Nothing beyond Groningen, NL

- Two (old) universities: Hanze and RUG
- Vibrant & lively student life (> 80,000 students)
- International surroundings
- Lot’s of energy-related things happening
Curriculum: why

Sustainable Fuel Systems for Mobility: 30 ECTS

• Mobility is key to future energy transition
  ▶ Mobility of people and goods
  ▶ Mobility of energy
  ▶ Mobility & environment and emissions

• Mobility world is buzzing with innovation
  ▶ Efficiency, storage, electricity, testing protocols etc.
  ▶ Hydrogen, car as energy buffer, etc.
  ▶ Hypes, hopes and hurray’s
Curriculum: how
Sustainable Fuel Systems for Mobility: supply chains

• **Module 1:** Sustainable fuel supply chains (10 ECTS)
  - Theory: combustion, phase change, dynamics, & lab
  - Fuel production: gas, liquid, solid
  - Case: supply chain modelling (Aspen) & lab
  - Fuel storage: technologies

• **Module 3:** Power2Hydrogen2Use (5 ECTS)
  - Theory: power to hydrogen (P2H₂)
  - Storage, distribution and use of hydrogen & lab
  - Case: P2H₂ value chain research topics
Curriculum: how
Sustainable Fuel Systems for Mobility: biofuels

- **Module 2:** Bio-energy conversion technology (10 ECTS)
  - Theory: biochemistry, thermodynamics, LCA
  - Biofuels: biochemical conversion
  - Biofuels: thermochemical conversion (by ECN)
  - Case: Bioethanol production

- **Module 4:** New business development (5 ECTS)
  - Theory: business models
  - Case: Algal biofuels/ new (own) concepts
  - LCA, regulation, risks, costs & selling (EP)
Future jobs and careers
Sustainable Fuel Systems for Mobility Scientists & Engineers

• Transport industry
• Consultancy (private/public)
• Energy equipment manufacturing
• Fuel producers
• Industry (biorefinery)
Practical information

Sustainable Fuel systems for Mobility

• Visa
  ➢ Contact International Service Desk (@ isd@org.hanze.nl)
  ➢ Non-EU: start arranging early; need financial guarantee
  ➢ www.hanze.nl/eng/study-at-hanze/practical-information/immigration

• Accommodation
  ➢ Contact Service Desk Housing
  ➢ Register at www.sshxnl.nl
  ➢ Start arranging early
Thesis, science & fun
Sustainable fuel systems for mobility

- Prior thesis projects @ Hanze
  - Emissions-to-liquid methanol and lignocellulosic bioethanol as substitute fuels in the energy transition scenario
  - Using methanation reaction in a solar cavity-receiver reactor to take advantage of the excess heat and implement it into a biogas supply chain
  - Systematic determination of scenario-dependent hydrogen demand for European regions

- Excursions in the curriculum
  - Attero, ECN, LNG terminal, peakshaver (Gasunie), SME’s

- Student life in Groningen
Contact details and info

@ www.master.eurec.be/en/Partnering-Universities/Spe-Sustainable-fuel-systems-for-mobility-Hanze-UAS-NL/

Mr. Gerrit Kuiken MSc
Program manager Energy Education
g.kuiken@pl.hanze.nl

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