Prof. Dr. Reinhard Madlener
Lehrstuhl für Wirtschaftswissenschaften,
insbesondere Energieökonomik
Institute for Future Energy Consumer Needs and
Behavior (FCN), E.ON Energy Research Center

Lecture and Exercise Unit (V2/Ü2) in

Smart Grid Economics and Information Management

16ss-42457 (Vorlesung), 16ss-54271 (Übung), 16ss-46631, 16ss-50221 (Klausur)

Description
The scope of the lecture is 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 revamped concepts like demand side management/demand response. The regulatory and economic aspects of electricity markets with an explicit focus on the “Smart Grid” will be covered in detail during this 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/Demand Response
   - Smart Metering, Dynamic Electricity Tariffs, Price Elasticity, Storage Systems, Electric Mobility
4. Advanced Pricing in the Smart Grid
   - Temporal Pricing, Spatial Pricing, Price Elasticity

Target audience
This course is primarily targeted to students in the M.Sc. Program in Economics and Industrial Engineering. Students enrolled in different programs with a background in micro and macroeconomics are welcome, too.

Requirements
Basic knowledge in Economics (Micro/Macro) and Energy Economics

Organization

Lecture
The lectures are grouped into blocks and will be held on Wednesdays between 12:15 and 14:45 hrs on April 27, May 11, June 1, 8, July 6, and July 13. All lectures will take place at the E.ON Energy Research Center SemRaum 00.24 (Mathieustraße 10, Main Building, 52074 Aachen).

Exercise Unit
The exercise sessions will be held on the following Tuesdays between 12:15 and 13:45 hrs: May 24, June 14, 21, and July 12, 19. All exercise units will take place at the E.ON Energy Research Center SemRaum

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00.24 except for the exercise unit on July 19 (On July 19 the exercise unit will take place in SemRaum 00.23). Please note that the students are expected to discuss their solutions during the exercise sessions (the assignments will be handed out in advance) with a short presentation. The presentations can be prepared in groups, and only one student belonging to each group needs to be present.

Exam

The exam dates are: Wednesday August 10, 08:00-10:00 hrs, in room 1010|131 (AachenMünchener Halle (Aula)); September 23, 16:30-18:30 hrs, in room 1820|201 (Fo 1).

Literature (selection)

Erdmann G, Zweifel P. Energieökonomik, Theorie und Anwendungen. 1. Aufl., Berlin-Heidelberg: Springer; 2007. (or 2. Aufl.)

Grimm V, Ockenfels A, Zoettl G. Strommarktdesign: Zur Ausgestaltung der Auktionsregeln an der EEX. Zeitschrift für Energiewirtschaft; 2008:147-161.

Harris C. Electricity Markets: Pricing, Structures and Economics. John Wiley and Sons; 2006.

Stoft S. Power System Economics: Designing Markets for Electricity. IEEE Press; 2002.

Ströbele W, Pfaffenberger W, Heuterkes M. Energiewirtschaft: Einführung in Theorie und Politik. 2nd ed. München: Oldenbourg Verlag; 2010:349.

Information

Further information on this course can be obtained from the FCN Website. For more specific questions please contact Ayse Tugba Atasoy (Office hours: Wednesdays between 14:30-15:30 hrs or by arrangement, room 10.26, E.ON ERC).

Please note that the office hours of Prof. Dr. Reinhard Madlener will usually take place on Thursdays between 10:30-11:30 hrs at the CBO (City Branch Office, Augustinerbach 2a, 2. Stock, R 203), registration by email is recommended, latest information on cancellations or re-arrangements can be found on Prof. Madlener's personal website.