Minor ‘Engineering for Large-scale energy conversion and storage’

ELECS

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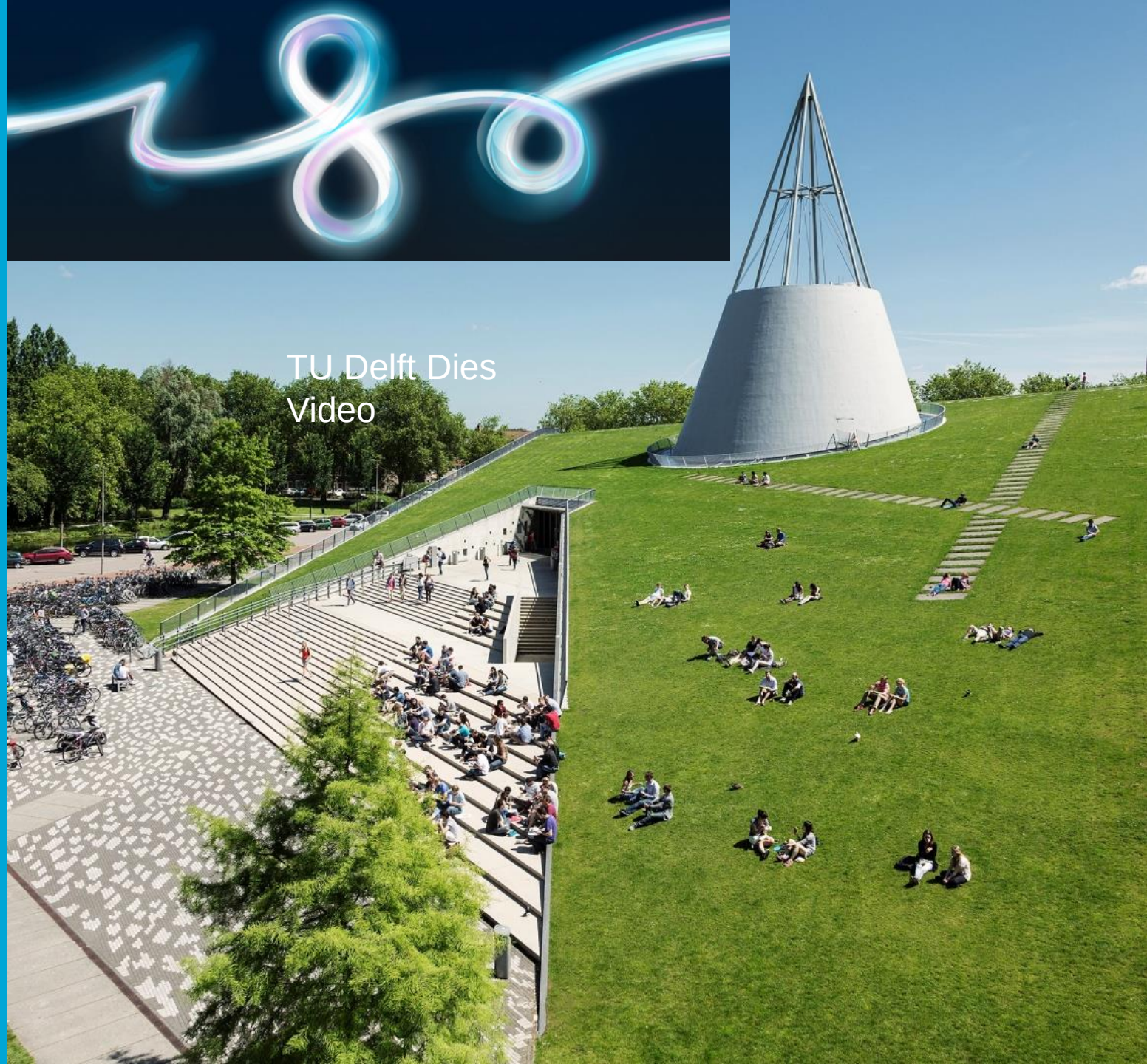
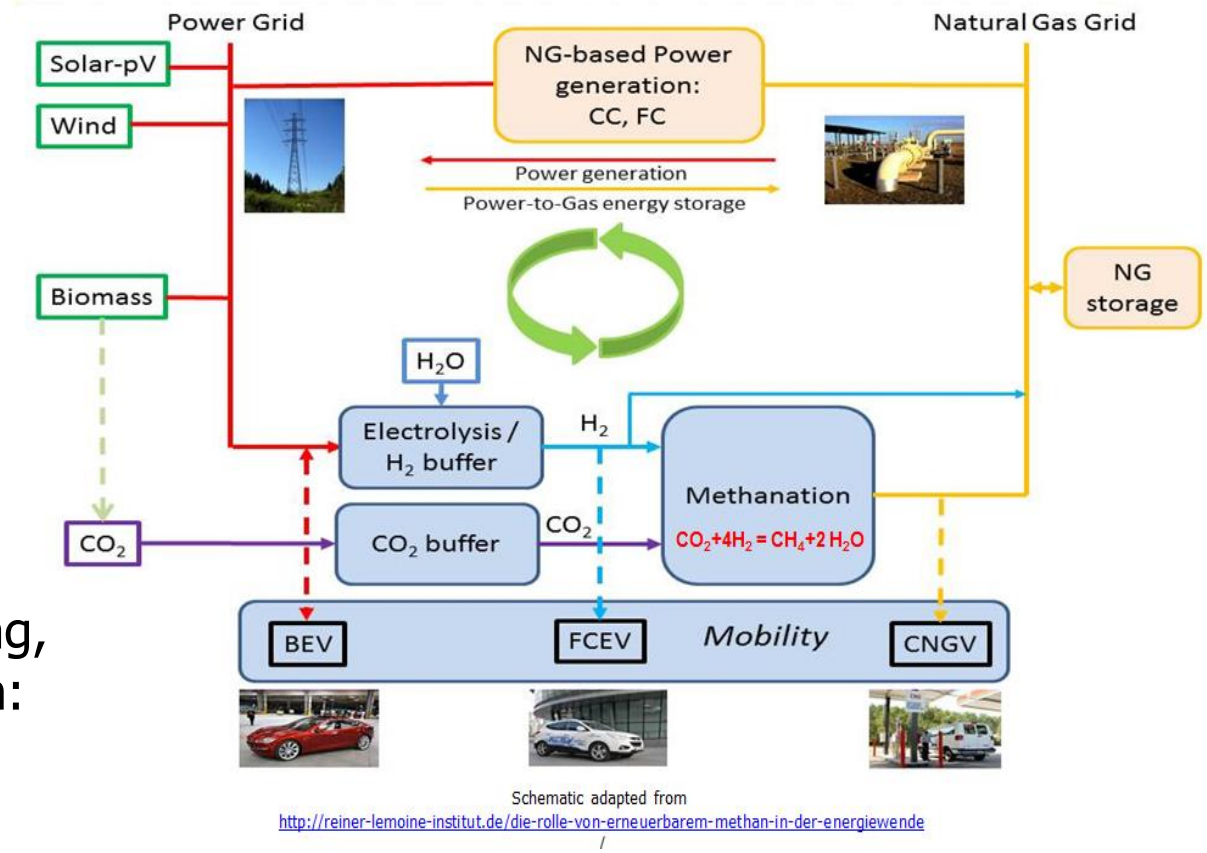


Increasing share of renewables, electrification

Picture: https://www.co2neutraalin2050.nl/

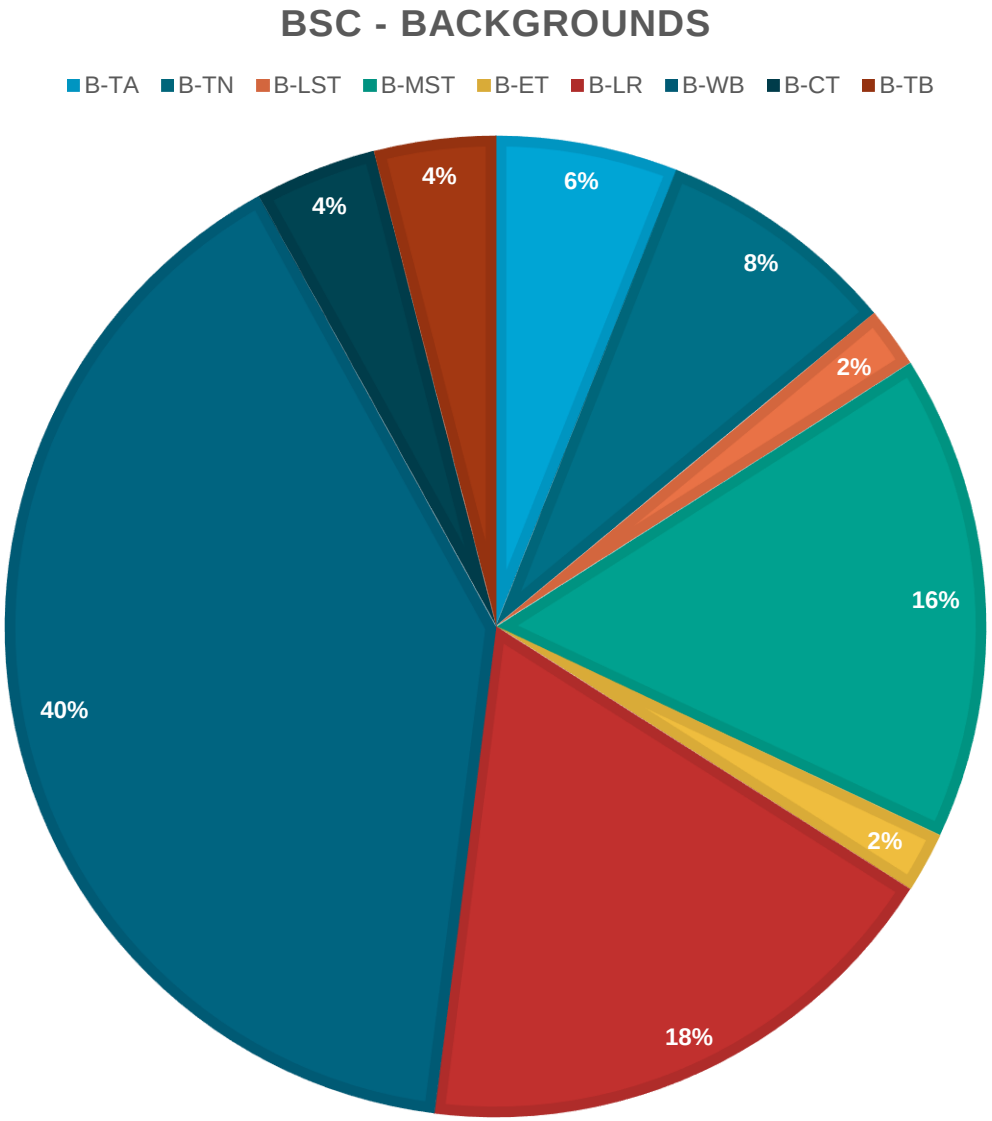
ELECS Minor, overall aim and setting

- Equip BSc. engineering students with selected knowledge & skills regarding energy conversion and storage systems and component technologies that are based on renewable sources
- Core issue is mismatch between supply and demand of renewable power (time and place); in addition societies need to become CO_2 emission-free
- Community: all BSc. tracks except for architecture, industrial design engineering, and informatics. Strong recommendation: basics in thermodynamics, heat/mass transfer courses
- Minor to be provided for the fourth time, cap on student number (75)



Schematic adapted from
http://reiner-lemoine-institut.de/die-rolle-von-erneuerbarem-methan-in-der-energiewende/

Participation from different study backgrounds
Moment of registration finalization (2021)



Total: ~50

Which courses are offered (in total 30 ECTS) ?

- **Design Project 'Renewables Based Energy Conversion and Storage'** (wb3595) over Q1 (3ECTS) and Q2 (9 ECTS) by prof. Johan Padding (3mE) and different supervisors
  Groups of students, roughly 5 and grouped according to background ratio construction:science:systems
- Q1
  - **Fundamentals of Wind Energy I** (AE3516A, 3 ECTS) by Dr. Axelle Viré (AE)
  - **Energy Conversion: Devices, Systems and Efficiencies** (WB3575, 4 ECTS) by Dr.ir. Mahinder Ramdin (3mE)
  - **Energy Storage (WB3580, 5 ECTS)** by Dr. René Delfos (3mE), Dr.ir. Martin Bloemendal (Civil Engineering & Geosciences) and me (3mE)
- Q2
  - **Solar Energy** (Et3034tu, 3 ECTS) by Prof.dr.ir. Arno Smets (EEMCS)
  - **Assessment of Energy Systems** (WB3585, 3 ECTS) by Dr.ir. Lydia Stougie and Dr.ir. Gijsbert Korevaar (all TPM)

Typical timeline of the Design Project (12 ECTS)

Q1 (September 2020 – October 2020):

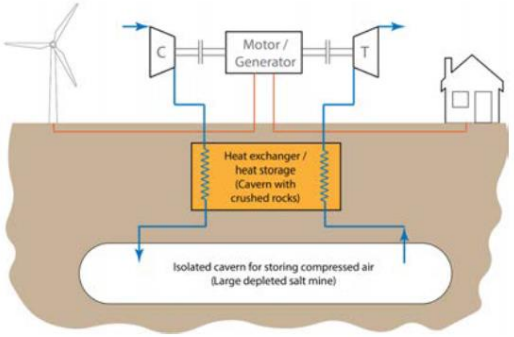
- During Q1: define precise design goal, perform literature study
- End of Q1: submit literature review to supervisor(s)
- End of Q1: design plan presentation (joint session with all minor students)

Q2 (November 2020 – January 2021):

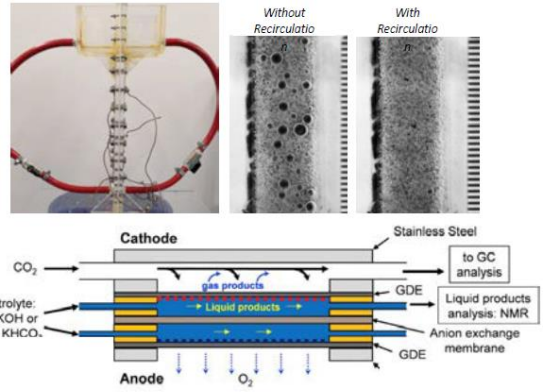
- During Q2: actual design and evaluation
- End of Q2: submit final report to supervisor(s)
- End of Q2: submit working model / prototype to supervisor(s)
- End of Q2: **presentation in joint on-line symposium** (Thursday 23 January afternoon)

Examples of previous Design Projects (12 ECTS)

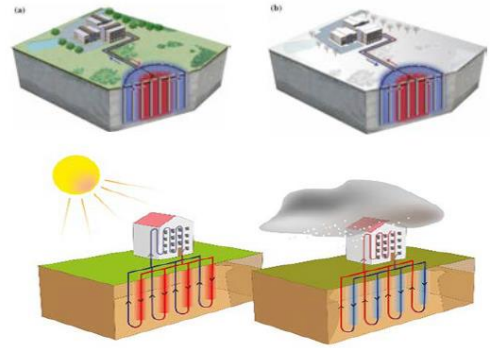
Compressed air energy storage (groups 1, 4)



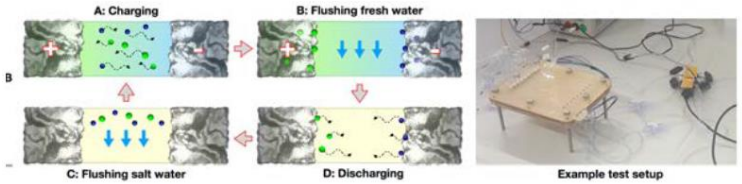
Electrolysis / electro-conversion (groups 2, 3)



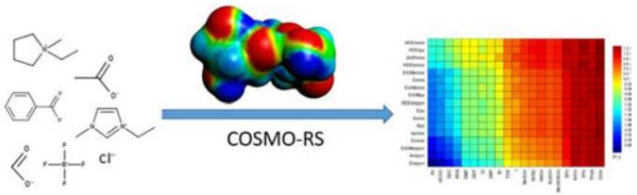
Thermal energy storage (groups 6, 9, 10)



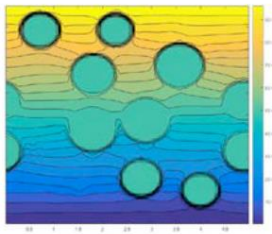
Capacitive deionisation (group 5)



Neural networks for fluid property prediction (group 7)



Experimental setup for measuring enhanced heat transfer (group 8)



For questions on this ELECS minor: use CHAT

Thanks for your attention!

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