QUICK TAKES: BRIGHT INSIGHTS: LIGHTING IMPACT MEASUREMENT AND PROGRAM EFFECTIVENESS

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PAPERS *(in order of appearance)*:

SESSION SUMMARY:

While efficient lighting continues to be a core component of nearly all residential and nonresidential efficiency portfolios, tracking and evaluating these savings will become increasingly challenging due to a variety of factors, including rapidly changing technologies and product pricing, standards impacts, and alternative program designs. This session provides "quick takes" on six diverse lighting topics ranging from residential hours of use metering to a study of urban canyon effects to alternative approaches to measure lighting savings in nonresidential buildings.

In the first paper of this session, Strom and Nelson discuss evaluation results of a lighting market lift program which provided retailer incentives for increasing sales of efficient products over a baseline of historical and comparison-store sales. The evaluation reviewed data, conducted a series of in-depth interviews, developed scenarios of results under different study designs, and provided recommendations for potential changes to the program. Strom and Nelson highlight challenges encountered including the choice of comparison areas, a natural disaster forcing a change in the program comparison area, and

product availability issues. The evaluation suggests that market lift—under very specific conditions—may be a worthwhile program approach, but is not without its difficulties in terms of evaluation challenges and gaining retailer/manufacturer buy in.

As part of a large, multi-state residential hours of use (HOU) study Walker et al. examined the impacts of high rise building shading and glazing orientation on lighting HOU in New York City. The study team employed a number of onsite measurement techniques to quantify building shading and glazing orientation. These data were then combined with metered HOU data to estimate the extent that these factors influenced lighting usage. The authors concluded from this "exploratory" analysis that insolation and glazing had some impact on lighting HOU, but that it did not fully explain the observed differences in hours of use between New York City and the rest of the larger study region.

To date there has never been a national residential metering study to develop national lighting hours of use (HOU) estimates. However, there have been prior efforts to leverage state-level data to develop such estimates and to also leverage household characteristic data to regionalize these HOU estimates. Gifford, Ghosh and Poplawski discuss expansion of prior work to develop national and regional HOU estimates using California data. In this updated study they have integrated data from two large regional HOU studies; one from three Mid-Atlantic states and one completed for the Tennessee Valley Authority. The new analysis shows higher hours of use than in the prior study. Further, hours of use are higher for CFLs than for all lamps on average and the authors hypothesize explanations for this finding.

In the next paper, Telarico and Blake describe work to follow up on a non-residential upstream lighting program impact evaluation which found a significant portion of program bulbs to be in storage. For the Year 1 impact evaluation, in-storage bulbs were counted as zero in the installation rate calculation, which contributed to an overall negative impact of approximately 20% of claimed program energy savings. Due to these findings, sites with any number of in-storage bulbs were revisited determine when and whether these bulbs were installed and to calculate savings from bulbs moving from storage to sockets. Follow-up research found increases in both LED and fluorescent installations, but also concluded that there was little opportunity for increased savings beyond Year 3, as many of the remaining in-storage bulbs were likely to be used in the future to replace program bulbs on burnout.

There are a number of methods by which lighting usage can be estimated within nonresidential buildings. These methods range from inexpensive, but less accurate approaches using a facility's business hour schedule, to the more accurate and costly approach of installing onsite monitoring equipment. Facility business hour approaches ignore variability in a facility's lighting load shape during open hours and fail to capture usage during closed or shoulder hours. Onsite monitoring involves extensive on-site visits and the installation of monitoring equipment over a long period of time. Gonzales and McAuley discuss the methods and findings that were developed from comparing business hours and customer self-reported lighting usage to actual monitored lighting data. These results provide evaluators with valuable insights on two cost effective methods for obtaining accurate lighting usage estimates within nonresidential buildings.

In the final panel paper DeCicco and Gogte describe a comprehensive onsite commercial building metering study to develop HOU values, coincidence factors, load shapes, and HVAC interactive factors for ten different building types. Previously, Pennsylvania's technical reference manual (TRM) estimates for these parameters were derived from a number of secondary regional and out of region studies. For many building types the study results varied significantly from the previous TRM estimates; as much as 55% for hours of use and 63% for summer coincidence.