SESSION 3C

EMISSIONS AND CLIMATE POLICY

Moderator: Elizabeth Titus, NEEP

PAPERS:

Using eGRID to Estimate GHG Emissions Reductions from Energy Efficiency
Art Diem, US EPA
Cristina Quiroz, TransSystems/E.H. Pechan
Manish Salhotra, TransSystems/E.H. Pechan

Quantifying Emissions Benefits for Wisconsin Focus on Energy Programs
David Sumi, Cadmus
Kate Swayne, Cadmus
Carol Stemrich, Public Service Commission of Wisconsin

An Analysis of Eco-Efficiency in Energy Use and CO_2 Emissions in the Swedish Service Industries
Clara Pardo Martinez, University of el Rosario in Bogota, Colombia

SESSION SUMMARY:

As the title suggests, this session will focus on estimating greenhouse gas (GHG) emissions related to avoided energy generation as a measure of the environmental benefits of energy efficiency. The first paper constitutes an introduction to the publicly available eGRID database. The database was developed and is routinely updated by the U.S. Environmental Protection Agency (EPA). As an introduction, the paper serves two purposes. First, it provides guidance to those who want to understand and use the database, by discussing key elements in the database and the applicability of specific variables for different types of analytical inquiries. The paper explains the various types of emission rates reported in the database, presents trends in CO_2 output emission rates by subregion from 1998 through 2009, and reports the most recent data on non-baseload and total CO_2 equivalent output emission rates. In addition, to illustrate how the information from the database can be used to estimate displaced greenhouse gas emissions from installed energy efficiency, the authors provide a hypothetical example in which they calculate the reduction of the carbon footprint in Atlanta, Georgia from non-baseload and purchases of grid supplied electricity combined.

The second paper is another take on the issue of quantifying emissions reductions. It presents results from the analysis of emissions benefits from Wisconsin Focus on Energy renewables and efficiency programs from 2012. The discussion also includes overall policy context for studying emissions and a comparative study of alternative methodological and accounting approaches. Focus on Energy's approach to estimating environmental benefits combined estimates of pounds of pollutant per MWH of avoided generation based on the US EPA's Acid Rain Hourly Emissions data series with the appropriate allowance prices for displaced emissions, Using Wisconsin data, the authors compared emission factor estimates obtained from the following: average of all load, average of marginal load, and time of savings accounting approaches, as well as from a beta test of EPA's recently developed AVERT (statistical dispatch simulation) model. Effects of the estimation approach vary quite significantly by pollutant. The accuracy of the emission factor estimate is improved when the generation source at the operating margin is accurately identified or estimated. The Time of Savings (TOS) approach aligns with guidelines from the World Resources Institute calling for consideration of which plants operate on the

margin of system supply for every hour of the year as the source of emission reductions. Availability of accurate savings loadshapes which allocate energy savings as a percentage across the hours of the year proves essential to the TOS approach. TOS factors for renewables pose special challenges, because savings occur when energy would have been consumed rather than when energy is collected or generated. The WI approach was used as a benchmark for EPA's AVERT model. However, the benchmarking test demonstrated that there is a resolution issue – the simulator accuracy is limited to project sizes that are larger than typical EE programs in WI. The benchmarking process highlighted one of the challenges of quantifying and crediting emissions impacts to EE programs.

In conclusion, the paper demonstrates how emissions effects are being counted as program benefits in cost-effectiveness analysis, raises questions about the choices that evaluators face in selecting methodologies for estimating emissions, and looks ahead, anticipating the benefits and challenges confronting evaluators given EPA's plan to designate energy efficiency as a best available control technology for GHG mitigation.

The third paper is the broadest in scope, bringing GHG emissions explicitly into the discussion of sectoral economic policy and academic inquiry. Eco-efficiency refers to the ability to generate more goods and services while using fewer resources and producing less waste and pollution. This paper applies a nonparametric data envelopment model (DEA) analysis combined with an econometric analysis of a fifteen year time series of macroeconomic data on the Swedish service sector, to explore the determinants of eco-efficiency. Findings suggest that the sector has the potential to further improve energy efficiency and decrease CO2 emissions by means of policies increasing energy taxes, investments and productivity. Applying the methods and techniques used in this study to other countries and sectors could increase our understanding of the relationships between energy efficiency and CO2 emissions and could further test the robustness and reliability of the results in order to build support for the role of eco-efficiency analysis in the formulation of energy and environmental policy.