

FUTURES PRICING IN ELECTRICITY MARKETS BASED ON STABLE CARMA
SPOT MODELS

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In recent years, electricity markets throughout the world have undergone massive changes due to deregulations. Extreme price volatility has forced producers and wholesale consumers to hedge not only against volume risk but also against price movements. Consequently, statistical modeling and estimation of electricity prices are an important issue for the risk management of electricity markets.

We consider a new model for the electricity spot price dynamics, which is able to capture seasonality, low-frequency dynamics and the extreme spikes in the market. Instead of the usual purely deterministic trend we introduce a non-stationary independent increments process for the low-frequency dynamics, and model the large fluctuations by a non-Gaussian stable CARMA process. We suggest an estimation procedure, where we fit the non-stationary trend using futures data with long time until delivery. The procedure also involves the estimation of the empirical and theoretical risk premiums. We apply the procedure to base load and peak load data from the German electricity exchange EEX.