Modeling Spot Market Pricing with the Residual Load

The determining variable in investment decisions is the expected future revenue. In the electricity sector, this revenue is determined to a high degree by the electricity prices and the fuel costs. The spot market price is widely accepted as the reference price for electricity. The main determinants for the spot market prices are the power plant fleet, the fuel prices and the load. The paper aims to calculate the spot market price development as a function of the residual load. The authors have identified the residual load as significant factor on spot market pricing through an analysis of the years from 2007 to 2009. The residual load represents the demand side on the electricity market. It is calculated as the load profile minus the feed-in from renewable energy sources (RES). The supply side is constituted through the conventional power plant fleet. In each hour the highest marginal costs of all committed power plants are decisive for pricing. In the model, a change of the power plant fleet is not regarded. Applying a simple linear trend line for the years 2007 to 2009 establishes coefficients of determination R² ranging from 0.54 (2009) to 0.77 (2008). Prices generated by the model are compared to real prices. The
mean prices of both datasets are nearly the same. The simulated prices tends to underestimate the very high prices and to overestimate the very low prices. Projections for spot market prices in 2020 are calculated on the basis of the residual load in 2020. The projections for the prices are based on a ceterus paribus analysis. The isolated analysis of the change of the residual load from 2008 to 2020 shows a higher deviation in prices and a decrease of the medial price of 15 €/MWh. A possible change in the conventional power plant fleet is not regarded in the paper but can be included into the model within further research work.

Stichworte:
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