
Prof. Dr. Reinhard Madlener, Chair of Energy Economics and Management, Head FCN

Lecture: “Smart Grid Economics and Information Management”

(V2/Ü2, 81.42457)

Description

The scope of the lecture is the economics and information management of energy markets. The integration of the growing number of renewable energy sources imposes new challenges on energy markets and the power system. For a better coordination of supply and demand it is necessary to interlink centralized and decentralized generators, storage devices, as well as consumers with each other by means of information and communication technologies (ICT). Current electricity networks are extended by intelligent ICT components, thus incorporating the "Smart Grid". The existing market structures for electricity have to be adjusted in order to successfully integrate an increasing number of renewable energy producers, electric vehicles, and new concepts like demand response (DR). Apart from the regulatory and economic background, methods for modeling and analyzing energy markets (i.e. agent-based simulation) are introduced and explained during the course.

Course outline

1. Electricity Markets
 - Market Models, EEX (spot and futures market), Over-the-Counter (OTC) Trade, Market Coupling
2. Regulation
 - Charges and Incentive Regulation, Network Congestion Management
3. Demand Side Management
 - Smart Metering, Tariffs, Price Elasticity, Storage Systems, Electric Mobility
4. Advanced Pricing in the Smart Grid
 - Temporal Pricing, Spatial Pricing, Price Elasticity

Organization

The lectures are grouped into blocks and will be held over 4 days. All lectures will take place from 09:00-14:00 hrs at Wüllnerstrasse 9 in Room 1420/201 (Campus Middle). The lectures are scheduled on the following Tuesdays: April 9, May 21, June 18, and July 9.

The exercise sessions will be held (SemRaum 00.23) on the following Fridays: June 7 (from 12:30 to 14:30 hrs), June 28 (from 12:30 to 16:00 hrs), July 5 (from 12:30 to 14:00 hrs), and July 12 (from 12:30 to 16:00 hrs). Please note that the students are expected to discuss the problem sessions (which will be handed out in advance) with a short presentation. The presentations can be prepared in groups.

The exam dates are: August 7, 2019; September 25, 2019.

Target audience

This course is dedicated to master's (MSc) students in economics and engineering economics, and selected other related fields. In order to find out whether you are allowed to take this course, please get in touch with your study advisor.

Requirements

Basic knowledge in Economics (Micro/Macro) and ideally also in Energy Economics.

Literature (selection)

1. Erdmann G, Zweifel P. Energieökonomik, Theorie und Anwendungen. 1. Aufl. Berlin-Heidelberg: Springer; 2007.
2. Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX. Zeitschrift für Energiewirtschaft. 2008:147-161.

3. Stoft S. Power System Economics: Designing Markets for Electricity. IEEE; 2002., Ströbele W, Pfaffenberger W, Heuterkes M. Energiewirtschaft: Einführung in Theorie und Politik. 2nd ed. München: Oldenbourg Verlag; 2010:349.

Information

Further information can be obtained from the FCN Website (www.eonerc.rwth-aachen.de/fcn). For more specific questions please contact Mahdi Karami (Mahdi.karami@eonerc.rwth-aachen.de).