Short Form Work Paper WPSDGENRCC0015

**Revision 1**

**San Diego Gas & Electric**

**Energy Efficiency Engineering**

**Commercial Conveyor Oven Gas**

**Measure Codes:**

**402031**

**March 12, 2018**

# SDG&E Commercial Conveyor Oven-Gas

## Introduction

This short form workpaper documents (WP) the values adopted from PGE’s WP entitled “Commercial Conveyor Oven - Gas” (PGECOFST117 R5 Commercial Conveyor Ovens-Gas\_20150313.docx). SDG&E adopts all of the values in PGECOFST117 R5 Commercial Conveyor Oven-Gas, with no exceptions.

## Document Revision History

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| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 6/15/2012 | Max Twogood, SDG&E | Adopted from: Commercial Conveyor Oven - Gas PGECOFST117 R3-Revised May 14 2012.doc dated May 14, 2012. Revised NTGR to 2011 DEER. Revised approvers to SDGE management. |
| 1 | **03/12/2018** | **Eduardo Reynoso, SDG&E** | **The changes are as follows:**   * **Updated workpaper format to short form workpaper.** * **Retired SDG&E legacy Implementation ID** 402030, Gas Conveyor oven-Small (≤ 25-in. total conveyor width). * **SDGE legacy implementation 402031 for large conveyor oven-gas (over 25” wide) is adopted from PGE measure-F208 as stated in 2015 workpaper PGECOFST117 Revision 5.** |
|  |  |  |  |

## At-a-Glance Summary

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| --- | --- | --- | --- | --- |
| **Measure ID** | **Implementation ID** | **Conveyor Oven Type** | **Savings (therms)** | **IMC** |
| Measure 2 | 402031 | Gas Conveyor Oven-Large  (> 25-in. total conveyor width) | 884 | $2230 |

## Measure Summary

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents ex-ante load impacts and cost-effectiveness values for Commercial Conveyor Oven-Gas. The base energy consumption and measure energy consumption values are from PG&E’s workpaper, PGECOFST117, Revision 5 for large conveyor ovens.  **Market Applicability**  This measure is applicable to any commercial cooking application, including (but not limited to) casual dining and quick service restaurants, hotels, motels, schools, colleges and recreational facilities. |
| **1.1 Measure & Baseline Data** | Measures    Measure 1: 402030 - (retired)  Measure 2: 402031 - Conveyor Oven lg >25" total conveyor width with 42% minimum cooking efficiency |
| **1.2 Technical Description** |  |
| Measures  Measure 1(Retired):  Measure2: | **Energy Efficiency Requirements for Commercial Gas Conveyor Ovens.**   |  |  |  |  | | --- | --- | --- | --- | | **Measure Code** | **Conveyor Oven Type** | **Cooking-Energy Efficiency a** | **Idle Energy Rate b** | | 402031 | Gas Conveyor Oven-Large  (> 25-in. total conveyor width) | ≥ 42% | ≤ 57,000 Btu/h | | a Based on the heavy-load test in ASTM F1817.  b Based on the idle energy rate test in ASTM F1817. | | | | |
| Code for All Measures | As cited per PGE workpaper PGECOFST117.  These measures are not governed by either state or federal codes and standards.  ASTM Standard Test Method for thePerformance of Conveyor Ovens (F1817) 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 | Refer to Measures information located herein above and  must be listed in the California Energy Commission database or listed on [www.fishnick.com/saveenergy/rebates](http://www.fishnick.com/saveenergy/rebates). |
| **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-ElecCombOven  Cook-GasCombOVen |
| **Section 2. Calculation Methodology** | DEER 2016 |
| Energy Savings/Peak Demand Reduction – All Measures | **. Commercial Gas Conveyor Oven-Large Cost Effectiveness Example.**   |  |  |  | | --- | --- | --- | | **Performance** | **Baseline Model** | **Energy Efficient Model** | | **Preheat Time (min)** | **15** | **15** | | **Preheat Energy (Btu)** | **35,000** | **18,000** | | **Idle Energy Rate (Btu/h)** | **70,000** | **57,000** | | **Heavy Load Cooking Energy Efficiency (%)** | **20%** | **42%** | | **Production Capacity (pizzas/hr)** | **150** | **220** | | **Operating Hours/Day a** | **12** | **12** | | **Operating Days/Year** | **365** | **365** | | **Number of Preheats per Day** | **1** | **1** | | **Pizzas Cooked per Day** | **250** | **250** | | **Gas Cost ($/therm)** | **$1.00** | **$1.00** | | **ASTM Energy to Food (Btu/pizza)** | **190** | **190** | | **Daily Energy Consumption (Btu)** | **978,333** | **736,073** | | **Annual Energy Consumption (therms) b** | **3,571** | **2,687** | | **Estimated Energy Savings (therms/yr)** | **-** | **884** | | **Annual Energy Cost ($)** | **$3,571** | **$2,687** | | **Estimated Cost Savings ($/yr)** | **-** | **$884** | | **Incremental Measure Cost c** | **-** | **SEE APPENDIX A** | | **Estimated Useful Life (EUL) d** | **12 years** | **12 years** | |
| **Section 3. Load Shapes** | SDG:35-OTI-OtherIndustrial-PROC\_OTH  WinterOnly |
| **Section 4. Costs** |  |
| **Section 4.1 Base and Measure Costs** |  |
| Base Cost  Measure 2: | |  |  |  | | --- | --- | --- | | ImplementationID | StdCostID | StdCost Value | | 402031 | FoodServ-Gas-CookConvOvn-gt25in-20p0 | $10,177.00 | |
| Measure Cost  Measure 2: | |  |  |  | | --- | --- | --- | | ImplementationID | MeasCostID | StdCost Value | | 402031 | FoodServ-Gas-CookConvOvn-gt25in-42p0 | $12,407.00 | |
| Incremental Cost  Measure 2: | |  |  |  | | --- | --- | --- | | ImplementationID | Measure Description | IMC | | 402031 | Conveyor Oven sm <=25" total conveyor width with 42% minimum cooking efficiency | $2,230.00 | |

1. Supplemental Cost Information
   * PGE workpaper PGECOFST117 Revision 3 for small conveyor oven -gas

**Equipment Cost Data for Gas Conveyor Ovens**

|  |  |  |  |
| --- | --- | --- | --- |
| **Make Energy Efficient** | **Model** | **Size** | **Cost($)\*** |
| Lincoln | 1116 | Small | 13,852 |
| Blodgett | MT1828G | Small | 16,700 |
| **Average List Price of Energy Efficient Small Conveyor Oven** | | | **$15,276** |
| **Average Estimated Purchase Price of Energy Efficient Gas Small Conveyor Oven\*\*** | | | **$9,166** |
|  |  |  |  |
| **Make Energy Baseline** | **Model** | **Size** | **Cost($)\*** |
| Star | UM1854 | Small | 11,296 |
| Zesto | 3018SGL | Small | 13,420 |
| **Average List Price of Baseline Model Small Conveyor Oven** | | | **$12,358** |
| **Average Estimated Purchase of Baseline Model Small Conveyor Oven\*\*** | | | **$7,415** |
|  | | |  |
| **Small Conveyor Oven List Price Average Incremental Cost Difference** | | | **$2,918** |
| **Small Conveyor Oven Estimated Purchase Price Average Incremental Cost Difference\*\*** | | | **$1,751** |
| \*Costs taken from 2006 published manufacturer list prices | | | |
| \*\*Estimated purchase price based on a typical 40% discount from the published list prices | | | |

* + PGE workpaper PGECOFST117 Revision 3 for large conveyor oven -gas
* **Equipment Cost Data for Gas Conveyor Ovens**

| **Group** | **Model** | **List Price ($)** | **Cost($)\*** |
| --- | --- | --- | --- |
| baseline | X1 | $26,219 | $13,110 |
| Baseline | X2 | $17,,738 | $8,869 |
| Baseline | X3 | $31,004 | $15,502 |
| Baseline | X4 | $6,842 | $3,421 |
| Baseline | X6 | $15,564 | $7,782 |
| Baseline | X8 | $14,282 | $7,141 |
| Baseline | X9 | $16,234 | $8,117 |
| Baseline | X10 | $18,086 | $9,043 |
| Baseline | X11 | $22,680 | $11,340 |
| Baseline | X12 | $34,896 | $17,448 |
| Energy Efficient | X13 | $32,773 | $16,387 |
| Energy Efficient | X14 | $34,917 | $17,459 |
| Energy Efficient | X17 | $50,000 | $25,000\* |
| Energy Efficient | X20 | $11,924 | $5,962 |
| Energy Efficient | X21 | $14,339 | $7,170 |
| Energy Efficient | X22 | $13,116 | $6,558 |
| Energy Efficient | X23 | $16,633 | $8,317 |

* \*Taken from industry survey
* **Equipment Incremental Cost Data for Energy Efficient Gas Conveyor Ovens\***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Baseline Unit Price** | **Energy Efficient Unit Price** | **Incremental Price Difference** | **Baseline Unit Cost** | **Energy Efficient Unit Cost** | **Incremental Measure Cost (IMC)** |
| Gas Conveyor Oven | $ 20,354 | $24,815 | $ 4,460 | $ 10,177 | $ 12,407 | $ 2,230 |

* \*Estimated purchase price and Incremental Measure Cost (IMC) were based on an industry-standard 50% discount off the manufacturer’s list price