Short Form Work Paper WPSDGENRRN0010

**Revision 3**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Commercial Reach-In Refrigerators and Freezers**

**December 28, 2016**

# SDG&E Commercial Reach-in Refrigerators and Freezers

## Introduction

This short form workpaper documents (WP) the values adopted from SCE’s WP entitled “Commercial Reach-in Refrigerators and Freezers” (SCE13CC001.3 Commercial Reach-In Refrigerators and Freezers\_Final.docx). SDG&E adopts all of the values in SCE13CC001Rev 3 –Commercial Reach-In Refrigerators and Freezers, with no exceptions.

## Document Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 07/01/2012 | SDG&E | Original Workpaper. |
| 1.0 | 10/11/2013 | Charles Harmstead (SDG&E) | Adopted SCE 13CC001, Revision 0 workpaper dated April 6, 2012 |
| 2.0 | 01/08/2015 | Kyle Dunn (MWE2) | -Adopted SCE Workpaper SCE13CC001 Rev 2 Commercial Reach-In Refrigerators and Freezers, updated June 23, 2014  - Added GSIA  - Updated load shapes  - Updated building types |
| 2.1 | 05/29/2015 | Kyle Dunn (MWE2) | Added additional data to Section 4, Measure Costs |
| 3.0 | 1/28/2016 | Eduardo Reynoso  (SDG&E) | * Converted SDG&E legacy workpaper “WPSDGENRRN0010 Rev 2- Commercial Reach-in Refrigerated and Freezers” to short form workpaper. * Adopted lead IOU workpaper from SCE “SCE13CC001.3 Commercial Reach-in Refrigerators and Freezers\_Final.docx” dated January 26, 2016. |

## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts for SCE’s “Commercial Reach-In Refrigerators and Freezers”. The base energy consumption and measure energy consumption values are from SCE’s workpaper, SCE13CC001, Revision 3. |
| **1.1 Measure & Baseline Data** | Measures:   |  |  |  | | --- | --- | --- | | SDG&E Product Codes | SCE Product Code | Description | | 402170 | FS-13121 | Food Service - Solid-Door Reach In Refrigerator <15' | | 402172 | FS-42962 | Food Service - Solid-Door Reach In Refrigerator 15-29' | | 402173 | FS-93044 | Food Service - Solid-Door Reach In Refrigerator 30-49' | | 402171 | FS-31425 | Food Service - Solid-Door Reach In Refrigerator >50' | | 402166 | FS-21276 | Food Service - Solid-Door Reach In Freezer <15' | | 402168 | FS-61432 | Food Service - Solid-Door Reach In Freezer 15-29' | | 402169 | FS-86848 | Food Service - Solid-Door Reach In Freezer 30-49' | | 402167 | FS-54809 | Food Service - Solid-Door Reach In Freezer >50' | | 402162 | FS-77373 | Food Service - Glass-Door Reach In Refrigerator <15' | | 402164 | FS-28291 | Food Service - Glass-Door Reach In Refrigerator 15-29' | | 402165 | FS-68882 | Food Service - Glass-Door Reach In Refrigerator 30-49' | | 402163 | FS-44686 | Food Service - Glass-Door Reach In Refrigerator >50' | | 402158 | FS-16170 | Food Service - Glass-Door Reach In Freezer <15' | | 402160 | FS-38598 | Food Service - Glass-Door Reach In Freezer 15-29' | | 402161 | FS-58112 | Food Service - Glass-Door Reach In Freezer 30-49' | | 402159 | FS-30794 | Food Service - Glass-Door Reach In Freezer >50' | |
| **1.2 Technical Description** |  |
| Measures | See Requirements |
| Code for All Measures | As cited per SCE workpaper  The 2013 Title 24 [355] code does not apply in this case because solid door reach-in refrigerators, solid door reach-in freezers, glass door reach-in refrigerators, and glass door reach-in freezers do not fall under the CEC Title 24, Building Energy Efficiency Standards or the Department of Energy (DOE) energy regulations.  The 2014 Title 20 [422] code does not apply to the measures within this work paper. As such, Federal Code, 10 CFR 431.66, would cover these measures. |
| Requirements | ***Terms and Conditions***   * Units with remote refrigeration systems do not qualify. * Used or rebuilt equipment is not eligible. * Each installed equipment must meet minimum prescriptive criteria to qualify for a per unit rebate. * This measure is only applicable to Non-residential building types. * Measure Case - Energy Star® Version 2.0 Requirements for Reach-In Refrigerators and Freezers per stated table below:  |  |  | | --- | --- | | **Equipment Description**  **(cubic feet)** | **Daily Energy Usage (kWh/day)** | | **Solid-Door Reach-In Refrigerator** |  | | 0 < V < 15 | ≤ 0.089V + 1.411\* | | 15 ≤ V < 30 | ≤ 0.037V + 2.200 | | 30 ≤ V < 50 | ≤ 0.056V + 1.635 | | 50 ≤ V | ≤ 0.060V + 1.416 | | **Solid-Door Reach-In Freezer** |  | | 0 < V < 15 | ≤ 0.250V + 1.250 | | 15 ≤ V < 30 | ≤ 0.400V – 1.000 | | 30 ≤ V < 50 | ≤ 0.163V + 6.125 | | 50 ≤ V | ≤ 0.158V + 6.333 | | **Glass-Door Reach-In Refrigerator** |  | | 0 < V < 15 | ≤ 0.118V + 1.382 | | 15 ≤ V < 30 | ≤ 0.140V + 1.050 | | 30 ≤ V < 50 | ≤ 0.088V + 2.625 | | 50 ≤ V | ≤ 0.110V + 1.500 | | **Glass-Door Reach-In Freezer** |  | | 0 < V < 15 | ≤ 0.607V + 0.893 | | 15 ≤ V < 30 | ≤ 0.733V - 1.000 | | 30 ≤ V < 50 | ≤ 0.250V + 13.500 | | 50 ≤ V | ≤ 0.450V + 3.500 | |  | | |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | Replace on Burnout (ROB) |
| Delivery Mechanisms | Downstream Rebate – Deemed  NOTE: If measures are offered in the SDG&E Direct Install program yet require customer co-pay, then measures are treated as downstream deemed. |
| **1.4.1 DEER Data** |  |
| Net-to-Gross Ratio | Com-Default>2yrs |
| Effective and Remaining Useful Life | |  |  |  |  | | --- | --- | --- | --- | | EUL ID | Description | Sector | UseCategory | | Cook-SDRef | Commercial Reach-In Refrigerator / Freezer | Com | ComRefrig | | Cook-SDFreez | Commercial Reach-In Refrigerator / Freezer | Com | ComRefrig | |  | | | | |
| **Section 2. Calculation Methodology** | DEER 2016 |
| Energy Savings/Peak Demand Reduction – All Measures | **As cited in SCE’s workpaper the Savings are:**   |  |  |  |  | | --- | --- | --- | --- | | SCE Product Code | SDG&E Product Cod | KWh/yr Savings | KW/yr  Savings | | 402170 | FS-13121 | 270 | 0.028 | | 402172 | FS-42962 | 493 | 0.051 | | 402173 | FS-93044 | 854 | 0.088 | | 402171 | FS-31425 | 1279 | 0.131 | | 402166 | FS-21276 | 595 | 0.061 | | 402168 | FS-61432 | 869 | 0.089 | | 402169 | FS-86848 | 2074 | 0.213 | | 402167 | FS-54809 | 4552 | 0.468 | | 402162 | FS-77373 | 723 | 0.074 | | 402164 | FS-28291 | 661 | 0.068 | | 402165 | FS-68882 | 775 | 0.079 | | 402163 | FS-44686 | 934 | 0.096 | | 402158 | FS-16170 | 1693 | 0.174 | | 402160 | FS-38598 | 2010 | 0.207 | | 402161 | FS-58112 | 4599 | 0.473 | | 402159 | FS-30794 | 8103 | 0.833 | |
| **Section 3. Load Shapes** | SDGE:01-ALC-AllCommercial-Refrig |
| **Section 4. Costs** | The Gross Measure Cost is obtained from costs documented by SCE work paper “SCE13CC001.3 Commercial Reach-In Refrigerators and Freezers\_Final.docx” section 4- Cost. |
| **Section 4.1 Base and Measure Costs** |  |
| Base Cost | As cited per SCE workpaper |
| 402170 | $ 1,284.00 |
| 402172 | $ 2,883.15 |
| 402173 | $ 3,802.03 |
| 402171 | $ 4,526.32 |
| 402166 | $ 773.84 |
| 402168 | $ 3,467.04 |
| 402169 | $ 5,151.16 |
| 402167 | $ 7,469.68 |
| 402162 | $ 1,270.00 |
| 402164 | $ 3,340.20 |
| 402165 | $ 4,788.00 |
| 402163 | $ 6,915.84 |
| 402158 | $ 1,281.20 |
| 402160 | $ 5,212.19 |
| 402161 | $ 7,401.52 |
| 402159 | $ 10,304.40 |
| Measure Cost |  |
| 402170 | $ 2,376.00 |
| 402172 | $ 4,293.88 |
| 402173 | $ 5,770.73 |
| 402171 | $ 7,249.60 |
| 402166 | $ 1,031.44 |
| 402168 | $ 4,830.22 |
| 402169 | $ 6,707.87 |
| 402167 | $ 9,437.71 |
| 402162 | $ 1,373.60 |
| 402164 | $ 4,204.00 |
| 402165 | $ 5,864.11 |
| 402163 | $ 8,464.80 |
| 402158 | $ 1,306.68 |
| 402160 | $ 5,336.22 |
| 402161 | $ 7,615.72 |
| 402159 | $ 11,203.70 |