

## SESSION 6C

### COLD CASE: METHODS AND EVIDENCE FOR EVALUATION REFRIGERATOR RECYCLING

*Moderator: Bobbi Tannenbaum, KEMA Inc.*

#### PAPERS:

##### **How Electric Customers Dispose of Used Refrigerators and Why They Choose a Utility Program**

Steven Westberg, Hiner & Partners  
John H. Reed, Innovologie, LLC  
Charles Bailey, Innovologie, LLC  
Moria Morrissey, Innovologie, LLC  
Don Dohrmann, ADM and Associates  
John Peterson, Athens Research  
Shahana Samiullah, Southern California Edison

##### **Gross Savings Estimation for Appliance Recycling Programs: The Lab Versus In Situ Measurement Imbroglio and Related Issues**

John Peterson, Athens Research  
Don Dohrmann, ADM and Associates  
Taghi Alereza, ADM and Associates  
Shahana Samiullah, Southern California Edison  
Steven Westberg, Hiner & Partners  
John H. Reed, Innovologie, LLC

##### **Net Savings Estimation in Appliance Recycling Programs: A Review and Empirical Analysis with Recent California Data**

Donald R. Dohrmann, ADM Associates  
John Peterson, Athens Research  
John H. Reed, Innovologie LLC  
Shahana Samiullah, Southern California Edison Company  
Steven Westberg, Hiner and Partners

#### SESSION SUMMARY:

This session explores three issues related to refrigerator recycling programs: customer appliance disposal choices; gross savings estimates, and net-to-gross analysis. This rare session provides a comprehensive look at multiple evaluation issues related to a single program type, with data consistent in time, geography and program parameters.

All three papers are based on research conducted as part of the evaluation of the 2004-2005 California statewide Residential Appliance Recycling Program (RARP). The California market and RARP program provide an excellent venue for research and results that are applicable to recycling programs throughout the nation. The market is large — approximately 700,000 refrigerator units disposed of annually and almost 100,000 program recycled units in 2005. In addition, the RARP program has a history of evaluation that builds upon previous approaches and findings.

The first paper, “How Electric Customers Dispose of Used Refrigerators and Why They Choose a Utility Program,” discusses the used appliance market and disposal choices available to customers. The authors use a combination of primary and secondary data, both qualitative and quantitative, to

develop a comprehensive flow diagram of refrigerator disposal in California. The authors also discuss customer preferences for disposal methods and reasons for participating in the recycling program.

The second paper, “Gross Savings Estimation for Appliance Recycling Programs: The Lab Versus In Situ Measurement Imbroglio and Related Issues,” addresses the differences between lab and in-situ metering of appliances. This issue is important for estimating per unit energy consumption (UEC), the foundation upon which program gross savings are based. Previous evaluations are based on DOE protocol based tests data (lab metering) and participating unit characteristics to determine population unit energy consumption. While estimating program gross savings, the paper also addressed the difference between lab-based UEC estimates and *in situ* metering-based UEC. The paper reports on analysis performed on a data from a dual metering study in which 200 units were metered in-situ and DOE-tested by BR Labs. The authors discuss the myriad factors that may cause differences, including whether there are systematic lab-in situ differences in the recycling population as well as issues such as extrapolating short term metering to annual consumption. The results, although preliminary, point to some systematic differences between in-situ and lab metered consumption estimates and recommends important elements for continued evaluation of the program.

The third paper, “Net Savings Estimation in Appliance Recycling Programs: A Review and Empirical Analysis with Recent California Data,” discusses the net-to-gross (NTG) ratio approach used to evaluate the RARP program. The authors repeat the 2002 program evaluation data collection and analysis approach and apply it to the 2004-2005 program. They discuss the approach and suggest modifications to some of the assumptions supported by market data collected in this study. Later in this paper the authors reevaluate the conceptual underpinnings of the approach and propose an alternative view akin to direct measurement of free-ridership regarding program recycled units that would have been transferred to another user in the absence of the program. Using the old approach, the modified assumption approach, and an approach reflecting the alternative view, the resulting NTG ratios for the 2004-2005 RARP range from 0.409 to as high as 0.68 (all higher than the 0.351 for the 2002 program.) The difference in results reflects the volatility of the NTG ratios over program populations, market data, and approved methodologies.