



UiO : Department of Technology Systems  
University of Oslo

# Renewable Energy Systems

Marianne Zeyringer

Sabrina Sartori

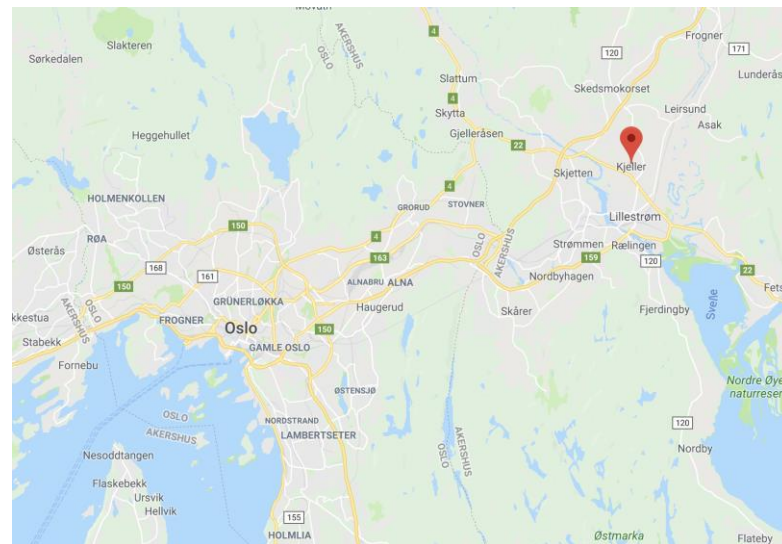


# Where are we?

Department of Technology Systems of UiO

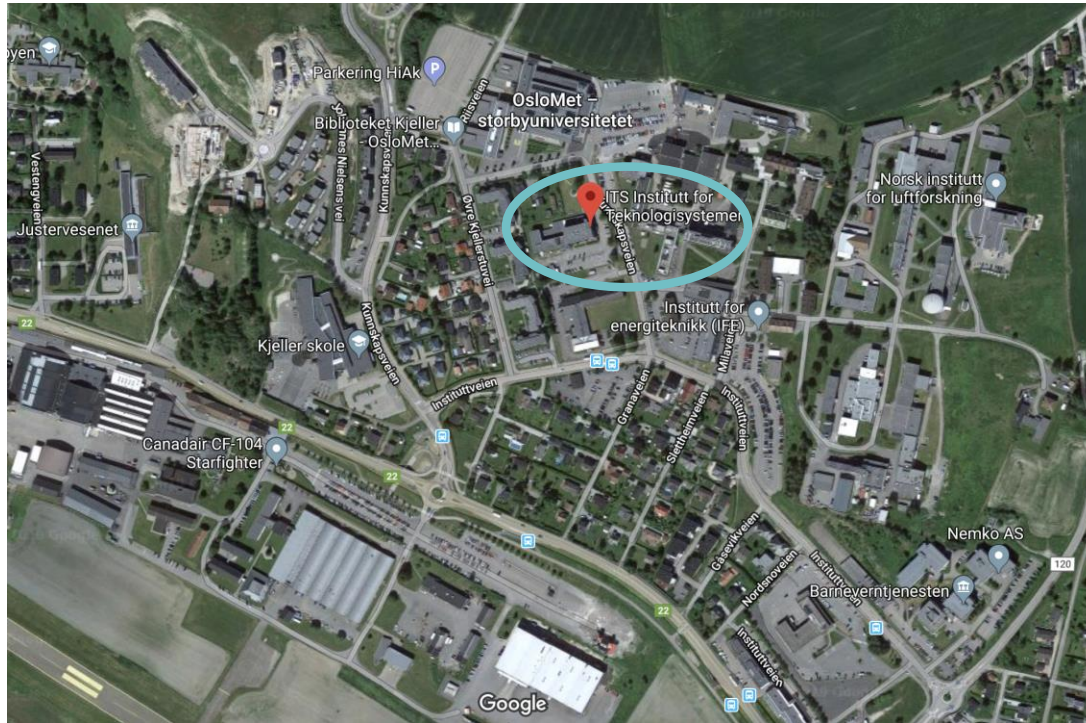


- Section for Energy Systems
- Section for Autonomous Systems and Sensor Technologies



# Around us

Norwegian Defence Research  
Establishment



Norwegian  
Metrology Service

Norwegian  
Seismic Array

Norwegian  
Institute for Air  
Research

Institute for Energy  
Technology



# Renewable Energy Systems



In everything from sun and wind to tidal waves and geothermal heat, we have energy that is renewable and widely available.

This Master's program aims to provide you with a solid foundation for developing the use of renewable energy systems in society.

**If you want a future job in the energy sector, this is the study program for you!**

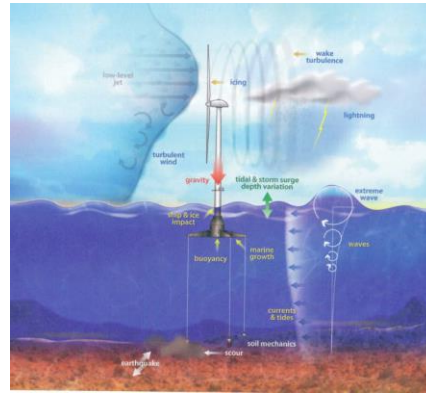
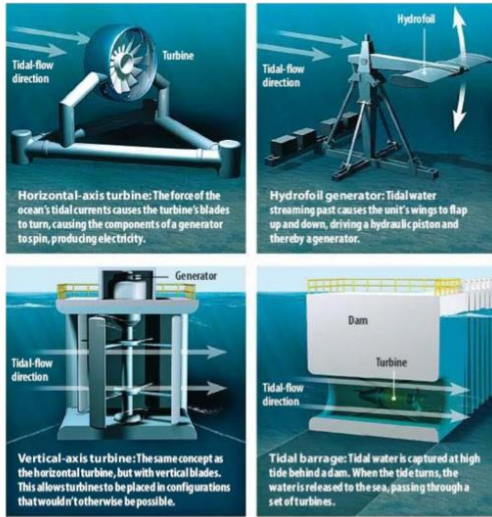
## Why?

- Use and investments in renewable energy is expanding causing major changes to society
- Extensive research in energy sector at Kjeller and Oslo area provides relevant up-to-date topics for your master thesis
- Connection to business and industry gives realistic perspectives

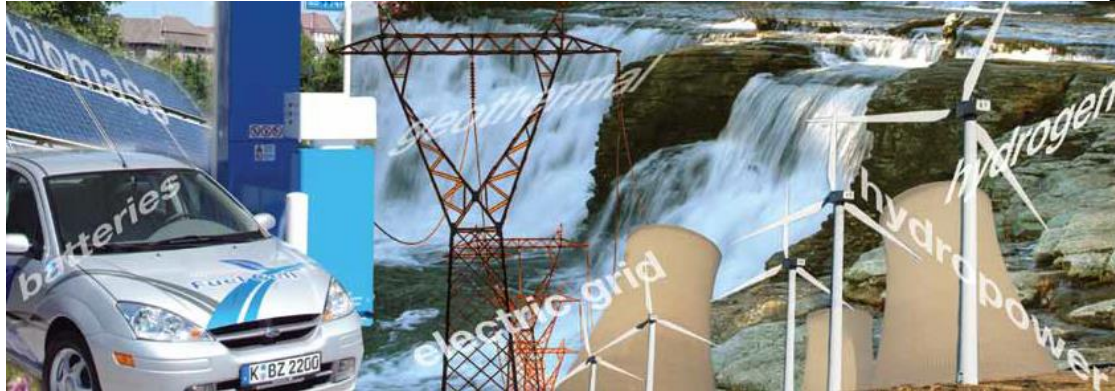
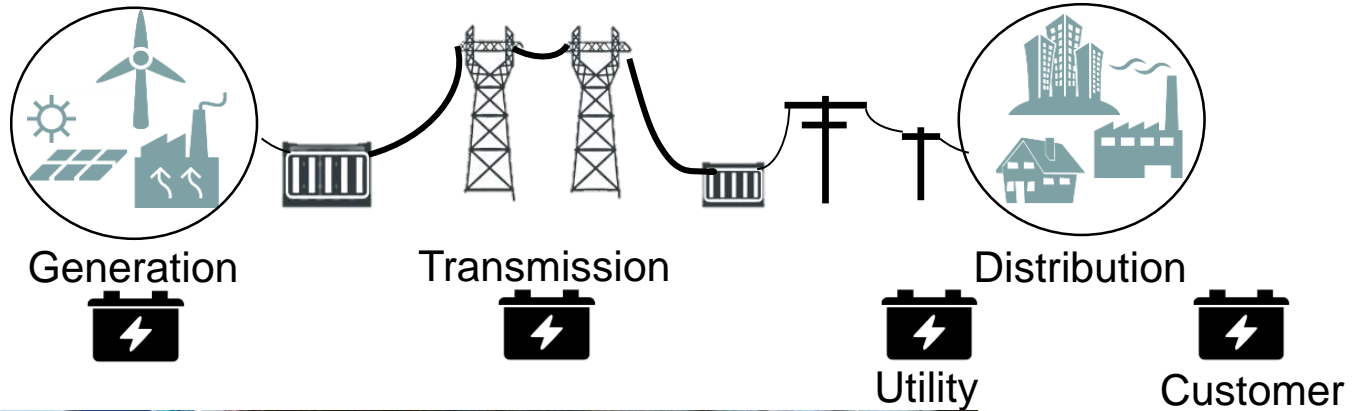


[Major climate changes inevitable and irreversible – IPCC's starkest warning yet](#)

# What will you learn? Some examples



Scientific principles and technologies related to harnessing and conversion of the renewable energy sources, combined with a wide range of case studies, laboratory activities and excursions



Energy storage solutions (e.g. batteries, and hydrogen storage)  
How grid and smart grid work

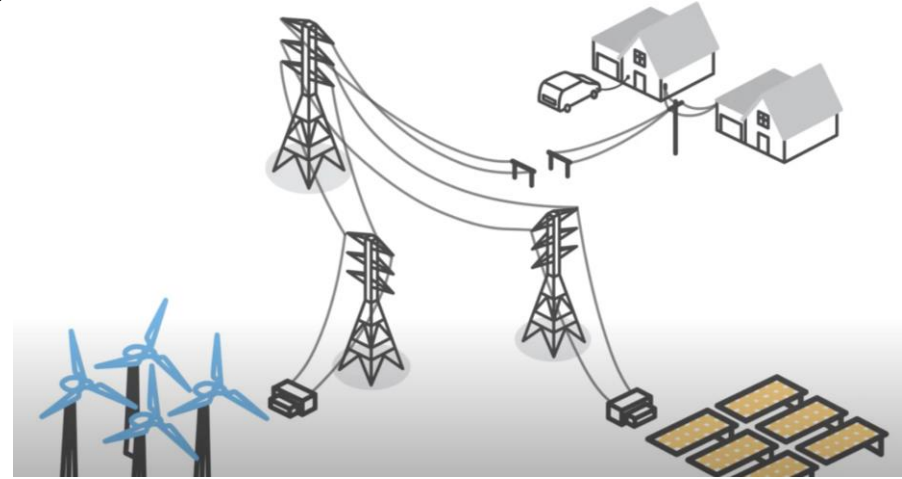
Discuss the integration of intermittent renewable electricity into the grid system through laboratory exercises



# Energy Systems Analysis

How do we design future energy systems that meet the Paris Agreement Goal?

Energy and power systems modelling :  
Computer models that consider technological developments, costs, environment, emissions and society





# Master in Renewable Energy Systems

4. semester	Master's thesis		
3. semester	Specialisation course	Specialisation course	Elective course
2. semester	Specialisation course	<a href="#">TEK5380 - Project course</a>	Elective course
1. semester	<a href="#">TEK5300 – Renewable Energy: Science and Technology</a>	<a href="#">TEK5350 - Energy markets and regulation</a>	<a href="#">TEK5370 – Grid, smartgrid and IoT</a>
	10 ECTS credits	10 ECTS credits	10 ECTS credits

## Specialisation courses (30 credits)

- **TEK5310 – Solar Cells (10 credits)**
- **TEK5330 – Solar Energy Systems (10 credits)**
- **TEK5320 – Battery Technology (10 credits)**
- **TEK5390 – Hydrogen Technology (10 credits)**
- **TEK5340 – Energy systems analysis:  
Modelling, methods and scenarios (10 credits)**
- **TEK5410 – Energy Markets and Regulation -  
Modelling and Analysis (5 credits)**
- **TEK5420 – Norway's Energy Transitions:  
Policy Directions and Challenges (5 credits)**
- **TEK5110 – Building Mobile and Wireless  
Networks (10 credits)**
- **TEK5530 – Measurable Security for the  
Internet of Things (10 credits)**

## Specialisation courses (20 credits)

Master level courses; discuss with your supervisor

## Master thesis

- During the last semester (17 weeks)
- independent research work under supervision
- 30 ECTS

### Examples of 2021 topics

- Norway's Offshore Wind Potential Considering Socio-environmental and Technological Factors
- Safety issues of Li-ion batteries – a methodology for determination of heat release during thermal runaway
- Building-integrated photovoltaics in Norway, challenges and standards



## Semester abroad



- 2nd or 3rd semester
- Also possible to work on your master thesis abroad

Apply to UiO for exchange by February 15th or September 15th

University of Utrecht University (the Netherlands)

Aalborg University (Denmark)

University Center on Svalbard: discussion next Wednesday at 1pm "Sustainable Energy Systems in the Arctic - Challenges and opportunities for Svalbard's energy transition?"

## Career prospects

- Analyst, scientist, project manager in in a research institute (e.g. Sintef, IFE), industry (e.g. UNITECH Offshore AS, Statkraft, Statnett), public organisation (e.g. City of Oslo, NVE) in an international organisation (e.g. IEA, IRENA, JRC-EC)
- Academic career/ doctorate (PhD)

(Guest)-lecturers from IFE, Nordpool, Statnett, Statkraft, NEL, Gexcon, Hexagon, Reading University...

## UiO:Energy

- one of three strategic priority areas at the university
- coordinating hub for energy research, education and outreach at the University of Oslo
- Subscribe to their newsletter, organise events, calls such as Summer Projects...





## UiO:Energi summer projects at ITS

This year: 5 students under 2 topics

- Weather and climate data
- Machine learning approach to public sentiment analysis towards wind energy in Norway

