University of Cologne

Department of Economics – Chair in Economics and Energy Economics
Prof. Dr. Marc Oliver Bettzüge

Seminar in Energy, Resource and Environmental Economics

Winter Term 2020/21

Online Seminar

Meteorology and the Electricity System: Interdependencies and methodological approaches

The electricity sector has always been subject to influences from weather and climatic conditions, e.g. in the transmission grid, the demand for electric heating systems, or the availability of water for cooling conventional power stations or for driving hydroelectric turbines. With the increased adoption of power generation based on wind and solar radiation, the dependencies of the electric system on both weather and climatic conditions have multiplied even more.

In the short run, the weather dependency requires producers, storage operators, and consumers to include weather risk into their decision-making. This makes accurate weather forecasts an essential part of the electricity market analysis. Also, short-term trading on intraday markets and on balancing markets gains importance to compensate for forecast errors of renewable energy producers.

Similarly, over the long term, changes in the climate (as a probability distribution of weather) therefore also have a significant impact on the electricity system. On the supply side, for example, long periods of low-wind speed, affect the renewable electricity production and thereby increase the need for back-up capacities. Or, on the demand side, an increase in average temperatures will lead to a change in electricity demand from heating to cooling, thereby changing the standard electricity consumption profiles of households.

Given this background, recent research in energy economics has greatly expanded the integration of meteorological data and models, thus improving our understanding of the weather/climate-electricity nexus. In this seminar, students will review the current state of this literature. In particular, they will analyse how meteorological and climatic factors affect

the electricity system, how energy market models can be enhanced, how meteorological data can be optimally leveraged for this purposes, and how the associated risk can be mitigated and optimally reflected in market mechanisms.

The seminar will be supported by Jun.-Prof. Dr. Stephanie Fiedler from the UoC meteorology department. Moreover, students will have the opportunity to directly interact with traders during the seminar.

Schedule

06.11.2020 *14:00-16:30*	**Introductory Meeting** *Zoom meeting* - Organizational Issues - Seminar Introduction and Overviews of Topic - Introduction to Meteorology
07.11.2020	**Deadline to Register or Withdraw from the Examination via KLIPS**
08.11.2020	*Groups and Topics for Examination Part A (Group Presentation) will be allocated via ILIAS.*
09.11.2020 *14:00-15:30*	**Guest Lecture** *Webex meeting* - Introduction to Energy Trading
10.11.2020 *09:00-10:30*	**Skills Seminar** *Zoom meeting* Expectations on your presentation and paper and helpful tips on how to find a research question, write a research paper and give a presentation
Group Meetings (*with Mentor*) Main Idea and goal, Structuring of Presentation etc.	
17.01.2021 *23:59*	**Deadline Submission of Presentation Slides to ILIAS** **Mandatory**
18.01.2021 *14:00-17:00*	**Group Presentations Group A and Group B** **Mandatory** *Zoom meeting* Group Presentation on overall topic (10 mins per Student + 40mins Discussion per groups with peers, mentors, professor and industry experts)
20.01.2021 *14:00-17:00*	**Group Presentations Group C and Group D** **Mandatory** *Zoom meeting* Group Presentation on overall topic (10 mins per Student + 40mins Discussion per groups with peers, mentors, professor and industry experts)
21.01.2021 *14:00-17:30*	**Group Presentations Group E and Group F** **Mandatory** *Zoom meeting* Group Presentation on overall topic (10 mins per Student + 40mins Discussion per groups with peers, mentors, professor and industry experts) Distribution of individual Seminar Topics (Examination Part B)
21.03.2021	**Deadline Submission of Final Seminar Paper** Please submit your seminar paper via ILIAS. **Mandatory**

Application

A maximum number of applicants of 30 can be admitted to the course, priority will be given to students of the WiSo Faculty. Please register on KLIPS for the seminar during the first registration period. IMES Students please register for the course by sending a email to Johanna.bocklet@uni-koeln.de.

After you receive a seat in the seminar, please make sure to register for the examination on KLIPS as well (use the Lehrveranstaltungsprüfung *"Seminar in Energy, Resources and Environmental Economics").* Only those, who have a seat in the seminar can register for the examination! Thus, if you decide to not take the seminar, please make sure to deregister from the course so your peers are able to enroll for the remaining spots before the exam registration phase ends. IMES students can register for examination by sending an email to Ms Soberon and include Johanna Bocklet in cc. (Deadline for examination registration: 07.11.2020!)

Once you have registered for the examination, the registration is binding and students who do not give a presentation or do not hand in a seminar paper in time will receive a failing grade. Thus, please make sure that you are able to attend the mandatory sessions before registering for the course.

Examination

The final grade consists of an oral and a written examination:

Examination part A (50%): presentation of overall topic at seminar meeting (10 minutes per student – individual grade)

Examination part B (50%): individual seminar paper on a specific research topic (max 5000 words)

Examination part A *(November – January)***:**

The aim of the oral part of the examination is to provide and receive a general overview of the different facets within the weather/climate-electricity nexus. Therefore, students will be allocated to one of five general topics within the scope of the seminar and distributed to groups consisting of 4-5 students. (The topic and group allocation is at the sole discretion of the Chair in Energy Economics.) In January, topic have to be presented to the other peers and discussed with industry experts. Each presentation should provide a general overview of the topic, analyse the current state of literature (introduce relevant literature and the methodology used in those sources) point out interesting research questions and critically discuss how the topic might evolve in the future. Students need to structure their topic, distribute the individual parts of their group presentation among themselves and deliver coherent and consistent presentation slides. In case of questions, as mentor will be able to

assist the group. Each student is required to present 8-10mins. Grading will be done based on individual performance.

Examination part B *(January – March)***:**

The aim of the written part of the examination is for students to become an expert in one specific topic within the weather/climate-electricity nexus. The individual seminar topics will be distributed after the group presentations in January. (The topic allocation is at the sole discretion of the Chair in Energy Economics.) The seminar topic allocated to a student will be from another area than the presentation topic of the respective student, allowing students to work on two different aspects within the weather/climate-electricity nexus. The written paper should be around 5000 words (+-10%). Students need to narrow down the scope of their paper by choosing a research question, provide an overview of the literature, pick a methodology and critically analyse their research question in depth. Each student will have a mentor in case any questions arise when composing the seminar paper.

General Requirements

The seminar is designed for students to prepare for a Master thesis in Energy Economics. The seminar participants are expected to gain in-depth insights into their topic independently. Thus, we expect students to already have a solid foundation in Energy Economics (i.a. have taken other courses in the Energy specialisation) before taking the seminar.

While the seminar topics will be distributed by the chair, students are expected to determine the main focus of their presentations and seminar paper themselves. The emphasis within the own topic as well as the draft structure of the paper shall be discussed with the mentor at an early stage. Furthermore, students should deal critically with the contributions of other participants. Active participation in the seminar discussion is expected. Attendance during all presentation days is therefore required.

We provide a guideline for the preparation of seminar papers. This includes all design requirements.

Further Information

Allocated Modules	▪ Specialisation in Energy Economics – Seminar in Energy, Resource and Environmental Economics ▪ Remaining seats can be allocated to students in the IMES program.
Credits	6
Language	English
Examiner	Prof. Dr. Bettzüge
Cooperation Partners	Jun. Prof. Dr Stephanie Fiedler (University of Cologne, Institute for Geophysics and Meteorology) RWE Supply and Trading
Organisation	Johanna Bocklet (Johanna.bocklet@uni-koeln.de), person of contact until November 10th. Cordelia Frings (Cordelia.frings@uni-koeln.de) person of contact from November 11th onwards.