# CHAPTER 14. UTILITY IMPACT ANALYSIS

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## 14.1 INTRODUCTION

The U.S. Department of Energy (DOE) will analyze specific effects of its proposed standards levels for electric motors on the electric utility industry as part of the notice of proposed rulemaking analyses, using a variant of the U.S. DOE's Energy Information Administration (EIA)'s National Energy Modeling System (NEMS). The NEMS is a large, multi-sectoral, partial equilibrium model of the U.S. energy sector. EIA uses NEMS to produce the *Annual Energy Outlook (AEO).*[1] NEMS produces a widely recognized baseline energy forecast for the United States, and this energy forecast is available in the public domain. DOE will use a variant known as NEMS-BT to provide key inputs to the analysis.[a]

The utility impact analysis will consist of a comparison between model results for the base case and for policy cases in which proposed standards are in place. The use of NEMS-BT for the utility analysis offers several advantages. As the official DOE energy forecasting model, NEMS relies on a set of assumptions that are transparent and have received wide exposure and commentary. NEMS-BT allows an estimate of the interactions between the various energy supply and demand sectors and the economy as a whole. The utility impact analysis will report the changes in installed capacity and generation, by fuel type, which result for each trial standard level, as well as changes in electricity sales.

DOE will conduct the utility impact analysis as a policy deviation from the latest available version of the *AEO*, applying the same basic set of assumptions. For example, the operating characteristics (e.g., energy conversion efficiency, emissions rates) of future electricity generating plants are as specified in the *AEO* reference case, as are the prospects for natural gas supply.

## 14.2 METHODOLOGY

The electric utility impact analysis will consist of NEMS-BT forecasts for generation by plant type, installed capacity, sales, and prices. The gas utility impact analysis will consist of forecasts of change in sales due to standards. NEMS provides reference-case load shapes for several end uses. The model uses predicted growth in demand for each end use to build up a projection of the total electric system load growth for each region, which it uses in turn to predict the necessary additions to capacity. DOE uses NEMS-BT to account for the implementation of energy conservation standards by decrementing the appropriate reference case load shape. DOE will determine the size of the decrement using data for the per-unit energy savings developed in

[a] For more information on NEMS, please refer to the U.S. Department of Energy, Energy Information Administration documentation. A useful summary is *National Energy Modeling System: An Overview 2003*, DOE/EIA-0581(2003), March 2003. EIA approves use of the name NEMS to describe only an official version of the model without any modification to code or data. Because this analysis entails some minor code modifications and the model is run under various policy scenarios that are variations on EIA assumptions, DOE refers to the model by the name NEMS-BT (BT is DOE's Building Technologies Program, under whose aegis this work has been performed). NEMS-BT was previously called NEMS-BRS.

the life-cycle cost analysis (chapter 8 of the Technical Support Document) and the projection of shipments developed for the national impact analysis (chapter 9).

Since the *AEO* version of NEMS forecasts only to the year 2035, DOE must extrapolate results after that year to be consistent with the analysis period being used by DOE in the national impact analysis.

Results of the analysis will include changes in residential electricity sales, installed capacity and generation by fuel type, and residential natural gas sales for each trial standard level, in five-year increments over the forecast period.

## REFERENCES

1. Energy Information Administration, *Updated Annual Energy Outlook 2009 Reference Case Service Report*, 2009. Washington, DC. Report No. DOE/EIA-0383(2009). <http://www.eia.gov/forecasts/aeo/ >