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MEASURE CHARACTERIZATION

Fryer, Commercial

https://www.caetrm.com/measure/SWFS011/03-4/

USE CATEGORY
FS - Food Service

COMMITTED
December 9, 2021 9:51 AM

STATUS
CPUC Review

EFFECTIVE START DATE
January 1, 2022

VERSION
SWFS011-03-4

DOWNLOADED
December 14, 2021 8:47 AM

Technology Summary

Commercial fryers are among the most common appliances in commercial food service facilities. All fryers share a common basic design. The fry vat contains enough oil so that the cooking food is essentially supported by displacement of the oil rather than by the bottom of the vessel. Two fryer attributes width and energy-input rating – suggest the approximate amount of food a fryer can prepare within a given period, which is one of the most important factors in choosing the proper fryer for a kitchen.

Large vat fryers have fry pots ranging from 18 x 14 inches to 34 x 34 inches; the most common is the 18 x 18-inch size. Large vat fryers are becoming more common in restaurants as they replace smaller (14 inch) fryers to increase production capability while maximizing the available space in the kitchen.

This technology category has historically been driven by the lowest first cost and traditionally has not incorporated energy-efficient features. Recent advances in fryer design, however, have increased fryer operational efficiency as well as safety. Energy-efficient commercial fryers reduce energy consumption primarily through advanced burner and heat exchanger design, advanced controls, and insulation. ENERGY STAR®-rated fryer models enable the differentiation between high-efficiency and standard-efficiency models. ENERGY STAR-qualified fryers offer shorter cook times and higher production rates, and frypot insulation reduces standby losses resulting in a lower idle energy rate.

This measure specification follows the American Society for Testing and Materials (ASTM) Standard Test Method for the Performance of Open Deep Fat Fryers (F1361) and the ASTM Standard Test Method for the Performance of Large Vat Fryers (F2144) for calculation of energy use and demand, based on testing in an approved and qualified laboratory. R145 R150

The Pacific Gas and Electric Company (PG&E) and Southern California Gas Company (SCG) each funded an Emerging Technologies (ET) Program study to evaluate the energy and cost savings.

Emerging Technologies

FRYER TYPE	PROJECT NUMBER (TEXT)	PROGRAM FUNDING YEAR (TEXT)	YEAR INTRODUCED TO PROGRAMS (DATE)
Electric	**ET12PGE8201, ET13SCG0002**	**2010-2012**	
Gas (Tier 1)	**ET12PGE8201, ET13SCG0002**	**2010-2012**	
Gas (Tier 2)	**ET12PGE8201, ET13SCG0002**	**2010-2012**	

Measure Case Description

The measure case specification represents the performance characteristics of equipment that meets or exceed the ENERGY STAR certification requirements (See Program Requirements). The measure case specification accounts for idle energy rate, cooking efficient rate, and production capacity of a commercial fryer. The measure case specification values represent the average values of the analysis with the tested equipment data, ENERGY STAR certified product list, and the qualifying product list for California foodservice equipment rebate programs (2020). The data from these sources of commercial gas fryers were compiled and analyzed in 2020; the results of which were summarized by the Southern California Gas Company (SCG) in a memo and supplemental attachment. R1454 R1389

Measure Case Specification - Electric R1389

COOKING EFFICIENCY (%)	IDLE ENERGY RATE (KW)	PREHEAT ENERGY (KWH)	PRODUCTION CAPACITY (LB / HR)
86.21%	**0.682**	**1.56**	**62**

Measure Case Specification - Gas R1389

FRYER TYPE	COOKING EFFICIENCY (%)	IDLE ENERGY RATE (BTU / HR)	PREHEAT ENERGY (BTU)	PRODUCTION CAPACITY (LB / HR)
Gas (Tier 1)	**51.84%**	**7,571.45**	**10,277.86**	**63**
Gas (Tier 2)	**60.93%**	**3,956.99**	**9,181.68**	**69**

Offering ID

FRYER TYPE	STATEWIDE MEASURE OFFERING ID (TEXT)	MEASURE OFFERING DESCRIPTION (TEXT)
Electric	**A**	**Efficient commercial fryer, electric**
Gas (Tier 1)	**B**	**Efficient commercial fryer, gas (tier 1)**
Gas (Tier 2)	**C**	**Efficient commercial fryer, gas (tier 2)**

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Base Case Description

The base case specification represents the performance characteristics of equipment that does not meet ENERGY STAR certification requirements. Since commercial fryers are not covered by state or national codes, there is little incentive for equipment manufacturers to test their baseline equipment. Therefore, the baseline efficiency was determined from equipment tested by the Food Service Technology Center (FSTC) and Food Service Testing Lab (FSTL, SCG), updated in 2019. R1389

Base Case Specification - Electric R1389

COOKING EFFICIENCY (%)	IDLE ENERGY RATE (KW)	PREHEAT ENERGY (KWH)	PRODUCTION CAPACITY (LB / HR)
83.66%	0.873	1.75	69

Base Case Specification - Gas R1389

COOKING EFFICIENCY (%)	IDLE ENERGY RATE (BTU / HR)	PREHEAT ENERGY (BTU)	PRODUCTION CAPACITY (LB / HR)
37.00%	12,847.32	16,609.17	58

Base Case Descriptions

FRYER TYPE	STATEWIDE MEASURE OFFERING ID (TEXT)	EXISTING DESCRIPTION (TEXT)	STANDARD DESCRIPTION (TEXT)
Electric	**A**	**Standard commercial fryer, electric**	**Standard commercial fryer, electric**
Gas (Tier 1)	**B**	**Standard commercial fryer, gas**	**Standard commercial fryer, gas**
Gas (Tier 2)	**C**	**Standard commercial fryer, gas**	**Standard commercial fryer, gas**

Code Requirements

This measure is not governed by either state or federal codes and standards.

Applicable State and Federal Codes and Standards

CODE	APPLICABLE CODE REFERENCE	EFFECTIVE DATE
CA Appliance Efficiency Regulations – Title 20	None.	n/a
CA Building Energy Efficiency Standards – Title 24	None.	n/a
Federal Standards	None.	n/a

This measure specification follows the American Society for Testing and Materials (ASTM) Standard Test Method for the Performance of Open Deep Fat Fryers (F1361) and the ASTM Standard Test Method for the Performance of Large Vat Fryers (F2144) for calculation of energy use and demand, based on testing in an approved and qualified laboratory. R145 R150

Program Requirements

MEASURE IMPLEMENTATION ELIGIBILITY

All combinations of measure application type, delivery type, and sector that are established for this measure are specified below. Measure application type is a categorization based on the circumstances and timing of the measure installation; each measure application type is distinguished by its baseline determination, cost basis, eligibility, and documentation requirements. Delivery type is the broad categorization of the delivery channel through which the market intervention strategy (financial incentives or other services) is targeted. This table also designates the broad market sector(s) that are applicable for this measure.

Note that some of the implementation combinations below may not be allowed for some measure offerings by all program administrators.

Implementation Eligibility

MEASURE APPLICATION TYPE	SECTOR	DELIVERY TYPE
NC	Ag	DnDeemDI
NC	Ag	DnDeemed
NC	Ag	UpDeemed
NC	Com	DnDeemDI
NC	Com	DnDeemed
NC	Com	UpDeemed
NC	Ind	DnDeemDI
NC	Ind	DnDeemed
NC	Ind	UpDeemed
NR	Ag	DnDeemDI
NR	Ag	DnDeemed
NR	Ag	UpDeemed
NR	Com	DnDeemDI
NR	Com	DnDeemed
NR	Com	UpDeemed
NR	Ind	DnDeemDI
NR	Ind	DnDeemed
NR	Ind	UpDeemed

ELIGIBLE PRODUCTS

This measure includes new commercial fryers that are ENERGY STAR-qualified or meet the qualifications in the Measure Case Description. R1201

Eligibility Requirements

FUEL TYPE	FRYER TYPE	HEAVY-LOAD COOKING EFFICIENCY	IDLE ENERGY RATE	SOURCE
Electric	Standard	≥ 83%	≤ 800 Watts	ENERGY STAR. 2015. "ENERGY STAR® Program Requirements for Commercial Fryers: Version 3.0." Effective October 1, 2016. **Download** (PDF, 57.0 KB)
	Large Vat	≥ 80%	≤ 1,100 Watts	
Gas- Tier 1	Standard	≥ 50%	≤ 9,000 Btu/hr	
	Large Vat	≥ 50%	≤ 12,000 Btu/hr	
Gas- Tier 2	Standard/ Large Vat	≥ 60%	≤ 6,100 Btu/hr	Frontier Energy. 2020. "Memo-Gas Fryers: Gas Fryer Tier Analysis." **Download** (DOCX, 134.3 KB)

ELIGIBLE BUILDING TYPES AND VINTAGES

This measure is applicable for any nonresidential building type and any vintage.

ELIGIBLE CLIMATE ZONES

This measure is applicable in all California climate zones.

Program Exclusions

Used or rebuilt equipment is not eligible.

Data Collection Requirements

Data collection requirements are to be determined.

Electric Savings (kWh)

The annual electric unit energy saving (UES) was calculated as the difference between the baseline and measure case unit energy consumption (UEC).

ANNUAL ELECTRIC UNIT ENERGY CONSUMPTION

The daily electric UEC (baseline or measure case) equaled to the sum of the energy required for cooking, preheat, and idle modes of fryer operation. The calculations for a baseline electric fryer are shown below; the identical measure case calculations can be viewed on the Calculation tab.

Daily Unit Energy Consumption - Electric, Baseline

EQUATION (KWH / DAY)
$CookingkWhBase + IdlekWhBase + PreheatkWhBase$

CookingkWhBase = Cooking energy, baseline (kWh)
IdlekWhBase = Idle energy, baseline (kWh)
PreheatkWhBase = Preheat energy, baseline (kWh)

Cooking energy is a function of the pounds of food cooked per day, the energy absorbed per pound of food product during cooking, and the measured heavy load cooking energy efficiency.

Cooking Energy - Electric, Baseline

EQUATION (KWH / DAY)
$\frac{const\_\_lb\_day \bullet const\_\_Btu\_lb}{(ElecBase\_\_Eff \bullet CFac\_\_Btu\_kWh)}$

const__lb_day = Pounds of food cooked per day (lbs)
const__Btu_lb = ASTM energy to food ratio, energy absorbed per lb of food during cooking (Btu)
ElecBase__Eff = Measured heavy load cooking energy efficiency (%, decimal)
CFac__Btu_kWh = Btu to kWh conversion factor

Idle energy is a function of the idle energy rate, operating hours per day, and production capacity; idle energy does not include preheat time.

Idle Energy - Electric, Baseline

EQUATION (KWH / DAY)
$ElecBase\_\_idlekW \bullet \left(const\_\_ophr\_Day - \left(\frac{const\_\_lb\_day}{ElecBase\_\_ProdCap}\right) - \left(\frac{const\_\_numPreheat \bullet ElecBase\_\_preheatTime}{CFac\_\_min\_hr}\right)\right)$

ElecBase__idlekW = Measured idle energy rate (kW)
const__ophr_Day = Operating hours per day (hrs)
const__lb_day = Pounds of food cooked per day (lbs)
ElecBase__ProdCap = Measured production capacity (lbs/hr)
const__numPreheat = Number of preheats per day (#)
ElecBase__preheatTime = Preheat time (min)
CFac__min_hr = Constant minutes per hour (min)

Preheat energy is calculated as the product of the assumed number of preheats per day and the energy required per preheat mode.

Preheat Energy - Electric, Baseline

EQUATION (KWH / DAY)
$ElecBase\_\_preheatkWh \bullet const\_\_numPreheat$

ElecBase__preheatkWh = Measured preheat energy (kWh)
const__numPreheat= Number of preheats per day (#)

The **annual UEC** was calculated as the daily UEC multiplied by the number of operating days per year.

Annual Unit Energy Consumption - Electric, Baseline

FRYER TYPE	EQUATION (KWH / YR)
Electric	$UEC\_DaykWhBase \bullet const\_\_opDaysYr$
Gas (Tier 1)	$Null\_\_ZerokWh$
Gas (Tier 2)	$Null\_\_ZerokWh$

UEC_DaykWhBase = Daily unit energy consumption - electric, baseline (kWh)
const__opDaysYr = Operating days per year (days)

ANNUAL UNIT ENERGY SAVINGS

The **annual UES** was calculated as the difference between the baseline and measure case annual UEC.

Annual Unit Energy Savings - Electric

EQUATION (KWH / DAY)
$UEC\_YrkWhBase - UEC\_YrkWhMeas$

UEC_YrkWhBase = Annual unit energy consumption - electric, baseline (kWh)
UEC_YrkWhMeas = Annual unit energy consumption - electric, measure case (kWh)

Note that for measures implemented through investor-owned utility (IOU) portfolios, Decision 11-07-030 stipulated an adjustment to the UES: "Energy Division believes that operating hours, food production rates and baseline efficiencies contribute to overly optimistic UES calculations and recommend a 30% reduction in UES values." These operating characteristics were investigated and revised in 2019 and incorporated into the UEC calculation, thus the 30% reduction factor was excluded from the UES calculation.

INPUTS AND ASSUMPTIONS

The inputs for the calculation of the UES of an electric fryer are specified below. The CPUC issued disposition, "Non-standard disposition for the commercial electric and gas fryer workpaper SWFS011-01", required the collection and analysis of secondary source test data. R1202 Electric fryers represent a smaller share of the market segment than gas fryers and thus baseline data in both a lab and field context is scarce. Measure case assumptions were further updated in 2019 based on the findings of the 2019 analysis per CPUC

review comments from November 2019. R1203 These assumptions remain in the 2020 updated measure analysis, as the electric commercial fryer had no updates or changes.

The assumed hours and days of operation are calculated from on-site monitored data and responses from surveys as shown in the referenced source.

Base Case Specification - Electric R1389

FRYER SIZE (IN)	PREHEAT TIME (MIN)	PREHEAT ENERGY (KWH)	IDLE ENERGY RATE (KW)	COOKING EFFICIENCY (%)	PRODUCTION CAPACITY (LB / HR)
14	9	1.75	0.873	83.66%	69

Measure Case Specification - Electric R1389

FRYER SIZE (IN)	PREHEAT TIME (MIN)	PREHEAT ENERGY (KWH)	IDLE ENERGY RATE (KW)	COOKING EFFICIENCY (%)	PRODUCTION CAPACITY (LB / HR)
12	9	1.56	0.682	86.21%	62

Constants - Calculation Inputs R1389

NUMBER OF PREHEATS PER DAY (TEXT)	OPERATING HOURS PER DAY (HR / DAY)	OPERATING DAYS PER YEAR (DAYS / YR)	BTUS PER POUND (TEXT)	POUNDS OF FOOD COOKED PER DAY (LB / DAY)
1	12	351.44	570	110.74

SAMPLE CALCULATION

A sample calculation of the daily baseline electric UEC is provided below.

```
UEC_DAY = Cooking energy + Idle energy + Preheat energy
```

```
Cooking energy = [(111 × 570 × (1/3412.14)) / 0.84] = 22.10 kWh/day
Idle energy = [0.873 × (12 – (111/69.4) – (1 × 9.2/60))] = 8.94 kWh/day
Preheat energy = 1 × 1.75 = 1.75  kWh/day

UEC_DAY = 22.10 + 8.94 + 1.75 = 32.80 kWh/day
```

Peak Electric Demand Reduction (kW)

The actual contribution to building 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 peak period is significantly higher than for any other input rate for that appliance. Therefore, it has been assumed that the probable contribution to building peak demand is equal to the combination oven average demand.

PEAK DEMAND REDUCTION CALCULATION

It is assumed that this measure operates within the Database of Energy Efficient Resources (DEER) peak period of 4 p.m. to 9 p.m. on weekdays at a constant load throughout the day. R622 (OP 1.) The average and peak demand reduction calculations utilize the measured data of base case and measure case fryers specified for Electric Savings. The average demand (baseline or measure case) is equal to the annual unit energy consumption (UEC) divided by the assumed annual hours of operation.

Average Demand - Baseline

EQUATION (KW)
$\frac{UEC\_YrkWhBase}{(const\_\_opDaysYr \bullet const\_\_ophr\_Day)}$

UEC_YrkWhBase = Annual electric unit energy consumption, baseline (kWh)
const__opDaysYr = Operating days per year (days)
const __ophr_Day = Operating hours per day (hours)

The average demand reduction is the difference between the baseline and measure case average demand. The estimated peak demand reduction is calculated as the average demand reduction multiplied by the coincident demand factor (CDF).

Peak Demand Reduction

EQUATION (KW)
$(UEC\_YrkWBase - UEC\_YrkWMeas) \bullet CDF\_\_\_Value$

UEC_YrkWBase = Average demand - baseline (kW)
UEC_YrkWMeas = Average demand - measure case (kW)
CDF___Value = Coincident demand factor (#)

Note that for measures implemented through investor-owned utility (IOU) portfolios, Decision 11-07-030 stipulated an adjustment to the UES: “Energy Division believes that operating hours, food production rates and baseline efficiencies contribute to overly optimistic UES

calculations and recommend a 30% reduction in UES values." These operating characteristics were investigated and revised in 2019 and incorporated into the UEC calculation, thus the 30% reduction factor is excluded from the UES calculation.

INPUTS AND ASSUMPTIONS

The table below provides the inputs for the calculation of peak demand reduction of a commercial electric fryer.

Constants - Calculation Inputs R1389

NUMBER OF PREHEATS PER DAY (TEXT)	OPERATING HOURS PER DAY (HR / DAY)	OPERATING DAYS PER YEAR (DAYS / YR)	BTUS PER POUND (TEXT)	POUNDS OF FOOD COOKED PER DAY (LB / DAY)
1	12	351.44	570	110.74

Coincident Demand Factor

VALUE (RATIO) R102
0.9000

Gas Savings (Therms)

The annual gas unit energy saving (UES) is calculated as the difference between the measure case and baseline annual unit energy consumption (UEC).

ANNUAL GAS UNIT ENERGY CONSUMPTION

As shown below, the daily gas UEC (baseline or measure case) is equal to the sum of the energy required for cooking, preheat, and idle modes of fryer operation. The calculations for a baseline gas fryer are shown below; the identical measure case calculations can be viewed on the Calculation tab.

Daily Unit Energy Consumption - Gas, Baseline

EQUATION (BTU / DAY)
$CookingBtuBase + IdleBtuBase + PreheatBtuBase$

CookingBtuBase = Cooking energy, baseline (Btu)
IdleBtuBase = Idle energy, baseline (Btu)
PreheatBtuBase = Preheat energy, baseline (Btu)

Cooking energy is a function of the pounds of food cooked per day, the energy absorbed per pound of food product during cooking, and the measured heavy load cooking energy efficiency.

Cooking Energy - Gas, Baseline

EQUATION (BTU / DAY)
$\frac{const\_\_lb\_day \bullet const\_\_Btu\_lb}{GasBase\_\_Eff}$

const__lb_day = Pounds of food cooked per day (lbs)
const__Btu_lb = ASTM energy to food ratio, energy absorbed per lb of food during cooking (Btu)
GasBase__Eff = Measured heavy load cooking energy efficiency (%, decimal

Idle energy is a function of the idle energy rate, operating hours per day, and production capacity; idle energy does not include preheat time.

Idle Energy - Gas, Baseline

EQUATION (BTU / DAY)
$GasBase\_\_idleBtuh \bullet \left(const\_\_ophr\_Day - \frac{const\_\_lb\_day}{GasBase\_\_ProdCap} - \frac{const\_\_numPreheat \bullet GasBase\_\_preheatTime}{CFac\_\_min\_hr} \right)$

GasBase__idleBtuh = Measured idle energy rate (Btuh)
const__ophr_Day = Operating hours per day (hrs)
const__lb_day = Pounds of food cooked per day (lbs)
GasBase__ProdCap = Measured production capacity (lbs/hr)
const__numPreheat = Number of preheats per day (#)
GasBase__preheatTime = Preheat time (min)
CFac__min_hr = Constant minutes per hour (min)

Preheat energy is calculated as the product of the assumed number of preheats per day and the energy required per preheat mode.

Preheat Energy - Gas, Baseline

EQUATION (BTU / DAY)
$const\_\_numPreheat \bullet GasBase\_\_preheatBtu$

const__numPreheat = Number of preheats per day (#)
GasBase__preheatBtu = Measured preheat energy (Btu)

The **annual UEC** (baseline or measure) is calculated as the daily UEC multiplied by the number of operating days per year.

Annual Unit Energy Consumption - Gas, Baseline

FRYER TYPE	EQUATION (THERM / YR)
Electric	$Null\_\_ZeroTherms$
Gas (Tier 1)	$\frac{UEC\_DayBtuBase \bullet const\_\_opDaysYr}{CFac\_\_Btu\_therm}$
Gas (Tier 2)	$\frac{UEC\_DayBtuBase \bullet const\_\_opDaysYr}{CFac\_\_Btu\_therm}$

UEC_DayBtuBase = Daily unit energy consumption, baseline (Btu)
const__opDaysYr = Operating days per year (days)
CFac__Btu_therm = Btu to therm conversion factor

ANNUAL GAS UNIT ENERGY SAVINGS

The **annual gas UES** is calculated as the difference between the baseline and measure annual UEC.

Annual Unit Energy Savings - Gas

EQUATION (THERM / YR)
$UEC\_YrThermBase - UEC\_YrThermMeas$

UEC_YrThermBase = Annual unit energy consumption - gas, baseline (therms)
UEC_YrThermMeas = Annual unit energy consumption - gas, measure case (therms)

Note that for measures implemented through investor-owned utility (IOU) portfolios, Decision 11-07030 stipulated a downward adjustment to the UES: "Energy Division believes that operating hours, food production rates and baseline efficiencies contribute to overly optimistic UES calculations and recommend a 30% reduction in UES values." These operating characteristics were investigated and revised and incorporated into the UEC calculation, thus the 30% reduction factor is excluded from the UES calculation.

INPUTS AND ASSUMPTIONS

The inputs for the calculation of the UES of an electric fryer are specified below. The CPUC issued disposition, "Non-standard Disposition for the commercial electric and gas Fryer workpaper SWFS011-01", required the collection and analysis of secondary source test data. R1202 This data was collected from the FSTC and ENERGY STAR certified product database and combined with other data sources into a comprehensive spreadsheet to revise baseline and measure assumptions and to verify efficiency eligibility requirements.

Base Case Specification - Gas R1389

FRYER SIZE (IN)	PREHEAT TIME (MIN)	PREHEAT ENERGY (BTU)	IDLE ENERGY RATE (BTU / HR)	COOKING EFFICIENCY (%)	PRODUCTION CAPACITY (LB / HR)
14	7	16,609.17	12,847.32	37.00%	58

Measure Case Specification - Gas R1389

FRYER TYPE	FRYER SIZE (IN)	PREHEAT TIME (MIN)	PREHEAT ENERGY (BTU)	IDLE ENERGY RATE (BTU / HR)	COOKING EFFICIENCY (%)	PRODUCTION CAPACITY (LB / HR)
Gas (Tier 1)	14	7	10,277.86	7,571.45	51.84%	63
Gas (Tier 2)	13	7	9,181.68	3,956.99	60.93%	69

Constants - Calculation Inputs R1389

NUMBER OF PREHEATS PER DAY (TEXT)	OPERATING HOURS PER DAY (HR / DAY)	OPERATING DAYS PER YEAR (DAYS / YR)	BTUS PER POUND (TEXT)	POUNDS OF FOOD COOKED PER DAY (LB / DAY)
1	12	351.44	570	110.74

SAMPLE CALCULATION

A sample base-case calculation of daily UEC is provided below.

```
EDAY = Cooking energy + Idle energy + Preheat energy
```

```
Cooking energy = [(111 × 570) / 0.37] = 170,597 Btu
Idle energy = [12,847 × (12 – (111/58) – (1 × 7/60))] = 128,124 Btu
Preheat energy = 1 × 16,415 = 16,415 Btu

EDAY = 171,000 + 128,079 + 16,415 = 315,136 Btu
```

Life Cycle

Effective useful life (EUL) is an estimate of the median number of years that a measure installed through a program is still in place and operable. Remaining useful life (RUL) is an estimate of the median number of years that a technology or piece of equipment replaced or altered by an energy efficiency program would have remained in service and operational had the program intervention not caused the replacement or alteration.

The EUL specified for gas and electric commercial fryers are specified below. R1556 R104 (Page 18, Table 4.1) Note that RUL is only applicable for add-on and accelerated replacement measures and not applicable for this measure.

Effective Useful Life and Remaining Useful Life

EFFECTIVE USEFUL LIFE ID	EUL DESCRIPTION (TEXT)	SECTOR (TEXT)	EUL YEARS (YR)	START DATE (TEXT)	EXPIRE DATE (TEXT)
Cook-ElecFryer	**Electric Fryer**	**Com**	**12**	**2013-01-01**	
Cook-GasFryer	**Gas Fryer**	**Com**	**11**	**2022-01-01**	

Base Case Material Cost ($/Unit)

The base case material cost for equipment delivered via direct install is equal to $0.

For all other delivery types of electric commercial fryers, the base case material cost was calculated as the average of the manufacturer list prices for electric commercial fryers retrieved from the AutoQuotes online catalog for foodservice equipment and supplies. R111 Because it is common knowledge that dealers do not pay the published list prices for equipment, it was necessary apply a discount factor to the AutoQuotes data to more accurately reflect the actual prices paid for the equipment. The discount factor of 50% was based upon professional judgement by Food Service Technology Center (FSTC) staff. Additional analysis to validate the reasonableness of this value was conducted by comparing AutoQuotes published prices with actual prices on invoices submitted through the Southern California Gas Company Instant Rebates! point-of-sale rebate program from 2015 through August of 2017. R125 This verification revealed that a “list-to-actual” cost ratio for food service equipment of 50% is a reasonable average discount factor.

For all other delivery types of gas commercial fryers, the base case cost was updated based on a query of published prices from online equipment and supply dealers from Frontier Energy’s “Gas Fryer Tier Analysis” memo. R1390 A discount factor was not applied as these are published retail prices that reflect the typical price the customer would pay.

Measure Case Material Cost ($/Unit)

The measure case material cost for all delivery types of electric commercial fryers were calculated as the average of the manufacturer list prices for electric commercial fryers retrieved from the AutoQuotes online catalog for foodservice equipment and supplies. R111 Because it is common knowledge that dealers do not pay the published list prices for equipment, it was necessary to apply a discount factor to the AutoQuotes data to more accurately reflect the actual prices paid for the equipment. The discount factor of 50% was based upon professional judgement by Food Service Technology Center (FSTC) staff. Additional analysis to validate the reasonableness of this value was conducted by comparing AutoQuotes published prices with actual prices on invoices submitted through the Southern California Gas Company Instant Rebates! point-of-sale rebate program from 2015 through August of 2017. R125 This verification revealed that a “list-to-actual” cost ratio for food service equipment of 50% is a reasonable average discount factor.

The measure case material cost for all delivery types of gas commercial fryers were calculated as the average of equipment costs based on a query of published prices from online equipment and supply dealers from Frontier Energy’s “Gas Fryer Tier Analysis" memo. R1390 A discount factor was not applied as these are published retail prices that reflect the typical price the customer would pay.

Base Case Labor Cost ($/Unit)

The base case labor cost for equipment *delivered via direct install* is equal to $0.

For *all other delivery types*, the base case and measure case model installation costs are expected to be the same for the customer and thus were not estimated for the incremental cost analysis.

Measure Case Labor Cost ($/Unit)

The measure case labor cost for equipment *delivered via direct install* will be derived as the average installation cost submitted by one or more implementation contractors. The actual installation cost can vary by contractor, the date when the work occurred, and by the volume of each specific contractor's business. Contractor costs are confidential information and are based upon contractually agreed upon pricing as established in their purchase order with the program administrator. Therefore, the program administrator program tracking systems are the only source for the labor installation cost data. The program administrator will utilize the actual program cost to evaluate the cost-effectiveness of the measure.

For *all other delivery types*, a high efficiency model does not require additional installation labor compared to a base case model. Since this measure is applicable for normal replacement and new construction installations, the base case and measure case model installation costs are expected to be the same for the customer and thus were not estimated for the incremental cost analysis.

Net-to-Gross

The net-to-gross (NTG) ratio represents the portion of gross impacts that are determined to be directly attributed to a specific program intervention. These NTG values are based upon the average of all NTG ratios for all evaluated 2006 – 2008 commercial, industrial, and agriculture programs, as documented in the 2011 DEER Update Study conducted by Itron, Inc. These sector average NTGs ("default NTGs") are applicable to all energy efficiency measures that have been offered through commercial, industrial, and agriculture sector programs for more than two years and for which impact evaluation results are not available. R103 (Page 15-4, Table 15-3)

Net to Gross Ratio - Nonresidential

NET TO GROSS RATIO ID	NTGRKWH (RATIO) R103	NTGRTHERM (RATIO) R103
Agric-Default>2yrs	**0.6000**	**0.6000**
Com-Default>2yrs	**0.6000**	**0.6000**
Ind-Default>2yrs	**0.6000**	**0.6000**

Gross Savings Installation Adjustment (GSIA)

The gross savings installation adjustment (GSIA) rate represents the ratio of the number of verified installations of the measure to the number of claimed installations reported by the utility. This factor varies by end use, sector, technology, application, and delivery method. This GSIA rate is the current “default” rate specified for measures for which an alternative GSIA has not been estimated and approved. R105 (Page 31)

Gross Savings Installation Adjustments - Default

GSIA ID	GSIA (RATIO) R105
Def-GSIA	**1.0000**

Non-Energy Impacts

Non-energy impacts for this measure have not been quantified.

DEER Differences Analysis

This table below summarizes the inputs and methods that are and are not based upon the Database for Energy Efficient Resources (DEER).

DEER Difference Summary

DEER ITEM	COMMENT
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 2020 does not contain these measures.
DEER Measure IDs Used	n/a

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