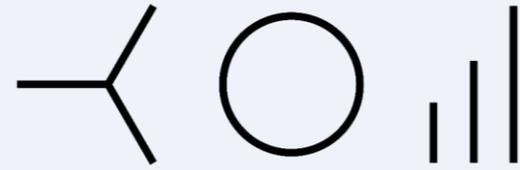


Power Markets & Energy Economics



About Neon

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

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

About your instructor

Prof. Dr. Lion Hirth is founder and director of Neon. He also teaches at Hertie School of Governance. Lion is energy economist and expert in wind and solar energy, power market modeling, and electricity market design. He has five years of industry experience, 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 and think tanks
- » Extend your analytical understanding 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 previous participants would recommend it to a colleague

Pricing and booking

- » Two days
- » Book individual sessions or the full seminar
- » Prices starting from EUR 400
- » 40% discount for NGOs and public sector
- » 10% early bird discount
- » English or German
- » In-house seminars and group discounts
- » neon-energie.de/seminar
- » hirth@neon-energie.de
- » [+49 1 57 55 199 715](tel:+4915755199715)

Program overview

- I. [Fundamentals of electricity economics](#)
- II. [Renewable-based power systems](#)
- III. [Current topics in electricity economics](#)
- IV. [Energy and climate policy](#)



Session overview

Session I

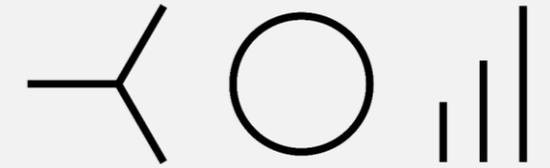
Fundamentals of electricity economics

1. The electricity sector
2. Power plants
3. The cost of electricity
4. The value of electricity
5. The long term

Session II

Renewable-based power systems

6. The cost of renewable energy
7. The value of renewable energy
8. Markets for electricity
9. Power grids
10. Balancing energy – [see example slides](#)



A two-day introduction into modern energy economics and current policy debates.

Session III

Current topics in electricity economics

11. System transformation
12. System-friendly renewables
13. Batteries and prosumers
14. Market design
15. The power price plunge

Session IV

Energy and climate policy

16. Externalities and policy instruments
17. Renewables support schemes
18. Auction design
19. Emissions trading: the EU ETS

A matter of choice

Create your personal schedule

- » Each session = half a day
- » Individual sessions: EUR 400 + VAT
- » Two-day seminar: EUR 1200 + VAT
- » NGOs and public sector: 40% discount
- » Early bird (3 months): 10% discount
- » Group discounts and in-house seminars

Fundamentals of electricity economics

1. The electricity sector
2. Power plants
3. The cost of electricity
4. The value of electricity
5. The long term

1. The electricity sector

- » Energy data
- » The electricity sector value chain
- » Generation
- » Transmission
- » Distribution
- » Retailing / sales

2. Power plants

- » Power plant technology for non-engineers
- » Coal-fired power plants
- » Gas-fired combined cycle plants
- » Hydroelectricity
- » Wind power
- » Solar photovoltaics

3. 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

4. The value of electricity

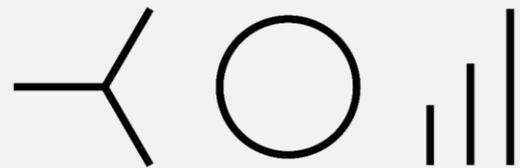
- » Non-storability of electricity
- » Price setting in power markets
- » Fluctuating prices and its reasons
- » Market value of wind and solar energy

5. The long term

- » 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

Electricity is fundamentally different from other commodities.

Understand why.



Renewable-based power systems

6. The cost of renewables energy
7. The value of renewable energy
8. Markets for electricity
9. Power grids
10. Balancing energy – [see example slides](#)

6. Cost of renewables

- » “The Energiewende is all about wind and solar power” – is Rainer Baake right?
- » Cost structure and cost drivers
- » The dramatic cost decline
- » The role of cost of capital

6. Value of renewables

- » Market value of wind and solar energy
- » Market data
- » Model results
- » Mitigation options



21st century power systems will be dominated by renewables.

See the difference.

7. Markets for electricity

- » Three markets for electricity: retail, wholesale, system services
- » Composition of retail prices
- » Future and spot markets
- » Power exchanges and over-the-counter trading

8. Power grids

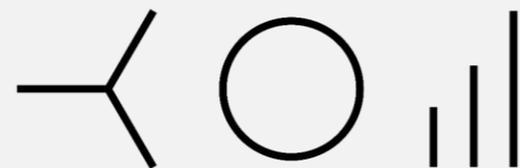
- » Fundamentals of integrated power systems
- » Overview of transmission and distribution technology
- » DC load flow
- » Zonal pricing and nodal pricing
- » Redispatch and congestion management

9. Balancing energy

- » Balancing reserve requirements
- » Balancing power auction design
- » Imbalance pricing
- » Recent reforms and further reform options
- » The German “balancing paradox”
- » Balancing power provision by wind and solar power

Current topics in electricity economics

- 11. System transformation
- 12. System-friendly renewables
- 13. Batteries and prosumers
- 14. Market design
- 15. The power price plunge



11. System transformation

- » Flexibility options for renewable system integration
- » Long-distance interconnection
- » Flexible thermal power plants
- » Demand side integration
- » Hydro power
- » Electricity storage
- » Storage market update
- » Storage for balancing power

12. System-friendly RE

- » System-friendly wind: low wind-speed turbines
- » System-friendly solar: east- and west-orientation
- » Hydro reservoirs: using the Nordic region as Europe's battery?
- » Benefits and costs

13. Batteries and prosumers

- » Battery technologies
- » Recent trends in battery deployment and pricing
- » Auto-generation / self-consumption of electricity
- » Cost, benefits, and incentives
- » Market design for a "prosumer world"

14. Market design

- » Electricity market design
- » Investment incentives for power generation
- » Energy-only markets with scarcity pricing
- » Flexibility: the "EOM 2.0"
- » The current capacity market discussion in Europe

15. The power price plunge

- » European electricity wholesale price development since 2008
- » The European utility crisis
- » Reasons for the price drop: is it all renewable energy?

Power systems are undergoing fundamental transformations.

Be part of it.

Energy and climate policy

- 16. Externalities and policy instruments
- 17. Renewables support schemes
- 18. Auction design
- 19. Emissions trading: the EU ETS

16. Externalities & policy instruments

- » First theorem of welfare economics
- » Perfect and complete markets
- » Market failure
- » Internalization instruments
- » Price and quantity instruments

17. Renewables support schemes

- » Reasons to support renewable energy – or not
- » Different types of support schemes
- » Risk structure of support schemes
- » Policy design
- » A history of the EEG

18. Auction design

- » The rapid rise of auctions for renewable energy
- » Design elements for auctions
- » Avoiding underbidding and maximizing realization rates
- » Key risks and de-risking strategies

19. Emissions trading: the EU ETS

- » EU ETS
- » Price determination: fundamentals, expectations, speculation
- » Reasons for the price decline in the EU ETS
- » Reform options and proposal



Renewable energy support and climate action are shaping the energy sector.

Understanding policy has never been more important.