# Short Form Work Paper PGECOFST129 R1

**Pacific Gas & Electric**

**Customer Energy Solutions**

**Commercial Conveyor Broiler**

# PG&E Commercial CONVEYOR BROILERS

## Introduction

This short form workpaper documents (WP) the values adopted from SCG’s WP entitled “Commercial Conveyor Broilers” (WPSCGNRCC171226A Rev 1 WPSCGNRCC171226A-Rev01\_Commercial Conveyor Broiler.docx). PG&E adopts all of the values in WPSCGNRCC171226A Rev 1 Commercial Conveyor Broilers, with some exceptions.

## Document Revision History

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| --- | --- | --- | --- |
| Rev | Date | Author | Summary of Changes |
| 0 | 06/04/2018 | Steve Fok (PG&E) | Adopted SCG Workpaper WPSCGNRCC171226A Rev 0 dated December 28, 2017 (authored by Denis Livchak and created by Frontier Energy) with minor changes. |
| 1 | 12/24/2018 | Henry Liu (PG&E) | Adopted SCG Workpaper WPSCGNRCC171226A Rev 1 dated October 5, 2018 (authored by Carlos Pineda (SCG)) |
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## Measure Summary

Table 1: Measure Summary Table

| **Section** | **Value** |
| --- | --- |
| **Summary & Purpose** | This short form workpaper documents details for the replacement of typical conveyor boilers operating at a constant input rate by advanced energy efficient control technology. The base energy consumption and measure energy consumption values are from SCG’s workpaper, WPSCGNRCC171226A, Revision 1. |
| **1.1 Measure & Baseline Data** | Measures:   |  |  |  |  | | --- | --- | --- | --- | | PG&E Measure Codes | SCG  Measure Codes | PG&E Description | SCG Description | | FS023 | 540631 | Energy Efficient Commercial Conveyor Broilers <22 inch wide conveyor | Automatic Conveyor Broilers Belt Width <20” | | FS024 | 540632 | Energy Efficient Commercial Conveyor Broilers 22-28 inch wide conveyor | Automatic Conveyor Broilers Belt Width 20-26” | | FS025 | 540633 | Energy Efficient Commercial Conveyor Broilers >28 inch wide conveyor | Automatic Conveyor Broilers Belt Width >26” |  * Note: PG&E measure descriptions are different from SCG measure descriptions, but the measures are the same. PG&E descriptions are defined in terms of conveyor **cavity** width while SCG descriptions are defined in terms of conveyor **belt** width. The belt width is approximately 2 inches narrower than the cavity width. There is a single qualified products list for PG&E and SCG, program eligibility is consistent statewide. |
| **1.2 Technical Description** |  |
| Measures | See Requirements |
| Code for All Measures | As cited per SCG workpaper  -These measures do not fall under Title 24 of the California Energy Regulations.  - The Title 20 Appliance Efficiency Regulations have a category for cooking appliances, but commercial conveyor broilers are not included.  - There are no Federal energy efficiency requirements for commercial conveyor broilers.  - Air Quality Management District Rule 1138: Devices Cooking >1250lb of beef per week shall be operated with pollution control equipment which reduces PM2.5 emissions by at least 85% starting July 1, 2013. This PM reduction can be achieved through ventilation systems including HEPA filters, Wet Scrubbers, Electrostatic Precipitators or Ultraviolet Filtration. PM reduction in enclosed cavity broilers such as automatic conveyor broilers can be achieved with a catalyst. |
| Requirements | ***Terms and Conditions***   * **Eligibility requirements (Measure)**: Replacement automatic conveyor broiler must have a catalyst and an input rate less than 80 kBtu/h or a dual stage or modulating gas valve with a capability of throttling the input rate below 80 kBtu/h. * **Eligibility requirements (Baseline)**: Baseline broiler must be an automatic conveyor broiler capable of maintaining a temperature above 600°F with a tested idle rate greater than:   + 40kBtu/h for a belt narrower than 20”   + 60kBtu/h for a belt between 20 and 26”   + 70kBtu/h for a belt wider than 26” * Conveyor broiler must be replaced by a conveyor broiler similar in size or smaller. * **Implementation and installation requirements**: Installation shall comply with all policies, codes and regulations within the installation territory. |
| **1.3 Installation Type and Delivery Mechanisms** |  |
| Installation Type | ROBNC (ROB or NC) |
| Delivery Mechanisms | Downstream Rebate – Deemed |
| **1.4.1 DEER Data** |  |
| Net-to-Gross Ratio | All-Default <=2yrs 0.7 |
| Effective and Remaining Useful Life | |  |  |  |  |  | | --- | --- | --- | --- | --- | | EUL ID | Description | Sector | UseCategory | EUL ( years) | | Cook-GasConvOven\* | Automatic Conveyor Broilers | Com | FoodService | 12 | | \*Note: Cook-ConvBroiler is the EUL\_ID used by SCG and proposed to include in the DEER but not available in DEER at the time of preparing this short form. Hence using Cook-GasConvOven in the interim. | | | |  | |
| **Section 2. Calculation Methodology** | DEER 2016 |
| Energy Savings/Peak Demand Reduction – All Measures | **As cited in SCG’s workpaper the Savings are:**   |  |  |  |  | | --- | --- | --- | --- | | Measure Codes | FS023 | FS024 | FS025 | | Measure Description | Energy Efficient Commercial Conveyor Broilers <22” wide conveyor | Energy Efficient Commercial Conveyor Broilers 22-28” wide conveyor | Energy Efficient Commercial Conveyor Broilers >28” wide conveyor | | Base Case Description | Standard Commercial Conveyor Broiler of similar size or larger | Standard Commercial Conveyor Broiler of similar size or larger | Standard Commercial Conveyor Broiler of similar size or larger | | Units | Broilers | Broilers | Broilers | | Energy Savings | 1.48 kW  1,145 therms/yr  7,144 kWh/yr | 0.88 kW  1,933 therms/yr  6,403 kWh/yr | 3.29 kW  3,161 therms/yr  23,849 kWh/yr | |
| **Section 3. Load Shapes** | Conveyor broilers have almost constant gas input rates I their load shapes.   |  |  |  | | --- | --- | --- | | **Building Type** | **Load Shape** | **E3 Alternate Building Type** | | PGE: COMMERCIAL:5 = Commercial Food Service | COMMERCIAL | 5 = Commercial Food Service | |
| **Section 4. Costs** | The Gross Measure Cost is obtained from costs documented by SCG work paper “WPSCGNRCC171226A\_Rev01.docx” section 4- COSTS |
| **Section 4.1 Base and Measure Costs** |  |
| Base Cost | |  |  |  | | --- | --- | --- | | **Burger Width** | **Conveyor Belt Width (in)** | **Retail Price** | | 2 | 14 | $ 8,881 | | 3 | 22 | $ 10,752 | | 4 | 27 | $ 12,552 | |
| Measure Cost | |  |  |  | | --- | --- | --- | | **Burger Width** | **Conveyor Belt Width (in)** | **Retail Price** | | 2 | 14 | $11,404 | | 3 | 22 | $13,898 | | 4 | 27 | $16,210 | |
| Incremental  Measure Cost | |  |  |  |  | | --- | --- | --- | --- | | **Installation Type** | **Burger Width** | **Conveyor**  **Belt Width (in)** | **Incremental Measure Cost** | | | ROBNC | 2 | 14(< 20”) | ($10,404+$1000)-  ($7,881+$1,000) = $2,523 | | 3 | 22(20-26”) | ($12,898+$1000) -  (9,752+$1000) = $3,146 | | 4 | 27(> 26”) | ($15,210 + $1000) -  ($11,552+$1000) = $3,659 | |