



Forecasting affluent natural energy using large-scale climate information for planning and management of the Brazilian electricity system

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Abstract:

Forecasting values of affluent natural energy (ANE*) are crucial for planning and operation of model using climate variables. The results indicate that the proposed SARIMAX model is hydropower plants in the Brazilian electricity statistically robust, with residuals $\epsilon \sim N(0, \sigma^2)$, for sector (BES). Traditionally, in the BES, stakeholders use periodic auto-regressive models (PAR) with ANE lagged time series as input data in the conventional forecasting models (i.e., NEWAVE) and do not use large-scale climate variables. However, due to the increasing number of intermittent renewable power plants operating in the grid and future climate changes, the use of climate variables in the ANE forecasting process could become a necessary input.

This study aims to compare the results of the official Newave model with a new SARIMAX the four regions of Brazil (SE, S, NE, and N) and the mean absolute percentage error (MAPE) of our model is lower than the formal Newave MAPE. Thus, the proposed model is competitive with, or even superior to the official model. The use of climate variables could enhance the official methodology used by the Brazilian government.

*We calculate ANE (Watt-hour) multiplying the streamflows (m³ per second) X turbines efficiency (%) X hydraulic head (m). We estimate ANE for each reservoir hydropower plants of the Brazilian electricity sector.

Biography:

Alcantaro Lemes Rodrigues is a system analyst by profession and works in the University of Sao Paulo, Brazil. He holds a DSc in Energy and currently he is a researcher at the Institute of Energy and Environment, University of São Paulo. Alcantaro has 22 years of public practices and seven years of private practices as a system analyst. He also works in investigations of energy uses in Brazil.



He has presented an abstract on “Analysis of choices to the adoption of hourly pricing in the Brazilian electricity sector by the Ministry of Mines and Energy” at the 11th Energy Planning Brazilian Congress (XI CBPE), Brazil.

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