciplinary content at an HEI and is thus applicable across various fields of action.

Improving, stabilizing, and expanding relationships with stakeholders that are closely associated with achieving the “objectives” of an HEI can only be achieved through focused and strategically positioned communication on issues of sustainability. In addition, such activities provide confidence, credibility, and understanding, and therefore should always be:

- up to date,
- consistent and without any contradictions,
- comprehensible and individual, and
- fair as well as (...) accessible.

As the basis for developing sustainable communication, the HEI's governance must ensure its establishment and implementation, designate persons in charge, and provide resources. The content can be determined in policy, informing stakeholders about what is important and the impact that the HEI want to achieve.

The defining of objectives and identifying of stakeholders are essential.

The objective should be to establish an integral communication strategy where sustainability becomes a cross-cutting element.

Internal communication on sustainability – Relevance

The existing internal and external communication channels constitute an approach for reporting on the HEI's performance.

Internal communication is of great relevance, as the members of an HEI are able to identify with their organization and aspire for a transparent and informative culture. Communication not only deals with information on sustainability performance, but also takes on the task of a mutual exchange of interaction. By interacting with other people, the members of an HEI may assume a role as multipliers to the outside community.

Examples for central internal stakeholders

<ul style="list-style-type: none"> • academic and non-academic staff • external lecturers • university administrators • sponsors and financiers 	<ul style="list-style-type: none"> • freshmen • students • guest auditors • exchange students
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Obstacles and drivers

Obstacles	Drivers
<ul style="list-style-type: none"> • Missing communication/information • Missing stakeholder dialogue/ participation • Missing awareness of sustainability 	<ul style="list-style-type: none"> • Anchoring a communication concept • Awareness-raising of stakeholders about sustainability • Acceptance and transparency

External communication on sustainability – Relevance

Sustainability (in practice) has an influential role on the credibility and reputation of an HEI. Trust is a crucial issue, since a convincing image can only be achieved through honest communication practices. Acceptance can be achieved by involving external stakeholders.

Examples for external stakeholders

<ul style="list-style-type: none"> • Partner HEIs • Networks • Companies (business, NGOs, etc.) • Suppliers • Public authorities/public administration • Society, Media, NGOs 	<ul style="list-style-type: none"> • Alumni and past students • Former and future employees • Residents and neighbors
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Objectives

An HEI should be able to define their communication objectives in an achievable form. Individual goals must be in accordance with the institutional goals and should be measurable, realistic, and time-related. This allows results to be evaluated and further measures to be derived.

Targets for a sustainability communication concept include:

- increase awareness for sustainability
- communication of social responsibility
- holistic approach to sustainability
- enhancement of transparency and reputation
- participation of stakeholders
- improvement of management systems

Obstacles and drivers

Obstacles	Drivers
<ul style="list-style-type: none"> • no communication concept • information not accessible or relevant for stakeholders • lack of awareness of the need to involve external parties • lack of priorities in reporting 	<ul style="list-style-type: none"> • stakeholder dialogue • communication concept with content for stakeholders • concept for the consideration of relevant issues, approaches, and activities

Checklist/Suggestions for communication on sustainability		Reference to
strategisch	<input type="checkbox"/> Policies, objectives, structures, and processes for sustainability-oriented communication	Governance
	<input type="checkbox"/> Definition of topics and key aspects and a framework for local, regional, and supranational stakeholders	
strategisch	<input type="checkbox"/> Concept development for the university's sustainability communication: <ul style="list-style-type: none"> • Situation analysis (stakeholders and their motivations) • Planning of measures (selection of content, aspects, topics, goals, and target groups) • Selection of communication instruments • Evaluation (success of the campaign / stakeholder reachability) 	Reporting
operativ	<input type="checkbox"/> Publication of a sustainability report	Reporting
	<input type="checkbox"/> Establishment of a sustainability communication strategy (internal and external) with stakeholders on projects and participation	Transfer, Governance
	<input type="checkbox"/> Participation in (national and international) networks and initiatives to exchange ideas and approaches	Transfer
	<input type="checkbox"/> Participation in stakeholder dialogues and federal participation processes/projects to promote and foster sustainability efforts	Transfer

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Appendix

Thematic Guide-Overview

Sustainability Reporting (Work Package 2)

Reporting as an interdisciplinary task allows us to map development steps and changes in the organization over time, to bundle sustainability-related activities, and to enter into dialogue with each other about them. Additionally, as a management tool, a report supports the HEI's administration. The HOCH^N Guidelines – “Application of the HEI-specific sustainability code – a way to sustainability reporting at HEIs” – presents examples adapted for HEI issues (HS-DNK) on the basis of the criteria of the German Sustainability Code.

Governance (Work Package 3)

The cross-sectional area of governance deals with the structural conditions and institutional mechanisms of sustainability in higher education. The results presented in this guideline, “Sustainability Governance at HEIs”, are based on the evaluation of a comprehensive empirical study conducted at the eleven participating universities of HOCH^N. Representatives from all areas of the HEIs were interviewed: students, researchers, HEI management, administrative staff, and sustainability coordinators. The guideline is dedicated to the conditions for implementing sustainability at HEIs. In addition, measures of HEI sustainability governance are presented. This concerns, in particular, the establishment of structures and processes through which actors from within the higher education sector can participate in the HEI's sustainability process and with which transformative impacts can be achieved in the long term.

Teaching (Work Package 4)

Teaching is not just sensitizing students to sustainability-relevant topics, but also how the teaching and learning process can be comprehensively structured according to the model of “Education for Sustainable Development (ESD) in Higher Education”. The HOCH^N guideline “Sustainability in Teaching” provides access to the core elements of ESD as well as areas of tension, action, and cultural spaces.

Research (Work Package 5)

The HOCH^N guide “Sustainability in Higher Education Research” looks at the landscape of sustainability-oriented academic research with regard to its research foci, key actors, as well as research modes and essential scientific and practice-relevant yields. In addition, relevant

fields of action and a selection of concrete instruments are highlighted in order to initiate, expand, and consolidate sustainability-oriented research at one's own HEI. The mutual HOCH^N understanding of sustainability, which is intended to provide orientation and reflection both within and outside the network and thus represents the thematic entry point, was developed under the leadership of the research section.

Operations (Work Package 6)

The guideline “Sustainability in Higher Education Operations” takes a closer look at exemplary operational processes of an HEI. These include procurement, waste management, mobility, building and energy management, controlling, research operations, event management, employment relationships, and communication.

Transfer (Work Package 7)

Transfer is understood in a broad sense as a mutual exchange between HEIs and practice. At many universities, transfer is part of their self-image. The guideline “Transfer for Sustainable Development at Universities” shows how transfer can contribute to sustainable development and provide impulses for the HEI. It provides an overview of various forms and formats of sustainability transfer in teaching and research. The guide helps teachers, researchers, and students to classify their transfer activities and presents starting points from which sustainability transfer can be initiated, further developed, and established through tangible implementation.

Table of illustrations

Figure 1: Overall structure of HOCH^N (University of Hamburg)

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Figure 2: PDCA cycle

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List of German abbreviations

Abbreviation	Original	Translation
Abb.	Abbildung	Figure
AVV	Abfallverzeichnisverordnung	Waste Catalogue Regulation
BGF	Bruttogrundfläche	Gross Base Area
BGG	Behindertengleichstellungsgesetz	Disability Equality Act
BMI	Bundesministerium des Inneren	Federal Ministry of the Interior
BImSchG	Bundesimmissionsschutzgesetz	Federal Immission Control Act
BMVBS	Bundesministerium für Verkehr, Bau und Stadtentwicklung	Federal Ministry of Transport, Building and Urban Affairs
BMUB	Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
BMWi	Bundesministeriums für Wirtschaft und Energie	Federal Ministry for Economic Affairs and Energy
BNB	Bewertungssystem Nachhaltiges Bauen	Sustainable Construction Rating System
BNC	Baukastensystem Nachhaltiger Campus (HSZG/TUD)	Building Kit System Sustainable Campus (HSZG/TUD)
CAFM	Computer Aided Facility Management	Computer Aided Facility Management
CRM	Customer Relation Management	Customer Relation Management
CSD	Kommission der Vereinten Nationen für Nachhaltige Entwicklung	United Nations Commission on Sustainable Development
CSR	Corporate Social Responsibility	Corporate Social Responsibility
DGNB	Deutsche Gesellschaft für Nachhaltiges Bauen e. V. Deutsches Gütesiegel Nachhaltiges Bauen	Deutsche Gesellschaft für Nachhaltiges Bauen e. V. German Sustainable Building Certificate
DIW	Deutsches Institut für Wirtschaftsforschung	German Institute for Economic Research
DL	Dienstleistung	Service
DLV	Dienstleistungsvereinbarung	Service Agreement
DNK	Deutscher Nachhaltigkeitskodex	German Sustainability Code
e. V.	eingetragener Verein	Registered association
EDV	Elektronische Datenverarbeitung	Electronic data processing
EEG	Erneuerbare-Energien-Gesetz	Renewable Energies Act
EEWärmeG	Erneuerbare-Energien-WärmeGesetz	Renewable Energies Heat Act
EHB	Einrichtungen Höherer Bildung	Institutions of Higher Education
EM	Energiemanagement	Energy Management
EMAS	Eco-Management und Audit-Scheme, europäisches Öko-Audit-System	Eco-Management and Audit Scheme, European Eco-Audit System
EnEV	Energiesparverordnung	Energy Saving Ordinance

EnWG	Energiewirtschaftsgesetz	Energy Industry Act
EU	Europäische Union	European Union
FASi	Fachkraft für Arbeitssicherheit	Occupational Safety Specialist
FM	Facility Management	Facility Management
FM-V	FM-Vereinbarung	FM agreement
FSC	Forest Stewardship Council	Forest Stewardship Council
GEFMA	Deutscher Verband für Facility Management (German Facility Management Association)	German Facility Management Association
GM	Gebäudemanagement	Facility Management
GRI	Global Reporting Initiative	Global Reporting Initiative
HNEE	Hochschule für nachhaltige Entwicklung Eberswalde	University for Sustainable Development Eberswalde
HS-DNK	Hochschulspezifischer Deutscher Nachhaltigkeitskodex	University-specific German Sustainability Code
HSZG	Hochschule Zittau/Görlitz	University of Applied Sciences Zittau/Görlitz
HTW	Hochschule für Technik und Wirtschaft	University of Applied Sciences
IGM	Infrastrukturelles Gebäudemanagement	Infrastructural Facility Management
INE	Indikatoren für Nachhaltige Entwicklung	Indicators for Sustainable Development
IÖW	Institut für ökologische Wirtschaftsforschung e. V.	Institute for Ecological Economy Research e. V.
ISO	Internationale Organisation für Normung	International Organization for Standardization
KGM	Kaufmännisches Gebäudemanagement	Commercial Facility Management
KOINNO	Kompetenzzentrum für innovative Beschaffung	Competence Centre for Innovative Procurement
KPI	Key Performance Indicator	Key Performance Indicator
KrWG	Kreislaufwirtschaftsgesetz	Closed Substance Cycle Waste Management Act
KV	Kontinuierliche Verbesserung	Continuous improvement
KVP	kontinuierlicher Verbesserungsprozess	Continuous improvement process
KWKG	Kraft-Wärme-Kopplungs-Gesetz	Combined Heat and Power Act
MINT	Mathematik, Informatik, Naturwissenschaften, Technik (Studiengänge)	Mathematics, Informatics, Natural Sciences, Technology (courses of study)
NABU	Naturschutzbund Deutschland e. V.	Naturschutzbund Deutschland e. V. (Nature and Biodiversity Conservation Union)
NF	Nutzfläche	Usable surface area
NGF	Nettogrundfläche	Net surface area
NMS	Nachhaltigkeitsmanagementsystem	Sustainability Management System
OECD	Organisation für wirtschaftliche Zusammenarbeit und Entwicklung	Organisation for Economic Co-operation and Development
PDCA-Zyklus	Plan-Do-Check-Act-Zyklus („Deming-Cycle“)	Plan-Do-Check-Act cycle (“Deming cycle”)
QM	Qualitätsmanagement	Quality management
QMS	Qualitätsmanagementsystem	Quality management system

RNE	Rat für Nachhaltige Entwicklung	Council for Sustainable Development
SAPOS gGmbH	Soziales Arbeitsprojekt Ostsachsen gemeinnützige GmbH	Social Work Project East Saxony Non-profit GmbH
SIB	Staatsbetrieb Sächsisches Immobilien- und Baumanagement	Saxon Real Estate and Construction Management
TGM	Technisches Gebäudemanagement	Technical Facility Management
TUD	Technische Universität Dresden	Dresden University of Technology
u. a.	unter anderem	Among other things
UBA	Umweltbundesamt	Federal Environmental Agency
UMS	Umweltmanagementsystem	Environmental Management System
usw.	und so weiter	and so on
VgV	Vergabeverordnung	Public Procurement Ordinance
VHB	Vergabehandbuch	Public Procurement Handbook
VOL	Verdingungsordnung für Leistungen	Contracting Rules for Services
VZ	Vollzeitarbeitskräfte	Full-time employees
WIA	Whole Institution Approach	Whole Institution Approach

The guide “Sustainability in Higher Education Operations” takes a closer look at the operational processes of an HEI. These include procurement, waste management, mobility, building and energy management, controlling, research operations, event management, employee relationships, and communication.

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