



Advantages and disadvantages of different market integration schemes

Conference “Paths towards a New Energy Market Design” , Session
“European Market Integration”

Dr. Christoph Maurer | Berlin | 05 September 2013

Intensive European discussion on market integration schemes

Focus on wholesale energy markets

- > Current market design mostly based on bidding zones identical with countries
 - » Some notable exceptions: Norway, Italy, Sweden
- > Demand for evolution of the current scheme
 - » European policy debate focussed on review, and potentially, splitting of existing bidding zones
 - » Additional, mostly scientific discussion on advantageousness of nodal pricing approach

But market integration schemes are also relevant for other segments

- > Balancing energy
- > Potential capacity markets
- > RES support schemes

European Discussion about Bidding Zone Review

Recent policy developments

Challenges from changing load flow situations

- > Need to integrate new renewable energy generation
- > Restructuring in the topology of conventional power generation and the evolution of power demand
- > Actions needed to relieve congestion on the system

Options for relieving congestion

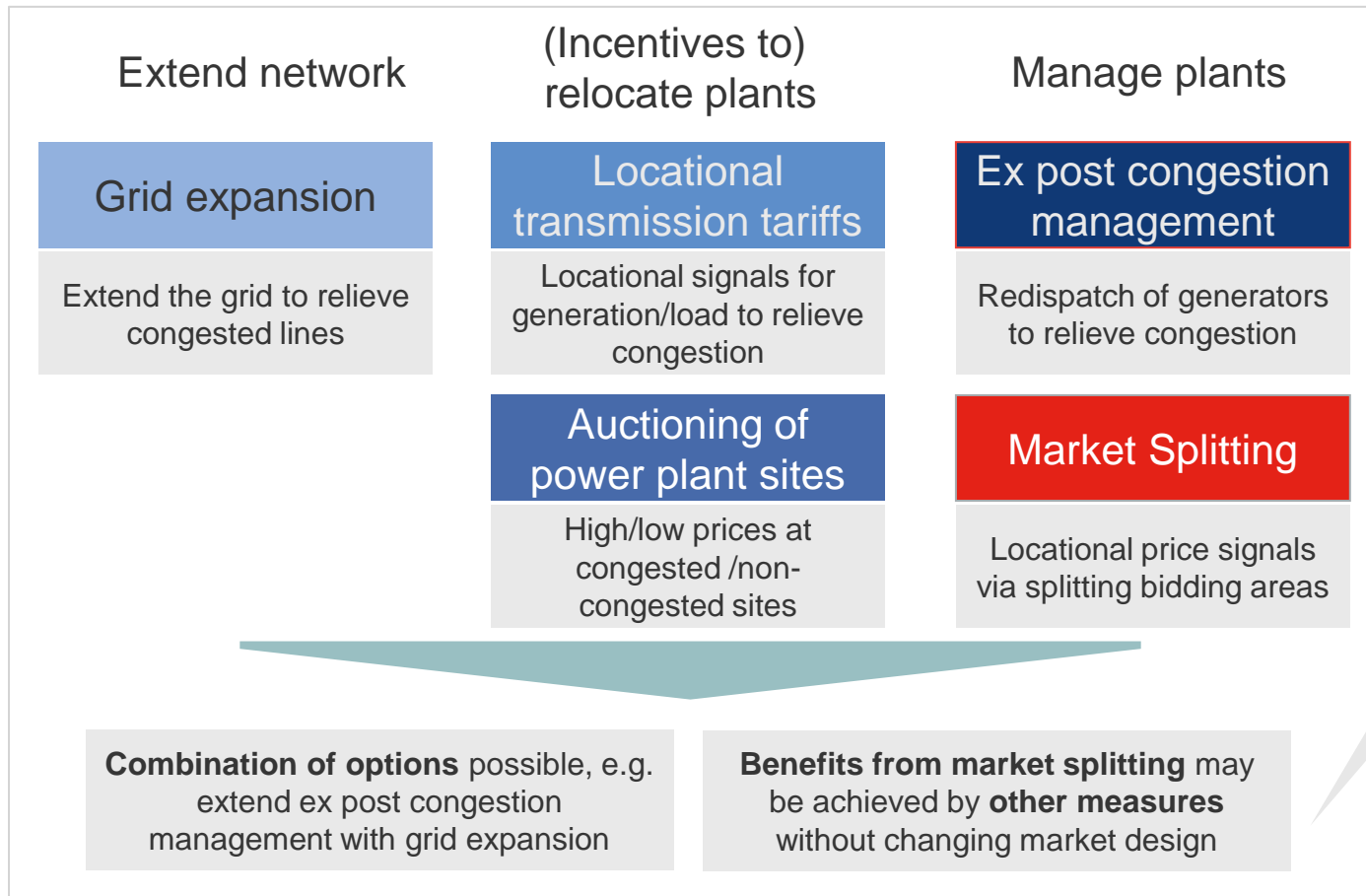
- > Measures that fundamentally relieve congestion (e.g. grid expansion)
- > Measures that have a more short term and operational effect (e.g. Market splitting, Redispatch)

Recent policy developments

- > ENTSO-E Network Code CACM demands periodic review of bidding zones
- > European debate on effects of loop flows caused by internal trade within bidding zones → split especially of bidding zone DE/AT demanded
- > EU Com Decision on Svenska Kraftnät resulting in splitting the Swedish market

Options to deal with congestion

Retailing of bidding zones (market splitting) is only one option inter alia



More and smaller bidding zones?

Potential arguments in favour of such approach

> Static efficiency

- » Market sees congestion and can handle congestion efficiently
- » Reduced demand for curative, potentially inefficient countermeasures
- » No potential for abuse of market power in illiquid redispatch markets

> Dynamic efficiency

- » Signals for efficient investments (generators, consumers, lines)
- » Especially: plant allocation will follow price signals and relieve congestion

> If these arguments are valid and comprehensive → why should we stick to bidding zones at all?

- » Nodal pricing would be the logical consequence

> There are, however, severe concerns that

- » arguments in favor of small bidding zones are not totally convincing
- » additional factors not considered might change the overall conclusion

Are more and smaller bidding zones the right way? (1/4)

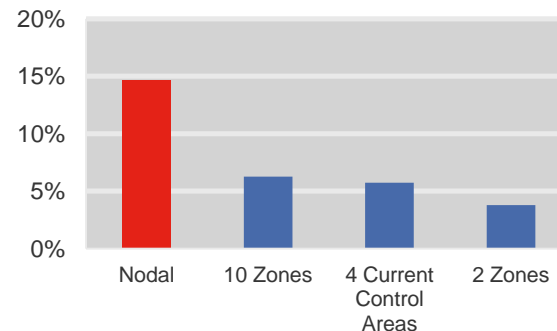
Nodal pricing is a *theoretic* reference

- > Nodal pricing will deliver a statically efficient dispatch
 - » under perfect competition (i.e. no abuse of market power possible)
 - » in a system with centralised planning and dispatch
 - » if the dispatch algorithm can handle all real-world effects (short-time dispatch, hydro management, load flexibility etc.)

> One may doubt whether these conditions are fulfilled in Europe

Also small zones cannot omit re-dispatch

- > Any zonal model requires combination of preventive and curative (nodal) congestion management
- > Even with small zones effectivity of congestion management is significantly lower than with nodal approach



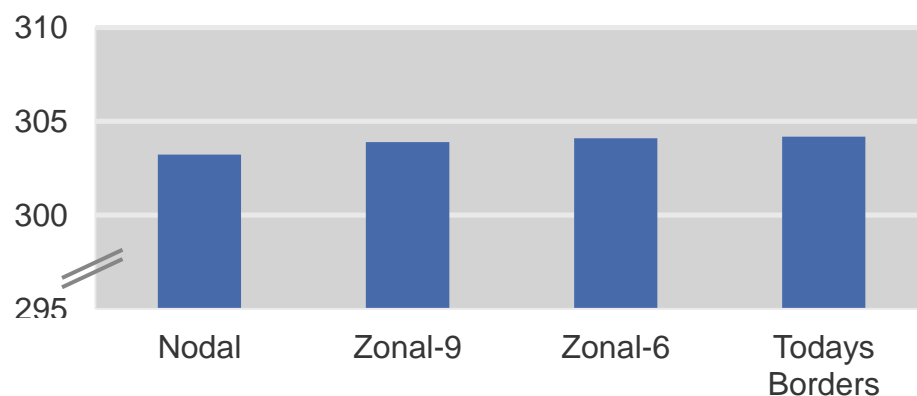
Effectivity (Ratio load flow change/dispatch change) of load flow control on highly loaded line in German EHV grid (Weißenthurm-Waldlaubersheim, own calculations)

> Smaller bidding zones no substitute for nodal load flow control

Are more and smaller bidding zones the right way? (2/4)

Effects on static efficiency limited

- > In theory, nodal pricing and zonal market with nodal redispatch could lead to identical, efficient results
- > Differences mainly due to
 - » different timeframes for actions taken
 - » organisation of redispatch (cross-border vs. internal)
 - » imperfect information (cost-based redispatch) or potential abuse of market power (market-based redispatch)
- > Quantitative simulations show limited impact



Total costs for electricity generation (major parts of Europe, 2015, including wholesale *and* redispatch),

Source: Barbara Burstedde, From Nodal to Zonal Pricing: A Bottom-Up Approach to the Second-Best, IEEE · 9th International Conference on the European Energy Market (EEM), 2012, Florence, Italy

- > Higher efficiency gains might lie in other questions (e.g. organisation of redispatch)

Are more and smaller bidding zones the right way? (3/4)

Stipulation of dynamic efficiency by locational investment signals?

> No clear evidence for effect on preferred allocation of new conventional generation in high price areas even in established market schemes with several bidding zones

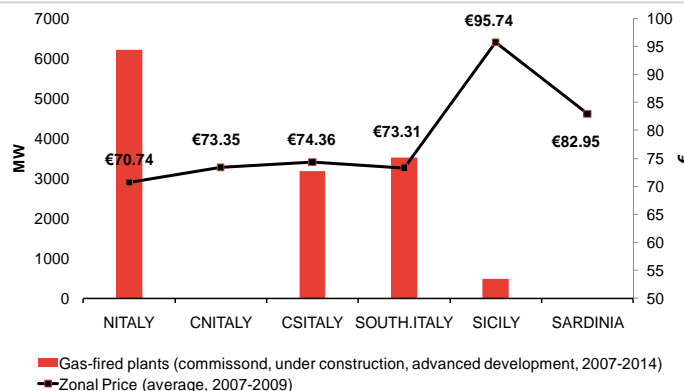
> Potential causes

- » Price differences too low, no trust in stability of price signals
- » Higher volatility of prices
- » Other influences dominant for choice of site (even more relevant for consumers or RES generation relying on natural resources)

> Periodic review of bidding zones as foreseen in NC CACM

- » the periodic review process itself bears an uncertainty for investors
- » ongoing, but hardly predictable process of network extension might eliminate or mitigate congestion and related price signals

> Higher congestion revenues might even discourage grid investments



Investment in gas-fired plants and regional prices in Italy 2007-2014,

Source: Platts, Frontier Economics in Frontier Economics/Consentec, Relevance of established national bidding areas for European power market integration – an approach to welfare oriented evaluation, 2011

> Effect of locational/regional prices as investment signals doubtful

Are more and smaller bidding zones the right way? (4/4)

Larger bidding zones can also have positive effects on overall efficiency

Market Concentration and Level of Competition

- > Smaller bidding zones increase danger for profitable execution of market power
 - » Potential welfare losses in wholesale markets, less efficient prices
 - » High barriers for new-entry in retail markets

	GWB Thresholds	Status Quo	North Bidding Zone	South Bidding Zone
CR1	30%	30%	37%	42%
CR3	50%	58%	57%	72%
CR5	66%	69%	64%	75%

Change of Market Concentration Ratios for potential split of Germany into two bidding zones (data basis 2010),

Source: Frontier Economics in Frontier Economics/Consentec, Relevance of established national bidding areas for European power market integration – an approach to welfare oriented evaluation, 2011

Liquidity and Hedging Possibilities

- > Effects of market splitting on spot market liquidity are hardly to predict
- > However, significant risks for forward market liquidity
 - » Today, in Europe liquid forward markets exist only in largest bidding zones
- > Alternative concepts (e. g. forwards on system prices like in the Nordic market) might assure forward market liquidity, but do not allow a full hedge against price risks in bidding zones

Vision of an alternative market integration scheme

Completing the internal market does not mean splitting it up further

> Instead

- » Focus on elimination of structural congestion by rapid grid extension
- » Intensify cross-border co-operation of TSOs with respect to curative measures like cross-border redispatch
- » Find effective technical and financial solutions for loop flow problems
- » Further optimise capacity allocation and market coupling
- » Further increase liquidity of short-term trading
- » Stipulate RES market integration

> On the long run

- » Think about merging of existing bidding zones instead of splitting them

Wider view on market integration is necessary

Potential capacity markets

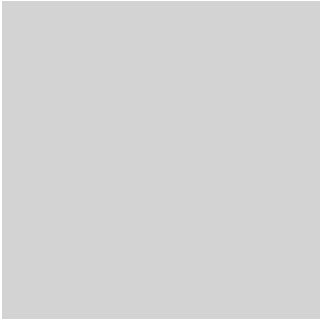
- > Currently, introduction of *national* capacity remuneration mechanisms is discussed in several European countries (FR, UK, DE, ...)
- > Lack of integration means significant risk for efficiency and effectivity of such mechanisms

- > Urgent demand for some kind of market integration → there is still a chance
- > Problem: No direct EU responsibility for SoS and energy mix

RES support schemes

- > National, uncoordinated support schemes established over years
- > Interaction with ETS not appropriately reflected in support schemes
- > Obvious inefficiencies → almost 35 GW of solar panels in Germany, but carbon price at 4 EUR/t CO₂

- > Obvious demand for European support scheme on the long run
- > Large differences in status quo → agreements hard to achieve



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