LEUPHANA
UNIVERSITÄT LÜNEBURG

Participation in the project

“Climate-neutral campus“
-
experience and lessons learned

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Spring Campus FU Berlin, 28. März 2017

Europa fördert Niedersachsen

EUROPÄISCHE UNION
Europäischer Fonds für regionale Entwicklung

Gefördert durch:
Bundesministerium für Wirtschaft und Technologie
aufgrund eines Beschlusses des Deutschen Bundestages

Medium-sized town: 72.500 people
Close to Gorleben, projected
Nuclear Waste disposal site

50 % renewable electricity (100 % by 2021)
25 % renewable heat (7 % with industry)
4 local heating networks

- CHP / Vessels
- Biomethane / natural gas
- ~20 % bioenergy land use in the region

University:
9500 students
1100 Staff members
The Campus has 50 % share
of one local heating network

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Sustainability Implementation: The University of Lueneburg adopted scientific and public sustainability trends early

Year	
1996	**Foundation of the interdisciplinary department „Environmental Science“** Paradigma: 50 % natural and 50 % social sciences
1997	Joining the “University Network for Sustainability”, COPERNIKUS Campus
1999	Founding of the senate commission “Agenda 21”
1999	Project “Agenda 21 and University of Lueneburg” (1999 - 2001)
2000	**Implementation of the EMAS management and reporting scheme** Staff (1 Pers. 50%), guidelines, 2 year reporting cycle (ISO 14001)
2001	Research and development project “Sustainable University“ (2004 - 2007)

Sustainability became part of the „Leuphana“ profile

Year	
2005	Bestowal of the UNESCO Chair “Higher Education for Sustainable Development”
2006	Decision of the senate for a **„humanistic, sustainable and action-oriented“** university for the 21st century
2007	**Definition of the goal: climate neutral university**
2007	First overall sustainability report “Steps to the future”
2008	Emphasis on sustainability research as one of four initiatives
2010	**Foundation of the Faculty Sustainability**

An integral approach to reach climate neutrality:

Energy system, Renewables, innovative technologies

Campus development, **new central building**, reduction of energy demand

Projects aiming at the reduction of THG-emissions due to induced traffic.

Energy

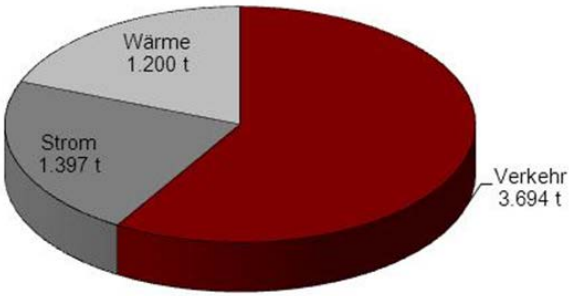
Campus-Development

Mobility

Integral Approach

Climate-Neutrality

CO_2-Emission in Tonnen aus Verkehr und Energie 2007

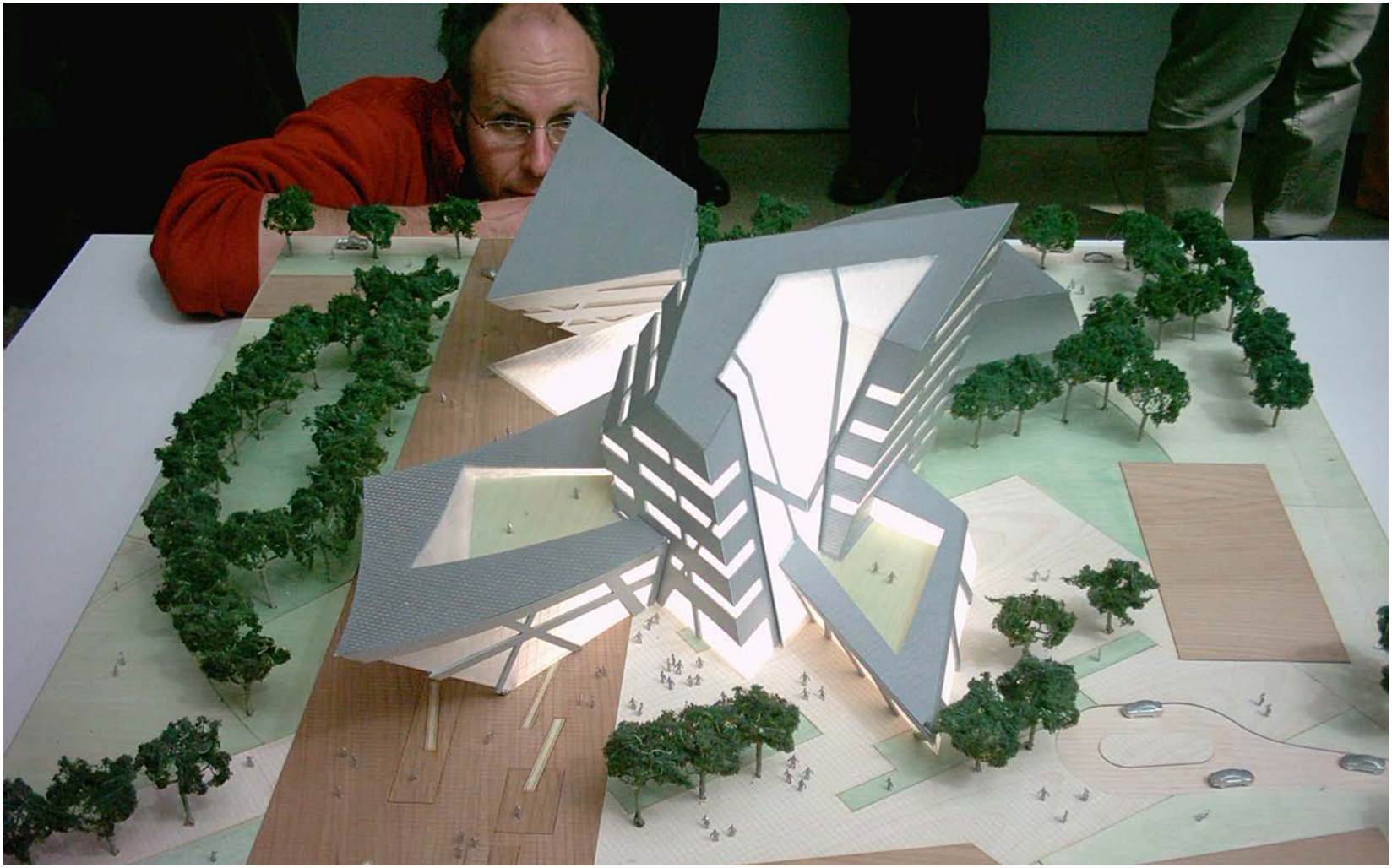


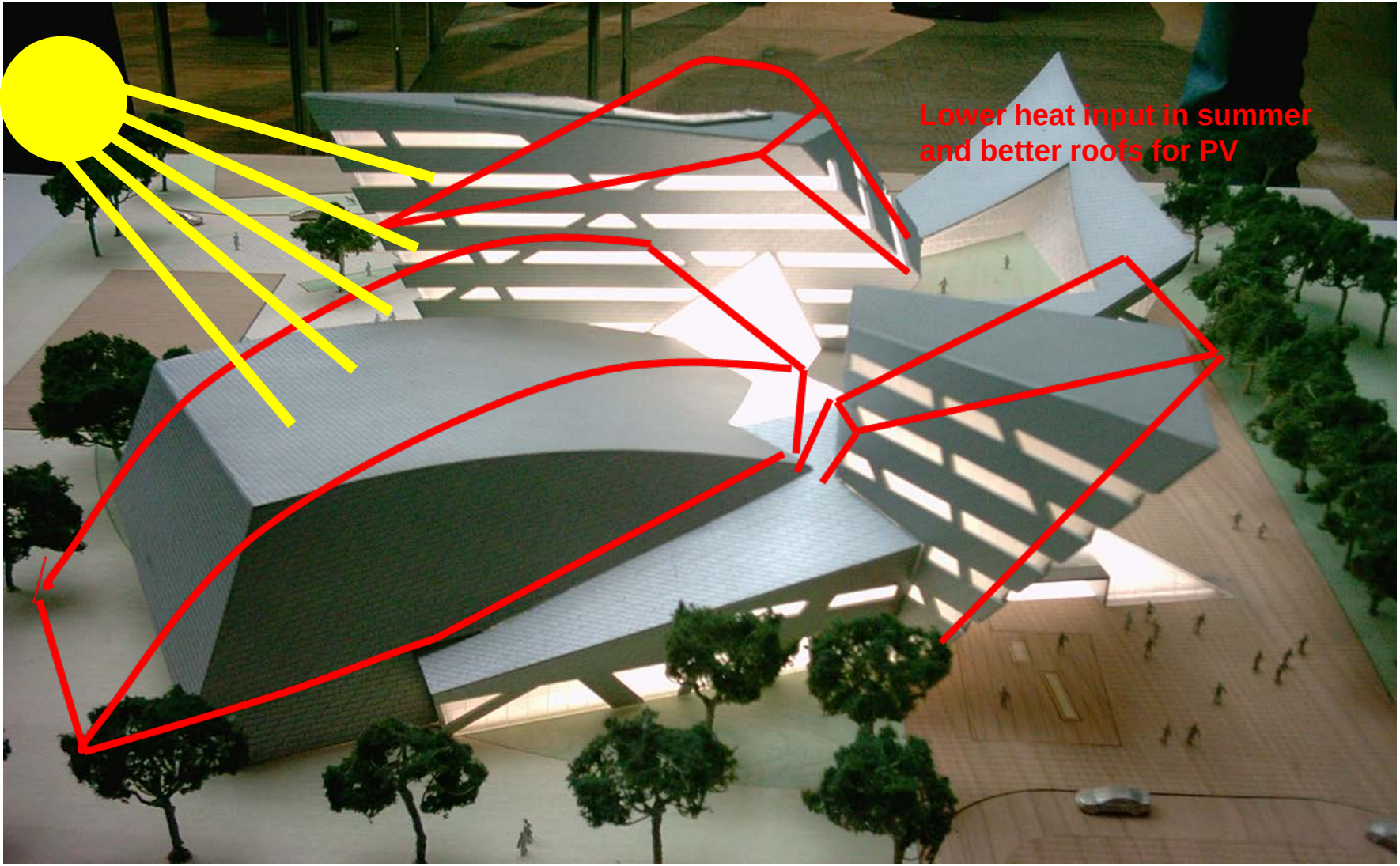
Here we have free space for campus development!

Participation from the very beginning

Student Seminars in Lueneburg and New York defined needs and visions…

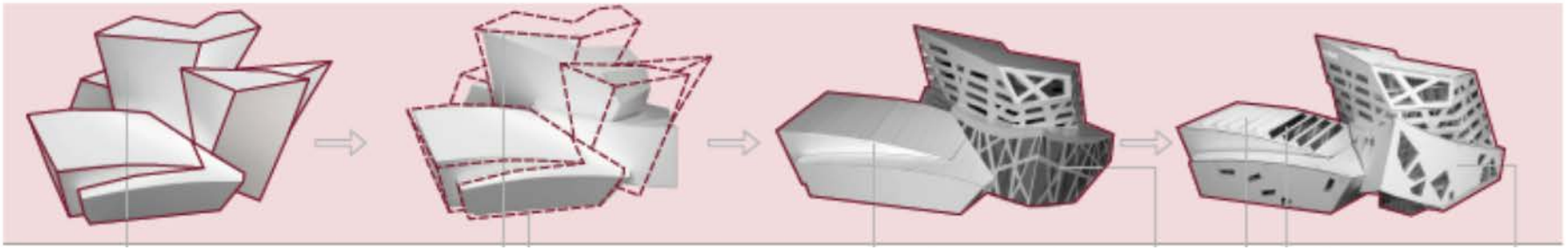
… that lead to first drafts and models:





A summer school in Lueneburg took care about solar design and energy demands and supply!

Based on these contributions, the architects optimized the design of the building:



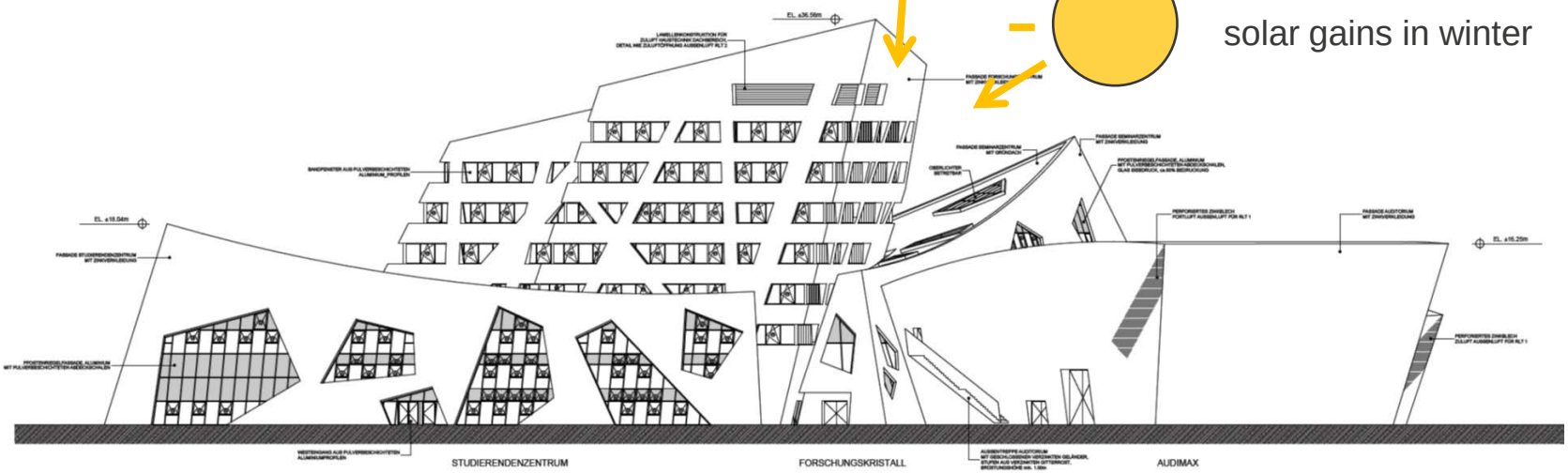
Original Draft
fissured with large glass surfaces towards the south

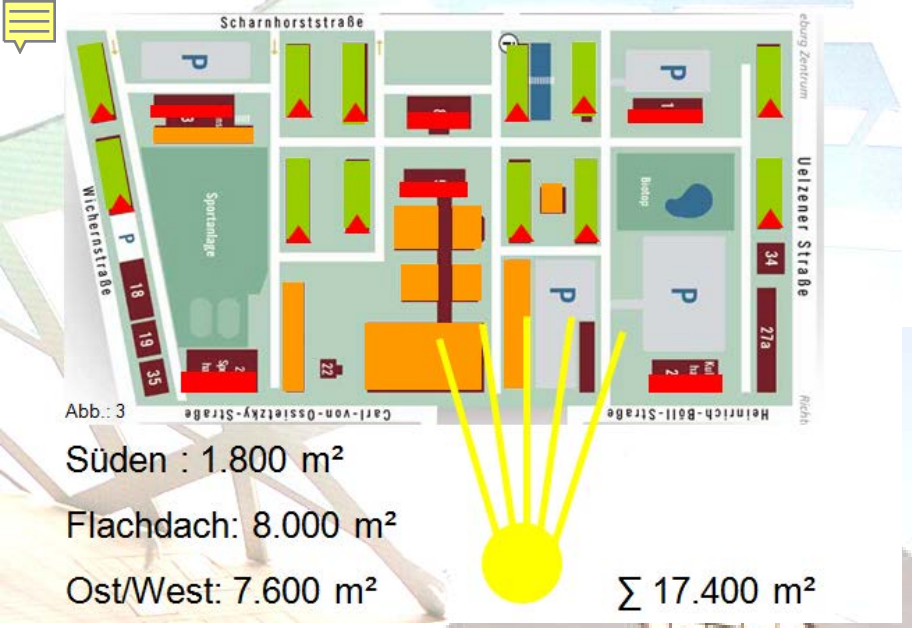
Better A/V Ratio ($0.2\ m^{-1}$)

Facade orientation and optimization of the glazing to avoid overheating

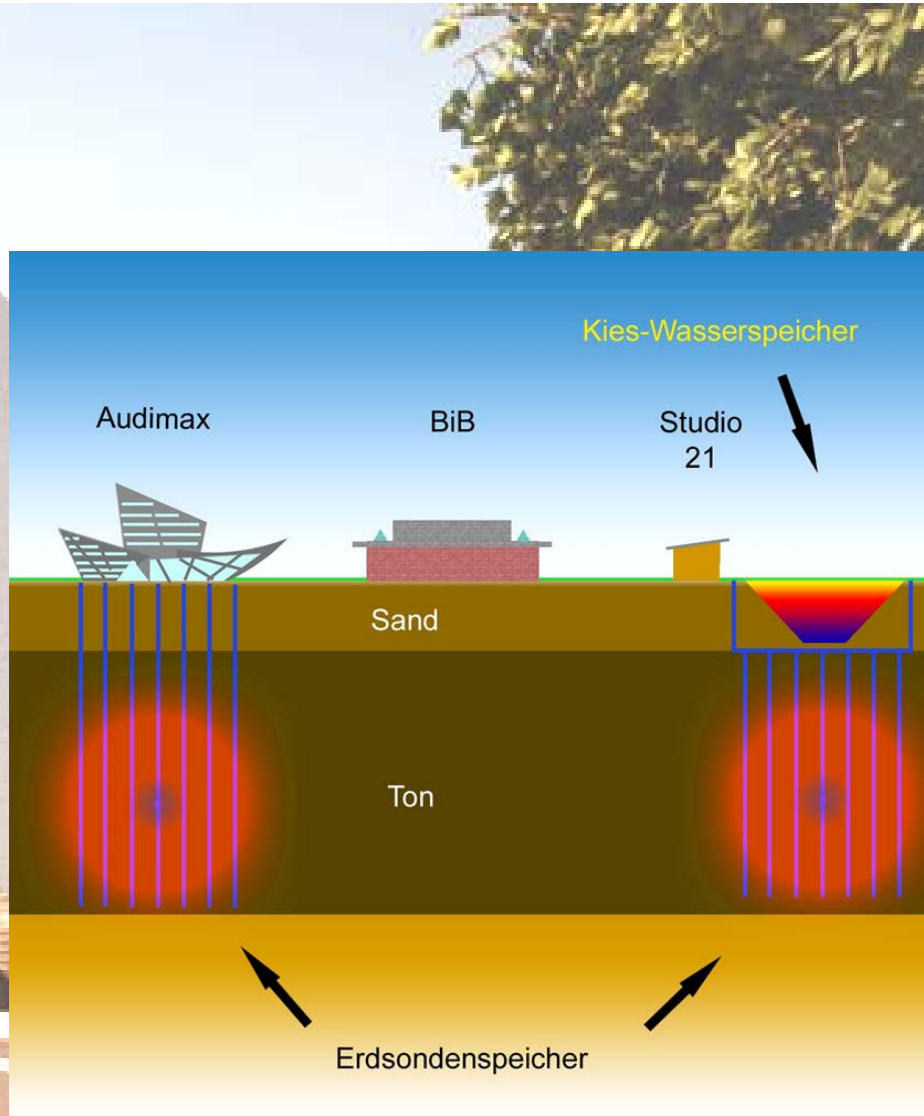
Lower irradiation in summer

solar gains in winter

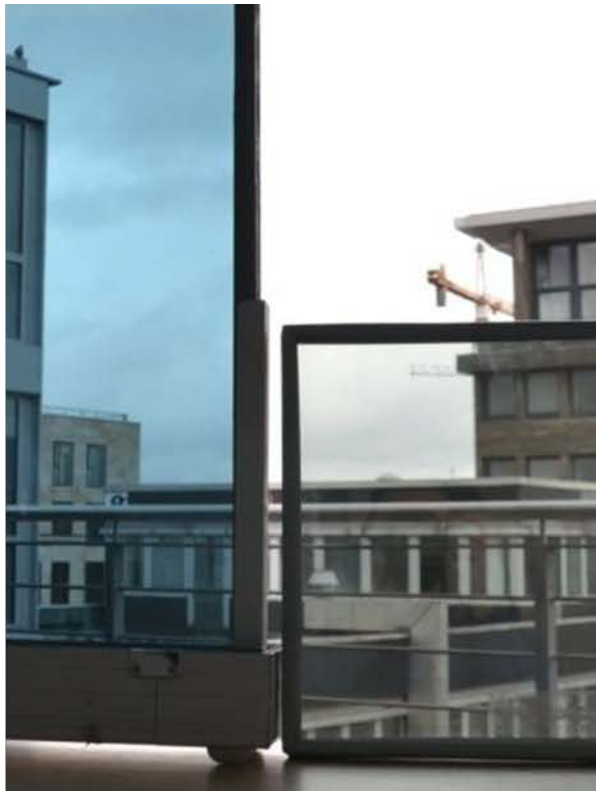




The students also proposed large PV installations and energy storage:



Scientists contributed innovative technologies and optimized the building in detail:

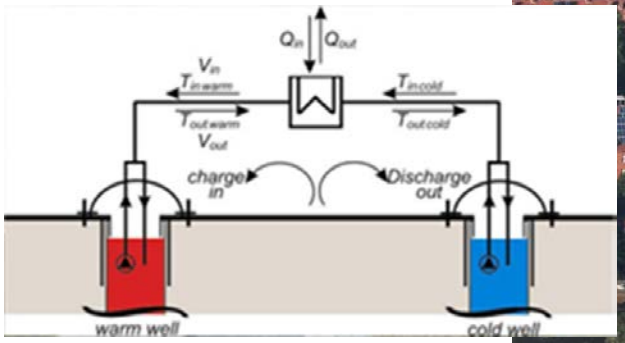


Switchable glazing in south-east and south-west faced facades:
The glass is toned in 5 steps from very light to dark blue.

This gives 50 % solar gains in winter and 50 % less heat in summer.

These rooms dont need ventilation and cooling, saving 160 MWh/a!

For heat supply, storage and PV / campus buildings it was decided to use a tendered contracting model



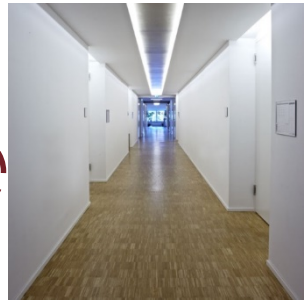
Scientists, the technical team and the administration was involved during preparation, in the tendering process and during <u>implementation</u>:

BUT NOT ENOUGH!

The buildings on the campus were renewed and insulated (roofs)

- Roofs were used for PV (east/west/south)
- 650 kWp PV (total 720 kWp), 95 % used in university electricity network (~600 MWh, 25 % of the demand)

- 40% savings heat / electricity:
- and insulated for more useable space
- renewed heating network
- new pumps
- **optimisation of the heating systems**
- **LED-lighting**
- **building automation**
- energy management



COFELY
GDF SUEZ

- As with the central building, there was much criticism about the optimization of the heating systems and building automation
- The temperature was set to 20.5 °C in order to fulfill the legislations and gain savings
- The works council criticised the rigid setpoint
- At the beginning of the first heating season, the automation specialist was in vacation: Temperature was too low, a debacle for the project
- In parallel to the tendering process, the technical team had lowered the energy demands manually over 2-3 years
- The contractor and responsible staff did not include this knowledge to its full potential

- **The public is still ambivalent about both project parts**
  (the building took longer and was more expensive, people forgot about the enthusiasm of the beginning)

- **But participation made them much better**

Our biggest mistake: LACK OF TIME

(naturally, otherwise we would have talked even more and had found out about hidden potentials, that could have been realized by even more people participating)

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THINKING GREEN
GERMANY SEEKS
SUSTAINABILITY

PAGE 7 | EDUCATION

Dr. Oliver Opel, Prof. Dr.-Ing. Wolfgang Ruck, Dipl.-Ing. Karl F. Werner, Dipl.-Uwiss. Irmhild Brüggen