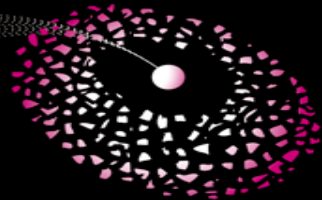
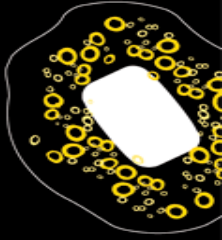


UNIVERSITY OF TWENTE.

WELCOME TO SUSTAINABLE ENERGY TECHNOLOGY

JIM KOK, PROGRAMME DIRECTOR



THE GLOBAL ENERGY CHALLENGE

- Climate change
- Security of energy supply
- Sustainability and renewable resources

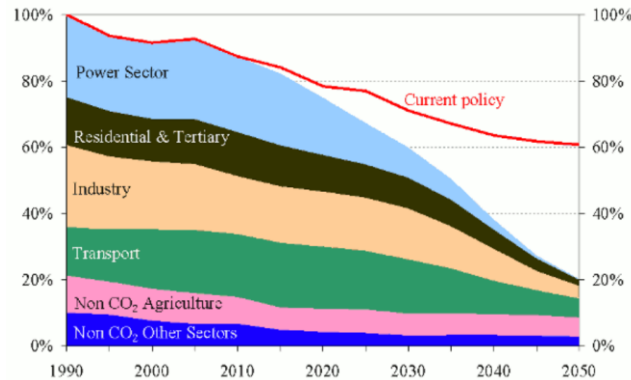
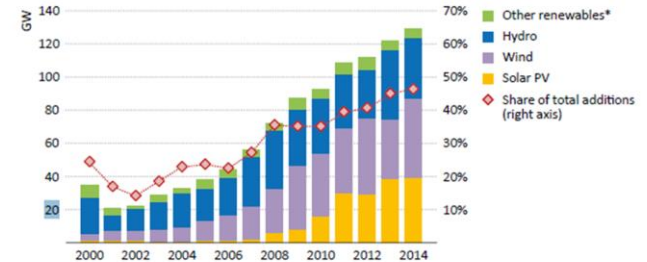


Figure 1.1 Global renewables-based power capacity additions by type and share of total capacity additions



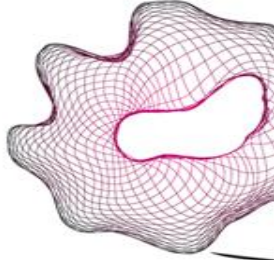
* Includes geothermal, marine, bioenergy and concentrating solar power.



WHY CHOOSE THE MSC SUSTAINABLE ENERGY TECHNOLOGY

- To become a member of a new generation of engineers that will lead the renewable energy revolution!
- You will become *the* expert to respond to the global energy challenge

SET: A 3TU MASTER



THE SET CURRICULUM

FIRST YEAR (CORE PROGRAMME)

THEME 1: ENERGY SOURCES (15 EC)

- Energy from Biomass
- Solar Energy
- Wind Energy

THEME 2: TECHNOLOGY AND SUSTAINABILITY (15 EC)

- Energy Conversion Technology
- Energy Storage
- Life-Cycle Strategy

THEME 3: SOCIO-ECONOMICS (15 EC)

- Energy, Sustainability and Society
- System Innovation and Strategic Niche Management
- Sources of Innovation

THEME 4: DESIGN AND SYSTEM INTEGRATION (15 EC)

- Electrical Power Engineering and System Integration
- Basics for Process Simulation
- Thermodynamics and Flowsheeting

**Elective part: 1-2 wild
cards to replace courses
for individual choice**



SECOND YEAR CURRICULUM

SPECIALIZATION IN ENGINEERING OR BIORESOURCES

▪ SET ENGINEERING SPECIALIZATION

- Module 5: Internship (15 EC) or Specialization courses (15 EC)
- Module 6: Pre-assignment study courses (15 EC)
- Module 7: Master assignment (30 EC)

▪ SET BIORESOURCES SPECIALIZATION

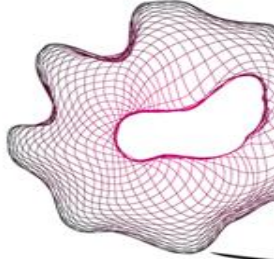
- Module 5: Bioresource Economics and Management (15 EC)
- Module 6: Bioresource Value Chain Optimization (15 EC)
- Module 7: Master assignment (30 EC)



ENGINEERING SPECIALIZATION

SUSTAINABLE ENERGY TECHNOLOGY

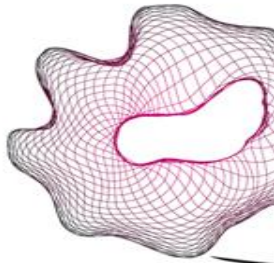
- **Affiliation with a UT research group on wind/solar/thermal/electrical/chemical sustainable energy during modules 5, 6, and 7**
- **Module 5: Internship**
 - Internship at a Dutch or international company in the field of sustainable energy
- **Module 6: Pre-assignment study courses**
 - Choice of 3 courses in support of defined Master assignment
- **Module 7: Master assignment**
 - Main and associated supervisor of different group



INTERNSHIP: THE WORLD IS THE LIMIT

EXAMPLES OF POSSIBLE INTERNSHIP COMPANIES IN VARIOUS COUNTRIES

- *Spain*: Abengoa
- *China*: Tsinghua University, Goldwind
- *Curacao*: University of Curacao, Aquaelectra
- *Germany*: GE-wind
- *Nicaragua, Cambodia, Indonesia, South Africa*
- *The Netherlands*: Grolsch, NEM, Stork, Tri-O-Gen, Twence, Hygear, ECN, TNO, EDON, ENECO, Energie Delfland, EnergieNed, EPON, GASTEC, KEMA, Shell



THE MASTER ASSIGNMENT

EXAMPLES OF SET MASTER ASSIGNMENTS

Modeling and optimization of the MHFs for a future scenario at Shell's Pernis refinery

Power To Gas and Energy Neutrality for Texel

Full Scale Two-Phase solid liquid Anaerobic Digestion: Analysis, Modeling and Design

Analysis of a monitored photovoltaic system and the feasibility of photovoltaics at the campus of the University

Supercritical Water Gasification of Biomass: A Thermodynamic and System analysis

Experimental Study of Different Stacked Wire Mesh Regenerator Geometries in Steady and Oscillatory Flow

Measurements on the thermal performance of a concentrated photovoltaic-thermal (CPVT) module

Levelized cost of electricity for geothermal energy conversion combined with heat sale in the Netherlands

Effectively subsidizing sustainable energy projects

Modeling of a Magnetocaloric Heat pump in Comsol

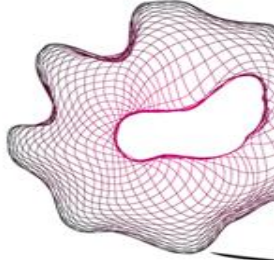
A numerical study on the performance of a cyclonic pyrogasification reactor using CFD

Technical developments in low and middle voltage grids affecting Dutch Distribution Network Operators

Laser Cladding for Energy-Efficient Processes and systems

Numerical study of volatile combustion in a biomass grate firing boiler

The impact of reactive power in the MV-and LV-grid



BIORESOURCES SPECIALIZATION

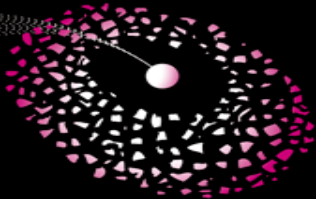
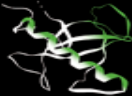
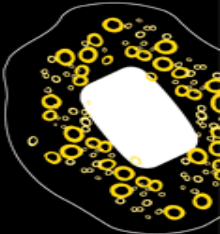
BIORESOURCE VALUE CHAIN MANAGEMENT

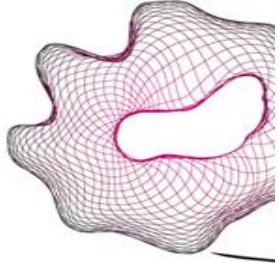
- **Q1: Bioresource Economics and Management (15 EC)**
 - (Regional) Economics of Bioresources (5 EC)
 - Bioresource Business Development and Management (5 EC)
 - Bioresource Value Chain Optimization (5 EC)

- **Q2: Bioresource Value Chain Optimization (15 EC)**
 - Sustainable Bioresource Supply Chain Management (5 EC)
 - Capita Selecta BET course list (bioresources or conversion technologies) (5 EC)
 - Integrative Business Project (5 EC)

- **Q3 + Q4: Master Thesis Assignment (30 EC)** (collaboration with industry)

ARE THERE ANY QUESTIONS?





SET: A 3TU MASTER

WHAT DOES THIS MEAN?

- SET Master enrolment at the UT
- Automatic secondary enrolment at TUD and TU/e for SET
- 1st year of SET: curriculum at the UT
- 2nd year of SET: 3 elective courses at the UT or TUD or TU/e



FIRST YEAR CURRICULUM PER QUARTER

- Q1:**
(15 EC)
- Energy Conversion Technology
 - Sources of Innovation
 - Basics of Process Simulation
- Q2:**
(15 EC)
- Thermodynamics and Flowsheeting
 - Energy from Biomass
 - Electrical Power Engineering and System Integration
- Q3:**
(15 EC)
- Energy, Sustainability and Society
 - Solar Energy
 - Energy Storage
- Q4:**
(15 EC)
- Wind Energy
 - System Innovation and Strategic Niche Management
 - Life-Cycle Strategy

4 THEMES:

- Energy Sources
- Technology and Sustainability
- Socio-Economics
- Design and System Integration

Year 2 Curriculum SET track
Bioresource Value Chain Management:

<https://youtu.be/SXHhW4qkBDs>

Year 2 Curriculum SET track

Bioresource Value Chain Management:

- Manage, optimize and innovate bioresource supply chains in European regional contexts and to optimize resource utilization within the framework of a bioeconomy.
- Career prospects
- The BioEnergyTrain context

Year 2 Curriculum SET track

Bioresource Value Chain Management:

Q1: Blok 1A: BIORESOURCE ECONOMICS AND MANAGEMENT (15 EC)

- (Regional) Economics of Bioresources (5EC)
- Bioresource Business Development and Management (5 EC)
- Bioresource Value Chain Optimization (5EC)

Q2: Blok 1B: BIORESOURCE VALUE CHAIN OPTIMIZATION (15 EC)

- Sustainable Bioresource Supply Chain Management (5 EC)
- Capita Selecta BET course list (bioresources or conversion technologies) (5EC)
- Integrative business project (5 EC)

Q3 and Q4: MASTER THESIS ASSIGNMENT (collaboration with industry) (30 EC)