Short Form Work Paper WPSDGENRCC0006

**Revision 4**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Commercial Convection Oven- Electric and Gas**

**December 28, 2016**

# SDG&E Commercial Oven-Electric and Gas

## Introduction

This short form workpaper documents (WP) the values adopted from PGE’s WP entitled “Commercial Convection Oven – Electric and Gas” (PGECOFST101 R6 Convection Ovens 032516)). SDG&E adopts all of the values in PGECOFST109 R6 Convection Oven, with no execeptions.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 12/12/2007 | David Zabrowski / Fisher-Nickel, Inc. | Original work paper: Commercial Convection Oven PGECOFST101 R0.doc |
| 1 | 07/17/2010 | Lucie Sidibe/SDG&E | Adopted from PGECOFST101, Revision 2\*refer to attachment for original work paper  Summary of changes:  1-Work Paper run ID was changed to mirror SDGE cataloging needs.  2.Measure code was updated to meet SDGE Program needs |
| 2 | 06/15/2012 | Max Twogood/SDG&E | Revised from Commercial Convection Ovens PGECOFST101 R4 -Revised June 7 2012.doc dated June 7, 2012. |
| 3 | 06/23/2014 | Judelson Enriquez/ RMS Energy Consulting, LLC | 1. Updated to new template.  2. Generated calculation spreadsheet based on IOU statewide Calculation Template, with additional columns for Mark M. and removed CZ cost factors.  3. Incorporated PG&E’s PGECOFST101 R5Commercial Convection Ovens.doc WP revisions, dated April 21, 2014.  4. Savings values were revised, as well as cost for large full-size conv. oven. |
| 4 | 12/28/16 | Kelvin Valenzuela/SDG&E | Adoption from PGE’s PGECOFST101 R6 Convection Ovens 032516.docx for Ex-Ante impacts and cost-effectiveness values. |

## Measure Summary

Table : Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts and cost-effectiveness values for Commercial Full-Size Convection Ovens. The base energy consumption and measure energy consumption values are from PG&E’s workpaper, PGECOFST101, Revision 6. |
| **1.1 Measure & Baseline Data** | Measure:  402026 - Food Service - Convection Oven-Electric  402027 - Food Service - Convection Oven-Gas |
| **1.2 Technical Description** |  |
| Measures | See Requirements |
| Code for All Measures | **California Title 20**  California Title 20 Appliance Efficiency Standards does require reporting the convection oven idle energy rate per ASTM F1496 for the CEC Appliance Database, but the standard contains no minimum performance requirement.[[1]](#endnote-1)  **California Title 24**  There are no State of California Title 24 Efficiency Regulation requirements for commercial convection ovens.  **Federal**  There are no Federal energy efficiency requirements for commercial convection ovens.  **American Society for Testing and Materials (ASTM) Standards**  ASTM Standards: ASTM Standard Test Method for thePerformance of Convection ovens (F1496) is applicable for estimating energy use and cooking performance. It was used to estimate the energy consumption of the base case and measure equipment. |
| Requirements | **Convection Oven - Electric**  The half-size electric oven must meet ENERGY STAR® specifications or have a tested heavy load potato cooking energy efficiency ≥ 71% and idle rate ≤ 1.0 kW utilizing ASTM Standard F1496.[[2]](#endnote-2)  The full-size (≤ 5 pans) electric oven must meet ENERGY STAR® specifications or have a tested heavy load potato cooking energy efficiency ≥ 71% and idle rate ≤ 1.6 kW utilizing ASTM Standard F1496.  The large full-size (> 5 pans) electric oven must have a tested heavy load potato cooking energy efficiency ≥ 73% and idle rate ≤ 1.9 kW utilizing ASTM Standard F1496.  **Convection Oven – Gas**  The half-size gas oven must have a tested heavy load potato cooking energy efficiency ≥ 46% and idle rate ≤ 8,000 Btu/h utilizing ASTM Standard F1496.  The full-size (≤ 5 pans) gas oven must meet ENERGY STAR® specifications or have a tested heavy load cooking energy efficiency ≥ 46% and idle rate ≤ 12,000 Btu/h utilizing ASTM Standard F1496.  The large full-size (> 5 pans) gas oven must have a tested heavy load potato cooking energy efficiency ≥ 46% and idle rate ≤ 13,000 Btu/h utilizing ASTM Standard F1496. |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | Replace on Burn-out (ROB) |
| Delivery Mechanisms | Downstream Rebate – Deemed  NOTE: Measures are offered in the SDG&E Direct Install program yet require a customer co-pay and are treated as downstream deemed. |
| **1.4.1 DEER Data** |  |
| Net-to-Gross Ratio | Com-Default>2yrs |
| Effective and Remaining Useful Life | Cook-ElecConvOven  Cook-GasConvOven |
| **Section 2. Calculation Methodology** | DEER 2016 |
| Energy Savings/Peak Demand Reduction – All Measures | **Convection Oven - Electric (PG&E: F187) (SDG&E: 402026)**  ***Full - Size***  Base Case Energy Consumption: Source: PG&E Calculations – 12,193 kWh/yr; 2.8 kW  Measure Energy Consumption: Source: PG&E Calculations – 9,406 kWh/yr; 2.1 kW  Energy Savings (Base Case – Measure): Source: PG&E Calculations – 2,787 x 0.70 = 1,951 kWh/yr; 0.7 x 0.90 (CDF) x 0.70 = 0.441 kW  **Convection Oven - Gas (PG&E: F188) (SDG&E: 402027)**  ***Full - Size***  Base Case Energy Consumption: Source: PG&E Calculations – 1,052 therms/yr  Measure Energy Consumption: Source: PG&E Calculations – 695 therms/yr  Energy Savings (Base Case – Measure): Source: PG&E Calculations – 357 x 0.70 = 250 therms/yr |
| **Section 3. Load Shapes** | SDG:35-OTI-OtherIndustrial-PROC\_OTH  Annual |
| **Section 4. Costs** |  |
| **Section 4.1 Base and Measure Costs** |  |
| Base Cost |  |
| 402026 – Full-Size | $4,108 (PG&E F187) |
| 402027 – Full-Size | $4,349 (PG&E F188) |
| Measure Cost |  |
| 402026 – Full-Size | $5,115 (PG&E F187) |
| 402027 – Full-Size | $5,635 (PG&E F188) |

1. 2005 California Energy Commission (CEC) Title 20 Appliance Efficiency Regulations, CEC 400-2005-012, p. 69. [↑](#endnote-ref-1)
2. American Society for Testing and Materials. *Standard Test Method for the Performance of Convection Ovens*. ASTM Designation F1496, in Annual Book of ASTM Standards, West Conshohocken, PA. [↑](#endnote-ref-2)