ENG-636

NRG2019: Energy Systems: managing the transition to renewables

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Cursus	Sem.	Type
Energy		Opt.

Language of teaching	English
Credits	2
Session	
Exam	Written
Workload	60h
Hours	**28**
Lecture	28
Number of positions	**55**

Frequency

Every 2 years

Remark

Next time: tbd

Summary

This Summer School will try to bring to together these very disparate topics including energy policy, modeling and technologies in one coherent single event and give the participants a unique perspective on the opportunities and challenges of the coming energy transition.

Content

In this school, we will focus on energy systems. In this way, participants will get a broad overview of the inherently diverse field of energy solutions through the lens of their connectivity and how these solutions may eventually come together. First we will give an overview of the issues and challenges for the energy transition (climate change and energy policy), then we will present several current and improvable fossil energy technologies (nuclear and carbon capture and sequestration), the main sustainable energy technologies (solar, wind, hydro, geothermal and biomass) and options for bringing these systems together (storage, buildings and electricity grids) and evaluating them (energy systems, systems modeling, life cycle assessment and urban design).
These topics will be split into 8 half day symposia. We will begin with system that outline the challenges and intricacies of the energy transition. Specifically, we will begin by covering Climate Change, energy systems and energy policy (Symposium I) and Systems modeling and Life Cycle Assessment (Symposium II). We will then begin our overview of various energy producing solutions with: Fossil Energy solutions (Symposium III), Wind and Hydro energy (Symposium IV), Solar Energy (Symposium V), Biomass and Sustainable chemistry (Symposium VI) and Geothermal Energy and sustainable buildings (Symposium VII). Finally, we will end with an overview of a particularly critical enabling technology for sustainable energy which will cover Electricity use both in terms of storage and grids (Symposium VIII). All symposia will be highly interdisciplinary and will provide a unique but necessary overview to the attendants of the larger context to the technology or system that their PhD focuses on.
For the symposia, we are inviting a combination of outstanding scientists from Switzerland and renown international experts. We believe this will provide the PhD students with a view of the expertise available in Switzerland but also maximize the opportunities for scientific exchange.
Several Swiss scientists and international researchers have already been invited and accepted, including:
Confirmed Swiss Contributors:
1. Carbon sequestration (Prof. B. Smit, EPFL)
2. Urban Systems Design (Prof. F. Maréchal, EPFL)
3. Hydroenergy (Prof. F. Avellan, EPFL)
4. Photovoltaics (Prof. C. Ballif, EPFL)
5. Solar thermal energy (Prof. S. Haussener, EPFL)
6. Electric grids (Prof. M. Paolone, EPFL)
Confirmed international contributors:
1. Climate change (Prof. Jean-Pascal Van Ypersele, Université Catholique de Louvain, Belgium)
2. Energy Policy (Prof. M. Aklin, University of Pittsburgh, USA)

3. Energy Economics (Prof. S. Pachauri, International Institute for Applied Systems Analysis, Austria)
4. Life Cycle Assessment (Prof. E. Stechel, Arizona State University, USA)
5. Solar Fuels (Dr. J. Ager, Lawrence Berkeley National Laboratory, USA)
6. Biofuels (Dr. Blake Simmons, Joint Bioenergy Institute, USA)
7. Sustainable Chemical Production (Prof. N. Lopez, Institut Català d'Investigació Química, Spain)
8. Geothermal Energy (Dr. Katherine Young, National Renewable Energy Laboratory, USA)

Keywords

NRG2019
Energy systems Transition to renewables summer school
EDEY

Resources

Websites

- https://nrg2019.epfl.ch/