

State of California

Memorandum



Date: July 30, 2020

To: Gary Barsley, Southern California Edison (SCE); Henry Liu, Pacific Gas and Electric (PG&E); Chan Paek, Southern California Gas (SCG); Ed Reynoso, San Diego Gas and Electric (SDG&E); Nancy Goddard, PacifiCorp

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From: Peter Biermayer - Utilities Engineer, Industrial/ Agricultural Programs and Portfolio Forecasting Section, Energy Efficiency Branch, Energy Division, CPUC

Subject: Disposition Approving LED High or Low Bay: **SWLG011-03**

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## 1. Discussion and Direction

The California Public Utilities Commission (CPUC) approves the statewide workpaper for LED High or Low Bay: SWLG011-03. This workpaper is a Phase 1 submission for 2021 and the workpaper will become effective on 01/01/2021 with an expiration date of 12/31/2021.

## 2. Workpaper Summary

This linear lighting workpaper supports the normal replacement of High or Low Bay fixtures with efficient LED fixtures. This workpaper updates the measure case efficacies and baseline efficacy values for product improvements since the previous revision in 2019 (SWLG011-02). The Workpaper Review Team found operating hours and interactive effects for all impacts were taken from the most applicable and updated DEER data and that all relevant cost and energy savings calculations were accurate.

The workpaper is in conformance with previous direction, including the 2020 DEER Update Resolution E-4952 and the 2021 DEER Update Resolution (E-5009), to update the efficacy values based on analysis of current products on the market.

## 3. Critical Review Issues

The 2021 revision, SWLG011-03, revises previous workpaper SWLG011-02 with updated high and low bay fixture measure and base case efficacy and costs.

Tubular LED lamps (TLED)s are an LED product that can directly replace an existing lamp in a tubular (also called linear) fluorescent fixture. They are generally less expensive and efficient than an LED fixture,

which includes the light source, electronic voltage regulator (driver), and the housing and is completely designed and optimized for LED technology. Since consumers select between TLED or a full LED fixture replacement when considering LED technology, TLEDs are included in the baselines of fixture measures. The TLED base case efficacy and costs were also revised in this workpaper to reflect recent market changes.

High or low bay fixture measures will assume the mixed baseline noted in Table 1. The assumed mixes are based on previous dispositions and is a 100% LED baseline. For linear lamp measures not explicitly addressed in Table 1, a baseline mix of 50% TLED and 50% LED fixture will be assumed<sup>1</sup>.

**Table 1 - High or Low Bay Fixture Baseline Technology Mix**

| Measure Description                       | % TLED | % LED base |
|---|--------|------------|
| LED High/Low Bay, 4500 to < 5400 lumens   | 40%    | 60%        |
| LED High/Low Bay, 5400 to < 6500 lumens   | 40%    | 60%        |
| LED High/Low Bay, 6500 to < 7800 lumens   | 40%    | 60%        |
| LED High/Low Bay, 7800 to < 9400 lumens   | 40%    | 60%        |
| LED High/Low Bay, 9400 to < 11800 lumens  | 40%    | 60%        |
| LED High/Low Bay, 11800 to < 14800 lumens | 40%    | 60%        |
| LED High/Low Bay, 14800 to < 18500 lumens | 20%    | 80%        |
| LED High/Low Bay, 18500 to < 23100 lumens | 20%    | 80%        |
| LED High/Low Bay, 23100 to < 30000 lumens | 20%    | 80%        |
| LED High/Low Bay, 30000 to < 39000 lumens | 0%     | 100%       |
| LED High/Low Bay, 39000 to < 50700 lumens | 0%     | 100%       |
| LED High/Low Bay, 50700 to < 65900 lumens | 0%     | 100%       |

CPUC guidance in 2019 suggested that LED performance was increasing by approximately 10-12 lm/W per year. The conclusion from a 2020 aggregate analysis of a variety of resources is that LED efficacy improvements have slowed over recent years, and that contrary to the 10-12 lm/W per year improvement that was specified in 2019 DEER Update Resolution (E-5009), a 5 lm/W per year increase is more appropriate. Table 2 below summarizes the change in base case efficacies for previous workpaper and the values that will be used for this version of the workpaper.

**Table 2 - Linear Fixture Baseline Efficacy Values**

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<sup>1</sup> TLED are tubular LEDs which directly replace fluorescent linear lamps, while LED fixtures include the light source, electronic voltage regulator (driver), and the housing. The baseline assumes a mix of Type A, B, and C type TLEDs which are differentiated by whether they can operate using the existing fluorescent ballast (which regulates voltage) or require a new driver.

| <b>Technology Type</b> | <b>Previous Workpaper/E-5009<br/>(lm/W)<br/>SWLG011-02</b> | <b>Current Workpaper<br/>(lm/W)<br/>SWLG011-03</b> |
|------------------------|--|--|
| High/Low Bay           | 105  | 115  |
| TLED                   | 111  | 128  |

Additional adjustments in efficacy values are expected for program year 2022 and future program years. Actual values will require further research and evaluation of the DLC Premium standards product lists.

A new LED High or Low Bay workpaper should be submitted by June 1, 2021 for program year 2022 with revised efficacy values based on relevant research and analysis.