Energy Markets and Regulation (Master) - Syllabus

Dr. Johannes Wagner, Cordelia Frings

Winter term 2020/2021

Mail: wagnerj4@uni-koeln.de Web: www.ewi.uni-koeln.de/de/team/johannes-wagner/
Office Hours: on request Lecture/Class: Fri 10:00-13:30 @ XIa or 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 Cordelia Frings in case of further questions.

Final Exam

tba

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

We offer an Anki flashcard deck for spaced-repitition learning of the content of this lecture. The first time you download the file, Anki will create a new deck of cards. After every update (i.e., us adding cards), we will update the file on ILIAS. You then have to download it and Anki will automatically add the new cards to your deck. You can also add cards on your own. These cards will remain in your deck, even after updating your deck with a new file from ILIAS.

You can download Anki (free of charge, except for iOS) at **https://apps.ankiweb.net/**. An introduction to Anki can be found on the developers website and at **https://youtu.be/QS2G-k2hQyg?t=81** . The Youtube-Video intentionally starts at 1:21 as prior to that they are talking about so-called "public decks". But we are using a "private deck", so no need for the first 81 seconds of the video. The video will introduce you to all the important aspects of using Anki.

Course Policies

During Lecture/Exercise

I understand that the electronic recording of notes will be important for lecture and class and so computers will be allowed in lecture or class. Please refrain from using computers for anything but activities related to the lecture or class.

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

tba