



Power DSOs and the Energy Transition: Regulation for Investments and Flexibility

The decarbonisation of electricity systems relies increasingly on the electrification of end uses (transport, heating) and the deployment of decentralized low-carbon generation (e.g. rooftop PV). This transformation calls for substantial investments in electricity distribution networks, which are managed by Distribution System Operators (DSOs). DSOs play a central role in enabling a smart, flexible, and resilient energy system. However, they face several challenges: rising peak demand due to electric vehicle (EV) charging, increasing variability from distributed generation, and growing pressure to maintain affordability and fairness in network tariffs.

This seminar explores the regulatory and economic issues surrounding DSOs in the context of the energy transition. We will focus on the following interrelated questions:

- What types of investments are required in distribution grids to accommodate electrification and decentralisation?
- How can flexible demand (e.g. EV charging, heat pumps) reduce or defer network investments?
- What are the roles of tariff design, smart technologies, and consumer behaviour in shaping these outcomes?
- How can regulators ensure cost recovery for legacy investments in a world of falling grid usage?

The course is realized in cooperation with E.ON, one of Europe's largest energy network operators. E.ON manages electricity and gas distribution networks serving nearly 50 million customers across several European countries. Its infrastructure connects over 95% of Germany's renewable energy installations, making it a key player in the energy transition. With an investment plan of €42 billion between 2024 and 2028, E.ON is expanding its grids to support renewables and electrification. This collaboration offers students practical insights into the regulatory and economic challenges DSOs face in delivering a reliable and decarbonised energy system.

The seminar is designed to reflect the full cycle of a Master's thesis, with a reduced scope to fit the constraints of a seminar. In particular, students will be asked to work on an individual research project and present their findings to the group. Individual topics are prepared jointly with the seminar partner and students are welcome to hand in their own suggestions. A detailed list of topics will be presented at the introductory event on October 14th 2025.

PLEASE NOTE: Student presentations are scheduled to take place at E.ON's premises in mid to late November, as part of a two-day field visit offering insights into real-world DSO operations and infrastructure. These on-site sessions will include student presentations. Participation on these dates is mandatory. Confirmation and details will be given *prior to the Deadline* to **Register for the Examination via KLIPS**.



Schedule

14.10.2025 13:30-17:00	<i>KFR 1</i>	Introductory meeting Organizational Issues & Topic Introduction
21.10.2025 13:30-17:00	<i>KFR 1</i>	Presentation and Writing Skills Seminar
21.10.2025 23:59	<i>Klips</i>	Deadline to Register for the Examination via KLIPS
28.10.2025 23:59	<i>Klips</i>	Deadline to Withdraw from the Examination via KLIPS
25.11.2025 15:00	<i>ILIAS</i>	Deadline Submission of Presentation Slides to ILIAS
26.11. – 27.11.2025	<i>E.ON - Essen</i>	Field Trip to E.ON and Student Presentations
12.02.2026 15:00	<i>ILIAS</i>	Deadline Submission of Final Seminar Paper

KFR1 is equivalent of [827 Seminarroom x.EG.03] at the Institute of Energy Economics (ewi), Vogelsanger Str. 321a, 50827 Cologne.

Application

A maximum number of 20 applicants can be admitted to the course. Please register on KLIPS for the seminar during the first registration period.

After you receive a seat in the seminar, please make sure to register for the examination on KLIPS as well (use the Lehrveranstaltungsprüfung). Only those, who have a seat in the seminar can register for the examination! Thus, if you decide not to take the seminar, please make sure to deregister from the course, so your peers are able to enrol for the remaining spots before the registration phase ends. 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 hand in all documents within the deadline and attend the mandatory sessions before registering for the course.

Examination

The final grade consists of an oral and an written examination part. To pass the examination, students are required to participate in all parts of the examination.

The final grade for this course will be a weighted average of (the quality of):

- A) presentation (40 % - 10 minutes)
- B) seminar paper (60% - 5000 words)

The participation in all examination parts and dates is mandatory in order to successfully complete the course. Fruitful contributions to the sessions can have a positive impact on the final grade.



Examination part A: Presentation

This is the oral part of the examination. The aim of this part is to provide and receive an overview of different facets of the seminar topic. Students will individually work on a literature review resulting a specific topic definition and a design for a research approach. Review, topics and research approach have to be presented to the other peers and discussed with industry experts. Each student is required to present 10 minutes. A discussion will follow the presentation.

Examination part B: Seminar paper

The written paper should be 5000 words (+-10%). Students need to narrow down the scope of their paper by choosing a research question, providing an overview of the literature, and critically analysing their research question in depth.

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** 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. (https://energie.uni-koeln.de/sites/energie/pdf/Guideline_English.pdf) Further we will ask you to sign an agreement for foto usage during the field trip.

Further information

Allocated Modules	1289MSENE1 There are NO seats for students in the IMES program or incoming students.
Credits	6
Language	English
Examiner	Dr. Félix Michelet
Cooperation partners	E.ON & EWI
Field Trip	Scheduled for two days in the second part of November, to be confirmed.
Organization	Felix Michelet (felix.michelet@wiso.uni-koeln.de)