

Freie Universität Berlin **Strategic Options to Achieve** **Climate Neutrality by 2025**

UAS Workshop Series 2020
Management Workshop
Universities on the Way to Climate Neutrality

November 5, 2020

Agenda

1

Introduction

- Climate Emergency Declaration 2019
- How did the Decision Come About?
- Climate Mitigation Activities and Achievements

2

Climate Neutral University 2025

- Carbon Dioxide Factors and Balance Limits
- Carbon Dioxide Emissions in 2018
- Strategic Options to Achieve Carbon Neutrality

3

Challenges



37,300 students
(incl. 3,800 PhD students)

founded in 1948

11 faculties
4 central institutes
228 degree courses

5,380 employees
incl. 559 professors
(incl. 359 tenured professorships)

**665 sustainability-related
research projects**
out of a total 1.796 research projects
(37%)

ca. 230 buildings
with 575,000 m²

government grant: 351 million €
third-party funds: 140 million €

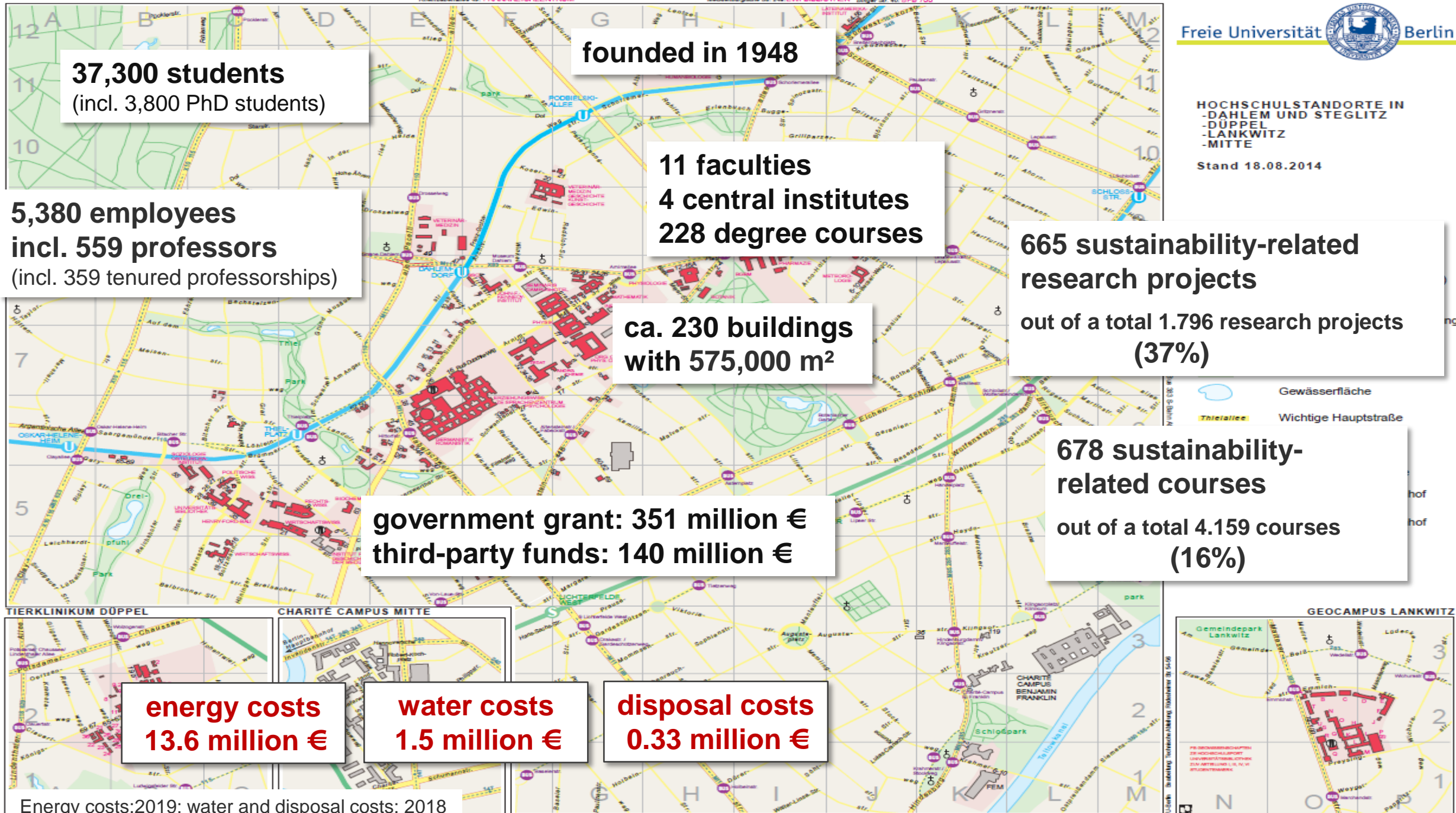
**678 sustainability-
related courses**
out of a total 4.159 courses
(16%)

energy costs
13.6 million €

water costs
1.5 million €

disposal costs
0.33 million €

Energy costs:2019; water and disposal costs: 2018

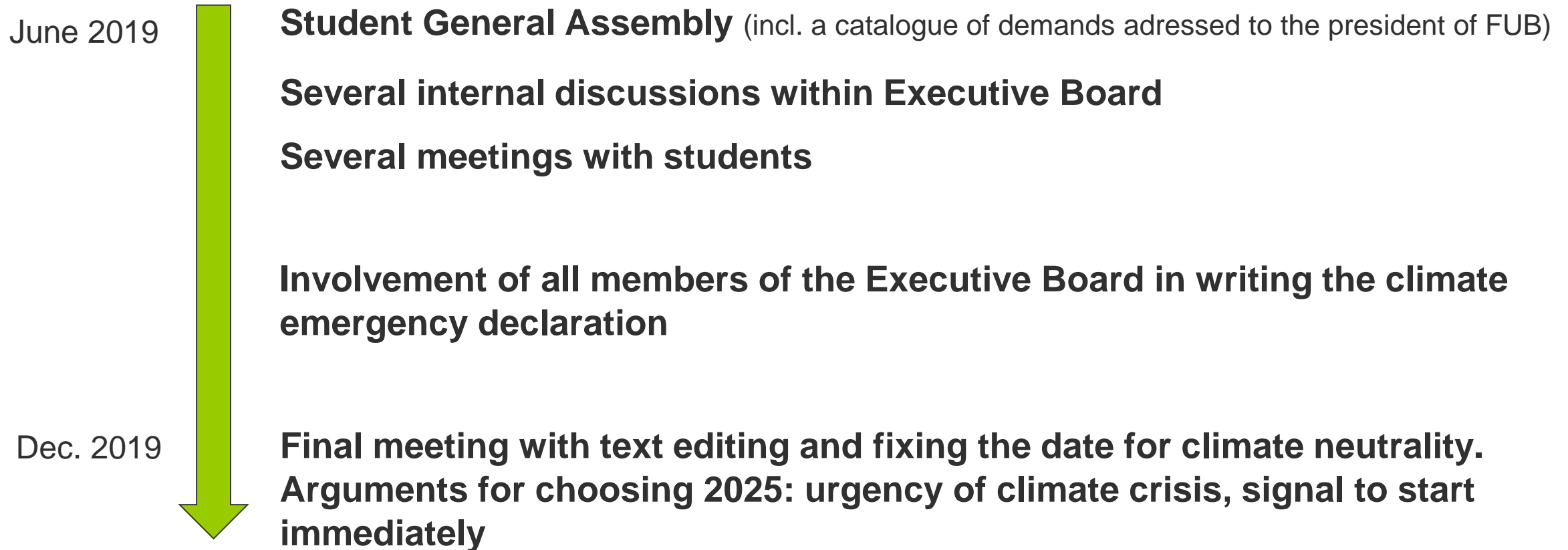


Climate Emergency Declaration (Dec. 2019)

“For Freie Universität Berlin, declaring a climate emergency stems from a sense of urgency and comprises the following sub-goals:

- Considering the possible consequences for the climate **in all decisions and plans**
- Achieving **climate neutrality** at Freie Universität Berlin **by 2025**
- **Comprehensively integrating** climate protection and sustainability **in the curricula** at Freie Universität Berlin
- Making sustainability and climate protection even **more visible** in research, teaching, and transfer in the future and systematically embedding these themes in our **international networks**
- Supporting the personal dedication to sustainability and climate protection of all members of the university through an **ideas and innovation management**
- **Continuing our efforts** to promote sustainability and climate protection in our own areas of responsibility, i.e., **within the administration and on campus**
- Assessing and documenting our progress through **periodic reports**”

1 How did the decision come about? Procedure



1 How did the decision come about? Key Discussion Points

Politics and Society

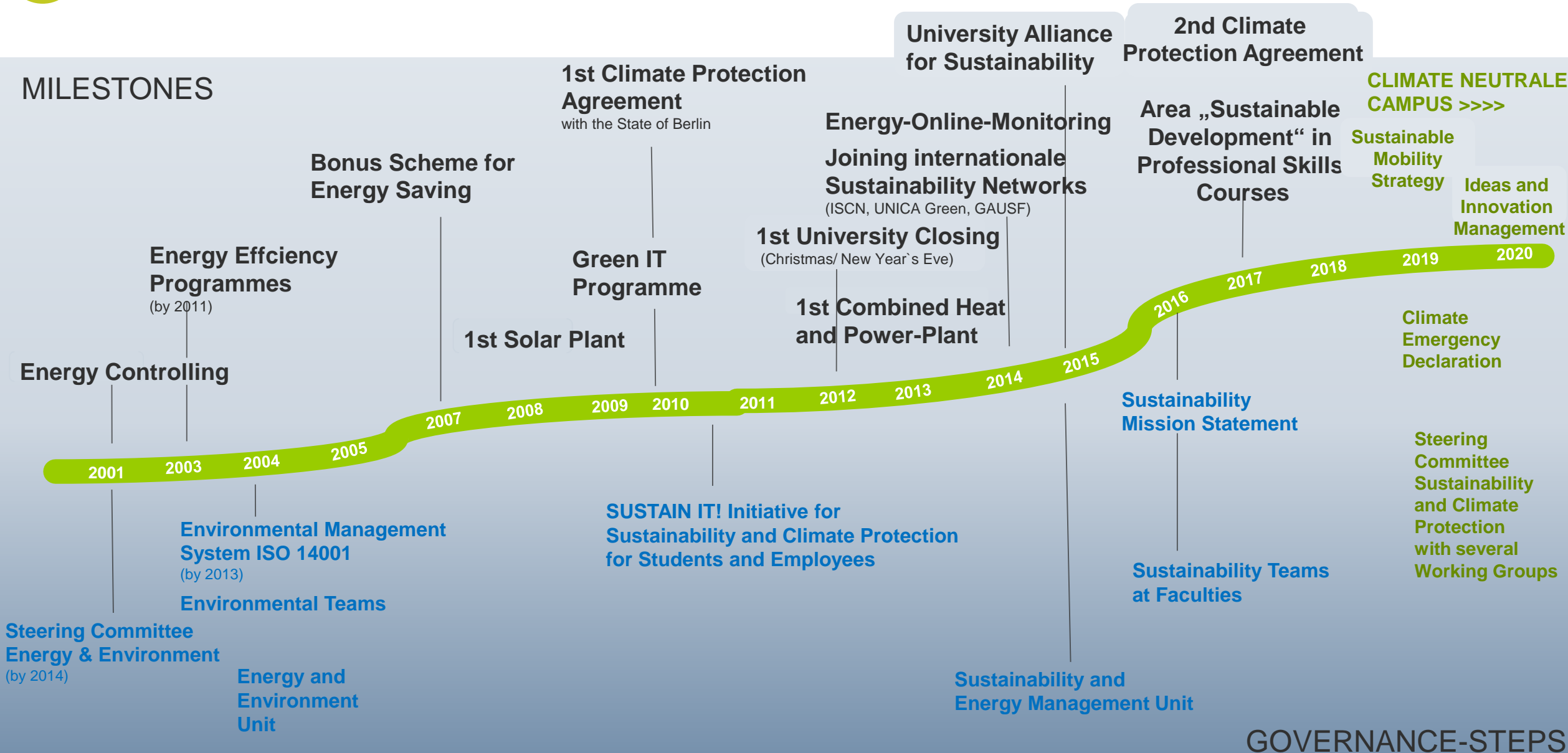
- Scientific evidence of climate change
- Rising importance of science in global climate policy
- Fridays-for-Future and Scientist-for-Future Movement („from climate change to climate crisis“)
- A growing number of prominent universities signing a climate emergency declaration

University Internal

- Student General Assembly in June 2020 with a list of demands addressing the President of the university
- Several meetings with student representatives at the executive level and at the unit for sustainability
- At an early stage: The decision to establish a new *Steering Committee for Sustainability and Climate Protection* with members representing all status groups, appointed by the Academic Senate
- Long-standing experiences in climate mitigation

From Energy to Sustainability Management

MILESTONES



Climate Mitigation Activities on Campus

- **ENERGY MONITORING (2001-today)**
 - Installation of energy meters (2001/02)
 - Online energy monitoring since 2014
- **ANNUAL ENERGY EFFICIENCY-PROGRAMMES (2003-2011)**
 - Focused on optimisation of operational technologies
 - Investment costs of 1.5 to 2.5 million € per year with payback times < 5 years
- **BONUS SCHEME FOR ENERGY SAVING (2007-today)**
 - Incentives for faculties to save energy
- **GREEN IT PROGRAMME (2010-today)**
 - Modernisation of the cooling generation and supply of 2 data centers
 - Central power management
 - Incentives for replacing old and inefficient computers
- **4 COMBINED HEAT AND POWER PLANTS (715 kW_{el})**
- **9 SOLAR PLANTS (657 kW_p)**
- **PROCUREMENT of CO₂-free ELECTRICITY (2010-today)**

KEY OUTCOMES

CHANGES BETWEEN 2000/01 AND 2019

- 29% energy consumption (without increased floor space)
- 27% energy consumption (including increased floor space)
- 98% heating oil
- 35% heat consumption
- 11% electricity consumption
- 19% electricity procurement

CARBON DIOXIDE EMISSIONS

(Energy Consumption on Campus)

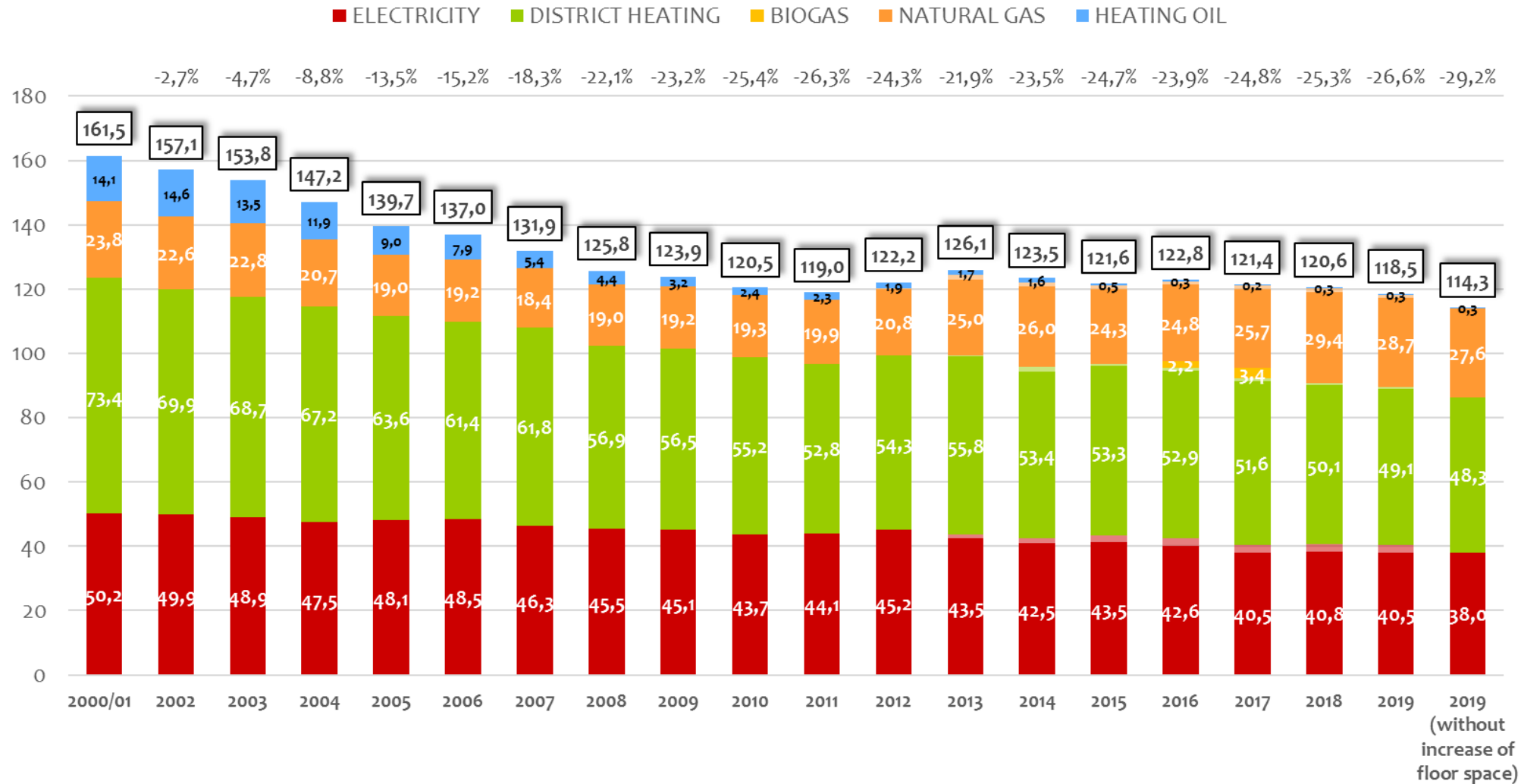
- **80 %** (based on CO₂-emission factors of energy suppliers and electricity supply contract)

AVOIDED COSTS

- 5.0 mill. € (2019 compared to 2000/01)
- 52.1 mill. € (accumulated since 2003)

2 Energy Consumption 2000–2019

in mill. kWh, weather adjusted



-27 %
(-29%)

-98%
(-98%)
Heating Oil

+21%
(+16%)
Natural Gas /
Biogas

-33%
(-31%)
District
Heating

-19%
(-24%)
Electricity

Climate Neutral University – Which CO₂-Factors?

CO₂-Factors in g/kWh 2017

	District Heating	Natural Gas	Heating Oil	Electricity
CO ₂ factors according to Federal Environment Agency *	194	202	268	486
CO ₂ -factors according to Office for Statistics Berlin-Brandenburg **	239	201	266	507
CO ₂ factors according to energy suppliers / supply contracts	129	176 ***	268	0

* = National average data ** = District Heating: Berlin average, Electricity: National average

*** =The natural gas used had a biogas share of 12.2% in 2017, from 2021 the biogas share will be at least 15% to a maximum of 25%

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Climate Neutral University – Which Balance Limits?

Scope 1 Direct emissions from sources within the organization

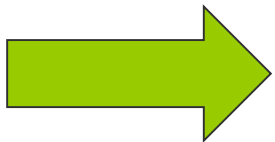
= Emissions from the generation of heat and electricity on campus and the vehicle fleet

Scope 2: Indirect emissions from procured energy, generated outside the organization

= Emissions from procured district heating and electricity

Scope 3: Other indirect emissions from activities of the organization which are from sources outside the organization

= Emissions from business trips as well as the production and transport of procured goods and services



FUB includes the carbon dioxide emissions of energy consumption on campus, of the vehicle fleet and of the business trips

3 Carbon Dioxide Emissions in tons 2018

(including energy consumption on campus, vehicle fleet and business trips)

	District Heating t	Natural Gas t	Heating Oil t	Electricity t	Vehicle Fleet* t	Emissions on Campus t	Business Trips (only flights**) t	Total in t
CO₂-emissions (according to emission factors of energy suppliers / electricity supply contract)	6,475	5,154	0,081	0,000	0,190	11,900	5,868	17,768
as a percentage (campus and business trips)	36%	29%	0%	0%	1%	67%	33%	100%

* ca 680,000 km/year (2016/17)

** according to CO₂ emission factors of the German Federal Environment Agency;
only Flights, which are accounted by the FUB business travel unit

Strategic Options for Achieving Climate Neutrality by 2025

Areas	Baseline 2018 (17,768 tons CO ₂)	possible CO ₂ reduction in tons	Measures / Comments
Improving campus related energy efficiency by 10%	campus related carbon dioxide emissions 11,900 tons	1,200	Continuation of campus-related energy efficiency and optimization measures, bonus system for energy saving, Green IT, energy online monitoring, sustainability certification of buildings, procurement of energy-efficient IT and laboratory equipment, energy-efficient behavior, etc.
Increasing the use of renewable energy (installation & procurement)		11,900	Installation of additional photovoltaic systems and solar thermal systems (= avoiding up to 720 tons of CO ₂ emissions, if the existing PV capacity will be tripled), purchase of CO ₂ free district heating (substitution of up to 6,475 tons (=100%), switch from natural gas to biogas (substitution of up to 5.145 tons (=100%))
Sustainable mobility (including business trips)	flight related carbon dioxide emissions ca 5,868 tons	2,934	Definition of a target for reducing flight-related CO ₂ emissions, development of a sustainability-oriented business travel policy with incentives to avoid air travel and to give preference to rail, strengthening of virtual communication, etc, possible savings target: halving flight-related CO ₂ emissions
Internal offset projects (e.g. plant coal project)		2,800 +	Production of compost and plant coal from green and organic waste, use of carbonisation heat for heating buildings, feasibility study shows a potential of 2,800 tons of negative emissions
Ideas and innovation management		tbd	Including different sustainability awards, promoting climate protection projects and living labs on campus as well as additional ideas for carbon offset mechanisms, addressing research, teaching, transfer and campus

Strengths and Challenges of Strategic Options

Areas	Possible CO ₂ -Reduction in t Baseline 2018: 17,768 tons	Strengths	Challenges
Improving campus related energy efficiency by 10%	1,200	high effectiveness & cost reduction	small-scale task, involvement of many stakeholders required
Increasing the use of renewable energy (installation & procurement)	11,900	high effectiveness and acceptance	high costs, if available
Sustainable mobility (including business trips)	2,934	high effectiveness	multiple conflicting goals, reduction commitment, complex incentives and regulation required
Internal offset projects (e.g. plant coal project)	2,800 +	innovative negative emission technology, high acceptance of living lab	additional R&D funding required
Ideas and innovation management	Tbd	involvement of research & teaching & university stakeholders	complex project management and networking required, needs time and financial resources,
Sum	18,834		

Challenges

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- **Maintaining Credibility**

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- **Costs**



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- **Involvement of internal and external stakeholders**

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- **Holistic view on research, teaching, transfer & campus**

Thank you!



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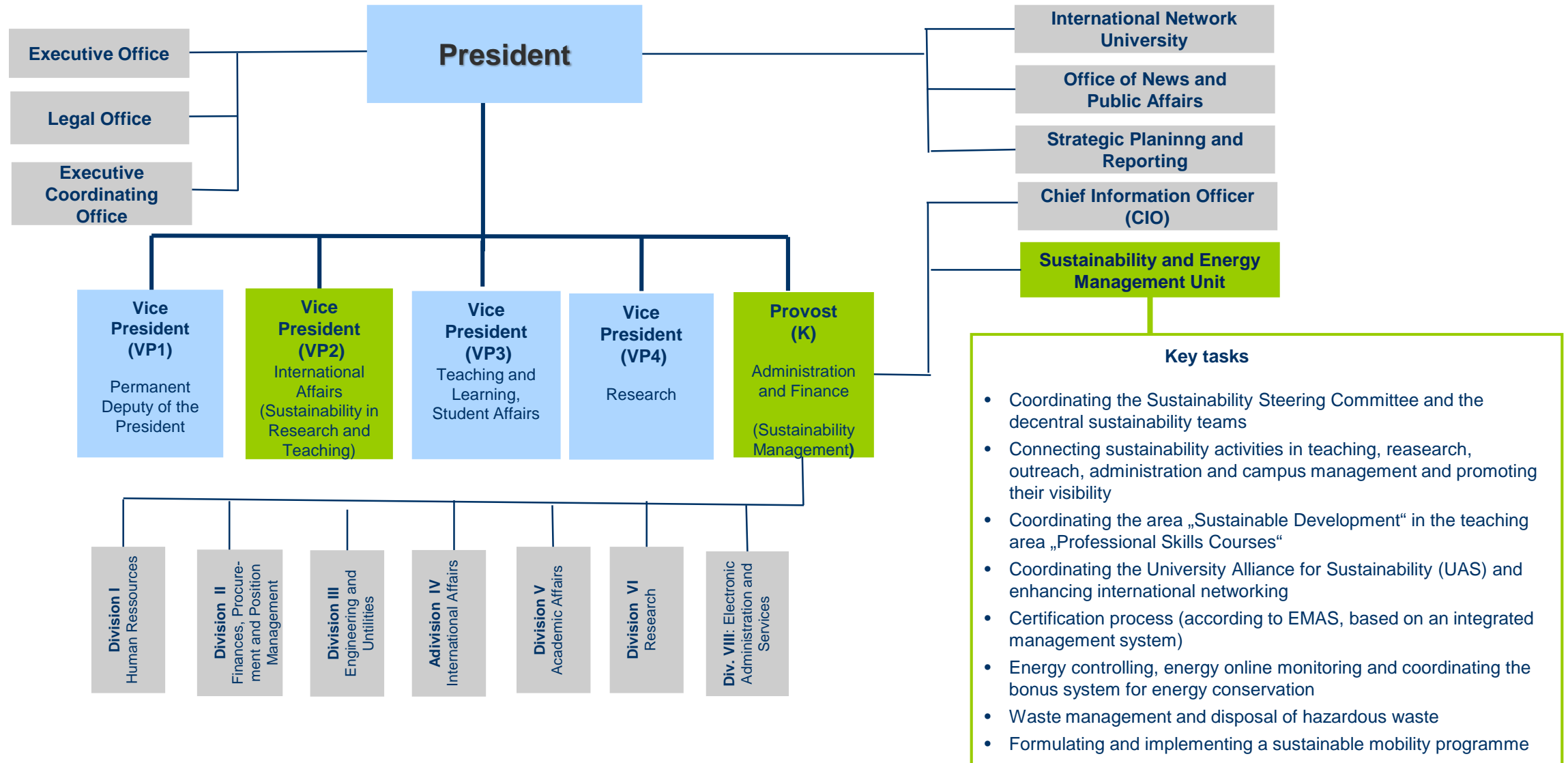




SUSTAINABILITY REPORT 2018

The report is available here:
www.fu-berlin.de/sustainability

Governance-Structure of the University Management



Governance und Participation

