

The EIA Short-Term Regional Electricity Model: Data Analysis and Model Calibration

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Abstract

The United States Energy Information Administration (EIA) completed the development of a thirteen-region electricity demand and supply model in the early 2005. Subsequently, EIA modelers used the generic least cost dispatching algorithm to simulate regional generation patterns and fuel choices in meeting a given set of regional electricity demand. Comparison of model results with 2002 and 2003 monthly generation data shows that cost captures only part of dispatching decisions facing electric utilities. And it became clear that modifications to the input assumptions are needed to improve the performance of the model.

This paper documents how EIA data are used to identify and estimate key model parameters that are important to the performance of the model. In addition, this paper will also demonstrate that the calibrated model will be as robust and can provide insightful information on winter heating fuel market, natural gas market, and summer electricity market.

The data used for model calibration include:

- EIA-906: monthly data on generation and fuel use at the generator or plant level by states.
- EIA-826: monthly electric utility sales and revenue report with state distributions
- EIA-423 and FERC-423: monthly cost and quality of fuels for electric plants
- EIA-860: capacity of generators by technology and fuel at plant level
- Office of DOE Fossil Energy (FE): Annual Report of International Electric Import/Export data

Key model parameters EIA modelers have to estimate are:

- Designation of generators to one of the five dispatching groups
- Import constraints
- Numerical criteria for fuel switching
- Generation share of oil and gas in coal power plants
- Share of hydro power allocated to base load and the dispatching profile for non-base load power