

## 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 2013-2015 Energy Efficiency Program Cycle. This Appendix contains the Responses to Recommendations in the report:

<b><i>RTR for the Impact Evaluation of 2015 Upstream and Residential Downstream Lighting Programs</i></b> (DNV GL, Calmac ID #CPU0152.01, ED WO #ED_I_LTG_4)
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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 2013-2016 Energy Division-Investor Owned Utility Energy Efficiency Evaluation, Measurement and Verification (EM&V) Plan<sup>1</sup> and CPUC Decision (D.) 07-09-043<sup>2</sup>.

Individual RTR reports consist of a spreadsheet for each evaluation study. Recommendations were copied verbatim from each evaluation’s “Recommendations” section.<sup>3</sup> 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.

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<sup>1</sup> 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/cpuc>.

<sup>2</sup> Attachment 7, page 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.”

<sup>3</sup> Recommendations may have also been 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.

## Response to Recommendations (RTR) in Impact, Process, and Market Assessment Studies

**Study Title:** Impact Evaluation of 2015 Upstream and Residential Downstream Lighting Programs  
**Program:** Lighting  
**Author:** DNV GL  
**Calmac ID:** CPU0152.01  
**ED WO:** ED\_I\_LTG\_4  
**Link to Report:** [http://www.calmac.org/publications/2015\\_LTG4\\_Impact\\_Evaluation\\_Report-FINAL.pdf](http://www.calmac.org/publications/2015_LTG4_Impact_Evaluation_Report-FINAL.pdf)

Item #	Page #	Findings	Best Practice / Recommendations (Verbatim from Final Report)	Recommendation Recipient	Disposition	Disposition Notes
				If incorrect, please indicate and redirect in notes.	Choose: Accepted, Rejected, or Other	Examples: Describe specific program change, give reason for rejection, or indicate that it's under further review.
1	120	<ul style="list-style-type: none"> <li>In a few cases, there were inconsistencies between the program year reported in the tracking data and the shipment year included in lamp suppliers' records. (Note that supplier records did not attribute these issues to specific IOUs.)</li> <li>SDG&amp;E and PG&amp;E assigned incorrect measure groups to approximately 250,000 lamps based on the lamp wattage recorded in the program tracking data (177,676 lamps in SDG&amp;E's tracking data and 69,696 in PG&amp;E's). In some cases, the tracking data assigned wattages that contradicted the measure name and measure group (e.g., assigned wattage of 9 Watts for a lamp in the "high-wattage CFL [&gt; 30 Watts]" measure group).</li> </ul>	Tracking data should consistently present measures that were truly discounted and shipped within the program year. We also recommend that a careful review that claims occurred within the listed cycle be considered a future research priority.	All IOUs	Other	<p>SCE will be the statewide administrator of the Primary Lighting Program starting in 2018, the soonest year to which most recommendations apply. The other IOUs are involved in areas that made their input to these recommendations equally valuable.</p> <p>This recommendation to consider the issue a future research priority is dependent on the outcome of clarification from the CPUC on the 2018 program and other direction around this issue.</p> <p>It might help to understand why the data issue exists.</p> <p>SCE prepares data based on our understanding of CPUC guidelines. Currently for past-year shipments invoiced in the current year, our agreed-upon practice is to charge dollars to the previous year's budget, but claim savings in the current year.</p> <p>We do this because we get late arriving invoices for the past year's shipments. A solution that does not require failure to pay a legitimate invoice, to claim associated savings, or to report within the CPUC's time table, has yet to be crystallized, but would be welcome.</p> <p>This recommendation should be jointly directed to the IOUs and the CPUC.</p>
2			Program administrators should consider performing additional review and accuracy checks on the measure group classifications and wattage estimates for program-discounted lamps.	All IOUs	Accepted	<p>The program administrator will do a review of the mapping between the lamp models and measures in the IOUs' computer systems to ensure that no mapping errors occur with new lamps.</p> <p>Wattage values are provided by manufacturers and will be verified against the CEC MAEDBS list. Current workpapers do a good job of classifying measure groups. All reported data will conform to the applicable workpapers.</p>
3	120	<ul style="list-style-type: none"> <li>Without program support, significantly fewer customers would have purchased energy efficient</li> </ul>	The IOUs should consider shifting more of their upstream lighting program incentives toward the non-	All IOUs	Accepted	The IOUs have been actively pursuing the activities prescribed in these recommendations and will continue to do so. With a shift of

		<p>lamps in drug, grocery, and hardware channels. Furthermore, the inefficient lamps that program lamps displaced in these channels were even less efficient than the lamps that IOU customers replaced with efficient lamps on average. In other channels—such as home improvement, mass merchandize, and membership club—many consumers would purchase program-discounted lamp technologies even without the program discounts.</p> <p>Hard-to-reach channels generally received high NTGRq and big-box channels generally received lower NTGRq.</p>	<p>big box channels (discount, drug, grocery, and small hardware) to minimize free-ridership and maximize net UES. However, we acknowledge that these channels are not capable of moving a large volume of program-discounted lamps as quickly as the big box channels, so some effort may be required to strike the appropriate balance between program effectiveness and volume.</p>			<p>focus from resource savings to code readiness, we continue aggressively to bring in new manufacturers and ship to new retailer locations, many of which pertain to hard-to-reach markets. Due to allocation strategies, Program LEDs in large home improvement channels make up a small percent of LED quantities in the program and constitute a small portion of the LED sales in the sector. This is largely due to the CEC Voluntary specification requirement and the retailer’s decision to stock the less expensive, non-CEC Specification products. This phenomenon could make the older findings of high free-ridership for program products less applicable today in that channel.</p> <p>The program’s warehouse club big-box chain was influenced by the California IOUs to remove standard efficiency lightbulbs from their shelves and to stock only energy efficient lighting. They did so nationwide. Then later they began carrying only California quality LEDs nationwide.</p> <p>The responsiveness of big-box channels resulted in far-reaching spillover and market transformation effects too large to quantify. To shift allocations further away from these retailers would unfairly penalize the historically highest performing class of participating retailers, who continue to be important partners in promoting energy efficiency throughout the state and nation.</p>
4	120	<ul style="list-style-type: none"> <li>The 2015 upstream lighting program appeared to drive very few basic spiral CFLs ≤ 30 W purchases. Free-ridership was relatively high and net UES was relatively low.</li> <li>The program strategy to discount CFL A-lamps ≤ 30 W in discount, drug, grocery, and small hardware stores yielded favorable savings results. Free-ridership was relatively low and net UES was relatively high.</li> </ul> <p>Basic spiral CFLs generally saw low NTGRq and low NTGRu while A-lamp CFLs received relatively high NTGRq and NTGRu.</p>	<p>The IOUs should continue shifting upstream lighting program incentives away from basic spiral CFLs ≤ 30 W.</p>	All IOUs	Accepted	<p>The IOUs only incentivize a small portion of CFL lamps in the upstream portfolio compared to previous years. The IOUs have discontinued all the CFLs of the basic and advanced types as understood at the time of this evaluation.</p> <p>A new type of CFL has emerged. The ENERGY STAR 2.0 specifications made basic bare spiral CFLs and covered CFLs obsolete for the program due to the very high efficacy (efficiency) requirements. All IOUs now require CFLs to meet current ENERGY STAR requirement.</p>
5	120	<ul style="list-style-type: none"> <li>The program appears to have convinced some customers to purchase high-wattage CFLs (&gt; 30 W) in grocery stores, but the energy savings achieved by high-wattage CFLs was lower than anticipated. Many consumers are using high-wattage CFLs to replace lamps that are less bright and lower wattage than expected. As such, while free-ridership was reasonable, net UES for these measures was lower than anticipated.</li> </ul>	<p>With regard to high-wattage CFLs (&gt; 30 W) in particular, moderate free-ridership suggests the IOUs could continue to influence customer purchases by providing incentives for these measures in grocery, discount and drug stores—however:</p> <ol style="list-style-type: none"> <li>Given the potentially limited applicability of these measures in PG&amp;E, SCE, and SDG&amp;E residential electric customer households, the IOUs should also consider the overall installation potential for these measures when establishing program quantities.</li> </ol>	All IOUs	Accepted/Other	<p>The Program curtailed support for the kinds of products cited in this recommendation.</p> <p>Starting in November 2016, the new 80 Lumens Per Watt CFLs began to ship into stores as a result of program incentive allocations. They were of higher efficiency than 79% of all the LED models in the 2016 SCE program.</p> <p>They fill a market gap that LEDs are not able to address. They satisfy customers’ needs for brightness that affordable LEDs cannot. Sometimes they increase brightness beyond lamps replaced. This is a plus when it comes to customer satisfaction. Between January and June 2017, they saved considerably more claimable energy</p>

		High-wattage CFLs received low-to-moderate NTGRq, modest NTGRu, however, gross UES estimates suggested low realization rates, so these measures ultimately saved less energy than expected.	b. Consumer survey results suggest that consumers are, in many cases, using high-wattage CFLs to replace lamps of lower brightness. It is possible that consumers would choose lower-wattage replacement lamps in the absence of program incentives for high-wattage CFLs. The implication here is that for some applications, the program may be shifting consumers toward higher-wattage replacement lamps than they would choose absent the program. This point may warrant further consideration from the IOUs, particularly in light of the previous point.			with higher TRC and PAC cost-effectiveness than any LEDs in the program. It is not recommended that NTG is the correct vehicle for reducing the energy claims for products that surpass lumen equivalency of the light bulbs replaced. There does not appear to be a logical way to attribute increased free-ridership to a product-type that virtually does not exist in any stores without IOU incentives. Rather lumen increase appears to be an issue related to delta Watts. The May 2017 ex ante disposition reduced delta Watts for CFLs by 54 percent, which was likely prompted by the tendency for customers not to replace based on lumen equivalency when it comes to very bright, new, low-cost products. Other reductions influenced by this impact evaluation are expected in ex ante workpapers for 2017. Due to Title 20 code changes and lack of viable baselines, these CFLs might not be available for the program after 2017.
6	121	<ul style="list-style-type: none"> <li>The program appears to have moderately motivated customers to purchase LED A-lamps and LED reflector lamps by heavily discounting these products in membership club stores. Our analysis suggests that many of these purchases would have occurred at other retail channels in the absence of the program. LED A-lamps and LED reflector lamps achieved around 60% NTGRq, suggesting 40% of them were purchased by free-riders. However, many of the non-LED lamps that customers would have purchased in the absence of the program would have been more efficient than the ones that IOU customers replaced on average, which produced low NTGRu results. The net UES estimates were highest in the hardware and discount channels and the lowest in the membership club channel.</li> <li>Consumer satisfaction with LED lamps in general was high during 2015 and 2016.</li> </ul> <p>LED A-lamps and LED reflector lamps received low overall NTGRs, however the NTGRq around 60% showed modest program influence, and high gross savings were responsible for creating low NTGRus. Final net savings realization rates suggest that LED lamps saved about as much energy as anticipated.</p>	Despite low overall NTGRs, LED A-lamp and LED reflector lamp NTGRq results are moderate, and realization rates are high, suggesting IOUs should continue shifting upstream lighting program incentives to LED A-lamps and LED reflector lamps. The IOU's should begin to discount more mid-to-high brightness LED lamps, and future studies should explore the degree to which customers are replacing mid-to-high watt CFLs and incandescent lamps with low-watt LED lamps.	All IOUs	Accepted	Compared to previous years, the IOUs have diversified their offerings to balance between A-lamp and reflector LEDs. The IOUs have also increased the share of mid-to-high brightness LEDs as recommended in this study. The 2017 CEC Voluntary LED Quality Specifications along with the recent ex ante disposition further supported this decision. Since 2015, incentive amounts for LEDs have become comparatively high in the Program compared to other utilities. The exception, as noted above, is big-box retailers because low incentives offset low NTG. Some LED incentives remain low due to regulatory policy. The ex ante IMC caps prohibit higher incentives, particularly on lower wattage A-lamps. Because setting the baseline mix of light sources for LEDs is the role of the CPUC, we redirect that portion of the recommendation to them. The CPUC might find that little or no availability of baseline products in California retail stores in 2018 and 2019 may make such a study unwarranted.
7	122	<ul style="list-style-type: none"> <li>The upstream lighting program influences the retail channels through which manufacturers sell replacement lamps to PG&amp;E, SCE, and SDG&amp;E residential electric customers in California.</li> </ul>	Future EM&V efforts should further explore channel shift effects—including the quantity of lamps shifted, the channels to and from which the shifts occur, and the measure groups most affected.	All IOUs	Other	A study of this type would best be completed after the effects of the 2018 Title 20 Code changes are seen in the market. Otherwise, findings might not be inferable to subsequent years.

		Supplier interviews continue to show that upstream program influence retail stocking decisions and strategy.				It appears likely that the code changes alone will create massive channel shifts away from discount and grocery channels and into big-box, home improvement, and hardware.  This is deduced because program incentives are considered responsible for most discount and grocery stores' economic motivation to stock and promote large quantities of LEDs.
8	122	<ul style="list-style-type: none"> <li>Among the IOUs' residential electric customers who purchased LED lamps during 2015 and 2016, satisfaction was high. However, because LED lamps that meet the California Quality spec comprised such a small share of LED lamp stock among California retailers—approximately 13% as of winter 2015-16—it is unlikely that the spec is the primary driver of customer satisfaction.</li> <li>Manufacturers' representatives suggest that the upstream lighting program was the primary reason they produced LED lamps that met the spec in 2015.</li> </ul> <p>Consumers claimed high satisfaction with LED lamps in 2015 and 2016, and suppliers noted that the program was the primary reason they manufactured lamps that met the CEC spec. However, we have little data to suggest causation between these two findings.</p>	Commission staff should consider pursuing a more definitive assessment of consumer satisfaction with LED lamps that do and do not meet the California Quality spec. The best opportunity for this assessment may be during the upcoming in-home lighting inventory and metering study. Note that at this time, Commission staff plan to launch this study in 2018, and preliminary study objectives include this topic.	CPUC		
9	123	<ul style="list-style-type: none"> <li>Consumer survey results suggest that 68% of LED lamps purchased by customers replaced functioning lamps. The extent to which LED lamps are replacing CFLs, other LEDs, incandescent, or halogen lamps remains unknown, but this finding suggests that there is a potential savings impact related to early replacement.</li> </ul>	Future evaluations should further investigate which lamps are being replaced early. With this more complete picture, future evaluations should estimate savings impacts associated with early replacements.	CPUC		
10	123	<ul style="list-style-type: none"> <li>While the above recommendations reflect a business-as-usual environment, market conditions are expected to change in 2018 due to California's Title 20 legislation. These changes are likely to dramatically limit or eliminate the potential for residential and upstream lighting program savings.</li> </ul>	A potential study should be considered to estimate the remaining available energy savings potential that incorporates the impacts of Title 20 changes in 2018. This study could leverage data collected from the upcoming in-home metering study, and attempt to establish the extent to which upstream lighting programs and the CEC spec are transforming the market.	IOUs and CPUC	Other	<p>The IOUs concur with the findings and conditionally accept the recommendations.</p> <p>If incentives are still offered in 2018 and beyond, a potential study would need to provide incentive-specific market potential. Then separately it would provide market potential stemming from other categories relating to program designs and market conditions, such as any post-code-change utility activities producing non-claimable results.</p> <p>This study should also mention the potential associated with the Codes &amp; Standards program, and delineate between it and Primary Lighting potential, showing why there is no overlap. This is because the Codes &amp; Standards Program is the assigned recipient of energy savings due to code changes. They should not be</p>

						<p>claimed by an incentive program when already being claimed by Codes &amp; Standards.</p> <p>The study should present substantial justification for forecasting cost-effective claimable savings for the Primary Lighting Program in light of the strict Title 20 Code for 2018, becoming stricter code in 2019.</p> <p>Conceivably a new kind of lighting product could be developed several years in the future that would be efficacious enough to provide claimable energy savings due to incentives as a result of the delta between minimum code efficacy and product efficacy.</p>
11	123	<ul style="list-style-type: none"> <li>The modelling in this report uses respondent demographics by applying coefficients, which are shown in Table 89, in Appendix G. These results serve the primary goals of this impact evaluation well, as they produce accurate savings estimates at the channel-level. However, the underlying data have the potential to offer additional insights into the customer side of the lighting market. Additionally, the consumer survey and supplier interview results that were collected in pursuit of estimating program impacts also have potential to offer additional demand and supply-side insights into the lighting market. While we do not have the space available in this report to delve into such details, we would recommend leveraging these results in a future market report.</li> </ul>	<p>The data collected to answer the research questions for this evaluation have the potential to offer additional insights into the customer and supplier sides of the lighting market. Such a study could look at customer segmentation among various retail channels, perceptions of lighting technologies, and could explore price sensitivities.</p>	IOUs and CPUC	Rejected	<p>The IOUs are of the opinion that code changes and continued market adoption of more efficient lighting are likely to provide a different market relative to the 2015 Impact Evaluation. If a study is conducted before knowing the possible reach and magnitude of the 2018 and 2019 Title 20 Code changes, findings might not be inferable to subsequent years. The recommendation overlaps IOUs' studies in process to an extent. There are studies underway for in-home lighting inventory and metering along with a customer decision study.</p> <p>If a study similar to that recommended can be completed in the future in a way to avoid these concerns, and would be of value to the CPUC, the IOUs would be open to it.</p>