ENVIRONMENTAL ASSESSMENT FOR PROPOSED ENERGY CONSERVATION STANDARDS FOR BEVERAGE VENDING MACHINES

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EA.1 INTRODUCTION

The U.S. Department of Energy (DOE) will conduct an environmental assessment as part of the Notice of Public Rulemaking for beverage vending machines. DOE will assess the impacts of proposed energy conservation standards for beverage vending machines on certain environmental indicators using a variant of the U.S. DOE/Energy Information Administration (EIA)'s National Energy Modeling System (NEMS).[a] DOE/EIA uses NEMS to produce the EIA *2007 Annual Energy Outlook (AEO2007)*.[1] DOE will use a variant known as NEMS-BT to provide key inputs to the analysis. Results of the environmental analysis are similar to those provided in *AEO2007*. DOE anticipates that the primary environmental effects will be reduced power plant emissions resulting from reduced electricity consumption.

DOE intends the environmental assessment 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 assessment considers three pollutants (sulfur dioxide (SO_2), nitrogen oxides (NO_x), and mercury (Hg)) as well as carbon emissions. The only form of carbon emissions tracked by NEMS-BT is of carbon dioxide (CO_2), so the carbon discussed in this report is only in the form of CO_2. For each of the standard levels, DOE will calculate total emissions using NEMS-BT, with external analysis used as needed.

DOE will conduct the environmental assessment as a policy deviation from the *AEO2007*, using the same basic set of assumptions. For example, the emissions characteristics of an electricity generating plant will be exactly those used in *AEO2007*. The NEMS *reference case* and alternative growth scenarios are as described in the utility impact analysis (chapter 13 of the Technical Support Document (TSD)).

EA.2 METHODOLOGY

The NEMS-BT tracks carbon emissions using a detailed carbon module; this approach provides 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 measures will slow generating capacity growth in future years, and new generating capacity is expected to be more efficient than existing capacity. On the whole, NEMS-BT provides carbon emissions results of reasonable accuracy, at a level consistent with other published Federal results. In addition to providing estimates of quantitative impacts of beverage vending machine standards

[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 2000*, DOE/EIA-0581(2000), March 2000. 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, we refer to it as NEMS-BT (BT is DOE's Building Technologies Program). NEMS-BT was previously called NEMS-BRS.

on carbon emissions, DOE will consider the use of monetary values to represent the potential value of such emissions reductions.

The NEMS-BT model reports the two airborne pollutant emissions that DOE has reported in past analyses, SO_2 and NO_x. The Clean Air Act Amendments of 1990 set an SO_2 emissions cap on all large power plants. The attainment of this target, however, is flexible among generators through the use of emissions allowances and tradable permits. The NEMS-BT model includes a module for SO_2 allowance trading and delivers a forecast of SO_2 allowance prices. Accurate simulation of SO_2 trading tends to imply that physical emissions effects will be zero, as long as emissions are at the ceiling.

However, there may be an SO_2 economic benefit from energy conservation, in the form of a lower SO_2 allowance price as a result of additional allowances from this rule, and if it is large enough to be calculable by NEMS-BT, DOE will report this value. The NEMS-BT model also has an algorithm for estimating NO_x emissions from power generation. The impact of these emissions, however, will be affected by the Clean Air Interstate Rule (CAIR) issued by the U.S. Environmental Protection Agency on March 10, 2005. (70 FR 25162 (May 12, 2005). CAIR will permanently cap emissions of NO_x in 28 eastern States and the District of Columbia. As with SO_2 emissions, a cap on NO_x emissions means that equipment energy conservation standards are not likely to have a physical effect on NO_x emissions in States covered by the CAIR caps. Therefore, while the emissions cap may mean that physical emissions reductions in those States will not result from standards, standards could produce an environmental-related economic benefit in the form of lower prices for emissions allowance credits. However, as with SO_2 allowance prices, DOE does not plan to monetize this benefit for those States because the impact on the NO_x allowance price from any single energy conservation standard is likely to be small and highly uncertain.

With regard to mercury emissions, NEMS-BT has an algorithm for estimating these emissions from power generation, and, as it has done in the past, DOE is able to report an estimate of the physical quantity of mercury emissions reductions associated with an energy conservation standard. DOE assumed that these emissions would be subject to EPA's Clean Air Mercury Rule[b] (CAMR), which would permanently cap emissions of mercury for new and existing coal-fired plants in all States by 2010. Similar to SO_2 and NO_x, DOE assumed that under such a system, energy conservation standards would result in no physical effect on these emissions, but would be expected to result in an environmental-related economic benefit in the form of a lower price for emissions allowance credits. DOE's plan for addressing analysis does not include monetizing the benefits of reduced mercury emissions, because DOE considered that valuation of such impact from any single energy conservation standard would likely be small and highly uncertain.

On February 8, 2008, the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit) issued its decision in State of New Jersey, et al. v. Environmental Protection Agency[c], in which the Court, among other actions, vacated the CAMR referenced above.

[b] 70 FR 28606 (May 18, 2005)
[c] No. 05-1097, 2008 WL 341338, at *1 (D.C. Cir. Feb. 8, 2008).

Accordingly, DOE is considering whether changes are needed to its plan for addressing the issue of mercury emissions in light of the D.C. Circuit's decision.

With regard to particulates, these emissions are a special case because they arise not only from direct emissions, but also from complex atmospheric chemical reactions that result from NO_x and SO_2 emissions. DOE does not intend to analyze or report on the particulate emissions from power plants because of the highly complex and uncertain relationship between particulate emissions and particulate concentrations that impact air quality.

EA.3 RESULTS

The results of the environmental analysis are similar to a complete NEMS run, as published in the *AEO2007*. These include power sector emissions for SO_2, NO_x, and carbon, and SO_2 prices, in five-year forecasted increments extrapolated to the year 2042. DOE reports the outcome of the analysis for each trial standard level as a deviation from the *AEO2007 reference case* results.

REFERENCES

1. EIA (Energy Information Administration). 2007. *Annual Energy Outlook 2007.* EIA, Washington, D.C., DOE/EIA-0554 (2007).