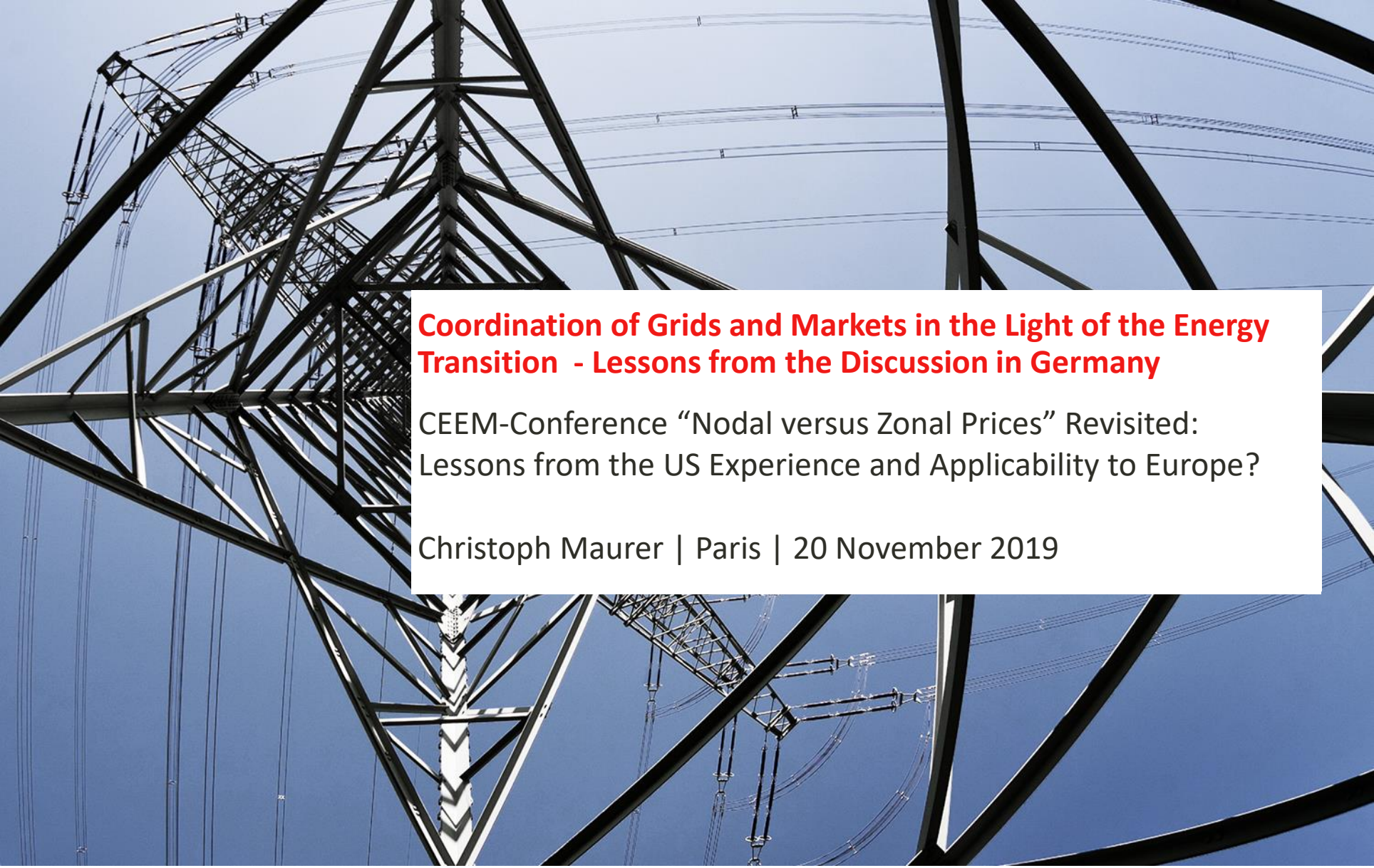

Coordination of Grids and Markets in the Light of the Energy Transition - Lessons from the Discussion in Germany

CEEM-Conference “Nodal versus Zonal Prices” Revisited: Lessons from the US Experience and Applicability to Europe?

Christoph Maurer | Paris | 20 November 2019

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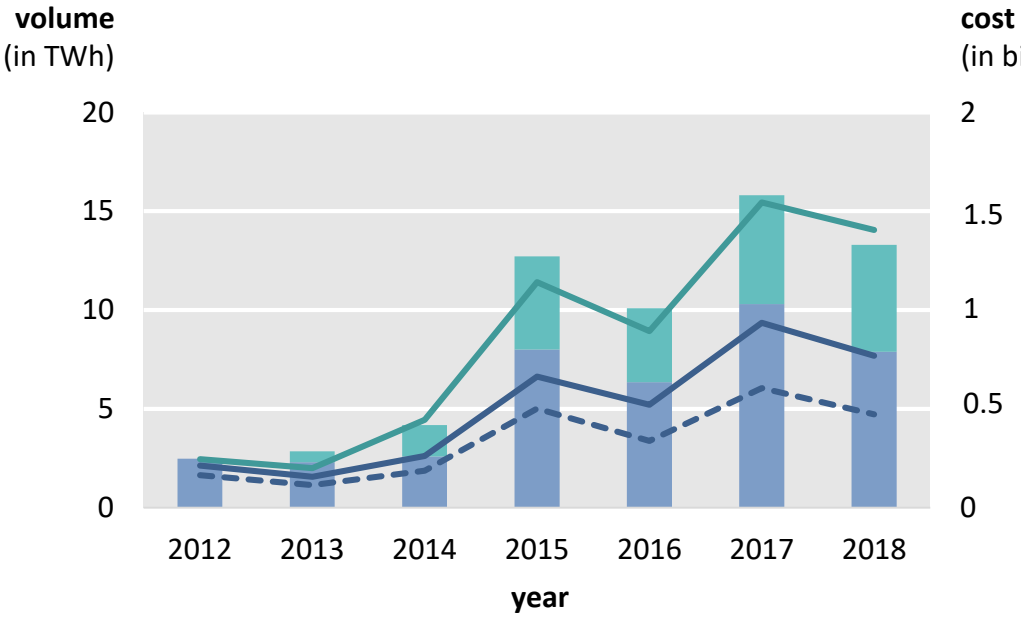
Background

Coordination of grids and markets becomes more of a concern in Germany



congestion management mainly for internal congestion

volume

- RES curtailment
- Redispatch, grid reserve, counter-trading*

cost
depicted as a stacked line chart

- **RES curtailment****, grid reserve provision, RD activation, CT
- **grid reserve provision**, Redispatch, counter-trading
- **Redispatch, counter-trading**

* volumes show downward regulation only

** based on estimations by grid operators

Source: based on BNetzA data

→ **Could become worse with CEP implementation/70% MinRAM**

Coordination of grids and markets

What is the idea behind the current market design? Is it still viable?

main objective "undistorted market environment"

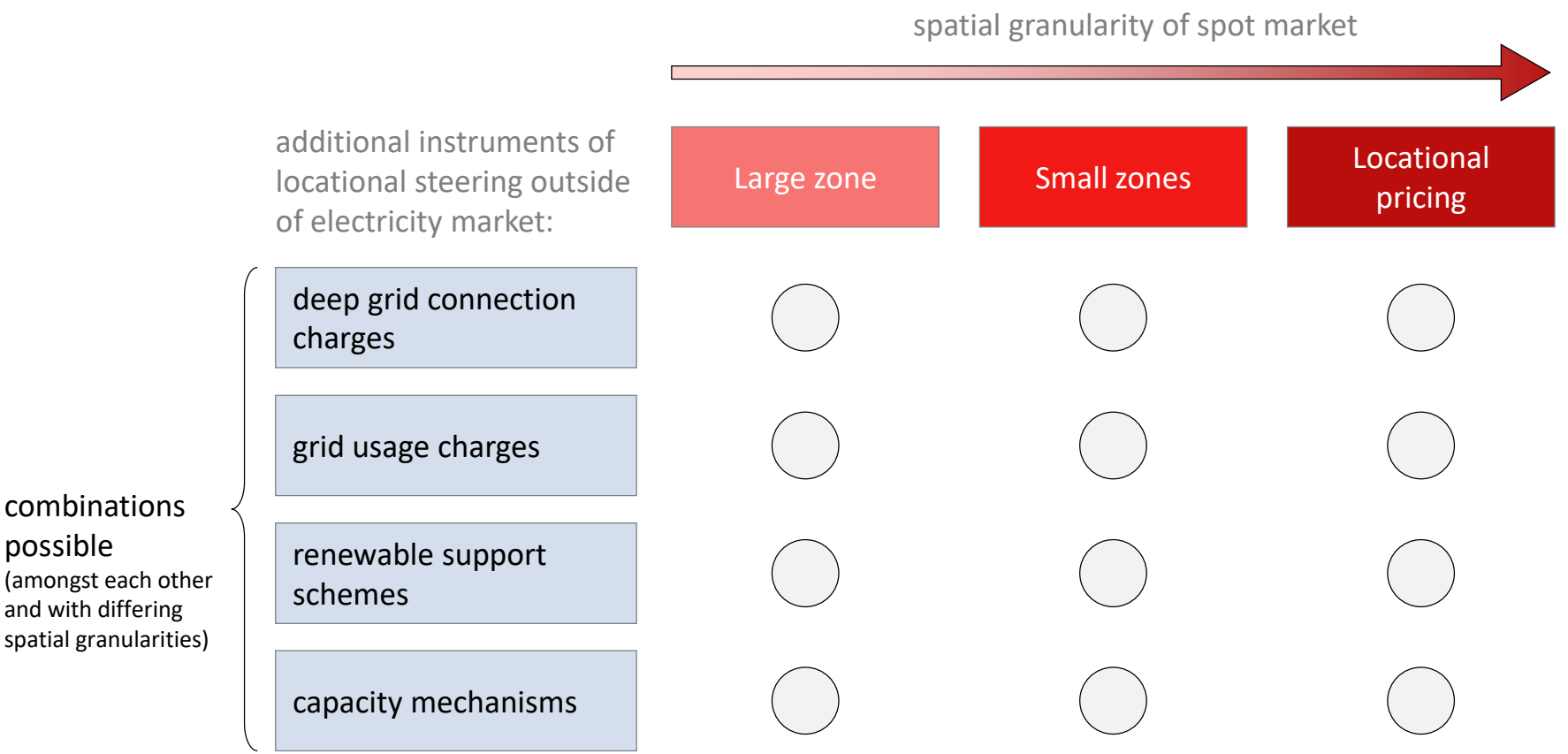
- markets are offered a virtual copperplate within large and liquid bidding zone
- market participants can trade as if there was no congestion
  - cost-based compensation in case of necessary interventions by grid operators
- decisions by grid operators (necessarily non-market-based) have no (or only little) influence on market participants' profits
- grid follows demand – continuous grid expansion to minimize gap between virtual copperplate and physics

downsides become more significant, though

- additional efforts needed to avoid XB-discrimination
- lagging grid expansion undermines credibility of the market design and could even endanger security of supply
- with more synchronized demand due to active market participation of consumers and new electricity applications like e-mobility and power-to-heat, unconditional promise to expand grid instead of controlling consumer behavior might become unsustainable

Coordination of grids and markets

Different dimensions of local incentive components



Based on: Neon/Consentec, Future redispatch procurement in Germany, report for BMWi, 2019

Coordination of grids and markets

Nodal Pricing (LMP) as a theoretical benchmark?!

- Full integration of grids and markets by means of LMP often considered as an ideal in academia
- But optimality holds true only under certain assumptions which cannot be fulfilled in real-world situations
  - no transaction costs
  - no market power and contestable markets
  - no bulky, but fully divisible investments
  - no political influences on decision making e.g. grid expansion
  - perfectly rational, risk-neutral actors

Evaluation should not be based on ideal, but real models

Dynamic system transformation due to energy transition needs to be considered

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Applicability of Nodal Pricing (LMP) in the Light of Germany's Energy Transition – Discussion Series with Experts

Main Findings of a Report by Neon and Consentec (1/2)*

requirements due to energy transition

- expansion of transmission and distribution grids required
- demand for innovations regarding market and grid integration of RES
  - demand response, aggregators, storage, ...

static efficiency of dispatch

- LMP most likely advantageous
  - but redispatch not necessarily inefficient
  - application of nodal pricing to distribution level remains an issue
- with binding congestion, some kind of regulation/market supervision required independent from market design

dynamic efficiency of system development

- lack of local incentives w/ large bidding zones is a problem
- but credibility of localized price signals delivered by real-world LMP is doubtful, at least
- incentives for innovations in the field of (non-local) flexibility might be lower with LMP
  - high transaction costs, no pooling
  - no reliable price expectations due to low price stability

diverging opinions in discussion with experts

*Consentec/Neon, Nodale und zonale Strompreissysteme im Vergleich, report for BMWi, 2017

Applicability of Nodal Pricing (LMP) in the Light of Germany's Energy Transition – Discussion Series with Experts

Main Findings of a Report by Neon and Consentec (2/2)

consequences for grid expansion

- long lead-times for grid expansion → decisions cannot be based on observed prices
- fear of increased NIMBY behavior because LMP might be considered as an efficient way to deal with limited grid capacity

diverging opinions in discussion with experts

security of supply

- system security can be maintained also with redispatching, but effort might be lower with LMP
- w/o local incentives and w/o grid expansion, long-term risks for SoS cannot be excluded

RES development and support schemes

- Fundamentals of today's support schemes not compatible with LMP
  - balance responsibility for zonal portfolios
  - sliding FIP
  - siting considered (only) when granting support
- with LMP, risk exposure of RES might be much higher → costs for RES support might increase
  - no portfolios and no continuous intra-day trading → increase in imbalance costs?
  - sliding FIP not viable because incentives from LMP require exposure to price risks

Applicability of Nodal Pricing (LMP) in the Light of Germany's Energy Transition – Discussion Series with Experts

Lessons learned

- There is not one way to deal with congestion

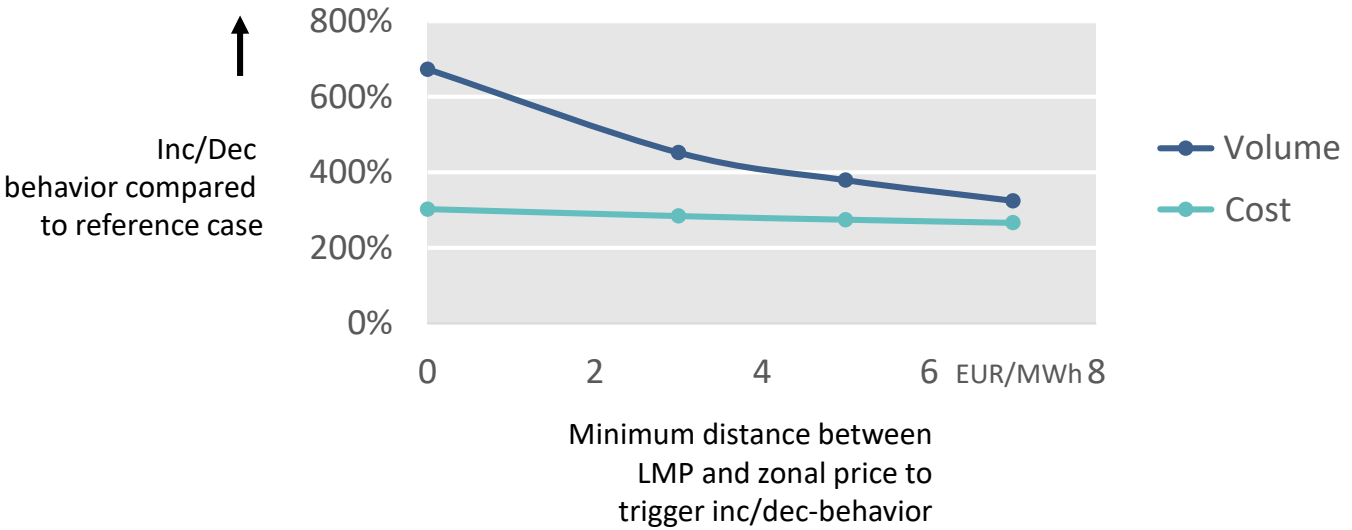
- Energy transition puts strong focus on dynamic efficiency
  - and LMP might not be optimally suited for this purpose
  - LMP might need to be complemented by government-granted support for all kinds of investments

- But zonal market design will only be sustainable if grid expansion remains credible option

LMP might have pros and cons – but it is definitely better than inconsistent market design combining zonal and nodal markets

Potential effects of inc-dec-gaming with market-based redispatch*

- Best-Guess-Scenario for Germany 2030
- high correlation of congestion with wind generation → anticipation not too complicated
- effects of maximizing revenues over zonal market and nodal redispatch market



Redispatch costs and volumes might more than triple → no sustainable solution

* Neon/Consentec, Future redispatch procurement in Germany, report for BMWi, 2019

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