Short Form Work Paper WPSDGENRHC0022

**Revision 2**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Non-Residential Refrigerant Charge Adjustment**

**January 1, 2019**

**SDG&E Non-Residential Refrigerant Charge Adjustment**

## Introduction

This short form workpaper documents the values adopted from PGE’s workpaper entitled “Refrigerant Charge Adjustment (RCA)” (PGE3PHVC160 Revision 3). SDG&E adopts all the values in PGE3PHVC160 Revision 3, with the following exceptions:

1. Measure Application Type was adjusted to BRO-RCx from Retro-Commissioning (RC) per E-4818.
2. In addition to the “Typical” measures adopted as part of PGE3PHVC160 Revision 3. SDG&E also adopted impacts from “High” and “Low” charge measures from READi 2.5.1 as listed in Measures table below.
3. SDG&E is in the process of simplifying its internal Ex Ante data and tracking data warehouse.   Part of that process requires that there be savings values for all potential climate zone and building type combinations. READi v2.5.1 did not include impacts for building types Gro, Mtl, SUn or WRf so the data tables include Gro, Mtl, SUn or WRf for all climate zones with zero savings. The following building types ECC, EUn, and Hsp were only missing location 15 climate zone so the ex-ante data adopted SCG energy efficiency impacts for climate zone 15.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 9/28/2011 | Janice Peterson | * Draft Workpaper |
| **1** | **10/8/2012** | **Charles Harmstead** | * Added SDGE Workpaper number |
| 2 | 12/26/18 | Keith Valenzuela (AESC) | * Updated workpaper name from “Non-Residential RTU Quality Maintenance” to “Non-Residential Refrigerant Charge Adjustment” and removed all measures with the exception of non-residential refrigerant charge adjustments * Adopted PGE3PHVC160 Revision 3 energy impact and cost values. * Adopted READI v.2.5.1 energy impacts for DEER 2019 updates in accordance with Energy Division Resolution E-4867 dated August 24, 2017 * Measure Application Type was adjusted to BRO-RCx from Retro-Commissioning (RC) per Resolution E-4952/E-4818. |

## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **1.1 Measure & Baseline Data** | Please reference PGE3PHVC160 Revision 3 Section 1.1 Measure Description & Background. |
| **1.2 Technical Description** | Please reference PGE3PHVC160 Revision 3 Section 1.2 Technical Description |
| Measures | Measures and Codes   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Measure Codes** | | | | **Measure Name** | | SCG | SDG&E | SCE | PG&E | | N/A | 465645  465646 | N/A | HV387 | Small Pkg AC system with No TXV, increase refrigerant charge from Typical under-charge (4 - 50%) to factory specified level  (NE-HVAC-RefChg-Inc-Typ-ntxv)  WPSDGENRHC0022-Rev02-Msr007 | | N/A | 465647  465648 | N/A | HV390 | Small Pkg AC system with TXV, increase refrigerant charge from Typical under-charge (4 - 50%) to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Inc-Typ-txv)  (WPSDGENRHC0022-Rev02-Msr008) | | N/A | 465649  465650 | N/A | HV388 | Small Pkg AC system with No TXV, decrease refrigerant charge from Typical over-charge (4 - 50%) to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Dec-Typ-ntxv)  (WPSDGENRHC0022-Rev02-Msr001) | | N/A | 465651  465652 | N/A | HV389 | Small Pkg AC system with TXV, decrease refrigerant charge from Typical over-charge (4 - 50%) to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Dec-Typ-txv)  (WPSDGENRHC0022-Rev02-Msr002) | | N/A | 465653  465654 | N/A | N/A | Small Pkg AC no TXV (undercharged between 10% and 50%), adjust refrigerant charge to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Inc-High-ntxv)  (WPSDGENRHC0022-Rev02-Msr003) | | N/A | 465655  465656 | N/A | N/A | Small Pkg AC w/ TXV (undercharged between 10% and 50%), adjust refrigerant charge to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Inc-High-txv)  (WPSDGENRHC0022-Rev02-Msr004) | | N/A | 465657  465658 | N/A | N/A | Small Pkg AC no TXV (undercharged between 4% and 5%), adjust refrigerant charge to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Inc-Low-ntxv)  (WPSDGENRHC0022-Rev02-Msr005) | | N/A | 465659  465660 | N/A | N/A | Small Pkg AC w/ TXV (undercharged between 4% and 5%), adjust refrigerant charge to factory specified level  (DEER MsrID: NE-HVAC-RefChg-Inc-Low-txv)  (WPSDGENRHC0022-Rev02-Msr006) |   Note: SDG&E has two measure codes per measure to account for each available delivery type (Direct Install and Downstream Incentive) |
| Code for All Measures | Please reference PGE3PHVC160 Revision 3 Section 1.4.2 Codes and Standards Analysis |
| Requirements | Please reference PGE3PHVC160 Revision 3 Section 1.1 Measure Description & Background.  Note: Contractor must be SDG&E approved. |
| **1.3 Installation Type and Delivery Mechanisms** | |
| Installation Type | BRO-RCx |
| Delivery Mechanisms | Please reference PGE3PHVC160 Revision 3 Section 1.3 Installation Type and Delivery Mechanisms and SDG&E Ex-ante database table submission. |
| **1.4 DEER Data** | |
| Net-to-Gross Ratio | Please reference PGE3PHVC160 Revision 3 Section 1.4.1 DEER Data and SDG&E Ex-ante submission. |
| Effective and Remaining Useful Life | Please reference PGE3PHVC160 Revision 3 Section 1.4.1 DEER Data and SDG&E Ex-ante submission. |
| GSIA | Please reference PGE3PHVC160 Revision 3 Section 1.4.1 DEER Data and SDG&E Ex-ante submission. |
| **Section 2. Calculation Methodology** | |
| Energy Savings/Peak Demand Reduction – All Measures | Please reference PGE3PHVC160 Revision 3 Section 2 Calculation Methodology, DEER READI v2.5.1 and SDG&E Ex-ante database table submission, and as stated herein by reference in the Measures Section table on page 4. |
| **Section 3. Load Shapes** | |
| Load Shape | Please reference PGE3PHVC160 Revision 3 Section 3 Load Shapes  E3 Electric Impact Profile = “SDG:DEER:Com:HVAC\_Split-Package\_AC” |
| **Section 4. Cost** | |
| **Section 4.1 Base and Measure Costs** | |
| Base Cost | Please reference PGE3PHVC160 Revision 3 Section 4.1 Base Case Cost for details on how baseline cost estimates were determined.  SDG&E adopts all cost and created SDG&E measure cost IDs for reporting purposes. SDG&E measure cost IDs are included in Ex-Ante tables submission.  Base Cost ID = BaseCostZero = $0.00 |
| Measure Cost | Please reference PGE3PHVC160 Revision 3 Section 4.2 Measure Case Cost for details on how measure cost estimates were determined.  SDG&E adopts all cost and created SDG&E measure cost IDs for reporting purposes. SDG&E measure cost IDs are included in Ex-Ante tables submission. Units = “Cap-Tons”.  Measure Cost ID = SDG-RCAadjCom = $47.49/Unit  IMC = $47.49/Unit |