



SAN MATEO COUNTY
Sustainability
Department

Commercial Kitchen Electrification Cost Study

December 18, 2025

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Speakers



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Zoom Functions



Introduce yourself in the chat: Name and Organization

Please ask questions in chat – we will monitor and take questions at the end of the presentation



Presented by  SAN MATEO COUNTY
ENERGY WATCH



- Local government partnership between PG&E and the City/County Association of Governments of San Mateo County (C/CAG), administered by San Mateo County Sustainability Department
- Funded by California utility customers, administered by PG&E under the auspices of the California Public Utilities Commission
- Provide coordination, outreach, referrals, and educational resources to help organizations pursue energy efficiency and electrification projects
- Refer “hard-to-reach” customers to PG&E programs: small businesses, local governments, special districts, K-12 public school districts



Background

Commercial Kitchen Electrification Cost Study



- **Food Service businesses** represent a **significant share of energy consumption**.
- Supporting the food service industry in **electrifying and improving energy efficiency** will be necessary to **meet State and local climate goals**.
- This cost study will **further industry knowledge about the costs and feasibility** of implementing energy efficiency and electrification measures in restaurants.
- Study design modeled on single-family home decarbonization case studies completed in 2023 by Sustainability Department, funded by BayREN



Today's Learning Topics



Sustainability: Decarbonization & Electrification



Achieving Sustainability through Energy Efficiency



Electrification Study Overview & Insights



Energy Efficient & Electric Cooking Equipment Specification



What's Next – Kitchen of the Future & Real-World Examples



What's Needed – Recommendations & Discussion



Sustainability through Decarbonization & Electrification



Decarbonization



Reducing human-related carbon and CO₂ equivalents in all aspects of human society

Voluntary decarbonization is not working, so we are moving towards Codes and Standards



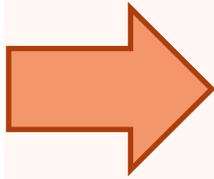
Decarbonization through Energy Efficiency



Directly at the point source



35% Efficient
Gas Fryer

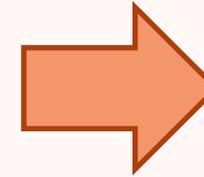


50% Efficient
Gas Fryer

Indirectly back to the powerplant



40% Efficient
Electric Steamer



70% Efficient
Electric Steamer



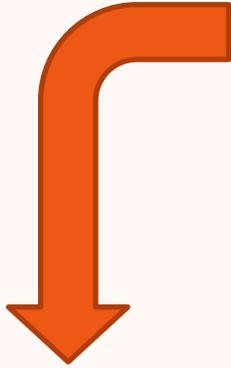
Electrification



Replacing technologies that consume fossil fuels with technologies that consume electricity

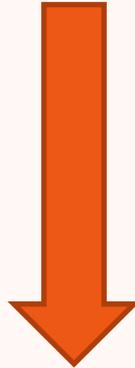


Three Paths to Kitchen Decarbonization



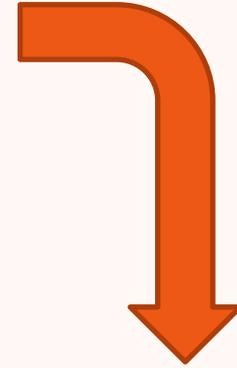
Existing Kitchens: Limited Electrical Panels

Replace gas & electric equipment with high efficiency gas & electric



Existing Kitchens: Electrical Panel Capacity

Replace gas & electric equipment with high efficiency electric



New Kitchens & Major Rehab

Install high efficiency electric equipment



Achieving Sustainability with Equipment Energy Efficiency



Energy efficiency is the most crucial component

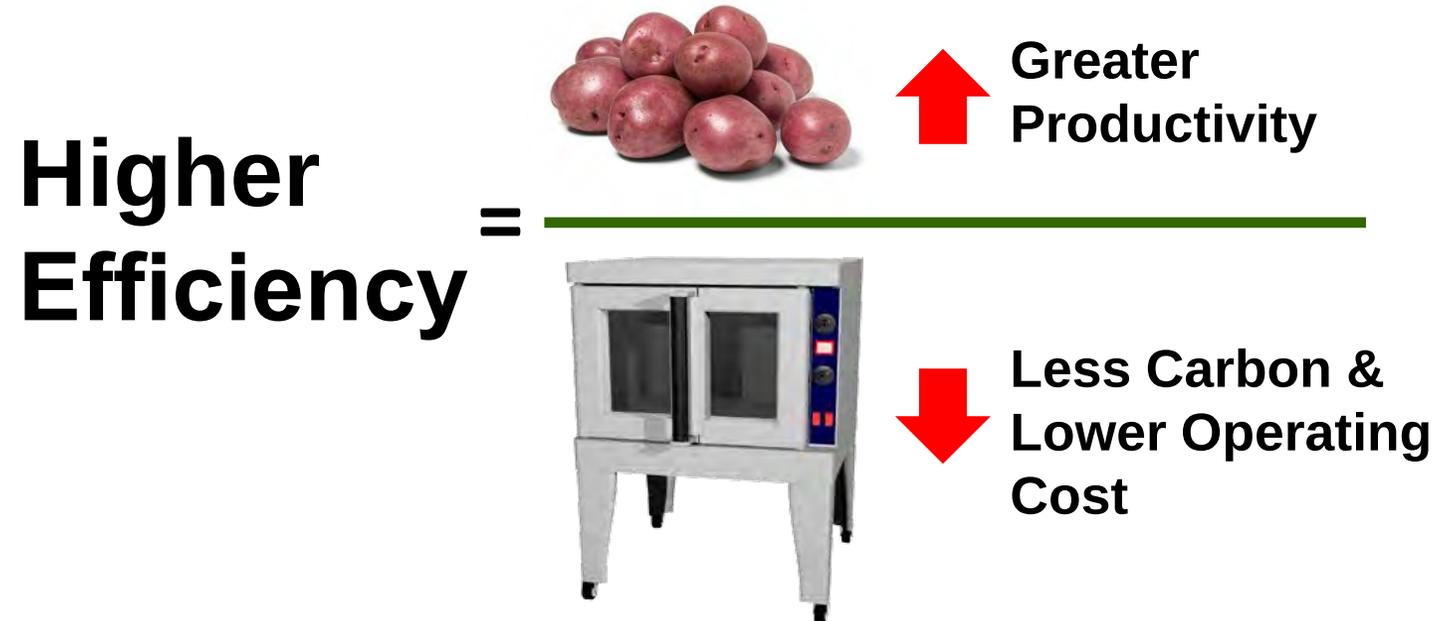
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$$\text{Efficiency (\%)} = \frac{\text{Btu to Food} \rightarrow \text{Potatoes}}{\text{Btu to Appliance} \rightarrow \text{Oven}}$$




Energy efficiency is the most crucial component

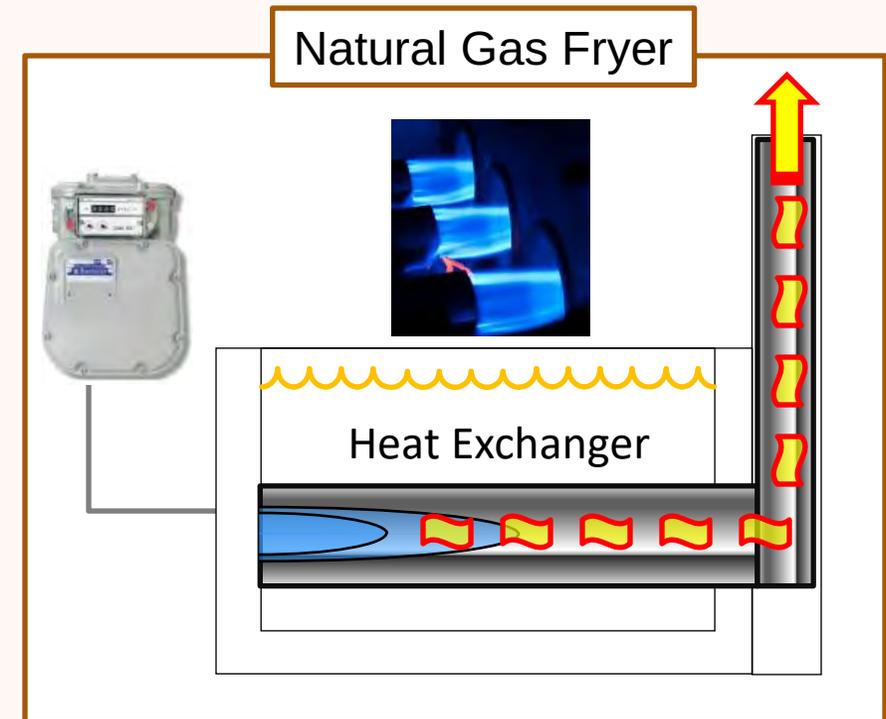
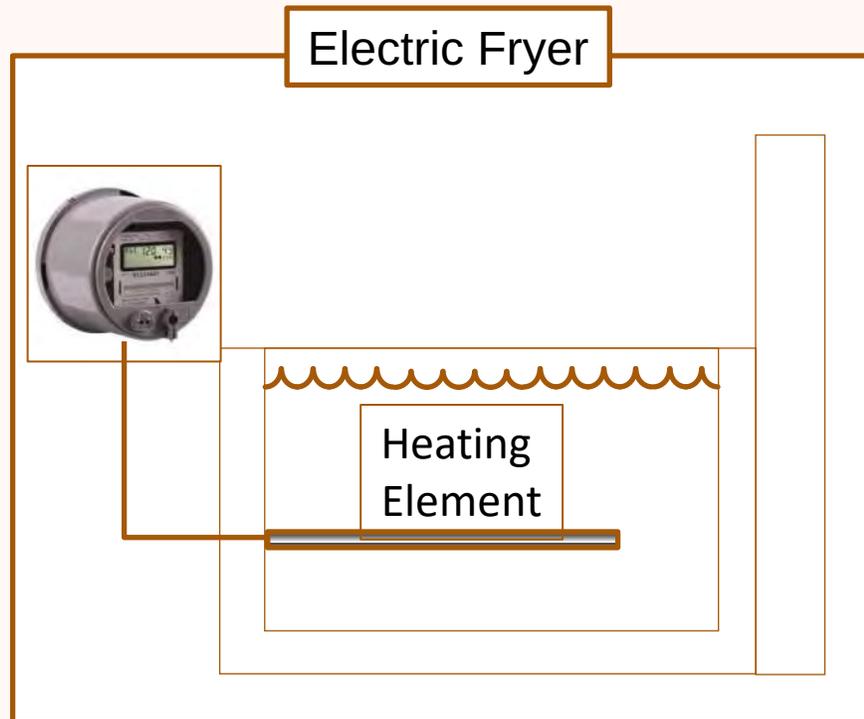
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Electric vs Natural Gas Cooking Equipment



- Electric appliances are typically 1.5 to 3 times **more** energy efficient
- Electricity costs 2.5 to 4 times more per unit of energy
- Gas appliances are typically less expensive to operate in California



Study Overview and Insights



Study Objectives



- Provide the County with an analysis of the costs associated with transitioning methane gas appliances to electric cooking equipment in commercial kitchens and decarbonizing the buildings themselves.
- Assessment of upfront costs such as equipment, installation, utility upgrades, associated infrastructure improvements, and ongoing operational costs.
- The findings will be used by the County to inform future planning and decision-making regarding kitchen electrification initiatives.
- The results of the study will be shared publicly and used to advance industry knowledge of electrification in commercial foodservice.



Study Scope

1. Visit ten (10) **commercial food service kitchens** to inventory the cooking, water, and space heating equipment to develop alternative energy-efficient and all-electric equipment schedules. Report the following:
 - Estimated the energy use, operating cost and carbon footprint of the existing cooking equipment line-up and that of the proposed alternate energy efficient and all electric equipment schedules.
 - Equivalent heating units for an electrified heating system
 - Sizing of heat pump water heaters to replace natural gas-powered water heaters
 - Calculated electrical service requirements for the installation of the proposed electric cooking and water heating equipment
2. **For three (3) of the sites**, partnering electrician and plumber to provide cost estimates for infrastructure upgrades and proposed cooling and water heating equipment
3. Identify utility rebates available to off set the capital cost associated with alternative energy-efficient and all-electric equipment



Study Sites



Site	Food Service Operation Type	Building Type
Bayhill Vietnamese Bistro	Casual Dining - Independent	Multi-Unit Commercial/Retail Suite
Broadway Grill	Casual Dining - Independent	Free Standing with abutted building
Coconut Bay Thai	Casual Dining - Independent	Multi-Unit Commercial/Retail Suite
Empanadas King	Catering	Multi-Unit Commercial/Retail/Light Industrial Suite
Hillview Middle School	Public School Cafeteria	School
JobTrain	Culinary Arts Teaching Kitchen	Multi-Unit Business Park
Taqueria Los Moreno	Fast Casual – Independent	Multi-Unit Commercial/Retail Suite
Menlo Atherton High School	Public School Cafeteria	School
Sizzler	Casual Dining – Chain Franchise	Free Standing
Twin Pines Senior & Community Center	Community Center & Events Catering	Multi-Use Government Building



Common Natural Gas Cooking Equipment



Convection Ovens



Underfired Charbroilers



Griddles



Restaurant Ranges – Open Burners & Oven Base



Fryers



Example of a Common Natural Gas Cookline at Taqueria Los Moreno



Restaurant Range
– 6 Open Burners
and Oven Base

Purchase Price:
\$2,420

Charbroiler
– 24"

Purchase
Price:
\$1,800

Fryer –
14", 35 lbs,
ENERGY
STAR®

Purchase
Price:
\$3,325
(Utility
Rebate:
\$900)

Manual
Griddle – 36"

Purchase Price:
\$1,760

Total Equipment Package Purchase Price:
\$8,405



Less Common Natural Gas Cooking Equipment



Deck Oven – 4 Decks
(Empanadas King)



Stock Pot Ranges – Single & Double
Open Burners
(Bayhill Vietnamese Bistro)



Wok
(Coconut Bay Thai)



Common Natural Gas Water Heating Equipment



Purchase Price:
\$6,600



Purchase Price:
\$6,210



Purchase Price:
\$6,210



Purchase Price:
\$900



Purchase Price:
\$6,210

Standard Efficiency Tank Storage Non-Condensing Type



Less Common Natural Gas Water Heating Equipment

- Gas High Efficiency Tank Storage Condensing Type



(Menlo-Atherton H.S.)

Purchase Price: \$11,000

- Electric Heat Pump Water Heater Type



(Hillview M.S.)

Purchase Price: \$11,300



Study Sites: Comprehensive Assessment

Electrical & Plumbing Infrastructure Upgrade Investigation



Site	Food Service Operation Type	Building Type
Broadway Grill	Casual Dining - Independent	Free Standing with abutted building
JobTrain	Culinary Arts Teaching Kitchen	Multi-Unit Business Park
Taqueria Los Moreno	Fast Casual – Independent	Multi-Unit Commercial/Retail Suite



Broadway Grill, Burlingame



Site Details

Commercial Food Service Type	Casual Dining
Primary Cuisine Served	European-inspired fare with a modern Californian flair
Building Type	Attached commercial
Approximate Square Footage	3,140 (main floor) + 1,130 (second floor): 4,270 total
Customer Seating Capacity	80
Age of Building	97 years
Years in Business	5
Building Occupancy	Leased
Days of Operation per Year	253

Natural Gas & Electricity Costs: June 2025

Electricity – PG&E Delivery Charges (\$)	Electricity – Peninsula Clean Energy Charges (\$)	PG&E Natural Gas (\$)	Total Energy Utility Cost (\$)
1,662	930	1,350	3,942

Equipment Inventory

Cooking



Type
Restaurant Range – 36" Underfired Charbroiler with Oven Base
Restaurant Range – 36" Manual Flattop Griddle with Oven Base
Salamander
Restaurant Range – 6 Open Burners with Oven Base
Fryer – 14", 35 lbs
Fryer – 14", 50 lbs
Convection Oven – Full (Double)



Water Heating



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	45,000 BTU/hr	55
Tank Storage	Gas	38,000 BTU/hr	50



Space Heating



Type	Location	Rated Heating Capacity (Btu/hr)	Equivalent Heating Units (kW)
Package Gas Heating / Electric Cooling RTU	Rooftop	103,000	30.2
Package Gas Heating / Electric Cooling RTU	Rooftop	103,000	30.2



All Electric & Energy Efficiency Options – Specification

Gas Cooking Equipment

Type	QTY
Restaurant Range – 36" Underfired Charbroiler with Oven Base	1
Restaurant Range – 36" Manual Flattop Griddle with Oven Base	1
Salamander	1
Restaurant Range – 6 Open Burners with Oven Base	2
Fryer – 14", 35 lbs	1
Fryer – 14", 50 lbs	1
Convection Oven – Full (Double)	1



Electric Cooking Equipment

Type	QTY	Purchase Price (\$ per unit)	Extended Purchase Price (\$)
Underfired Charbroiler – 36"	1	5,800	5,800
Low Profile Convection Oven	4	7,900	31,600
Flattop Thermostatic Griddle – 36"	1	6,900	6,900
2-Hob Countertop Induction Range	2	4,000	8,000
4-Hob Countertop Induction Range	2	7,000	14,000
Salamander	1	6,700	6,700
Fryer – 14", 50 lbs	1	7,700	7,700
Fryer – 14", 50 lbs	1	7,700	7,700
Double Convection Oven – Full	1	15,000	15,000
Total			103,400



Efficient Gas Cooking Equipment

Existing Type	Replacement Type	Purchase Price (\$)
Fryer – 14", 50 lbs	Gas Fryer – 14", 35 lbs	1,700

Special Electric Equipment Specification – Disaggregate the Restaurant Range



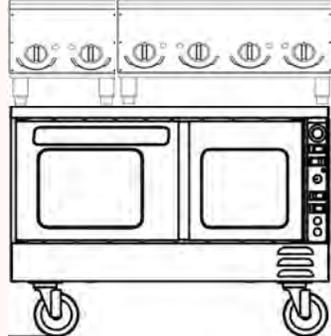
Countertop Induction Ranges



Low Profile Oven







Picture & Graphics Credit: Vollrath, Southbend

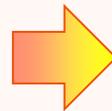
Electric Water Heater Specification



Colmac CxV-7 HPWH (1) & 400 Gallon Storage Tank (1)



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	45,000 BTU/hr	55
Tank Storage	Gas	38,000 BTU/hr	50



DESIGN OPERATING CONDITIONS	
ENTERING POTABLE TEMP:	40°F
LEAVING POTABLE TEMP:	140°F
SOURCE CONDITIONS:	30°F @ 60 %RH
COMPRESSOR SPEED:	100 %
DESIGN PERFORMANCE ²	
POTABLE FLOW RATE:	1.5 GPM (90.1 GPH)
HEATING:	75,100 Btu/hr (6.3 TONS)
HEATING COP:	2.3
COOLING:	47,600 Btu/hr
COOLING COP:	1.5
SYSTEM POWER:	9.6 kW
ENERGY EFFICIENCY RATIO:	7.8



Electrical Loads



Type	Qty	Load Type	Minimum Circuit Ampacity (A)	Circuit Breaker Ampacity (A)	Discrete Demand Load - KVA
Charbroiler	1	K	28.8	30	8.3
Low Profile Convection Oven	1	K	26.0	30	7.5
Thermostatic Flattop Griddle	1	K	56.3	60	16.2
Low Profile Convection Oven	1	K	26.0	30	7.5
Salamander	1	K	23.4	30	6.7
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30.0	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30.0	30	5.0
2-Hob Countertop Induction Range	1	K	30.0	30	5.0
Low Profile Convection Oven	1	K	26.0	30	7.5
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30.0	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30.0	30	5.0
2-Hob Countertop Induction Range	1	K	30.0	30	5.0
Low Profile Convection Oven	1	K	26.0	30	7.5
Fryer – 14", 35 lbs	1	K	48.8	50	14.1
Fryer – 14", 50 lbs	1	K	48.8	50	14.1
Double Convection Oven – Full (Top Oven)	1	K	38.8	40	11.2
Double Convection Oven – Full (Bottom Oven)	1	K	38.8	40	11.2
Heat Pump Water Heater	1	K	83.8	90	13.9
Heat Pump Water Heater	1	K	83.8	90	13.9
Total Connected Load KVA					169.5
NEC Demand Factor					65%
Total Demand - KVA					110.2
Total Demand Amps @120V/208V 3Ph 4-Wire					305.8



Electrical Infrastructure Upgrade Scope



- 1. Furnish and install (1) 800A 3-phase/4-wire 120/208V pad-mounted electrical service** containing (1) meter section. The distribution section of the switchgear shall contain (1) 3-pole 800A main and (2) 3-pole 400A circuit breakers. A concrete housekeeping pad is included. Included is a 36x36x12 NEMA3R enclosure to provide a single point of connection to new PG&E utility equipment.
- 2. Furnish and install (1) 3-phase/4-wire 120/208V wall-mounted distribution panelboard.** The panelboard shall contain (1) 400A main, (6) 2-pole 30A, (6) 3-pole 30A, (2) 3-pole 40A, (2) 3-pole 50A, (1) 3-pole 60A, and (2) 3-pole 90A circuit breakers.
- 3. Refeed (1) existing 400A** distribution board from new electrical service equipment.
- 4. Furnish and install raceway, supports and conductors to bond to ground rod and domestic water supply grounding electrodes.**
- 5. Furnish and install conduit, supports and conductors to provide electrical connections to the following equipment.**
- 6. Engineered electrical drawing costs are included in this proposal.**



Exclusions



1. Code upgrades for electrical infrastructure outside of the present project scope are excluded.
2. Fire alarm upgrades are excluded.
3. All fees which shall potentially be assessed by Pacific Gas and Electric are not included in this proposal. Additionally, labor and material costs associated with PG&E involvement, direction and coordination are presently excluded. The project scope described above requires a service **upgrade from 400A to 800A** and includes a single point of connection in a junction box on the building exterior face. All costs associated with PG&E utility infrastructure upgrade are excluded from this proposal.
4. Architectural and structural changes to the project site to accommodate the new electrical infrastructure are excluded from this proposal.
5. Building permit fees are excluded.



Upgrade Costs



Electrical Infrastructure Upgrade

Element	Cost (\$)
Labor	224,042
Material	100,281
Equipment	17,289
Engineering	47,196
Total	388,808

HPWH Upgrade

Element	Cost (\$)
Labor	30,740
Material/Equipment	138,770
Total	169,510



Electrification Project Cost



Element	Cost (\$)
Electrical	388,808
Plumbing	169,510
Cooking Equipment	103,400
Energy Efficient Electric Cooking Equipment Rebates	(5,350)
Total Cost (\$)	486,858

Utility Rebate – Electric Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
2-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	1,000
4-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	2,000
Flattop Thermostatic Griddle – 36"	Griddle	Instant Mid-Stream	750
Fryer	Fryer	Instant Mid-Stream	400
Convection Oven - Double	Convection Oven	Instant Mid-Stream	1,500
Total			5,350

Utility Rebate – Efficient Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
Flattop Thermostatic Griddle – 36"	Griddle	Instant Mid-Stream	750
Fryer	Fryer	Instant Mid-Stream	1,500
Double Convection Oven – Full	Convection Oven	Instant Mid-Stream	1,500
Total			3,750



Annual Operating Cost Comparison

Type	Qty	Existing Equipment Annual Operating Cost (\$)	Alternative Energy Efficient Equipment Annual Operating Cost (\$)	Alternative One-for-One Electric Equipment Annual Operating Cost (\$)
Restaurant Range – 36" Underfired Charbroiler Oven Base - Charbroiler	1	4,314	4,314	5,055
Restaurant Range – 36" Underfired Charbroiler with Oven Base – Oven	1	291	291	607
Restaurant Range – 36" Manual Flattop Griddle with Oven Base - Griddle	1	1,104	1,104	1,833
Restaurant Range – 36" Manual Flattop Griddle with Oven Base - Oven	1	874	874	1,822
Salamander	1	1,092	1,092	3,200
Restaurant Range – 6 Open Burners with Oven Base - Burners	1	1,166	1,166	2,332
Restaurant Range – 6 Open Burners with Oven Base – Oven	1	291	291	607
Restaurant Range – 6 Open Burners with Oven Base - Burners	1	1,166	1,166	2,332
Restaurant Range – 6 Open Burners with Oven Base – Oven	1	291	291	607
Fryer – 14", 35 lbs	1	662	662	2,290
Fryer – 14", 50 lbs	1	1,256	662	2,290
Double Convection Oven – Full (Top)	1	547	547	2,955
Restaurant Range – 36" Underfired Charbroiler Oven Base - Charbroiler	1	4,314	4,314	5,055
Total		13,601	13,007	28,885
Value vs Existing			-594	+15,283



Note: Operating cost based on utility rates of \$0.38/kWh and \$1.90/therm, respectively

Annual Carbon Intensity Comparison



Type	Qty	Existing Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative Energy Efficient Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative One-for-One Electric Equipment Annual Carbon Intensity (MTCO ₂ e)
Restaurant Range – 36" Underfired Charbroiler Oven Base - Charbroiler	1	11.9	11.9	0.5
Restaurant Range – 36" Underfired Charbroiler with Oven Base – Oven	1	0.8	0.8	0.1
Restaurant Range – 36" Manual Flattop Griddle with Oven Base - Griddle	1	3.0	3.0	0.2
Restaurant Range – 36" Manual Flattop Griddle with Oven Base - Oven	1	2.4	2.4	0.2
Salamander	1	3.0	3.0	0.3
Restaurant Range – 6 Open Burners with Oven Base - Burners	1	3.2	3.2	0.2
Restaurant Range – 6 Open Burners with Oven Base – Oven	1	0.8	0.8	0.1
Restaurant Range – 6 Open Burners with Oven Base - Burners	1	3.2	3.2	0.2
Restaurant Range – 6 Open Burners with Oven Base – Oven	1	0.8	0.8	0.1
Fryer – 14", 35 lbs	1	1.8	1.8	0.2
Fryer – 14", 50 lbs	1	3.5	3.5	0.2
Double Convection Oven – Full (Top)	1	1.5	0.4	0.3
Double Convection Oven – Full (Double - Bottom)	1	1.5	1.5	0.3
Total		37.5	36.4	2.9
Value vs Existing			-1.1	-34.6



Job Train, Menlo Park



Site Details

Commercial Food Service Type	Job Training – Culinary Arts Program
Primary Cuisine Served	-
Building Type	Combined Multi-unit Commercial Office Complex Suites
Approximate Square Footage	1,500 (Kitchen & Classroom)
Customer Seating Capacity	10 – 15 students per class
Age of Building	60 years
Years in Business	-
Building Occupancy	Owned
Days of Operation per Year	176 instruction days

Equipment Inventory

●●● Cooking Equipment



Type	QTY
Fryer – 14", 50 lbs	1
Restaurant Range – 10 Open Burners with Oven (2) Base	2
36" Underfired Charbroiler	1
24" T-Stat Countertop Griddle	1
Salamander	1
Restaurant Range – 6 Open Burners with Oven Base	1
Convection Oven – Full (Double)	1

Water Heating Equipment



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	199,000 BTU/hr	100



All Electric & Energy Efficiency Options – Specification

Gas Cooking Equipment

Type	QTY
Fryer – 14", 50 lbs	1
Restaurant Range – 10 Open Burners with Oven (2) Base	2
36" Underfired Charbroiler	1
24" T-Stat Countertop Griddle	1
Salamander	1
Restaurant Range – 6 Open Burners with Oven Base	1
Convection Oven – Full (Double)	1



Electric Cooking Equipment

Type	QTY	Purchase Price (\$ per unit)	Extended Purchase Price (\$)
Fryer – 14", 50 lbs	1	2,000	2,000
4-Hob Countertop Induction Range	4	7,000	28,000
2-Hob Countertop Induction Range	2	4,000	8,000
Low Profile Convection Oven	2	7,900	15,800
Salamander	1	6,700	6,700
Flattop Thermostatic Griddle – 24"	1	4,200	4,200
Underfired Charbroiler – 24"	1	4,700	4,700
Double Convection Oven – Full	1	15,000	15,000
Total			84,400



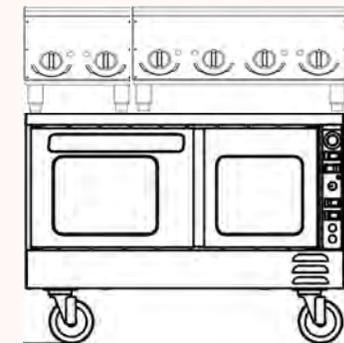
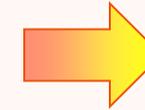
Efficient Gas Cooking Equipment

Existing Type	Replacement Type	Purchase Price (\$)
Fryer – 14", 50 lbs	Gas Fryer – 14", 35 lbs	1,700
Manual Flattop Griddle – 24"	Gas Thermostatic Flattop Griddle – 24"	7,300

Special Electric Equipment Specification – Disaggregate the Restaurant Range

Countertop Induction Ranges

Low Profile Oven



Picture & Graphics Credit: Vollrath, Southbend

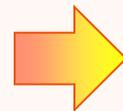
Electric Water Heater Specification



Existing



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	199,000 BTU/hr	100



Colmac CxV-7 HPWH (1) & 300 Gallon Storage Tank (1)



DESIGN OPERATING CONDITIONS

ENTERING POTABLE TEMP:	40°F
LEAVING POTABLE TEMP:	140°F
SOURCE CONDITIONS:	30°F @ 60 %RH
COMPRESSOR SPEED:	100 %

DESIGN PERFORMANCE ²

POTABLE FLOW RATE:	1.5 GPM (90.1 GPH)
HEATING:	75,100 Btu/hr (6.3 TONS)
HEATING COP:	2.3
COOLING:	47,600 Btu/hr
COOLING COP:	1.5
SYSTEM POWER:	9.6 kW
ENERGY EFFICIENCY RATIO:	7.8



Electrical Loads



Type	Qty	Load Type	Minimum Circuit Ampacity (A)	Circuit Breaker Ampacity (A)	Discrete Demand Load - KVA
Fryer – 14", 50 lbs	1	K	49	50	14.1
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30	30	5.0
2-Hob Countertop Induction Range	1	K	30	30	5.0
Low Profile Convection Oven	1	K	26	30	7.5
Low Profile Convection Oven	1	K	26	30	7.5
Salamander	1	K	23	30	6.7
24" Manual Flattop Griddle	1	K	56	60	16.2
24" Underfired Charbroiler	1	K	29	30	8.3
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 1 of 2 Wires	1	K	30	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wires	1	K	30	30	5.0
2-Hob Countertop Induction Range	1	K	30	30	5.0
Low Profile Convection Oven	1	K	26	30	7.5
Low Profile Convection Oven	2	K	26	30	7.5
Double Convection Oven – Full	1	K	39	40	11.2
Double Convection Oven – Full	1	K	39	40	11.2
Heat Pump Water Heater	1	K	84	90	13.9

Total Connected Load KVA	161.5
NEC Demand Factor	65%
Total Demand - KVA	104.9
Total Demand Amps @120V/208V 3Ph 4-Wire	291.3



Electrical Infrastructure Upgrade Scope



- 1. Furnish and install (1) 800A 3-phase/4-wire 120/208V pad mounted electrical service** containing (1) meter section. The distribution section of the switchgear shall contain (1) 3-pole 800A main and (2) 3-pole 400A circuit breakers. A concrete housekeeping pad is included. Included is a 36x36x12 NEMA3R enclosure to provide a single point of connection to new PG&E utility equipment.
- 2. Furnish and install (1) 3-phase/4-wire 120/208V wall mounted distribution panelboard.** The panelboard shall contain (1) 400A main, (6) 2-pole 30A, (6) 3-pole 30A, (2) 3-pole 40A, (2) 3-pole 50A, (1) 3-pole 60A, and (2) 3-pole 90A circuit breakers.
- 3. Refeed (1) existing 400A distribution board** from new electrical service equipment.
- 4. Furnish and install raceway, supports and conductors to bond to ground rod and domestic water supply grounding electrodes.**
- 5. Furnish and install conduit, supports and conductors to provide electrical connections to the following equipment.**
- 6. Engineered electrical drawing costs are included in this proposal.**



Exclusions



1. Code upgrades for electrical infrastructure outside of the present project scope are excluded.
2. Fire alarm upgrades are excluded.
3. All fees which shall potentially be assessed by Pacific Gas and Electric are not included in this proposal. Additionally, labor and material costs associated with PG&E involvement, direction and coordination are presently excluded. The project scope described above requires a service **upgrade from 400A to 800A** and includes a single point of connection in a junction box on the building exterior face. All costs associated with PG&E utility infrastructure upgrade are excluded from this proposal.
4. Architectural and structural changes to the project site to accommodate the new electrical infrastructure are excluded from this proposal.
5. Building permit fees are excluded.



Upgrade Costs



Electrical Infrastructure Upgrade

Element	Cost (\$)
Labor	179,560
Material	79,570
Equipment	14,720
Engineering	36,790
Total	310,640

HPWH Upgrade

Element	Cost (\$)
Labor	31,600
Material/Equipment	138,700
Total	170,300



Electrification Project Cost



Element	Cost (\$)
Electrical	310,640
Plumbing	170,300
Cooking Equipment	84,400
Energy Efficient Cooking Equipment Rebates	(6,900)
Total Cost (\$)	558,440

Utility Rebate – Electric Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
2-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	1,000
4-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	4,000
Fryer	Fryer	Instant Mid-Stream	200
Griddle	Griddle	Instant Mid-Stream	500
Convection Oven - Double	Convection Oven	Instant Mid-Stream	1,200
Total			6,900

Utility Rebate – Efficient Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
Flattop Thermostatic Griddle – 24"	Griddle	Instant Mid-Stream	750
Fryer	Fryer	Instant Mid-Stream	500
Total			1,250



Annual Operating Cost Comparison



Type	Qty	Existing Equipment Annual Operating Cost (\$)	Alternative Energy Efficient Equipment Annual Operating Cost (\$)	Alternative One-for-One Electric Equipment Annual Operating Cost (\$)
Fryer – 14", 50 lbs	1	24	13	50
Restaurant Range – 10 Open Burners with Oven Base - Burners	1	676	676	1,284
Restaurant Range – 10 Open Burners with Oven Base – Oven	1	101	101	201
Salamander	1	8	8	22
24" Griddle - Thermostatic	1	25	16	136
24" Underfired Charbroiler	1	46	46	51
Restaurant Range – 10 Open Burners with Oven Base - Burners	1	676	676	1,284
Restaurant Range – 10 Open Burners with Oven Base – Oven	1	101	101	201
Double Convection Oven – Full (Top)	1	195	195	982
Double Convection Oven – Full (Bottom)	1	195	195	982
Total		2,047	2,028	5,193
Value vs Existing			-20	+3,146

Note: Operating cost based on utility rates of \$0.38/kWh and \$1.90/therm, respectively



Annual Carbon Intensity Comparison



Type	Qty	Existing Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative Energy Efficient Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative One-for-One Electric Equipment Annual Carbon Intensity (MTCO ₂ e)
Fryer – 14", 50 lbs	1	0.07	0.03	0.01
Restaurant Range – 10 Open Burners with Oven Base - Burners	1	1.9	1.9	0.1
Restaurant Range – 10 Open Burners with Oven Base – Oven	1	0.3	0.3	0.0
Salamander	1	0.0	0.0	0.0
24" Griddle - Thermostatic	1	0.07	0.05	0.01
24" Underfired Charbroiler	1	0.1	0.1	0.0
Restaurant Range – 10 Open Burners with Oven Base - Burners	1	1.9	1.9	0.1
Restaurant Range – 10 Open Burners with Oven Base – Oven	1	0.3	0.3	0.0
Double Convection Oven – Full (Top)	1	0.5	0.5	0.1
Total		5.7	5.6	0.4
Value vs Existing			-0.054	-5.2



Taquería Los Moreno, San Mateo



Site Details



Commercial Food Service Type	Fast Casual
Primary Cuisine Served	Mexican Comfort
Building Type	Multi-unit Commercial Suite
Approximate Square Footage	1,000
Customer Seating Capacity	30
Age of Building	40 – 50 years
Years in Business	13
Building Occupancy	Leased
Days of Operation per Year	320

Natural Gas & Electricity Costs: June 2025



Electricity – PG&E Delivery Charges (\$)	Electricity – Peninsula Clean Energy Charges (\$)	PG&E Natural Gas (\$)	Total Energy Utility Cost (\$)
939	395	689	2,023

Equipment Inventory

Cooking



Type	QTY
Restaurant Range –6 Open Burners with Oven Base	1
36" Manual Flattop Griddle	1
36" Underfired Charbroiler	1
Fryer – 14", 35 lb (ENERGY STAR®)	1



Water Heating



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	38,000	50



Space Heating



Type	Location	Rated Heating Capacity (Btu/hr)	Equivalent Heating Units (kW)
Tubular Unit Heater	Hanging Interior – Dining Area	Unknown	Unknown



All Electric & Energy Efficiency Options – Specification



Gas Cooking Equipment

Type	QTY
Restaurant Range -6 Open Burners with Oven Base	1
36" Manual Flattop Griddle	1
36" Underfired Charbroiler	1
Fryer - 14", 35 lb (ENERGY STAR®)	1



Electric Cooking Equipment

Type	QTY	Purchase Price (\$)
2-Hob Countertop Induction Range	1	4,000
4-Hob Countertop Induction Range	1	7,000
Low Profile Convection Oven	1	7,900
Flattop Thermostatic Griddle - 36"	1	6,900
Underfired Charbroiler - 24"	1	5,800
Fryer - 14", 50 lbs	1	7,700
Total		39,300



Efficient Gas Cooking Equipment

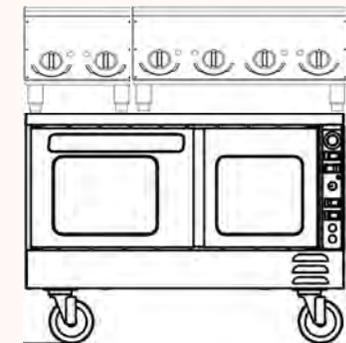
Existing Type	Replacement Type	Purchase Price (\$)
Manual Flattop Griddle - 36"	Gas Thermostatic Flattop Griddle - 36"	7,300

Special Electric Equipment Specification – Disaggregate the Restaurant Range



Countertop Induction Ranges

Low Profile Oven



Electrical Loads



Type	Qty	Load Type	Minimum Circuit Ampacity (A)	Circuit Breaker Ampacity (A)	Discrete Demand Load - KVA
2-Hob Countertop Induction Range	1	K	30	30	5.0
4-Hob Countertop Induction Range – 1 of 2 Wire	1	K	30	30	5.0
4-Hob Countertop Induction Range – 2 of 2 Wire	1	K	30	30	5.0
Low Profile Convection Oven	1	K	50	50	8.3
Flattop Thermostatic Griddle – 36"	1	K	97	100	16.2
Underfired Charbroiler – 24"	1	K	33	40	5.4
Fryer – 14", 50 lbs	1	K	84	90	13.9
Resistive Tank Type Water Heater	1	K	90	90	15.0

Total Connected Load KVA	73.8
NEC Demand Factor	65%
Total Demand - KVA	48.0
Total Demand Amps @120V/208V 1Ph 3-Wire	230.8



Electrical Loads & Infrastructure Scope



1. Furnish and install (1) 1-phase/3-wire 120/240V connected, wall mounted, single-overhead fed, outdoor rated, electrical service meter main containing (1) meter section. The distribution section of the switchgear shall contain (3) 2-pole 30A, (1) 2-pole 40A, (1) 2-pole 50A, (2) 2-pole 90A and (2) 2-pole 100A circuit breakers.
2. Furnish and install raceway, supports and conductors to bond to ground rod and domestic water supply grounding electrodes.
3. Furnish and install conduit, supports and conductors to provide electrical connections to the following equipment.
4. Engineering Drawings



Exclusions



1. Code upgrades for electrical infrastructure outside of the present project scope are excluded.
2. Fire alarm upgrades are excluded.
3. All fees which shall potentially be assessed by Pacific Gas and Electric are not included in this proposal. Additionally, labor and material costs associated with PG&E involvement, direction and coordination are presently excluded.
4. Building permit fees are excluded from the total below.



Electric Water Heater Specification



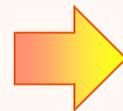
Existing



Colmac CxV-7 HPWH (1) & 215 Gallon Storage Tank (1)



Type	Fuel Source	Rated Heating Capacity (Btu/hr)	Water Storage Capacity (gallons)
Tank Storage	Gas	199,000 BTU/hr	100



DESIGN OPERATING CONDITIONS

ENTERING POTABLE TEMP:	40°F
LEAVING POTABLE TEMP:	140°F
SOURCE CONDITIONS:	30°F @ 60 %RH
COMPRESSOR SPEED:	100 %

DESIGN PERFORMANCE ²

POTABLE FLOW RATE:	1.5 GPM (90.1 GPH)
HEATING:	75,100 Btu/hr (6.3 TONS)
HEATING COP:	2.3
COOLING:	47,600 Btu/hr
COOLING COP:	1.5
SYSTEM POWER:	9.6 kW
ENERGY EFFICIENCY RATIO:	7.8



Upgrade Costs



Electrical Infrastructure Upgrade

Element	Cost (\$)
Labor	108,957
Material	41,422
Equipment	8,240
Engineering	21,942
Total	180,561

HPWH Upgrade

Element	Cost (\$)
Labor	29,170
Material/Equipment	123,460
Total	152,630



Total Electrification Project Cost



Element	Cost (\$)
Electrical	180,561
Plumbing	152,630
Cooking Equipment	39,300
Energy Efficient Electric Cooking Equipment Rebates	(2,450)
Total Cost (\$)	217,411

Utility Rebates – Electric Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
2-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	500
4-Hob Countertop Induction Range	Cooktop – Induction	Instant Mid-Stream	1,000
Flattop Thermostatic Griddle – 36"	Griddle	Instant Mid-Stream	750
Fryer	Fryer	Instant Mid-Stream	200
Total			2,450

Utility Rebates – Efficient Cooking Equipment

Type	Rebate Category	Rebate Type	Total Available Utility Rebates (\$)
Flattop Thermostatic Griddle – 36"	Griddle	Instant Mid-Stream	750
Total			750



Annual Operating Cost & Carbon Intensity Comparison

Operating Cost

Type	Qty	Existing Equipment Annual Operating Cost (\$)	Alternative Energy Efficient Equipment Annual Operating Cost (\$)	Alternative One-for-One Electric Equipment Annual Operating Cost (\$)
Restaurant Range – 6 open burners with Oven Base - Burners	1	1,475	1,475	2,949
Restaurant Range – 6 open burners with Oven Base - Oven	1	737	737	1,536
Flattop Manual Griddle – 36"	1	2,350	533	1,720
Underfired Charbroiler – 24"	1	1,935	1,935	5,376
Fryer – 14"	1	1,297	1,297	2,328
Total		7,795	5,978	13,908
Value vs Existing			-1,817	+6,114

Note: Operating cost based on utility rates of \$0.38/kWh and \$1.90/therm, respectively

Carbon Intensity

Type	Qty	Existing Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative Energy Efficient Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative One-for-One Electric Equipment Annual Carbon Intensity (MTCO ₂ e)
Restaurant Range – 6 open burners with Oven Base - Burners	1	4.1	4.1	0.3
Restaurant Range – 6 open burners with Oven Base - Oven	1	2.0	2.0	0.2
Flattop Manual Griddle – 36"	1	6.5	1.5	0.2
Underfired Charbroiler – 24"	1	5.3	5.3	0.5
Fryer – 14"	1	3.6	3.6	0.2
Total		21.5	16.5	1.4
Value vs Existing			-5.0	-20.1

All Site Summary: New Electric Cooking Equipment Purchase Cost

...

Site	Total Equipment Cost (\$)
Bayhill Vietnamese Bistro	67,700
Broadway Grill	103,400
Coconut Bay Thai	118,400
Empanadas King	45,300
Hillview Middle School	15,000
JobTrain	84,400
Los Moreno Taqueria	39,300
Menlo Atherton High School	53,400
Sizzler	71,300
Twin Pines Senior & Community Center	33,400



All Site Summary: Carbon Intensity



Site	Existing Equipment Annual Carbon Intensity (MTCO ₂ e)	Alternative Energy Efficient Equipment Annual Carbon Intensity (MTCO ₂ e)	Carbon Intensity Decrease vs Existing (%)	Alternative One-for-One Electric Equipment Annual Carbon Intensity (MTCO ₂ e)	Carbon Intensity Decrease vs Existing (%)
Bayhill Vietnamese Bistro	38.1	35.5	7%	2.2	94%
Broadway Grill	44.6	43.5	3%	3.3	93%
Coconut Bay Thai	44.1	42.7	3%	2.8	94%
Empanadas King	12.2	12.0	1%	0.6	95%
Hillview Middle School	1.2	1.0	17%	0.1	92%
JobTrain	5.7	5.6	1%	0.4	92%
Los Moreno Taqueria	21.5	16.5	23%	1.4	93%
Menlo Atherton High School	1.9	1.6	16%	0.2	91%
Sizzler	56.3	50.9	10%	3.2	94%

Note: Twin Pines Senior Center not included as carbon intensity calculated on a per hour basis. Refer to final report for reported values.



All Site Summary: Operating Cost



Site	Existing Equipment Annual Operating Cost (\$)	Alternative Energy Efficient Equipment Annual Operating Cost (\$)	Operating Cost Decrease vs Existing (%)	Alternative One-for-One Electric Equipment Annual Operating Cost (\$)	Operating Cost Increase vs Existing (%)
Bayhill Vietnamese Bistro	13,816	12,869	7%	34,867	152%
Broadway Grill	16,166	15,572	4%	32,953	104%
Coconut Bay Thai	15,994	15,475	3%	26,589	66%
Empanadas King	4,405	4,370	1%	5,625	28%
Hillview Middle School	462	390	16%	1,122	143%
JobTrain	2,047	2,028	1%	5,193	154%
Los Moreno Taqueria	7,795	5,978	23%	13,908	78%
Menlo Atherton High School	693	585	16%	1,683	143%
Sizzler	20,398	18,455	10%	29,654	45%

Note: Twin Pines Senior Center not included and operating cost calculated on a per hour basis. Refer to final report for reported values



Energy Efficient & Electric Cooking Equipment Specification



The ENERGY STAR® and CA ENERGY WISE programs make specification of Energy Efficient Equipment easy!

...



ISO Accredited Testing Laboratories are the foundation of Energy Star and Utility Rebate Programs



Standardized Tests = Comparable Data



Overcoming the Challenges



Many appliances require no behavior change to go all-electric...for example:



Overcoming the Challenges



Much of the equipment is already electric, and trends are moving more electric equipment into the kitchen.



Overcoming the Challenges

...

Open Burner Rangetops and Woks are problematic



Overcoming the Challenges

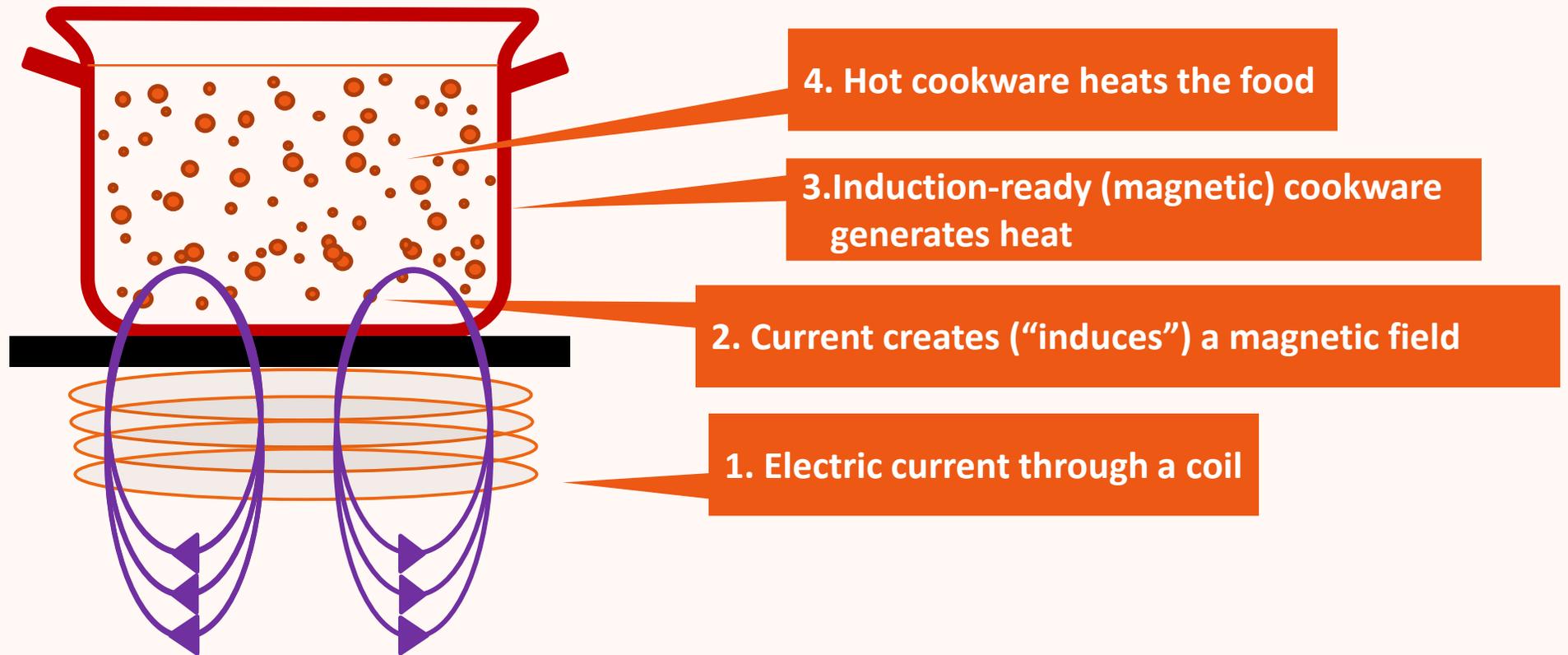
...

Induction is a superior technology



How Does Induction Cooking Work?

...



Induction Features



An induction hob is more like a gas burner than a traditional electric resistance element.



Induction Hob



Gas Burner



Electric Element

Fast Heat Up



Quick



Temperature

Response

Quick Cool Down

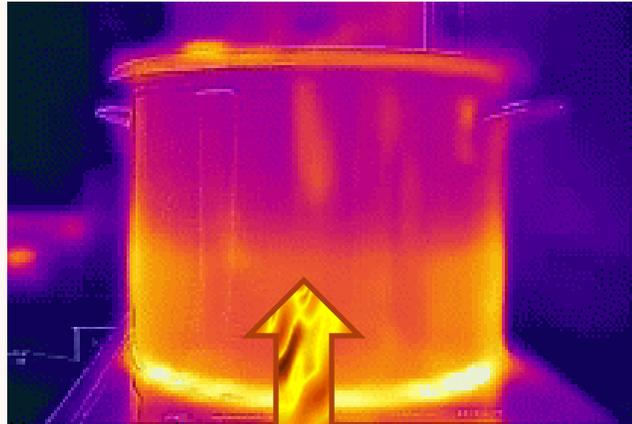
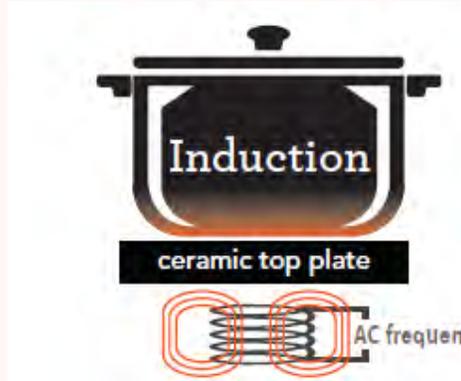


Good for Sauté



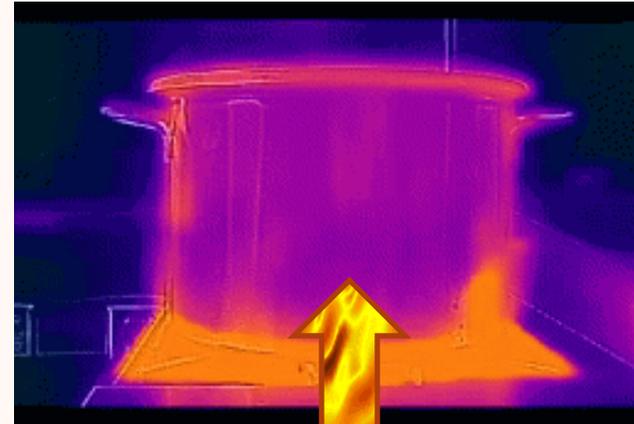
Efficiency: Where Does the Heat Go?

...



85%

Induction only heats the pan so most of the energy is used effectively.



35%

Gas heats the air and the range top as well as the pan so most of the energy is NOT used effectively.



Source:

Performance - Production

...

30kBTU/h x 30% efficiency



=

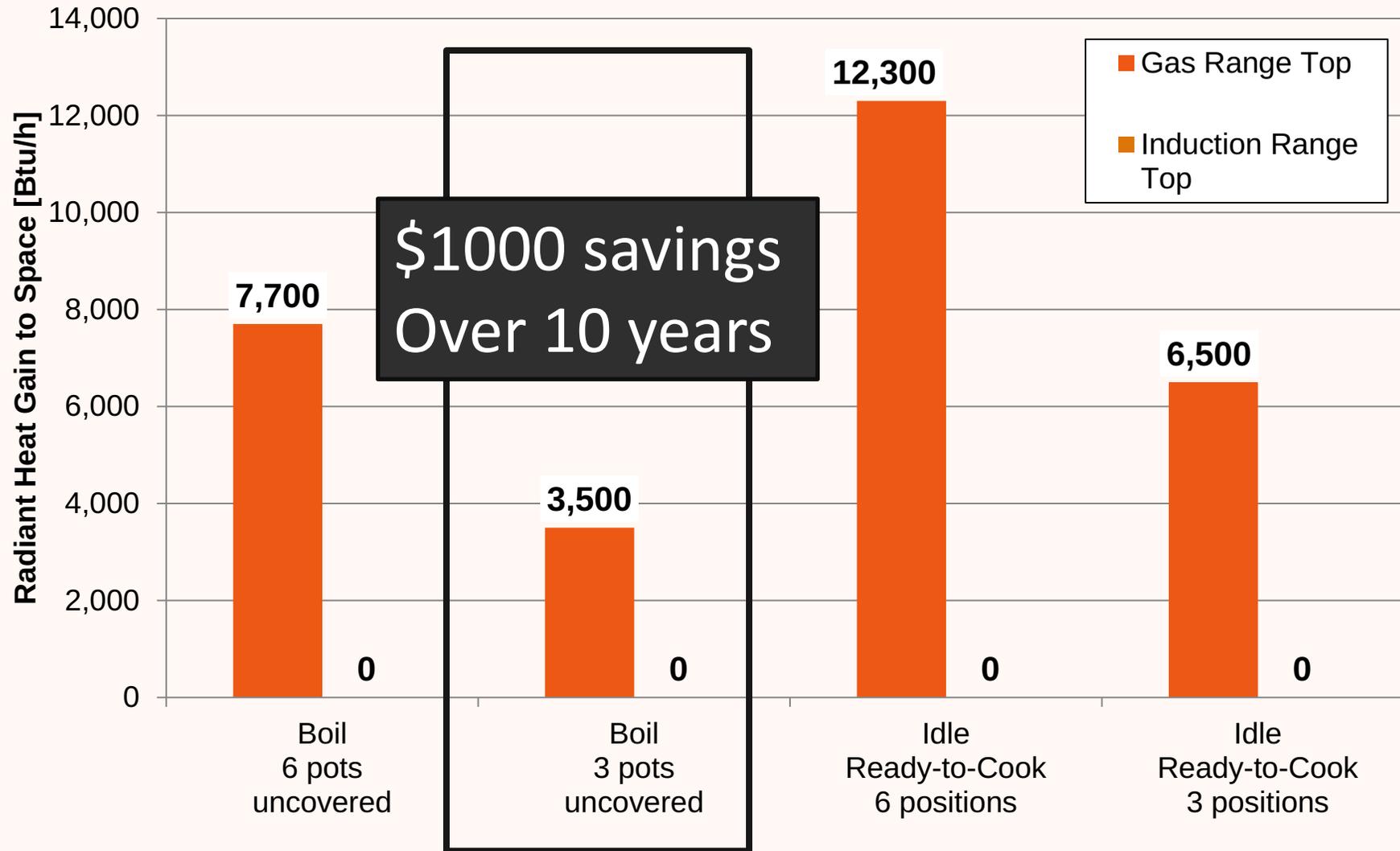
3.5kW x 90% efficiency



3kW of useful energy = 70 lb/hour of production



Kitchen Comfort – Heat Gain

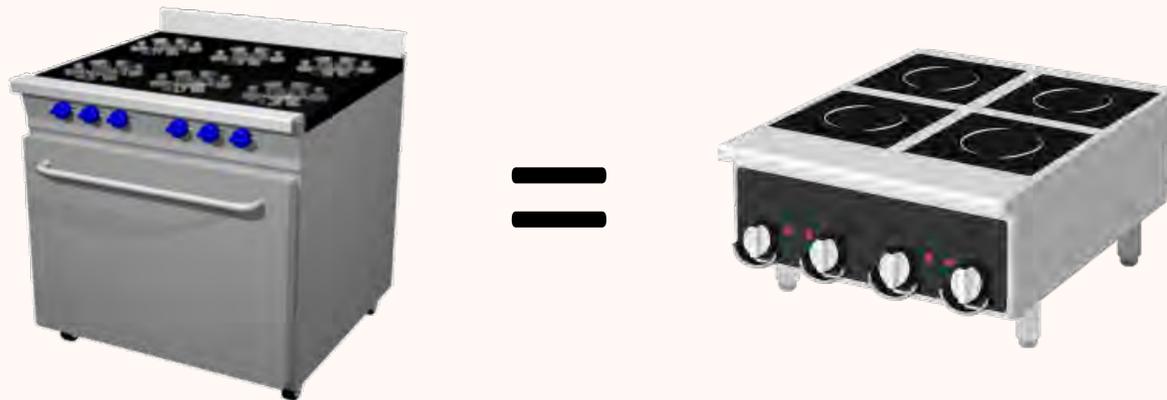


Energy, Carbon, and Methane - OpEx

...

Cooking Efficiency + Operational Efficiency

- Induction consumes 3.5 to 4.5 times less energy
- Cancels the increased cost of electricity
- Cancels the carbon emissions on fossil fueled grid



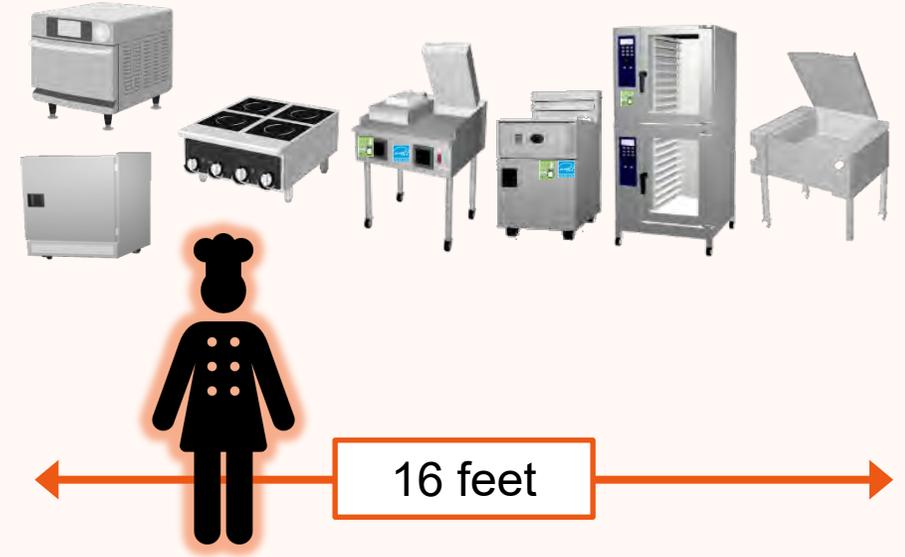
What's Next? Kitchen of the Future and Real-World Examples



Kitchens of the Future



The traditional cookline



The electric Kitchen of the Future



Kitchens of the Future



Fast, small, flexible, and energy efficient

\$1.85/therm, \$0.34/kWh, 89 lb CO2/MWh (PGE 2021)



Base vs All-Electric

...

Base Efficiency Cookline



Gas

Electric

CO₂ = 35.2 metric tons/year

Fuel Cost = \$24,446/year



All-Electric “Kitchen of the Future” Cookline



Unhooded/Ventless
High-Speed Oven

Electric

CO₂ = 2.2 metric tons/year

Fuel Cost = \$18,710/year

Savings Compared to Base Kitchen:

33.0 tons CO₂ and \$5,710 saved



Kitchens of the Future DO Exist!



Giorgio's Italian Grill & Pizzeria,
Mountain View



Villa Toscana Memory Care,
Mountain View



Kitchen Electrification Case Studies

Find case studies at www.frontierFSTC.com/resources/#case-studies

CASE STUDY



Giorgio's Italian Grill & Pizzeria Mountain View, CA

Giorgio's Italian Grill & Pizzeria is located on the ground floor of a newly constructed, mixed-use commercial building and replaces the longtime mainstay that was Frankie, Johnnie, and Luigi 'Too'. The D'Ambrosio family owns and operates the restaurant, serving the same classic Italian fare that made their legacy restaurant a longtime institution of El Camino Real. While Giorgio's is half the size of the previous restaurant, the new large patio offers customers al fresco dining and the business model will see a greater focus on takeout and delivery service.

Giorgio's now has a new hotline containing modern, energy-efficient, and highly productive cooking equipment. Most of the new equipment is electrically powered in compliance with the City of Mountain View's commercial building reach code that severely restricts the use of natural gas in new construction and extensive renovation projects.*

As a result, kitchen designer Susan McDonnell was tasked with specifying electric cooking equipment to meet the menu demands of the restaurant without sacrificing the performance associated with traditional natural gas cooking equipment.

A longtime collaborator and promoter of the Frontier Energy Food Service Tech Center (FSTC) in Pleasanton, CA, Susan consulted the energy efficiency experts at the FSTC to ensure the selected equipment would provide the ample production capacity and increased energy efficiency necessary to minimize the expected operating cost increase on their utility bill when going all-electric.

*The new building reach code was active at the time of project permitting. In April 2024, the City of Mountain View suspended the all-electric new building requirements to comply with a court order.



The new cookline has four 2-hob induction countertop ranges (pictured below) that otherwise would have been gas-fired open burner models in a traditional kitchen with natural gas infrastructure. FSTC controlled lab testing has demonstrated that induction cooktops surpass the cooking performance of comparable natural gas ranges and make for a cooler and safer work environment for kitchen staff. Cooktops with induction technology are critical to curtailing energy use on an electric cookline as traditional resistive electric cooktops are slow, energy intensive, and radiate more heat into the kitchen space.



Four 2-hob Induction Countertop Ranges

CASE STUDY



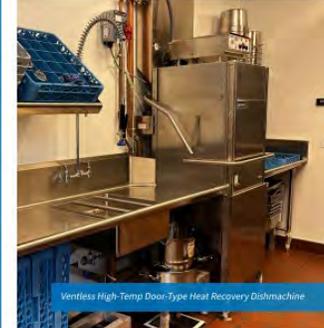
Villa Toscana Memory Care Mountain View, CA

The D'Ambrosio family's Villa Toscana Memory Care Community is located in a new multi-story, mixed-use commercial building in Mountain View where their former full-service Italian restaurant once stood. Villa Toscana is an assisted living facility catering exclusively to those with memory care needs. The multi-recreational facility features outdoor patios, indoor lounges, an activity room, a salon, and a dining room with meal service through an on-site commercial kitchen.

At the time of the Villa Toscana project's inception and permitting, City of Mountain View reach codes prohibited the use of natural gas in new construction and extensive renovation projects.* As a result, kitchen designer Susan McDonnell was tasked with specifying electric cooking equipment to meet the foodservice needs of the care facility without sacrificing the performance associated with traditional natural gas-fired cooking equipment. Susan consulted the experts at the Frontier Energy Food Service Tech Center (FSTC) to ensure the equipment was energy efficient with a high production capacity to minimize the expected operating cost increase on their electric bill.

To maximize kitchen productivity, the FSTC team selected multi-functional and programmable combination ovens and an advanced-design tilt skillet to support the facility's batch cooking operation. The combination ovens and tilt skillet can cook numerous pre-programmed menu items with automatic hold or shutoff settings. Automation optimizes energy use management for the facility, which reduces the risk of staff accidentally leaving the equipment on.

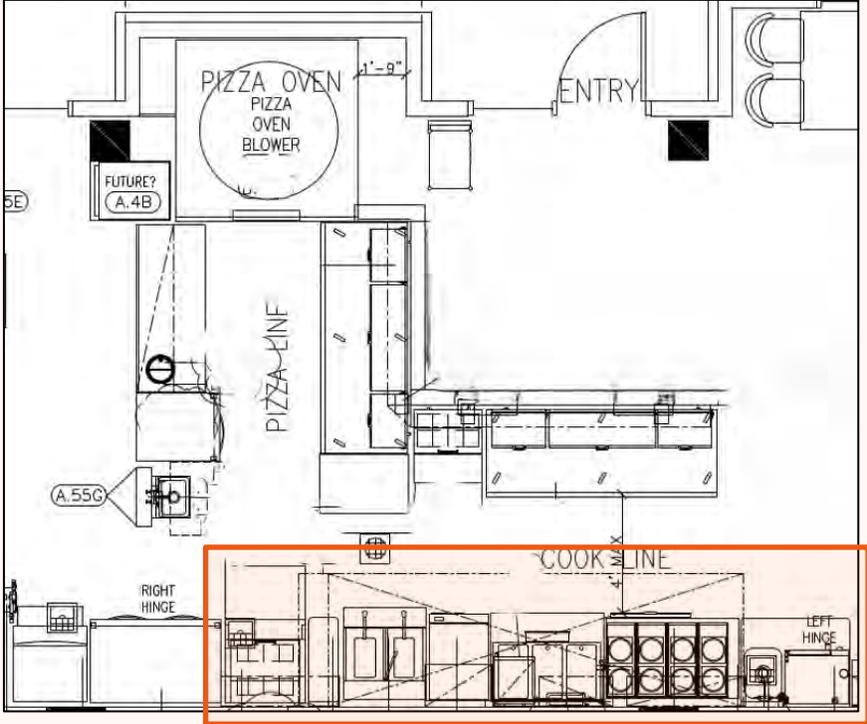
*The new building reach code was active at the time of project permitting. In April 2024, the City of Mountain View suspended the all-electric new building requirements to comply with a court order.



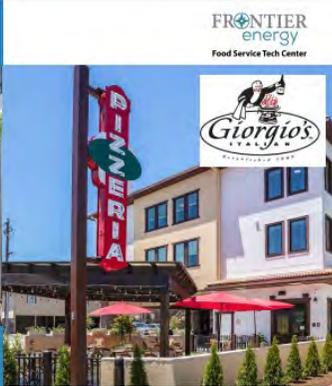
Ventless High-Temp Door-Type Heat Recovery Dishmachine



Giorgio's Italian Grill & Pizzeria



CASE STUDY



Giorgio's Italian Grill & Pizzeria
Mountain View, CA

Giorgio's Italian Grill & Pizzeria is located on the ground floor of a newly constructed, mixed-use commercial building and replaces the longtime mainstay that was Frankie, Johnnie, and Luigi Too! The D'Ambrosio family owns and operates the restaurant, serving the same classic Italian fare that made their legacy restaurant a longtime institution of El Camino Real. While Giorgio's is half the size of the previous restaurant, the new large patio offers customers a fresco dining and the business model will see a greater focus on takeout and delivery service.

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*The new building reach code was active at the time of project permitting. In April 2024, the City of Mountain View accelerated the all-electric new building requirements to comply with a court ruling.

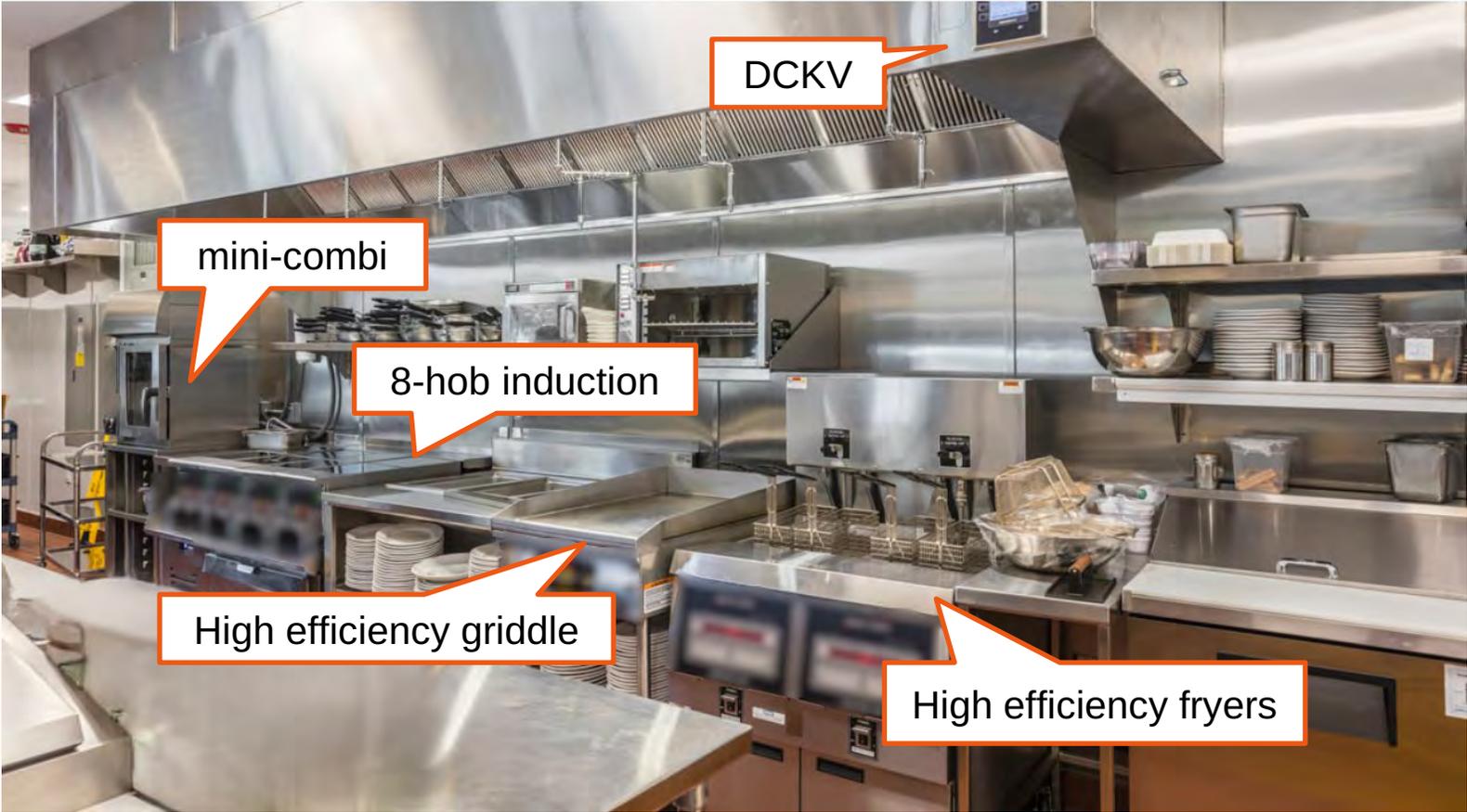
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Four 2-hob Induction Countertop Ranges



Giorgio's Italian Grill & Pizzeria



CASE STUDY



Giorgio's Italian Grill & Pizzeria
Mountain View, CA

Giorgio's Italian Grill & Pizzeria is located on the ground floor of a newly constructed, mixed-use commercial building and replaces the longtime mainstay that was Frankie, Johnnie, and Luigi Too! The D'Ambrosio family owns and operates the restaurant, serving the same classic Italian fare that made their legacy restaurant a longtime institution of El Camino Real. While Giorgio's is half the size of the previous restaurant, the new large patio offers customers al fresco dining and the business model will see a greater focus on takeout and delivery service.

Giorgio's now has a new hotline containing modern, energy-efficient, and highly productive cooking equipment. Most of the new equipment is electrically powered in compliance with the City of Mountain View's commercial building reach code that severely restricts the use of natural gas in new construction and extensive renovation projects.

As a result, kitchen designer Susan McDonnell was tasked with specifying electric cooking equipment to meet the menu demands of the restaurant without sacrificing the performance associated with traditional natural gas cooking equipment.

A longtime collaborator and promoter of the Frontier Energy Food Service Tech Center (FSTC) in Pleasanton, CA, Susan consulted the energy efficiency experts at the FSTC to ensure the selected equipment would provide the ample production capacity and increased energy efficiency necessary to minimize the expected operating cost increase on their utility bill when going all-electric.

*The new building reach code was active at the time of project permitting. In April 2024, the City of Mountain View enacted the all electric new building requirement to comply with a court order.



FRONTIER energy
Food Service Tech Center

Giorgio's
ITALIAN GRILL & PIZZERIA
ESTABLISHED 1987

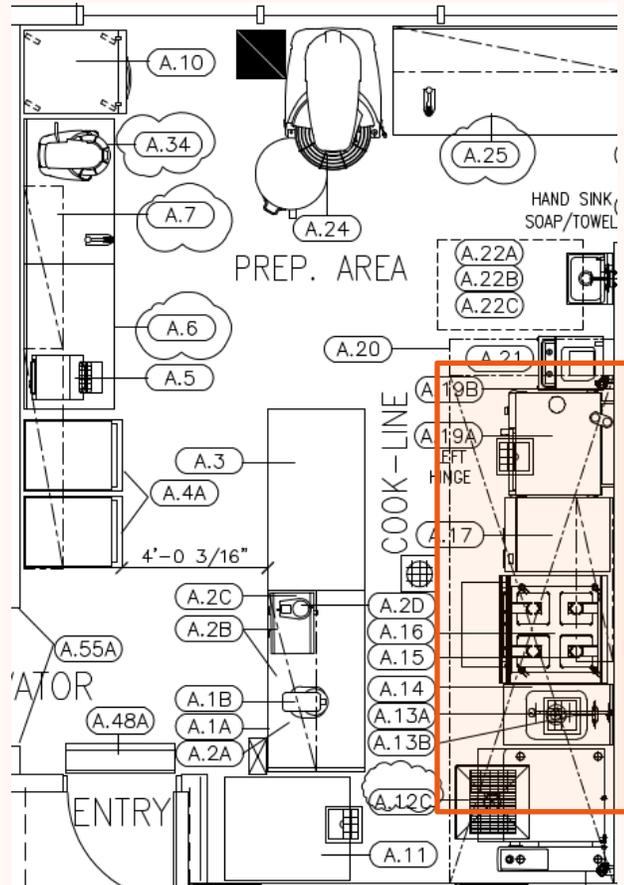
The new cookline has four 2-hob induction countertop ranges (pictured below) that otherwise would have been gas-fired open burner models in a traditional kitchen with natural gas infrastructure. FSTC controlled lab testing has demonstrated that induction cooktops surpass the cooking performance of comparable natural gas ranges and make for a cooler and safer work environment for kitchen staff. Cooktops with induction technology are critical to curtailing energy use on an electric cookline as traditional resistive electric cooktops are slow, energy intensive, and radiate more heat into the kitchen space.



Four 2-hob Induction Countertop Ranges



Villa Toscana Memory Care



CASE STUDY

FRONTIER energy
Food Service Tech Center



VILLA TOSCANA
MEMORY CARE

Villa Toscana Memory Care Mountain View, CA

The D'Ambrosio family's Villa Toscana Memory Care Community is located in a new multi-story, mixed-use commercial building in Mountain View where their former full-service Italian restaurant once stood. Villa Toscana is an assisted living facility catering exclusively to those with memory care needs. The multi-recreational facility features outdoor patios, indoor lounges, an activity room, a salon, and a dining room with meal service through an on-site commercial kitchen.

At the time of the Villa Toscana project's inception and permitting, City of Mountain View reach codes prohibited the use of natural gas in new construction and extensive renovation projects.* As a result, kitchen designer Susan McDonnell was tasked with specifying electric cooking equipment to meet the foodservice needs of the care facility without sacrificing the performance associated with traditional natural gas-fired cooking equipment. Susan consulted the experts at the Frontier Energy Food Service Tech Center (FSTC) to ensure the equipment was energy efficient with a high production capacity to minimize the expected operating cost increase on their electric bill.

To maximize kitchen productivity, the FSTC team selected multi-functional and programmable combination ovens and an advanced-design tilt skillet to support the facility's batch cooking operation. The combination ovens and tilt skillet can cook numerous pre-programmed menu items with automatic hold or shutoff settings. Automation optimizes energy use management for the facility, which reduces the risk of staff accidentally leaving the equipment on.

*The new building reach code was in effect at the time of project permitting, in April 2024. The City of Mountain View suspended the all-electric new building requirements to comply with 2021 rating.

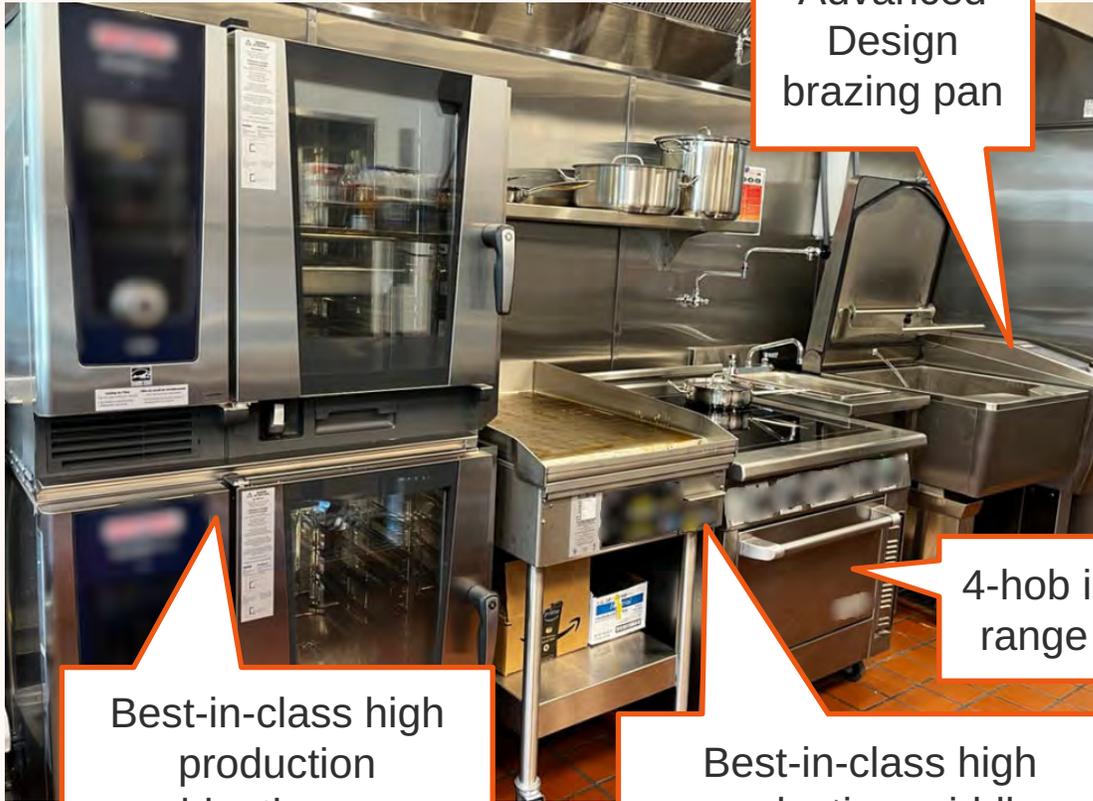
The FSTC also selected an energy-efficient, high-production griddle and four-hub induction range with oven base. The induction range surpasses the cooking performance of a comparable natural gas-fired range, making for a cooler and safer work environment for kitchen staff. The induction range is more energy efficient with quick cookware heat-up and zero standby energy use when cookware is removed from its surface.



Ventless High-Temp Door-Type Heat Recovery Dishmachine



Villa Toscana Memory Care



Advanced Design brazing pan

Best-in-class high production combination ovens

Best-in-class high production griddle

4-hob induction range w oven



Ventless Dish Machine - Cold Water Supply Dish Machine
Removes a significant hot water load from the water heater

CASE STUDY

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Mountain View, CA

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*The City of Mountain View reach codes were updated in April 2024, which allowed for the all-electric new building requirements to be implemented.

The FSTC also selected an energy-efficient, high-production griddle and four-hob induction range with oven base. The induction range surpasses the cooking performance of a comparable natural gas-fired range, making for a cooler and safer work environment for kitchen staff. The induction range is more energy efficient with quick cookware heat-up and zero standby energy use when cookware is removed from its surface.

Ventless High-Temp Door-Type Heat Recovery Dishmachine





Cold Water Supply, Ventless High Temperature Door Type Dish Machine

Dish Machine Type	Standard Model	Cold Water Connection, Heat Recovery Model
Machine Annual Energy Use (kWh)	7,676	8,330
Water Heater Annual Energy Use (kWh)	3,095	0
Total Annual Energy Use (kWh)	10,771	8,330
Annual Water Use (gallons)	16,060	15,695
Annual Energy Cost (\$)*	4,093	3,166
Annual Water & Sewer Cost (\$)*	494	483
Total Annual Operating Cost (\$)	4,587	3,648
* Assumes a PG&E B-19 electricity rate of \$0.38/kWh		
**Assumes a combined City of Mountain View Water and Sewer utility rate of \$23.00/CCF		

54kW electric resistance water heater



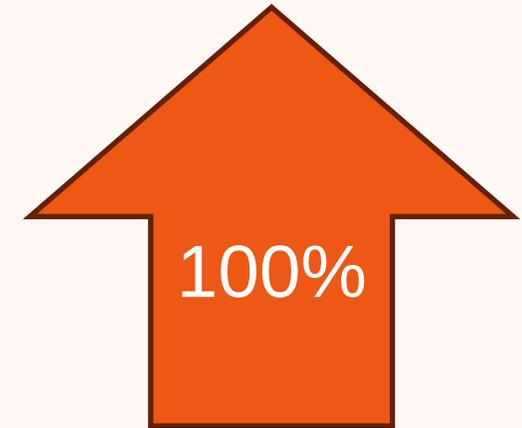
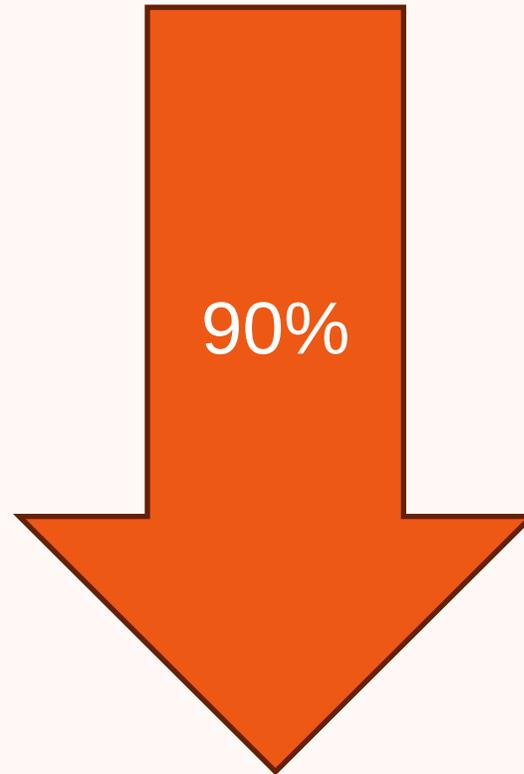
“Designed for use as a recovery heater...NOT recommended for sanitizing water applications”

“...the planning dept. [...was confused] and the Architect would not listen to me.”



Results

Carbon Reduction
 $\approx 14 \text{ MTCO}_2$



Energy Cost
 $\approx \$10\text{k} / \text{year}$



Recommendations: What's Needed?



For Kitchen Operators...



- Teach Operators about the **benefits of electric cooking equipment** like higher productivity, labor savings, cooler work environment and improve indoor air quality
- **Guidance on energy management strategies** like equipment start-up and shut down schedules
- **Easy access to resources and tools** that provide pathways to successful adoption of efficient electric equipment
- **Respect the challenging economics** of the food service market segment – *carrots not sticks*



For Kitchen Designers, specify...



- Smart, high-tech and energy efficient equipment – *examples:* combination & rapid-cook ovens
- Safer, faster, equipment - induction cooking and holding
- Equipment that can run “off peak” - automation, cook/chill, sous vide
- Properly design demand-controlled ventilation systems
- Advanced plumbing system designs with HPWHs and ventless dish machines
- Optimized HVAC with HP space heating



For Utilities...



- Create an electricity rate structure that does not penalize food service businesses operating during 4 p.m. to 9 p.m. PEAK
- Maintain and develop equipment rebate and infrastructure upgrade incentive programs to encourage adoption of electric and high efficiency equipment, like CA Energy Wise Instant Rebates
- Promote rate payer funded kitchen electrification resources and tools like those offered by the Food Service Tech Center
- Engage Trade Professionals that have experience in Commercial Food Service market segment



For Government Agencies...



- Update the Environmental Health Guidelines for Water Heating to make installation of HPWH's easier
- Streamline project permitting
- Have tax incentives for decarbonization projects



Get the Resources at CAEnergyWise.com



CALIFORNIA
ENERGY WISE

California Utilities Partnering for Energy Efficiency

TRY BEFORE YOU BUY

REBATES

CALCULATORS

ENERGY SURVEYS

DESIGN GUIDES

The banner features a background image of a commercial kitchen with stainless steel equipment. The text 'CALIFORNIA ENERGY WISE' is prominently displayed in large, white, sans-serif font. Below it, the tagline 'California Utilities Partnering for Energy Efficiency' is written in a smaller white font. At the bottom of the banner, there are five colored rectangular tiles, each containing a resource category in white text: 'TRY BEFORE YOU BUY' (orange), 'REBATES' (teal), 'CALCULATORS' (blue), 'ENERGY SURVEYS' (brown), and 'DESIGN GUIDES' (yellow).



Let's Stay in Touch

San Mateo County Commercial Kitchen Electrification Cost Study



Final Report and Kitchen Case Studies will be posted online – link coming soon!

smcsustainability.org

For additional questions please contact:

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Thank you.

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