Balancing and Intraday market Design – Options for Wind Integration

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The Role of Power Market Design for the Achievement of the 20% Renewables Target

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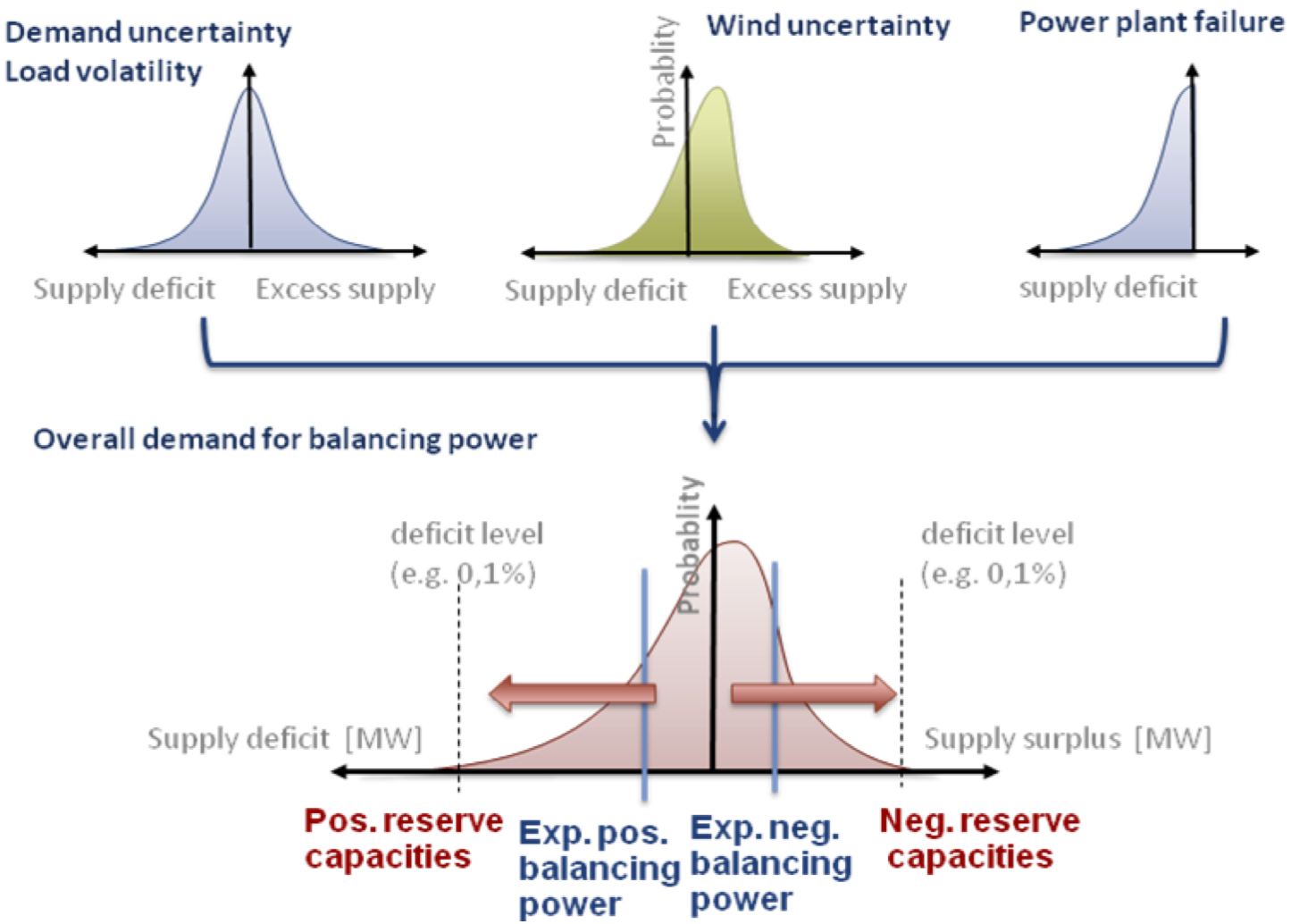
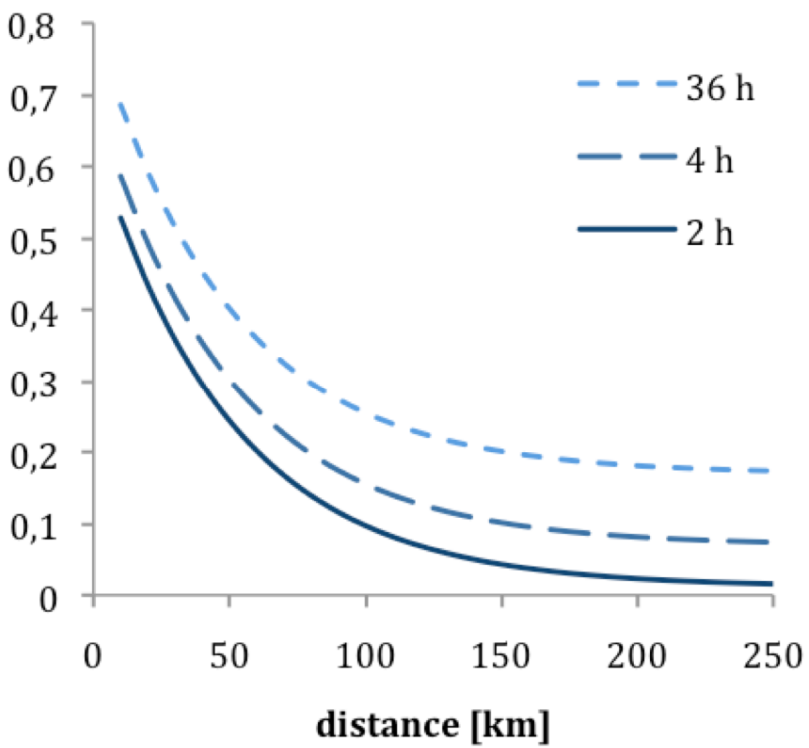
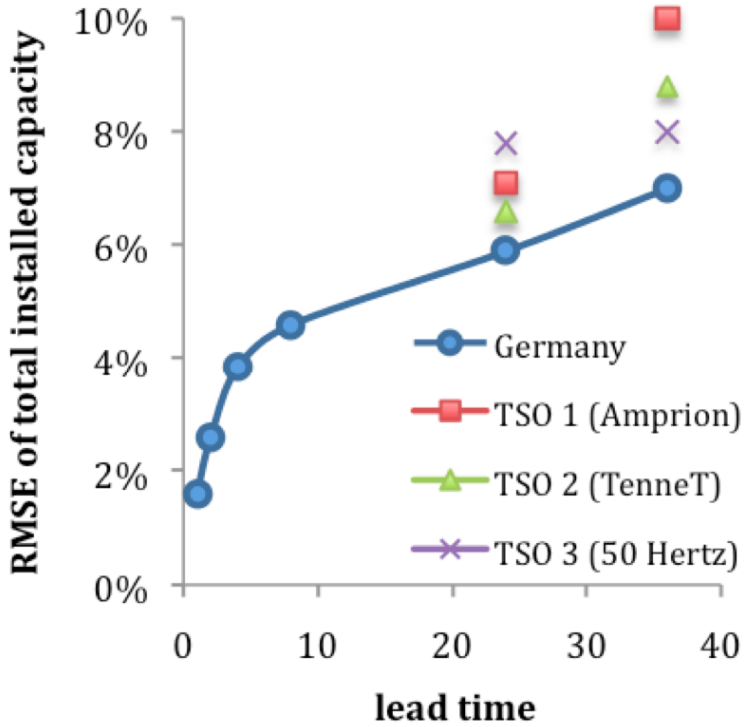
Wind and system uncertainty



Wind uncertainty depends on size of region and lead time





Source: Own, DENA II forthcoming 2010, Roon und Wagner 2009

Potential to integrate wind depends on ...

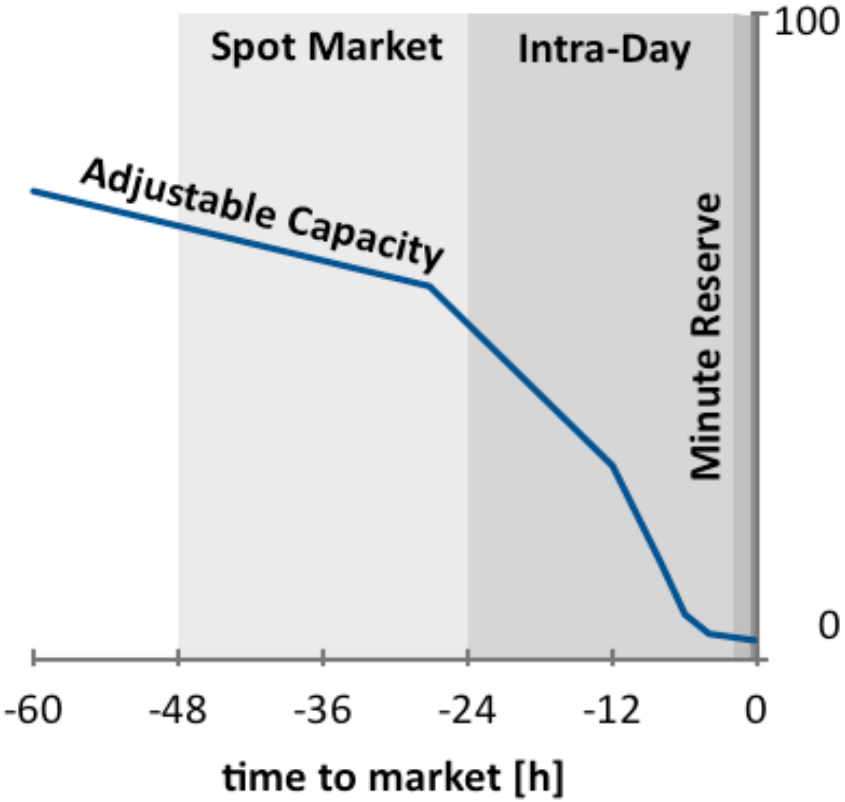
Potential supply of balancing services

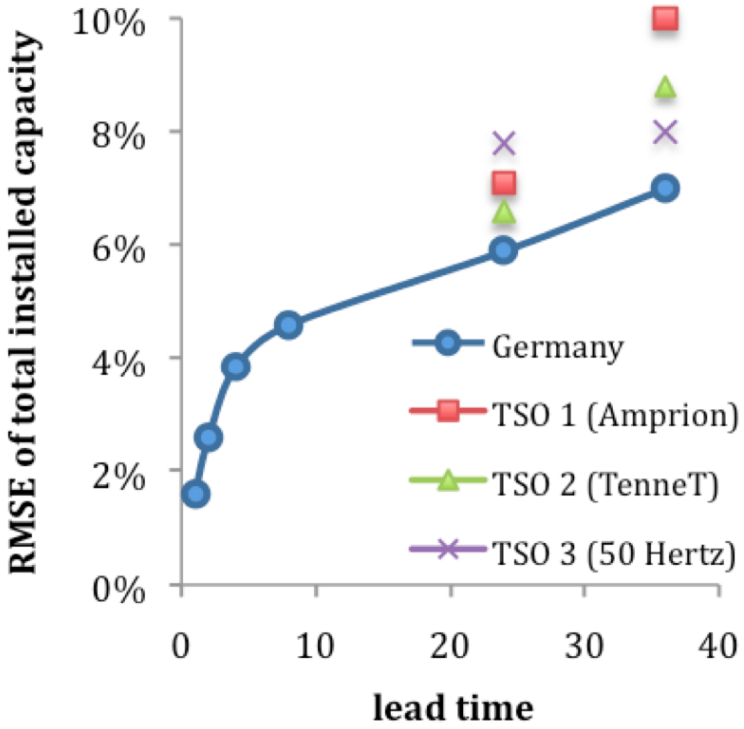
- Technical constraints
- Interaction with energy markets
- Interaction with transmission constraints
- Market power

Demand uncertainty

- Reducing lead time of forecasts
- Improving accuracy of wind forecasts
- Averaging wind putput over larger areas

Lead time – benefit and drawback





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Criteria for an efficient market design

Efficient dispatch of the market:

- Does the market make full use of information as it is improving during the day?
- Will incentives exist for the least-cost source of balancing to provide them?
- How transparent and liquid is the market?

Market access:

- Will all actors that technically could respond be included into market?

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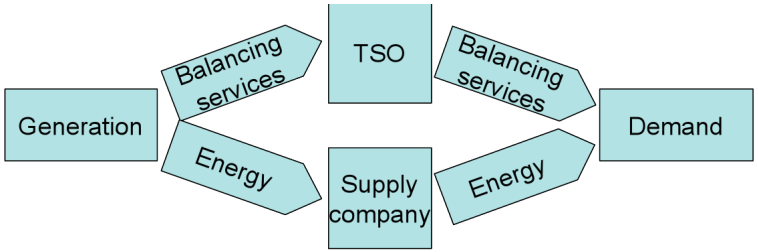
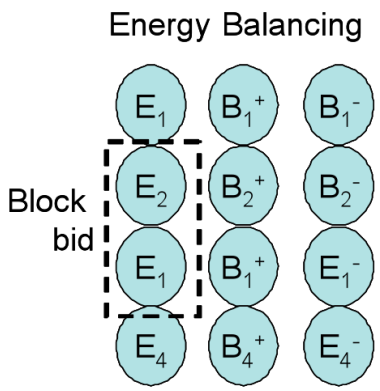
Does the market make full use of information as it is improving during the day?

1. Ability to optimize between balancing and energy markets



2. Joint provision of power accross multiple hours



3. Ability to re-optimize dispatch of power systems within day

4. Efficient dispatch of the market

Does the market make full use of information as it is improving during the day?

- Intraday-markets become more important
- System of block-bids has worked well in the past but difficult for the future
- Bids must consider intertemporal aspects
- and interactions between Spot- and balancing markets

Will incentives exist for the least-cost source of balancing to provide them?

- Transparent information on bids and system state
- Institutional capacity to perform market power analysis -> Transparency

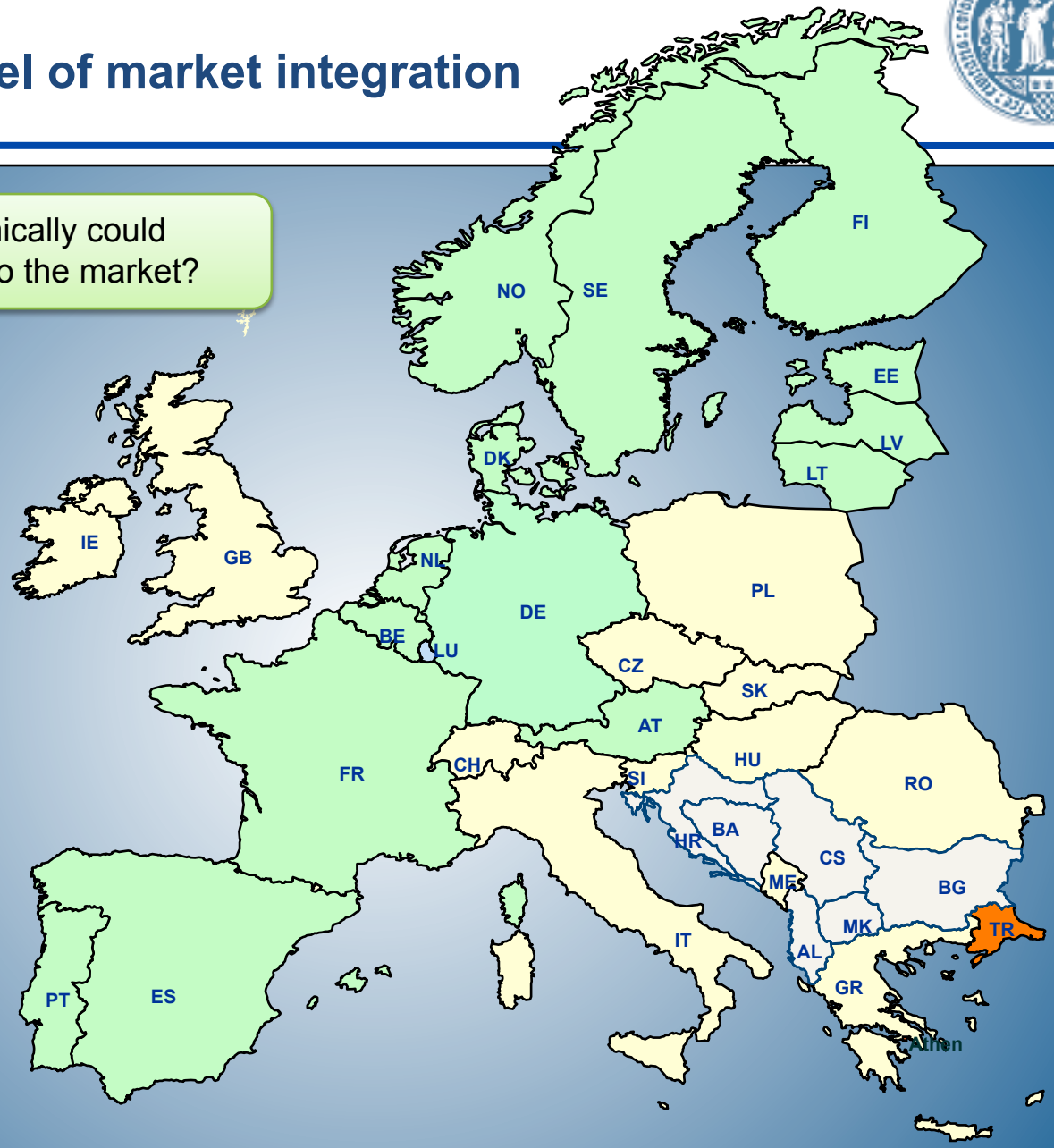
How transparent and liquid is the market?

- Can current bilateral market mechanism allow for efficient dispatch AND ensure liquidity of the market?

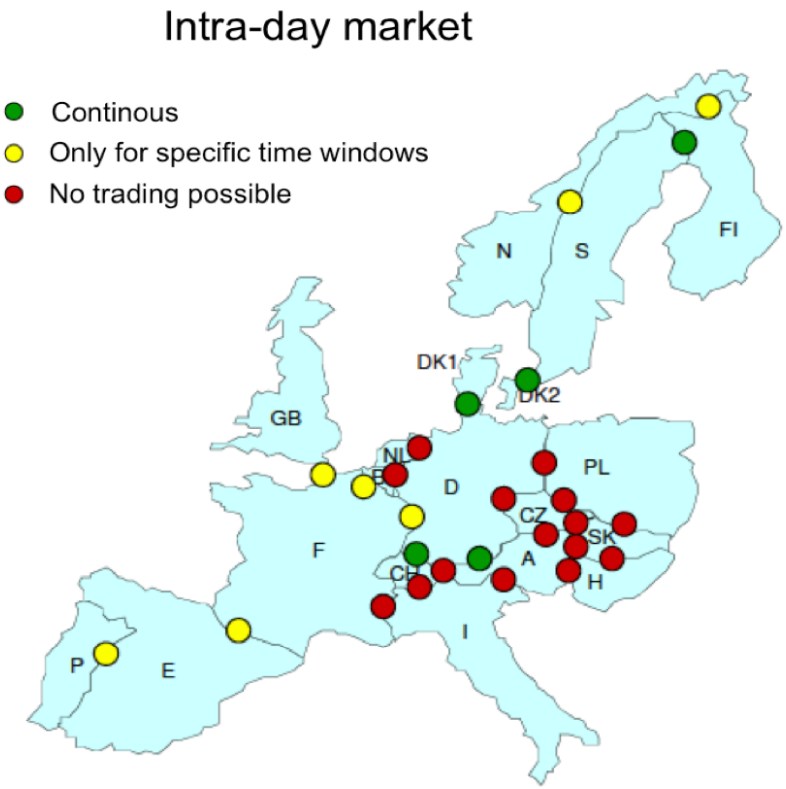
-> Need for a complex market design

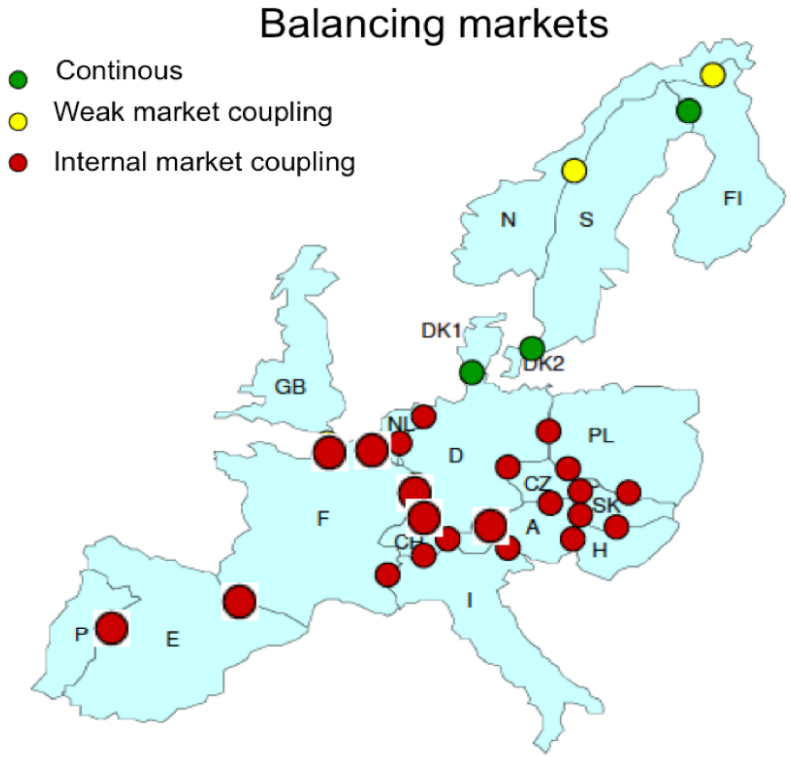
Spot market – level of market integration

Will all actors that technically could respond be included into the market?



Market coupling - still some way to go





Market access must be improved

Will all actors that technically could respond be included into market?

- Internal European market for intra-day and balancing – still some way to go!
- Internal market coupling mechanism for intra-day and balancing technical feasible (Flow based market coupling)
- However in EU no consensus yet
- Balancing market in many countries low priority

- Market barriers for DSM and renewables

Different approaches to provide reliable market design for integration of renewables

Different approaches

- Increase liquidity of intra-day markets
- Spanish System
- Nord-Pool type zonal pricing
- PJM approach
  -> Stream line

How to chose a Solutions?

Thank you for your attention