SESSION 5B

LIGHT TRANSPORT THEORY – IMPACT AND MARKET EFFECTS, STATE VS. STATE

Moderator: Jeff Ihnen, Michaels Energy

PAPERS:

Development of Interior Lighting Hours of Use and Coincidence Factor Values for Evaluation of the EmPOWER Maryland Commercial Lighting Programs

Joe Loper, Itron, Inc., Silver Spring, MD
Bob Ramirez, Itron, Inc., San Diego, CA
Rachel Harcharik, Itron, Inc., San Diego, CA
John Cavalli, Itron, Inc., Oakland, CA
Mike Messenger, Itron, Inc., Davis, CA

Quantifying Energy Savings from Market Effects: The Case of High Bay Lighting

Mitchell Rosenberg, KEMA, Inc., Burlington, MA
Edward Vine, California Institute for Energy and Environment, Berkeley, CA
Tim Pettit, KEMA, Inc., Fairfax, VA

Is The Customer Always Right? A Cost-Effective Method for Estimating Lighting Usage in Commercial Buildings

Blake Rector, Itron, Inc., San Diego, CA
John Cavalli, Itron, Inc., Oakland, CA
Rachel Harcharik, Itron, Inc., San Diego, CA

SESSION SUMMARY:

Papers in this session leverage one of the largest lighting data collection efforts ever performed, including nearly 7,000 lighting loggers in 1,200 facilities partitioned into 13 building types. The data were collected by Itron as part of the 2006-2008 non-residential lighting programs evaluation for the California Public Utilities Commission.

The papers in this session may be categorized in two groups. The papers by Messrs. Loper and Rector can be used to shore up technical resource manuals (TRMs) in other jurisdictions based on metered data from the expansive California study. Mr. Rosenberg's paper provides a logical method for quantifying market effects and the results of programs in an environment where programs have been in place many years, relative to a control group of four states that have lacked programs to date.

As part of its independent evaluation of EmPOWER Maryland's programs, Itron was tasked with recommending hours of use and coincidence factors for prescriptive commercial lighting applications. Upon review of available data, including TRMs from other locales, Itron found that secondary sources for comprehensive statistically-valid information were insufficient. As a result, Itron, led by Mr. Loper, used the fresh California data set to compile hours of use and coincidence factors for linear and compact fluorescent lamps for 13 building types. Insufficient data were available for a statistically valid sample for a few building types. In these cases, values from California's Database for Energy Efficiency Resources supplemented the results of Mr. Loper's analysis. This paper will be relevant for anyone seeking to transfer evaluation results from one territory or state to another.

A primary goal of energy efficiency programs is to positively affect the marketplace to encourage adoption of energy efficient technologies both within and outside program activities. While

program evaluations typically include elements of free ridership and spillover in determining net program savings, can attributable effects of the program be reliably quantified? Mr. Rosenberg's paper uses the California lighting survey data and a four-state control group to determine these market effects for high bay lighting programs for the state of California. The paper quantifies cumulative energy and demand impacts due to market effects for the 2006-2008 high bay lighting program years, and supports the California Public Utilities Commission's planning efforts to use market effects as a quantifiable resource.

A primary uncertainty when determining impacts for lighting measures is the annual hours of use. In many cases, self reported hours of use are considered to be a reliable and relatively accurate means for determining savings. In his paper, using the California lighting survey, Mr. Rector demonstrates that this generally introduces what is arguably significant error presumably because end users are simply not aware of how much, or in most cases, how little they use their lighting. Cursory review of the results indicates end users over-estimate their lighting hours of use by roughly 20%. Mr. Rector's paper provides usage rates and adjustment factors for multiple building types and within these, multiple activity types. Adjustment factors are provided for hours of metered lighting use compared to both self-reported hours and facility "open" hours. The results of the paper may be applied to some extent for estimating hours of lighting use given readily available self reported end user data.