Short Form Work Paper WPSDGEREWH1012

**Revision 2**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Faucet Aerators for Bathroom/Kitchen Sinks in Residential Buildings**

**December 28, 2017**

**SDG&E Faucet Aerator for Bathroom/Kitchen Sinks in Residential Buildings**

## Introduction

This short form workpaper documents the energy impacts and costs adopted from SCE’s workpaper entitled “Faucet Aerator and Low Flow Showerhead” (SCE17WP004.0 Faucet Aerator and Low Flow Showerhead\_Final.docx). SDG&E adopts all the values in SCE17WP004.0 Faucet Aerator and Low Flow Showerhead, with the following exceptions:

1. Kitchen faucet aerators are included in this workpaper with a measure case flow of 1.5 gpm.
2. The SCE workpaper values were adjusted for SDG&E territory. Since SDG&E provides gas and electric the savings use the savings defined as “both” in the Energy Division disposition
3. Low flow showerheads are covered in a separate workpaper (WPSDGERWH1061A, Rev 5).

## Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 06/18/2012 | Chan Paek, SCG | Original Workpaper |
| 0.1 | 06/27/2012 | Peter Ford (SDGE) | Adopted SCG Workpaper |
| 1 | 01/30/2014  06/19/2014 | Kyle Dunn/MWE2  Judelson Enriquez / RMS | Incorporates revisions per Energy Division Workpaper Disposition for Water Fixtures dated 2/22/2013  Revised calculation template to include Mark M.’s additional columns and remove CZ cost factors. |
| 2 | 12/28/17 | Keith Valenzuela/SDGE Contractor | Adopted SCE workpaper SCE17WP004.0 Faucet Aerator and Low Flow Showerhead |

## Measure Summary

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts and cost-effectiveness values for Faucet Aerator measures. The base energy consumption and measure energy consumption values are from SCE’s workpaper, SCE17WP004, Revision 0.  SCE’s workpaper details the installation of a lavatory faucet aerator with a measure case flow of 1.0 gallons per minute (gpm). This workpaper also includes the installation of a kitchen faucet aerator with a case flow of 1.5 gpm.  Both measures were in previous DEER versions but do not remain in DEER 2016. Therefore, savings in this work paper are based on an Energy Division disposition. |
| **1.1 Measure & Baseline Data** | |
| **1.2 Technical Description** | A faucet aerator is a device that screws onto an existing faucet head in order to reduce water flow. It splits the flow of water into multiple streams and adds air. This reduces flow while maintaining sufficient water pressure. This work paper assumes an aerator measure case flow of 1.0 gpm in lavatories and 1.5 gpm in kitchens. |
| Measures | Measure 1: Faucet Aerator Measures:  464090- Lavatory Faucet Aerator  Measure 2: Kitchen Faucet Aerator Measure:  421014- Kitchen Faucet Aerator  Measure 3: Faucet Aerator Measures:  405034- Water Heating-Faucet Aerators |
| Code for All Measures | **Title 20 2016:** Section 1605.1, Table H-3 provides requirements for aerators and Table H-4 provides requirements for kitchen aerators. The measure cases in this work paper have lower flow rates (1.0 gpm for laboratory aerators and 1.5 for kitchen sink aerators) when compared to 2016 Title-20 standards.  Screen Clipping  Screen Clipping |
| Requirements | Eligible building types are:   * Residential Single Family * Residential Multi-family * Residential Mobile Home - Double-Wide   All SDG&E climate zones are eligible. For direct install measures, the contractor must verify that the product is installed correctly and the installed product must exceed code requirements. |
| **1.3 Installation Type and Delivery Mechanisms** | |
| Installation Type | Retrofit Add-on (REA) |
| Delivery Mechanisms | Measure 1: Faucet Aerator Measures:  464090- Lavatory Faucet Aerator (Direct Install)  Measure 2: Kitchen Faucet Aerator Measure:  421014- Kitchen Faucet Aerator (Direct Install)  Measure 3: Faucet Aerator Measures:  405034- Water Heating-Faucet Aerators (PreRebDown) |
| **1.4.1 DEER Data** | |
| Net-to-Gross Ratio | The NTG values were obtained using the DEER READI tool. The relevant NTG values for the measures in this work paper are in the table below.  Screen Clipping |
| Effective and Remaining Useful Life | The EUL and RUL values were obtained using the DEER READI v2.4.7 tool. DEER defines the RUL as 1/3 of the EUL value.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** | | WtrHt-WH-Aertr | Faucet Aerators | Any | SHW | 10 | 3.33 | |
| **Section 2. Calculation Methodology** | |
| Energy Savings/Peak Demand Reduction – All Measures | The 2/22/13 Energy Division Workpaper Disposition for Water Fixtures provided “basis” savings values for:   * Faucet Aerators 0.5 gpm, 1 gpm, and 1.5 gpm   + The average base case flow is 1.91 gpm, according to SCG and SDG&E study data. * Faucet Aerators 1.5 gpm   + The average base case flow is 2.09 gpm, according to SCG and SDG&E study data.   These basis values were multiplied by climate zone-specific multipliers to determine final savings. The Single Family, Multi Family, and Mobile Home building types were included.  Since SDG&E provides both gas and electric, the workpaper savings use the savings defined as “both” in the Energy Division disposition. |
| **Section 3. Load Shapes** | |
| Load Shape | The ideal load shape for net benefits estimates would represent the difference between the base case and measure case. The closest load shapes that are applicable to the measures in this work paper are listed in the table below.   |  |  |  | | --- | --- | --- | | **Building Type** | **Load Shape** | **E3 Alternate Building Type** | | Residential Mobile Home - Double-Wide | SDGE:19-RES-AllResidential-WAT\_HEAT | Residential | | Residential Multi-family | SDGE:19-RES-AllResidential-WAT\_HEAT | Residential | | Residential Single Family | SDGE:19-RES-AllResidential-WAT\_HEAT | Residential | |
| **Section 4. Cost** | |
| **Section 4.1 Base and Measure Costs** | |
| Base Cost | The base case is the customer’s existing equipment; therefore, the base case cost is $0.00. |
| Measure Cost | The measure cost for the faucet aerator has been calculated as an average of (3) cost quotes from 2016 online retailer, grainger.com per the SCE workpaper.  For the faucet aerator measure, the labor rate was not available in the CPUC’s supported WO17 cost evaluation; however, it was estimated using DEER 2008 assumptions with installation time for the faucet aerator = 7.2 mins (0.12\*60). This time is multiplied by the average national plumber labor rate based on 2016 RSMeans ($64.40).  All aerators:  The costs per unit is $7.28 for materials and $7.73 for labor for a total cost of $15.01/unit. |