Short Form Work Paper WPSDGENRHC1052

**Revision 0**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**High Efficiency Package Terminal Air Conditioners & Heat Pumps**

**March 2, 2018**

**SDG&E** **Energy Upgrade California – High Efficiency Package Terminal Air Conditioners & Heat Pumps**

## Introduction

This short form workpaper documents the cost and energy impacts adopted from SCE’s workpaper entitled “High Efficiency Package Terminal Air Conditioners & Heat Pumps 24kBtu/h (2 tons) and under” (SCE17HC007.0 High Efficiency Package Terminal AC&HP 24kBtuh\_Final docx). SDG&E adopts all the cost and energy impacts in SCE17HC007 Rev0 - High Efficiency Package Terminal Air Conditioners & Heat Pumps 24kBtu/h (2 tons) and under, with the following exceptions:

1. Only SDGE climates zones are included in this workpaper.
2. The SCE workpaper includes residential and commercial installations. This workpaper will only include commercial installations.
3. The SCE workpaper includes “NEW” installation type which required adjustments to DEER PTHP savings to account for more stringent 2016 Title 24 Standards. This workpaper will only address “ROB” installation type and will use savings directly from DEER.
4. The SCE workpaper assumes an equipment size of <= 24 kBtuh and uses the DEER savings for 7-15 kBtuh. SDGE Implementation IDs align with the DEER bins of <7 kBtuh, 7-15 kBtuh and >15 kBtuh. Therefore, this workpaper uses DEER savings and costs for the Implementation IDs corresponding bin.

The energy impacts are based on DEER measure energy savings. The measure costs are based on DEER costs and Work Order 17 (WO017) Ex Ante Measure Cost Study.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 03/02/2018 | Keith Valenzuela/SDGE Contractor | - Adapted SCE’s workpaper SCE17HC007.0 |
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## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | The short form workpaper documents the adoption of the cost and energy impacts from SCE workpaper SCE17HC007 Rev0 for high efficiency package terminal air conditioners & heat pumps. |
| **1.1 Measure & Baseline Data** | |
| **1.2 Technical Description** | PTACs & PTHPs are through-the-wall units usually less than or equal to 2 tons in capacity and are typically used to condition small areas that have wide swings in occupancy levels. As a result, they are most commonly used in hotels and motels where individual zone control is necessary.  This work paper details replace on burnout (ROB) of package terminal air conditioning units (PTAC) or package terminal heat pumps (PTHP) that are through the wall, self-contained with an EER that is 20% higher than the base case. |
| Measures | Measure 1: 416278 - Packaged Terminal AC <7k-Rebate (D03-084)  Measure 2: 416280 - Packaged Terminal AC >15k-Rebate (D03-100)  Measure 3: 416282 - Packaged Terminal AC 7-15k-Rebate (D03-099)  Measure 4: 416284 - Packaged Terminal HP <7k-Rebate (D03-085)  Measure 5: 416286 - Packaged Terminal HP >15k-Rebate (D03-102)  Measure 6: 416288 - Packaged Terminal HP 7-15k-Rebate (D03-101) |
| Code for All Measures | Per the SCE workpaper:  Screen Clipping |
| Requirements | Per the SCE workpaper:  To be eligible for a rebate, the measure must meet the following minimum Energy Efficiency Ratio (EER) which exceeds the Title 24 Minimum (EER):  Screen Clipping |
| **1.3 Installation Type and Delivery Mechanisms** | |
| Installation Type | Replace on Burn-out (ROB) |
| Delivery Mechanisms | PreRebDown |
| **1.4.1 DEER Data** | |
| Net-to-Gross Ratio | The Net-to-Gross Ratio is from the SCE workpaper. The table is included for reference:  Screen Clipping |
| Effective and Remaining Useful Life | The EUL and RUL values are summarized in the SCE workpaper. The table is included for reference:  Screen Clipping |
| GSIA | The GSIA values are summarized in the SCE workpaper. The table is included for reference:  Screen Clipping |
| **Section 2. Calculation Methodology** | |
| Energy Savings/Peak Demand Reduction – All Measures | Electrical energy and demand as well as natural gas savings for the SDGE measures were based on the following DEER2005 measures for the SDGE California climate zones (CZs):  Measure 1: D03-084 - H.E. Package Terminal A/C < 7k  Measure 2: D03-100 - H.E. Package Terminal A/C > 15k  Measure 3: D03-099 - H.E. Package Terminal A/C 7k-15k  Measure 4: D03-085 - H.E. Package Terminal HP < 7k  Measure 5: D03-102 - H.E. Package Terminal HP > 15k  Measure 6: D03-101 - H.E. Package Terminal HP 7k-15k  The energy impacts were taken directly from the DEER READI v2.4.7 tool. |
| **Section 3. Load Shapes** | |
| Load Shape | DEER:HVAC\_Split-Package\_AC (D03-084, D03-100 and D03-099)  DEER:HVAC\_Split-Package\_HP (D03-085, D03-102 and D03-0101) |
| **Section 4. Cost** | |
| **Section 4.1 Base and Measure Costs**  Per the SCE workpaper:  “The measure case costs were taken from DEER2008 and were validated utilizing online retailers as a part of this update. In total (base and measure case combined), ten online retailer spot checks were performed and found the pricing to be within plus or minus 5% of the DEER2008 costs. Based on these findings, the DEER2008 costs were found to be reasonable and were utilized” | |
| Base Cost | Per 2008 DEER Costs and WO17 labor rate: |
| Measure Cost | Per 2008 DEER Costs and WO17 labor rate: |
| Incremental Cost | Per 2008 DEER Costs: |