Energy Markets and Regulation (Master)

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Course contents

Energy is needed for almost every economic activity. At the same time, the energy sector is responsible for about 75% of global greenhouse gas emissions and fundamental changes are due to mitigate climate change. Two good reasons to study energy markets and their regulation, which have some interesting particularities compared to other markets.

This course focuses on electricity markets, which play a central role in the energy sector already today and even more so in the future. We start with some technical background that is necessary to understand electricity markets. On this basis, we study

1) The optimal dispatch and price setting in short-term electricity markets
2) The optimal long-term mix of electricity generation & storage technologies
3) The European electricity market model
4) The transmission of electricity and implications for markets and regulations
5) Markets and regulation to keep electricity grids in balance at every moment in time
6) The regulation and market participation of electricity consumers

This course will provide you with fundamental knowledge on energy markets and regulation. It will relate to real-world case studies, recent academic papers, and current developments in the context of the 2022 energy crisis and the ongoing energy transition. In addition to conventional lectures and exercises, practitioners will be invited for guest lectures.

Please refer to the second page of this syllabus for a detailed overview of topics.

Course organization

Class hours & venues:

- Wednesdays, 10:00 – 11:30, 107b Seminarraum B I
- Thursdays, 10:00 – 11:30, 105 Hörsaal G

Office hours are offered on request.

Course registration generally works via KLIPS, with two exceptions: IMES students and doctoral students should register via Monika Räthe (monika.raethe@uni-koeln.de).

The final exam will be 90 minutes long. We offer two examination dates during the winter term, which will be published on KLIPS. There is no separate examination date in the summer.

Further information and course material will be distributed via the ILIAS platform.

For questions, please do not hesitate to reach out:

- On content, please contact Oliver Ruhnau (oliver.ruhnau@uni-koeln.de)
- On administration, please contact Monika Räthe (monika.raethe@uni-koeln.de)

Course schedule

The following schedule is tentative and may be subject to changes, which we would communicate via ILIAS.

Date	Type	Topic
11 Oct 23	Lecture	Introduction
12 Oct 23	Lecture	Energy systems
18 Oct 23	Lecture	Power plants
19 Oct 23	Exercise	Energy systems & power plants
25 Oct 23	Lecture	Short-term dispatch and prices
26 Oct 23	Exercise	Merit order model
01 Nov 23	No class	
02 Nov 23	Lecture	Long-term optimal mix
08 Nov 23	Exercise	Screening curve model
09 Nov 23	Guest lecture (EWI)	Capacity markets
15 Nov 23	Lecture	Electricity storage
16 Nov 23	Lecture	EU electricity markets
22 Nov 23	Buffer	
23 Nov 23	Guest lecture (EEX)	Wholesale markets
29 Nov 23	Lecture	Electricity grids & nodal pricing
30 Nov 23	Exercise	Nodal pricing
06 Dez 23	Lecture	Zonal pricing
07 Dez 23	No class	
13 Dez 23	Exercise	Zonal pricing
14 Dez 23	Guest lecture (EWI)	Bidding zone configuration
20 Dez 23	No class	
21 Dez 23	No class	
25 Dez 23 – 5 Jan 24	Winter break	
10 Jan 24	Lecture	Balancing
11 Jan 24	Exercise	Balancing
17 Jan 24	Lecture	Consumers
18 Jan 24	Exam prep	Exam prep
24 Jan 24	Q & A	Q & A
25 Jan 24	Buffer	
31 Jan 24	No class	
01 Feb 24	No class	