Short Form Work Paper WPSDGENRWH1208

**Revision 0**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Commercial Low Flow Showerhead**

**Implementation IDs:**

**465279-** **Low Flow Showerhead for Commercial Buildings - 1.5 GPM Flow Rate**

**465280-** **Low Flow Showerhead for Commercial Buildings - 1.8 GPM Flow Rate**

**May 14, 2019**

# SDG&E Commercial Low Flow Showerhead Short Form Workpaper

## Introduction

This short form workpaper documents the adoption of SCG workpaper WPSCGNRMH170412A Rev1 Low Flow Showerheads for Commercial Facilities for calculating ex-ante savings impacts and cost-effectiveness values used for commercial low flow showerheads. The savings and costs are based on WPSCGNRMH170412A Rev1 Low Flow Showerheads for Commercial Facilities

Exceptions and Clarifications

* Added “Log make, model number and flow rate of existing showerhead” to the Requirements section
* Update the Measure Application Type to Accelerated Replacement (AR) to align with CPUC Resolution E-4952.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 6/25/2018 | Keith Valenzuela/ SDG&E Contractor | 1. Adopted short form workpaper format 2. Short form is based SCG workpaper “WPSCGNRMH170412A Rev1 Low Flow Showerheads for Commercial Facilities”. 3. Updated Measure Application Type (MAT) to Accelerated Replacement (AR). |

## Measure Summary

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents adoption of the SCG workpaper WPSCGNRWH170412A Rev1, which includes responses to Commission Staff comments in a disposition released for WPSCGNRWH170412A Rev0. SDG&E reviewed the comments and adopts all responses along with the savings and costs. |
| **1.1 Measure & Baseline Data** | |  |  |  | | --- | --- | --- | | SDG&E Implementation ID  (Delivery/Sector) | SCG Measure Code | Measure Description | | 465279 | Commercial 1.5 GPM5 LFSH | 1.5 GPM Low Flow Showerhead for Commercial Facilities | | 465280 | Commercial 1.8 GPM5 LFSH | 1.8 GPM Low Flow Showerhead for Commercial Facilities |   Note: refers to the SDG&E Ex-ante database submittal for additional detail. |
| **1.2 Technical Description** | Installation of low-flow showerheads in commercial facilities reduces water consumption and saves energy associated with water heating. Studies have shown that there are many commercial buildings in Southern California that can benefit from replacing their existing water fixtures, and specifically, showerheads into low flow fixtures. The economics from such improvements are very cost effective.  By reducing the flow rate, this device will reduce the amount of water consumed. As a result, the water heater energy load will decrease, thus yielding energy and water savings. An existing baseline flowrate of 2.25 GPM is used for the energy savings estimate during the first baseline period. The code required baseline flow rate of 1.8 GPM for the second baseline is used to estimate the energy savings in the second baseline period. |
| Requirements | ***Terms and Conditions***   * This workpaper includes only a Direct Install delivery method. All implementers of this measure will market and identify commercial facilities utilizing higher flow showerheads (>2.25 gpm) and offer to replace with high efficiency low flow showerheads (<1.8 gpm). * Log make, model number and flow rate of existing showerhead * Make and model number must be included with a copy of the invoice. * The measure is applicable to replacement (Early Retirement) of the existing showerhead of 2.25 gpm flow rate or greater with a low-flow showerhead of 1.8 gpm or lower flow rate. * Water heating source fuel must be natural gas. * Low-flow showerhead shall meet the requirements of test procedure ANSI/ASME A112.18.1-2000, Section 5.5   ***Market Applicability***   * The measures defined in this workpaper are applicable to existing buildings only. Newly constructed buildings, additions to existing buildings, and alterations to existing buildings are excluded. * Gas savings from these measures will apply to both lodging building types (Hotel/Motel), as well as all other commercial building types. The COM building type designation will include, but is not limited to, educational facilities (University, Public/Private Schools), healthcare facilities, small/large office buildings, fitness centers, and municipal facilities (Recreation centers, parks). |
| Measures | Refer to the SDG&E Ex-ante database submittal |
| Code for All Measures | As stated per WPSCGNRWH170412A Revision 1 workpaper and provided herein below. Codes & Standards Requirements *Title 20:* Title 20 of the California Energy Regulations states that the flow rate of a showerhead shall not be greater than 2.0 GPM at 80 psi if they are sold or manufactured for sale in California prior to July 1, 2018, and 1.8 GPM at 80 psi for after July 1, 2018.  Code Summary   |  |  |  | | --- | --- | --- | | **Code** | **Reference** | **Effective Dates** | | Title 20 (2016) | Section 1605.3 (Table H-5). Plumbing Fittings | July 1, 2016 (current)  July 1, 2018 (upcoming) |   This workpaper only includes the Early Retirement (ER) installation type which have dual baselines. The two baselines are defined below:   |  |  | | --- | --- | | 1st Baseline: | The first baseline is evaluated using existing conditions, which was found to be 2.25 GPM through the SCG’s field survey (Section 1.5.2). This baseline is evaluated over RUL period. | | 2nd Baseline: | The second baseline is evaluated using the 2018 code baseline. The current code requirement is 2.0 GPM, which will last until June 30th, 2018. A code update will reduce the flow rate to 1.8 GPM at 80 PSI for all showerheads manufactured on or after July 1st, 2018. The 2nd baseline savings will be calculated using the reduced flow rate of 1.8 gpm for the EUL-RUL period. |   cid:image002.png@01D235CA.4D94F7C0  Figure 1: Title 20 Standards for Showerheads |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | * Accelerated Replacement (AR) |
| Delivery Mechanisms | * Direct install – Deemed (DnDeemDI) |
| **1.4.1 DEER Data** |  |
| GSIA | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **GSIA ID** | **Description** | **Sector** | **Bldg Type** | **ProgDelivID** | **GSIAValue** | | Def-GSIA | Default GSIA values | Any | Any | Any | 1 | |
| Net-to-Gross Ratio | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **NTGR ID** | **Description** | **Sector** | **BldgType** | **Measure Delivery** | **NTGR** | | All-Default<=2yrs | All other EEM with no evaluated NTGR; new technology in program or fewer years | Any | Any | Any | 0.7 | |
| Effective and Remaining Useful Life | The low-flow showerhead has an existing useful life of 10 years and a remaining useful life of 3.3 years. The EUL and RUL values were obtained using the DEER READI tool (WtrHt-WH-Shrhd), with the RUL equaling 1/3 of the EUL.  Though the EUL/RUL is listed in DEER for the residential sector, showerheads are subject to very similar conditions in the commercial sector, regardless of flow rate. Thus, it is expected that all low flow showerheads will have approximately the same EUL. The relevant EUL and RUL values for the measures in this work paper are below.  EUL Table   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** | | WtrHt-WH-Shrhd | Low-Flow Showerhead | Com ”Res” | SHW | 10 | 3.3 | |
| **Section 2. Calculation Methodology** |  |
| Energy Savings/Peak Demand Reduction | Energy savings calculations and assumptions are detailed in SCG workpaper WPSCGNRWH170412A Rev1. SDG&E has reviewed and adopted all assumptions and savings. |
| **Section 3. Load Shapes** | There are no existing commercial water heater or showerhead electric load shapes. The energy savings for this workpaper are gas only therefore the closest electric load profile was chosen.  Electric Impact Profile - SDGE:DEER:ClothesDishWasher  Gas Impact Profile - Annual |
| **Section 4. Costs** |  |
| Measure Cost | Base Case Cost  Revised DEER cost data for 2.25 GPM showerhead measure was used for installed base cost. The equipment/material cost per unit ($/unit) is $14.32, while the installation cost is $16.74 per unit. The total installed base cost per unit is $31.06. The base material cost and base labor cost for Early Retirement is $0.00.  Base Cost = $ 0.00  Standard Cost ID = “BaseCostZero” = 0  Gross Measure Cost  Low flow showerheads will have the same cost as a 2.0 GPM showerhead cost in DEER2008. The DEER 2008 measure cost is $45.96, to replace greater than 2.25 GPM (~4-6 GPM) shower-heads with 2.0 GPM showerheads. The components of low flow showerhead fixtures are fundamentally the same, thus low flow showerheads will not incur any additional cost. In addition, installation costs will be the same for low flow showerheads.  The DEER equipment cost per unit ($/unit) is $29.22 for low flow showerheads, and the installation labor cost is $16.74. The total installed measure cost per unit is $45.96, same as the base cost.  For ER measures, a dual baseline is adopted. RUL will equal to . In the remaining useful life (RUL) of the measure, there will be no base total cost in upgrading from 2.25 GPM showerheads to less than 2.0 GPM showerheads. However, the base total cost will be $31.06 after the remaining useful life.  Full and Incremental Measure Cost  The incremental measure cost is the difference between the measure total cost and the base total cost. In ER programs, the base total cost is $0 in the first baseline (existing) and $31.06 in the second baseline (code); however, the measure total cost is $45.96 in the first baseline and $14.90 in the second baseline.  Table 16: Full and Incremental Measure Cost Equations   |  |  |  |  | | --- | --- | --- | --- | | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | | | **1st Baseline** | **2nd Baseline** | | ER | (MEC + MLC) – (BEC + BLC) | MEC + MLC | (MEC + MLC) – (BEC + BLC) |   MEC = Measure Equipment Cost; MLC = Measure Labor Cost  BEC = Base Case Equipment Cost; BLC = Base Case Labor Cost  Table 17: Full and Incremental Costs   |  |  |  |  | | --- | --- | --- | --- | | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | | | **1st Baseline** | **2nd Baseline** | | ER | $45.96- $31.06 = $14.90 | $31.06 + $14.90 = $45.96 | $45.96- $31.06 = $14.90 |  |  |  |  | | --- | --- | --- | | Measure  Cost ID | Cost Value $ | Measure Description | | Com-SHW-LowFlowShrhd-2.25 | 45.96 | DEER 2008 measure cost to replace greater than 2.25 GPM (~4-6 GPM) shower-heads with 2.0 GPM | | BaseCostZero | 0.00 | Existing conditions | |