Work Paper SCE17LG131

**Revision 3**

**Short Form**

**Southern California Edison**

**LED BR/R Lamps**

**Introduction**

This short form workpaper documents (WP) the values adopted from DEER 2019 and costing information from PGE workpaper PGE workpaper PGECOLTG177\_R6. SCE adopts all the DEER 2019 values, with the following exceptions:

1. Cost updates were based on PGE workpaper PGECOLTG177\_R6, with prices updated to 2018 values and additional costing samples added in wattage ranges that lacked sufficient sampling.
2. For measure case wattage ranges not included in DEER 2019, base case wattage ranges were determined using wattage reduction ratios (WRR) from DEER 2019 and 2018 Screw-In Lamp Savings Methods Disposition.
3. New DEER LED NTG value is used for all measures – All-Ltg-LED-WRR.
4. MultiFamily Dwelling Area (MFm) uses the same 541 operating hours as the Residential Single Family (SFm).
5. Three different calculation templates for Res, Common/Dwelling, and Non-Res were developed using SCE’s 2018 calculation template. The different approaches have independent solution codes and cost-effectiveness assumptions associated with them to avoid confusion.

# Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 12/22/16 | Arvind Subramanya (TRC) | 1. Calculation templates were developed based on PG&E’s template “PGECOLTG177\_R4-9-11-2015F” incorporating the changes described above. |
| 1 | 6/30/2017 | Lake Casco (TRC) | 1. The following updates were made based on CPUC Lighting dispositions provided on March 1st and May 26th of 2017.   Calculation templates were developed based on PGE’s template “PGECOLTG177\_R5-9-11-2015F”. Calculations and costs were updated based on new WRR values from the disposition.   1. Update NTG Values per READi PEAR version 2.4.7 NTG table. |
| 2 | 5/1/2018 | Kara Vega (TRC) | The following updates were made based on the CPUC 2018 Screw-In Lamp Savings Method Disposition dated March 1, 2018.   1. Calculation templates were developed based on PGE’s template “PGECOLTG177\_R6-9-11-2015F”. Calculations and costs were updated based on new WRR values from the disposition. 2. Updated NTG to be “All-Ltg-ScrwInLED” based on “2018ScrewInLampSavingsMethods-1March2018” disposition |
| 2 | 10/19/2018 | Stephen Brett Reno (TRC) | 1. Updated savings methodology and WRR to reflect DEER 2019. 2. Updated costs for the 2019 program year. 3. Updated all measures to new DEER NTG value for all LED using WRR methodology. 4. Included additional solution codes to match DEER measure wattages. 5. Added additional solution codes for common areas and 21W R lamp measures. |

**Measure Differences Summary**

Table : Measure Differences Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts and cost-effectiveness values for LED BR/R Lighting. Savings calculation methodology was taken directly from DEER 2019, while costing methodology and eligibility requirements were taken from PGECOLTG177\_R6. Only differences are explained here. |
| **1.1 Measure & Baseline** | Please refer to Attachment #1 Calculation Templates for the list of measure solution codes and baseline condition. |
| **1.2 Technical Description** |  |
| **Measures** | Refer to Attachment 1. |
| **Code for All Measures** | No difference |
| **Requirements** | * The customer must be a residential or commercial SCE electric customer.   Note: Other program level restrictions and guidelines exist for this work paper. Please see the **Programs Restrictions and Guidelines** section of PGECOLTG177 R6 - LED BR-R Lamps for more details.  For SCE, the residential upstream program follows the CEC specification and all other programs follow the Energy Star 2.0 specifications. |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| **Installation Type** | No difference |
| **Delivery Mechanisms** | Residential Mobile Home - Double-Wide, Residential Multi-family for Common and Dwelling area scenario:  Financial Support: Direct Install  Financial Support: Down-Stream Incentive - Deemed  Residential Single Family:  Up-Stream Incentive  Financial Support: Direct Install  Financial Support: Down-Stream Incentive - Deemed  Non-Residential:  Financial Support: Direct Install  Partnership: Direct Install  Financial Support: Down-Stream Incentive – Deemed  Financial Support: Down-Stream Incentive – Deemed - OBF  Partnership: Down-Stream Incentive – Deemed  Partnership: Down-Stream Incentive – Deemed - OBF  Mid-Stream Programs: Mid-Stream Incentive  Up-Stream Programs: Up-Stream Incentive |
| **1.4.1 DEER Data** |  |
| **Net-Gross-Ratio** | All-Ltg-LED-WRR |
| **Effective and Remaining Useful Life** | ILtg-Res-LED-20000hr  ILtg-Com-LED-20000hr |
| **Section 2. Calculation Methodology** |  |
| **Energy savings/Peak Demand Reduction – All Measures** | Energy savings are taken directly from DEER 2019 or calculated using DEER WRR methodology. The operating hours and interactive effects for all impacts were taken from the most applicable and updated DEER data. These interactive effects and operating hours were used to calculate energy savings for SCE specific climate zones. |
| **Section 3. Load Shapes** | DEER:Indoor\_CFL\_Ltg |
| **Section 4. Costs** |  |
| **Section 4.1 Base and Measure Costs** | Costing calculation methodology was taken from PGECOLTG177\_R4. Please refer to Attachment #2 Cost Calculations for detailed baseline and measure costs. |

**Savings and Calculation Methodology**

Costing for this short form is based on PGE workpaper PGECOLTG177\_R6, which used prices obtained through web scraping. These prices were updated to 2018 values, and additional costing samples added in wattage ranges that lacked sufficient sampling.

Measure case costs were based on LED lamps, while base case costs were based on a blend of LED, CFL, and Halogen lamp costs obtained from the 2018 DEER Lamp disposition. The LED lamp costs were calculated by applying a linear best fit line based on average cost per watt. The baseline CFL and halogen costs were updated based on a linear best fit line for the average lamp cost per incandescent wattage equivalent.

See Attachment 2 for details.

Savings impacts for most measures were taken from DEER 2019. For non-DEER measures, savings impacts used approved WRR values from the 2018 LED lamp disposition and were revised based on the changes in the space types and corresponding operating hours. Below table shows the space type classifications, schedule, and operating hours:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sector** | **Building Type** | **Space Type** | **Schedule** | **Operating Hours** |
| Residential | Residential Mobile Home - Double-Wide and Residential Multi-family | Common Area | Interior Common - CFL - Res DMO & MFM (6142) | 6142 |
| Dwelling Area | Interior General - CFL Other - Res (541) | 541 |
| Residential Single Family | | Interior General - CFL Other - Res (541) | 541 |
| Non-Residential | All Commercial Building Types | | Interior General - CFL Other - Com (Varies) | Varies |

The schedules and operating hours noted above were found in the READI 2.5.1.

Above space type with corresponding operating hours were used in the calculation template to calculate energy impacts. The overall calculation methodology has not changed from the methodology found in PGECOLTG177\_R6.

**Attachments**

1. SCE17LG131.3 A1 – Calculation Template\_Final.zip
2. SCE17LG131.3 A2 – Cost Calculations.xls