

# **Climate Protection Agreement**

between

**the State of Berlin**

**Senate Department for Environment, Transport and Climate  
Protection**

represented by

**the Senator for the Environment, Transport and Climate Protection**

**Ms. Regine Günther**

and

**Technische Universität Berlin**

represented by

**The President**

**Professor Dr. Christian Thomsen**

## I. Preamble

Climate change is one of the key challenges of this century.

To keep the consequences of climate change within manageable limits, a significant reduction in greenhouse gas emissions is required worldwide. As the capital of Germany and a major European city, Berlin is aware of its special responsibility in climate policy. Climate change is therefore a key focus of Berlin's energy and climate policy objectives. The Berlin Energy Transition Act (*Energiewendegesetz* – EWG) sets out the climate policy goals of the State of Berlin and the measures that are central to achieving them. In addition to these legal obligations, the State of Berlin intends to step up its efforts immediately in order to achieve a reduction in its CO<sub>2</sub> emissions by 2045. Furthermore, it is aiming to achieve secure, low-cost and climate-friendly energy generation and supply in the State of Berlin.

The Berlin Energy and Climate Protection Program (BEK) has also developed concrete strategies and measures aimed at achieving the climate protection goals that have been formulated. This climate protection agreement is intended to support the implementation of these strategies and measures.

Technische Universität (TU) Berlin has a special social responsibility as educator and shaper of future decision-makers in our society and its role as multiplier is both a responsibility and an opportunity. TU Berlin recognizes the goals of “sustainable development and climate protection” as urgent societal tasks and that its primary responsibility is to embed these goals into teaching, research, and knowledge transfer.

TU Berlin and the State of Berlin will therefore work in partnership to use energy economically, ecologically and, as far as possible, sparingly, and also to make intensive use of renewable energies in the existing building stock. They will also use appropriate means to tap existing potential for saving energy and reducing CO<sub>2</sub> emissions. The partners agree that the scope of the measures to be implemented also depends on issues such as the provision of financial resources, and the use of funding and funding conditions.

The partners agree to support each other in the implementation of climate policy and in the measures to achieve the climate protection goals and to work together in a cooperative manner. This includes joint activities to adapt to the consequences of climatic changes that can no longer be avoided.

## II. Context

Based on the current science, there is widespread agreement that the economical and efficient use of energy is the most important aspect of a sustainable and climate-friendly energy policy in the short and medium term. The climate protection goals of the State of Berlin are correspondingly ambitious. The achievement of these goals is dependent on the support of all actors across the city landscape.

TU Berlin is committed to the climate protection goals outlined in Section 3 (1) of the EWG and, through this climate protection agreement, declares that it will support the State of Berlin in achieving them to the best of its ability.

The basis for this agreement is the building-related energy consumption of the baseline year, 2018 (see Annex 1). This corresponds to CO<sub>2</sub> emissions<sup>1</sup> of 45,934 metric tons, which serves as the basis for the reductions target agreed in Chapter III. Given a net floor area (NFA) of 627,185 m<sup>2</sup>, this corresponds to 73.2 kg CO<sub>2</sub>/m<sup>2</sup> of NFA. Energy consumption is mainly caused by heating, air conditioning, and the use of the managed teaching and research buildings, especially since many of them have highly technical uses. The architecture of TU Berlin, which has developed over more than 125 years, consists of a heterogeneous building stock from

---

1 The emissions factors published by the Berlin Office of Statistics (*Amt für Statistik*) in the official energy and CO<sub>2</sub> figures for 2018 are used to determine the energy consumption-related CO<sub>2</sub> emissions.

various eras of construction and has been continuously adapted to the contemporary requirements of teaching and research up to the present day. Buildings and facilities therefore offer a particularly high potential for emissions reductions. However, the University also wants to meet the challenges of climate change and continuously develop in its core areas of teaching and research. This is where the present agreement comes in.

In its environmental guidelines adopted in 1997, TU Berlin declared the primary goal of research, teaching and university operations to be the protection and preservation of the natural foundations for life. The focus on the goal of sustainable development was taken up again in the 2011 Mission Statement and later renewed several times. The *Council for Sustainable Development* was established in 2016 and is an advisory body directly affiliated with the Executive Board. In 2018, sustainability was once again explicitly incorporated into the academic teaching objectives.

Across the University, a broad spectrum of scientific institutes (such as the Institute for Environmental Technology), student initiatives and advisory bodies address the topics of sustainability, climate and environmental protection. A number of study programs, such as the master's in *Renewable Energy Systems* and *Sustainable Management*, and student-organized forms of teaching such as the *Project Laboratories for Social and Ecological Thought and Action* are targeted at the challenges of sustainability. Since 2018, the *Sustainability Certificate* has offered all students the opportunity to make sustainability a cross-disciplinary focus in their studies.

In a number of collaborative projects and regional, national, European and global partnerships, researchers contribute to strengthening the visibility and impact of the principle of sustainable development (for example, through the *Distribut-e* project on testing green supply chains). TU Berlin is also active in umbrella sustainability networks, for example in the *Hoch-N* network, where it has helped develop the sustainability code for universities, and as a founding member of *Netzwerk Umwelt* ("environmental network"). Initiatives such as *StadtManufaktur* and *Campus Charlottenburg* help drive urban and climate transformation by carrying out research in living laboratories in close interaction with Berlin civil society.

When it comes to building operations, TU Berlin has carried out robust energy management, which has meant that electricity consumption has stopped rising despite the higher demand caused by increases in student numbers and third party-funded research projects, longer usage times, and progressive digitalization. The University reduced its heat consumption by 25% between 2001 and 2018. Additional efforts are therefore needed to further increase CO<sub>2</sub> savings, for example by linking research and operations more closely. With this in mind, in 2017 the Council for Sustainable Development launched an open competition awarding 200,000 euros for the implementation of sustainability ideas. In addition, as part of the research project *Eneff: HCBC*, nearly 1000 measures have been identified for reducing energy consumption and using renewable energy in facilities and buildings. TU Berlin documents its sustainability activities in its Environmental Report, which has been published regularly since 1995.

### III. Partnership goals

With the present agreement, TU Berlin demonstrates that it takes its responsibility for climate and environmental protection seriously. During the term of this agreement, it will take appropriate steps to make its operations, where possible, largely climate-neutral by 2045.

The primary objective of this agreement is therefore to reduce direct CO<sub>2</sub> emissions, as defined in Chapter II – through the implementation of the measures identified in Chapter IV (and Annex 2) and other appropriate efforts – by at least

**470 metric tons**

by the end of 2030 compared to the baseline year of 2018, which corresponds to an overall reduction of **30%**.

---

At the same time, TU Berlin aims to reduce the final energy consumption causing indirect CO<sub>2</sub> emissions by at least

**25%**

by the end of 2030.

This corresponds to a total saving in direct and indirect emissions of **11,500 metric tons** in relation to the net floor area of the baseline year and evaluated using the emission factors of the baseline year.

Under the present document, a separate interim target is also agreed, which is the achievement of a **12%** reduction in total emissions by the end of 2025, compared with the baseline year. If this interim target is not met, appropriate adjustments to the measures or to the overall target are to be agreed (see Chapter VII).

The agreed savings target relates only to areas that can be influenced by TU Berlin. Due to the expected changes in the energy system, the real reduction in CO<sub>2</sub> emissions is expected to be higher and thus represent a correspondingly greater contribution to the achievement of Berlin's climate goals.

Like the State of Berlin, TU Berlin aims to become climate-neutral by 2045. To this end, additional renewable energies with the new technical standards that have then become available will be used beyond 2030 in keeping with the transformation of the energy system, and energy and resource efficiency measures will be implemented to further optimize building operations and operational processes. Staff training on climate themes will be an integral part of corporate communications in the long term in order to harness all opportunities for reducing CO<sub>2</sub>.

Regarding mobility, during the term of this agreement a clear course is expected to be set in relation to efficient power systems and climate-friendly fuels, and this is intended to contribute to the future decarbonization of the University's fleet of vehicles.

TU Berlin aims to extend the present climate agreement after its expiration. With this in mind, it will examine the technological and organizational options for achieving climate neutrality by 2045, taking into account the results achieved. This is presented in a goal achievement path based on the baseline emissions presented in Annex 1; the path may also include the additional effects of the future low emissions energy system.

#### **Other goals**

Beyond achieving the stated emissions reduction targets and measurable savings, the partnership is intended to contribute more broadly to the fulfillment of Berlin's climate goals. In this context, activities carried out by the State of Berlin or third parties can be jointly pursued or supported to the extent that the partners are able. These activities might, for example, focus on awareness raising, changing lifestyles and consumption habits, and adapting to the consequences of climate change, including through the Berlin climate impact monitoring system.

## **IV. Measures to be taken to achieve the goals**

In order to achieve the CO<sub>2</sub> reduction targets set out in Chapter III, measures are required in various areas. In addition to traditional renovation and optimization measures aimed at reducing energy consumption, as well as technical measures to increase energy efficiency and integrate renewable energies, these include measures whose impact on CO<sub>2</sub> reductions cannot be directly measured. For example, measures under this agreement include those that promote the embedding of sustainability in the core areas of teaching, research and knowledge transfer, that help protect resources, that promote networking between the University and other societal stakeholders, and that contribute in other ways to meeting the State of Berlin's climate goals.

The following catalog of measures will become part of TU Berlin's climate neutrality strategy and is aimed at implementing it. The measures outlined therefore represent important steps on the road to climate neutrality.

The following measures and activities are planned:

<b>Group of measures</b>	<b>No.</b>	<b>Brief description</b>
<b>Structural and technical measures</b>	1	Energy-efficient renovation and climate-friendly construction of University buildings
	2	Improving energy efficiency and optimizing systems engineering
	3	Sustainable and energy-efficient conversion and expansion of the cooling system
	4	Converting interior and exterior lighting to LED
	5	Local use of waste heat for heating buildings
	6	Expanding and modernizing building automation, building control systems and metering equipment
<b>Renewable energies</b>	7	Expanding the use of solar and wind energy
	8	Converting fossil fuel plants to sustainable heat generation
<b>Mobility</b>	9	Creating a sustainable mobility strategy for the Charlottenburg Campus and adjacent areas
	10	Promoting environmentally friendly mobility on and around campus
	11	Environmentally friendly handling of official travel and field trips: reduction and offsetting/compensation
	12	Continuing the sustainable procurement of the University vehicle fleet, reducing the number of University-owned vehicles for personal use, and more sustainable use of the remaining vehicles
<b>Digitalization</b>	13	Expanding the Green IT program
	14	Continuing the digitalization of administrative processes
	15	Digital data display for research, teaching and planning
<b>Measures in teaching, research, knowledge transfer, and networking</b>	16	Integrating sustainability into degree programs
	17	<i>MINTgrün</i> pre-study orientation program
	18	Sustainability Certificate for Students
	19	Further developing an online teaching and learning environment
	20	Lifelong learning and knowledge transfer
	21	Incentives for sustainability in teaching and research
	22	Establishing the Climate Change Center Berlin Brandenburg
	23	Support for model projects, living laboratories and concrete sustainability measures on campus and in the urban environment

<b>Organization</b>	24	Creating a climate neutrality strategy
	25	Focusing public relations and agenda setting on climate and sustainability
	26	Developing a comprehensive sustainability report, and setting up and making available a sustainability portal on the TU Berlin website
	27	Expanding central energy management
	28	Supporting the transfer of knowledge from research work to the University's own operations
	29	Coordinating the measures in the climate protection agreement
	30	Connecting, implementing and reviewing climate activities through the Climate Action Task Force and One-Stop Climate Shop
	31	Aligning financial policy with climate protection targets
	32	Improving the sustainability of catering
	33	Organizing a continuous improvement process (CIP) and energy saving process
<b>Climate change offsetting measures and adaptation to climate impacts</b>	34	Increase in areas that help restore nature, decentralized stormwater management, improvement of the microclimate, preservation and increase in biodiversity

A detailed description of measures can be found in Annex 2 to this agreement.

In addition, the following feasibility studies are agreed, which should lead to the measures described being extended in appropriate ways:

- Feasibility study 1: Feasibility of a layered climatic envelope for groups of listed buildings
- Feasibility study 2: Increasing the sustainability of procurement
- Feasibility study 3: Restricting short-haul flights for official trips

The scope of measures described can be supplemented or adjusted during the term of this agreement if necessary, taking into account the requirements outlined in Chapters VI and VII, in particular if monitoring shows that the targets may not be met. Where this occurs, Annex 2 is to be amended accordingly.

## V. Cooperation

The State of Berlin will support TU Berlin in achieving the agreed goals (see Chapter II) and in implementing the measures planned for this purpose (see Chapter IV and Annex 2) to the best of its ability.

To this end, the State of Berlin will, in particular, forward to TU Berlin existing information on funding and funding conditions provided by the EU, the German Federal Government, the State of Berlin, and other institutions. If necessary, the State of Berlin is available to support TU Berlin in applying for state-level and European funding and in reporting on the use of funding.

As part of this cooperation, the State of Berlin will inform TU Berlin about new legal regulations relating to climate and, if applicable, provide existing information materials.

In the context of the climate protection agreements concluded by the State of Berlin, working groups are offered that provide a forum for exchange with other climate partners. In addition, the State of Berlin will publicize high-quality climate projects delivered by TU Berlin, e.g., by displaying them on the website of the Senate Department with responsibility for the environment.

The two cooperation partners will also seek new solutions over the term of the present agreement on the basis of future legal, technical and other relevant developments in order to tap further potential for energy savings and CO<sub>2</sub> reductions.

Within this agreement, the State of Berlin and TU Berlin will cooperate closely, and in a spirit of trust and partnership in order to promote their common interests.

## **VI. Monitoring**

TU Berlin will set up an appropriate monitoring system for savings and the measures taken in order to regularly review the implementation of the present agreement.

### ***Annual monitoring***

The energy and CO<sub>2</sub> savings achieved are documented and evaluated annually by TU Berlin. This is carried out by evaluating planned and implemented measures on the basis of the overview of measures given in Annex 2, which is supplemented by additional implemented measures if required. This evaluation involves assessing or briefly describing the progress made in implementing all the measures. The CO<sub>2</sub> savings from measures implemented so far are presented in a comprehensible manner.

In addition, the current consumption and emissions figures are compared with the baseline situation in 2018. This calculation is made using the baseline data listed in Annex 1 to this agreement, which is updated annually for the purposes of energy accounting (using the sample file provided by the State of Berlin for this purpose). Heating consumption figures are to be adjusted for climatic conditions. In this context, the State of Berlin will regularly provide the corresponding emissions and adjustment factors.

The evaluation of measures as well as the consumption and CO<sub>2</sub> figures are prepared by 30 April each year for the previous year and submitted to the State of Berlin. Based on the results of the consumption accounts and the comparison of measures, a joint evaluation of the feasibility and effectiveness of the measures described in Chapter IV and Annex 2 is carried out within three months of submission of the monitoring report (see also Chapter VII). If the CO<sub>2</sub> savings resulting from the measures cannot be understood from the emissions figures, the causes are briefly described.

### ***Interim report***

A detailed interim report will be prepared for the period 2021-2025 and submitted to the State of Berlin by 30 June 2026. In addition to the annual consumption and CO<sub>2</sub> figures, a comparison is made with the interim target defined in Chapter III.

Furthermore, the interim report should contain a description of the approach to achieving the objectives taken to date and the approach to be taken going forward; this description should refer in particular to the measures already implemented, those currently being implemented and those still to be implemented and the impact they have achieved or are expected to have.

If the interim target defined in Chapter III is not met, the reasons for this are presented.

### ***Final report***

After the present climate protection agreement expires, TU Berlin will prepare an expert final report, which is to be submitted to the State of Berlin by 30 June 2031 at the latest. The final report will have an analogous design to the interim report.

### ***Publication***

The interim report and the final report will, in agreement with TU Berlin, be published on the website of the Senate Department responsible for climate.

In this context, both partners undertake to treat confidential information and data exchanged during the coordination of measures and projects accordingly and not to pass them on to third parties.

## **VII. Adjustment of targets and measures**

The cooperation partners meet at least once a year to exchange experiences on the implementation of this agreement and to find ways to improve their cooperation. At the same time, solutions to any conflicting objectives that may have arisen in individual cases can be discussed in a timely manner.

### ***Adjustment of the scope of measures***

In the annual coordination meetings, both partners can make suggestions for adapting or supplementing the scope of measures. This is primarily intended to ensure flexibility with regard to changing conditions and to enable countermeasures to be taken if it appears that targets may not be met.

To make formal changes to the scope of measures, the results of the coordination meeting regarding discarded or additional measures are recorded in the minutes. Brief reasons are given for discarding measures. Additional measures are adequately described. An amended summary of measures (in line with Annex 2) is attached to the minutes and used for future monitoring reports.

### ***Adjustment of the objectives of this agreement***

It is only possible to adjust the objectives defined in Chapter III if it becomes apparent upon submission of the interim report in accordance with Chapter VI that the planned measures cannot be fully implemented and that the objectives can therefore not be achieved.

If, in the opinion of TU Berlin, it is necessary to adjust the goals, this is outlined and justified in the interim report. Reasons for an adjustment of the objectives are significant changes in the economic, technical or legal circumstances that were centrally important at the time of concluding the agreement and which mean that it is no longer reasonable or possible for one party to fulfill the individual provisions of this agreement.

The new objectives are jointly determined and recorded in an additional annex to this agreement in accordance with Chapter IX.

If it transpires that the targets defined will be achieved significantly sooner than planned, these targets can also be adjusted by mutual agreement to reflect current developments.



## VIII. Entry into force and term

This agreement enters into force **retroactively from 1 January 2021**. The term of the agreement is **10 years**.

Furthermore, the agreement will continue to apply with regard to the reporting obligations set out therein until they have been fulfilled.

## IX. Final provisions

If one or more provisions of this agreement are or become invalid or unenforceable, all other provisions will remain in full force and effect. The invalid or unenforceable provisions will be replaced by the provision which the cooperation partners would have agreed in good faith and with due regard to customary practice if they had known of the invalidity or unenforceability. If the content of this provision cannot be determined because there are several equally valid possibilities, the cooperation partners must amend the agreement in the most logical way possible. The same will apply mutatis mutandis to the filling of gaps in the agreement.

Changes or additions to this agreement must be made in writing.

Berlin, [date]

Senator

President

Regine Günther

Prof. Dr. Christian Thomsen

the State of Berlin  
Senate Department for Environment,  
Transport and Climate Protection

Technische Universität Berlin

### Annexes

- Annex 1: Complete summary of energy consumption and CO<sub>2</sub> emissions in the baseline year
- Annex 2: Measures and projects to be carried out to achieve the goals

## **Annex 1**

**To the climate protection agreement between the  
State of Berlin**

**Senate Department for Environment, Transport and Climate  
Protection**

**and**

**Technische Universität Berlin**

**Baseline year: 2018**

	<b>Direct emissions</b>	Indirect emissions	Total emissions
Final energy consumption	<b>7,313 MWh</b>	127,621 MWh	134,934 MWh
CO <sub>2</sub> emissions	<b>1,587 metric tons</b>	44,347 metric tons	45,934 metric tons

**Annex 2**  
**to the climate protection agreement between the**  
**the State of Berlin**  
**Senate Department for Environment, Transport and Climate**  
**Protection**  
**and Technische Universität Berlin,**  
**represented by the President**  
**Straße des 17. Juni 135, 10623 Berlin**

**Measures and projects to be carried out to achieve the goals**

---

**Contents**

<b>Summary of measures</b>	<b>4</b>
<b>1 Structural and technical measures</b>	<b>6</b>
Measure 1: Energy-efficient renovation and climate-friendly construction of University buildings	6
Measure 2: Improving energy efficiency and optimizing systems engineering	7
Measure 3: Sustainable and energy-efficient conversion and expansion of the cooling system	7
Measure 4: Converting interior and exterior lighting to LED	7
Measure 5: Local use of waste heat for heating buildings	7
Measure 6: Expanding and modernizing building automation, building control systems and metering equipment	8
<b>2 Renewable energies</b>	<b>8</b>
Measure 7: Expanding the use of solar and wind energy	8
Measure 8: Converting fossil fuel plants to sustainable heat generation	8
<b>3 Mobility</b>	<b>8</b>
Measure 9: Creating a sustainable mobility strategy for the Charlottenburg Campus and adjacent areas	8
Measure 10: Promoting environmentally friendly mobility on and around campus	9
Measure 11: Environmentally friendly handling of official travel and field trips: reduction and offsetting/compensation	10
Measure 12: Continuing the sustainable procurement of the University vehicle fleet, reducing the number of University-owned vehicles for personal use, and more sustainable use of the remaining vehicles	10
<b>4 Digitalization</b>	<b>10</b>
Measure 13: Expanding the Green IT program	10
Measure 14: Continuing the digitalization of administrative processes and reporting	11
Measure 15: Digital data display for research, teaching, and planning	11
<b>5 Teaching, research, knowledge transfer, and networking</b>	<b>11</b>
Measure 16: Integrating sustainability into degree programs	11
Measure 17: <i>MINTgrün</i> pre-study orientation program	12
Measure 18: Sustainability Certificate for Students	12
Measure 19: Further developing an online teaching and learning environment	12
Measure 20: Lifelong learning and knowledge transfer	13
Measure 21: Incentives for sustainability in teaching and research	13
Measure 22: Establishing the Climate Change Center Berlin Brandenburg	13
Measure 23: Support for model projects, living laboratories and concrete sustainability measures on campus and in the urban environment	14
<b>6 Organization</b>	<b>15</b>
Measure 24: Creating a climate neutrality strategy	15
Measure 25: Focusing public relations and agenda setting on climate and sustainability	15

---

Measure 26: Developing a comprehensive sustainability report, and setting up and making available a sustainability portal on the TU Berlin website	16
Measure 27: Expanding central energy management	17
Measure 28: Staff support for the transfer of knowledge from research work to the University's own operations	17
Measure 29: Coordinating the measures in the climate protection agreement	17
Measure 30: Connecting up, implementing and reviewing climate activities through the Climate Action Task Force and One-Stop Climate Shop	17
Measure 31: Aligning financial policy with climate protection targets	18
Measure 32: Improving the sustainability of University catering	18
Measure 33: Developing a continuous improvement process (CIP) and energy saving process	19
<b>7 Climate change offsetting measures and climate change adaptation</b>	<b>19</b>
Measure 34: Increase in areas that help restore nature, decentralized stormwater management, improvement of the microclimate, preservation and increase in biodiversity	19
<b>8 Feasibility studies</b>	<b>20</b>
Feasibility study 1: Feasibility of a layered climatic envelope for groups of listed buildings	20
Feasibility study 2: Increasing the sustainability of procurement	21
Feasibility study 3: Restricting short-haul flights for official travel	21

## Summary of measures

Under the climate protection agreement between the State of Berlin and Technische Universität Berlin, the implementation of the following measures and activities is planned:

Group of measures	No.	Brief description
<b>Structural and technical measures</b>	1	Energy-efficient renovation and climate-friendly construction of University buildings
	2	Improving energy efficiency and optimizing the systems engineering
	3	Sustainable and energy-efficient conversion and expansion of the cooling system
	4	Converting interior and exterior lighting to LED
	5	Local use of waste heat for heating buildings
	6	Expanding and modernizing building automation, building control systems and metering equipment
<b>Renewable energies</b>	7	Expanding the use of solar and wind energy
	8	Converting fossil fuel plants to sustainable heat generation
<b>Mobility</b>	9	Creating a sustainable mobility strategy for the Charlottenburg Campus and adjacent areas
	10	Promoting environmentally friendly mobility on and around campus
	11	Environmentally friendly handling of official travel and field: reduction and offsetting/compensation
	12	Continuing the sustainable procurement of the University vehicle fleet, reducing the number of University-owned vehicles for personal use, and more sustainable use of the remaining vehicles
<b>Digitalization</b>	13	Expanding the Green IT program
	14	Continuing the digitalization of administrative processes
	15	Digital data display for research, teaching and planning
<b>Measures in teaching, research, knowledge transfer, and networking</b>	16	Integrating sustainability into degree programs
	17	<i>MINTgrün</i> pre-study orientation program
	18	Sustainability Certificate for Students
	19	Further developing an online teaching and learning environment
	20	Lifelong learning and knowledge transfer
	21	Incentives for sustainability in teaching and research
	22	Establishing the Climate Change Center Berlin Brandenburg
	23	Support for model projects, living laboratories and concrete sustainability measures on campus and in the urban environment

<b>Organization</b>	24	Creating a climate neutrality strategy
	25	Focusing public relations and agenda setting on climate and sustainability
	26	Developing a comprehensive sustainability report, and setting up and making available a sustainability portal on the TU Berlin website
	27	Expanding central energy management
	28	Supporting the transfer of knowledge from research work to the university's own operations
	29	Coordinating the measures in the climate protection agreement
	30	Connecting, implementing and reviewing climate activities through the Climate Action Task Force and One-Stop Climate Shop
	31	Aligning financial policy with climate protection targets
	32	Improving the sustainability of catering
	33	Organizing a continuous improvement process (CIP) and energy saving process
<b>Climate change offsetting measures and adaptation to climate impacts</b>	34	Increase in areas that help restore nature, decentralized stormwater management, improvement of the microclimate, preservation and increase in biodiversity

The measures outlined can be supplemented or adjusted as necessary during the term of this agreement (see Chapter VII of the climate protection agreement) if monitoring shows that targets may not be met. Where this occurs, the summary table is to be updated accordingly.

In addition, the following feasibility studies are agreed, which should lead to the measures described being extended in appropriate ways:

- Feasibility study 1: Feasibility of a layered climatic envelope for groups of listed buildings
- Feasibility study 2: Increasing the sustainability of procurement
- Feasibility study 3: Restricting short-haul flights for official trips

---

## 1 Structural and technical measures

Technische Universität (TU) Berlin has a large number of buildings from various years of construction, some of which date back to the 19th century. Their structural condition varies; almost half are listed buildings. Over the past few decades, a backlog has built up of renovation projects, and this has led to a real need to take action, especially in terms of energy-efficient renovation. In recent years, as part of the research project *Eneff: HCBC*, TU Berlin has conducted a detailed energy analysis of its buildings. On this basis, it will develop a climate neutrality pathway by the end of 2022.

### **Measure 1: Energy-efficient renovation and climate-friendly construction of University buildings**

Regarding renovations and new buildings, TU Berlin strives for an energy standard that goes beyond the legal standard (GEG) at the time of the application for measures, provided that this is economically feasible. For new buildings, the goal is to construct them so that they are as climate-neutral as possible. In the listed building stock, the aim is to take new approaches in cooperation with the authorities responsible for historic preservation in order to significantly reduce energy demand and CO<sub>2</sub> emissions beyond statutory levels. In addition, the University endeavors to construct buildings using timber where suitable.

The recommendations of the *Working Group on Mechanical and Electrical Engineering of State and Municipal Administrations (AMEV)* as well as the *Guideline on Technical Monitoring of Public Buildings for Optimizing Operations and Increasing Efficiency, published by the Senate Department for Urban Development, Building and Housing in Berlin in 2018* are binding for the planning of new buildings. In the case of renovations, TU Berlin aims to achieve a corresponding standard in the long term.

The following measures are planned as part of the Higher Education Development Plan (HSEP):

- Renovation of Building MA for the electrical engineering institutes as a climate and energy showcase project
- Replacement of the Nanophysics Building as a climate and energy showcase project
- Partial renovation in accordance with historic preservation regulations and a partial new construction meeting cutting-edge energy standards on the Seestraße site
- Energy-efficient renovation of the new Electrical Engineering Institute (EN) as part of the building's overall refurbishment
- Renovation or demolition and replacement of the Aeronautical Institutes (F) as a climate and energy showcase project
- Renovation and partial redevelopment of the Severin Campus in terms of sustainability
- Renovation or demolition and replacement of the new Physics Building (EW) as a climate and energy showcase project
- Energy-efficient renovation of the Physical Chemistry (PC) Building as part of the building's overall refurbishment
- Energy-efficient renovation of the Sports Center on Waldschulallee as part of the building's overall refurbishment
- Innovative climate-friendly renovation of the listed brick buildings on Fasanenstraße and Hertzallee

In all these cases, there is an assessment of whether it is reasonable and possible for existing TU Berlin buildings to be used (including alternative uses) based on needs in order to use the embodied energy in the building for as long as possible, or whether the construction of a new building brings significant advantages in the long term, for example by contributing to densification and saving land.



---

## **Measure 2: Improving energy efficiency and optimizing systems engineering**

A scientific analysis carried out at TU Berlin over the past four years shows a high potential for CO<sub>2</sub> savings in existing buildings, which can be harnessed through monitoring and energy optimization. TU Berlin intends to implement these measures and will prioritize buildings with the highest potential for absolute savings. There is high potential for energy saving across various areas, including heating and cooling systems, pumps, and ventilation and air-conditioning systems, for example, through retrofitting with more efficient system components, early replacement of inefficient systems, and installation of heat recovery systems.

## **Measure 3: Sustainable and energy-efficient conversion and expansion of the cooling system**

There was already a high demand for air-conditioning and process cooling, and this has risen sharply in recent years due to the increase in research projects (including those funded by third parties) and the digital transformation; this is set to continue to increase in the future. Not only does cooling demand high levels of energy, but conventional fluorinated refrigerants have an enormous global warming potential (GWP). *EU Regulation (EU) No. 517/2014 of 16 April 2014 on fluorinated greenhouse gases* progressively caps the maximum quantities of fluorinated greenhouse gases that may be placed on the market in the EU as part of a phase down plan through to 2030.

When refurbishing and modernizing its cooling systems, the University has already undertaken to continuously replace conventional refrigerants with more climate-friendly refrigerants and to aim for a GWP value of below 150 when building new systems, where this is technically and economically possible on a case-by-case basis. In this regard, AMEV Recommendation No. 139 *Kälte (Cooling)* from 2017 must be used as the basis for planning.

A further option for improving the energy efficiency of cooling systems in the phase down period and in winter is the large-scale expansion of free cooling, to the extent that the building structures allow for this. In addition, cooling networks are to be created on the north and south sides of the main TU Berlin campus. In this context, TU Berlin is looking to work with Berlin University of the Arts (UdK) to set up optimized networks on the shared campus at Berlin-Charlottenburg.

A cooling network not only increases supply reliability, but also system efficiency, as the individual cooling units can run at optimum operating points. At the same time, the installed power can be reduced by a simultaneity factor. This also reduces the amount of refrigerants used. Since the cooling network itself stores the cold, power peaks can be reduced.

## **Measure 4: Converting interior and exterior lighting to LED**

The TU Berlin building stock is equipped with different light sources depending on the year of construction and user requirements. The aim of the plan is to gradually convert all lighting to LED technology, as far as usage allows.

## **Measure 5: Local use of waste heat for heating buildings**

As the share of renewable energy in the power sector continues to rise, it makes increasing sense to use the low-temperature waste heat, which is generated in significant quantities at TU Berlin, either directly or using heat pumps, to heat buildings.

---

## **Measure 6: Expanding and modernizing building automation, building control systems and metering equipment**

Technical buildings, especially laboratories, are becoming increasingly complex. At the same time, there are more and more opportunities to use building automation and control systems to improve the way in which building elements and systems interact, as well as the energy efficiency of operations.

Optimizing the energy use of the building stock means improving metering, as well as management and control as building automation is expanded. This is carried out based on the recommendations of the *Working Group on Mechanical and Electrical Engineering of State and Municipal Administrations (AMEV)*, the *Guideline on Technical Monitoring of Public Buildings for Optimizing Operations and Increasing Efficiency* published by the Senate Department for Urban Development, Building and Housing in 2018, and the *Guideline on Building Automation in Public Buildings for Optimizing Energy and Increasing Efficiency in Technical Building Services* published in 2018. These recommendations and guidelines are mandatory for new buildings, and they are implemented to the extent that is economically feasible for refurbishments and modernizations.

## **2 Renewable energies**

### **Measure 7: Expanding the use of solar and wind energy**

Currently, there is only one photovoltaic (PV) system on the TU Berlin campus, which was built by the student-initiated association Solar Powers e.V. In order to promote the large-scale deployment of solar energy on roofs and facades, all potential uses will be identified and implemented wherever possible. In future, the potential for installing a PV system will be examined for all roof renovations and new buildings, and also for existing buildings whose roof structure has been renovated in recent years. If the necessary conditions for construction are met, TU Berlin will first examine whether the project is to be financed using University funds or with the help of third parties. It will then implement the project.

The construction of PV systems on the following buildings has already been coordinated with the internal user:

- New Mathematics and IMoS (Interdisciplinary Center for Modeling and Simulation) buildings
- Technical Chemistry
- Hydraulic Engineering

TU Berlin is looking into using wind energy on campus and will implement this if the enabling conditions are met and it is deemed economically viable.

### **Measure 8: Converting fossil fuel plants to sustainable heat generation**

The energy supply of some external sites, such as the Sports Center on Waldschulallee, the Severin Campus, and the Seestraße site, is currently based on inefficient fossil fuel plants and is to be converted to more sustainable energy over the next few years in order to reduce direct emissions. In this regard, at least one climate-neutral alternative is to be considered.

## **3 Mobility**

### **Measure 9: Creating a sustainable mobility strategy for the Charlottenburg Campus and adjacent areas**

In cooperation with the district of Charlottenburg-Wilmersdorf and Berlin University of the Arts (UdK), TU Berlin is developing an integrated, sustainable mobility strategy for the Charlottenburg Campus. An initial research project has already been carried out which provides the basis for the strategy, including an inventory and a survey of mobility behavior.

---

Based on the climate goals of the federal and state governments, as well as the principles of environmental and land use justice, TU Berlin develops accessible, socially equitable and climate-neutral mobility offerings.

The main principle underpinning the mobility strategy is to reduce individual motorized traffic, for example by providing an infrastructure that encourages the use of the sustainable modes of transport (public transport, walking and cycling), by designing public transport and car sharing services to meet demand, and by improving connections between the campus and external sites and relevant locations in the local area. The aim is also to improve internal access within the campus and the experience of being on campus, while reducing emissions.

Another goal is to convert the remaining individual motor vehicles from internal combustion to renewable power by 2030. To this end, TU Berlin is building a charging infrastructure and creating an effective incentive system.

Existing approaches to promoting sustainable mobility behavior are identified, developed in open, participatory workshops, and implemented through pilot projects. The goal is to establish a strategic student and university mobility management system that can implement and embed specific measures (such as those outlined in Measure 12).

A new mobility management role will be created to coordinate the many mobility activities required.

## **Measure 10: Promoting environmentally friendly mobility on and around campus**

In addition to the mobility strategy, there are already a number of approaches used on campus regarding sustainable mobility, the improvement of bicycle and pedestrian mobility (while taking accessibility into account), and the establishment of secure bicycle parking infrastructure. Some aspects have already been fleshed out or are under review:

### **1. Promoting sustainable means of transport for employees**

TU Berlin will support the use of public transport by making the travel pass (“*Jobticket*”) more attractive. In addition, the University is committed to enabling employees in the public sector to use a “*Jobrad*” (a tax-deductible work bike) in future in order to promote a shift from motorized private transport to cycling. TU Berlin also sees an increase in working from home as making an additional contribution to reducing traffic. In future, TU Berlin will enable and put in place appropriate structures in order for its employees to choose where they carry out a portion of their working hours, to the extent that their tasks allow for this.

### **2. Removing car parking spaces**

On-campus vehicle parking spaces will be kept to a minimum; their use will be reserved for people with mobility impairments and the University’s own fleet of vehicles. The space gained is to be used for bicycle parking, green spaces and community gardens.

### **3. Cycle-friendly infrastructure**

In order to make cycling more attractive, TU Berlin plans, in addition to expanding bicycle parking facilities and redesigning traffic routes on campus, to set up a cycle hub at a central location, which will be equipped with a compressor air pump for general use, among other things.

As part of the University’s sustainability competition, two cargo bikes were procured that can be borrowed free of charge for transportation purposes via the ADFC (German Cyclists Association) platform. Academic chairs and departments will be encouraged to purchase their own cargo bicycles for transportation on and off campus in order to replace motorized transport.

---

### **Measure 11: Environmentally friendly handling of official travel and field trips: reduction and offsetting/compensation**

A growing number of employees have committed to avoiding short-haul flights as part of the *Scientists for Future* initiative. To reduce long-haul flights, which are harmful to the climate, the University leadership is setting up video conference rooms that can be used in particular for hybrid in-person and online events.

In addition, TU Berlin will seek to implement the following measures:

1. In future, all official travel will be reviewed in order to see if it can be avoided.
2. The emissions of all unavoidable official travel and field trips will be offset. For this purpose, a CO<sub>2</sub> fund will be set up, and a defined amount will be paid into it in order to offset each trip. The fund will be used to finance CO<sub>2</sub> reduction measures at TU Berlin.
3. If TU Berlin has achieved CO<sub>2</sub> neutrality in terms of generation and consumption (in scopes 1 and 2 of the climate neutrality pathway) on its sites, the CO<sub>2</sub> offsetting of official travel will be carried out by certified providers.
4. The selection of field trip destinations should be based on sustainability criteria wherever possible. Intercontinental field trips must be satisfactorily justified by the participants in terms of their necessity and their net impact on the environment.

As part of the conversion of the ERP system, additional checks will be carried out to determine how travel distance and primary means of transport can be recorded in the processing of official travel in the future. The University could use travel accounting to prepare a relevance assessment and identify further avoidance and offsetting measures.

### **Measure 12: Continuing the sustainable procurement of the University vehicle fleet, reducing the number of University-owned vehicles for personal use, and more sustainable use of the remaining vehicles**

TU Berlin already awards procurement contracts on the basis of environmental protection criteria. For example, the procurement of diesel vehicles is already prohibited.

In practice, this means that sustainability is taken into account as part of all tenders and costs are calculated according to the life cycle calculation as outlined in the Administrative Regulation for Procurement and the Environment (VwVBU). Environmental impacts are therefore taken into account as follow-up costs of the vehicle.

In addition, in the future the kilometers traveled per University-owned staff vehicle and year will be accounted for based on the vehicle type in order to analyze the use and appropriateness of the individual vehicles.

On this basis, the University will review the extent to which:

- Vehicles are not needed at all and therefore do not need replacing;
- A sharing platform for TU-owned staff vehicles can be used to reduce the total number of vehicles; and
- Cargo bikes (including electric ones) can be used instead of cars and delivery vehicles for transport within Berlin.

The entire University-owned fleet will be converted to zero-carbon vehicles by 2030 at the latest, to the extent that this makes sense environmentally.

## **4 Digitalization**

### **Measure 13: Expanding the Green IT program**

TU Berlin will continue to replace decentralized server rooms with centralized and energy-efficient data centers. In addition, TU Berlin aims to put in place and continually upgrade an energy-efficient building environment for the operation of central server structures. In future,

---

the University also aims to include requirements relating to the use of central infrastructures as part of appointment and retention negotiations.

In addition – building on green IT principles – TU Berlin will develop its IT and digitalization strategy in order to:

1. Holistically integrate the reduction of climate and environmental impacts of procured IT products and infrastructures, and at the same time take into account social responsibility concerns, including the working environment and the socially responsible manufacturing of IT products;
2. Align the use of digital technologies wherever possible with TU Berlin's sustainability goals by reviewing the potential for digital optimization and efficiency in order to support climate measures and by evaluating digitalization processes in terms of their climate and environmental impacts.

TU Berlin is currently investigating which certified IT standards are best suited to support the expansion of its Green IT program. The University is also looking into re-using IT equipment by passing it on, for example via the platforms *Zoll-Auktion* or *VEBEG* platforms for the public sector.

#### **Measure 14: Continuing the digitalization of administrative processes and reporting**

Administrative processes will be digitalized by expanding the integrated SAP system. Aims include facilitating mobile working in order to reduce passenger traffic and reducing energy and paper consumption. In addition, analytical functions will be added to the reporting system in order to enable planning and evaluation on climate and sustainability.

#### **Measure 15: Digital data display for research, teaching, and planning**

As part of the *StadtManufaktur Berlin* living lab, TU Berlin has developed a prototype interactive planning display in cooperation with the Berlin-based Einstein Center Digital Future: The Platform for Urban Exchange is a communication and planning platform for urban design scenarios. The platform consists of a screen displaying a publicly available dataset of planning materials, which is overlaid with a 3D physical model. This gives users a vivid and practical understanding of spatial transformation processes focused on delivery. Digital data are translated into visual scenarios so that all stakeholders can discuss, develop and compare them in terms of their implementation. The data display is a particularly promising tool in the context of negotiation processes around climate-friendly urban development.

The platform can be used in planning workshops with experts and representatives to exchange planning information and simulate planning scenarios. The plan is to integrate the data display into transdisciplinary teaching projects as part of further expansions of the project. The data display is particularly useful for addressing climate and sustainability-issues, especially in the context of digitalization.

### **5 Teaching, research, knowledge transfer, and networking**

#### **Measure 16: Integrating sustainability into degree programs**

In addition to courses with a clear sustainability focus, such as *Environmental Science and Technology* and *Sustainable Management*, TU Berlin offers a large number of sustainability-oriented courses as compulsory subjects and compulsory elective subjects in many degree programs. These include courses such as *Blue Engineering - Sustainability in Engineering*, the *Energy Seminar*, and the *Transportation Seminar*. The teaching concept used in the *Blue Engineering* course has been adopted and adapted by numerous other universities in Germany. Furthermore, since the 1980s TU Berlin has had two funding instruments for

---

teaching innovation – the *Project Laboratories for Social and Ecological Thought and Action* (TU projects) and the *Study Reform Projects* – which explicitly focus on sustainable development. With the establishment of the *Climate Change Center Berlin Brandenburg*, the University also plans to introduce an interdisciplinary master's program on climate change (cf. Measure 22). Since the 2019/20 winter semester, TU Berlin has offered an interdisciplinary lecture series on climate change topics for students of different disciplines. More than 1,000 students enrolled in the 2020/21 winter semester.

In its *Mission Statement for Teaching*, TU Berlin commits itself to designing its degree programs in such a way that students are empowered to participate in achieving the 17 Sustainable Development Goals of the United Nations. This includes transformative education as described by UNESCO in the *Education for Sustainable Development (ESD) for 2030 Framework*. In this context, teaching at TU Berlin is continually developed and existing offerings are expanded or embedded accordingly.

As part of quality assurance, another field is added to the module descriptions: Teaching staff indicate whether and in what ways their courses contribute to the 17 Sustainable Development Goals. Appropriate items are added to course evaluation forms and degree program surveys.

### **Measure 17: MINTgrün pre-study orientation program**

Since 2012, the two-semester pre-study orientation program *MINTgrün* (MINT is the German term for STEM subjects) has been offering first-year students an initial insight into the variety of degree programs at TU Berlin, so that they can make a considered decision about which degree to pursue. Approximately 600 students in each intake participate in the program. In the compulsory elective subject *MINTgrün Labor*, students take part in sustainability-oriented practical projects that address open, cross-disciplinary issues. The 17 Sustainable Development Goals are addressed in the compulsory module *Wissenschaftsfenster* (“*Window on Science*”). The *MINTgrün Labor* options are developed so that students can use interdisciplinary projects to learn how to contribute to the 17 goals through their academic and scientific work.

### **Measure 18: Sustainability Certificate for Students**

Since 2018, the *Sustainability Certificate for Students* has given students the option to focus on sustainability within their own studies. At the same time, it increasingly focuses university teaching on sustainability issues. The compulsory module *Critical Sustainability* aims at transformative learning: Participants first analyze the interconnections between technology, the individual, nature, society, and democracy, before using this knowledge to develop intervention research and directly contribute to social and ecological change. More than 360 students have participated in the program so far. To build on this, an annual project week focusing on social and ecological transformation will be set up along the lines of ETH Zurich's *Sustainability Week*. Within the Berlin University Alliance, existing offerings are coordinated and, where possible, jointly expanded. In addition, the University will also consider the internationalization of the certificate in cooperation with the strategic partner universities and with the partner network ENHANCE (European Universities Initiative).

### **Measure 19: Further developing an online teaching and learning environment**

In response to the coronavirus pandemic, in spring 2020, the University successfully switched from in-person to online formats in a matter of weeks. TU Berlin will review which online offerings should be continued from the point of view of teaching quality and in what cases face-to-face learning can be replaced by online or e-learning. In addition to the expansion of online teaching, an online teaching and learning platform will be developed to strengthen linkages with sustainability topics and ensure the broader accessibility of courses. The platform will also

---

be used to announce thesis topics related to sustainability. The expansion of Open Educational Resources will in future enable lecturers to make available teaching videos and other didactic materials to people outside TU Berlin.

### **Measure 20: Lifelong learning and knowledge transfer**

TU Berlin's continuing education courses currently mainly include fee-based master's programs, some of which have a clear focus on sustainability. They are not part of regular teaching. Based on the *Sustainability Certificate for Students*, certificate programs and microdegrees will be developed to strengthen both interdisciplinary and subject-specific qualifications. These programs will be offered and delivered by *TU Berlin ScienceMarketing GmbH (TUBS)*, a wholly owned subsidiary of TU Berlin.

In addition, TU Berlin also addresses civil society with free courses on sustainability, for example the ongoing lecture series *TU Berlin For Future*. The range of lecture videos targeted at the interested public on current topics, especially sustainability, will be expanded on TU Berlin's YouTube channel.

### **Measure 21: Incentives for sustainability in teaching and research**

TU Berlin's LinF system, which measures performance in research and teaching, does not currently take into account sustainability. At the same time, TU Berlin's Mission Statement for Teaching specifies that special achievements in teaching will be rewarded through an incentive system. The data collected are currently used for the performance-based distribution of material resources, and development and equipment planning as part of faculty budgeting. The mechanisms for distributing resources will be revised within LinF in order to capture and give special consideration to the contribution of all activities within teaching, science communication, and knowledge and technology transfer to sustainable development and the achievement of the 17 Sustainable Development Goals.

The integration of climate and sustainability in research and teaching will also be given greater consideration when appointing new professorships and filling new positions. A commitment to sustainability is already included in job descriptions when positions are advertised.

In addition, TU Berlin will develop criteria for a *Sustainability Award for Teaching*, which will be introduced by 2022 at the latest. The award will be presented for outstanding achievements in the didactic communication of sustainability ideas within courses.

### **Measure 22: Establishing the Climate Change Center Berlin Brandenburg**

TU Berlin is taking a leading role in the establishment of the *Climate Change Center Berlin Brandenburg*, working with university and non-university partners in Berlin and Brandenburg. The joint project was initiated by TU Berlin together with FU Berlin, Berlin University of the Arts, Charité – Universitätsmedizin Berlin, and the University of Potsdam. The center will help accelerate the delivery of climate solutions in four closely related "solution fields":

1. Society (Governance & Democracy, Policy & Economy, Culture)

Climate protection must be embedded in a social, political, and legal framework that enables and supports the measures taken. Changes in consumer habits and values are also crucial.

2. Technology (Energy, Transport & Mobility, Built Environment)

The discussion around technological transformations and innovations centers on some of the main areas that cause harmful emissions: the energy, transportation, and building sectors. Digital technologies unlock important effects in this context.

3. Nature (Bioeconomy & Circular Economy, Ecosystems, Green Infrastructure)

---

As part of nature-based solutions (NbS), it is necessary to strengthen healthy (natural and managed) ecosystems. These include approaches such as ecosystem-based adaptation, ecosystem-based disaster risk reduction, natural infrastructure, green and blue infrastructure, and forest and landscape restoration.

#### 4. Urban/Rural Settlements (Urban/Rural Systems)

All factors interact in agglomerations and in the context of specific spatial uses (living, working, shopping, leisure, and mobility); these function together and must be understood as interlocking systems.

A central task of the research center is to develop and apply solutions for climate neutrality within living laboratories *on site at the university* and to include solution fields as examples. The fact that TU Berlin is an inner-city campus makes it particularly suitable for this. The *Climate Change Center Berlin Brandenburg* provides TU Berlin with access to the knowledge networks of partner institutions.

### **Measure 23: Support for model projects, living laboratories and concrete sustainability measures on campus and in the urban environment**

TU Berlin will develop and embed the initiation and delivery of model projects through the following three initiatives and networks:

#### 1. Campus Charlottenburg network

Founded in 2010 by Charlottenburg district council, TU Berlin and UdK, the *Campus Charlottenburg* initiative, which now has nine further cooperation partners, forms a spatial and institutional network within which the TU Berlin main campus and the district are gradually developing into a living laboratory for research and teaching. The initiative focuses on energy, mobility, nutrition, climate change adaptation, and biodiversity. Projects such as *Sustainable Mierendorff-INSEL* and *Food Waste - (K)ein Thema* are leading the way.

#### 2. StadtManufaktur Berlin

*StadtManufaktur Berlin* was established in 2019 as a living laboratory center and transdisciplinary platform for the sustainable transformation of a growing city. It offers support for model projects, the genesis of living laboratories, and the implementation of concrete sustainability measures on campus and in the surrounding urban area. The thematic focuses are climate resilience and climate adaptation, energy and heat transition (including mobility, circular economy, biodiversity development, and transformation knowledge).

*StadtManufaktur Berlin* also supports the Campus Charlottenburg network, which aims to use urban space as a living laboratory through flagship projects in these thematic areas. The way in which actors from academia and science, politics, and business, as well as ordinary citizens, are working together to make Berlin climate-friendly can also be used as a model for other cities. Further projects are being developed with the cooperation partners and *StadtManufaktur Berlin* to strengthen climate change adaptation and biodiversity, energy and heat transition, and the circular economy. In addition, living labs are used in teaching: Students are given the opportunity to apply the principle of “think global, act local” in their work, and to contribute to the implementation of the 17 UN Sustainable Development Goals at local level. Students acquire practical skills for designing sustainable development and strengthen their sense of agency.

#### 3. Sustainability competition



---

In October 2017, on behalf of the president, the TU Berlin Council for Sustainable Development announced an open competition to implement ideas on sustainability. All members of TU Berlin could enter project ideas. 34 concepts were submitted, 17 of which were selected. Almost all projects were or are integrated into teaching – in some cases into teaching projects where students are responsible for teaching themselves (such as project laboratories). The projects were linked up with each other based on theme in order to generate the strongest possible synergies in implementation and publicity.

From 2021, there will be an ideas competition on the implementation of sustainability measures every two years. The competition is aimed at students and lecturers. The funding volume is EUR 100,000.

## 6 Organization

### **Measure 24: Creating a climate neutrality strategy**

As a priority measure, TU Berlin will prepare a climate neutrality strategy for its own area of impact by the end of 2022; it will set out in detail how it can achieve climate neutrality by 2045. The contents of the present climate protection agreement will be incorporated, updated and developed as a basis for the strategy. Verifiable interim targets will be formulated for 2030 and 2040. The goal is to reduce the remaining amount of CO<sub>2</sub> and offsetting as much as possible. In order to establish a baseline for quantifying CO<sub>2</sub> savings and to make savings targets verifiable, TU Berlin is currently having its carbon footprint calculated.

### **Measure 25: Focusing public relations and agenda setting on climate and sustainability**

In its public relations work, TU Berlin communicates on climate and sustainability with the media and the general public. Climate protection will be made more publicly visible as a topic, and related research topics and actions will be made accessible to a broad public. The goal of the following six packages of measures is to expand TU Berlin's role as a multiplier on climate protection:

1. Media relations: Press releases, press campaigns, media reports, interviews

In addition to continuous and systematic media relations, laboratory tours for journalists and visits to the campus will be offered more frequently in future in order to explain and communicate science and research on climate and sustainability. The goal is to position TU Berlin as a forward-looking actor on climate protection and sustainability not only in research and teaching but also in campus life.

2. Organizing events and participating in large public events

TU Berlin sees itself as a university that also disseminates knowledge to the general public. This is carried out via a large number of public events, among other things. These include Long Night of the Sciences, with many projects on climate protection and sustainability (science slam, sustainability market, experiments, lectures, children's campus), and the traditional Queen's Lecture, which also focuses on the topic. In addition, representatives of TU Berlin participate as experts in external public events, such as Futurium, Urania, the Berlin Year of Science, and panel discussions.

In future, in-person events will also be offered in hybrid format (in-person and online) and with bilingual interpretation in order to reach the largest possible group of interested parties. Knowledge transfer and strengthening the climate/sustainability brand are at the heart of these measures. As well as generating interest, for example among young people who are looking for a particular field of study, the aim of these measures is also to help set the agenda. The goal is for representatives from the University's Executive Board and research to make strong public statements around climate action and sustainability.

3. Presenting the topic online, in films and in social media posts

---

Research projects and actors are also described in TU Berlin TV statements and films, and shown on the University's website, YouTube channel, and social media. TU Berlin would like to greatly expand its offering and make more frequent use of film to present stories and issues related to climate and sustainability. This ranges from reports and interviews to a regular news program from the TV studio at the Charlottenburg campus. In this way, TU Berlin aims to present the subject in a way that is appropriate for the target group, especially young people, and to communicate scientific facts. The offerings are designed bilingually and linked to advertising campaigns.

4. Communicating the topic to TU alumni

TU Berlin has one of the oldest and largest alumni programs in Germany. It maintains contact with around 35,000 former students and researchers. TU Berlin addresses this target group with information on various channels, including climate and sustainability. This information policy is to be supplemented in future by the active involvement of alumni in climate change projects. This might include tree sponsorships, fundraising for projects and professorships in the new Climate Change Network, and scholarships for students who are actively involved in climate projects on campus.

5. Communicating the topic to political actors

There are more political institutions in Berlin than in any other Germany city. TU Berlin taps the potential for networking and knowledge exchange, for example, through the traditional VIP tour during TU Berlin's Long Night of the Sciences.

In future, TU Berlin will invite politicians to the University and the laboratories four times a year with the *Grünes Lunchpaket* ("Green Lunchbox") series to inform them in person about climate topics from a scientific perspective. In the upcoming "*Grüner Schulterblick*" ("Green Shadowing") program, between four and six researchers and politicians will spend several working days together each year to learn about the processes in politics and science. A film will be made of this exchange. Building this network of policymakers and researchers generates trust, cooperation, and an understanding of each other's professions.

6. Continuing education for junior researchers in science communication

With a number of certified courses and a continuing education master's program, TU Berlin has a good offering of continuing education on science communication. The program is also open to junior researchers. These continuing education programs will continue to cover topics and examples from climate and sustainability. The courses are also to be offered to master's students.

**Measure 26: Developing a comprehensive sustainability report, and setting up and making available a sustainability portal on the TU Berlin website**

The Environmental Report, which has been published almost annually since 1995, was supplemented in 2016 by the report of the Council for Sustainable Development, and, more recently, expanded through a broad participatory process into a Sustainability Report, which was published for the first time in October 2020.

By systematically bringing together information on and involving all TU Berlin status groups (professors, academic staff, administrative and technical staff and students), the report presents and documents the entire spectrum of sustainability in research and teaching as well as in operations and infrastructure at TU Berlin, from strategy to governance and transfer to construction and operational processes.

The Sustainability Report provides a snapshot, and its contents are presented on the Sustainability Portal on the web, which allows for adjustments and updates to be made throughout the year. This Sustainability Portal provides content and links that go beyond the Sustainability Report, so that the users can easily explore the entire spectrum of sustainable activities via one access point. The portal is intended as a hub for all areas of sustainability policy, research, teaching, transfer, operations and construction.

### **Measure 27: Expanding central energy management**

In 2018, TU Berlin began restructuring and expanding its energy management staff. This involves the following:

- Expanding and automating energy data collection and data analysis in order to manage, optimize and reduce energy use while increasing operational reliability and thermal comfort.
- Continuous review of opportunities for renewable energy integration.
- Establishing and implementing high climate-responsive building and facility standards for existing and new constructions that go beyond legal requirements.
- Strategically coordinating climate-related measures in the building and facilities sector as well as in climate impact adaptation with the goal of realizing a climate-neutral campus.
- Energy optimization, planning and advice regarding concepts for sustainable energy and systems in existing and new buildings.
- Activating additional resources in order to achieve the goals of the climate protection agreement (e.g. by establishing knowledge transfer from research to operations).

### **Measure 28: Staff support for the transfer of knowledge from research work to the University's own operations**

As part of ongoing applied research projects, a number of climate-related findings and measures are emerging at TU Berlin that can be usefully implemented in the University's actual construction and building management processes beyond the research level. In order to coordinate and implement these measures – which were developed through university research even though they are not considered research projects but climate-related infrastructure measures – there is a need for organizational structures and personnel resources on both the academic and administrative sides, especially in Department IV Building and Services Management. Staffing capacities will be created in both areas in order to plan, coordinate and execute these processes.

### **Measure 29: Coordinating the measures in the climate protection agreement**

The sustainable transformation of a complex organization such as TU Berlin requires the coordination of various sustainability stakeholders, including the Climate Action Task Force, the Council for Sustainable Development, the Occupational Health and Safety Services and Environmental Protection Unit (SDU), and the administration. By further expanding personnel and financial capacities, the University will ensure the implementation of the measures in the climate protection agreement as well as the investigation of the feasibility studies. In addition, further topics are to be highlighted in order to expand the climate protection agreement with each evaluation. The level of staff resources needed will be explored by the Climate Action Task Force.

### **Measure 30: Connecting up, implementing and reviewing climate activities through the Climate Action Task Force and One-Stop Climate Shop**

In order to coordinate the implementation of the measures decided in the climate protection agreement and to expand the catalog of measures, the TU Berlin Executive Board established the Climate Action Task Force (CATF) in May 2020 under the leadership of the Executive Board member responsible for sustainability. In addition, the Task Force has the role of analyzing and evaluating options for climate action, updating TU Berlin's climate action plan, initiating and coordinating climate funding applications, and strengthening exchange with other universities on climate. The CATF has an annual budget of EUR 100,000.

---

Also under the leadership of the Vice President for Education, Digitalization and Sustainability, the One-Stop Climate Shop will be established to aggregate and systematize information, activities, ideas and future prospects for TU Berlin's climate agenda and to increase their internal and external visibility. The measure aims to improve efficient communication, coordination and increased incentives for climate-related activities. The One Stop Climate Shop acts as the first and main port of call for all TU internal and external inquiries, suggestions and ideas regarding TU Berlin's climate agenda. It increases the visibility and strengthens TU Berlin's political communication as a climate policy actor.

### **Measure 31: Aligning financial policy with climate protection targets**

TU Berlin bases its financial investments on fossil-free principles.

In future, it commits to aligning investment decisions with ambitious climate and sustainability efforts. For projects that are in line with this strategy, the University examines options for co-financing and, where a positive decision is made, provides funding (for example, HCBC, Hydraulic Engineering Building).

The aforementioned offsetting fund for unavoidable official travel is used for CO<sub>2</sub> reduction measures at TU Berlin.

### **Measure 32: Improving the sustainability of University catering**

TU Berlin supports the transition to sustainable and climate-friendly nutrition. *studierendenWERK BERLIN*, which operates a large number of the canteens and cafés, has already taken steps towards climate-friendly catering. However, the university catering facilities operated by private providers also show some potential for improving their sustainability performance, especially regarding vegetarian and vegan food offerings and avoiding the use of disposable tableware.

#### 1. Requiring food service contractors to provide regional, fair trade, and sustainable products

When concluding new contracts and renewing existing ones, TU Berlin requires the canteens and cafés not to use disposable tableware and to serve all food and beverages with reusable tableware. At least 50% of dishes must be vegetarian or vegan in each category (main dishes, smaller dishes and sandwiches, desserts, etc.), and at least one vegan dish per category should be offered. The dishes should, as far as possible, be sourced from regional produce and fair trade.

#### 2. Sustainable catering at TU Berlin events

In future, the catering at events financed by TU Berlin budget funds will be exclusively vegan or vegetarian. Overall, catering will be sustainably oriented: This includes no longer using disposable tableware and, where possible, using fairly traded, regionally sourced, seasonal and organically produced food. At all other TU Berlin events (including external events on TU premises), sustainable catering is explicitly encouraged.

#### 3. Installing drinking fountains on the University campus

In cooperation with Berliner Wasserbetriebe, a public drinking fountain is to be built in the immediate vicinity of TU Berlin's Charlottenburg campus, preferably in front of the Main Building or the Mathematics Building. The drinking fountain will be built and operated by Berliner Wasserbetriebe. In addition, TU Berlin is examining whether it is possible to install water dispensers in central university buildings, following the example of the drinking water dispenser in the Hardenbergstraße canteen. In new buildings, the installation of drinking water dispensers is integrated into the planning process.

---

### **Measure 33: Developing a continuous improvement process (CIP) and energy saving process**

#### 1. Continuous improvement instead of large-scale, drastic innovations

The science shop kubus / ZEWK (Center for Scientific Continuing Education and Cooperation) is developing the “Continuous Climate Improvement Process/Energy Saving Process”. In this way, the potential for energy saving and climate protection is determined at regular intervals by TU Berlin employees and measures are developed to harness this potential. kubus/ ZEWK develops the corresponding guidelines, trains the facilitators in the CIP and energy saving process group and supports the implementation process. Based on the experience of the premium model, which was used in TU Berlin’s KT building, the University will review whether several CIP groups (e.g. across institutes or buildings) can be established, which are supported by the environmental officers and energy management. This creates an interface between users and building operators, so that any anomalies identified in the use of the building are incorporated into the planning and implementation of measures. In addition, the measures encourage users to become more aware of energy-saving, climate-friendly processes, which can also lead to changes in individual behavior and consumption patterns – a self-reinforcing process.

#### 2. Energy-saving building use

Working with the Occupational Health and Safety Services and Environmental Protection Unit (SDU), kubus is developing training modules that enable employees to use the energy-saving potential available in each individual building. In addition to using the infrastructural potential, emphasis is also placed on energy-saving behavior, where easy-to-implement measures – which often require no additional expense – are used to increase savings potential. This continuing education program also includes a course tailored to managers, which addresses “energy-saving leadership behavior,” including setting an example and valuing energy-saving behavior. This also includes regular internal evaluation, e.g. in annual meetings, to ensure continuity. kubus conducts initial pilot trainings, which can be integrated into the standard ZEWK training offering after the end of the project. In addition to training, the University also develops and implements building-specific campaigns using a variety of formats to inform and motivate employees. These campaigns are linked with the CIP groups, which act as multipliers in the buildings.

## **7 Climate change offsetting measures and climate change adaptation**

### **Measure 34: Increase in areas that help restore nature, decentralized stormwater management, improvement of the microclimate, preservation and increase in biodiversity**

TU Berlin creates human resources for designing, planning and operations in order to develop outside areas that benefit nature.

Ecologically sound climate change adaptations are systemically used to create a number of simultaneous effects:

#### 1. Increase in areas that help restore nature

Increasing the amount of green space, green facades, green roofs, and open spaces will increase the amount of land area on the campus that helps restore nature. This area mitigates the urban impacts of climate change (e.g., heat stress, heavy rainfall). At the same time, CO<sub>2</sub> sequestration contributes to the deceleration of climate change. Measures include the reallocation, unsealing and greening of unused sealed traffic areas, median strips, service roads and parking spaces, urban gardening in raised beds, and the greening of roofs and facades. Positive impacts include building shading, transpiration cooling and insulation, increased biodiversity and habitat, and reduced noise propagation. Green roofs and facades also save CO<sub>2</sub>, as the amount of energy required for cooling the buildings is reduced and CO<sub>2</sub> is simultaneously fixed via the biomass.

## 2. Decentralized stormwater management

Through sustainable, ecological and decentralized management, rainwater will be used as a resource in future, or directly stored, infiltrated and evaporated. In addition to ecological benefits, such as energy and CO<sub>2</sub> savings, groundwater recharge and climate change offsetting, decentralized stormwater management also has economic advantages, such as a reduction in wastewater charges.

At TU Berlin, there are various options for using rainwater on site, for centralized and decentralized infiltration, and for using rainwater for evaporation on facades, roofs, and green spaces. Measures include unsealing surfaces, redirecting rainwater from roof surfaces (“decoupling”), creating storage (cisterns), and constructing infiltration structures (swales, swale infiltration ditches, tree trenches).

## 3. Improvement of the microclimate

By preserving and adding to existing green spaces, building greenery, and mature trees, the University can prevent overheating on campus, in buildings, and open spaces, and, more generally, help reduce heat in the city. The capacity of the vegetation types to provide a cooling effect (evaporative cooling; shading) is dependent on their location and structure (green roofs, green facades, trees and shrubs, lawns) and the optimal supply of water.

## 4. Preserving and increasing biodiversity

As an extension of the ecosystem of Berlin’s Großer Tiergarten, the Main Campus and East Campus play a prominent role in interlinking biotope stepping stones. Preserving vegetation and adding to it on the East Campus are priority biodiversity conservation measures. This also applies to the Salzufer Campus, where the green banks of the Landwehr Canal represent a significant migration route for biodiversity across different parts of the city. In order to increase biodiversity, there is a need to develop biotopes and biotope stepping stones, for instance by creating and interlinking ponds, tree avenues, shrubs, dead wood, and natural stone areas, as well as roof and facade greenery. Direct installations on buildings such as nesting boxes, bat boxes and insect hotels are also built in order to increase biodiversity. Several bee colonies are already established on TU sites. For these and other free-living insects, it is necessary to examine what plant communities can be established and where in order to increase biodiversity. The maintenance involved is also be taken into account, and this usually requires fewer resources compared to an area that has a productive use.

The first model project to cover all four aspects is the Hydraulic Engineering Building, where innovative facade greening is combined with sustainable rainwater management and photovoltaics.

## 8 Feasibility studies

### **Feasibility study 1: Feasibility of a layered climatic envelope for groups of listed buildings**

Apart from in the case of comprehensive refurbishments, alternative energy measures can also be implemented in an economical way in the listed historic buildings. One approach is to develop layered climatic envelopes: These form an additional transparent envelope around individual parts of buildings or around entire buildings in order to improve energy efficiency without the need for conventional building insulation on the facades. This reduces investment costs by around 25% compared with a standard refurbishment, while increasing energy savings by around 40%. At the same time, the layered climatic envelope spatially connects transitional spaces, courtyards and circulation areas between buildings. It therefore improves the experience of being in the building and creates additional usable space.

---

### **Feasibility study 2: Increasing the sustainability of procurement**

TU Berlin reviews the extent to which procurement can be made more sustainable by expanding climate and sustainability criteria in specifications, for example by:

- Making product-related criteria mandatory in procurement in accordance with the VwVBU;
- Using life-cycle assessment in economic evaluation in the context of tenders;
- Supporting the procurement of low-waste products including recycled products, e.g. avoiding non-recyclable composites, using low-packaging products, etc.;
- Including product-related greenhouse gas emissions;
- Including product-related environmental certificates in procurement;
- Promoting the implementation of digitalization throughout the procurement process (from call for proposals through to payment); especially when concluding framework agreements;
- Using modern climate-neutral solutions in economic evaluation in the context of tenders;
- Sensitizing and training procurement office staff in sustainable and climate-friendly procurement, e.g. through the training opportunities offered by the Federal Environment Agency

### **Feasibility study 3: Restricting short-haul flights for official travel**

Emissions resulting from official travel account for a significant share of TU Berlin's total emissions. In order to reduce this share, measures to reduce emissions through mode choice will be investigated in addition to the means described under Measure 11, which are particularly aimed at avoiding official travel. In this context, TU Berlin reviews whether it can enforce the non-use of air travel for official travel and field trips where the travel time by train is less than 6 hours. TU Berlin assesses the acceptance of these measures among employees. A new model tailored to TU Berlin is developed to restrict short-haul flights for official travel. Exceptions for people with impairments and employees with dependents in need of care are explicitly taken into account.