



Foto: Martin Braun

## Local Energy Markets: Designs and Interfaces

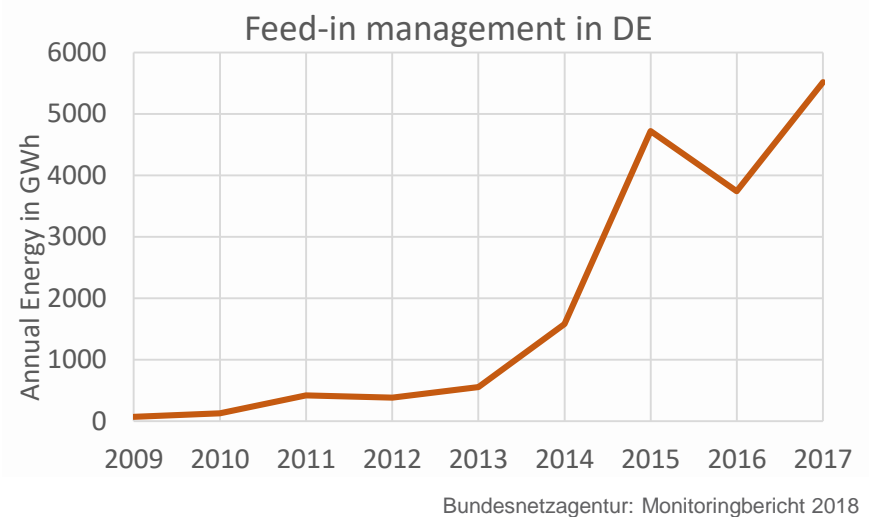
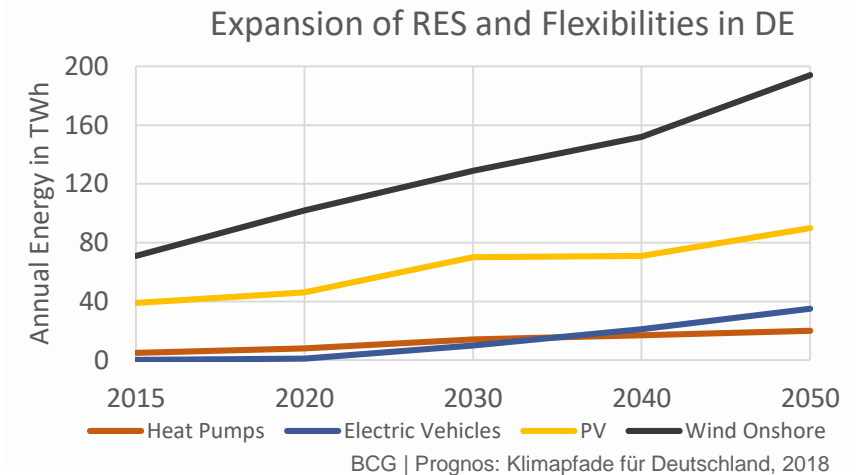
CEEM CONFERENCE on LOCAL FLEXIBILITY PLATFORMS: Which Design and Governance to Support an Efficient Interface with National and European Markets?

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Université Paris-Dauphine, May 29<sup>th</sup> 2019

- ▶ Introduction
- ▶ Local Energy Market Designs
- ▶ Interfaces to DSOs and TSOs
- ▶ Interfaces to Central Electricity Markets

- Current trends in energy systems:
  - Electrification and sector coupling (heat and mobility sectors)
  - Increasing share of renewables
  - New information and communication infrastructure
  - Growing number of small-scale producers and prosumers with no direct access to central markets
  
- Increasing congestion management:
  - Grid congestions on distribution and transmission grid level
  - Rising Redispatch and feed-in management costs
  
- New market- and grid-oriented coordination and integration concepts for distributed flexibilities and renewables needed



### Local Flexibility Markets (FXM)

- Market-based congestion management on distribution / transmission grid level
- Market Platform with distribution system operators (DSO) / transmission system operators (TSO) as buying entities
- Flexibility as deviation from market-based schedule

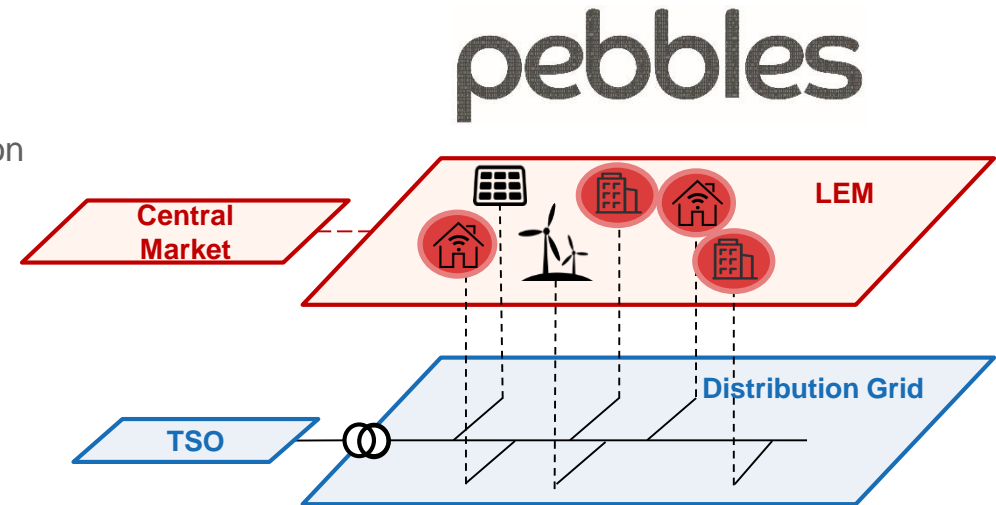
### Local Energy Markets (LEM)

- Market platform for energy trading among local producers, consumers and prosumers
- Incentive mechanism for PV and flexibility expansion
- Increase of local self-consumption and reduction of transmission grid usage

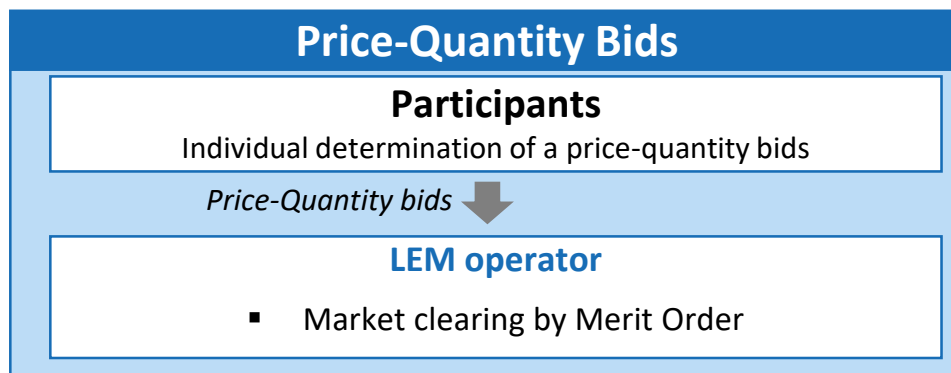
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Different use cases for local markets  
→ Different interfaces to grid operators and central market platforms

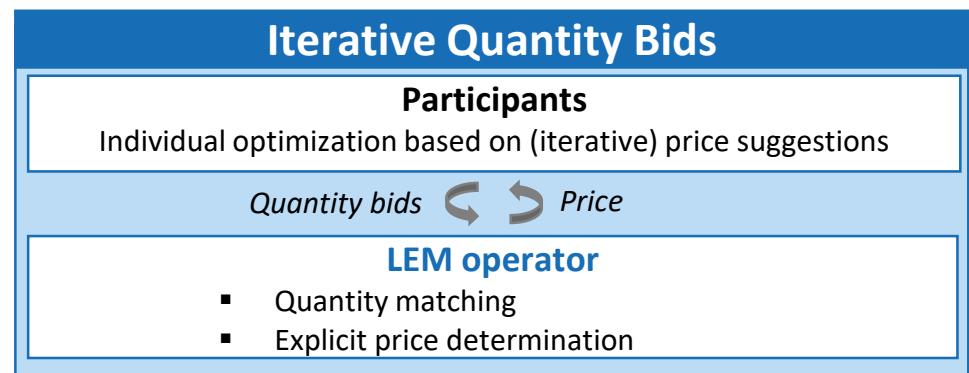
- Market design premises
  - (Day-)Ahead market
    - Increased liquidity and optimal flexibility allocation
    - Increased uncertainty
    - Extension by Intraday trading
  - Uniform pricing
  - Market area defined by distribution grid area
    - Tariff/ Tax reductions for locally traded energy



## ■ Market mechanism options



➤ Price determination problem for participants



➤ Price coordination problem for LEM operator



### Interface to TSO

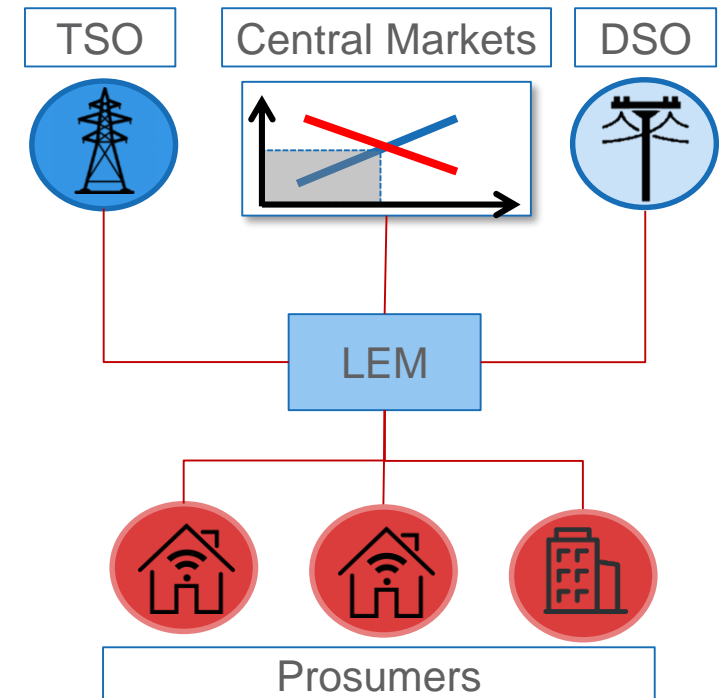


- Explicit interface between LEM and TSO widely disregarded
- Potential for time-based transmission grid fee reductions for local energy imports
- Variation of transmission grid fees by TSO to influence LEM participation and outcomes („Nodal Pricing“ by TSO)

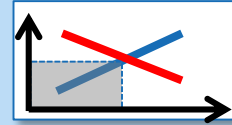
### Interface to DSO



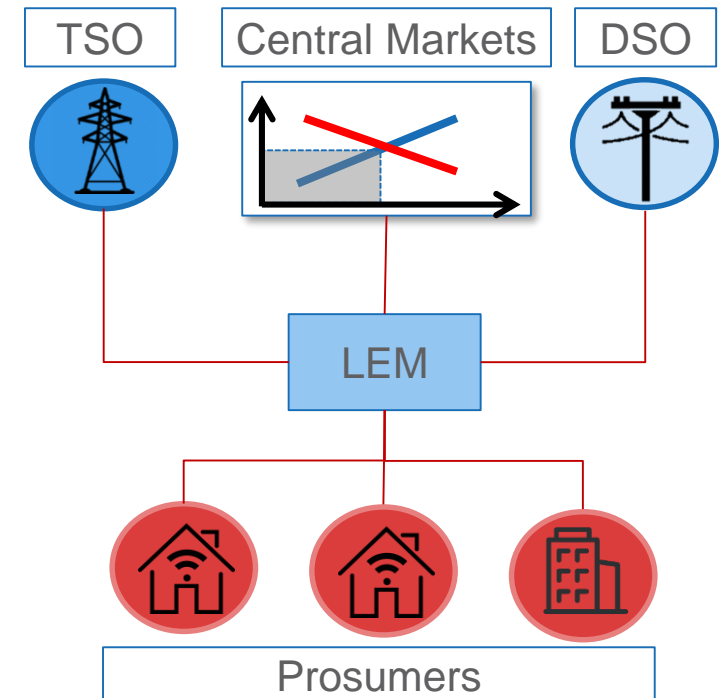
- Temporary restrictions for trading on LEM to prevent asset overloads
- Zonal pricing within LEM
- DSO grid tariff depending on voltage level usage
- Potential for reduced distribution grid expansion



### Interface to central markets



- Interface depending on LEM objective:
  - „Direct“ interface for increasing liquidity on local market as opposed to restriction of LEM participation to local assets
- Interface options:
  1. Neutral Market Coupling:
    - Platform operator is offering energy to LEM at central spot prices and aggregating local market residue
    - Market-making as a service
  2. Open trading platform for central market players
    - Prevention of gaming through competition
    - Approximation of neutral market coupling
    - Unbundling between platform operation and trading
- Market closing times as further interface issue:
  - Price risk (LEM closing before central market closing)
  - Quantity risk (Central market closing before LEM closing )



# Thank you for your attention



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