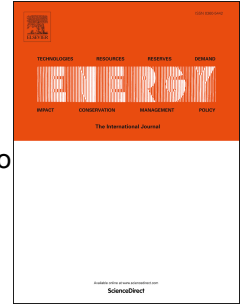


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Integrating long-term economic scenarios into peak load forecasting: An application to Spain

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## INTEGRATING LONG-TERM ECONOMIC SCENARIOS INTO PEAK LOAD FORECASTING: AN APPLICATION TO SPAIN

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### Abstract

The treatment of trend components in electricity demand is critical for long-term peak load forecasting. When forecasting high frequency variables, like daily or hourly loads, a typical problem is how to make long-term scenarios - regarding demographics, GDP growth, etc. - compatible with short-term projections. Traditional procedures that apply de-trending methods are unable to simulate forecasts under alternative long-term scenarios. On the other hand, existing models that allow for changes in long-term trends tend to be characterized by end-of-year discontinuities. In this paper a novel forecasting procedure is presented that improves upon these approaches and is able to combine long and short-term features by employing temporal disaggregation techniques. This method is applied to forecast electricity load for Spain and its performance is compared to that of a nonlinear autoregressive neural network with exogenous inputs. Our proposed procedure is flexible enough to be applied to different scenarios based on alternative assumptions regarding both long-term trends as well as short-term projections.

*JEL classification:* Q4, L94, C53

*Keywords:* Peak load forecasting, load curve forecasting, long-term scenarios, temporal disaggregation

### *Highlights:*

Grid capacity planning is critically linked to peak demand forecasts.

A methodology to produce long-term hourly peak load forecasting is presented.

Modelling hourly load have to deal with long-term and short-term features.

Long and short-term features are combined by temporal disaggregation techniques.

The method is flexible and allows for what-if simulations, key in grid planning.

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