

RTR Appendix

Southern California Edison, Pacific Gas and Electric, Southern California Gas, and San Diego Gas and Electric (“Joint Utilities” or “Joint IOUs”) developed Responses to Recommendations (RTR) contained in the evaluation studies of the 2010-2012 Energy Efficiency Program Cycle. This Appendix contains the Responses to Recommendations in the report:

RTR for the LED Workpaper Update and Market Characterization Study (2013, 2014, Navigant Consulting, Calmac ID #SCE0380.02)

The RTR reports demonstrate the Joint Utilities’ plans and activities to incorporate EM&V evaluation recommendations into programs to improve performance and operations, where applicable. The Joint IOUs’ approach is consistent with the 2013-2014 Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan (version 3) ¹ and CPUC Decision (D.) 07-09-043².

Individual RTR reports consist of a spreadsheet for each evaluation study. Recommendations were copied verbatim from each evaluation’s “Recommendations” section.³ In cases where reports do not contain a section for recommendations, the Joint IOUs attempted to identify recommendations contained within the evaluation. Responses to the recommendations were made on a statewide basis when possible, and when that was not appropriate (e.g., due to utility-specific recommendations), the Joint IOUs responded individually and clearly indicated the authorship of the response.

The Joint IOUs are proud of this opportunity to publicly demonstrate how programs are taking advantage of evaluation recommendations, while providing transparency to stakeholders on the “positive feedback loop” between program design, implementation, and evaluation. This feedback loop can also provide guidance to the evaluation community on the types and structure of recommendations that are most relevant and helpful to program managers. The Joint IOUs believe this feedback will help improve both programs and future evaluation reports.

¹ Page 336, “Within 60 days of public release of a final report, the program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings. The IOU responses will be posted on the public document website.” The Plan is available at http://www.energydataweb.com/cpucFiles/pdaHomeDocs/2/2013-2014_Energy_Efficiency_EMV_Plan.zip (visited on 10/1/14).

² Attachment 7, p.4, “Within 60 days of public release, program administrators will respond in writing to the final report findings and recommendations indicating what action, if any, will be taken as a result of study findings as they relate to potential changes to the programs. Energy Division can choose to extend the 60 day limit if the administrator presents a compelling case that more time is needed and the delay will not cause any problems in the implementation schedule, and may shorten the time on a case-by-case basis if necessary to avoid delays in the schedule.”

³ Recommendations may have also made to the CPUC, the CEC, and evaluators. Responses to these recommendations will be made by Energy Division at a later time and posted separately.

Market Assessment and Impact

Study Title: LED Workpaper Update and Market Characterization Study

Program: Statewide Lighting

Author: Navigant

Available at: CALMAC ID #SCE0381.01

Energy Division Work Order: 2073 - Lighting Market Characterization & Workpaper Update - LED Workpaper

Item #	Page #	Findings	Best Practice / Recommendations	Recommendation Recipient	Disposition (Accepted, Rejected, or Other)	Disposition Notes (e.g. Description of specific program change or Reason for rejection or Under further review)
1	5-1	<p>Finding: Current prices for both LED and baseline (non-LED) products included on the CA Statewide Cost Data Sheet52 are no longer accurate.</p>	<p>Recommendation: Update cost sheet to use web-based pricing analysis results for LED and baseline (non-LED) products provided in Table 2-1. Additionally, consider using updated incremental cost results.</p>	All IOUs	Accepted	<p>The IOUs agree and will pursue cost updates accordingly. This recommendation has already been followed in the 2016 workpapers, which employed the Navigant study's raw cost data. The IOUs also acknowledge that incremental measure cost data should reflect updated values in each element of the equation.</p> <p>The IOUs see the benefit of all the recommendations, and believe they deserve our attention to explore and determine the best ways of applying them. On an operational level, execution will be subject to crystallization after the IOUs work together with Commission Staff on the details of implementable courses of action. The IOUs look forward to these joint processes. Dates for implementation of some recommendations will be subject to the lead time for work involved, and to CPUC scheduling for program changes.</p> <p>The IOUs have created a working group for specific recommendations to develop proposals that address Navigant's recommendations on changes needed. The goal of this process is to achieve consensus amongst the IOUs and the CPUC on new approaches that address the potential challenges with the savings methodology as Navigant detailed, and to update the associated work papers by September 2016 based on determinations available at that time.</p> <p>The working groups are tasked with (1) understanding the data collection needs for the various recommended methods; (2) the data collection and reporting capabilities of each IOU; (3) evaluation of the recommended methods; (4) determining appropriate methods to propose based on feasibility, cost effectiveness, and the ability to support Program Administrators (PAs) in promoting and incentivizing more efficient products; (5) if appropriate, develop an alternate proposal beyond Navigant's recommendations that appears to uphold the study's findings, but fit better with IOU implementation analysis; and (6) engage with the CPUC and Ex Ante Team to review and implement findings pertaining to new savings methodologies. Some of the recommendations below could require update-studies that may not be finalized until after September 2016, and therefore will apply to the following period. Currently assigned working groups each include appropriate personnel from product/program management and engineering/workpaper groups, with additional support and involvement by the IOU M&E/EM&V groups.</p>

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2	5-1	Finding: There is no statistical difference for any high-priority LED product category between the San Francisco and San Diego mean price at the 95% level of confidence.	Recommendation: All IOUs can use the same updated cost data.	All IOUs	Accepted	The IOUs concur that no differences between pricing per service territory are currently noted. Current workpapers include price variations among climate zones. The IOUs agree to use the same updated cost data as each other applicable to the established protocols. The IOUs did so in the 2016 workpapers submitted.
3	5-1	Finding: Prices have not stabilized for any high-priority LED product category. The web-based pricing analysis indicates that in the near term, average LED lamp prices will decrease annually by 21% per year and luminaires by 20% per year.	Recommendation: Use updated costs data for the next 2 to 3 years only (until about 2017 or 2018).	All IOUs	Accepted	The IOUs agree that 20-21% annual price reductions for LEDs could indicate a continued downward trend warranting updates. The IOUs will develop proposed methods and frequency of updates. The recommendation to apply updates only for the next two or three years appears consistent with the code changes and price stabilization currently anticipated. The annual price reduction percentage ratio will be revisited and updated in future analyses.
4	5-1	Finding: Although there was variation among market actors, survey responses collectively showed a higher share of CFL lamps in the non-residential market baseline than the 50 percent assumed in the disposition. Additionally, due to EISA legislation, incandescent sales now include halogen incandescent lamps with higher efficacy. For bay lighting applications, most market actors reported high shares of linear fluorescent lamps and relatively low shares of PSMH lighting. This indicates that a baseline of 100 percent PSMH may no longer be standard practice. Standard practice baselines are especially important where no code requirements exist or code requirements are unclear.	Recommendation: Consider updating the non-residential baseline for LED lamps to reflect the current market mix of baseline technologies.	CPUC	Accepted	The IOUs are supportive of an update to non-residential screw-in lamp baselines. The IOUs envision related improvements to be included in baselines, such as differentiation matched to sector, product type, market mix, socket mix, and matched standard practices.
5	5-2	see above	Recommendation: Consider updating the non-residential baseline for bay lighting to reflect the current market mix of baseline technologies. This may require additional research since not all fixtures are one-to-one replacements and the survey did not collect data on number of lamps per linear fluorescent fixture.	CPUC	Accepted	The IOUs are supportive of an update to baselines for non-residential bay lighting applications to reflect base technologies. The IOUs envision related improvements to be included in baselines, such as differentiation matched to sector, product type, market mix, socket mix, and matched standard practices.

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6	5-2	<p>Finding: The WRR method underestimates savings for more efficient lamps and overestimates savings for less efficient lamps, which provides a disincentive for programs to focus on more efficient products. Additionally, existing WRR values also do not accurately reflect the current baseline and LED efficacies in the non-residential market.</p>	<p>Recommendation: Navigant presents the following “good, better, best” options for the DEER team to consider as they continue research focused on improving the methodology for screw-in lamps, recognizing that some changes may not be possible.</p> <p>§ Ideal “Best” Method. The most accurate option is to determine a single baseline for each product category—i.e. EISA lumen bin—and determine which bin LEDs fall into by collecting actual lumen output for incandescent products. This is the recommended approach for A-line lamps in the residential lighting uniform methods protocol.⁵³ Average program LED wattage per bin would determine the savings. In lieu of program LED wattage averages, average LED wattage for each bin could be updated annually with web-scraping data.</p> <ul style="list-style-type: none"> · This approach would require programs to collect detailed records of incandescent LED products including wattage and efficacy or lumen output. <p>§ Alternative “Better” Method. If collecting lumen output is not possible, simply assigning a single baseline wattage for each product category and assigning product categories by LED wattage could be an improvement. In this case, savings should be the category baseline watts minus the actual LED watts.</p> <p>Programs would need to review the LED wattage bin mapping annually to account for increases in efficacy that will change the LED bounds of each EISA category.</p> <ul style="list-style-type: none"> · This approach would require programs to collect the rated wattage of incandescent LED products. <p>§ Possible Improvements to WRR Method. If the WRR method cannot be changed, the following improvements to its application will improve accuracy:</p> <ul style="list-style-type: none"> · Update average LED efficacy and wattage annually using web-scraped data · Apply different WRRs to each EISA bin as determined by LED lumens (ideal) or wattage (possible) · Update baseline technology mix and wattage regularly, starting with mix reported in distributor surveys 	IOUs and CPUC	Accepted	<p>The IOUs agree that the savings methodology for screw-in lamps should be updated to reflect more appropriate baselines and efficacy, and to support Program Administrators in promoting and incentivizing more efficient products.</p> <p>As noted in the report, the current Wattage Reduction Ratio (WRR) and Wattage Range methods are critically deficient in effectively characterizing the energy savings and potential improvements offered by each new generation of LED product efficacy increase. Wherever the recommended methodologies for screw-in lamps would be improvements in accuracy compared to the WRR and the Wattage Range Method currently in use, the IOUs agree to employ them in the manner and schedule feasible. As noted in the Navigant Study, the predominant practice by customers with standard efficiency lighting is to favor lumen-equivalency when replacing it with high efficiency lighting. Where the current WRR and Wattage Range methods work against the objective of influencing the market toward adoption of lumen-equivalent products with greater efficacy, the IOUs prefer a better alternative.</p> <p>The IOUs will strive to incorporate proposed solutions as they most compatibly balance with cost effectiveness, systems readiness, and data management, as well as with workable analytical mechanisms used in the savings methodology.</p>

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7	5-3	<p>Finding: Navigant's analysis suggests that the typical installed LED wattage for bay and exterior lighting applications falls nearer to the mean of the existing LED wattage ranges. The existing methodology of deriving delta watt savings using the upper bound of the LED wattage range, therefore, is underestimating savings and not reflecting typical installation. Moreover, it provides a disincentive to promote the most efficacious products.</p>	<p>Recommendation: Update guidance to specify using the mean of LED wattage ranges for delta watts calculations instead of upper end.</p>	IOUs and CPUC	Accepted	<p>The IOUs agree that in circumstances where wattage ranges are deemed the most appropriate method for bay and exterior lighting applications, a more representative value, such as the mean of LED wattages in each range should be used instead of the current method of using the lowest wattage. Usage of values that better reflect the typical bay and exterior lighting applications will result in more accurate energy savings estimates and remove the disincentive to support more efficacious products. It is a critical barrier to the continued success and cost effectiveness of our programs and improvement is strongly supported. While using the mean average would be an improvement, if a more precise and practical method than using the recommended mean is found, it will be proposed as an alternative.</p>
8	5-3	see above	<p>Recommendation (for bay lighting): Consider adding the narrower ranges suggested in Figure 4-7 within the current lowest wattage range to improve accuracy in the delta watts savings calculation.</p>	IOUs and CPUC	Accepted	<p>The IOUs agree that in instances that a wattage range method is identified as the most appropriate method for use in estimating energy impacts, narrower wattage ranges allow for greater accuracy in delta Watts savings calculations. As stated in item #6, the Wattage Range Method may need to be updated. The IOUs will work together with the Commission staff to determine the best approach to balance greater accuracy in savings calculations, operational cost-efficiencies, and customer understanding of the applicable programs.</p>
9	5-3	<p>Finding: Due to the large variability in LED product efficacy and quality, using broad wattage ranges may lead to inaccurate savings estimates.</p>	<p>Recommendation: Collect more detailed product information on pre-and post-retrofit fixtures, namely quantity and rated input wattage and lumen output. This will allow programs to verify whether high quality, efficacious products are in fact the majority of program participation. An alternative method based on lumen output and fixture quantity is presented in the recent disposition on LED troffers, which could be used here but would also require programs to collect data on rated lumen output. Footnote: Workpaper Disposition for PGECOLTG179 LED Ambient Commercial Fixtures and Retrofit Kits, California Public Utilities Commission, Energy Division, June 26, 2015</p>	All IOUs	Accepted	<p>The IOUs agree that using broad wattage ranges may lead to inaccurate savings estimates. The recommendation to examine the applicability of lumen equivalency for hard-wired fixture retrofits is worth exploring. Further expansion of this examination is quite valuable where it pertains to manageability of data and analysis, efficacy improvement, cost-efficiency, and project size.</p> <p>The study's other recommendations such as narrow ranges and mean wattages are more immediate solutions and address the same problems. The recommended exploration of pre- and post-retrofit fixtures for the purposes stated should include comparisons of these approaches recommended to ascertain comparative benefit versus cost differential. The IOUs will explore feasibility and cost of customer equipment inventories of the type needed to fulfill this recommendation, and the relative value.</p> <p>The recommendation suggests parts of PGECOLTG179 can be examined as well. This alternative form of analysis is based on a combination of parameters, not just lumen output. Some of its aspects are not a perfect match to this recommendation, particularly in the area of "LED Quality", and should not be considered applicable to the recommendation.</p>