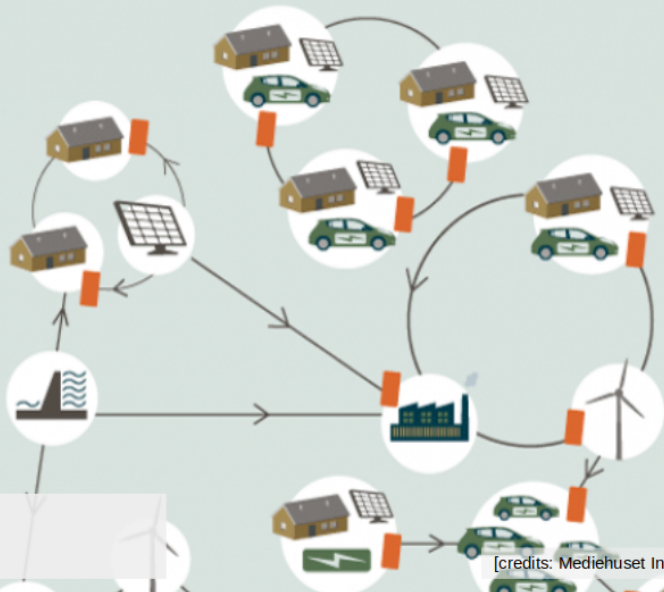
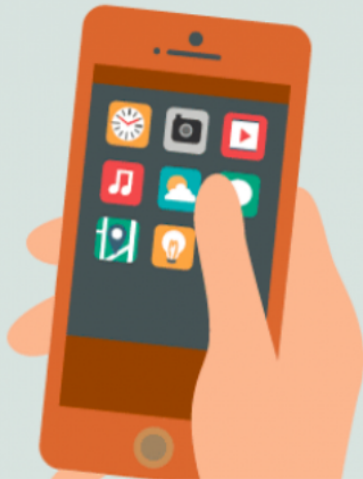


# Module 1 – Fundamentals of Electricity Markets

## 1.2 Actors, roles and market organization



**Pierre Pinson**  
Technical University of Denmark

[credits: Mediehuset Ingeniøren]

# Who are we talking about?

Can you list all the actors...

- involved in *power system operation*?
- and that interact with the *electricity market*?

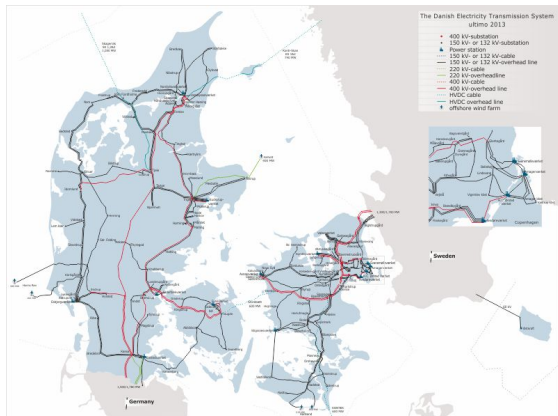
[For the case of Denmark, a description of the actors is available at:

<http://www.energinet.dk/EN/EI/Engrosmarked/Viden-om-engrosmarkedet/Sider/Roller.aspx>]

# Those who operate the power grid(s)

- **TSO** - Transmission System Operator

The TSO operates the transmission assets and is responsible for the power balance on the transmission system. For the example case of Denmark, it is *Energinet.dk*



- **Disco**: Distribution company / Distribution System Operator (DSO)

The DSO operates the distribution grid, and often additionally acts as a retailer. Examples in Denmark include, e.g., *Radius*, *Syd Energi*, *SEAS-NVE*, etc.

- **Genco** - Generating company (also referred to as Independent Power Producer - IPP)

The Genco owns production assets (from single generator to a portfolio), whose generation is offered through the electricity market. Ex: *Ørsted, Vattenfall, etc.*

- **Retailer**

The Retailer buys electricity *en gros* from the wholesale electricity market, to then be sold to the end-consumers. Ex: *Ørsted, Vindstød, GetBarry, etc.*

- **Consumers (large and small)**

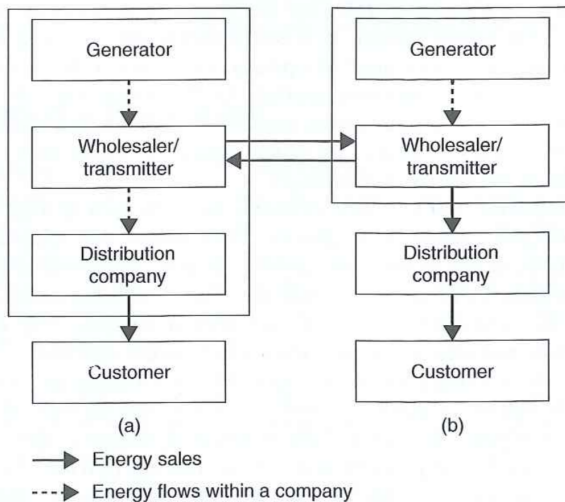
Those eventually use the electricity for any purpose (from watching TV to heating to industrial production processes). There is a difference between small and large consumers, since the latter ones may be allowed to directly participate in the wholesale electricity market.

- **Regulator**

The regulator is responsible for the market design and its specific rules. It also monitors the market in order to spot misbehavior in electricity markets (collusion, abuse of market power, etc.). Exs: *The Danish Energy Regulatory Authority – DERA, CRE in France, Ofgem in the UK, etc.*

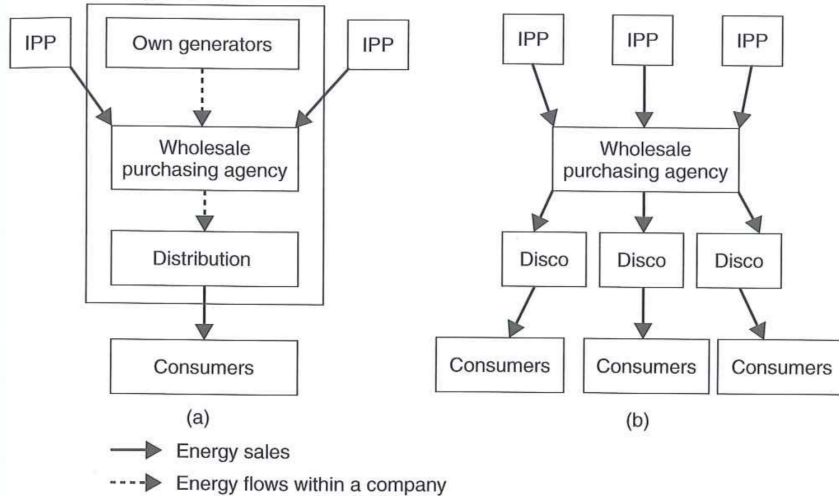
- **The Market Operator**

The Market Operator organizes and operates the market place. This may include the definition of bid products and bid forms, set up and maintenance of the trading platform, daily matching of supply and demand offers, etc. Ex: *Nord Pool, APX, EEX, PowerNext, etc.*

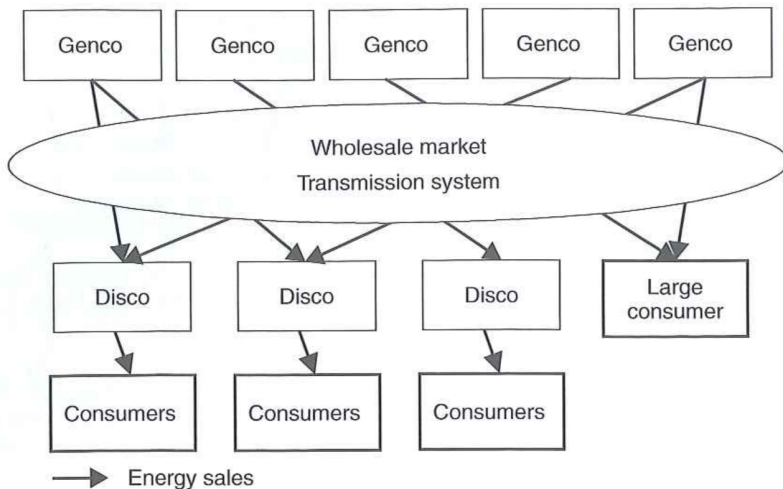


[source: Kirschen D and Strbac G (2018). *Fundamentals of Power System Economics, 2nd Ed.*, Wiley]

## Organization: Purchasing agent

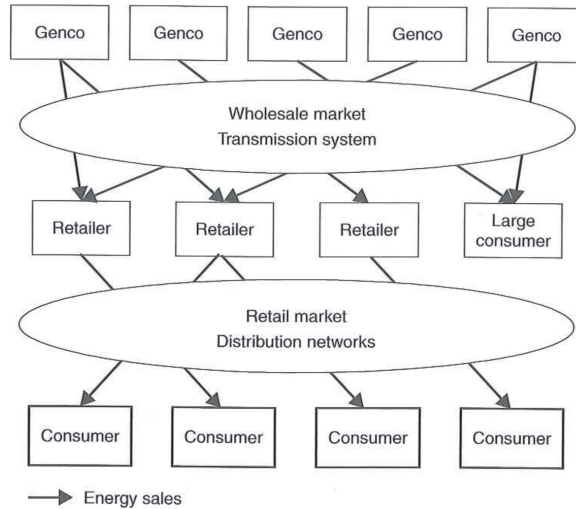


[source: Kirschen D and Strbac G (2018). *Fundamentals of Power System Economics, 2nd Ed.*, Wiley]



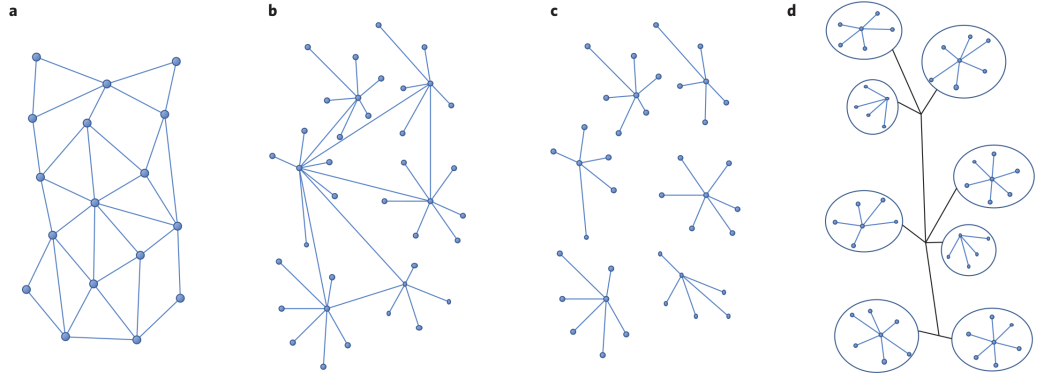
[source: Kirschen D and Strbac G (2018). *Fundamentals of Power System Economics, 2nd Ed.*, Wiley]





[source: Kirschen D and Strbac G (2018). *Fundamentals of Power System Economics, 2nd Ed.*, Wiley]

# In the future... consumer-centric electricity markets?



**Figure 1 | Structural attributes of three prosumer markets.** **a**, Peer-to-peer model, in which prosumers interconnect directly with each other, buying and selling energy services. **b, c**, More structured models involving prosumers connected to microgrids. These entail prosumer-to-interconnected microgrids, in which prosumers provide services to a microgrid that is connected to a larger grid (**b**), or prosumer-to-islanded microgrids, in which prosumers provide services to an independent, standalone microgrid (**c**). **d**, Organized prosumer group model, in which a group of prosumers pools resources or forms a virtual power plant. Dots represent prosuming agents; lines represent a transaction of prosuming service; circles represent an organized group of prosumers.

[source: Parag Y, Sovacool BJ (2016). Electricity market design in the prosumer era. *Nature Energy* 1, art. no. 16032]

**Use the self-assessment quizz to check your understanding!**

