Energy Markets and Regulation (Master) - Syllabus

Dr. Johannes Wagner, Cordelia Frings

Winter term 2021/2022

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Office Hours: on request
Lecture: Fri 10:00-11:30 @ online
Class: Wed 10:00-11:30 @ online

Course Description

The energy sector not only contributes to 65% of global energy consumption and undergoes a related substantial change, it also supplies an input for almost any economic activity. Thus, the secure and safe supply of energy is of important concern for the society. These aspects hold in particular for the supply of electric energy. For that reason, we will put the focus of this course on understanding the economics of power systems.

The importance of power supply, its special characteristics as a good or service, its interactions with other sectors and across different regional dimensions as well as its grid-boundedness and related technological complexities require a distinct investigation of the underlying economics. We will see how and why the economics of power systems deviate from simple models learned in microeconomics 101 courses. This semester the course will consist of four chapters: 1.) Introduction and the History of Power Supply, 2.) Regulating Power Systems, 3.) the Economics of conventional and renewable Generation and 4.) the Economics of Transmission. There are many other interesting and upcoming aspects of power supply, such as electric vehicles, peer-to-peer markets, digitization in general etc. However, we will stick to the basics for most of this course, as a sound understanding of the basics is key to understanding trends. If we have some spare time at the end of the semester, we might discuss some of the trends.

Our intention for this course goes beyond introducing the economics of power systems with a focus on application. We intend to motivate the topics of the course with real-world problems/applications, lecture on the underlying economics from textbooks and challenge you intellectually by deep-diving into some of the most-cited academic papers on the economics of power systems. In addition, we'll have two/three guests that will give practitioner lectures in which they will take a very applied look on things. You could say this course is built on three pillars: real-world, fundamental knowledge and deeper insights from academia.

Course Topics

1. Introduction: History of the Power System

2. Regulating Power Systems
3. The Economics of Generation (Conventional and Renewable)
4. The Economics of Transmission

Literature

1. Introduction: History of the Power System
    - Müller, Leonhard. Handbuch der Elektrizitätswirtschaft: Technische, wirtschaftliche und rechtliche Grundlagen. Springer-Verlag, 2013. Chapter 2 (in German)
2. Regulating Power Systems
    - Höffler, Felix, and Sebastian Kranz. "Legal unbundling can be a golden mean between vertical integration and ownership separation." International Journal of Industrial Organization 29.5 (2011): 576-588.
    - Decker, Christopher. Modern economic regulation: An introduction to theory and practice. Cambridge University Press, 2014. Chapter 8
    - Berg, Sanford V., and John Tschirhart. Natural monopoly regulation: principles and practice. Cambridge: Cambridge University Press, 1988. Part I
3. The Economics of Generation
    (a) Conventional
        - Stoft, Steven. "Power system economics." Chapter 1-3
        - Bhattacharyya, Subhes C. Energy economics: concepts, issues, markets and governance. Springer Science & Business Media, 2011. Chapter 10
        - Kirschen, Daniel S., and Goran Strbac. Fundamentals of power system economics. John Wiley & Sons, 2018. Chapter 4.3
        - Green, Richard J., and David M. Newbery. "Competition in the British electricity spot market." Journal of political economy 100.5 (1992): 929-953.

    (b) Renewable
        - Neuhoff, Karsten. "Large-scale deployment of renewables for electricity generation." Oxford review of economic policy 21.1 (2005): 88-110.
        - Sinn, Hans-Werner. "Buffering volatility: A study on the limits of Germany's energy revolution." European Economic Review 99 (2017): 130-150.
        - Alexander Zerrahn, Wolf-Peter Schill, Claudia Kemfert. "On the economics of electrical storage for variable renewable energy sources" European Economic Review 108 (2018): 259-279.
4. The Economics of Transmission
    - Kirschen, Daniel S., and Goran Strbac. Fundamentals of power system economics. John Wiley & Sons, 2018. Chapter 6.1-6.3
    - Joskow, Paul L., and Jean Tirole. "Transmission rights and market power on electric power networks." The Rand Journal of Economics (2000): 450-487.

Course organisation

Cordelia Frings (MSc.), E-mail: cordelia.frings@uni-koeln.de.
Please do not hesitate to contact us in case of further questions.

This semester the course will be held fully online. Course material and links for the lectures and classes will be provided via the ILIAS platform.

Final Exam

The exam dates are:

- 16.02.2022; 3:00-4:00pm
- 23.03.2022; 5:00-6:00pm

The deadlines for the exam registration via Klips are:

- 25.01.2022 for the exam on 16.02.2022
- 01.03.2022 for the exam on 23.03.2022

Please note that these dates and examination mode might be changed for several reasons. The examination office states: „Alle festgesetzten Termine stehen unter dem Vorbehalt der jeweils gültigen Bestimmungen zur Bekämpfung des Pandemie-Geschehens. Es ist daher nicht ausgeschlossen, dass auch kurzfristig bekannt gegebene Termine verschoben oder geändert werden müssen. Dies gilt ebenfalls für den Fall, dass die abschließenden Anmeldezahlen die großzügig geplante Sitzplatzkapazitäten überschreiten und dann Termine gesplittet werden müssen."

Pracitioner Lectures

We will invite one or two guests over the course of this semester to give practitioner lectures. While we take some time to investigate the academic aspects of energy markets and regulation in the normal lectures, the guests will share their view from a business perspective on relevant topics (not necessarily topics that we had the time to discuss in the course).

Anki Flashcards

Due to the circumstances that the course is offered online, there will not be a Anki flashcard deck this semester.

Course Policies

During Lecture/Exercise

I encourage you to actively participate in this course. There is plenty of research suggesting that cognitive activation (i.e., active participation) has a huge positive impact on your learning. Hence, answer questions, participate in discussions and ask questions if you do not understand anything. In the latter case: It is very likely that you are not the only one that stumbled over that part. If you ask a question, your actions even have a positive externality on others. How cool is that? The university is meant to be a learning environment and not always coming up with the right answer is absolutely normal and often even helps. So do not free-ride on the participation of others, join the discussion!

Academic Integrity and Honesty

Don't cheat.

Schedules

The schedule is tentative and subject to change. We will notify you over changes via ILIAS and update the Syllabus accordingly.

13.10.2021 no course

15.10.2021 no course

20.10.2021 lecture

22.10.2021 lecture

27.10.2021 class

29.10.2021 tba

03.11.2021 tba

05.11.2021 tba

10.11.2021 tba

12.11.2021 tba

17.11.2021 tba

19.11.2021 tba

24.11.2021 tba

26.11.2021 tba

01.12.2021 tba

03.12.2021 tba

08.12.2021 tba

10.12.2021 tba

15.12.2021 tba

17.12.2021 no course

22.12.2021 no course

12.01.2022 tba

14.01.2022 tba

19.01.2022 tba

21.01.2022 tba

26.01.2022 tba

28.01.2022 tba

02.02.2022 tba

04.02.2022 tba