**Workpaper WPSCGNRWH120618A**

**Revision 1**

**Southern California Gas Company**

**Customer Programs Department**

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

Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Revision No. | Date | **Description** | **Author** |
| 0 | June 18, 2012 | Original Workpaper | Chan Paek, SCG |
| 1 | December 23, 2013 | Disposition Changes & Weather Updates | Julianna Colwell, SCG |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

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Measure Summary Table A

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Measure ID | Measure Name | Program Application Type  (RE, NC, ROB, ER, etc) | EUL/RUL  (yr) | CZ | Building Type | Building Vintage | Unit  Definition | NTG  IMC | NTG Savings | Program  Delivery  Method  (CustIncent, PreReb, DirInstall, etc) | Gross  Realization Rate (GRR) | % Eligible for TOU AC  Adjustment |
| 1 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 1 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 2 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 2 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 3 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 3 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 4 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 4 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 5 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 5 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 6 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 6 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 7 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 7 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| 8 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | ER | 10 | 8 | SF | ANY | Aerator | .59 | .59 | Direct Install | 1 | N/A |
| **\*Please see attached Measure Worksheet for the complete list of measures.** | | | | | | | | | | | | |

Measure Summary Table B

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Measure ID | Measure Name | 1st Baseline | | | | | 2nd Baseline | | | | |
| Gas  Savings (Therms) | User Entered kW Savings per unit (kW/unit) | Gross Unit Annual Electricity Savings (kWh/unit) | Measure Electric End Use Shape (Load Shape) | Incremental  Measure Cost ($/unit) | Gas  Savings (Therms) | User Entered kW Savings per unit (kW/unit) | Gross Unit Annual Electricity Savings (kWh/unit) | Measure Electric End Use Shape (Load Shape) | Incremental  Measure Cost ($/unit) |
| 1 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.55 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 2 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.47 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 3 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.47 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 4 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.52 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 5 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.55 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 6 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.55 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 7 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.56 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| 8 | Faucet Aerator,  Bathroom Sink,  1.0 gpm | 1.52 | 0 | 0 | N/A | $5.43 | N/A | N/A | N/A | N/A | N/A |
| **\*Please see attached Measure Worksheet for the complete list of measures.** | | | | | | | | | | | |

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1. General Measure & Baseline Data

Measure & Delivery Description

This workpaper addresses the savings associated with the installation of faucet aerators on bathroom sinks or kitchen sinks in single- and multi-family homes.

Measures in this workpaper include 1.0-gpm aerator for bathroom sink and 1.5-gpm aerator for kitchen sink, with a single- and multi-family option for each.

Measure Application Type & Delivery Method

* + - 1. Measures in this workpaper are direct install (DI) retrofit (ER) for existing faucets with no aerators.
      2. This measure is applicable for MF & SF residential buildings with gas water heating only.

DEER Differences Analysis

The savings for this technology are not included in DEER2013, but EUL, NTG Ratio, and the cost information are provided in DEER and the Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013, which is provided below in the attachment section.

Code Analysis

* + 1. There are no codes & standards that apply for this technology.

Measure Effective Useful Life

* + 1. The EUL of the aerator provided in DEER table[[1]](#endnote-1) is 10 years.

Net-to-Gross Ratios for Different Program Strategies

* + 1. The NTGR values for this technology are provided in the Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013 as follows.
       1. NTGR for this measure in SF (single-family) building type with direct install delivery method is 0.59.
       2. NTGR for this measure in MF (multi-family) building type with direct install delivery method is 0.65.

Gross Realization Rate

* + 1. The gross realization rate of 1.0 is applied for this workpaper.

Time-of-Use Adjustment Factor

* + 1. N/A

1. Energy Savings & Demand Reduction Calculations

Load Shapes

* + 1. N/A

Energy Savings

* + 1. The savings calculations for this paper are defined in the Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013. The stated Climate zone factors in Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013 are out of date and should be replaced by the Climate Zone[[2]](#endnote-2) calculated factors.
    2. Table 1 shows the savings values listed in the Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013.
       1. Values in Table 1 below represent the before of the climate zone adjustment factors being applied.
       2. The climate zone factors are applied to Aerator Savings in Table 1, and the estimated savings for each climate zone are presented “Measure Worksheet.xlsx” in Attachment section.
       3. The baseline flow rates can be found in DEER and Title 20.
          1. The maximum flow rate of faucets should not be greater than 2.2 gpm at 60 psi.

1. Aerator Savings

|  |  |
| --- | --- |
| **Aerator** | **Estimated Savings (therm/yr/aerator)** |
| 1.5 gpm, Kitchen (SF) | 5.9 |
| 1.0 gpm, Bathroom (SF) | 1.5 |
| 1.5 gpm, Kitchen (MF) | 4.9 |
| 1.0 gpm, Bathroom (MF) | 0.9 |

* + 1. The installation rate for measures covered in this workpaper is 0.665 as provided in DEER2011[[3]](#endnote-3).

1. Base Case & Measure Costs

Base Case Cost

* + 1. The base case of this retrofit is not doing anything, and therefore, the base case cost is $0.

Gross Measure Cost

* + 1. These measure costs were pulled from the 2013 program cycle negotiated 3rd party contractor installation costs.
       1. The average cost to install a Kitchen Aerator was $7.99
       2. The average cost to install a Bathroom Aerator was $5.43
    2. The gross measure cost is $7.99 for Kitchen Aerators and $5.43 for Bathroom Aerators.

Incremental Measure Cost

* + 1. The IMC is equal to the gross measure cost; $7.99 for Kitchen Aerators and $5.43 for Bathroom Aerators.

Measure Worksheet



Workpaper Disposition for Water Fixtures from the California Public Utilities Commission (CPUC), Energy Division (ED) February 22, 2013



Energy Efficiency Starter Kit Workpaper, SCGWP100309A Rev. 3.



References

1. Expected Useful Life, “EUL\_Summary\_11-7-2013.xls”, DEER 2013.

    [↑](#endnote-ref-1)
2. Climate Zone Factors

    [↑](#endnote-ref-2)
3. Installation rates, “SupportTable\_GSIA.xlsx”, GSIA\_ID: Res-LowF-FA-All

    [↑](#endnote-ref-3)