***Zonal pricing in Germany – A prefereable tradeoff between ndal and uniform pricing?***

Alfredo Zamora, Workgroup for Infracstructure and policy TU Belin, 017661327253, alz@wip.tu-berlin.de

Christoph Weyhing, Workgroup for Infracstructure and policy TU Belin, cw@wip.tu-berlin.de

## Overview

The outcome and efficiency of electricity markets is heavily influenced by their geographical configuration. Market zones often align with national borders, whilst generation and load patterns differ on smaller geographical scales. Zonal configurations with historically grown centralized energy infrastructures are outdated by fast growing decentralized renewable generation, which leads to network congestions and inefficiencies. This problem can be resolved by either adapting the infrastructure or changing the zonal configuration. Academic publications that investigate optimal zonal configuration often use electricity system data prior to 2015 with renewable shares under 30%, while in 2019 number increased to over 45%. Hence, the effects of growing renewables on zonal configurations are rarely investigated. This research aims to give an update for 2020 on the discussion on market splitting by the example of Germany.

## Methods

## Based on a model of the German transmission grid including demand and supply, market clearing is simulated for a defined multi-zonal configuration with subsequent redispatch. The zones are arranged according to transmission bottlenecks and in line with existing research. The results focus on the implications on system costs, market prices, congestion management and regional generation. We pay special attention to the exchange between zones to estimate the impact of different inter-zonal trading capacities. The zonal configuration is benchmarked against a nodal pricing and a uniform pricing approach.

## Results

Preliminary results show a reduction of redispatch and curtailment to almost negligible values by shortening the available trading capacity between zones significantly. Hence, market outcome aligns better with the physical infrastructure and generation is properly allocated in the market. While redispatch costs drop with more restricted trade, generation costs rise. Also, limited trading capacities lead to price spreads between northern and southern zones, which increase with decreasing trading limits. Market prices in the southern zone deviate from the others averaging 40 €/MWh over the other.

## Conclusions

The present work provides additional insights on the debate of a split-market in Germany by addressing the impact of inter-zonal trade capacity. The market price deviation illustrate the dependency of some regions in Germany to low-cost energy due to disproportionate distribution of renewable generation capacities. It also highlights the increment in net-efficiency gained by reducing the redispatch amount.

## References

Egerer, J., Weibezahn, J., and Hermann, H.September 2016. "Two price zones for the German electricity market — Market implications and distributional effects."Energy Economics59 ():365–381