Short Form Work Paper WPSDGENRWH0014

**Revision 0**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Aerators for Faucets in Commercial Buildings**

**January 2, 2018**

# Aerators for Faucets in Commercial Buildings Short Form WP

## Introduction

This short form workpaper (wp) documents the values adopted from SCG’s wp entitled “Aerators for Faucets in Commercial Buildings” (WPSCGNRWH161222A Rev 0). SDG&E adopts all of the values in SCG WPSCGNRWH161222A Rev 0.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 1/02/2018 | Eduardo Reynoso / SDGE | Adopted from Southern California Gas Company WorkPaper WPSCGNRWH161222A, Revision 0 Dated March 24, 2017 without changes. |
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**Implementation and Installation Requirements**

This measure is to be implemented at private or public lavatory faucets in commercial buildings as a Retrofit Add-on (REA) measure for existing faucets that have a maximum flow rate of 2.2 GPM or greater. These building types include, but are not limited to, restaurants, hotels/motels, schools, universities, university campus housing, retail and offices.

Private lavatory faucets are defined as those that are found in individual dwelling units such as a hotel/motel guest room, dorm room, or nursing home room. Public lavatory faucets are defined as those found in bathrooms shared by a communal area such as a school, restaurant, hotel lobby, or office building.

Faucets at health care facilities that are subject to the Office of Statewide Health Planning and Development (OSHPD) code and regulation (e.g. hospitals, clinics, skilled nursing facilities) are not applicable for this measure. The use of aerators is banned in the health care industry due to the aerator’s flow control methods and components. The mixing of air and water within the aerator allows airborne bacteria to become waterborne and, in warm stagnant conditions, promote bacterial growth. Non-aerating laminar flow restrictors (LFRs) must be installed for faucets in these facilities.

This measure is applicable to all California climate zones and existing building vintages.

Table : Measure Summary Table

|  |  |
| --- | --- |
| **Section** | **Value** |
| **1.1 Measure & Baseline Data** | |  |  |  |  |  | | --- | --- | --- | --- | --- | | Measure code | |  | Measures Characteristics | | | SCG | SDG&E | SDGE Measure ID | Measure Name | MeasAppType | | 540445 | 464073  464074 | WPSDGENRWH0014-Rev00-Msr001 | Public Lavatory Faucet Aerator for Commercial Buildings – 0.5 GPM Flow Rate | REA | | 540446 | 464075  464076 | WPSDGENRWH0014-Rev00-Msr002 | Public Lavatory Faucet Aerator for Commercial Buildings – 1.0 GPM Flow Rate | REA | | 540447 | 464077 | WPSDGENRWH0014-Rev00-Msr003 | Private Lavatory Faucet Aerator for Commercial Buildings – 0.5 GPM Flow Rate | REA | | 540448 | 464078 | WPSDGENRWH0014-Rev00-Msr004 | Private Lavatory Faucet Aerator for Commercial Buildings – 1.0 GPM Flow Rate | REA |   This energy efficiency measure is applicable to existing faucets in commercial buildings that have a maximum flow rate of 2.2 GPM or greater. Only facilities that utilize natural gas-powered water heating equipment are eligible to receive incentives for this measure. Natural gas must be supplied by an investor owned utilities (IOU). |
| **1.2 Technical Description** | As cited per SCG workpaper “WPSCGNRWH161222A Rev0”:  Aerators are add-on devices that are installed at the faucet outlet to reduce the flow rate of water. This decrease in flow rate results in a reduction of the energy and water consumed by a faucet over a given operating time. The energy savings is a result of the decreased hot water consumption by the faucet.  Aerators reduce the water coming through a faucet by mixing it with air. Screens are used to introduce air into the water stream, dividing a single stream of water into many tiny streams. Since there is less space for the water to flow through, the flow rate of the water coming out of the faucet is reduced |
| Code for Measures  (as cited per WPSCGNRWH161222A Rev0) | Applicable codes for this measure are stipulated in Title 20 of the California Code of Regulations Table H-3 and H-4 in ***Figure 1***. A 2.2 GPM maximum flow rate or greater is used as an eligibility requirement for this measure but is not used as a baseline in the savings calculations due to the strong evidence of higher pre-existing faucet flow rates from the results of the studies in ***Section 1.5.*** |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | Installation Type Descriptions   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Installation Type** | **Savings** | | **Life** | | | 1st Baseline (BL) | 2nd BL | 1st BL | 2nd BL | | Retrofit Add-on (REA) | Above Customer Existing (See ***Section 2.1***) | N/A (Above Code Baseline) | RUL (6.67 years) | EUL – RUL (13.33 years) | |
| Delivery Mechanisms | Incentive Method Descriptions   |  |  | | --- | --- | | **Incentive Method** | **Description** | | Direct Install (DirInstall) | The program implements energy efficiency measures for qualifying customers, at no cost to the customer. | | Downstream Rebate (PreRebDown) | The program implements energy efficiency measures for qualifying customers, at a cost to the customer. | |
| **1.4.1 DEER Data** |  |
| DEER Measure ID | DEER does not contain this type of measure. |
| Net-to-Gross Ratio | NTG Values   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **NTGR ID** | **Description** | **Sector** | **BldgType** | **Measure Delivery** | **NTGR** | | All-Default<=2yrs | All other EEM with no evaluated NTGR; new technology in program for 2 or fewer years | Any | Any | Any | 0.7 | |
| Effective and Remaining Useful Life | EUL and RUL Values   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** | | WtrHt-WH-Faucet | Faucet Effective Useful Life | Com | SHW | 20 | 6.67 | | Measure life = RUL of faucet = 6.67 years | | | | | | |
| **Section 2. Calculation Methodology**  **(as cited per WPSCGNRWH161222A Rev0)** | Annual Savings Per Faucet   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Climate Zone** | **Public Lavatory** | | **Private Lavatory** | | | **0.5 GPM Aerator (therms/yr)** | **1.0 GPM Aerator (therms/yr)** | **0.5 GPM Aerator (therms/yr)** | **1.0 GPM Aerator (therms/yr)** | | 1 | 12.49 | 7.15 | 4.02 | 2.30 | | 2 | 10.90 | 6.24 | 3.51 | 2.01 | | 3 | 10.97 | 6.28 | 3.53 | 2.02 | | 4 | 10.30 | 5.90 | 3.32 | 1.90 | | 5 | 11.29 | 6.47 | 3.63 | 2.08 | | 6 | 9.70 | 5.56 | 3.12 | 1.79 | | 7 | 9.49 | 5.43 | 3.05 | 1.75 | | 8 | 9.17 | 5.25 | 2.95 | 1.69 | | 9 | 9.15 | 5.24 | 2.94 | 1.69 | | 10 | 9.06 | 5.19 | 2.92 | 1.67 | | 11 | 9.32 | 5.34 | 3.00 | 1.72 | | 12 | 9.94 | 5.69 | 3.20 | 1.83 | | 13 | 9.07 | 5.20 | 2.92 | 1.67 | | 14 | 9.46 | 5.42 | 3.04 | 1.74 | | 15 | 6.02 | 3.45 | 1.94 | 1.11 | | 16 | 12.39 | 7.09 | 3.99 | 2.28 | |
| **Section 3. Load Shapes** | SDGE:35-OTI-Otherindustrial-PROC OTH |
| **Section 4. Costs** |  |
| Base Case Cost | Baseline costs are $0 since it is an REA measure and the base case would be to do nothing to the faucet. |
| Measure Case Cost | Proposed Measure Costs   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Description** | **Delivery Method** | **Equipment Cost** | **Labor/Installation Cost** | **Total Measure Cost** | | Faucet Aerator (0.5 or 1.0 GPM) | Direct Install or PreRebDown | $2.89/fixture | $4.28/fixture | $7.17/fixture |   MeasureCost ID: SDG-DHW-FaucetAerLowFlow-Com |
| Full and Incremental Cost | Full and Incremental Costs   |  |  |  |  | | --- | --- | --- | --- | | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | | | **1st Baseline** | **2nd Baseline** | | REA, Direct Install | $2.89/fixture + $4.28/fixture = **$7.17 per fixture** | $7.17 per fixture | N/A | | REA, PreRebDown | $2.89/fixture + $4.28/labor = $7.17 per fixture | $ 7.17 per fixture | N/A | | MeasureCost ID: “SDG-DHW-FaucetAerLowFlow-Com” = $7.17 | | | | |