

# Customer stratification and different concepts of decentralization

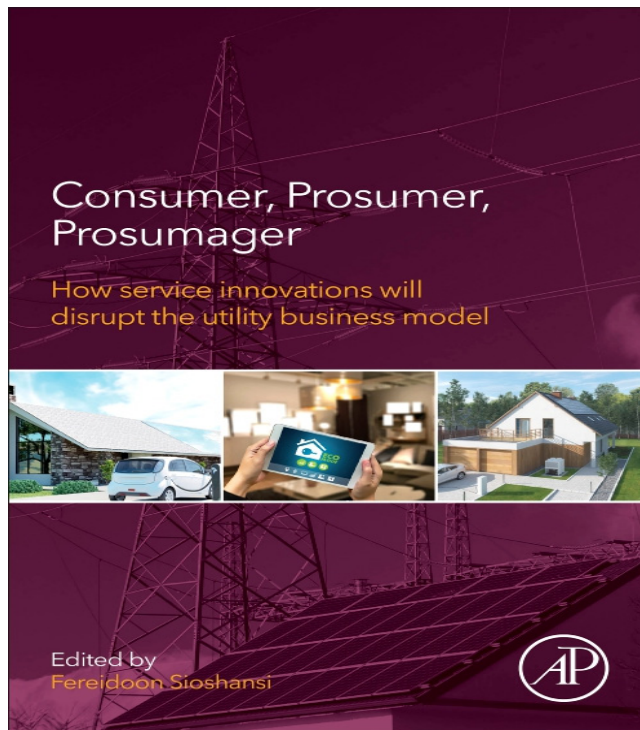


Dr. Dierk Bauknecht  
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**KOPERNIKUS**  
**>>PROJEKTE**  
Die Zukunft unserer Energie

GEFÖRDERT VOM  
 Bundesministerium  
für Bildung  
und Forschung

## Book chapter: Customer stratification and different concepts of decentralization



- Decentralization has a range of different meanings
- Each with specific consequences for the role of consumers.
- And specific system implications

## Techno-economic dimensions of decentralisation

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Connectivity: Network level of plants

Decentralisation increases with more renewables

Flexibility: Network level of flexibility

Decentralisation increases with RES & new consumers

Proximity: Geographical distribution

Generation close to demand?

Coordination of generation and demand

See Funcke, Bauknecht (2016): Typology of centralised and decentralised visions for electricity infrastructure Utilities Policy, 40, June 2016, Pages 67-74

## Decentralisation of coordination

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Starting point: The centralised model

- Copper plate to enable all market transactions
- Integrated market
- Consumers are located at the end of the supply chain

In Germany, we observe **3 developments/debates** (all driven by the rise of renewables) that are **often mixed up**

- I. Management of network constraints
- II. Markets for regional products, P2P and self-consumption
- III. Compulsory cells

# Decentralised Coordination I: Management of network constraints

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Managing network constraints rather than enabling all market transactions via the grid

- Still a centralised market
- Decentralisation of generation/demand balancing only in times of network constraints
- Prosumers can offer their flexibility

Regulatory approaches:

- At the moment: Redispatch and renewable curtailment
  - Energy based: Nodal or zonal pricing
  - Network based: Variable network tariffs
  - Targeted Flexibility Markets: Network operators buy flexibility from market participants
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## Decentralised Coordination II: Voluntary markets

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- A second group of approaches is not triggered by network constraints, but by voluntary demand for specific (regional) products
  - Self-consumption and landlord-to-tenant electricity supply
  - Consumers (without self-generation or storage) may decide to buy specific regional products
  - Trade between prosumers/ prosumagers → Peer-to-peer

## Self-consumption (Prosumer/prosumager)

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1. System economics: Is local balancing cheaper than grid usage?

Maybe, if storage continues to become cheaper, but maximisation of SC not useful

2. Does regulation reflect system costs? Grid still required!

3. Increasing acceptance?

Maybe for some, but attractive feed-in tariffs for self-generation did the job as well

4. Developing PV potential?

May help, but panels for SC often too small

5. EU: Self-consumption to replace support schemes?

## Supply of regional products

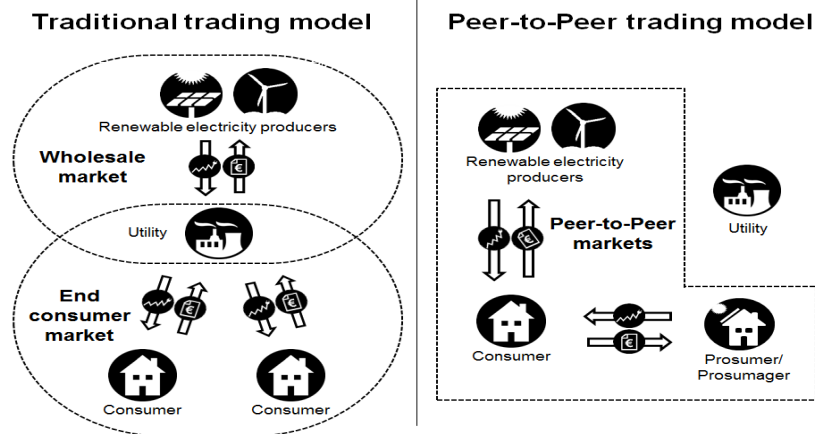
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Even consumers without self-generation or storage may decide to buy specific products, such as green electricity or regional products.

We expect potential to be low,  
similar to voluntary markets for green electricity



## Peer-to-Peer trading model



Potential economic advantage through reduced transaction costs and more market participants

But dispatch decision will not change, unless people are prepared to pay higher prices

Again: Potential for this expected to be small

P2P platforms with economies of scale? → Centralised markets?

## Decentralised Coordination III: Compulsory cells

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Decentralisation of generation/demand balancing not only in times of network constraints or consumer preferences, but as a general priority

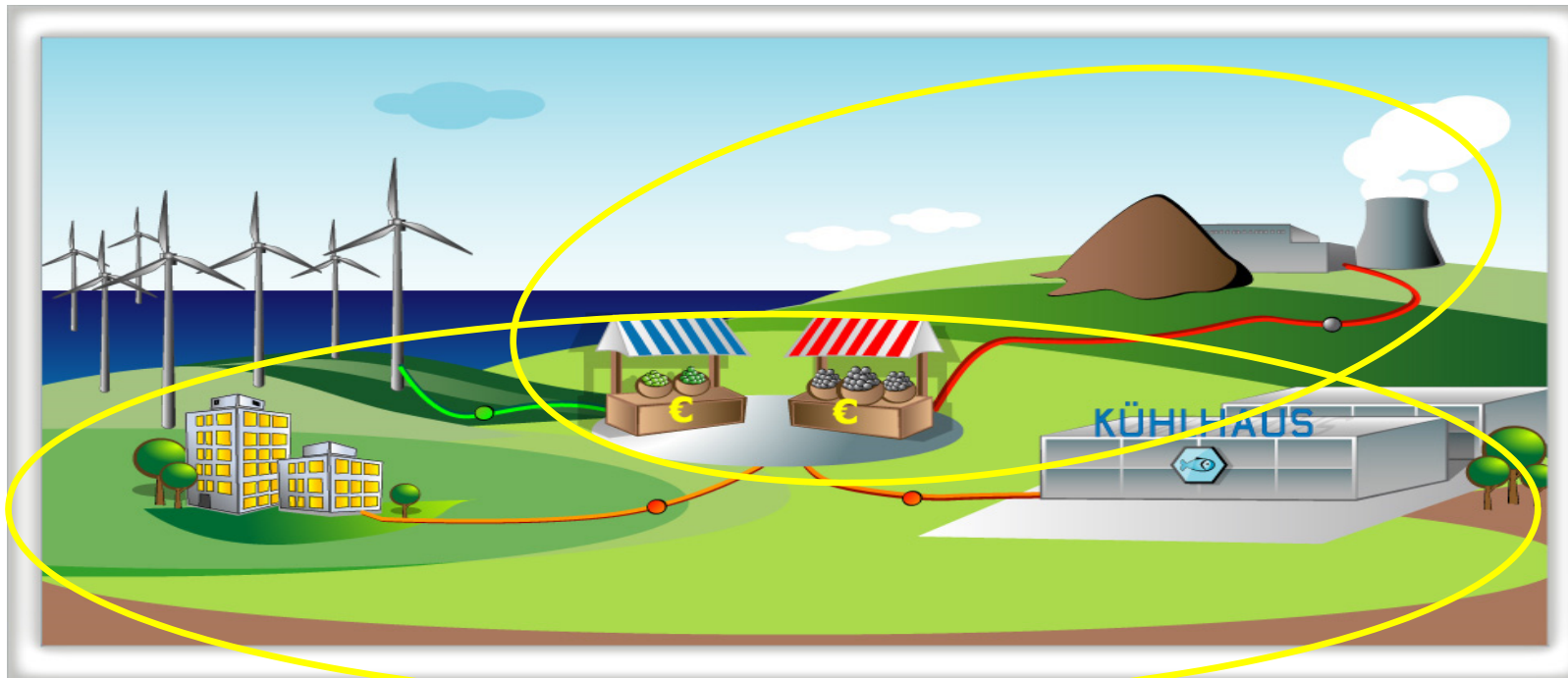
Trading between cells only if they cannot balance generation/demand within the cell

Cells would thus become a regulated and compulsory element of electricity systems, like today's balancing groups.

Possible Objectives:

- Reducing network expansion
- Managing complexity (Is this an energy or an IT issue?)
- Enabling local solutions that are not viable in a larger liberalised market

# Decentralised Coordination III: Coordination via compulsory regional market places?

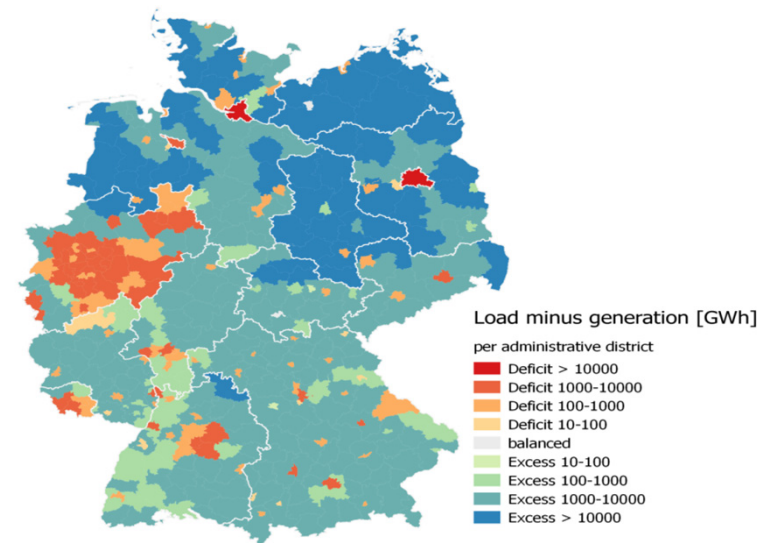


# Theoretical degree of self-supply within administrative districts in Germany

Which level is feasible & optimal for regional markets?

Also depending on available flexibility

→ Additional flexibility costs (investment and operation)



## Regulatory issues

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Cell approach is at odds with the liberalised market: Consumers cannot buy and generators cannot sell outside the cell.

How will the borders of cells be defined and who decides on the structure of the cells? Would the definition of cells be aligned with the current grid infrastructure?

Who would manage the cells? → New market role?

How much price variation between cells is acceptable?

Not clear whether higher prices in some cells has the expected effect (more “useful” local activities)

## Contact

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