APPLIANCE & PLUG LOADS
OVEN, GAS, RESIDENTIAL
SWAP017-02

CONTENTS

MEASURE NAME

Oven, Gas, Residential

STATEWIDE MEASURE ID

SWAP017-02

TECHNOLOGY SUMMARY

A residential gas oven includes a cooking cavity between approximately 5 and 7 cubic feet in volume that is heated by a gas burner located beneath the cavity. The gas byproducts are vented out of the cavity either through a flue that exits at the top of the oven above the range top burners or the front of the oven. Ovens can either have a glass or solid door for the cooking cavity. An oven equipped with a broiler feature can have a second burner at the top of the oven; other oven designs have a broiling compartment beneath the main cooking cavity that uses the bottom heat from the oven burner for broiling. Some residential gas ovens can be equipped with a convection fan, which can accelerate cooking by increasing airflow circulation in the cooking cavity.

Gas residential ovens come in three configurations: 1) standalone range with oven, 2) slide-in range with oven, and 3) built-in wall-mount oven. Slide-in ranges are similar to standalone ranges but are designed to be installed flush with the adjacent countertop and generally have a lower control profile. However, these feature differences do not affect oven performance. All gas range ovens have gas burners on top of them, but not all gas range burners are paired with a gas oven underneath. There are several gas range models with an electric oven underneath.

The most common residential oven size is 30-inches wide with the second most common being the 36-inch wide category. Most ovens come with two baking racks. Some models on the market have two baking cavities that can be operated independently of one another.

The following metrics define oven energy performance:

Preheat energy consumption: The energy consumed by the oven while heating up the internal cavity temperature to a stable 400 °F.

Cooking energy consumption: The energy consumption of the oven from when the food product is first placed into the oven to when the internal temperature reaches a set temperature. For the oven tests performed for this measure, the energy consumed when the potatoes are first placed into the oven (after oven is preheated to 400 °F) until the internal potato temperature reaches 205 °F.

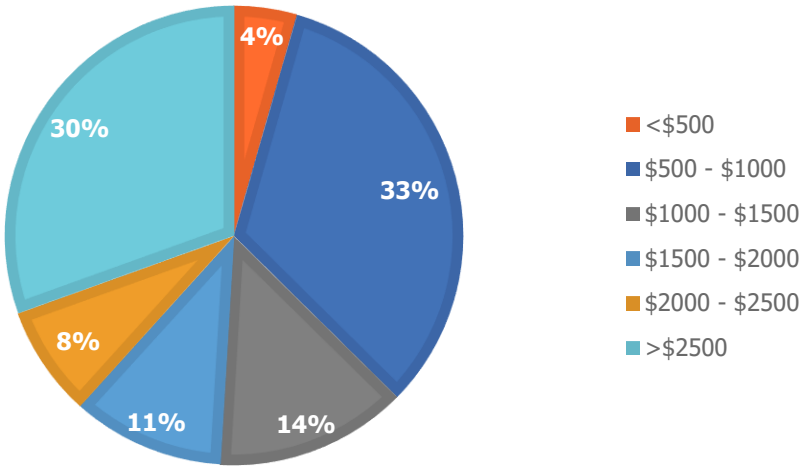
Idle Rate: The energy consumption of the oven while maintaining a ready-to-cook state at an average 400 °F internal cavity temperature.

Heavy Load Cooking Energy Efficiency: The ratio of the energy absorbed by the food product to the total energy consumed by the oven, expressed as a percent. For residential gas ovens, the specified test food product is two pans of russet potatoes with 15 potatoes per pan at an average weight of 0.5 lb per potato. The potatoes are cooked from room temperature to 205 °F with the oven operating at an average 400 °F internal cavity temperature.

Production Capacity: The maximum rate (pounds per hour, lb/hr) at which the oven can cook the specified food product. A production capacity of 15 lb/hr indicates a cook time of 60 minutes for the two-pan load of russet potatoes weighing 15 lbs.

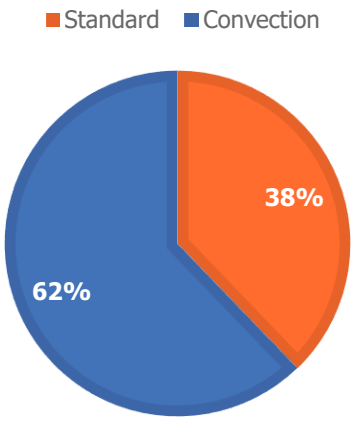
Nearly half of all available oven models use gas as its primary fuel. About a quarter of available models are dual fuel, which tend to be popular at higher price points. The two main segments of the residential range oven market are the $500 to $1000 typical household range ovens and the $2500+ high-end range ovens. The price premium for the more expensive range ovens is based upon a combination of advanced range designs, greater control options, higher quality build materials, and/or greater aesthetic appeal (due to higher cost of stainless steel). Cost rarely goes toward improving the internal oven design, therefore many high-end range ovens strongly resemble the more typical $800 to $1200 range ovens. Both price range segments of range ovens typically include features such as convection cooking, broiling, and self-cleaning.

Calculated Price Distribution of Residential Range Ovens by available model surveyed from Three Major Appliance Retailers in 2019



As shown, high-end range ovens account for approximately 30% of the residential market by available model selection. Considering the composition of the residential market, however, this percentage is likely much smaller since mid-priced units are bought more frequently. Exact market composition is difficult to quantify since quantities sold for each model are not readily disclosed, but high-end ranges likely account for less than 10% of the total volume of residential gas units sold – almost all the most frequently bought models listed fall between $500 and $1500.

Percentage of Residential Gas Range Oven Models in 2019 with Convection Capabilities



At a major appliance retailer, 270 out of the 482 (56%) available gas range single ovens have convection capabilities. At a second major appliance retailer, 292 out of the 427 (68%) available gas range single ovens have convection capabilities.

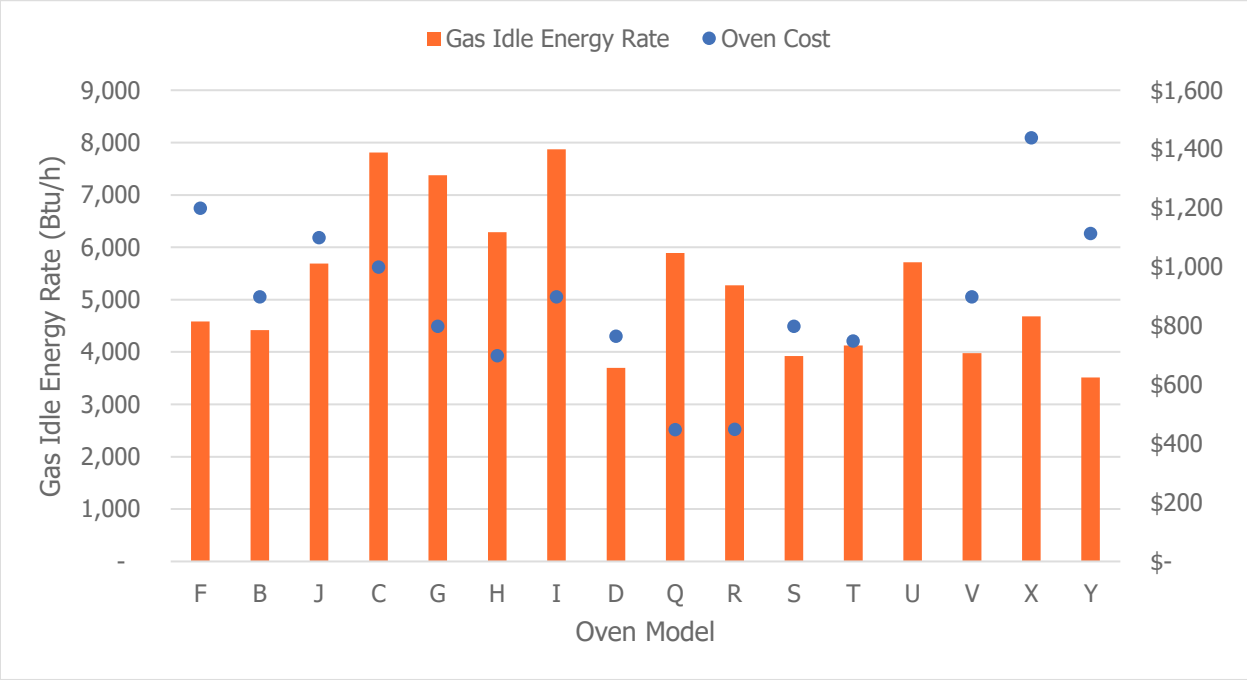
Most typical household range ovens have a 30-inch width, an oven cavity between five and six cubic feet, and a price point between $700 to $900. These ovens account for a significant portion of the market, comprising most or all a supplier's website when sorted by *best sellers*. Numerous 24-inch and 36-inch models are also available, but 30-inch ranges can be found in more than half of residential units. Price point is more variable than appliance size with higher-end equipment occupying a substantial segment of the market. The market characterization of residential ovens is summarized in the table below and demonstrates the drastic increase in the upper price range of the most popular 30-inch width category. Consumers who would purchase a high-end range are unlikely to want any appliance smaller than the perceived average 30" width, so the upper price range on smaller units is significantly lower.

Market Characterization of Available Residential Ovens

Width (in)	Units Available (Retailer #1)	Units Available (Retailer #2)	Typical Cavity Volume (ft^3)	General Price Range	Average Appliance Price
20	34	5	2.3 - 2.5	$450 – $1300	$700
24	97	24	2.9 - 3.1	$600 - $1600	$800
30	**284**	**282**	**5.0 – 6.0**	**$400 - $3200**	**$800**
36	106	102	3.9 - 5.8	$700 - $3500	$1300
48	2	0	7.2	$5000	$5000

The graph below shows gas idle consumption versus oven price. Oven cost does not have a direct correlation with overall oven energy efficiency.

Gas Oven Cost Compared to Energy Idle Rate



MEASURE CASE DESCRIPTION

An energy efficient residential gas oven is characterized by low preheat energy consumption and high cooking efficiency. These two metrics are typically interrelated and achieved through an efficient cooking cavity envelope and an efficient heat source. An efficient envelope is characterized by reduced infiltration and improved insulation. Infiltration can be reduced with shallower door panel gaps and stronger seals. Improved insulation is characterized by high R-value material surrounding the cavity and less conductive glass (often multilayered). In this case, an efficient heat source refers to efficient gas burners that achieve emission reductions while minimizing gas flue temperatures.

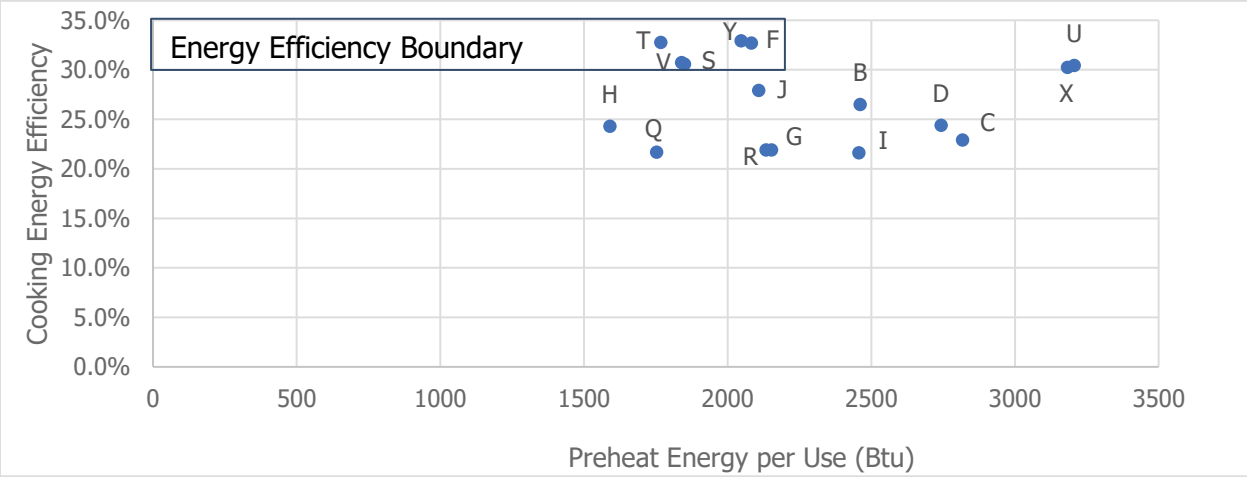
The measure case is defined as a residential gas oven model that performed highest, based on test results in both preheat energy consumption and cooking energy efficiency as outlined in the *Technology Summary* section. As shown below, the top performing models indicates a maximum preheat energy consumption of 2,200 Btu and a minimum cooking efficiency threshold of 30%. This threshold was established by a combination of ovens tested at SoCalGas's Food Service Testing Lab and ovens tested in the *Residential Oven Performance and Energy Comparison Study* conducted for SoCalGas (SCG) by Frontier Energy. [1]

Only the test results of ovens tested in non-convection mode were used for determining measure requirements and calculating energy savings. A considerable quantity of ovens do not have a convection fan and "non-convection" mode is the default mode of operation of a typical residential oven.

[1] E. Ruan, Hedrick, R., and Livchak, D. (Frontier Energy). 2019. *Residential Oven Performance and Energy Comparison Study.*. Frontier Energy Report #501319057-R0. Prepared for the Southern California Gas Company. December.

Additionally, test results showed running the oven in convection mode did not yield a significant change in oven cooking efficiency.

Oven Energy Performance and Energy Efficiency Boundary



Measure Case Specification

Preheat Energy per Use (Btu)	Cooking Energy Efficiency (%)
<= 2,200	>= 30%

BASE CASE DESCRIPTION

A base case residential gas oven is generally characterized by a higher preheat energy consumption and lower cooking energy efficiency. Inefficient burners and poor insulation result in a higher preheat consumption through cooking cavity surface loss and lower cooking efficiency. The threshold established by a combination of ovens tested at SoCalGas's Food Service Testing Lab and ovens tested for the *Residential Oven Performance and Energy Comparison Study* conducted for SoCalGas (SCG)[2] was a cooking efficiency of 30% and a preheat energy consumption of 2,200 Btu. Any oven that has lower efficiency or higher preheat consumption than the threshold using the metrics of performance outlined in the *Technology Summary* are classified as a base case model.

CODE REQUIREMENTS

Currently, there are no mandatory efficiency code requirements for residential gas ovens. The only existing efficiency codes for residential appliances apply to dishwashers, refrigerators, freezers, and water

[2] E. Ruan, Hedrick, R., and Livchak, D. (Frontier Energy). 2019. *Residential Oven Performance and Energy Comparison Study.*. Frontier Energy Report #501319057-R0. Prepared for the Southern California Gas Company. December.

heaters. All residential appliances, including gas ovens, are required to pass UL ANSI safety testing, which does not have an energy efficiency requirement.

Applicable State and Federal Codes and Standards

Code	Applicable Code Reference	Effective Date
CA Appliance Efficiency Regulations – Title 20 (2019)	N/A	
CA Building Energy Efficiency Standards – Title 24 (2019)	N/A	
Federal Standards	N/A	

NORMALIZING UNIT

Each

PROGRAM REQUIREMENTS

Measure Implementation Eligibility

All measure application type, delivery type, and sector combinations established for the residential gas oven 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.

Implementation Eligibility

Measure Application Type	Delivery Type	Sector
New construction	UpDeemed	Res
New construction	DnDeemed	Res
New construction	DnDeemDI	Res
Normal replacement	UpDeemed	Res
Normal replacement	DnDeemed	Res
Normal replacement	DnDeemDI	Res

Eligible Products

The measure pertains to energy efficient gas residential ovens. The measure is limited to gas ovens located underneath standalone and slide-in gas ranges.

All residential ovens must be tested by an ISO 17025-accredited California utility laboratory using ASTM F1496 *Standard Test Method for Performance of Convection Ovens*[3] with some modifications[4] to qualify for this measure.

Eligible Building Types and Vintages

This measure is applicable for all residential building types (single family, multifamily, and mobile homes) of both new and existing vintage.

Eligible Climate Zones

This measure is applicable in any California climate zone.

PROGRAM EXCLUSIONS

The following products are not eligible:

- Built-in wall-mount gas ovens without a cooktop
- Configurations other than standalone or slide-in gas range ovens
- Ovens with a cavity capacity ≤ 3 cubic feet.
- Gas ranges with electric ovens
- Commercial ovens

DATA COLLECTION REQUIREMENTS

Future Data Collection Plan

A qualifying product list (QPL) will be developed based on the result of tested units, and the QPL will be updated as more tests are conducted in the future.

Residential ovens currently do not require to meet any performance standards or adhere to any state or federal codes for performance. An additional purpose of this workpaper is to promote the standardization and testing of residential ovens, that would promote efficient ovens.

USE CATEGORY

Appliance or plug load (AppPlug)

ELECTRIC SAVINGS (kWh)

Electric savings are not determined for this residential gas oven measure. Electric consumption is small for residential gas oven and is similar for both baseline and measure case. Electric consumption is

[3] American Society for Testing and Materials (ASTM). 2019. *ASTM F1496-13 Standard Test Method for Performance of Convection Ovens.* West Conshohocken (PA): ASTM International.
[4] Residential Oven Test Method (2019), Frontier

included in the cooking efficiency calculation per ASTM F1496 *Standard Test Method for Performance of Convection Ovens*[5].

PEAK ELECTRIC DEMAND REDUCTION (kW)

Peak demand savings are not determined for this residential gas oven measure. See Electric Savings Section for more detail.

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). For the energy savings calculation, the 2.5 pound load of potatoes energy consumption results of the oven were used to determine savings as it better represents the typical usage of a residential oven.

Annual Gas Unit Energy Consumption

The per cooking cycle gas UEC (baseline or measure case) is equal to the sum of preheat and cooking energy. These calculations and the inputs are provided below.

$$UEC_{Day}\left(\frac{Btu}{use}\right) = Preheat\ Energy\ Per\ Use\ +\ Cooking\ Energy\ Per\ Use$$

Preheat energy consumption is a measured consumption value determined during the testing process.

Cooking energy use is equal to the product of the cooking energy rate for the oven tested at 2.5 pound load and the cook time.

$$Cooking\ Energy\ Per\ Use\ \left(\frac{Btu}{use}\right) = Cooking\ Energy\ rate\ \left(\frac{Btu}{h}\right) \times \frac{Cook\ time\ (min)}{60\ (\frac{min}{hr})}$$

The annual gas UEC is equal to the per cooking cycle UEC multiplied by the number of uses per year.

$$UEC_{Year} = \frac{UEC_{Day}\ (Btu/use)}{1000\frac{Btu}{kBtu}} \times Uses/yr$$

Annual Gas Unit Energy Savings

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

$$UES_{Year} = \left[UEC_{Year,\ Base} - UEC_{Year,\ Measure}\right] \div 100\ kBtu/Therm$$

UEC_{Year} = *Annual UEC, baseline or measure (kBtu/year)*
UES_{Year} = *Annual UES (therms/year)*

[5] American Society for Testing and Materials (ASTM). 2019. *ASTM F1496-13 Standard Test Method for Performance of Convection Ovens.* West Conshohocken (PA): ASTM International.

Example Calculation

An Example calculation for the measure consumption is provided below:

$$Cooking\ Energy\ Per\ Use\ \left(\frac{Btu}{use}\right) = Cooking\ Energy\ rate\ \left(\frac{Btu}{h}\right) \times \frac{Cook\ time\ (min)}{60\ (\frac{min}{hr})}$$

$$Cooking\ Energy\ Per\ Use\ \left(\frac{Btu}{use}\right) = 4920\ \left(\frac{Btu}{h}\right) \times \frac{34\ (min)}{60\ (\frac{min}{hr})}$$

$$Preheat\ Energy\ Per\ Use\ (Btu/use) = 1{,}876\ Btu/use$$

$$UEC_{Day}\left(\frac{Btu}{use}\right) = Preheat\ Energy\ Per\ Use\ +\ Cooking\ Energy\ Per\ Use$$

$$UEC_{Day}(Btu/use)\ =\ 1{,}876\ Btu/use + \ 2{,}788\ Btu/use =\ 4{,}664\ Btu/use$$

$$UEC_{Year,\ Measure} = \frac{UEC_{Day}\ (Btu)}{1000\frac{Btu}{kBtu}} \times uses/yr = \frac{4{,}664\ \frac{Btu}{use}}{1000\frac{Btu}{kBtu}} \times\ 156\ uses/yr = 727.6\ kBtu/yr$$

$$UES_{Year} = \left[UEC_{Year,\ Base} - UEC_{Year,\ Measure}\right] \div 100\ kBtu/Therm$$

$$UES_{Year} = [980.8\ kBtu/yr - 727.6\ kBtu/yr] \div 100\ kBtu/Therm = 2.53\ Therms/yr$$

Inputs and Assumptions

The Lawrence Berkeley National Laboratory (LBNL) study "*Cooking Appliance Use in California Homes*"[6] found that 54% of ovens in California residences are fueled by natural gas. The responses from a survey administered through the study found that residential ovens are used primarily for dinner with 53% of correspondents using the oven 1-2 days a week at dinnertime and 29% of correspondents using the oven 3-4 days a week in total. Less than 10% of the correspondents use their oven more frequently or never use their oven. Additionally, about 43% of correspondents use their oven 1-2 days a week for "other" purposes besides meal preparation, like baking. Ovens are seldom used for cooking breakfast or lunch with 76% of correspondents saying they never use their oven to cook breakfast and 68% of correspondents saying they never use the oven to cook lunch.

When in use, residential ovens typically operate between 16 to 30 minutes. Cooking durations of 31 to 45 minutes and 46 to 60 minutes are also common during dinner, but about one-third less likely. When used for lunch, residential ovens generally operate for short periods with most using the oven for 11 to 15 minutes and a sizeable percentage using it for less than five minutes. The oven is used for baking approximately 49% of the time for dinner, three times as likely as for either breakfast or lunch. Broiling is much less common, used for 12% of dinners. Broiling similarly occurs at least three times as often for

[6] V. Klug, obscheid, A., and Singer, B. (Lawrence Berkeley National Laboratory, LBNL). 2011. *Cooking Appliance Use in California Homes – Data Collected from a Web-Based Survey*. August. LBNL-5082E.

dinner than for breakfast or lunch. Given these findings, a reasonable estimate for typical residential oven use would be baking for a duration of 35 minutes, three times a week.

Surveyed Residential Oven Use When Cooking Meals, LBNL Survey Data

Cooking Type	Breakfast	Lunch	Dinner
Baking	13.5%	16.7%	48.9%
Broiling	3.1%	1.3%	12.2%

Inputs and assumptions for an energy use model are provided below. This analysis assumes the residential range oven is used on average three times per week and each use is estimated to consist of one oven preheat and 35 minutes of active cooking use. The average production capacity of a residential oven cooking russet potatoes is 10.4 and 10.6 pounds per hour for the measure and base case respectively, when used at full load.

Energy Model Input Assumptions

Parameter	Value	Reference
Average Oven Uses Per Week	3	E. Ruan, Hedrick, R., and Livchak, D. (Frontier Energy). 2019. *Residential Oven Performance and Energy Comparison Study*. Frontier Energy Report #501319057-R0. Prepared for the Southern California Gas Company. December.
Oven Uses Per Year	156	
Number of preheats per use	1	Professional judgement
Cooked time Per Use (min)	34	V. Klug, obscheid, A., and Singer, B. (Lawrence Berkeley National Laboratory, LBNL). 2011. *Cooking Appliance Use in California Homes – Data Collected from a Web-Based Survey*. August. LBNL-5082E.

These assumptions were applied to the representative measure case and base case oven in the table below.

Preheat energy and cooking energy rate values were averaged for four energy efficient ovens. While the same criteria were averaged for four baseline residential gas ovens. Both sets were tested in 2020 in SoCalGas's Food Service Testing Lab to populate the table below. All models were tested at differing loads from 2.5 to 15 pounds of potatoes. However, the values used in the table below and for the savings calculation, were of the 2.5 pound load test as it better represents the typical usage of a residential oven.

Energy Model for Residential Gas Ovens

Parameter	Base Case	Measure Case
Preheat Energy Per Use (Btu)	2,569	1,876
Cooking Energy Rate (Btu/h)	6,562	4,920

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 a high-efficiency residential gas oven is presented below. Insofar as the residential gas oven measure is not add-on equipment, the RUL is not applicable.

Effective Useful Life and Remaining Useful Life

Measure Offering	EUL ID	EUL Value (yrs)	Source
EUL (yrs)	Appl-Gas_Cooking	13.0	California Public Utilities Commission (CPUC), Energy Efficiency Branch. *Solicitation for Comments on Scope of Update for Database of Energy Efficiency Resources for program year 2022 (DEER2022) and error corrections for program years 2020 and 2021*. Memorandum submitted to the Energy Efficiency Proceeding Service List R.13-11-005. Table A-8-2, p. A-16.
RUL (yrs)	Appl-Gas_Cooking	n/a	

BASE CASE MATERIAL COST ($/UNIT)

The base case material cost was calculated as the average of the list prices of ten residential gas oven models identified as standalone or slide-in range residential ovens that did not meet the measure case energy efficiency and idle threshold criteria. Below list price are actual purchase price of test units purchased. Note that high-end gas ovens and built-in ovens over $2,000 were omitted from this list.

Baseline Residential Standalone or Slide-In Gas Oven Costs

Model	Convection	Cavity Size (ft^3)	List Price
B	no	5.0	$899
C	no	5.8	$999
G	no	5.0	$799
H	no	5.1	$699
I	no	4.2	$899
D	no	5.0	$765
J	yes	5.4	$1,099
Q	no	5.1	$448
R	no	5.1	$449
X	yes	5.6	$1,439
Average:		**5.0**	**$849**

MEASURE CASE MATERIAL COST ($/UNIT)

The measure case material cost was calculated as the average of the list prices of five residential gas oven models that are standalone or slide-in residential range gas ovens that met the energy efficiency and idle threshold criteria. Below list price are actual purchase price of test units purchased. Note that high-end gas ovens and built-in ovens over $2,000 were omitted from this list.

Energy Efficient Residential Standalone or Slide-In Gas Oven Costs

Model	Convection	Cavity Size (ft^3)	List Price
F	yes	5.8	$1,199
S	no	5.0	$799
T	yes	5.0	$749
V	no	5.0	$899
Y	yes	5.0	$1,114
Average:		**5.4**	**$952**

BASE CASE LABOR COST ($/UNIT)

Cost to deliver a residential range oven to a household location ranges from $50 to $150. Some retailers offer promotions and free delivery. Multifamily units not located on the ground floor may incur higher delivery charges. Delivery cost usually includes installation if no major electricity or gas service upgrades are required. A new gas hose is often recommended and costs $10 to $20. Gas range ovens usually come equipped with a built-in 120 V, 15A electrical cord.

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

For all other delivery types, it is assumed the participant would have purchased a standard efficiency residential gas oven absent the program. As such, the labor cost is assumed to be the same for both base case and measure case scenarios and the incremental labor cost is equal to $0.

MEASURE CASE LABOR COST ($/UNIT)

Energy efficient gas range ovens cost the same to install as baseline units.

For all other delivery types, it is assumed the participant would have purchased a standard efficiency residential gas oven absent the program. As such, the labor cost is assumed to be the same for both base case and measure case scenarios and the incremental labor cost is equal to $0.

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. The NTG value adopted for this measure is applicable to all energy efficiency measures with no specific evaluated Net-to-Gross ratio, for residential homes.

Net-to-Gross Ratios

NTG ID	Value	Source
All-Default<=2yrs	0.7	Itron, Inc. 2011. DEER Database 2011 Update Documentation. Prepared for the California Public Utilities Commission.

GROSS SAVINGS INSTALLATION ADJUSTMENT

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.

Gross Savings Installation Adjustment Rates

Parameter	Value	Source
GSIA	1.0	California Public Utilities Commission (CPUC), Energy Division. 2013. Energy Efficiency Policy Manual Version 5. Page 31.

NON-ENERGY IMPACTS

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

DEER DIFFERENCES ANALYSIS

This section provides a summary of DEER-based inputs and methods, and the rationale for inputs and methods that are not DEER-based.

DEER Difference Summary

DEER Item	Comment / 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
NTG	Source: DEER. The NTG of 0.70 is associated with NTG ID: All-Default<=2yrs
GSIA	The GSIA of 1.0 is associated with GSIA ID: Def-GSIA
EUL/RUL	Source: DEER 2020. The EUL of 13 years is associated with EUL ID: Appl-Gas_Cooking

REVISION HISTORY

Measure Characterization Revision History

Revision Number	Date	Primary Author, Title, Organization	Revision Summary and Rationale for Revision Effective Date and Approved By
01	12/22/2019	Denis Livchak, Sr. Engineer, Frontier Energy	Initial release as a new measure
	6/30/2020	Chan Paek/ Andres Marquez, SoCalGas	Adjusted cooking load per use and oven idle time per CPUC comments Additional minor grammatical changes
02	2/1/2021	Andres Marquez, SoCalGas	Add previous revision updates and then new revision updates separately below.
02	3/30/2021	Andres Marquez, SoCalGas	Incorporate 2020 test results from SoCalGas FSTL test Change qualifying parameter from "idle energy rate" to "preheat energy consumption" Update savings methodology with "cook time" as oppose to "amount of food cooked" per V. Klug, obscheid, A., and Singer, B. (Lawrence Berkeley National Laboratory, LBNL). 2011. *Cooking Appliance Use in California Homes – Data Collected from a Web-Based Survey*. August. LBNL-5082E. Update measure and base cost with additional 8 models of SCG FSTL tests Update measure and base energy consumption parameters with additional 8 models of SCG FSTL tests Remove idle energy consumption from energy savings calculation
	4/13/2021	Andres Marquez, SoCalGas	Minor adjustment to the *Cooked time Per Use (min)* of the **Energy Model Input Assumptions** due to calculation error in data spec sheet