

# **Probabilistic forecasting of hourly electricity prices in the medium-term using spatial interpolation techniques**

A. Bello, J. Reneses, A. Muñoz, A.R. Delgadillo

**Abstract—** In the context of competitive electricity markets, medium-term price forecasting plays an essential role for market stakeholders. In contrast to short-term price forecasting, very little research has been conducted in this field. Previous works regarding electricity price forecasting have tackled with the problem of mid-term prediction by using fundamental market equilibrium models over daily or, at most, averages of groups of hours. On the other hand, the limitations of point forecasts are widely recognized and the literature dealing with probabilistic forecasts is scarce. In this study, a novel methodology to deal with medium-term hourly forecasting of electricity prices is proposed. This methodology is unique in the sense that it also attempts to simultaneously perform punctual and probabilistic hourly predictions. The approach consists of a nested combination of several modeling stages. The first stage consists in the generation of multiple scenarios of uncertain variables. In a second stage, a market equilibrium model which incorporates Monte Carlo simulation and a new definition of load levels is executed for a reduced combination of the generated scenarios. The application of spatial interpolation techniques allows us to estimate numerous feasible realizations of electricity prices from only several hundreds executions of the fundamental market equilibrium model without losing accuracy. The efficiency of the proposed methodology is verified in a real-size electricity system characterized by a complex price dynamics: the Spanish market.

**Index Terms—** Electricity prices, medium-term probabilistic forecasting, medium-term hourly prediction, Monte Carlo simulation

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has a electronic subscription to International Journal of Forecasting, you can download the paper from the journal website:

[Access to the Journal website](#)

## **Citation:**

*Bello, A.; Reneses, J.; Muñoz, A.; Delgadillo, A.R.; "Probabilistic forecasting of hourly electricity prices in the medium-term using spatial interpolation techniques",*

