Short Form Work Paper PGECOLTG177

**Revision 7**

**Pacific Gas & Electric**

**LED BR/R Lamps**

**Introduction**

This short form workpaper documents the values adopted from SCE’s workpaper entitled “SCE17LG131.3” for LED R-BR lamps. SCE17LG131.3 adopted the measures from DEER 2019, and updated the cost with online web scraping which was the cost collection methodology used in PGE workpaper PGECOLTG177\_R6.

SCE’s workpaper adopts the DEER 2019 values with the following exceptions:

1. Cost updates were based on cost collection approach in 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 CPUC’s Disposition “2018 Screw-In Lamp Savings Methods-1March2018”.
3. DEER does not have the measure for the 21-watt LED reflector lamp; therefore, PG&E proposes the following Measure IDs:

* C-In-LED-RefR(21w)
* R-In-LED-RefR(21w)

# Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision** | **Date** | **Author** | **Summary of Changes** |
| 0 | 2/26/2013 | Alina Zohrabian  (PG&E) | PGECOLTG177 R0 LED BR/R-Lamps.doc  Original Workpaper |
| 1 | 9/16/2013 | Alina Zohrabian  (PG&E) | PGECOLTG177 R1 LED BR/R-Lamps.doc  Created WRR from the original workpaper calculation and applied it to the lowest wattage in the range (based on a direction from a phone conversation with Kevin Madison on 9/12/13. |
| 1 | 10/8/2013 | Alina Zohrabian  (PG&E) | PGECOLTG177 R1 LED BR/R-Lamps.doc  Revised program description |
| 2 | 10/19/2014 | Alina Zohrabian  (PG&E) | PGECOLTG177 R2 LED BR/R-Lamps.doc  Added DI values (No original DI workpaper existed) and Revised savings values per ED workpaper Disposition for lighting Retrofit, 12/14/2013. For updated savings values, see file PGECOLTG177 R2.xlsx |
| 3 | 1/1/2016 | Linda Wan (PG&E)/ Alina Zohrabian (PG&E) | Updated NTG, GSIA, EUL, annual hours of operation, CDF, and IE per DEER 2016. Base case costs and measure costs have also been updated. |
| 4 | 11/28/2016 | Mini Damodaran (PG&E)/ Alina Zohrabian (PG&E) | Updated Residential Interactive Effect(IE) per DEER 2017 |
| 5 | 6/7/2017 | Mini Damodaran (PG&E)/ Alina Zohrabian (PG&E) | Updated WRR, base case percentages and NTG as per 2017 Disposition for Screw-In Lamps; Base costs changed based on base case %; NTG changed to 0.91; Updated Program Restrictions and Guidelines |
| 6 | 4/2/2018 | Randy Kwok (PG&E) | Updated baseline technology mix to 40% LED, 10% CFL, and 50% Incan. New WRR = 4.17 for <11w, 3.28 for >=11W to <14W, and 2.97 for >14W per “2018ScrewInLampSavingsMethods-1March2018” disposition. Base case costs and measure costs have also been updated. Added measure type ER for Res DI channel and updated Program Requirements accordingly. Updated the NTG ID to All-Ltg-ScrwInLED (0.91 NTG). |
| 7 | 12/20/2018 | Randy Kwok (PG&E) | Adopted SCE’s workpaper SCE17LG131.3 (DEER 2019 savings values and cost update by web scraping). |

**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 and updated costs are adopted from SCE’s workpaper SCE17LG131.3.  SCE17LG131.3’s costing methodology (web scraping) and eligibility requirements are taken from PGECOLTG177\_R6 workpaper. Only differences are explained here. |
| **1.1 Measure & Baseline** | Refer to attached file “PGECOLTG177 R7 LED R-BR.xlsx” for the list of measure codes and baseline condition. |
| **1.2 Technical Description** |  |
| **Measures** | Refer to attached file “PGECOLTG177 R7 LED R-BR.xlsx” for detail measure descriptions. |
| **Code for All Measures** | |  |  |  |  | | --- | --- | --- | --- | | PG&E Code | SCE Code |  |  | | LT440 | LT-20608 |  |  | | LT441 | LT-20609 |  |  | | LT442 | LT-20610 |  |  | | LT443 | LT-20611 |  |  | | LT444 | LT-20595 |  |  | | LT445 | LT-20597 |  |  | | LT446 | LT-20598 |  |  | | LT447 | LT-20599 |  |  | | LT448 | LT-20600 |  |  | | LT449 | LT-20601 |  |  | | LT450 | LT-20602 |  |  | | LT451 | LT-20603 |  |  | | LT452 | LT-20604 |  |  | | LT453 | LT-20605 |  |  | | LT454 | LT-20606 |  |  | | LT455 | LT-20682 |  |  | | LT456 | LT-20607 |  |  | |
| **Requirements** | * The customer must be a residential or commercial PG&E 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. |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| **Installation Type** | No difference |
| **Delivery Mechanisms** | Residential and commercial (non-residential).  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. Relevant interactive effects and operating hours were used to calculate energy savings. |
| **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\_R6. Please refer to Attachment #2 Cost Calculations for detailed baseline and measure costs. |

**Savings and Calculation Methodology**

Costing methodology for SCE17LG131.3 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 attached file SCE17LG131.3 A2 - Cost Calculations\_2.xlsx for details on the cost data.

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.

**Attachments**

1. PGECOLTG177 R7 LED R-BR.xlsx
2. SCE17LG131.3 A2 - Cost Calculations\_2.xlsx