



# Freie Universität Berlin on the Way to Climate Neutrality

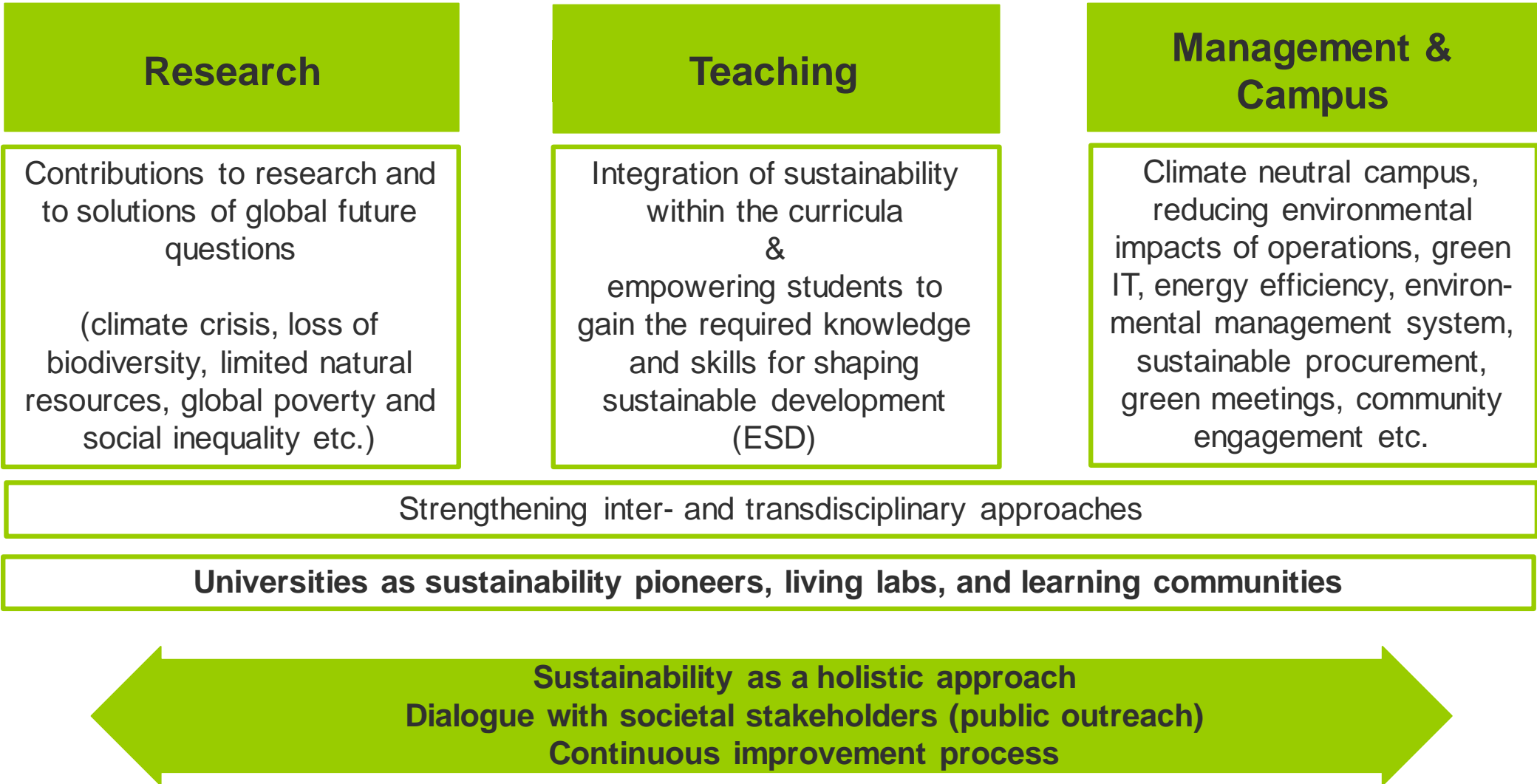
Physics Colloquium /  
Working Group on Sustainability  
Physics Department  
Freie Universität Berlin  
January 15, 2021

# Agenda

- 1 Introduction**
  - Sustainability at Universities...
  - ... and at FUB at a Glance
- 2 From Energy to Sustainability Management**
  - Chronology and Milestones
  - Outcomes
- 3 Climate Neutral University by 2025**
  - Climate Emergency Declaration 2019
  - Carbon Dioxide Factors and Balance Limits
  - Carbon Dioxide Emissions in 2018
  - Strategic Options to Achieve Carbon Neutrality
- 4 Challenges**



# 1 Sustainability at Universities



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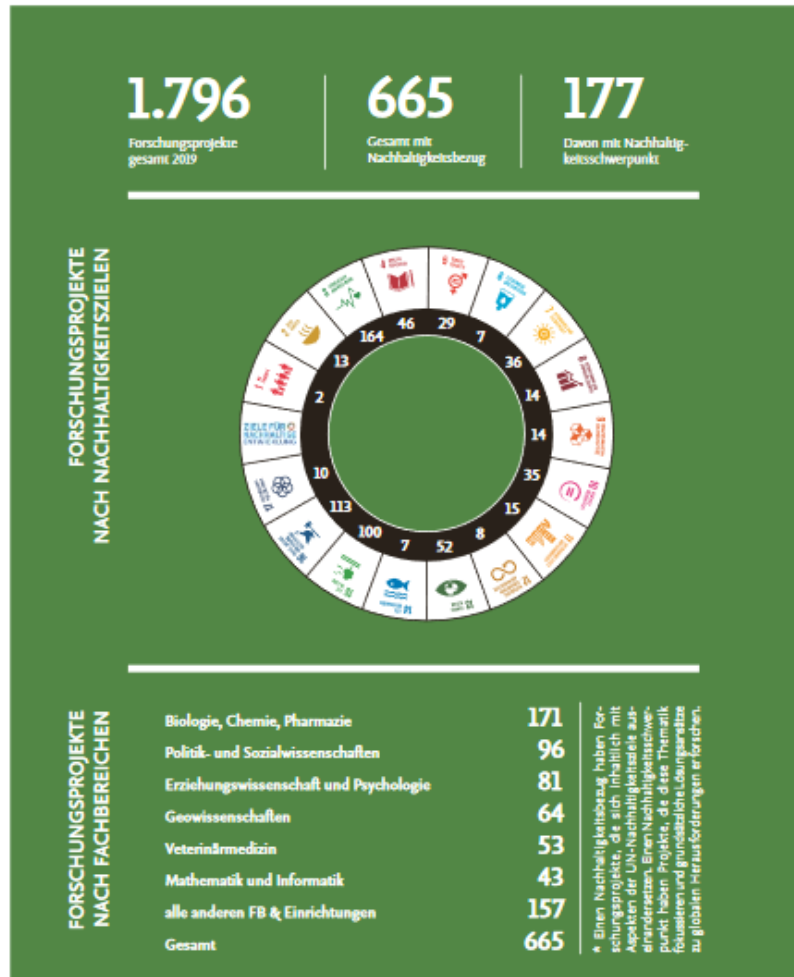
# Freie Universität Berlin

## Commitments towards climate protection

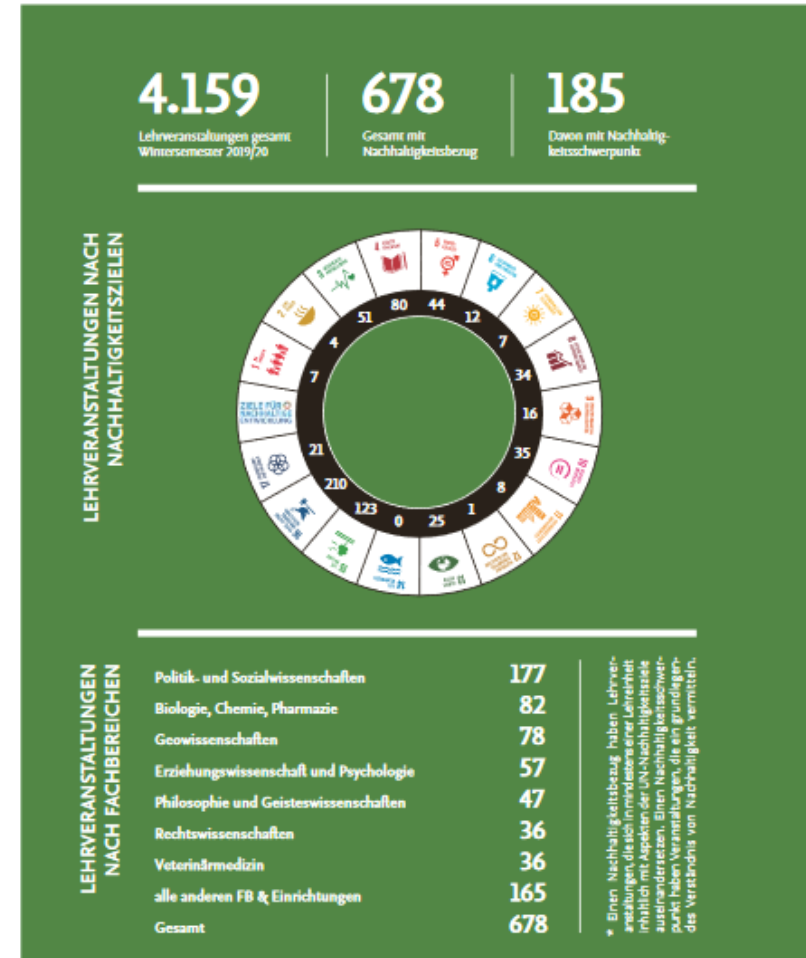
- 20-year development **from Energy to Sustainability Management**
- Focus on **climate mitigation, environmental management, and participation**
- **Sustainability Mission Statement**, signed by the Executive Board in 2016
- **Sustainability and Energy Management Unit**, assigned to the Executive Board since 2015, focusing on an **Whole Institution Approach** – addressing sustainability in research, teaching, transfer and on Campus
- Founding of **University Alliance for Sustainability in** 2015 (funded by DAAD)
- **1<sup>st</sup> Sustainability Report**, including the sustainability programme until 2021, published in 2018
- **2nd Climate Protection Agreement** with the State of Berlin in 2018
- **Climate Emergency Declaration** in Dec 2019

1

# Research and Teaching with Sustainability Reference



**36 %**  
of 1,796 research projects 2019

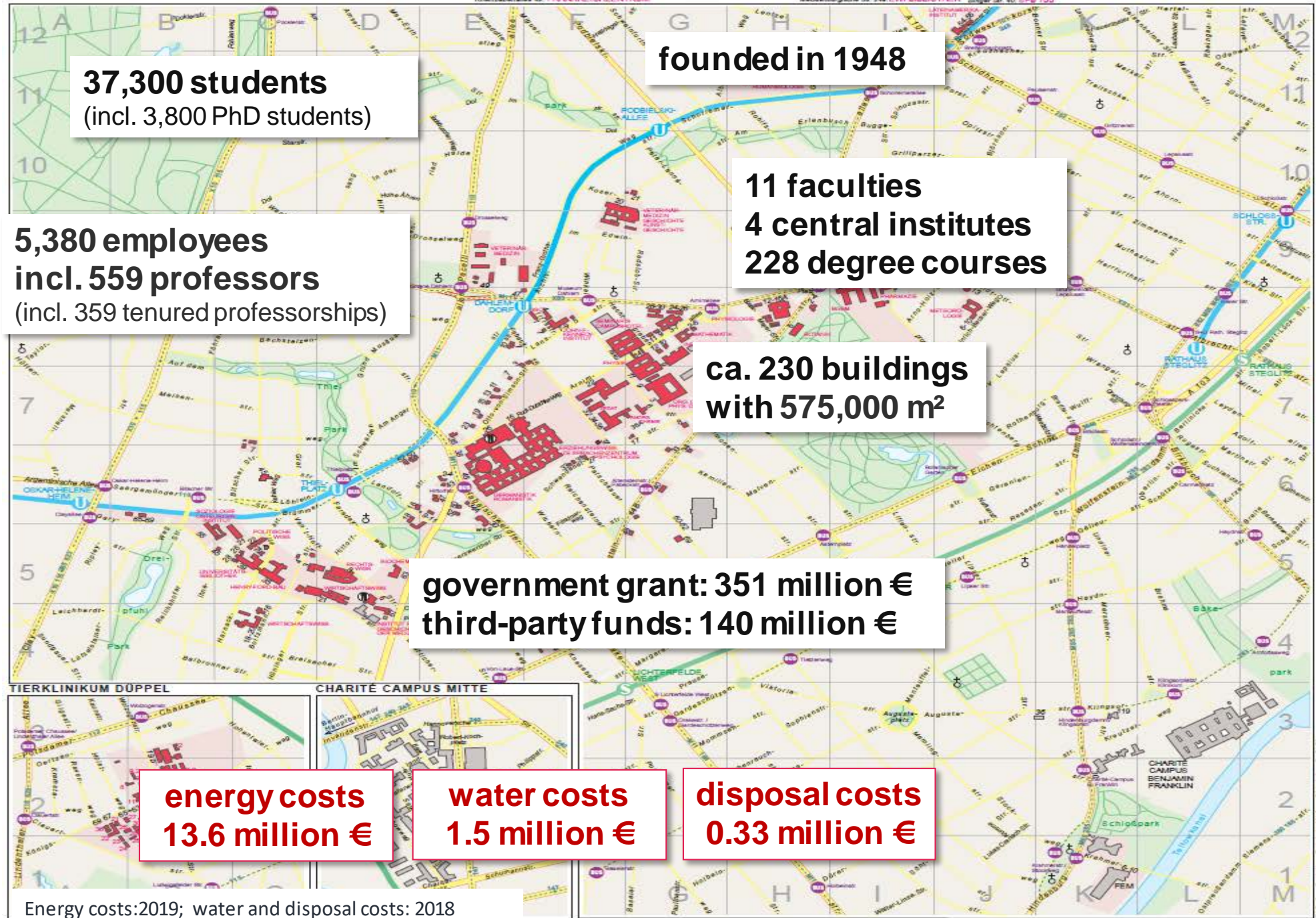


**16%**  
of 4,159 courses in WS 2019/20

**HOCHSCHULSTANDORTE IN  
-DAHLEM UND STEGLITZ  
-DÜPPEL  
-LANKWITZ  
-MITTE**

Stand 18.08.2014

-  Gebäude der FU mit Grundstücksfläche und Hausnummer
- GEOGRAPHIE**
-  Mensa
-  Gebäude mit teilw. FU-Nutzung
-  Übrige bebaute Fläche
-  Grünfläche
-  Gewässerfläche
-  **Triellinie** Wichtige Hauptstraße
-  **Schloßstr.** Hauptstraße
-  **Garystr.** Nebenstraße
-  Buslinie mit Haltestelle
-  S-Bahn Linie mit Bahnhof
-  U-Bahn Linie mit Bahnhof
-  Bushaltestelle



**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)

**ca. 230 buildings**  
**with 575,000 m<sup>2</sup>**

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

**energy costs**  
**13.6 million €**

**water costs**  
**1.5 million €**

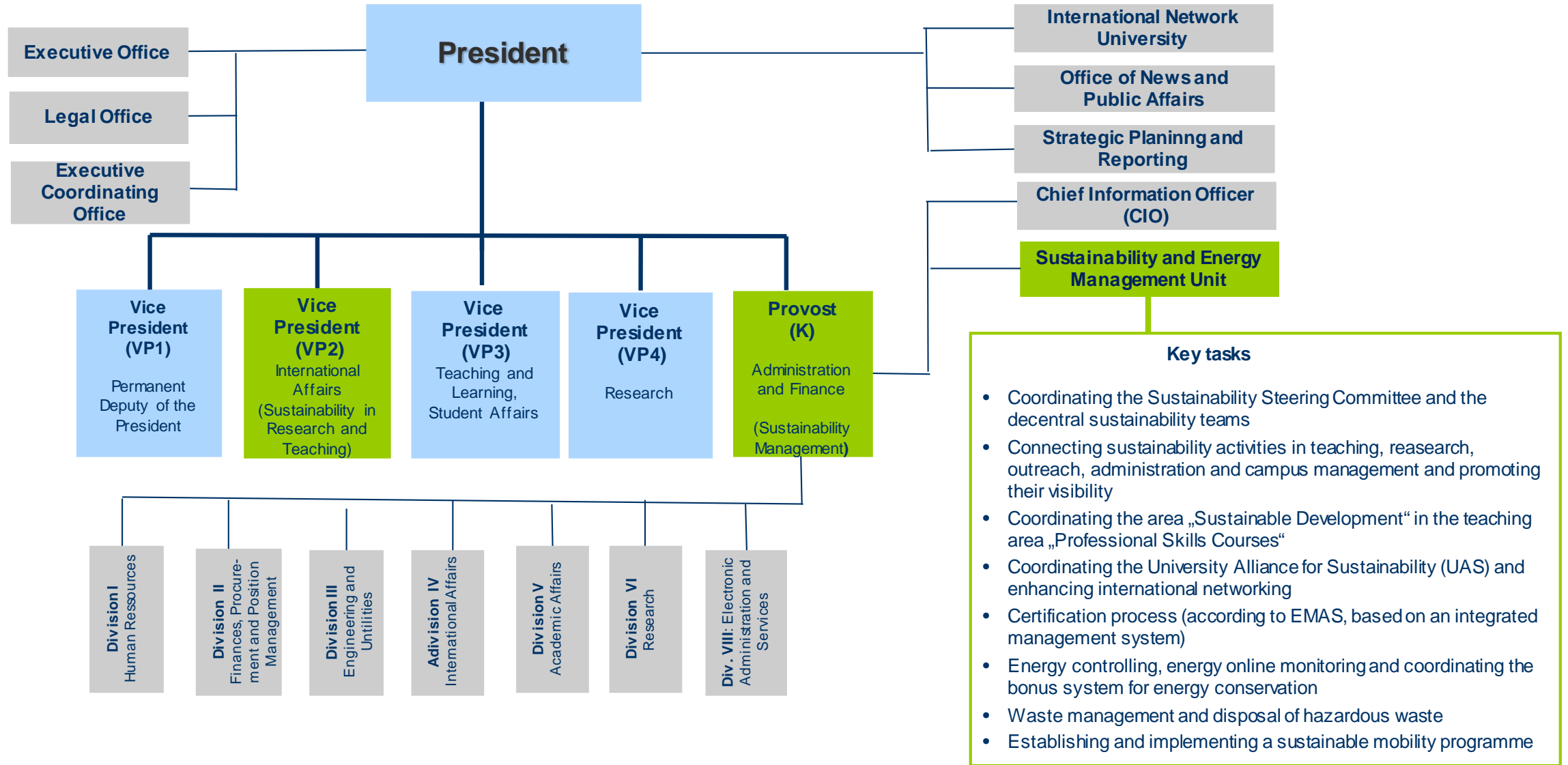
**disposal costs**  
**0.33 million €**

Energy costs:2019; water and disposal costs: 2018



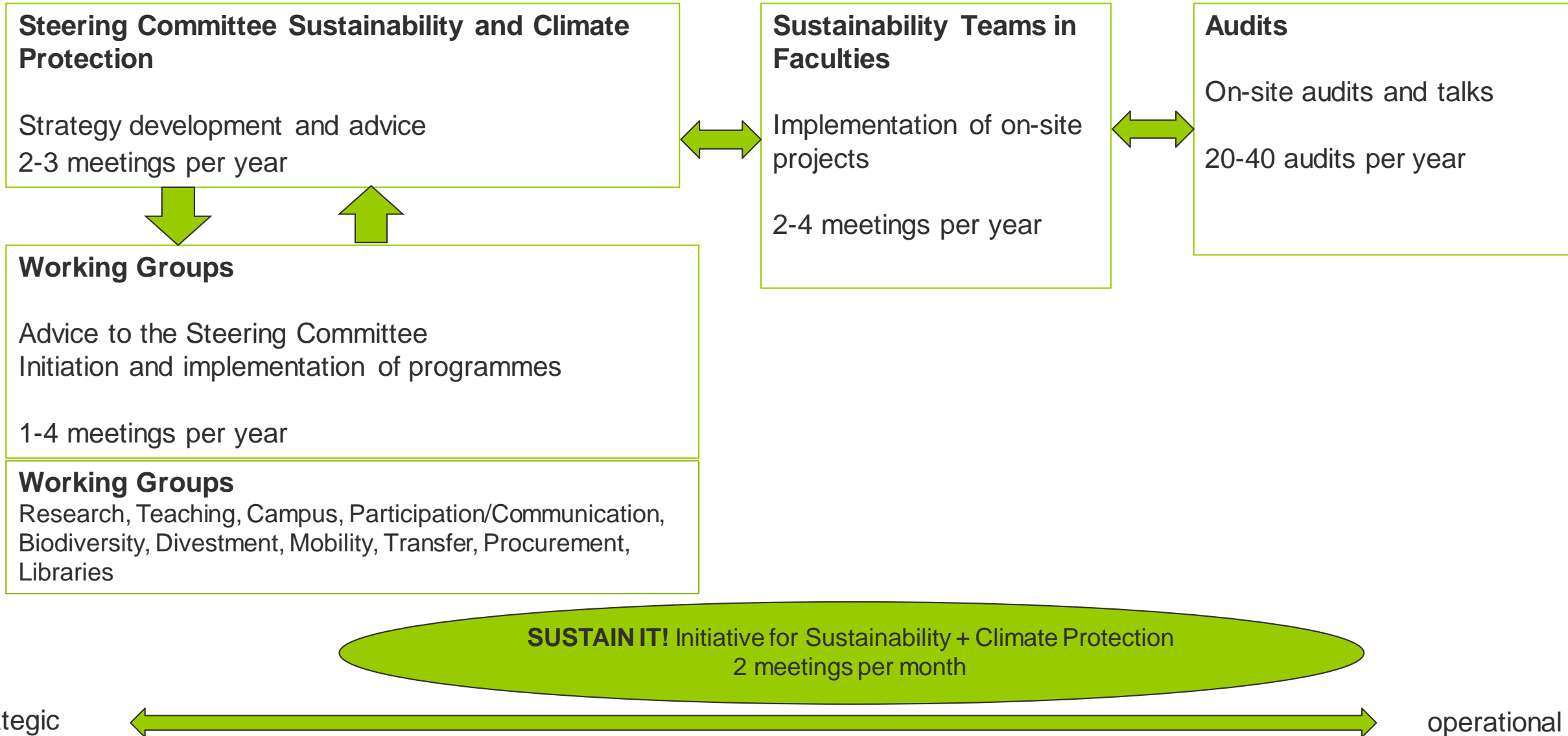
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# Governance-Structure of the University Management



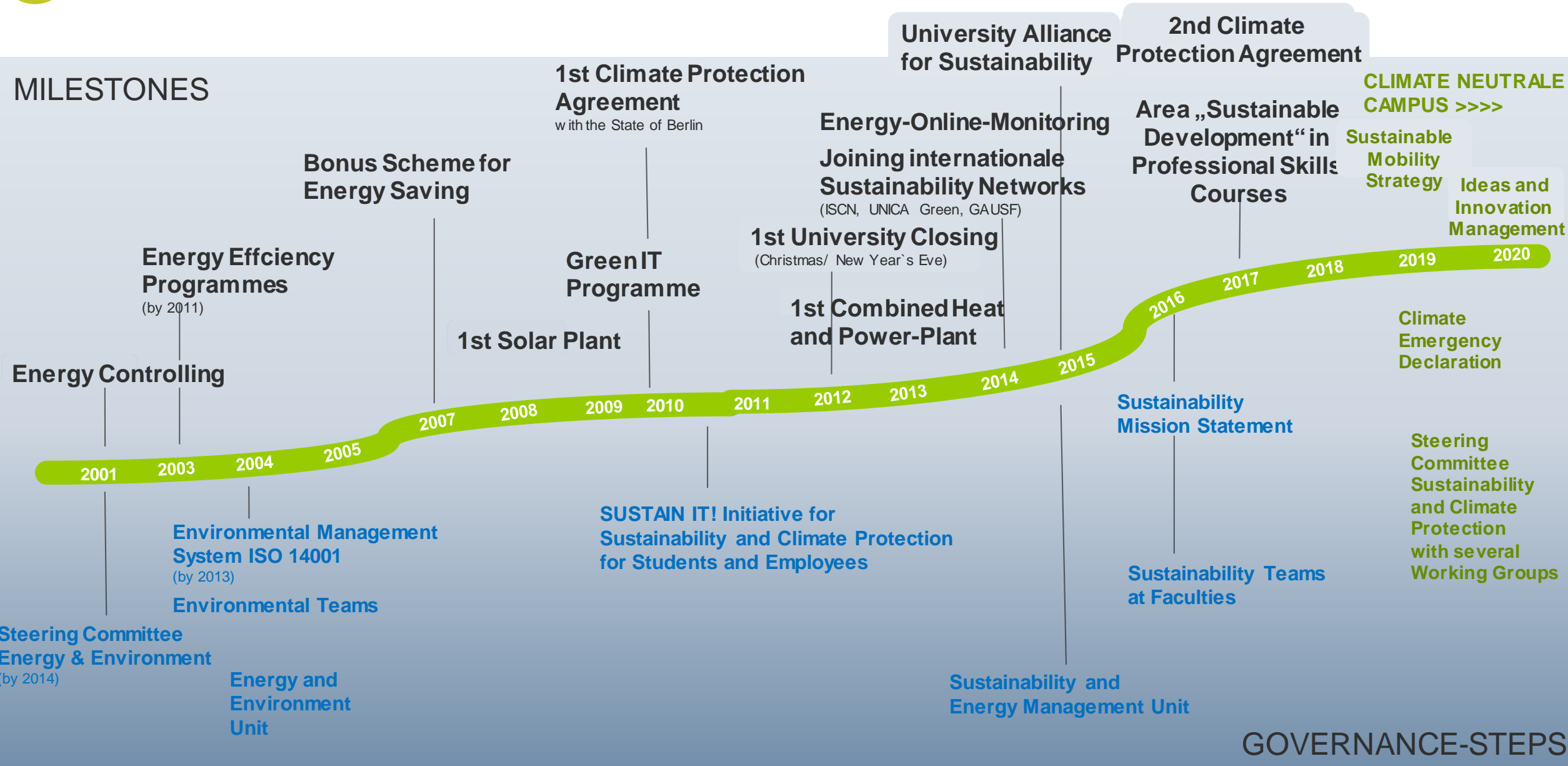
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# Governance und Participation





# 2 From Energy to Sustainability Management



## 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<sub>el</sub>)**
- **9 SOLAR PLANTS (657 kW<sub>p</sub>)**
- **PROCUREMENT of CO<sub>2</sub>-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 CO<sub>2</sub>-emission factors of energy suppliers and electricity supply contract)

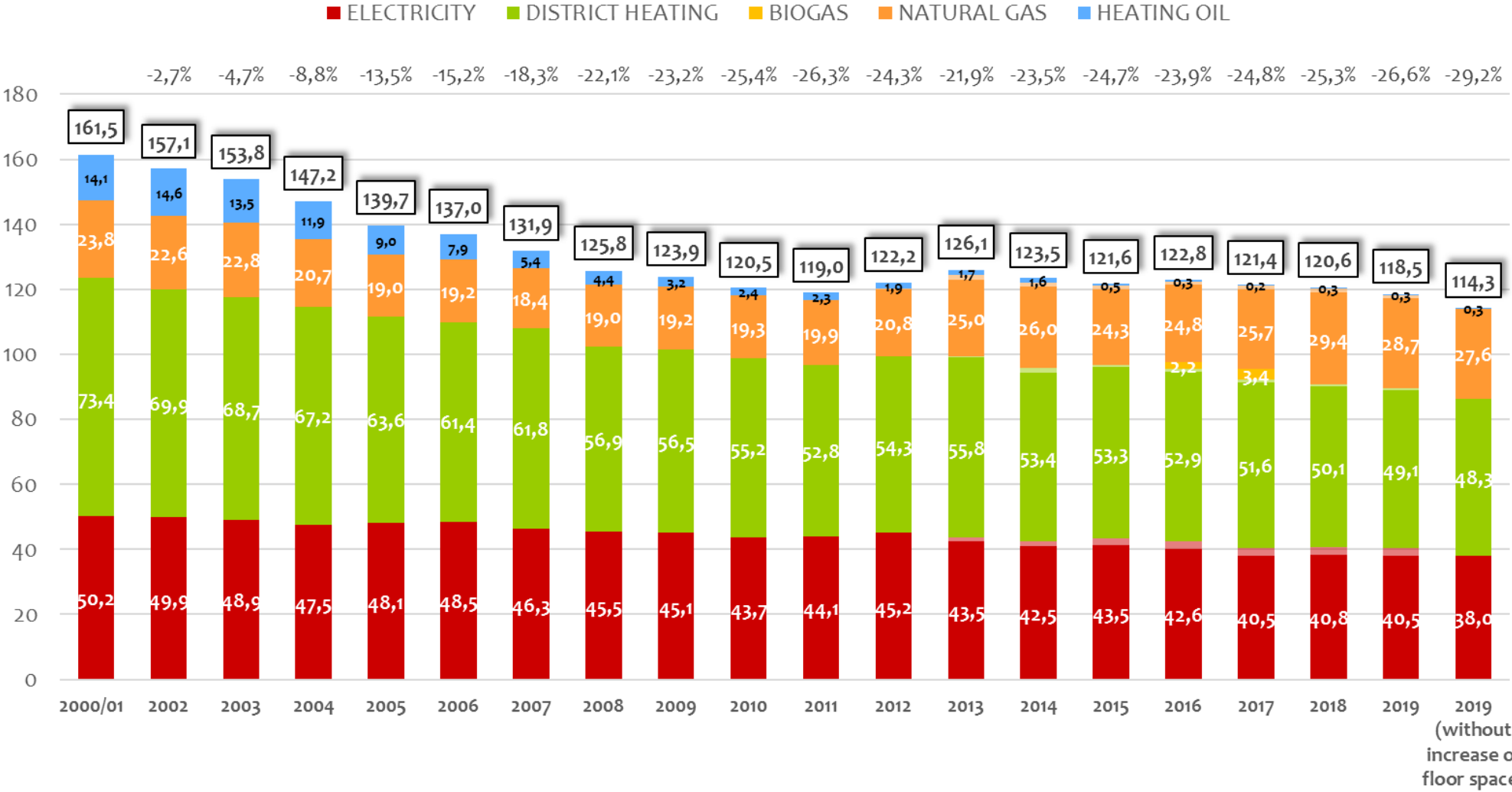
### AVOIDED COSTS

- 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 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 **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**”

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## How did the decision come about? Procedure

June 2019

**Student General Assembly** (with a list of requests addressing the President of FUB)

**Several internal discussions within Executive Board**

**Several meetings with students of Fridays-for-Future Group FU Berlin**

**Involvement of all members of the Executive Board in writing the climate emergency declaration**

Dec. 2019

**Final meeting with text editing and fixing the date for climate neutrality. Arguments for choosing 2025: urgency of climate crisis, signal to start immediately**

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## 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

- 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

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# Climate Neutral University – Which CO<sub>2</sub>-Factors?

## CO<sub>2</sub>-Factors in g/kWh 2017

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

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

## 3 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 emissions of energy consumption on campus, of the vehicle fleet and of the business trips



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# 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
<b>CO<sub>2</sub>-emissions</b> (according to emission factors of energy suppliers / electricity supply contract)	6,475	5,154	0,081	0,000	0,190	<b>11,900</b>	5,868	<b>17,768</b>
<b>as a percentage</b> (only campus)	54%	43%	1%	0%	2%	<b>100%</b>		
<b>as a percentage</b> (campus and business trips)	36%	29%	0%	0%	1%	<b>67%</b>	33%	<b>100%</b>

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

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## Strategic Options for Achieving Climate Neutrality 2025

Areas	Baseline 2018 (17,900 tons CO <sub>2</sub> )	possible CO <sub>2</sub> reduction in tons	Measures / Comments
<b>Improving campus related energy efficiency by 10%</b>	campus related carbon dioxide emissions  <b>11,900 tons</b>	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, promoting energy-efficient behavior, etc.
<b>Increasing the use of renewable energy</b> (installation & procurement)		11,900	Installation of additional photovoltaic systems and solar thermal systems (= avoiding up to 720 tons of CO <sub>2</sub> emissions, if the existing PV capacity will be tripled), Purchase of CO <sub>2</sub> 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%))
<b>Sustainable mobility</b> (including business trips)	flight related carbon dioxide emissions  <b>ca 6,000 tons</b>	3,000	Defining a target for reducing flight-related CO <sub>2</sub> 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 <sub>2</sub> emissions
<b>Internal Offset Projects</b> (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
<b>Ideas and innovation management</b>		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

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- **Maintaining Credibility**

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- **Costs and need for external funding**



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- **Involvement of internal and external stakeholders**

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

# Thank you!



## Contact

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