## The effect of wind generation and weekday on Spanish electricity spot price forecasting

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## Abstract-

This paper empirically compares the predictive accuracy of a set of methods for day-ahead spot price forecasting in the Spanish electricity market. The methods come from time series analysis and artificial intelligence disciplines, and include univariate, multivariate, linear and nonlinear. Within the univariate methods, the double seasonal ARIMA and the recently proposed exponential smoothing for double seasonality are compared and used as benchmarks. They allow us to quantify the improvement on price forecasting when including explanatory variables or using more complex models. Dynamic regression models including the electricity load forecast are then considered. Their good performance in price forecasting has been pointed out by many authors. However, we find evidences of their predictive accuracy can be significantly outperformed by accounting the wind generation forecast provided by the System Operator. Moreover, these forecasts can be even more accurate if changes of price's behavior according with the day of the week are taken into account by means of periodic models. The last of the tested methods are feed-forward neural networks used as multivariate nonlinear regression methods with universal function approximation capabilities. The influence of the wind generation forecast on price prediction is also proved with this approach. Detailed out-of-sample results of the tested methods are given.

Index Terms- Electricity markets; Time series analysis; Electricity price forecasting; Periodic models

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