

**ENVIRONMENTAL ASSESSMENT FOR PROPOSED ENERGY  
CONSERVATION STANDARDS FOR ELECTRICAL  
DISTRIBUTION TRANSFORMERS**

**Month Year**



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**ENVIRONMENTAL ASSESSMENT FOR ELECTRICAL DISTRIBUTION  
TRANSFORMERS**

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# ENVIRONMENTAL ASSESSMENT FOR ELECTRICAL DISTRIBUTION TRANSFORMERS

## 1.0 INTRODUCTION

The Department will assess the impacts of proposed distribution transformer standard levels on certain environmental indicators using a variant of the U.S. DOE/Energy Information Administration (EIA)'s National Energy Modelling System (NEMS).<sup>1</sup> The DOE/EIA uses NEMS to produce the *Annual Energy Outlook 2003 (AEO2003)*.<sup>2</sup> The Department will use a variant known as NEMS-BT,<sup>a</sup> as well as some exogenous calculations, to provide key inputs to the analysis. Results of the environmental analysis are similar to those provided in *AEO2003*.

The Department intends the environmental analysis to provide emissions results to policymakers and interveners, and to fulfill requirements that the environmental effects of all new Federal rules be properly quantified and considered. The environmental analysis considers two pollutants, sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>), as well as carbon emissions. The only form of carbon tracked by NEMS-BT is carbon dioxide (CO<sub>2</sub>), so the carbon discussed in this report is only in the form of CO<sub>2</sub>. For each of the trial standard levels, DOE will calculate total undiscounted and discounted emissions using NEMS-BT and will use external analysis as needed.

The Department will conduct the environmental analysis as a policy deviation from the *AEO2003*, using the same basic set of assumptions. For example, the emissions characteristics of an electricity generating plant will be exactly those used in *AEO2003*. The NEMS reference case and alternative growth scenarios are as described in the utility impact analysis (Chapter 13).

## 2.0 METHODOLOGY

The NEMS-BT tracks carbon emissions using a detailed carbon module; this gives good results because of its broad coverage of all sectors and inclusion of interactive effects. Past experience with carbon results from NEMS suggests that the NEMS-generated emissions estimates are somewhat lower than estimates based on simple average factors. One of the reasons for this divergence is that NEMS tends to predict that conservation displaces renewable generating capacity in the later years of its forecast. On the whole, NEMS-BT provides carbon emissions results of reasonable accuracy, at a level consistent with other published Federal results.

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<sup>a</sup> 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). DOE/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 DOE/EIA assumptions, we refer to it as NEMS-BT (BT is DOE's Building Technologies Program).

The NEMS-BT reports the two airborne pollutant emissions, SO<sub>2</sub> and NO<sub>x</sub>, that DOE has reported in past analyses. The Clean Air Act Amendments of 1990 set an SO<sub>2</sub> emissions cap on all power generation. Accurate simulation of SO<sub>2</sub> trading tends to imply that physical emissions effects will be zero, as long as emissions are at the ceiling. This fact has caused considerable confusion in the past. However, there is an SO<sub>2</sub> benefit from conservation in the form of a lower allowance price as a result of additional allowances from this rule, and, if it is big enough to be calculable by NEMS-BT, DOE will report this value. The NEMS-BT model also has an algorithm for estimating NO<sub>x</sub> emissions from power generation. Two recent regulatory actions proposed by the EPA regarding regulations and guidelines for best available retrofit technology determinations and the reduction of interstate transport of fine particulate matter and ozone are tending towards further NO<sub>x</sub> reductions and likely to an eventual emissions cap on nation-wide NO<sub>x</sub>. 69 FR 25184 (May 5, 2004) and 69 FR 32684 (June 10, 2004). Therefore, as with SO<sub>2</sub> emissions, a cap on NO<sub>x</sub> emissions will likely result in no physical emissions effects from equipment efficiency standards. However, there is a NO<sub>x</sub> benefit from conservation in the form of a lower allowance price as a result of additional allowances from this rule, and, if it is big enough to be calculable by NEMS-BT, DOE will report this value

### **3.0 RESULTS FORMAT**

The results for the environmental analysis are similar to a complete NEMS run, as published in the *AEO2003*. These results include power sector emissions (or additional allowances) for SO<sub>2</sub>, NO<sub>x</sub>, and carbon, and SO<sub>2</sub> and NO<sub>x</sub> prices, in five-year forecasted increments extrapolated to the year 2035. The Department reports the outcome of the analysis for each trial standard level as a deviation from the *AEO2003* reference cases.

## REFERENCES

1. U.S. Department of Energy-Energy Information Administration, *National Energy Modeling System: An Overview 2003*, 2003. Report No. DOE/EIA-0581(2003). <<http://www.eia.doe.gov/oiaf/aeo/overview/index.html>>
2. U.S. Department of Energy - Energy Information Administration, *Annual Energy Outlook 2003: With Projections Through 2025*, January, 2003. Washington, DC. Report No. DOE/EIA-0383(2003). <<http://www.eia.doe.gov/oiaf/aeo>>