

# Nodal pricing of the European Electricity Grid-A welfare Economic Analysis for Feeding-in Offshore Wind Electricity

H. Weight, K. Freund & T. Jeske

Discussion for the IDEI Electricity conference

- In any integrated electricity grid, increasing power at one node may change the level of congestion in different locations.
- The development of German wind capacity will have some impact on different areas and nodal pricing may be a relevant way to measure it.
- The current system in Europe is based on uniform pricing, which is unable to cope efficiently with congestion. Some alternatives (zonal pricing or nodal pricing) have been experienced in a few countries but remain marginal.
- This paper discusses and evaluates the impact of a switch from uniform to nodal pricing and how this change could efficiently cope with the extension of the offshore wind capacity in Germany.

- The numerical simulations show (confirm) that social welfare is higher under nodal pricing than under uniform pricing.
- Moreover, the authors show that cross-border flows must be considered to have a full picture and a realistic estimation of prices (even under uniform pricing).
- Analysing the impact of German wind extension on the Benelux countries assuming nodal pricing, simulations show that
  - ① with the existing grid, the increase supply of energy may either decreases the price level of energy (in the Netherlands) or increases it because of congestion (in Belgium).
  - ② With extended grid, the prices may decrease (in particular in Belgium) but some congestion will remain (in the Northern part of Netherlands).

- The welfare increase if uniform pricing is replaced by nodal pricing is about 0.8%.
  - ① It is rather low and it may be interesting to know what would be the cost of implementing the alternative system.
  - ② Since the congestion differs accross region, what could be the gains of using simply zonal pricing (easier to implement)?
- Wind capacity is treated as if this source of energy was standard. In fact, the wind production is hard to predict, wind is non storable (contrarily to water), and unrelated to demand.
  - ① How this variability can be taken into account in the estimation of welfare gains?
  - ② If this variability is taken into account, the gains of using nodal pricing instead of uniform pricing may rise since it become even more important to assure efficient transmission.