Short Form Work Paper PGECODHW104

**Revision #7**

**Pacific Gas & Electric**

**Residential Water Heater**

**Gas Storage Water Heater**

**>0.68 UEF<75 kBtu/h input,**

**Measure Codes: HA 58**

**December 07, 2018**

# PG&E Residential Water Heater

## Introduction

This short form workpaper documents (WP) the values adopted from SCG’s WP entitled “Residential Small Storage Water Heaters” WPSCGREWH180207A REV 00.

Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 08/31/18 | Carlos Pineda (SCG) | * Original Release: Workpaper for DEER 2017 Residential Small Storage Water Heaters. |

## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents details for the replacement of a 40-gallon natural gas storage water heater with an energy factor (UEF) ≥ 0.68. The base case measure is a 40-gallon low efficiency small storage water heater (ESWH) with an UEF =< 0.64. The base energy consumption and measure energy consumption values are from SCG’s workpaper, WPSCGREWH180207A, Revision 00. |
| **1.1 Measure & Baseline Data** | Measures:   |  |  |  | | --- | --- | --- | | PG&E Measure Code | SCG Product Code | Description | | HA58 | TBD | High Efficiency Storage Water Heater | |
| **1.2 Technical Description** |  |
| Measures | The Measure Case is a 40 Gallon Small Storage Water Heater, ≤ 75 kBtuh  UEF = 0.68 High Draw (RG-WtrHt-SmlStrg-Gas-Ite75kBtuh-40G-HD-0p68UEF)  The Base Case is UEF = 0.64 Medium Draw (RG-WtrHt-SmlStrg-Gas-Ite75kBtuh-40G-MD-0p64UEF) |
| Code for All Measures | California Title 20 presents water heater efficiency requirements with energy factor (EF) ratings, this factor has been changed by the code of federal regulations to uniform energy factor (UEF). This workpaper presents the code, savings and measure requirements in UEF values.  Less efficient units due to smaller heat exchangers and less effective insulation.   1. Stor\_UEF-Gas-030gal-MD-0.60UEF 2. Stor\_UEF-Gas-040gal-MD-0.58UEF 3. Stor\_UEF-Gas-040gal-HI-0.64UEF 4. Stor\_UEF-Gas-050gal-MD-0.56UEF 5. Stor\_UEF-Gas-050gal-HI-0.63UEF |
| **Requirements** | 1. Units Efficiency shall have been evaluated by the test methods referenced in the California Title 20 and Title 24 standards. 2. Minimum qualifying uniform energy factor (UEF) for small (≤75 MBtu/hr) storage water heaters replacing storage water heaters.    1. 30, 40, 50 gallon: 0.64 UEF, 0.68 for medium and high draw patterns respectively.   Minimum emmissions requirement as defined per applicable air district. |
| **1.3 Installation Type and Delivery Mechanisms** | 1. The rebate applies to gas-for-gas equipment replacements on burnout or to new installations. 2. This Workpaper does not cover water heaters used for space conditioning, process end-use applications, pools, or spas. 3. These measures are applicable to any building type in the residential building sector. 4. These measures replace a storage water heater by another storage water heater. |
| Installation Type | Replace on Burnout (ROB) and New Construction (NC) |
| Delivery Mechanisms | Down-Stream Incentive |
| **1.4.1 DEER Data** |  |
| Net-to-Gross Ratio | Res-Default>2yrs |
| Effective and Remaining Useful Life | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** | | WtrHt-Res-Gas | Residential Gas Water Heater | Res | SHW | 11 | 3.67 | |
| **Section 2. Calculation Methodology1** | DEER 2017 |
| Energy Savings/Peak Demand Reduction – All Measures | **DEER and READi Tool Outputs**   |  |  |  | | --- | --- | --- | | **Measure Code** | **Measure Name** | **READI Data** | | SCG: TBD  PG&E: HA58 | UEF ≥ 0.68 40 Gallon Residential Storage Water Heater replacing 40 Gallon Electric Storage Water Heater, UEF = <0.64 | DEER 2018, READI v2.4.8 | |
| **Section 3. Load Shapes** | PGE:Residential:21 = Res. Wtr. Heating |
| **Section 4. Costs** | The Gross Measure Cost is obtained from costs documented by SCG work paper   |  |  |  |  | | --- | --- | --- | --- | | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | | | **1st Baseline** | **2nd Baseline** | | ROB | (MEC + MLC) – (BEC + BLC)   1. Stor\_UEF-Gas-030gal-MD-0.64UEF   ($775.06 +$304.10) – ($728.08+304.10) = $46.98   1. Stor\_UEF-Gas-040gal-MD-0.64UEF   ($951.21+$328.73) – ($772.74+$328.73) = $178.47   1. Stor\_UEF-Gas-040gal-HI-0.68UEF   ($1,070.19+$328.73) – ($951.21+$328.73) = $118.98   1. Stor\_UEF-Gas-050gal-MD-0.64UEF   ($919.17 + $353.36) – ($646.88+$353.36) = $272.29   1. Stor\_UEF-Gas-050gal-HI-0.68UEF   ($1,056.21 + $353.36) – ($885.66+$353.36) = $170.55 | (MEC + MLC) – (BEC + BLC)   * + - 1. Stor\_UEF-Gas-030gal-MD-0.64UEF   ($775.06 +$304.10) –($728.08+304.10) = $46.98   * + - 1. Stor\_UEF-Gas-040gal-MD-0.64UEF   ($951.21+$328.73) – ($772.74+$328.73) = $178.47   * + - 1. Stor\_UEF-Gas-040gal-HI-0.68UEF   ($1,070.19+$328.73) – ($951.21+$328.73) = $118.98   1. Stor\_UEF-Gas-050gal-MD-0.64UEF   ($919.17 + $353.36) – ($646.88+$353.36) = $272.29   1. Stor\_UEF-Gas-050gal-HI-0.68UEF   ($1,056.21 + $353.36) – ($885.66+$353.36) = $170.55 | N/A | | NC | |
| **Section 4.1 Base and Measure Costs2** |  |

1. ***Energy savings calculation methodology for storage water heater or any water heaters with a very low testing draw pattern was not covered on the March 2018 Water Heater Disposition and was not address by the EAR team.***
2. ***Base and measure costs for water heaters were not covered under the EAR team analysis of the most recent USDOE requirement for Uniform Energy Factor (UEF), this paper uses the previous cost for EF rather.***