



**REGIONAL EVALUATION,
MEASUREMENT & VERIFICATION FORUM**

Regional EM&V Forum Net Savings Webinar July 28, 2011

On July 28, 2011, the Northeast Energy Efficiency Partnerships (NEEP) Regional Evaluation, Measurement, & Verification Forum (Forum) hosted a webinar on sharing recently completed net savings studies in Massachusetts. About 40 attendees joined the webinar. The net savings webinar provided an opportunity for Forum members (regulators, programs administrators, and other energy efficiency stakeholders in the Northeast and mid-Atlantic region) to learn about the results of a recent research study on C&I free-ridership and spillover methodologies sponsored by Massachusetts program administrators and conducted by Tetra Tech and KEMA.

Net Savings Webinar

Elizabeth Titus, NEEP's senior research and evaluation manager, kicked off the meeting and introduced the two speakers – Ms. Pam Rathbun from Tetra Tech and Dr. Mimi Goldberg from KEMA. Both speakers have extensive experience in the measurement of program attribution. Ms. Rathbun has considerable experience in survey research and has managed several C&I free-ridership and spillover studies in Massachusetts and California. Dr. Goldberg is a statistician and econometrician who has worked on many varied aspects of energy efficiency evaluation, modeling and analysis. This work has included contributions to attribution methods development and selection frameworks in several jurisdictions.

Powerpoint [slides](#) for the webinar presentation and an audio copy of the webinar are available, as is the MA study final report.

Research and Methodology Review

Ms. Rathbun provided background on the rationale for the Massachusetts methodology study, definitions of the types of free-ridership and spillover that contribute to net savings for C&I programs in Massachusetts, pros and cons of having a statewide approach to calculate net savings, debate around net-to-gross (NTG) measurement, and the mathematical relationship between free-ridership and spillover.

Dr. Goldberg summarized the methodology development activities, and identified and described the methods available for estimating net savings; these include customer/vendor self-reports (most commonly used), market sales data analysis, retailer/contractor surveys, econometric modeling (i.e. pricing and elasticity analysis, stated preference, and revealed preference), structured expert judging (i.e. Delphi panel) which Massachusetts often adopts, historical tracking, billing analysis (net savings comparison between participant and comparison group), program delivery staff interviews (as a primary source of understanding free-ridership, also a good starting point before reaching customers for more data), and on-site data collection by M&V contractors (focuses on gross impacts to better understand what equipments are included in the program).

Dr. Goldberg also provided an overview of method selection factors. Those factors are largely driven by program structure, information type, availability of market sales data and meaningful comparison group, homogeneity of the measure and customers, the likelihood of substantial upstream effects unknown to end-use participants (e.g. how contractors are affected by the program and, in turn, influence customers), and finally cost/value tradeoffs.

On method characterization, Dr. Goldberg described that the term "self-report" can apply to a variety of survey-based methods. To discuss strengths, weaknesses, and best practices, each method must be



further defined in terms of factors including who the respondents/data providers are, and what types of data they can provide. She stated that not all self-reports are created equal. In addition, even answers from end-user participants on what they would have done hypothetically absent the program can provide useful information, if question sequences are appropriately structured. Further, much of the information based on market studies is itself self-report by vendors (e.g., sales data) and nonparticipants (e.g., preferences and actual purchases). Some data is more easily corroborated by records and direct observation than others.

Dr. Goldberg then gave an overview characterizing survey-based methods, followed by a review and discussion of some issues regarding design factors and data collection. Methods discussed included post hoc counterfactual data collection, customer preferences and customer-specific influence study, shelf and stocking observations, and market sales data and billing data analysis.

After that, Dr. Goldberg summarized methods applicable to different conditions together with recommended approaches for Massachusetts C&I programs (including retrofit and new construction/major renovation). She also commented on end-user self-report design.

Recommendations for Improvements

Ms. Rathbun presented recommendations for improvements to Massachusetts' 2003 standardized methodology for C&I programs. She noted that the 2003 methodology based on self-reported information contained many best practice elements of survey design, data collection, and analysis. For current C&I programs, the consultants' recommendations were generally to continue to rely upon end-user and trade ally interviews. Additionally, there is a need to incorporate acceleration into the NTG (net-to-gross) calculation for both annual net savings and life-cycle savings and to improve the reliability and validity of estimates. In terms of free-ridership and spillover calculations, Ms. Rathbun introduced details on scoring of survey responses and consistency checks. On spillover estimation, she said they calculated spillover equipment amounts and associated efficiency impacts as well as the influence of the program on spillover equipment purchase decision-making. Nonparticipant spillover is calculated in a similar method but is based on responses from vendors rather than end-use customers.

Ms. Rathbun then briefly described the process used in testing the improved method that had been proposed. A revised survey instrument was pretested with a sample of 2010 program participants. Also, ways of handling missing data were explored. The consultants applied the 2003 algorithm to 2010 data. Pertaining to testing for the reliability and validity of the recommended self-report approach, they created simulated datasets and performed simulated dataset analysis. Ms. Rathbun also illustrated some recommended final improvements to the self-report methodology. These included, for example, clarifying some question wording, adding receipt of interest-free financing to the description of program services, adding questions to assess a program's influence on unlike spillover, adding consistency check scale items to like and unlike spillover batteries of questions, adding questions regarding expected non-energy impacts, and removing some process-related questions.

2011 Studies Schedule

Ms. Rathbun then introduced the schedule for the 2011 free-ridership and spillover research activities. She stated that 2010 participant survey was scheduled for April/May for electric and June/July for gas; free-ridership analysis and reporting was scheduled for June for electric and August for gas. Measurement of both like and unlike spillover will also be incorporated into the upcoming C&I non-energy benefits work scheduled for the fall of 2011. This will allow participants more time to install equipment after participation.

Q&A and Comment Session

Ms. Titus thanked the two presenters and opened the Q&A session, in which the following questions and comments were addressed:



1. If the free ridership is 5%, is that 5% also taken out of the participant costs? Dr. Goldberg said that in a benefit/cost test such as the Total Resource Cost test, yes, if 5% of the savings are not attributable to the program, the same 5% of participant incremental costs is a cost not attributable to the program. Only the program-attributable benefits and program-attributable costs are counted. The participant incremental costs are estimated from a different study than the free ridership study.
2. What is the impact of incentive levels on the program results for net savings? Dr. Goldberg replied that the lower the incentives are, the higher the free-ridership will be. Incentives usually do not cover all incremental costs, and she expected people not to fully engage in energy savings programs until they receive enough incentives. She also said the issue of how to design incentive levels to affect actual free ridership is a separate issue from how to design surveys to measure free ridership accurately. Ms. Titus asked how to make surveys more meaningful. Dr. Goldberg stated that it depends on how the research questions were designed. Some best practices are described in the Massachusetts report. Strategies to limit actual free ridership depend on program constraints, such as whether it is possible to increase incentives if they are too low. She also thought it is helpful to have a good understanding of other risk factors that might lead to high free ridership. Does the Massachusetts free-ridership and spillover survey provide insight into whether non-energy impacts influence or drive customer purchases? Dr. Goldberg thought that it will. She commented that it is good for programs to use non-energy impacts to help promote energy efficient choices. At the same time, it is important to put these pieces (free ridership, spillover, and non-energy impact surveys) together in order to understand how the non-energy impacts are helping to encourage more energy-efficient equipment purchases, and the extent to which the program is contributing to customers' understanding of these non-energy impacts (indicating higher attribution).
3. Jeff Schlegel, advisor to Massachusetts Energy Efficiency Advisory Council, commented that it is good to give people some time to take actions before conducting a spillover survey, but it is also good to conduct a free rider survey as soon as possible after the implementation decision. Dr. Goldberg said the Massachusetts study plan is to do both an early and late survey. The early survey asks about free ridership, the customer's expected non-energy impacts, the influence of the expected non-energy impacts on the customer's decision, and the influence of the program on the customer's expectation. The later survey asks about spillover and the non-energy impacts experienced. Ms. Rathbun noted that the later survey will be conducted with a sub-sample of the free rider survey respondents. Mr. Schlegel appreciated the presenters' contribution to advancing the Forum's knowledge and program experience sharing process. He then commented that subsidies are generally not much noticed and mentioned contractor training issues. He also asked how to communicate with customers on all things energy efficiency practitioners are currently doing or have already done. Dr. Goldberg commented that she does not think energy efficiency stakeholders need to make customers aware of all program activities. Rather, evaluators can assess the impact of the program on upstream actors and the impact of upstream actors on customers. She also said that there are no perfect methods.
4. What role, if any, do non-utility efficiency program impacts, from federal tax credit and the American Recovery and Reinvestment Act incentives, have in defining free-ridership? Dr. Goldberg answered that tax incentives are external to the program. If the federal incentive is large compared to the program's incentive, the attributable program impacts are likely to be relatively small. She said that the federal incentives can be combined with local programs and that the research group might try to find the overall impact of the combined programs, and allocate credit among them. Dr. Goldberg then added that they usually consider policy contexts when doing research design, determine whether a program relates to policies/regulations such as ARRA, and ask what the program is trying to achieve before making



surveys. Surveys will be designed differently if the objective is to assess the combined impact versus to estimate the incremental impact of the program on top of the federal incentives.

5. What are good examples showing the best way to collect market-based data? Dr. Goldberg said they collected online on-going manufacturer data from industry trade organizations like NEMA (National Electrical Manufacturers Association) and added that the process is all about building relationships with people/data providers. She added that in Wisconsin and other studies they also took surveys with local distributors and estimated their sales shares using interviews and data on number of employees.
6. What are the pros and cons of collecting information on C&I net savings at the level of individual measures versus bundles of measures, given how customers make purchase decisions? Ms. Rathbun said that the Massachusetts surveys provide detailed information about measures to respondents as background, but they report survey results by end-use category. Dr. Goldberg answered that customers mostly bundle up their purchases.
7. Looking ahead, in the consultants' opinion, could/should net savings be included in forward capacity market bids and in estimates of environmental impacts (e.g. information needed by air regulators)? Dr. Goldberg said that the current FCM rules consider only gross savings, on the assumption that the savings are "on the grid" regardless of whether they would have occurred anyway. However, this definition is problematic, since savings in the wholesale market needs to relate to a baseline that implicitly includes "business as usual" efficiency programs. On the other hand, it is not quite clear how exactly FCM would incorporate free-ridership estimates from a net savings study. The research group members are already beginning to develop a better understanding of energy efficiency programs' possible wide contributions and said that they are also looking at baseline questions. Webinar attendees also discussed emissions credit, and some participants commented that who pays for emissions might largely depend upon market structure.