Work Paper SCE17AP018

**Revision 0**

**Short Form**

**Southern California Edison**

**Residential High Efficiency Dishwasher (199 kWh EAEU)**

**Introduction**

This short form workpaper documents the values adopted from SCG’s WPSCGREAP170726A-Rev00 entitled “Residential High Efficiency Dishwasher (199 kWh EAEU)” (EAEU - estimated annual energy usage). SCE adopts all the values in WPSCGREAP170726A-Rev00 with no changes to the savings. The following changes were made in this short form:

* The Midstream Delivery Type was added to this version.
* Added requirement that customer must use an electric water heater.
* No Therms savings adopted.

# Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 2/2/2018 | Lake Casco (TRC) | 1. Transferred savings values to SCE Calculation template for the 2018 program year. 2. Calculation templates were developed based on SCG’s files “WPSCGREAP170726A-Rev00\_Res HE Dishwasher\_EAD Tables”. 3. Only SCE climate zones were used in this version. 4. The Midstream Delivery Type was added to this version. 5. Added requirement that customer must use an electric water heater. |

**Measure Summary**

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form work paper documents the inputs for the Residential High Efficiency Dishwasher measure. The savings values are from SCG’s workpaper WPSCGREAP170726A Rev00– Residential High Efficiency Dishwasher.  High efficiency residential dishwashers with an estimated annual energy usage (EAEU) of 199 kWh are ENERGY STAR certified. Residential ENERGY STAR certified dishwashers use advanced technology such as soil sensors, improved water filtration, more efficient jets, and innovative dish rack designs to reduce water and energy consumption. Residential standard-sized dishwashers that have earned ENERGY STAR certification are on average 12% more energy efficient and 30% more water efficient than standard models. |
| **1.1 Measure & Baseline** | Please refer to Attachment #1 Calculation Templates for the list of measure solution codes and baseline condition.  *Measure Case*: High Efficiency Dishwasher - Standard Size - EAEU = 199kWh  *Code Baseline*: Dishwasher - Standard Size - EAEU = 307, EF = 0.72  *Existing Baseline:* Dishwasher - Standard Size - EAEU = 355, EF = 0.62, or Code Level for New Vintage |
| **1.2 Technical Description** |  |
| **Measures** | AP-20219: High Efficiency Dishwasher - Standard Size - EAEU = 199 (EF = 1.17) |
| **Code for All Measures** | **Title 20:** Standards for dishwashers are outlined in California’s Title 20 Appliance Efficiency Code of Regulations. Applicable codes for this measure are stipulated in Title 20 of the California Code of Regulations Table O. Title 20 requires a maximum energy use of 307 kWh/year for standard size dishwashers effective May 30, 2013. Thus, an EAEU of 307 kWh/year is used as the baseline for savings calculations for this workpaper.  **Energy Star**: Standard-capacity ENERGY STAR dishwashers hold eight or more place settings and six serving pieces and have an estimated annual energy use (EAEU) of 270 kWh/year or less and water use of 3.5 gallons/cycle or less. |
| **Requirements** | * This energy efficiency measure is applicable to residential building types that either do not have a dishwasher or currently have a dishwasher with an estimated annual energy use (EAEU) of 307 kWh or greater. * Qualifying dishwashers for this measure must have an EAEU of 199 kWh or less and must be standard-capacity. Used or rebuilt equipment is not eligible. * The customer must use an electric water heater for their domestic hot water. |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| **Installation Type** | Replace on Burnout (ROB)  New Construction (NEW/NC) |
| **Delivery Mechanisms** | Down-Stream Incentive  Mid-Stream Incentive |
| **1.4.1 DEER Data** |  |
| **Net-Gross-Ratio** | All-Default<=2yrs |
| **Effective and Remaining Useful Life** | Appl-EffDW, EUL=11 years, RUL = 3.67 Years |
| **Section 2. Calculation Methodology** |  |
| **Energy savings/Peak Demand Reduction – All Measures** | The proposed high efficiency, standard-sized, 199 kWh dishwasher measure has an estimated annual energy use (EAEU) between the existing 180 kWh and 260 kWh DEER 2014 dishwasher measures. Thus, the savings for the 199 kWh dishwasher measure were determined through linear interpolation of the existing DEER values for the 180 kWh and 260 kWh measures. The 199 kWh savings calculations use the 2013 Title 20 code of dishwashers with EAEU = 307 kWh as the base case, which is consistent with the existing DEER measures. DEER savings are provided by climate zone for each IOU.  WPSCGREAP170726A Rev00 also includes therms savings, but since this short form requires electric water heaters, no therms savings are adopted.  Water savings are also calculated in the workpaper based on volume used and the number of cycles per year. |
| **Section 3. Load Shapes** | DEER:Res\_ClothesDishWasher  Note: The SCG workpaper used the SCG specific DEER load shape, but this SCE short form uses the SCE load shape. |
| **Section 4. Costs** |  |
| **Section 4.1 Base and Measure Costs** | Please refer to Attachment #1 Calculation Templates for detailed baseline and measure costs. |

*No Changes were required for this short form. The savings were simply transferred to SCE’s 2018 Calculation Template.*

**Savings Calculation Workbook**

Attachment 1: SCE17AP018.0 A1 Calc Template