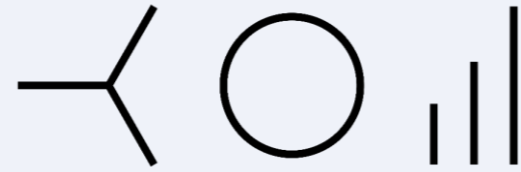


Electricity system modeling



About Neon

[Neon](#) is a Berlin-based boutique consulting firm for energy economics. We advise public and private sector clients on matters such as:

- » [Market value of wind and solar power](#)
- » [\(Whole\) system costs](#)
- » [Market design](#)
- » [Balancing power](#)
- » [Power market modeling](#)
- » [Data processing](#)
- » [Training seminars](#)

About your instructor

Prof. Dr. Lion Hirth is founder and director of Neon. He is energy economist and expert in wind and solar power, power market modeling, and electricity market design. He advises clients in the private and in the public sector. Previously, Lion spent five years with the Swedish utility Vattenfall. Lion holds a Ph.D. in energy economics and has published a number of highly cited academic articles.

- » [Curriculum vitae](#)
- » [Publications](#)
- » [Project references](#)

Executive training seminar

- » For energy professionals in industry, finance, policy making and think tanks
- » Extend your analytical understating of electricity markets and energy economics
- » Understand Europe's electricity sector during crisis, transformation and decarbonization
- » Applied and relevant, yet scientifically sound and rigorous
- » More than 98% of past workshop participants would recommend it to a colleague

Pricing and booking

- » 1.5 days
- » Book individual sessions or the full seminar
- » Prices from EUR 400
- » 50% discount for NGOs and public sector
- » English or German language
- » Ask for in-house seminars and group discount
- » hirth@neon-energie.de
- » [+49 1 57 55 199 715](tel:+4915755199715)

Program overview

- I. [Introduction to electricity system modeling](#)
- II. [Power market modeling: Excel](#)
- III. [Power market modeling: GAMS](#)



Session overview

Session I

Introduction to electricity system modeling

1. The cost of electricity
2. The value of electricity
3. The optimal thermal capacity mix
4. The economics of renewable energy
5. Electricity system models

Session II

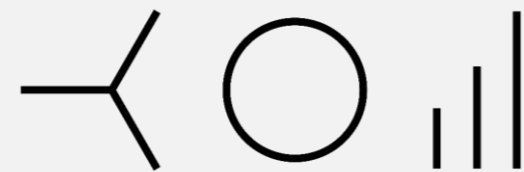
Power market modeling: Excel

6. A simple Excel model

Session III

Power market modeling: GAMS

7. A simple GAMS model
8. The power market model EMMA



A matter of choice

Create your personal schedule

- » Each session = half a day
- » One session: EUR 400 + VAT
- » Two sessions: EUR 700 + VAT
- » Three sessions: EUR 1000 + VAT
- » NGOs and public sector: 50% discount
- » Ask for group discounts and in-house seminars

Introduction to electricity system modeling

1. The cost of electricity
2. The value of electricity
3. The optimal thermal capacity mix
4. The economics of renewable energy
5. Electricity system models

1. The cost of electricity

- » Fixed and variable cost
- » Short-term and long-term profit
- » Cost structure of high- and low-carbon generators
- » Levelized costs of electricity
- » Screening curves
- » *What are the cost components for electricity generation and how can they be aggregated?*

2. The value of electricity

- » Non-storability of electricity
- » Price setting in power markets
- » Fluctuating prices and its reasons
- » Market value
- » *What determines the economic value of one MWh of electricity?*
- » *What drives the value gap of electricity from different plant types?*

3. The optimal thermal capacity mix

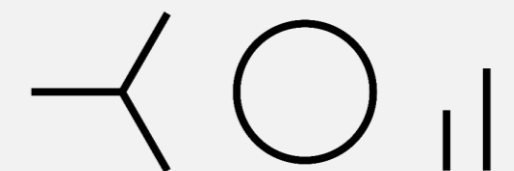
- » Load duration curves
- » Residual load duration curves
- » Optimizing the plant mix with pen and paper
- » The impact of renewable energy on the optimal generation mix
- » *What is the cost-minimal capacity and generation mix?*
- » *Why does base load disappear?*

4. The economics of renewable energy

- » “The Energiewende is all about wind and solar power” – is Rainer Baake right?
- » Cost structure and cost drivers
- » The dramatic decline of equipment cost
- » The role of resource quality in costs
- » The role of capital costs in costs
- » Market value of wind and solar power
- » *What drives the economics of renewable energy?*

5. Electricity system models

- » Types of electricity system models
- » Data requirements and sources
- » Applications and research questions
- » Optimization vs. simulation vs. agent-based models



Session II

Power market modeling: Excel

6. A simple Excel model

6. A simple Excel model

- » Optimal generation and capacity mix model
- » Hourly resolution
- » Ideal to test your intuition and for first quantifications

Do it yourself! Build your own simple, yet insightful power market model in one day.

Session III

Power market modeling: GAMS

7. A simple GAMS model

8. The power market model EMMA

7. A simple GAMS model

- » Optimal dispatch and investment model
- » Optimal renewable investment
- » Hourly resolution
- » Power system details: combined heat and power and system service constraints
- » Runs on free test version of GAMS

8. The EMMA model

- » Use a medium-scale open-source GAMS power market model
- » Tested and realistic
- » Expand the model according to your needs

