**Work Paper PGECOHVC114**

**PTAC and PTHP**

**Revision #4**

**Pacific Gas & Electric Company**

**Customer Energy Solutions**

**High Efficiency Package Terminal Air Conditioners & Heat Pumps 24kBtu/h**

**(2 tons) and under**

**Measure Code: HA08, HA11, HEP01, HEP02**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Applicable Measure Codes:** | HA08, HA11, HEP01, HEP02 |
| **Measure Description:** | High Efficiency Package Terminal Air Conditioners & Heat Pumps 24kBtu/h (2 tons) and under |
| **Energy Impact Common Units:** | kW/ton, kWh/ton, therms/ton of cooling capacity |
| **Base Case Description:** | Source: Title 20 and Title 24  Title 24 Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps – Minimum Efficiency Requirements |
| **Base Case Energy Consumption:** | DEER2014 READi v.2.0.1 does not provide the base case energy consumption |
| **Measure Energy Consumption:** | DEER2014 READi v.2.0.1 does not provide the measure case energy consumption. |
| **Energy Savings**  **(Base Case – Measure):** | Source: DEER 2014 and Engineering Calculations  Varies depending on climate zone, building type, vintage, and system capacity. |
| **Costs Common Units:** | $/ton of cooling capacity |
| **Base Case Equipment Cost ($/unit):** | Source: DEER2008 and Engineering Calculations.  Varies depending on system capacity. |
| **Measure Equipment Cost ($/unit):** | Source: DEER2008 and Engineering Calculations.  Varies depending on system capacity. |
| **Gross Measure Cost ($/unit)** | Source: DEER2008 and Engineering Calculations.  Varies depending on system capacity. |
| **Measure Incremental Cost ($/unit):** | Source: DEER2008 and Engineering Calculations.  Varies depending on system capacity. |
| **Effective Useful Life (years):** | Source: DEER 2014.  15 years |
| **Measure Application Type:** | Replace on Burnout (ROB) |
| **Net-to-Gross Ratios:** | Source: DEER2011.  NTG = 0.60 |
| **Important Comments:** |  |

# Work Paper Approvals

|  |  |
| --- | --- |
|  |  |
| The following Manager(s) approved this work paper through the PG&E Electronic Data Routing System under Routing Requisition # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| |  | | --- | |  | | **Grant Brohard**  Manager, Engineering Services | | **Carolyn Weiner**  Manager, Core Products | |  |

# Document Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Workpaper and Revision # | Tech. Revision | MM/DD/YY | Author/Affiliation | Summary of Changes |
| SCE13HC007.0 | Yes | 4/4/2012 | James Gowen/Matrix | Updated work paper to new template  Added PG&E and SDG&E climate zones  Used new vintage weighting |
| SCE13HC007.1 | No | 3/25/2014 | Justin Westmoreland, PE/AESC | -New template and updated DEER measures. |
| No | 4/17/2014 | Cassie Cuaresma/SCE | -Work paper updated for reporting period effective 7/1/2014-12/31/2014  -Added new solution codes for single family residential building type |
| PGECOHVC114 R3 | No | 6/19/14 | SCE lead revision  Chris Li (PG&E) |  |

# Section 1. General Measure & Baseline Data

## 1.1 Measure Description & Background

This work paper details the replace on burnout (ROB) of package terminal air conditioning units (PTAC) or package terminal heat pumps (PTHP) that are through the wall, self-contained and less than or equal to 2 tons (<=24kBtu/h) with an EER that is 20% higher than the base case. The base case is a code compliant unit; Section 1.3 describes how to calculate the base case efficiency. Note that ductless mini-split air conditioners do not apply to this work paper.

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. Please see the attached excel spreadsheet for the complete list of building types included in this work paper.

Table 1 Measure Names

|  |  |  |
| --- | --- | --- |
| PG&E Measure Code | SCE Solution Code | Measure name |
| HA08 and HEP01 | AC-21823 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Non Res) DX Equipment |
| NA | AC-70989 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Common Area) DX Equipment |
| NA | AC-89607 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Dwelling Area) DX Equipment |
| NA | AC-88667 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Res) DX Equipment |
| HA11 and HEP02 | AC-37854 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Non Res) DX Equipment |
| NA | AC-93045 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Common Area) DX Equipment |
| NA | AC-10964 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Dwelling Area) DX Equipment |
| NA | AC-84199 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Res) DX Equipment |

## 1.2 Technical Description

This measure requires the replace on burnout (ROB) of package terminal air conditioning units (PTAC) or package terminal heat pumps (PTHP) that are through the wall, self-contained and less than or equal to 2 tons (<=24kBtu/h) with an EER that is 20% higher than the base case.

To be eligible for a rebate, measure must meet the following minimum Energy Efficiency Ratio (EER) which exceeds the Title 24 Minimum (EER):

Table 2 Measure and Title 24 (T24) EER

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit Capacity** | **T24 Minimum EER (AC)** | **T24 Minimum EER (HP)** | **Measure Minimum EER (AC)** | **Measure Minimum EER (HP)** |
| ≤ 7,000 Btu/hr | 9.41 | 9.31 | 11.29 | 11.17 |
| > 7,000 and ≤ 15,000 Btu/hr | 8.56 | 8.46 | 10.27 | 10.15 |
| >15,000 Btu/hr | 7.71 | 7.61 | 9.25 | 9.13 |

## 1.3 Measure Application Type

Note: See Appendix A for a comparison of the application types used by and incorporated into SCE systems versus the application types available in the newest revision of DEER 2014. Appendix A will serve as a translation between the outputs of this work paper and application types used by READi.

The program/install types for the above measures are:

* Replace on Burn-out (ROB)

The delivery method that is available for these measures is:

* Financial Support - Down-Stream Incentive – Deemed

## 1.4 MEASURE and Base Case Cost Effectiveness Data

**1.4.1 DEER Measure and Base Case Analysis**

The DEER Version 2014 1.0.5 [386] database contains measure energy savings and cost information for Package Terminal AC Units and Heat Pumps. The DEER Measure IDs D03-084, D03-099, and D03-100 were used for Package Terminal AC units, and the DEER Measure IDs D03-085, D03-101, and D03-102 were used for Package Terminal Heat Pumps.

DEER provided individual vintages along with multiple tiers of unit capacity ranges that were combined, via a weighted average. See Section 2 for more information.

Table 3 DEER Difference Summary

|  |  |
| --- | --- |
| DEER Difference Summary Table | |
| Modified DEER Methodology | Yes |
| Scaled DEER Measure | Yes |
| DEER Building Prototypes Used | Yes |
| Deviation from DEER | DEER had three measures that this work paper combines into one. DEER had the measures broken out by vintage, and this work paper takes a weighted average. |
| DEER Version | DEER 2014 |
| DEER Run ID and Measure Name (Sample) | D03-084 index 242651: High eff. packaged terminal air-conditioner (< 7k) |

**Net to Gross**

The NTG value was obtained from the “DEER2011\_NTGR\_2012-05-16.xls” on the DEER website as required by Version 5 of the California Public Utilities Commission (CPUC) Energy Efficiency Policy Manual [351]. The relevant NTGR for this measure is shown in Table 4 below.

Table 4 Net-to-Gross Ratio

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| NTGR\_ID\* | Description\* | Sector\* | BldgType\* | ProgDelivID | NTG\* |
| Com-Default>2yrs | All other EEM with no evaluated NTGR; existing EEM with same delivery mechanism for more than 2 years | Com | Any | All | 0.6 |
| Ind-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Ind | Any | All | 0.6 |
| Agric-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Ag | Any | All | 0.6 |
| Res-Default>2 | All other EEM with no evaluated NTGR; existing EEM with same delivery mechanism for more than 2 years | Res | Any | All | 0.55 |

\*Denotes that the column is taken from the DEER NTG Table.

**Installation Rate**

The installation rate (IR) is identified in the calculation attachment. This value is obtained from the support table available in READi. Currently there is no versioning on the installation rate table. To address appropriate selection of the installation rate the date of the workpaper will serve as the last date checked for updated IR values. The installation rate varies by end use, sector, technology, application, and delivery method. The relevant IR values for this measure are shown in Table 5 below.

Table 5 Installation Rate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| GSIA\_ID\* | Description\* | Sector\* | BldgType\* | ProgDelivID | GSIAValue\* |
| Def-GSIA | Default GSIA values | Any | Any | Any | 1 |

**Spillage Rate**

Spillage rate will also be applied to measures however the values will not be tracked in the workpapers. The spillage rate will be tracked in an external table to be supplied to the Energy Division.

**READi Technology Fields**

To support the development of the ED ex ante tables, select fields from the ex-ante database will be identified in the workpaper. For a full set of values associated with the measures in the workpaper refer the Excel calculation template.

Table 6 READi Tech IDs

|  |  |
| --- | --- |
| READi Field Name | Values included in this workpaper |
| Measure Case UseCategory | HVAC |
| Measure Case UseSubCats | SpaceCool; HeatCool |
| Measure Case TechGroups | dxAC\_equip; dxHP\_equip |
| Measure Case TechTypes | pkgTerm |
| Base Case TechGroups | dxAC\_equip; dxHP\_equip |
| Base Case TechTypes | pkgTerm |

### 1.4.2 Codes and Standards Analysis

The following was taken from Table 110.2-E of the California 2013 Title 24 Regulations/Standards [355].

Table 7 Title 24 2013 Minimum Efficiencies for PTAC and PTHP



* If the capacity (Cap) is less than 7,000 Btu/hr, use 7,000 Btu/hr for the capacity.
* If the capacity is >15,000 Btu/hr, use 15,000 Btu/hr for the capacity.
* Replacement units must be factory labeled as follows: "MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY; NOT TO BE INSTALLED IN NEWLY CONSTRUCTED BUILDINGS." Replacement efficiencies apply only to units with existing sleeves less than 16 inches high or less than 42 inch wide and having a cross-sectional area less than 670 square inches.

Table 8 Code Summary

|  |  |  |
| --- | --- | --- |
| Code | Applicable Code Reference | Effective Dates |
| Title 24 (2013) | Table 110.2-E Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps – Minimum Efficiency Requirements | July 1, 2014 |

### 1.4.3 Non-DEER Study Review

### All references used in this work paper were from current or past DEER and T24.

### 1.4.4 Measure and Base Case Effective Useful Life

DEER14 update documentation provides EUL and RUL information to be used for the 2015 program cycle extension on [www.deeresources.com](http://www.deeresources.com). The DEER documentation “Summary of EUL-RUL Analysis for the April 2008 Update to DEER” provides the RUL value as a flat 1/3 of the EUL value. The RUL value will only be applied to the first baseline period for retrofit measures that have applicable code that will affect the energy savings. In all other installation types and retrofit with no applicable code that affects the energy savings, the RUL is not applicable to either the first or second baseline period.

To obtain the EUL value the DEER14 update documentation, EUL\_Summary\_10-1-08.xls [213], was consulted. Table 9 below identifies the value/methodology used for the measures in this work paper.

Table 9 DEER14 EUL Value/Methodology

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| READi EUL ID | Market | Enduse | Measure | EUL (Years) | RUL (Years) |
| HVAC-PTAC | Commercial | HVAC | Air Conditioners (split and unitary) | 15 | 5 |
| HVAC-PTHP | Commercial | HVAC | Heat Pumps (split and unitary) | 15 | 5 |
| HV-ResAC | Residential | HVAC | High Efficiency Air Conditioner (package and split systems) | 15 | 5 |
| HV-ResHP | Residential | HVAC | High Efficiency Heat Pump | 15 | 5 |

# Section 2. Energy Savings & Demand Reduction Calculations

DEER measures were used to calculate the energy savings and demand reduction for the measures in this work paper. The DEER 2014 database provided data on Packaged Terminal Air Conditioners and Heat Pumps for the following building types: Commercial, Lodging – Hotel, and Lodging - Motel. The savings for the Lodging - Motel building type were used for the Lodging - Motel building type as well as the Residential Multi-family (Common Area) and Single Family building type. The savings for Lodging - Hotel (Guest Rooms) was used for all other building types found in this work paper, including the Residential Multi-family (Dwelling Area) building type.

Table 10 DEER Building Type Used for Measure Savings

|  |  |
| --- | --- |
| **Work Paper**  **Building Type** | **DEER Building Type used for Measure Savings** |
| Agricultural | Lodging – Hotel |
| Health/Medical - Nursing Home | Lodging – Hotel |
| Health/Medical - Clinic | Lodging – Hotel |
| Lodging - Hotel | Lodging – Hotel |
| Lodging - Guest Rooms | Lodging – Hotel |
| Lodging - Motel | Lodging - Motel |
| Manufacturing - Bio/Tech | Lodging – Hotel |
| Manufacturing - Light Industrial | Lodging – Hotel |
| Industrial | Lodging – Hotel |
| Office - Large | Lodging – Hotel |
| Office - Small | Lodging – Hotel |
| Restaurant - Fast-Food | Lodging – Hotel |
| Retail - Small | Lodging – Hotel |
| Warehouse - Refrigerated | Lodging – Hotel |
| Residential Multi-family (Common) | Lodging - Motel |
| Residential Multi-family (Dwelling) | Lodging – Hotel |
| Residential Single Family | Lodging - Motel |

DEER provided data for the following unit capacity ranges for PTAC and PTHP units: <7 kBtuh,

7-15kBtuh, and >15kBtuh. These ranges were combined, via a weighted average, into one <=24kBtuh range for PTAC units and one <=24kBtuh range for PTHP units per the following table.

**Table 11 Weight Averaged Installation data for PTAC/PTHP units**

|  |  |
| --- | --- |
| **Unit Capacity Ranges** | **% of Units Installed** |
| PTAC/PTHP  <7kBtuh | 5% |
| PTAC/PTHP  7-15kBtuh | 90% |
| PTAC/PTHP  >15kBtuh | 5% |

A survey of PTAC and PTHP unit installations at various hotels/motels was obtained. In this survey, individual hotels provided a breakdown of PTAC and PTHP unit capacity sizes that were installed at their facility over a period of 15 years. This survey was the only information available during the drafting of this work paper and was used to obtain the rough distribution of unit sizes shown in Table 11 (which was used for the weighted average). The survey was not included in this work paper to maintain the confidentiality of the participants that were surveyed, but it is available from Southern California Edison upon request.

The following table shows sample energy and demand savings for this work paper.

**Table 12 Energy and Demand Savings**

| **Measure Name** | **Building Type** | **Climate Zone** | **Program Type (NEW, ROB, RET)** | **Annual Electricity Savings (kWh/ton)** | **kW Savings (kW/ton)** |
| --- | --- | --- | --- | --- | --- |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 1 | ROB | 219.20 | 0.1190 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 2 | ROB | 256.85 | 0.1590 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 3 | ROB | 261.20 | 0.1288 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 4 | ROB | 305.30 | 0.1582 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 5 | ROB | 290.83 | 0.1389 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 6 | ROB | 314.65 | 0.1097 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 7 | ROB | 378.45 | 0.1489 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 8 | ROB | 384.05 | 0.1687 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 9 | ROB | 370.50 | 0.1786 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 10 | ROB | 349.65 | 0.1781 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 11 | ROB | 292.90 | 0.1589 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 12 | ROB | 278.40 | 0.1583 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 13 | ROB | 362.55 | 0.1787 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 14 | ROB | 321.30 | 0.1589 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 15 | ROB | 513.00 | 0.1980 |
| High Efficiency Package Terminal Air Conditioner DX Equipment (<=24kBtu/h) | Lodging – Hotel | 16 | ROB | 219.40 | 0.1589 |

# Section 3. Load Shapes

The difference between the base case load shape and the measure load shape would be the most appropriate load shape; however, only end-use profiles are available. Therefore, the closest load shape chosen for these measures are shown below. See Table 13 for a list of all Building Types and Load Shapes. See the KEMA report [31] for a more thorough discussion regarding the load shapes for this measure.

Table 13 Building Types and Load Shapes

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Measure | | Building Type | | E3 Alt. Building Type | | Load Shape |
| AC-21823 <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner DX Equipment  AC-70989 <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Common Area) DX Equipment  AC-89607 <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Dwelling Area) DX Equipment  AC-88667 <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Res) DX Equipment | | Agricultural | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Health/Medical - Nursing Home | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Health/Medical - Clinic | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Lodging - Hotel | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Lodging - Guest Rooms | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Lodging - Motel | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Manufacturing - Bio/Tech | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Manufacturing - Light Industrial | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Industrial | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Office - Large | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Office - Small | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Restaurant - Fast-Food | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Retail - Small | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Warehouse - Refrigerated | | NON\_RES | | DEER:HVAC\_Split-Package\_AC |
| Residential Single Family | | RES | | DEER: HVAC\_Eff\_AC |
| Residential Multi-family | | RES | | DEER: HVAC\_Eff\_AC |
| AC-37854 <=24 kBtu/hr High Efficiency Package Terminal Heat Pump DX Equipment  AC-93045 <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Common Area) DX Equipment  AC-10964 <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Dwelling Area) DX Equipment  AC-84199 <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Res) DX Equipment | Agricultural | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Health/Medical - Nursing Home | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Health/Medical - Clinic | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Lodging - Hotel | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Lodging - Guest Rooms | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Lodging - Motel | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Manufacturing - Bio/Tech | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Manufacturing - Light Industrial | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Industrial | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Office - Large | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Office - Small | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Restaurant - Fast-Food | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Retail - Small | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Warehouse - Refrigerated | | NON\_RES | | DEER:HVAC\_Split-Package\_HP | |
| Residential Single Family | | RES | | DEER: HVAC\_Eff\_HP | |
| Residential Multi-family | | RES | | DEER: HVAC\_Eff\_HP | |

# Section 4. Base Case & Measure Costs

## 4.1 Base Case Cost

The base case costs were taken from DEER2008. The cost of a standard PTAC was obtained by averaging the base case costs of cost case IDs: PTAC-lt7kBtuh-11p01eer, PTAC-7to15kBtuh-10p16eer, PTAC-gt15kBtuh-09p31eer, and then applying the climate zone cost factor from table HVAC50. The cost of a standard PTHP was obtained by averaging the base case costs of cost case IDs: PTHP-lt7kBtuh-10p81eer-3p02cop, PTHP-7to15kBtuh-9p96eer-2p91cop, PTHP-gt15kBtuh-9p11eer-2p80cop, and then applying the climate zone cost factor from table HVAC50. These ranges were combined, via a weighted average, into one <=24kBtuh range for PTAC units and one <=24kBtuh range for PTHP units per table 11.

Table 14. Base Case Material Cost

|  |  |  |  |
| --- | --- | --- | --- |
| **Base Case** | **DEER Cost Case ID** | **Base Case -Code/Standard Material Cost** | **Weighted Average Base Case Cost** |
| Standard Package Terminal Air Conditioner DX Equipment | PTAC-lt7kBtuh-11p01eer | $1,258.00 | $1,048.80 |
| PTAC-7to15kBtuh-10p16eer | $1,061.00 |
| PTAC-gt15kBtuh-09p31eer | $620.00 |
| Standard Package Terminal Heat Pump DX Equipment | PTHP-lt7kBtuh-10p81eer-3p02cop | $1,272.00 | $1,092.70 |
| PTHP-7to15kBtuh-9p96eer-2p91cop | $1,104.00 |
| PTHP-gt15kBtuh-9p11eer-2p80cop | $710.00 |

## 4.2 Measure Case Cost

**Measure Case Cost**

The measure case costs were taken from DEER2008. The cost of a high efficiency PTAC was obtained by averaging the measure material costs of cost case IDs: PTAC-lt7kBtuh-13p21eer, PTAC-7to15kBtuh-12p19eer, PTAC-gt15kBtuh-10p28eer, and then applying the climate zone cost factor from table HVAC50. The cost of a high efficiency PTHP was obtained by averaging the measure material costs of cost case IDs: PTHP-lt7kBtuh-12p97eer-3p62cop, PTHP-7to15kBtuh-11p95eer-3p49cop, PTHP-gt15kBtuh-10p93eer-3p37cop, and then applying the climate zone cost factor from table HVAC50. These ranges were combined, via a weighted average, into one <=24kBtuh range for PTAC units and one <=24kBtuh range for PTHP units per table 11.

Table 15. Measure Material Cost

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Case** | **DEER Cost Case ID** | **Measure Material Cost** | **Weighted Average Measure Cost** |
| High Efficiency Package Terminal Air Conditioner DX Equipment | PTAC-lt7kBtuh-13p21eer | $1,342.00 | $1,099.75 |
| PTAC-7to15kBtuh-12p19eer | $1,105.00 |
| PTAC-gt15kBtuh-10p28eer | $763.00 |
| High Efficiency Package Terminal Heat Pump DX Equipment | PTHP-lt7kBtuh-12p97eer-3p62cop | $1,396.00 | $1,238.05 |
| PTHP-7to15kBtuh-11p95eer-3p49cop | $1,239.00 |
| PTHP-gt15kBtuh-10p93eer-3p37cop | $1,063.00 |

## 4.3 Gross and Incremental Measure Cost

### 4.3.1 Gross Measure Cost

For ROB measures, the gross measure cost is equal to the incremental costs taken from DEER2008. Incremental costs are described in Section 4.3.2.

### 4.3.2 Incremental Measure Cost

### Incremental Measure Cost (IMC) is the premium cost to install an energy efficient measure over a standard efficiency measure or code baseline measure. While IMC has a straight forward definition depending on the install type, the equation does vary. The incremental cost is only used to help determine program incentives and is not affected by the RUL and EUL-RUL periods and may differ from the cost used for reporting.

### In the case of ROB the IMC and GMC end up having the same equation and hence the same value.

### IMC = GMC

The incremental measure cost is the measure material cost minus the base material cost, as shown in the following table.

Table 16. Incremental Measure Cost

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Solution Code** | **Measure Name** | **Measure Case Cost** | **Base Case Cost** | **Incremental Measure Cost** |
| AC-21823 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner DX Equipment | $1,099.75 | $1,048.80 | $50.92 |
| AC-88667 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Res) DX Equipment |
| AC-70989 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Common Area) DX Equipment |
| AC-89607 | <=24 kBtu/hr High Efficiency Package Terminal Air Conditioner (Dwelling Area) DX Equipment |
| AC-37854 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump DX Equipment | $1,238.05 | $1,092.70 | $145.35 |
| AC-84199 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Res) DX Equipment |
| AC-93045 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Common Area) DX Equipment |
| AC-10964 | <=24 kBtu/hr High Efficiency Package Terminal Heat Pump (Dwelling Area) DX Equipment |

# Attachments

See accompanying files

# References

See accompanying files

[31]

[213]

[351]

[355]

[386]

# Appendix A – SCE/ED Application Types

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SCE Program Type | ED Application Type | 1st Baseline Savings | 2nd Baseline Savings | 1st Baseline Cost | 2nd Baseline Cost | 1st Baseline Life | 2nd Baseline Life |
| New | New Construction (Nc) | Above Code/Standard | N/A | Incremental Cost | N/A | EUL | 0 |
| Replace on Burnout (ROB) | Replace on Burnout (Rob)/Normal Replacement (NR) | Above Code/Standard | N/A | Incremental Cost | N/A | EUL | 0 |
| Retrofit (RET) | Early Replacement (ER) | Above Cust. Existing | Above Code/Standard | Full Cost | Incremental Cost | RUL | EUL-RUL |
| Retrofit – First Baseline Only (REF) | Early Replacement RUL (ErRul) | Above Cust. Existing | N/A | Full Cost | N/A | EUL | 0 |
| Retrofit Add-on (REA) | N/A | Above Cust. Existing | N/A | Full Cost | N/A | EUL | 0 |