Shaping Students for a Sustainable Future

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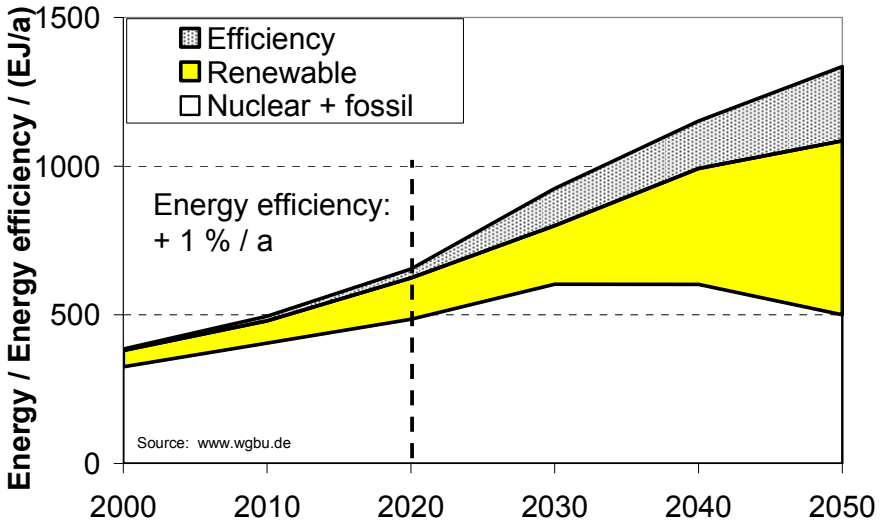
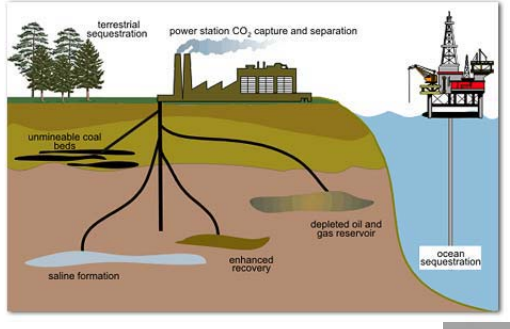
Future Energy Demand

- Energy demand will grow from now 400 EJ to 1100 EJ in 2050, despite better efficiency!
  - 1 EJ is the amount of energy received by the Earth from the sun in 6 seconds
  - New technical sustainable solutions will be required



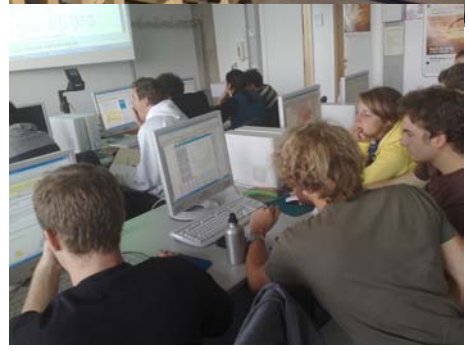
Sustainable Energy Systems

- Best and efficient use of energy
- CO_2 capture and sequestration
- Solar and energy efficient buildings
- More renewable energies:
  - Solar energy for electricity and heat
  - Wind
  - Biomass and biogas
  - Improved hydro (Tidal energy, …)
- More renewable energies →
  - Distributed power generation
  - Improved national and transnational grids
- **We have to train the students**



University of Applied Science Muc

- Offers courses in Sustainable Energy Systems
- Largest University of Applied Sciences in Bavaria
- ~14000 students
- 470 professors
- 26 bachelor, 26 master degree programs
- Department of electrical engineering and information technology:
  - Bachelor course "Renewable Energies"
  - An appropriate Master course (M.Sc.)



Cooperation Partners (non exhaustive)

IBC SOLAR AG
Strom aus Licht

e·on Bayern

e·on Energie

UmweltBank

TÜVRheinland®

gehrlicher

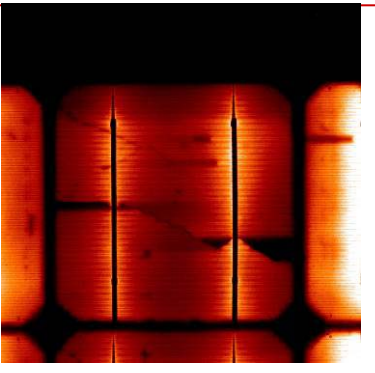
BASE CONSULT

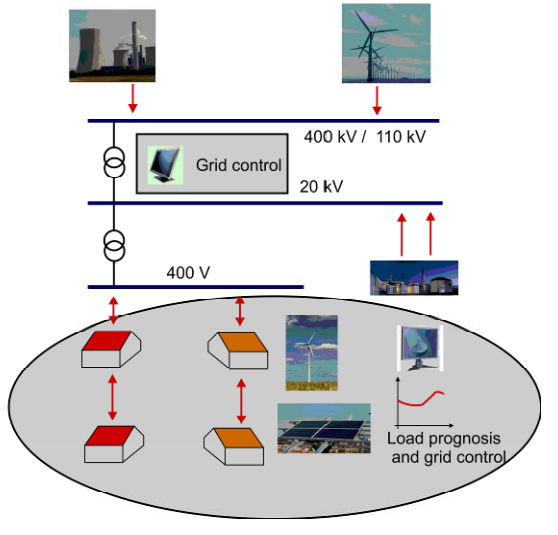
GEOSOL

GE Global Research
United States - India - China - Germany

Research and Development

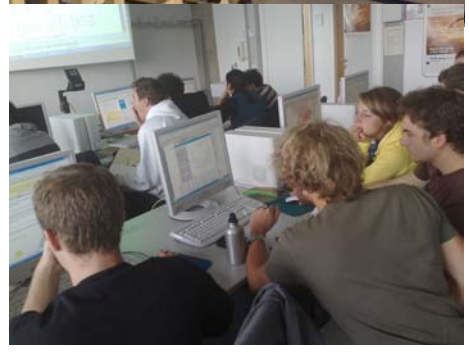
- Electroluminescence and thermography of PV modules for error detection
- Long term behavior of PV systems
- Simulation of PV systems
- Round Robin Sensor test
- Energy meteorology: Identification of snow covered modules
- Grid problems coming from large PV installations
- Starting with biogas





Requirements for Students

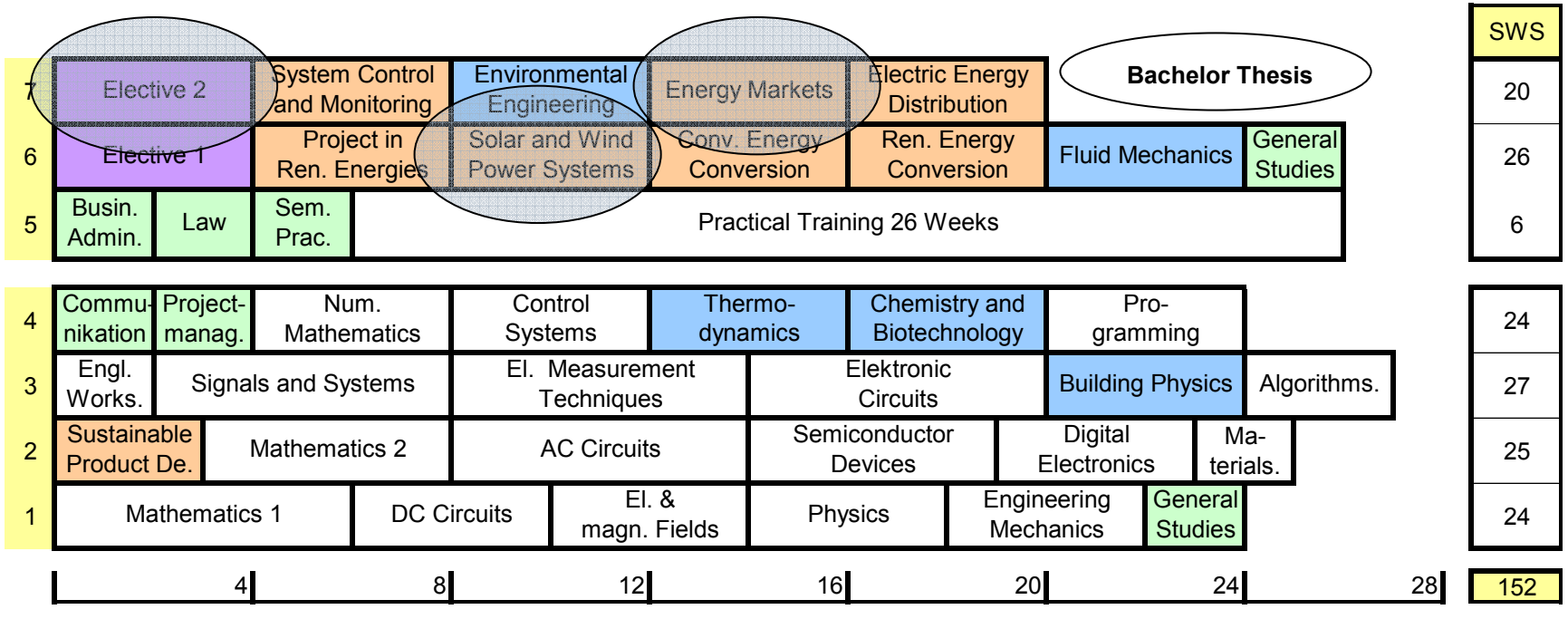
- Good knowledge in Mathematics and Physics
- Ability and interest to solve technical problems
- „Feeling" for technical data and dimensions
- „Certain" manual skills
- „Enthusiasm" for sustainable power supply
- Basic knowledge of English
- Social skills



Bachelor Course „Renewable Energies“

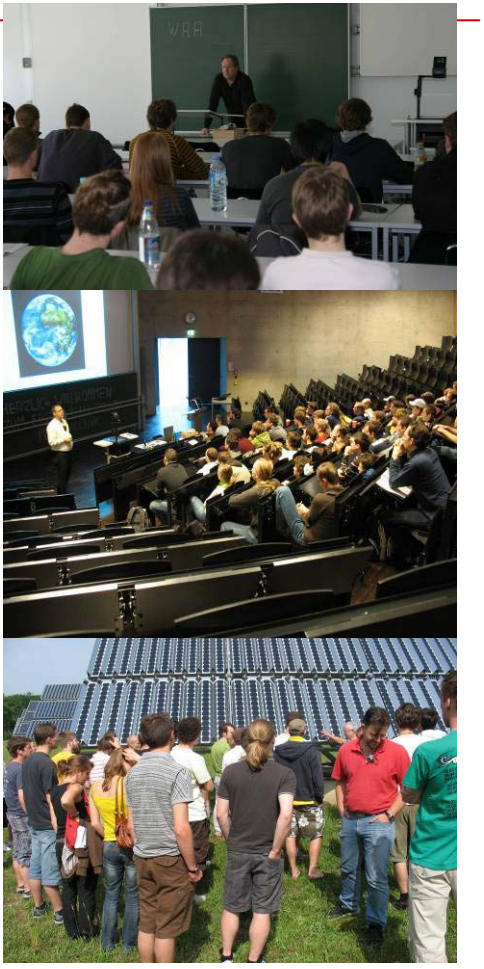
- 7 semesters – 3,5 years
- Basically „Electrical Engineering“
- However in basic studies:
  - Building Physics,
  - Sustainable product development
  - Biotechnology
- One semester (22 weeks) of work in industries, research labs, …
- Soft Skills like communication and project
- Courses in English

Curriculum Bachelor



Mentoring

- Lowering the number of students failing
- Ability to work in a team
- Organization of tutorials
- Transfer additional knowledge
  - Company presentations
  - Residential courses
- Improve motivation
  - Excursions



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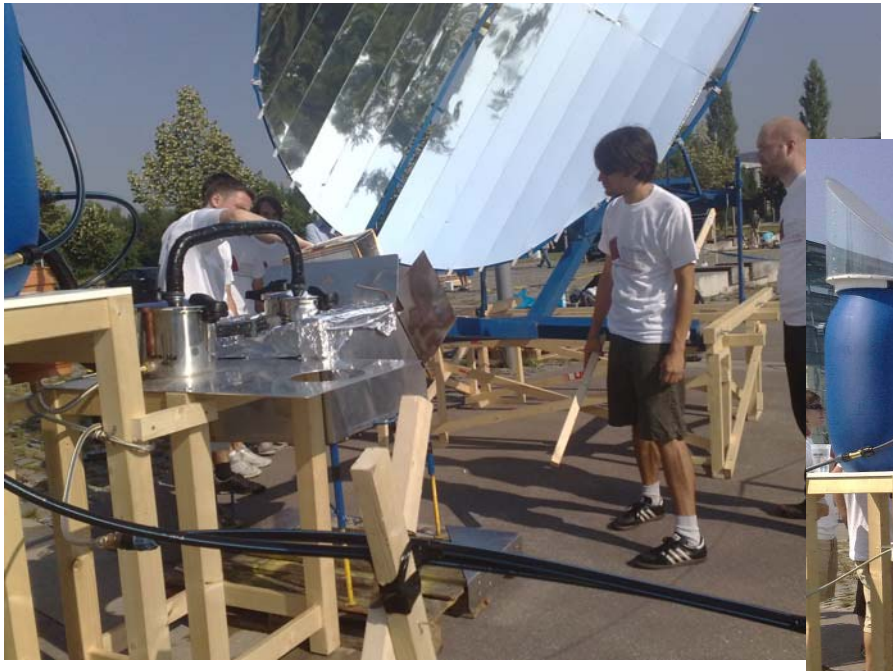
Project: Desalination of Seawater



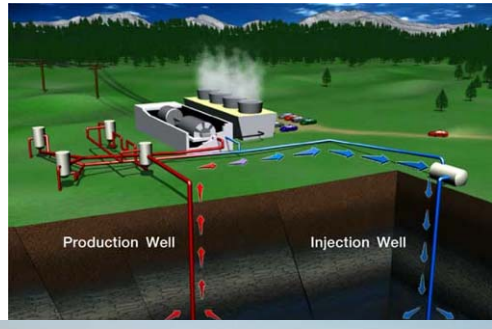
Goal: Prepare 1 l of drinking water as cheap as possible

Jobs for Graduates (Bachelor)

Company	Duties and Functions
Consulting Engineers	Project management for Biomass Power Stations
Electric board	Maintenance of transformers
Electric board	Planning Offshore – wind parks
Manufacturer of PV modules	Sales and distribution
Consulting engineers	Large scale PV projects with engineering world wide

Master Degree Program (M.Sc)

- Master of Science in Electrical Engineering
- For the best "Bachelors"
- 3 semesters – 1,5 years
- Focused on the "scientific side"
- Courses in advanced mathematics and general electrical engineering
- Courses in renewable energies
- Master thesis and project (300 h)
- Best Masters → PhD



Jobs for Graduates (Master)

Company	Duties and Functions
Research Center	Development of future energy systems
Electric board	Reliability of future grids
Research Center	Stability of future energy transmission

Conclusion

- Sustainable energy supply is future-proof!
- There are many interesting challenges and future-proof jobs not only in the office, but outside at the customer
- **Solar energy is available for the next 4 500 000 000 years**