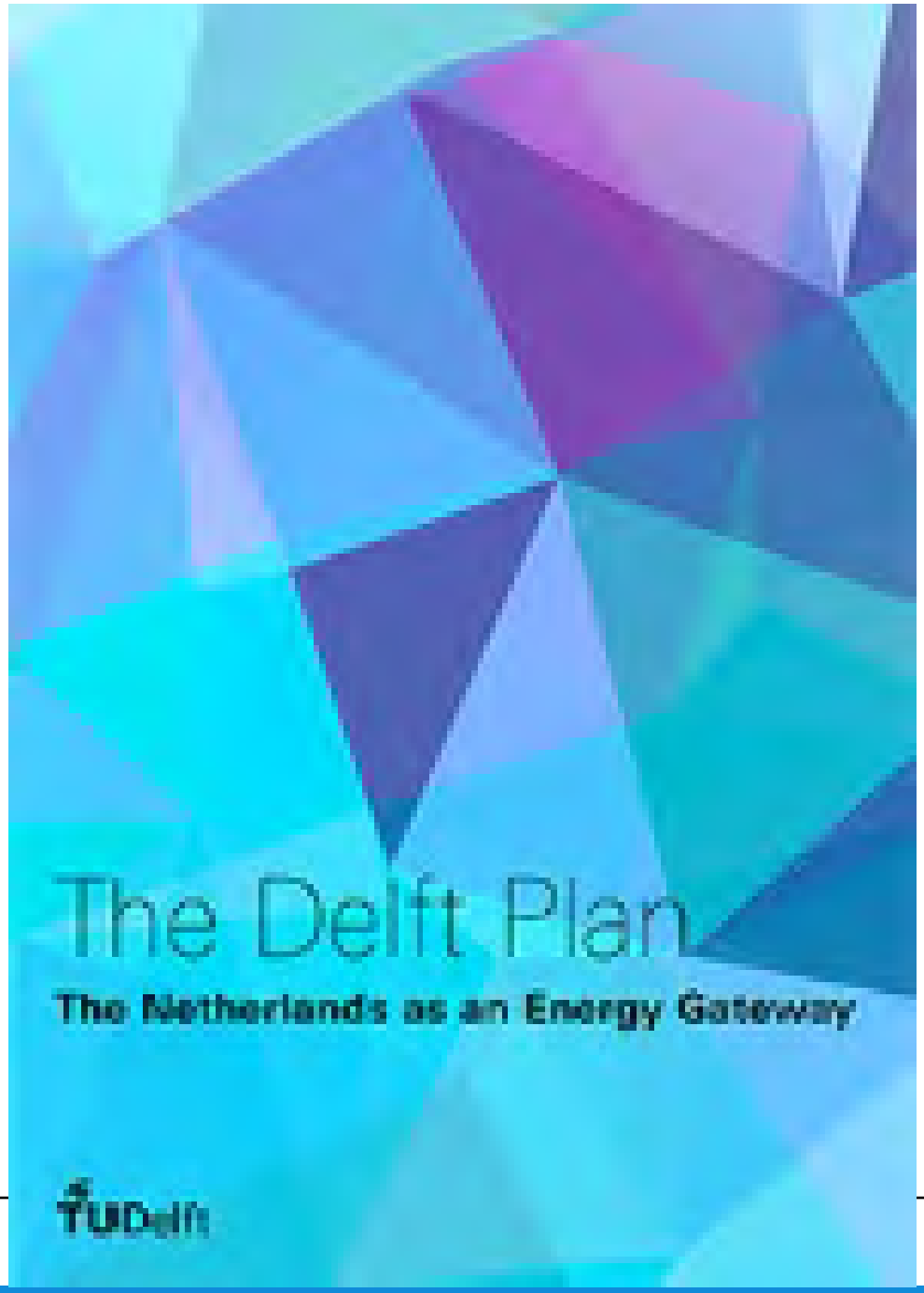
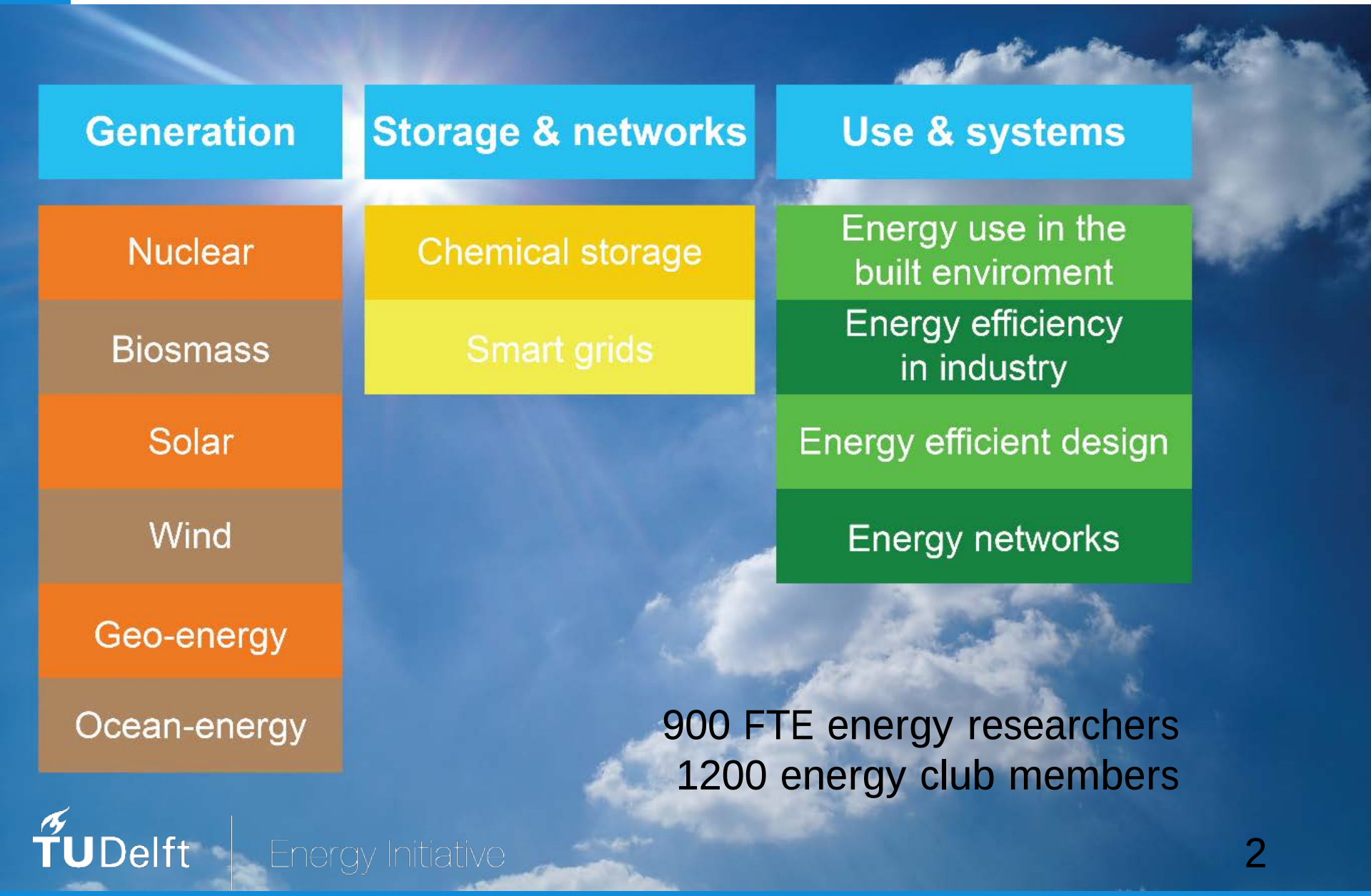
# Delft Energy initiative

Prof dr ir Paulien Herder
Director


The Delft Plan
The Netherlands as an Energy Gateway
TUDelft

# The Delft Energy Initiative



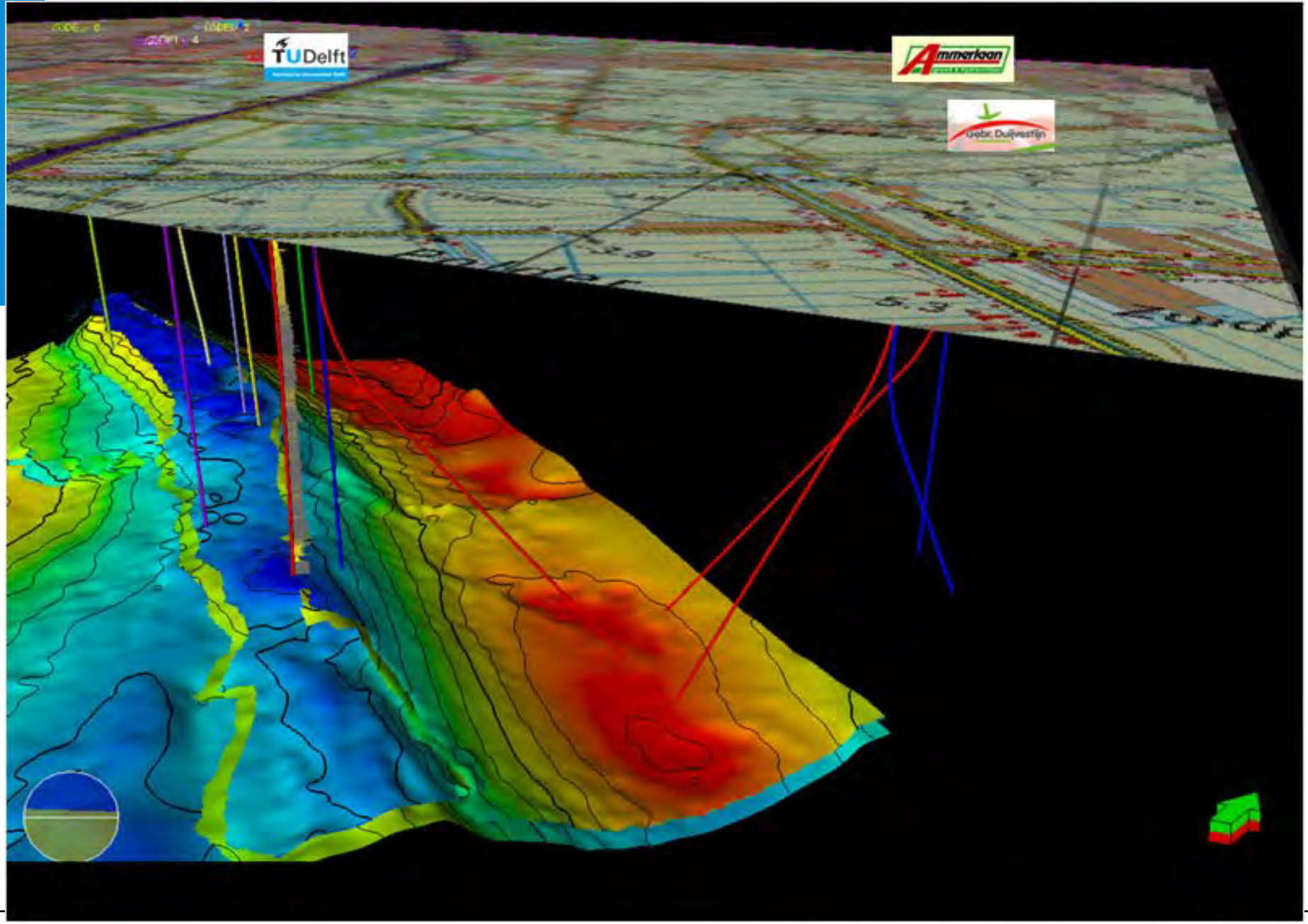


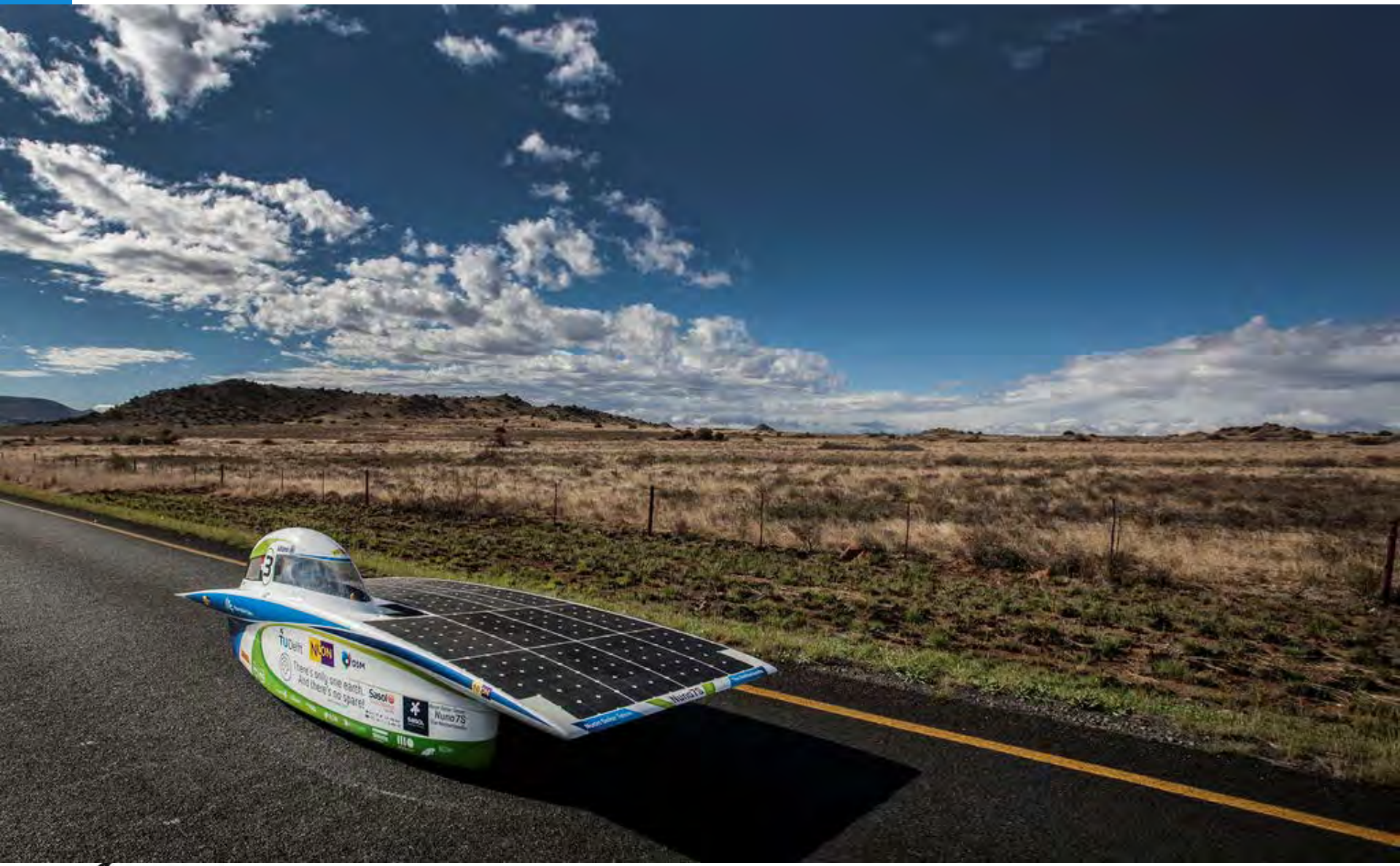

*Image courtesy of Douglas Gilding / DAP*

Data courtesy NAM

# Powerweb – interdisciplinary smart energy systems

# Energy Club Boards

- Study abroad
- Study trips
- International competitions
- International “energy boards”
- Global energy summit


There's only one earth.
And there's no spare!
Nuna7S


Kjell

# Online energy curriculum:

## MOOC, ProfEd, blended, flipped class room

**Recognized as one of the top 10 online universities world-wide**

| TU Delft | Worldwide |
| --- | --- |
| 700,000 | 30,000,000 |

UNIVERSITIES IN THE SET-PLAN

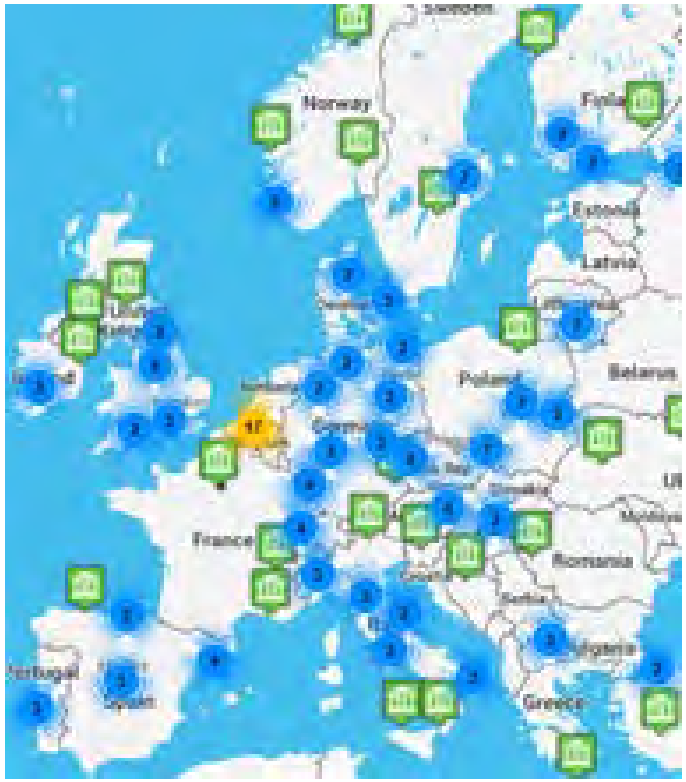
# UNI-SET - Mobilising the research, innovation and educational capacities of Europe's universities in the SET-Plan

## Summary of Project Findings in Education (May 2016)

This project has received funding from the European Union under the Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 609838.

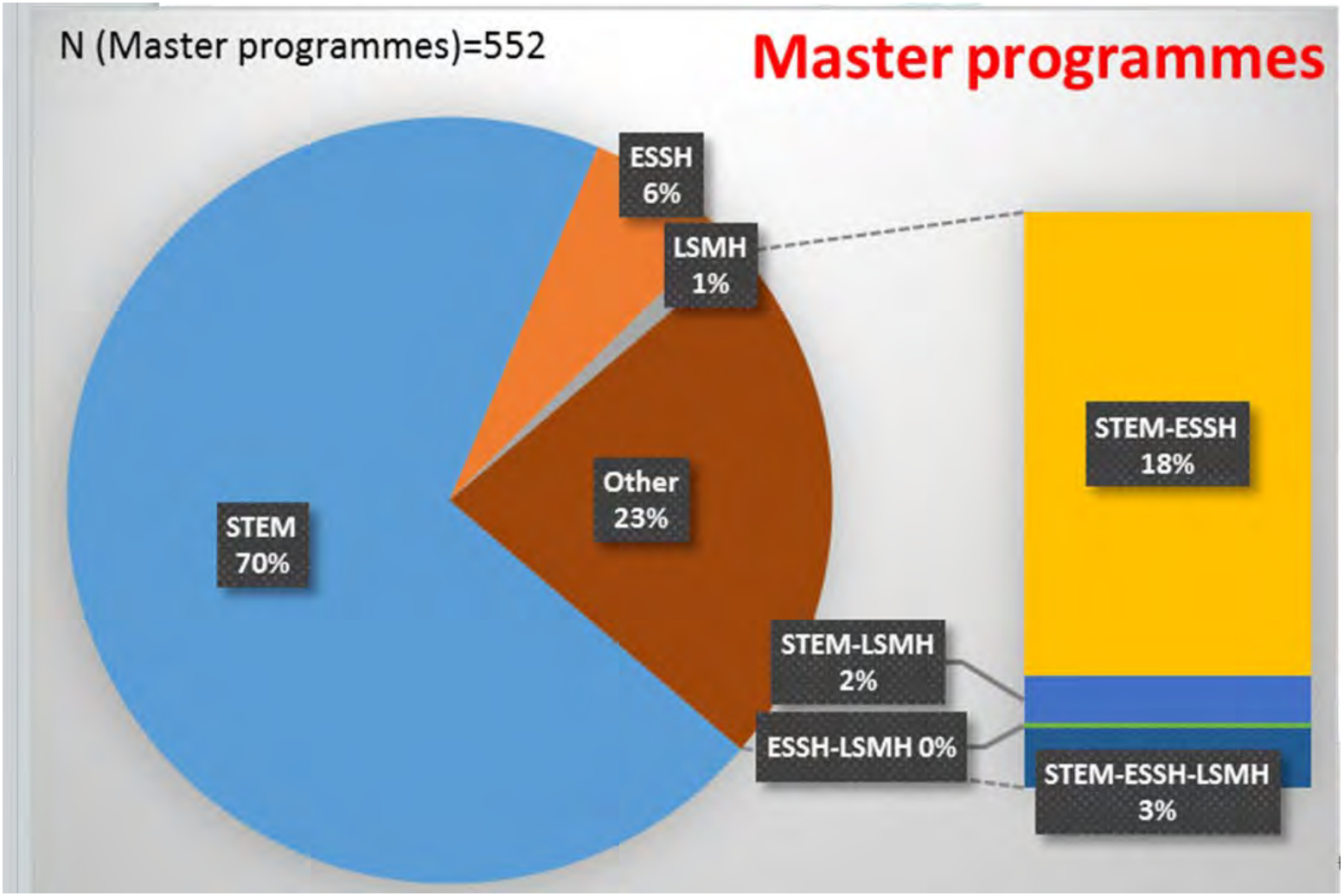
# UNI-SET Universities Survey (Phase II*)

- ✓ 202 universities
- ✓ 864 research topics
- ✓ 451 Doctoral schemes
- ✓ 579 Master programmes
- ✓ *Active in energy research*
  - ✓ Research staff 9,833.3 (FTE)
  - ✓ Doctoral candidates 6,286.6 (FTE)
  - ✓ Doctoral candidates 6,286.6 (FTE)
  - ✓ 36,903 Master-level students

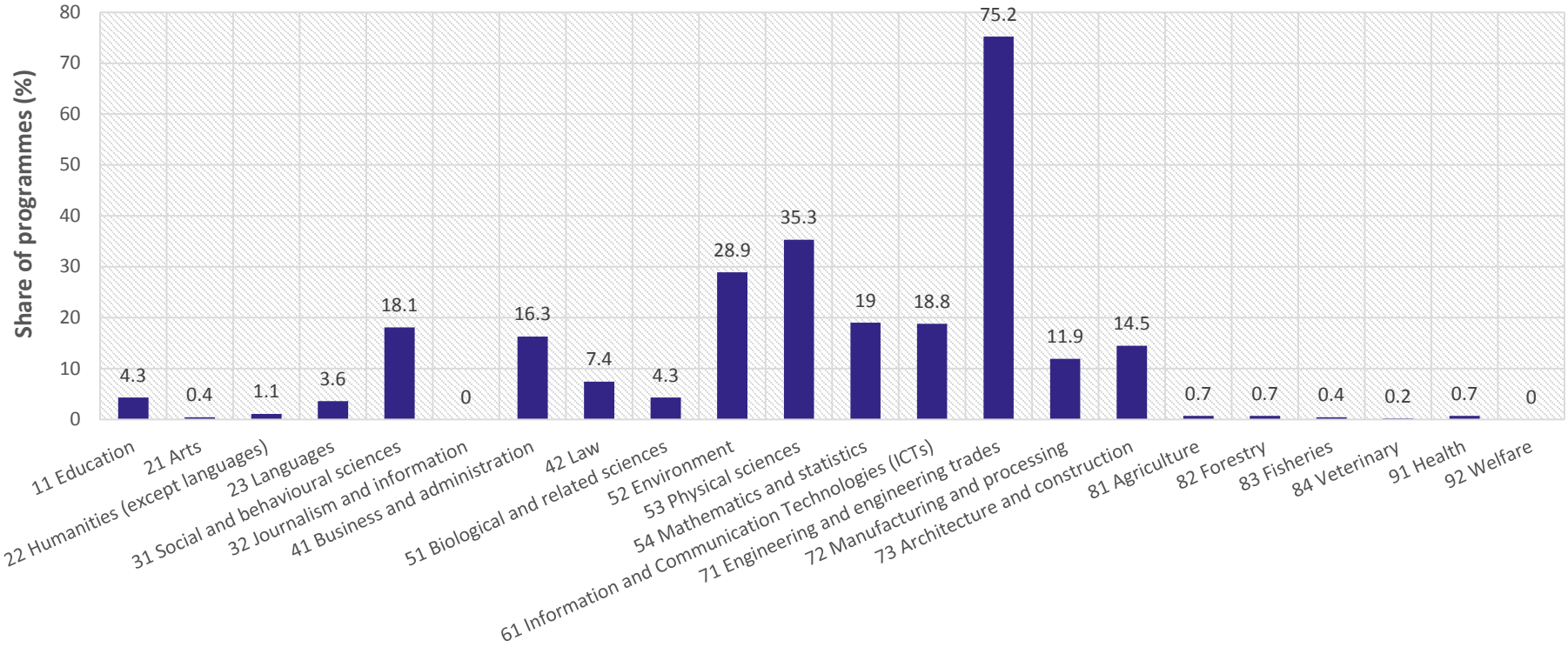



- http://uni-set.eu/index.php/atlas

# Multidisciplinarity



# Fields of Education and Training* in Master Programmes (%)

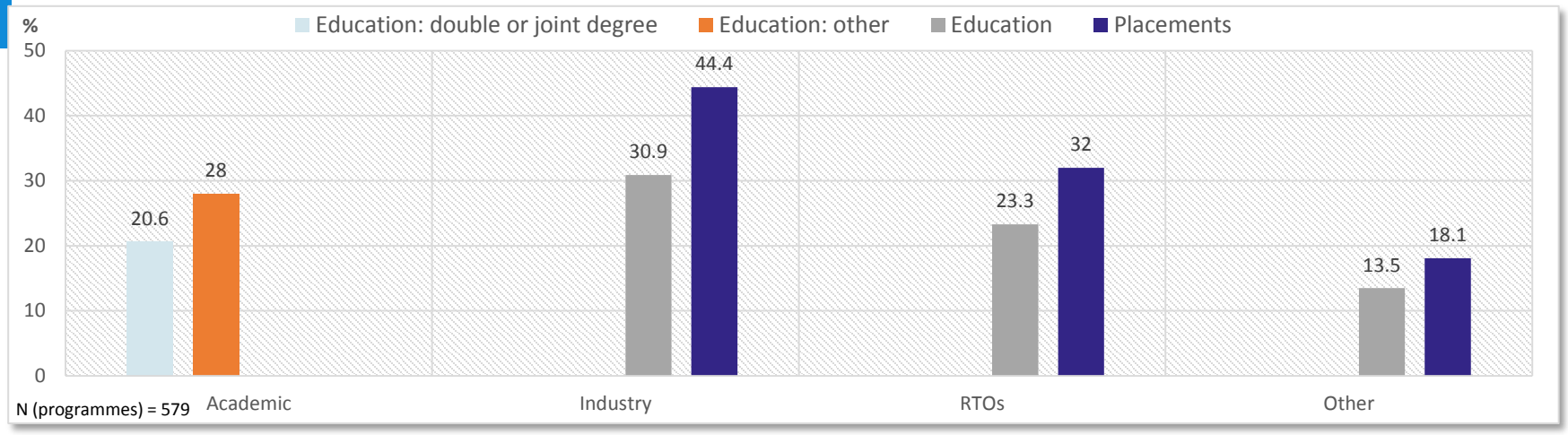



*According to International Standard Classification of Education, ISCED-F 2013 (http://www.uis.unesco.org/Education/Documents/isced-fields-of-education-training-2013.pdf)

N (Master programmes) = 447, max 8 Fields per topic


13

# Cooperation with external partners – master programmes




**Question**: Please specify the types of external partners and the form of partnerships in relation to the Master programmes.

Mark boxes (☑) to indicate whether your institution maintains a partnership with a specific purpose within the framework of a given Master programme. For joint/double degree programmes, please select 'Education: Double/joint degree'.

By partnerships, we refer to formal (i.e. not ad hoc) cooperation between your institution and a third party. The third party can, for example, give official lectures to students or host students as part of their training. Ideally, the cooperation is clearly defined and integrated in the programme structure.

**1 Partner categories:**
*Academic partners*: Universities, universities of applied sciences etc.
*Industry partners*: Companies, company research laboratories, consultancies, etc
*Research and Technology Organisations*: Public or private research and technology organisations
*Other partners*: Government bodies or agencies (e.g. ministries, agencies on the municipal, regional, national or European level), other partners (e.g. NGOs), etc.

**2 Form of cooperation (academic partners)**
*Education - double or joint degree:* Please tick this box if the programme is a double or a joint degree offered in cooperation with other academic institutions.
*Education - other*: Offering regular education activities to students of the programme, e.g. lectures or other courses, offering lab facilities and/or dedicating time to students, site visits or other activities.

**3 Form of cooperation (all other partners)**
*Education*: Offering regular education activities to students of the programme, e.g. lectures or other courses, offering lab spaces and/or time for students, site visits or other activities.
*Placements (internship / thesis)*: Please tick this box if an industry partner is regularly offering internships for students or to write a thesis in a partner company/organisation.

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UNIVERSITIES IN THE SET-PLAN

# Part II) Findings from Employers – Professional (Graduate) Profiles in the Field of Energy

EUA European University Association

KU LEUVEN

eit Knowledge & Innovation Community KIC InnoEnergy

This project has received funding from the European Union under the Seventh Framework Programme for research, technological development and demonstration under grant agreement no. 609838.

# Views and recommendations for Universities from the employers

| | |
|---|---|
| • University Education & fundamental knowledge in Energy<br>▪ MSc<br>▪ PhD | + "There is a need for **multidisciplinary** profiles". Need for broader profiles instead of specialized profiles, but technical knowledge is important. Combining energy and markets, and energy and sociology.<br>+ "Master degree is interpreted as basis for a career in industry"<br>+ Lack of entrepreneurship training is detected by some start-up's representatives. |
| • Extracurricular activities<br>▪ Mobility<br>▪ Industry Involvement | + **International mobility and internship** are ranked high, "higher than finishing studies in time". "Mobility is often ranked higher than internship experience".<br>- "Universities are often not really flexible towards internships".<br>+ "The student's **personality** needs time to develop" to be flexible, to make own decisions, to work in teams, and to look into industry in order "to develop an own profile".<br>+ **Flexibility** is more important than studying in the shortest time possible. |

# Views and recommendations for Universities from the employers

| | |
|---|---|
| • Languages & Soft Skills | + Cross subjects and **soft skills** are good, however, not on the expenses of technical knowledge<br><br>+ "Mother tongue plus **English** is required".<br><br>- "Give students time to develop **skills**". Grades are not all that count, also soft skills are important. |

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UNIVERSITIES IN THE SET-PLAN

## 2nd Energy Clustering Event
## 26–28 September 2016
## Politecnico di Torino

***SET-Plan Focus Area***

**'Develop and strengthen energy-efficient systems'**
**'Increase safety in the use of nuclear energy'**

POLITECNICO DI TORINO

## 3rd Energy Clustering Event
## 21-23 November 2016
## University Politehnica of Bucharest

***SET-Plan Focus Area***

**'The future smart EU energy system, with the consumer at the centre'**

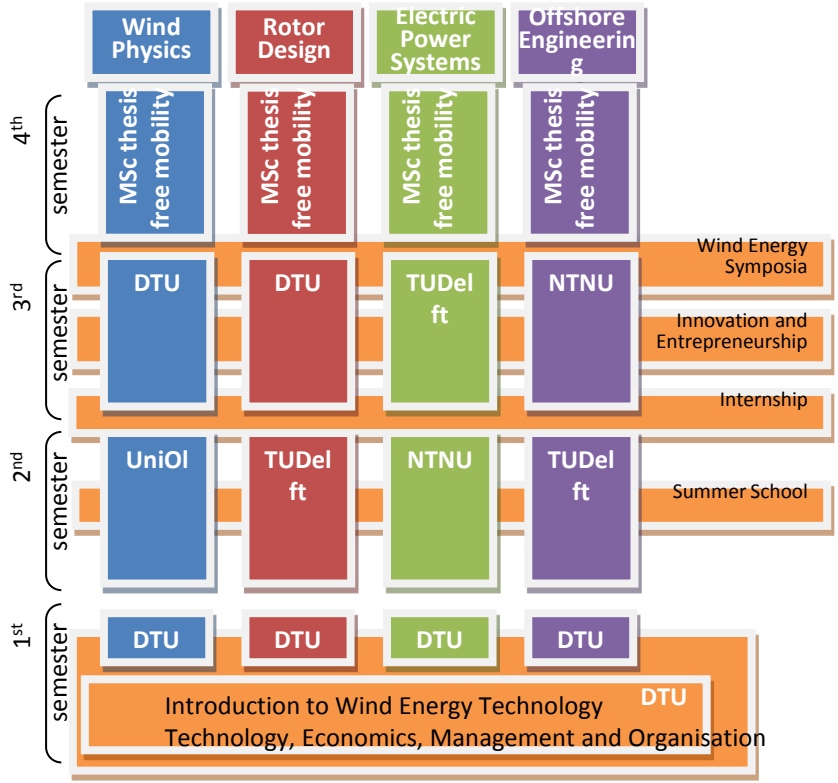
# Programmes with ‘built-in’ mobility

# Doctoral Education

- **EU Sustainable Energy Technology and Systems** programme (PhD)
- Comillas Madrid, KTH Stockholm, Delft Univ of Technology, Johns Hopkins USA
- **Joint** Doctorate
- **Mobility**

# European Wind Energy Master

## Erasmus Mundus MSc Programme




**Others:**

MSc EMIN

MSc MIND

...

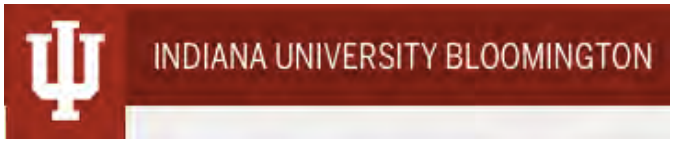
# Academic skill set & Mobility

# MSc Systems Engineering, Policy Analysis and Management (MSc SEPAM)

- Systems engineering
- Institutional economics
- Complexity science
- Math and algorithmics
- **Academic skills**
- **International exchange**





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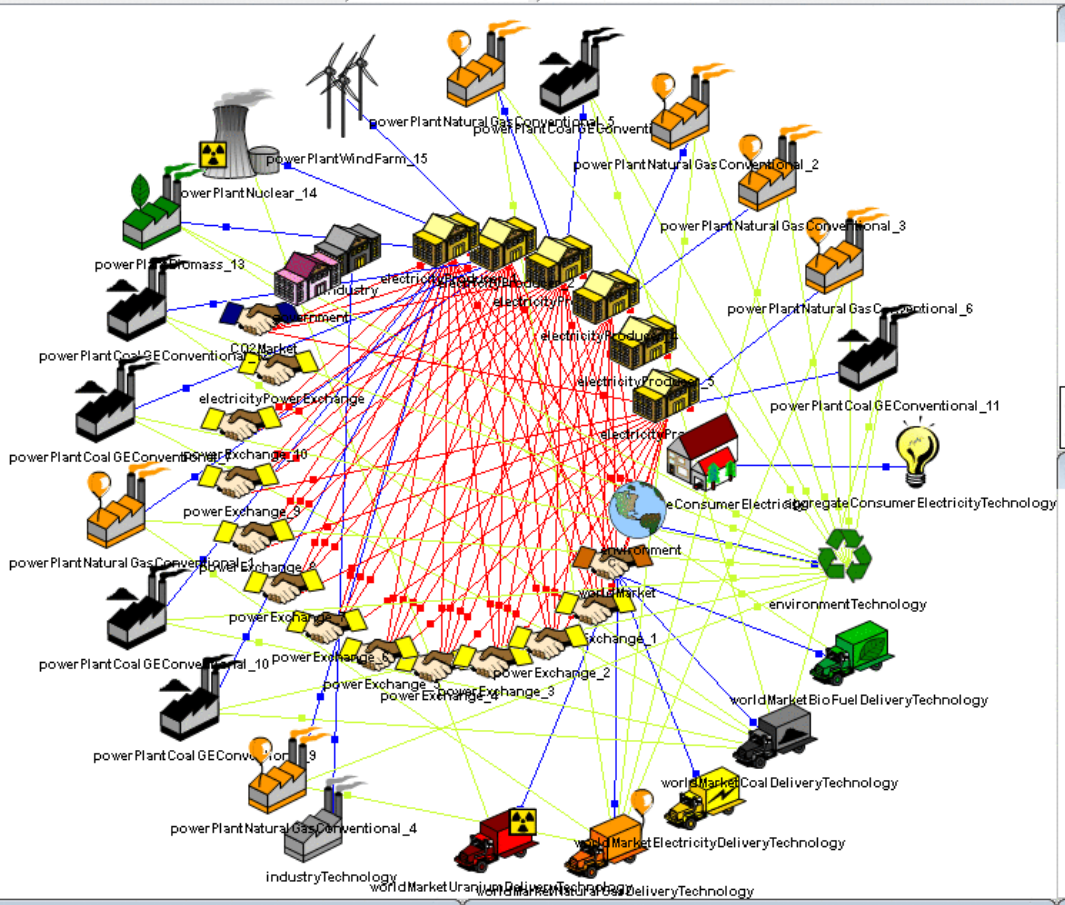
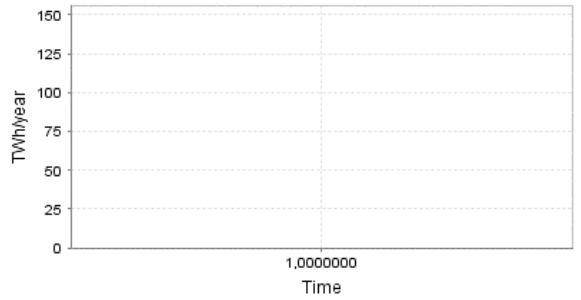
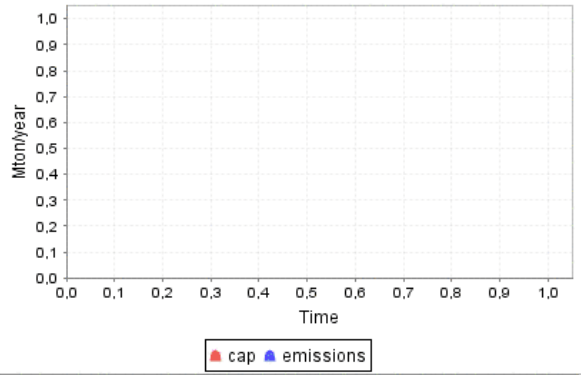


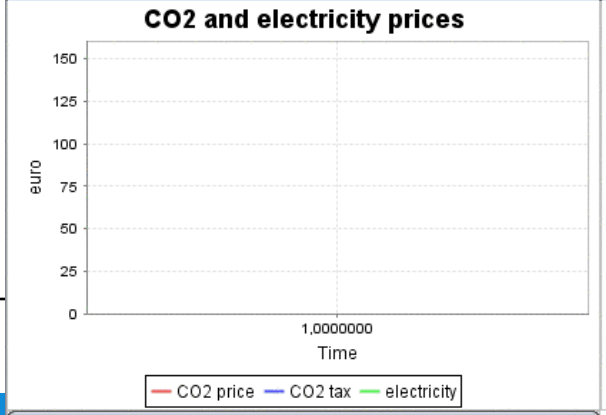

## Portfolio



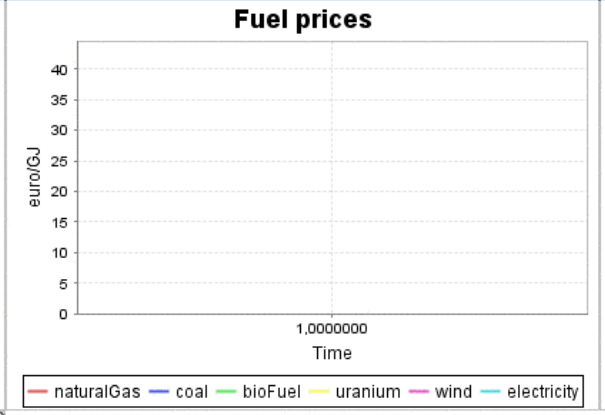

## CO2 market



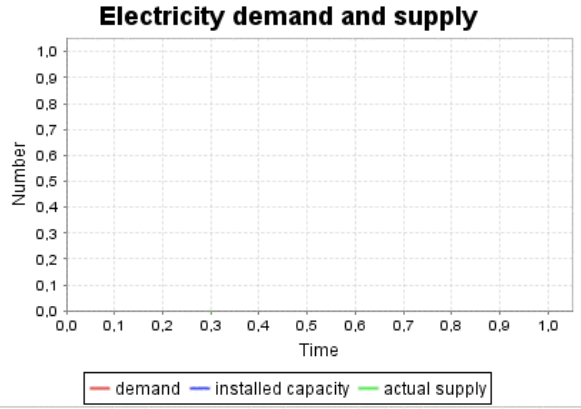

## CO2 and electricity prices




## Fuel prices




## Electricity demand and supply




## Capital Electricity Producers


reaching new frontiers
Allianz
3
TUDelft
NUON
DSM
There's only one earth.
And there's no spare!
Nuon Solar Team
Nuna7S
The Netherlands