Work Paper SCE13CC006

**Revision 2**

**Southern California Edison**

**Commercial Electric Combination Ovens**

# At-a-Glance Summary

|  |  |
| --- | --- |
| **Measure Codes** | FS-14121, FS-30956, FS-20134. |
| **Measure Description** | Energy-efficient commercial electric combination oven. |
| **Base Case Description** | Standard-efficiency commercial electric combination oven. |
| **Units** | Unit |
| **Energy Savings** | Refer to Excel Calculation Attachment |
| **Full Measure Cost ($/unit)** | Refer to Excel Calculation Attachment |
| **Incremental Measure Cost ($/unit)** | Refer to Excel Calculation Attachment |
| **Effective Useful Life** | Cook-ElecCombOven: 12 years |
| **Measure Installation Type** | Replace on Burnout (ROB) |
| **Net-to-Gross Ratio** | Com-Default>2yrs: 0.6  Ind-Default>2yrs: 0.6  Agric-Default>2yrs: 0.6 |
| **Important Comments** | This work paper has a complementary Ex Ante Database data set that will be provided in a separate submission to the California Public Utilities Commission (CPUC). |

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev** | **Date** | **Author** | **Summary of Changes** |
| 0 | 6/8/2012 | Ricson Chude/SCE | Updates from WPSCNRCC006.4:   * Updated Cost and Savings calculation based on ASTM testing * Updated EUL * Updated NTG values to DEER 2011 |
| 1 | 6/5/2014 | Ricson Chude/SCE | * Work paper updated for the reporting period, effective 7/1/14 – 12/31/14. |
| 2 | 01/19/2016 | Ajay Wadhera/Solaris | -New template update for 2016 program year  -WP effective from 1/1/2016 thru 12/31/2016  -Removed SCE building types  -No value modifications |

# Commission Staff and Cal TF Comments

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Rev** | **Party** | **Submittal Date** | **Comment Date** | **Comments** | **WP Developer Response** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Cal TF website: <http://www.caltf.org/>

# Section 1. General Measure & Baseline Data

## 1.1 Measure Description & Background

### This work paper details the replacement of standard-efficiency commercial electric combination ovens with energy-efficient commercial electric combination ovens.

**Base, Standard, and Measure Cases**

|  |  |
| --- | --- |
| **Case** | **Description of Typical Scenario** |
| Measure | Energy efficient commercial electric combination oven |
| Existing Condition | Standard efficiency commercial electric combination oven |
| Code/Standard | N/A |
| Industry Standard Practice | N/A |

Measures and Codes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure Codes** | | | | **Measure Name** |
| SCG | SDG&E | SCE | PG&E |
| N/A | N/A | FS-14121 | N/A | Electric Combi Oven <15 pan capacity |
| N/A | N/A | FS-30956 | N/A | Electric Combi Oven 15−28 pan capacity |
| N/A | N/A | FS-20134 | N/A | Electric Combi Oven >28 pan capacity |

### An oven is a fully enclosed, insulated chamber used to heat food. Commercial electric combination ovens offer even more options with their ability to add steam to the oven cavity. In addition to baking and roasting, a combination oven is also capable of steaming, proofing and re-thermalizing various food products. Foods can be cooked in a convection oven dry heat only mode, a steam only mode, and a combination of dry heat and steam modes. The programmability of combination ovens also allows food to be cooked partially in one mode at a certain temperature, and then finished in another mode and at a separate temperature. For example, a turkey can be cooked in combination mode at low temperature for several hours, and then stepped to a higher temperature in dry heat mode to finish.

### Combination ovens are available in a variety of sizes ranging from 6-pan countertop models to 40-pan roll-in models. Combination oven sizes are based on the capacity to accommodate 12 x 20 x 21/2-inch hotel pans. Half-size models can accommodate one column of hotel pans and 9 x 13-inch (half-size) sheet pans, while full-size models can accommodate two columns of hotel pans and 18 x 26-inch (full-size) sheet pans.

### Fifty percent of the operations in the commercial sector reported using combination ovens as compared to 83% of non-commercial operations [437]. With competition rising among equipment manufacturers, new designs that incorporate timesaving features via sophisticated control packages are being introduced.

Combination oven performance is determined by applying the American Society for Testing and Materials (ASTM) Standard Test Method for the Performance of Combination Ovens (ASTM F1639-05) [148] and ASTM Standard Test Method for the Performance for Enhanced Performance of Combination Ovens in Different Modes (F2861-10) [148]. The ASTM standard test methods are considered to be the industry standard for quantifying the efficiency and performance of combination ovens. This measure is focused on electric combination ovens.

## 1.2 Technical Description

Qualifying equipment must retrofit, replace, or upgrade existing equipment with new, energy-efficient technologies. Each installed equipment must meet minimum prescriptive criteria to qualify for a per unit rebate.

The electric combination oven must have a tested steam mode cooking energy efficiency of ≥50% and convection mode cooking energy efficiency of ≥70% utilizing American Society for Testing and Materials (ASTM) Standard F2861, and meet the idle rate requirements in table below.

ASTM F2861 Idle Rate Requirements for Commercial Combination Ovens.

|  |  |  |
| --- | --- | --- |
| **Combination Oven Type** | **Steam Mode  Idle Energy Rate** | **Idle Energy Rate** |
| Electric Combi <15 pan capacity\* | ≤ 5.0 kW | ≤ 2.0 kW |
| Electric Combi 15−28 pan capacity\* | ≤ 6.0 kW | ≤ 2.5 kW |
| Electric Combi >28 pan capacity\* | ≤ 9.0 kW | ≤ 4 kW |

\*Combination oven/steamer pan capacity on based on the maximum capacity of full-size 2 ½-inch deep hotel pans. This must be consistent with the number of pans used to meet the energy-efficiency qualifications per ASTM F2861.

## 1.3 Installation Types and Delivery Mechanisms

The delivery method is Financial Support - Down-Stream Incentive – Deemed.

The install type is ROB (Replace-on-Burnout).

**Installation Type Descriptions**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Installation Type** | **Savings** | | **Life** | |
| 1st Baseline (BL) | 2nd BL | 1st BL | 2nd BL |
| Replace on Burnout (ROB) | Above Code or Standard | N/A | EUL | N/A |

A delivery mechanism is a delivery method paired with an incentive method. Delivery mechanisms are used by programs to obtain program participation and energy savings.

**Delivery Method Descriptions**

|  |  |
| --- | --- |
| **Delivery Method** | **Description** |
| Financial Support | The program motivates customers, through financial incentives such as rebates or low interest loans, to implement energy efficient measures or projects. |

**Incentive Method Descriptions**

|  |  |
| --- | --- |
| **Incentive Method** | **Description** |
| Down-Stream Incentive | The customer installs qualifying energy efficient equipment and submits an incentive application to the utility program. Upon application approval, the utility program pays an incentive to the customer. Such an incentive may be deemed or customized. |

## 1.4 Measure Parameters

### 1.4.1 DEER Data

DEER Difference Summary

|  |  |
| --- | --- |
| **DEER Item** | **Used for Workpaper?** |
| Modified DEER methodology | No |
| Scaled DEER measure | No |
| DEER Base Case | No |
| DEER Measure Case | No |
| DEER Building Types | No |
| DEER Operating Hours | No |
| DEER eQUEST Prototypes | No |
| DEER Version | N/A |
| Reason for Deviation from DEER | DEER does not contain this measure. |
| DEER Measure IDs Used | N/A |

**Net-to-Gross Ratio**

The NTG values were obtained using the DEER READI tool. The relevant NTG values for the measures in this work paper are in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **NTGR ID** | **Description** | **Sector** | **BldgType** | **Measure Delivery** | **NTGR** |
| Com-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Com | Any | Any | 0.6 |
| Ind-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Ind | Any | Any | 0.6 |
| Agric-Default>2yrs | All other EEMs with no evaluated NTGR; existing EEM in programs with same delivery mechanism for more than 2 years | Ag | Any | Any | 0.6 |

**Spillage Rate**

Spillage rates are not tracked in work papers; they are tracked in an external document which will be supplied to the Commission Staff.

**Installation Rate**

The IR values were obtained using the DEER READI tool. The relevant IR values for the measures in this work paper are in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **GSIA ID** | **Description** | **Sector** | **BldgType** | **ProgDelivID** | **GSIAValue** |
| Def-GSIA | Default GSIA values | Any | Any | Any | 1 |

**Effective and Remaining Useful Life**

The EUL and RUL values were obtained using the DEER READI tool. DEER defines the RUL as 1/3 of the EUL value. The RUL value is only applicable to the first baseline period for an RET measure with an applicable code baseline. The relevant EUL and RUL values for the measures in this work paper are in the table below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **EUL ID** | **Description** | **Sector** | **UseCategory** | **EUL (Years)** | **RUL (Years)** |
| Cook-ElecCombOven | Combination Oven - Electric | Com | FoodServ | 12 | 4 |

### 1.4.2 Codes and Standards Analysis

**California Title 24 2013:** These measures do not fall under Title 24 of the California Energy Regulations.

**California Title 20 2014:** State of California Title 20 Appliance Efficiency Regulation [422] has a category for cooking appliances, but combination ovens are not included.

### ASTM Standards: ASTM Standard Test Method for Enhanced Performance of Combination Oven in Various Modes (F2861) was used to estimate the energy consumption of base case and measure equipment.

**Federal Standards:** These measures do not fall under Federal DOE or EPA Energy Regulations

Code Summary

|  |  |  |
| --- | --- | --- |
| **Code** | **Reference** | **Effective Dates** |
| ASTM | F2861 | January 1, 2014 |

## 1.5 EM&V, Market Potential, and Other Studies – Base Case and Measure Case Information

### 1.5.1 Non-DEER Study Review

No Non-DEER studies are used in this work paper.

## 1.6 Data Quality and Future Data Needs

N/A

# Section 2. Calculation Methodology

## 2.1 Electric Energy Savings Estimation Methodologies

Energy savings were developed using actual test data based on the calculation methods in ASTM Standard Test Method for thePerformance of Combination Ovens in Various Modes (F2861) which use measured data under preheat, idle, and heavy-load cooking conditions.

Baseline ASTM Test Results for Commercial Combination Ovens

|  |  |  |  |
| --- | --- | --- | --- |
| **Combination Oven Type** | **Idle Energy Rate** | **Cooking-Energy Efficiency\*** | **Production Capacity\*** |
| Electric Combi < 15 pan capacity\* | 3,000 W oven mode 10,000 W steam mode | 65% oven mode 40% steam mode | 80 lb/h oven mode 100 lb/h steam mode |
| Electric Combi 15−28 pan capacity\* | 3,750 W oven mode 12,500 W steam mode | 65% oven mode 40% steam mode | 100 lb/h oven mode 150 lb/h steam mode |
| Electric Combi > 28 pan capacity\* | 5,250 W oven mode 18,000 W steam mode | 65% oven mode 40% steam mode | 275 lb/h oven mode 350 lb/h steam mode |

\*Based on the Heavy-load potato test in ASTM F2861.

In the absence of mandatory regulations for testing commercial combination ovens, there is little incentive on the part of equipment manufacturers to have their baseline equipment tested. Therefore, the ASTM performance parameters for baseline equipment were drawn from a sample of economy grade equipment tested by the Food Service Technology Center, on the Heavy-load potato test in ASTM F2861.

The measure case data was drawn from data generated by The PG&E Food Service Technology Center in San Ramon, the Southern California Gas Company Foodservice Equipment Center in Downey, and the Southern California Edison Foodservice Technology Center in Irwindale. The lab-based test data was used to establish a measure case level that effectively differentiated between standard-efficiency models and energy-efficient models. The performance parameters used to determine the energy consumption for the measure case are summarized in Table below.

Measure Case ASTM Test Results for Commercial Combination Ovens.

|  |  |  |  |
| --- | --- | --- | --- |
| **Combination Oven Type** | **Idle Energy Rate** | **Cooking-Energy Efficiency\*** | **Production Capacity\*** |
| Electric Combi < 15 pan capacity\* | 2,000 W oven mode 5,000 W steam mode | 70% oven mode 50% steam mode | 100 lb/h oven mode 120 lb/h steam mode |
| Electric Combi 15−28 pan capacity\* | 2,500 W oven mode 6,000 W steam mode | 70% oven mode 50% steam mode | 125 lb/h oven mode 200 lb/h steam mode |
| Electric Combi > 28 pan capacity\* | 4,000 W oven mode 9,000 W steam mode | 70% oven mode 50% steam mode | 325 lb/h oven mode 400 lb/h steam mode |

\*Based on the Heavy-load potato test in ASTM F2861.

Tables in section 2.1 show the calculation results for electric combination ovens based on data obtained from applying the ASTM F2861 test method.

Commercial 12-Pan Electric Combination Calculations

(Solution Code FS-14121)

|  |  |  |
| --- | --- | --- |
| **Performance** | **Baseline Model** | **Energy-Efficient Model** |
| Preheat Time (min) | 15 | 15 |
| Preheat Energy (kWh) | 3.00 | 1.50 |
| Convection Idle Energy Rate (kW) | 3.00 | 2.00 |
| Convection Cooking Energy Efficiency (%) | 65% | 70% |
| Convection Production Capacity (lbs/hr) | 80 | 100 |
| Steam Idle Energy Rate (kW) | 10.00 | 5.00 |
| Steam Cooking Energy Efficiency (%) | 40% | 50% |
| Steam Production Capacity (lbs/hr) | 100 | 120 |
| Average Water Consumption Rate (gal/h) | 30 | 20 |
| Operating Hours/Day | 12 | 12 |
| Operating Days/Year | 355 | 355 |
| Number of Preheats per Day | 1 | 1 |
| Pounds of Food Cooked per Day | 200 | 200 |
| Percentage Time in Steam Mode | 50% | 50% |
| Electric Cost ($/kWh) | $0.13 | $0.13 |
| Water/Sewer Cost ($/CCF) | $5.00 | $5.00 |
| ASTM Convection Mode Energy to Food (kWh/lb) | 0.0732 | 0.0732 |
| ASTM Steam Mode Energy to Food (kWh/lb) | 0.0308 | 0.0308 |
| Daily Energy Consumption (kWh) | 84.6 | 53.1 |
| Average Demand (kW) | 7.1 | 4.4 |
| **Estimated Demand Reduction (kW)**  **(Applied 0.9 DEER CDF)** | **-** | **2.4** |
| Annual Energy Consumption (kWh) | 30,033 | 18,851 |
| **Estimated Energy Savings (kWh/yr)** | **-** | **11,182** |

Commercial 20-Pan Electric Combination Calculations

(Solution Code FS-30956)

|  |  |  |
| --- | --- | --- |
| **Performance** | **Baseline Model** | **Energy-Efficient Model** |
| Preheat Time (min) | 15 | 15 |
| Preheat Energy (kWh) | 3.75 | 2.00 |
| Convection Idle Energy Rate (kW) | 3.75 | 2.50 |
| Convection Cooking Energy Efficiency (%) | 65% | 70% |
| Convection Production Capacity (lbs/hr) | 100 | 125 |
| Steam Idle Energy Rate (kW) | 12.50 | 6.00 |
| Steam Cooking Energy Efficiency (%) | 40% | 50% |
| Steam Production Capacity (lbs/hr) | 150 | 200 |
| Average Water Consumption Rate (gal/h) | 40 | 25 |
| Operating Hours/Day | 12 | 12 |
| Operating Days/Year | 355 | 355 |
| Number of Preheats per Day | 1 | 1 |
| Pounds of Food Cooked per Day | 250 | 250 |
| Percentage Time in Steam Mode | 50% | 50% |
| Electric Cost ($/kWh) | $0.13 | $0.13 |
| Water/Sewer Cost ($/CCF) | $5.00 | $5.00 |
| ASTM Convection Mode Energy to Food (kWh/lb) | 0.0732 | 0.0732 |
| ASTM Steam Mode Energy to Food (kWh/lb) | 0.0308 | 0.0308 |
| Daily Energy Consumption (kWh) | 107.8 | 66.5 |
| Average Demand (kW) | 9.0 | 5.5 |
| **Estimated Demand Reduction (kW)**  **(Applied 0.9 DEER CDF)** | **-** | **3.2** |
| Annual Energy Consumption (kWh) | 23,608 | 58,930 |
| **Estimated Energy Savings (kWh/yr)** | **-** | **14,661** |

Commercial 40-Pan Electric Combination Calculations

(Solution Code FS-20134)

|  |  |  |
| --- | --- | --- |
| **Performance** | **Baseline Model** | **Energy-Efficient Model** |
| Preheat Time (min) | 15 | 15 |
| Preheat Energy (kWh) | 5.63 | 3.00 |
| Convection Idle Energy Rate (kW) | 5.25 | 4.00 |
| Convection Cooking Energy Efficiency (%) | 65% | 70% |
| Convection Production Capacity (lbs/hr) | 275 | 325 |
| Steam Idle Energy Rate (kW) | 18.00 | 9.00 |
| Steam Cooking Energy Efficiency (%) | 40% | 50% |
| Steam Production Capacity (lbs/hr) | 350 | 400 |
| Average Water Consumption Rate (gal/h) | 70 | 30 |
| Operating Hours/Day | 12 | 12 |
| Operating Days/Year | 355 | 355 |
| Number of Preheats per Day | 1 | 1 |
| Pounds of Food Cooked per Day | 400 | 400 |
| Percentage Time in Steam Mode | 50% | 50% |
| Electric Cost ($/kWh) | $0.13 | $0.13 |
| Water/Sewer Cost ($/CCF) | $5.00 | $5.00 |
| ASTM Convection Mode Energy to Food (kWh/lb) | 0.0732 | 0.0732 |
| ASTM Steam Mode Energy to Food (kWh/lb) | 0.0308 | 0.0308 |
| Daily Energy Consumption (kWh) | 166.0 | 105.7 |
| Average Demand (kW) | 13.8 | 8.8 |
| **Estimated Demand Reduction (kW)**  **(Applied 0.9 DEER CDF)** | **-** | **4.5** |
| Annual Energy Consumption (kWh) | 59,930 | 37,524 |
| **Estimated Energy Savings (kWh/yr)** | **-** | **21,406** |

**Daily Energy Consumption Calculation and Definitions**

EDAY = Convection Mode((LBFOOD x EFOOD) ÷ EFFICIENCY + [IDLERATE x (TON - LBFOOD/PC – nP x TP/60)]) + Steam Mode(lbfood\*Efood/Efficiency + IdleRate\*(ton - lbsfood/PC - tp)) + nP x EP

Where:

|  |  |
| --- | --- |
| EDAY = | Calculated Daily Energy Consumption (kWh/day) |
| LBFOOD = | Estimated Pounds of Food Cooked per Day |
| EFOOD = | ASTM Energy to Food (kWh/lb) = kWh/pound of energy absorbed by food product during cooking based on the ASTM test method |
| EFFICIENCY = | Measured Heavy Load Cooking Energy Efficiency % |
| IDLE RATE = | Measured Idle Energy Rate (kW) |
| TON = | Estimated Operating Hours/Day |
| PC = | Measured Production Capacity (lbs/hr) |
| TP = | Estimated Preheat Time (min) |
| nP = | Estimated Number of preheats/Day |
| EP = | Measured Preheat Energy (kWh) |

See Attachment 2 for all calculations. See Attachment 1 for a complete list of savings.

## 2.2. Demand Reduction Estimation Methodologies

A combination oven’s actual contribution to a building’s peak demand may vary significantly depending on its usage pattern in relation to that of other electric equipment in the facility (operating schedule, appliance on time, etc.). The probability of an appliance drawing its average rate during the period that the building peak is set is significantly higher than for any other input rate for that appliance. Therefore, it has been assumed that the probable contribution to the building’s peak demand is equal to the appliance’s average demand.

A coincidence factor of 0.9 from DEER 2005 [26] is applied to demand reduction; since combi ovens are not specifically addressed, the 0.9 from other foodservice measures is used. See Section 2.1 for final values.



Figure 1 DEER 2005 Cooking Coincidence Factor

# Section 3. Load Shapes

The ideal load shape for net benefits estimates would represent the difference between the base case and measure case. The closest load shapes that are applicable to the measures in this work paper are listed in the table below.

Building Types and Load Shapes

|  |  |  |
| --- | --- | --- |
| **Building Type** | **Load Shape** | **E3 Alternate Building Type** |
| Assembly | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Education - Community College | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Education - Primary School | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Education - Secondary School | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Education - University | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Grocery | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Health/Medical - Hospital | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Health/Medical - Nursing Home | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Lodging - Hotel | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Lodging - Motel | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Manufacturing - Bio/Tech | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Manufacturing - Light Industrial | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Office - Large | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Office - Small | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Restaurant - Fast-Food | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Restaurant - Sit-Down | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Retail - Multistory Large | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |
| Retail - Small | DEER:Indoor\_Non-CFL\_Ltg | NON\_RES |

# Section 4. Costs

High-efficiency combination ovens typically have a higher list price than standard efficiency combination ovens. However, high-efficiency designs are often bundled with other features such as all stainless steel construction and high quality components and controls. In addition to lower operating costs, high-efficiency combination ovens exhibit better uniformity and higher production rates that increase their cost-effectiveness.

## 4.1 Base Case Cost

Base case costs are calculated by applying an industry-standard 50% discount to manufacturer published list prices. It is assumed that the labor cost is the same in base and measure cases, so only equipment costs are presented here.

Equipment prices for this work paper were compiled from a number of sources including quotes, equipment sales representatives, and manufacturer sources. Since equipment pricing in food service is closely held information and prices vary widely according to buying volume and other factors, the sources for prices cannot be listed explicitly.

## 4.2 Full and Incremental Measure Cost

Table below shows the calculation of full measure cost:

Full and Incremental Measure Cost

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Combination Oven Type** | **Baseline Unit Price** | **Energy Efficient Unit Price** | **Baseline Unit Cost** | **Energy Efficient Unit Cost** | **Full and Incremental Measure Cost** |
| Electric Combi < 15 pan capacity\* | $18,274 | $21,411 | $9,137 | $10,705 | $1,568 |
| Electric Combi 15−28 pan capacity\* | $30,048 | $33,216 | $15,024 | $16,608 | $1,584 |
| Electric Combi > 28 pan capacity\* | $39,220 | $53,316 | $19,610 | $26,658 | $7,048 |

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

**Full and Incremental Measure Cost Equations**

|  |  |  |  |
| --- | --- | --- | --- |
| **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| ROB | (MEC + MLC) – (BEC + BLC) | (MEC + MLC) – (BEC + BLC) | N/A |
| NEW/NC |

MEC = Measure Equipment Cost; MLC = Measure Labor Cost

BEC = Base Case Equipment Cost; BLC = Base Case Labor Cost

**Full and Incremental Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Measure** | **Installation Type** | **Incremental Measure Cost** | **Full Measure Cost** | |
| **1st Baseline** | **2nd Baseline** |
| Electric Combi < 15 pan capacity\* | ROB | $1,568 | $1,568 | N/A |
| Electric Combi 15−28 pan capacity\* | ROB | $1,584 | $1,584 | N/A |
| Electric Combi > 28 pan capacity\* | ROB | $7,048 | $7,048 | N/A |

# Attachments

1. 

1. 

# References



|  |  |
| --- | --- |
| [26] | 2004-2005 Database for Energy Efficiency Resources (DEER) Update Study - Final Report - Itron Inc. - Dec. 2005 |
| [148] | Standard Test Method for the Performance of Combination Ovens |
| [422] | 2014 Appliance Efficiency Regulations (Title 20) |
| [437] | The Baking Boom |