Fuel prices scenario generation based on a multivariate GARCH model for risk analysis in a wholesale electricity market

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Abstract-

This paper presents a fuel prices scenario generator in the frame of a simulation tool developed to support risk analysis in a competitive electricity environment. The tool feeds different exogenous risk factors to a wholesale electricity market model to perform a statistical analysis of the results. As the different fuel series that are studied, such as the oil or gas ones, present stochastic volatility and strong correlation among them, a multivariate Generalized Autoregressive Conditional Heteroskedastic model has been designed in order to allow the generation of future fuel prices paths. The model makes use of a decomposition method to simplify the consideration of the multidimensional conditional covariance. An example of its application with real data is also presented.

Index Terms- Fuels; Monte Carlo methods; Power system modeling; Risk analysis; Stochastic processes

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