

Summary

SCE13LG117r0: LED T8 Replacement Lamps UL Type A

The following pages include the EAR team preliminary review comments for the workpaper listed above.

Due to the level of detail presented in the preliminary review which is higher than normal, the Commission Staff ex ante review team (EAR team) is providing this summary sheet to document the top 3 questions and concerns raised in the review along with a summary of our recommended change for each. In addition to an updated workpaper submission, EAR team requests that SCE's next submission include a narrative response which directly addresses each of the following items:

1. The emerging technology net-to-gross (ET NTG) value of 0.85 does not seem appropriate for this workpaper. EAR team believes that the following NTG value is more appropriate: All-Default \leq 2yrs (0.7).
2. The wattage for the pre-existing technology is proposed is be 26.43 watts and averages together many lighting technologies. The January 2015 Lighting Retrofits guidance document states that lighting measures which cover a range of technologies and/or wattages must assume the lowest wattage within the range when defining measure energy savings. However, based on the data presented in this workpaper, this approach would lead to negative savings. Subject to the additional justification and/or analysis outlined in the preliminary review below, EAR team is prepared to accept a single pre-existing T8 lamp assumption of 26 watts for this work paper.
3. The wattage for the measure technology is proposed is be 12.64 watts and averages together many lighting technologies. The January 2015 Lighting Retrofits guidance document also applies to measure technologies and states that measure technology wattage should be at the high end of the range. The workpaper presents 2 sets of measure technology wattage data. SCE has chosen 1 set of data, presented some analysis, and proposed the average wattage rather than the most conservative. EAR team rejects SCE's proposal and, instead recommends a measure wattage of 20 watts based on the laboratory ET study provided within the workpaper. In case SCE wishes to propose lower measure wattage values, EAR team has provided a series of recommendations for modified and updated analysis.

Workpaper ID	SCE13LG117r0	Title	LED T8 Replacement Lamps UL Type A								
SCE Stated Scope of											
Submittal:	Part of Aliso Canyon deemed measures, New workpaper, data based on ET studies										
Submitted Date	5/23/2016	3rd Party WP?	No								
Response Date	6/6/2016	14 # days since submission	Complete?	No							
Submitted Files Pass Preliminary Review?											
Yes	No	N/A	Narrative Workpaper	Yes	No	N/A	Data in Ex Ante Format	Yes	No	N/A	Supporting Documents
To pass the preliminary review, items above must be marked Yes or N/A. If any item is marked No, please address comments in order to complete the workpaper submittal.											

Narrative Workpaper Review Comments	
Program Implementations and Measure Types	<p>Update the workpaper to address the following:</p> <ol style="list-style-type: none"> 1. D.12-05-015 assigns a default NTG value of 0.85 for emerging technology measures (D.12-05-015 OP 14) that have been "added to the utility portfolios as a direct result of Emerging Technology Program activities" (D.12-05-015 @62). It appears that the research performed to support this workpaper development was completed using ET funds, but the research originated out of CPUC staff concerns with savings values, measure life and customer experience. These concerns were provided to the PAs in the fall of 2014. At that time, a workpaper proposal for this technology had been submitted by SDG&E and PG&E. The act of pursuing a study funded by ET money is not sufficient to claim the ET-default net-to-gross (ET NTG) value. Based on the information supplied with the workpaper, EAR team does not believe that SCE has met the criteria to claim this value. Therefore, either change the NTG value to be All-Default<=2yrs (0.7) or provide documentation to justify that the emerging technology group independently brought LED tube technology to the PAs. 2. According to data presented in the workpaper from ET15SCE8040 – LED Tube Retrofit Scaled Field Placement (SFP), approximately 4.8% of fixtures required a ballast replacement either with initial installation or within 6 weeks of installation. This number of ballasts likely represents a higher percentage of LED lamps since more than 1/3 of sampled fixtures are multi-lamp fixtures. While this data is presented in the workpaper, no proposal is made on how to address this issue. This issue appears to affect measure cost and may affect the annual installation rate, if it is not properly addressed within the program. Please clarify how the SCE program will account for this issue within the cost effectiveness values. 3. SCE's proposed delivery mechanism include direct install, downstream incentives, and mid-stream incentives. A document called "LED Tube Requirements" is attached to the workpaper and documents the methods being used by the SFP study to document LED installations. This document appears to be a good starting point for program paperwork which will track how the measures conform to the workpaper requirements; however, it's not clear how much of this data will be tracked outside of the SFP study. Please clarify.

Narrative Workpaper Review Comments	
UES code / standard practice	<p>Update the workpaper to address the following:</p> <ol style="list-style-type: none"> 1. The pre-existing T8 lamp wattage is proposed to be deemed as a single value that averages many dozens of technologies; the proposed value is 26.43 watts. Ideally, this workpaper would create measures which include specific pre-existing technologies for use by direct install contractors and downstream rebates. Absent that, the January 2015 lighting guidance document requires that SCE select the lowest wattage within the range of pre-existing technologies and assume this low value for the pre-existing wattage. However, based on the data presented in this workpaper, this would lead to negative savings. Therefore, for this workpaper only, EAR team will accept a single pre-existing T8 lamp assumption of 26 watts. This value is based on a higher percentage of 2-lamp fixtures than the percentage documented in the workpaper. The SFP study is composed of ~54% 1-lamp fixtures (average per lamp wattage of 26.6), ~34% 2-lamp fixtures (average per lamp wattage of 24.1) whereas the general linear fluorescent market has a much higher percentage of 2-lamp fixtures than 1-lamp fixtures. If SCE wishes to propose a different pre-existing technology wattage, provide the DEER technology ID and the Appendix B technology ID for all technologies that are proposed as part of the pre-existing technology. EAR team suggests that this data might be added to the "Ballast Data" worksheet, if that worksheet represents the pre-existing technologies. 2. It is unclear whether the SFP and/or the SCE workpaper are allowing LED replacements for 25-watt T8 fixtures. Note that the ET study ET14SCE1040 submitted within the workpaper only studied 28- and 32-watt T8s with NLO ballasts. Confirm the lamp wattage(s) and ballast factor(s) which are eligible for change out. If the wattage is less than 28-watts and if the ballast factor is lower than NLO, justify any assumptions made by SCE which extend the allowed pre-existing technologies beyond these studied technologies. Additionally, re-calculate the allowed wattage in item #1, above, to include the percentage of 25-watt lamps expected to be removed by the program. Justify any re-calculation by referencing market studies which show how many 25-watt lamps are installed compared with 28- and 32-watt lamps.
UES calculation methods	<p>Update the workpaper to address the following:</p> <ol style="list-style-type: none"> 1. Similar to the issues noted in the Code/Standard calculations methods, above, the LED tube measure wattage is proposed to be a straight average of what appears to be a random sample of data from SCE's on-going survey. No effort is made to categorize or weight the lamps by the type of fixture they are installed in. Also, the proposed measure wattage is ~50% of the wattage reported in the ET study ET14SCE1040 for 1-lamp fixtures and ~67% of the wattage reported for 2-lamp fixtures which appears to greatly underestimate the actual wattage of the installed technologies. Although the workpaper mentions this study and provides a copy, it does not address the significant difference between the controlled laboratory results in this ET study and the measure wattage proposed to be used for this workpaper which is derived from ET15SCE8040 – Scaled Field Placement (SFP). As well, it is unclear how the data from the SFP was derived. EAR team will accept a measure wattage of 20 watts which is a weighted average for the 2-lamp (75%) and 1-lamp (25%) LED fixtures studied in the ET study ET14SCE1040. If SCE wishes lower measure wattages, then the following steps are recommended:

Narrative Workpaper Review Comments	
	<ol style="list-style-type: none"> Address the wide range of lamps wattages presented in the field data (8.5 watts per fixture to 22 watts per fixture) and justify why these should be averaged together and considered a single measure. Confirm that all data used to set the measure wattage meets the conditions for the pre-existing technology (see UES code/standard practice comments). Justify how a straight average of the sampled data is the best data available to set as the deemed measure wattage. Consider weighting the measure technology wattages to reflect the expected market (e.g. more 2-lamp fixtures than 1-lamp fixtures) Consider proposing multiple measures which address differing wattages in single- and multi-lamp fixtures. Justify why the wattage measurements from the laboratory experiment is not used. EAR team finds that SCE's analysis of the illumination readings should be adjusted as described under "Other", below. EAR team's draft evaluation of the illumination data finds that 35% of the installations surveyed by SCE either increased or decreased level of service (illumination readings average per site). EAR team attempted to correlate the illumination data with the energy savings data but was unable to match the two data sets together because the indexing between the worksheets does not seem to be consistent. SCE should re-evaluate the illumination level data to determine whether the sites where there is a change of service have significantly different energy savings values and should adjust energy savings calculations accordingly.
Cost Methods	Update the workpaper, as needed, to reflect increase in measure costs which result from the 4.8% ballast changes needed. If no changes are needed to the workpaper costs, provide a written response describing how the costs are already incorporated into the workpaper.
Other	<ol style="list-style-type: none"> EAR team has general concerns with the persistence of this measure since it is easy to replace the LED tube with a T8 tube. The SFP survey currently shows the surveyed customers are overwhelmingly satisfied. This survey will continue with follow up after 1 year of installation. EAR team expects that SCE will update this workpaper to reflect any installation rate issues noted when the 1-year of installation data is available. <u>Illumination Levels</u>: SCE's SFP provides detailed pre- and 6-week post-measurements for ~29 installations. For each site, a representative fixture is selected and multiple illumination readings (3 to 8) are taken around the fixture. EAR team finds that the raw SFP data is useful; however, SCE's analysis does not appear to be correct. SCE adds up the number of total measurements which either increase or decrease which removes the value of taking multiple measurements at each site. Instead of grouping illumination readings from different sites together, each site should be evaluated independently for an increase or decrease in light level. Additionally, error bands should be established based on the illumination levels (not the difference) to determine whether or not each site is considered an "increase", "decrease", or "no difference". EAR team has provided a draft evaluation of the illumination data with estimated error bands based on the brightness of each site. For example, if the difference in illumination between pre- and post-LED installation is 4 FC, a site where the average illumination is 55 FC is a "no change" but a site with an average of 22 FC is

Narrative Workpaper Review Comments	
	a change of service. Based on this draft analysis, our results show that 16 out of 29 installations had "no change" in overall illumination levels. Additionally, EAR team's evaluation shows that 6 installations decreased in illumination levels, 5 increased in illumination levels, and 2 sites appear to have measurement errors (Sites 07 and 24). For reference, a copy of SCE's "Attachment 5" is uploaded to the WPA showing these estimates. Note that changes to this analysis are only indicated if SCE does not accept EAR team's proposed measure wattage shown in the UES calculation methods section.

Ex Ante Data Review Comments	
MeasureCatalog Table	<ol style="list-style-type: none"> 1. Update the ex ante data to address the issues above, as needed. 2. The sector is listed as "Any" for the residential common area records. Update this to be "Res".
Measure Table	<p>Revise and resubmit the Measure table to address the following:</p> <ol style="list-style-type: none"> 1. The measure definitions do not correctly include the EnergyImpactIDs which are required so that the ex ante database can calculate the scaled measure energy impacts. Revise the measure definitions as follows: <ul style="list-style-type: none"> EnergyImpactID = Res-Ilgt-Cmn-dWatt-LF (for common areas) = Com-Ilgt-dWatt-LF (commercial measure) MeasImpactType = Non-DEER MeasImpactCalcType = Scaled ImpScaleBasis = Delta PreScaleVal = 26 – 20 = 6 or as proposed by SCE (this is the wattage difference between measure and pre-existing technology) StdScaleVal = 0 watts to indicate an ER-RULonly measure 2. The UseSubcategory for the residential common area measure should be InCommon, not InGen. 3. The EUL ID for the residential common area measure should be LtgFixture-Default. The workpaper value is limited to commercial installations. 4. Update the measure table to address the issues in Narrative Workpaper, above.
EnergyImpact Table	Do not submit EnergyImpacts. The ex ante database will calculate the impacts directly, based on correctly defined measures.
Measure Cost Table	The submitted cost records include duplicates. Only 1 set of records will be uploaded to the ex ante database. Also, submit revised costs, as needed, to reflect the Cost Methods comment, above.

Supporting Documentation Comments	
1	See attached copy of "SCE13LG117.0 LED Tubes-Attachment5-EARteamComments.xlsx" showing EAR team preliminary review evaluation calculations in the following tabs: "Light Measurements" and "4' lamps only". These calculations are described above until the "UES code/standard practice", "UES calculation methods", and "other".
2	