



Balancing and Intraday market Design – Options for Wind Integration

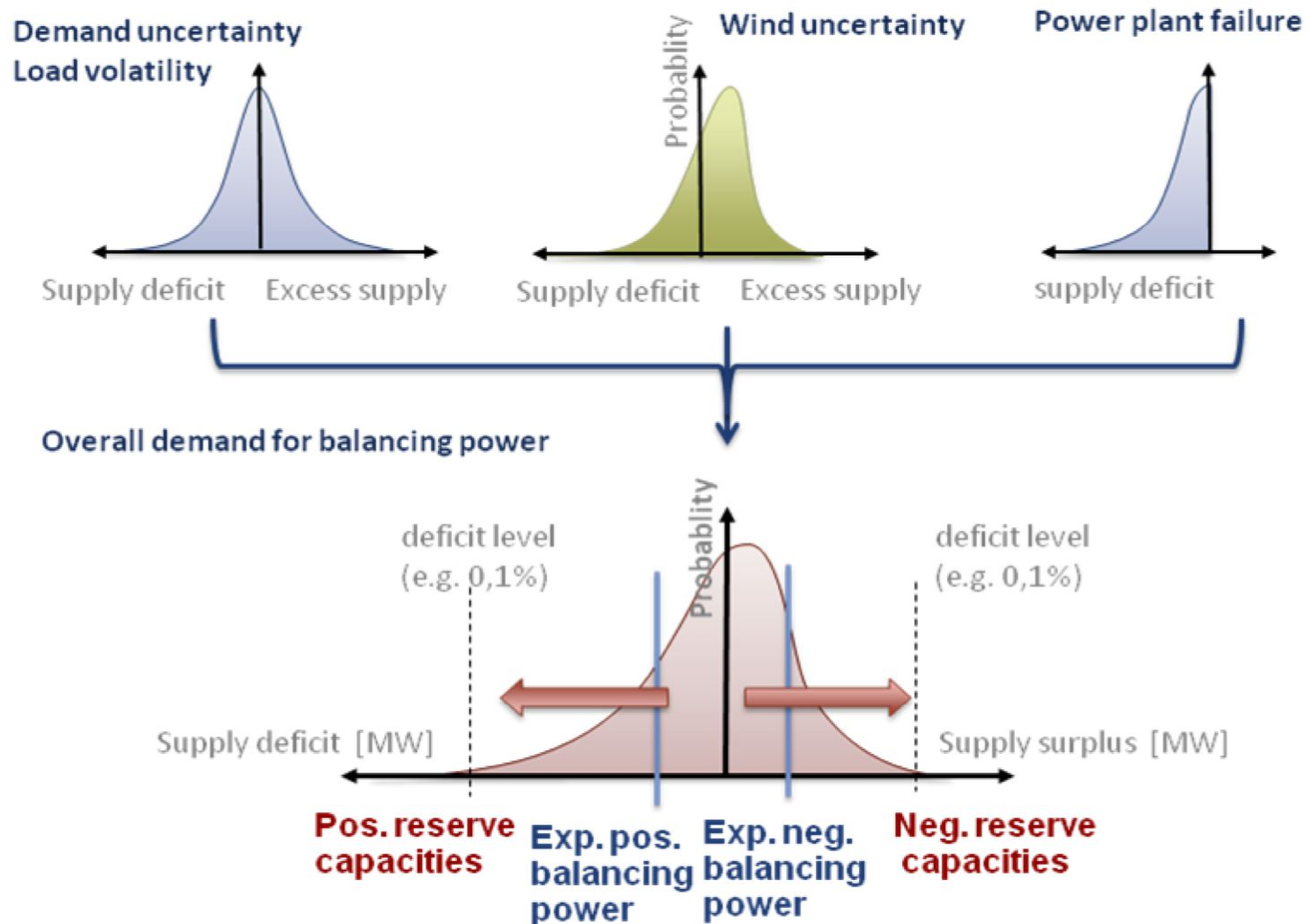
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The Role of Power Market Design for the
Achievement of the 20% Renewables Target

Brussels, June 10, 2010

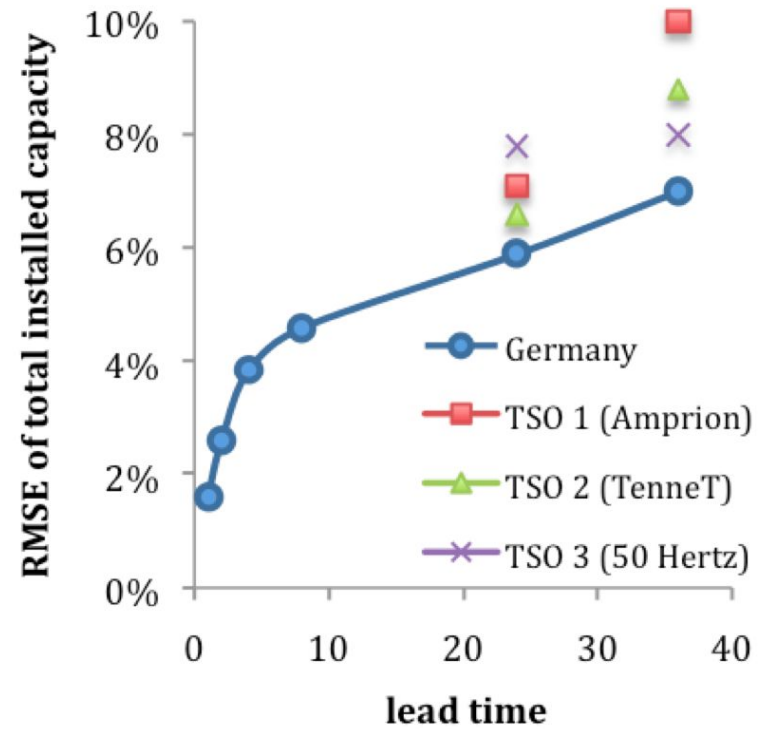
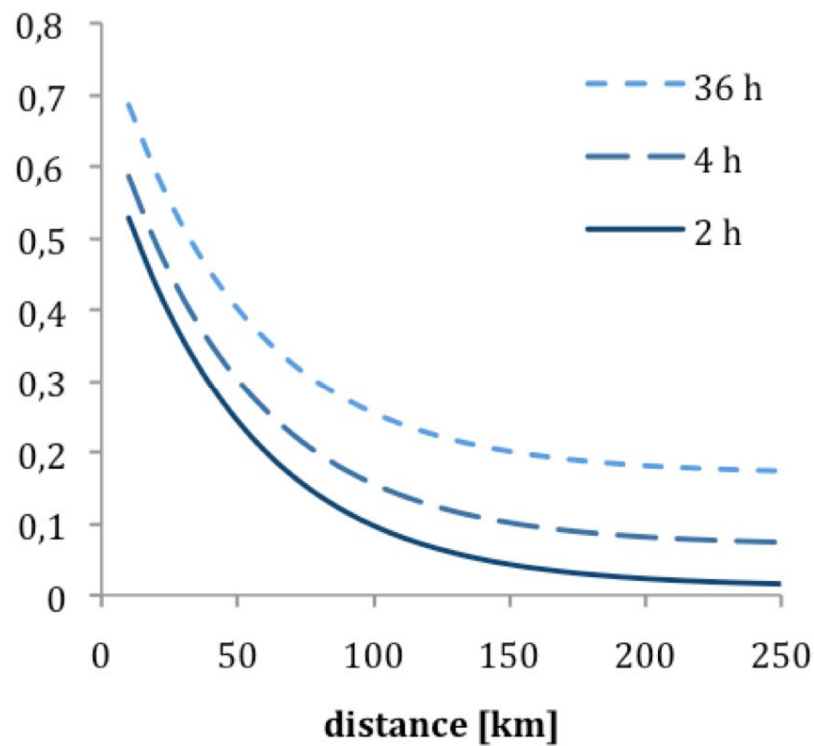


Wind and system uncertainty





Wind uncertainty depends on size of region and lead time





Potential to integrate wind depends on ...

Potential supply of balancing services

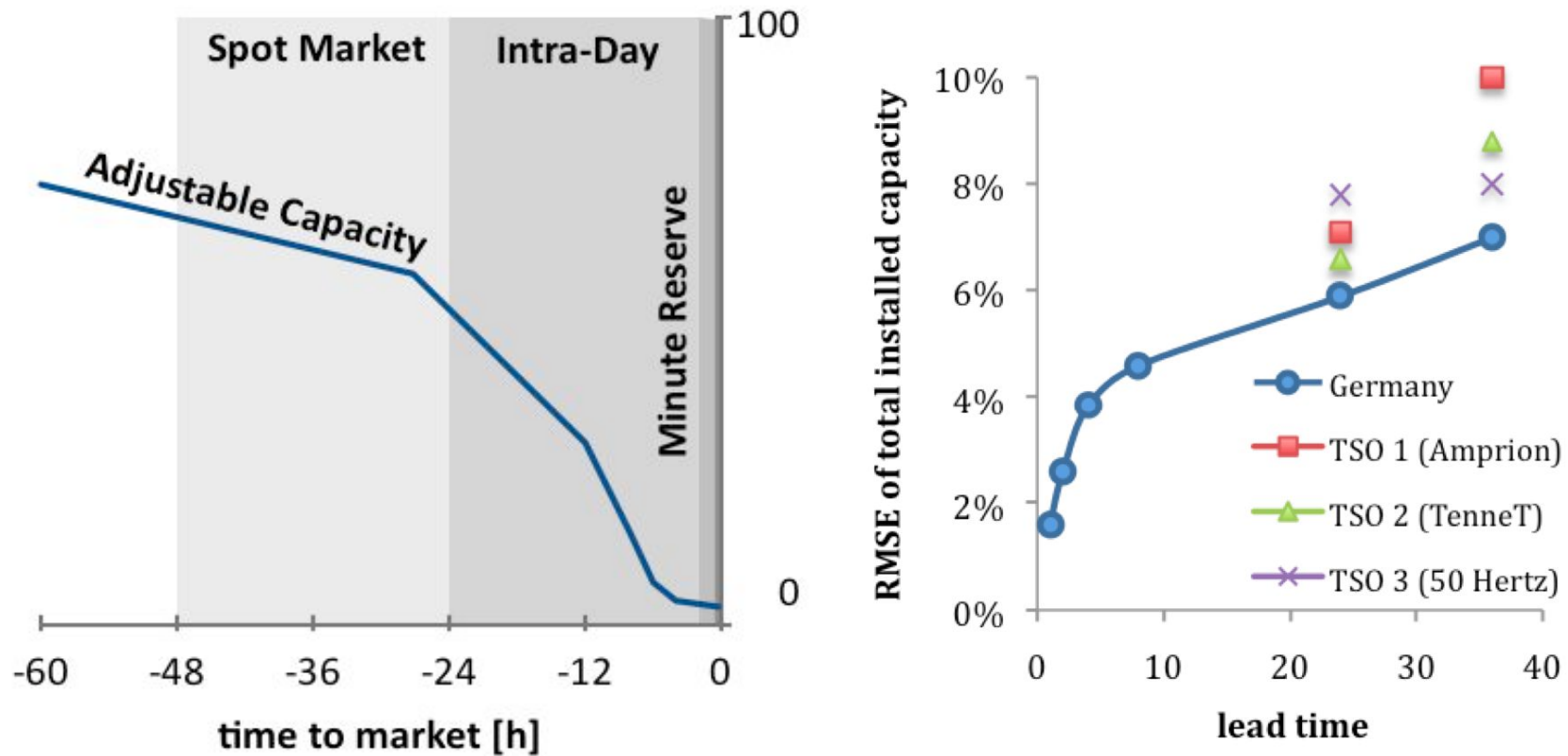
- Technical constraints
- Interaction with energy markets
- Interaction with transmission constraints
- Market power

Demand uncertainty

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



Lead time – benefit and drawback



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?

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?

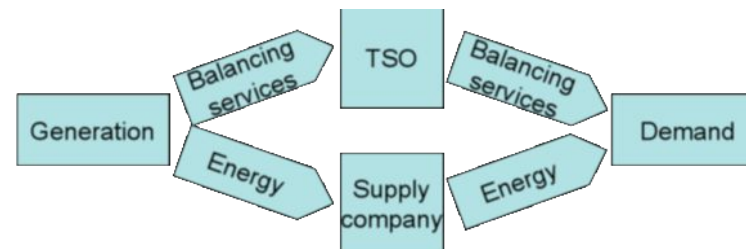
Market access:

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

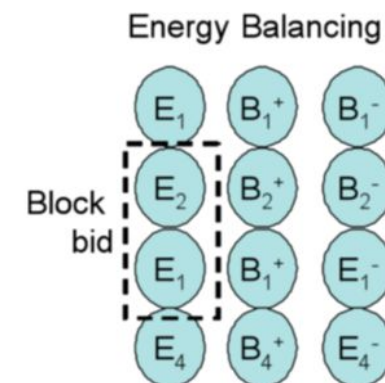


Does the market make full use of information as it is improving during the day?

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?

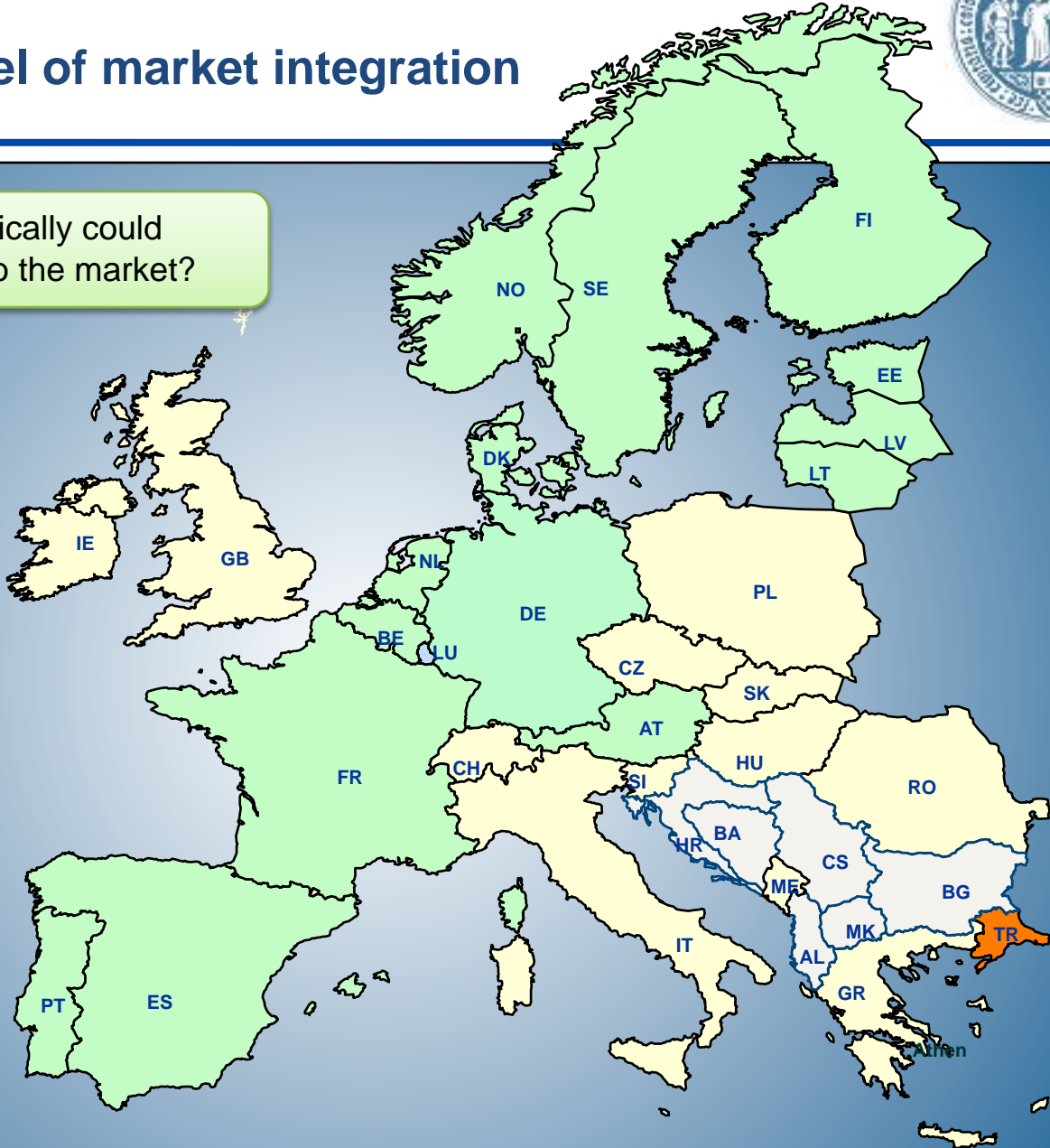
- Can current bilateral market mechanism allow for efficient dispatch AND ensure liquidity of the market?
- > Need for a complex market design

Market access

Spot market – level of market integration



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

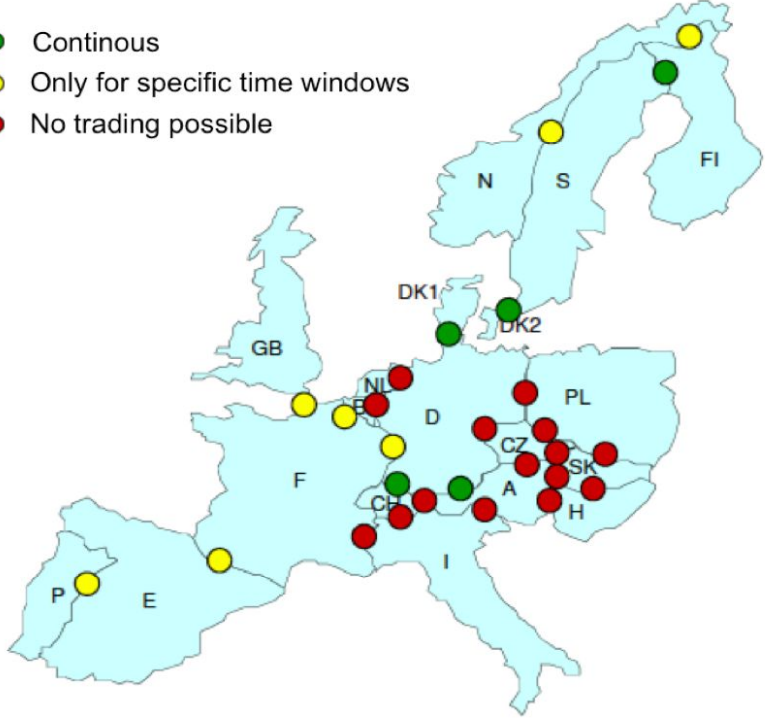


Market coupling - still some way to go



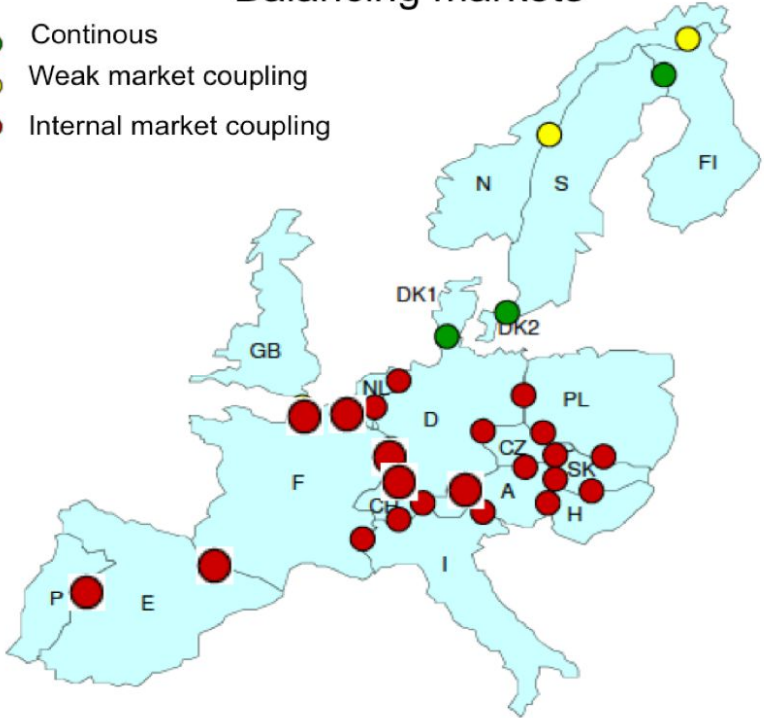
Intra-day market

- Continuous
- Only for specific time windows
- No trading possible



Balancing markets

- Continuous
- Weak market coupling
- Internal market coupling



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

Balancing and Intraday market Design – Options for Wind Integration

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