

2010 GFEN Blue Flame Product of the Year Award Form

Please e-mail this form to GFEN with supporting documentation: photo(s), specification sheets, brochures, etc. to GFEN. Entries must be submitted no later than **March 22, 2010** to Eric Burgis at eburgis@escenter.org or 400 North Capitol St., 4th Floor, Washington, DC 20001.

Appliance Name	Evolution Gas Convection Steamer	Manufacturer	AccuTemp Products, Inc.	
Model #	N61201E060 or P61201E060	Address	8415 North Clinton Park Drive	
Date Marketed	April 30, 2010	City, State	Fort Wayne	Indiana
Sug. Retail Price	\$13,200 List	Zip, Country	46825	USA

Brief Product Description	The Evolution gas convection steamer is a six pan gas-fired, boilerless convection steamer utilizing a pre-mix burner with pressure switch heat control to efficiently generate steam on demand for energy efficient operation. This steamer has a patent-pending passive steam distribution system with no moving parts in the cooking compartment for fast and peerless pan-to-pan uniformity.
Features and Benefits	<ol style="list-style-type: none"> 1) The cooking compartment capacity is six 2.5 inch deep steam table pans, which is 20% larger capacity than five pan steamers. But the additional capacity does not require more tabletop/countertop space or a special stand, than our standard six pan electric steamer. 2) The variable temperature hold feature is unique in the industry as no other boilerless or connectionless gas steamer has a hold function. 3) The digital timer and temperature display has one cooking mode, one hold mode, and an independent timer, for very simple operation. The flush keypad interface has no protruding features and is extremely easy to clean. 4) Standard features are automatic water fill and connected drain for maximum operator convenience, while maintaining low water usage. Connectionless models are available as well. 5) The burner is constructed of heavy gauge T304 stainless square tubing to be impervious to any water or other physical damage caused by poor cleaning or maintenance habits. 6) A finned heat sink mounted to the underside of the cooking chamber in combination with an exhaust deflector, maximizes the heat transfer efficiency to the cooking chamber water reservoir. 7) The patent-pending Steam Vector Technology, a passive steam distribution system, enables second-to-none pan-to-pan cooking uniformity.

Sales and economic impact:

Marketing	<p>The Evolution gas convection steamer is a new product for AccuTemp Products. It is based on the Evolution electric convection steamer that was launched at the NRA Show in May 2009. Since then, while replacing some Steam 'N' Hold electric steamer business, the Evolution electric convection steamer has re-opened doors to old customers as well as gaining a strong acceptance by new customers. Current customers include Whole Foods, Applebee's, Piccadilly Cafeteria and Bonefish Grill. We anticipate its market share to continue to grow. The Evolution gas convection steamer is the same steamer as the electric model, except for the replacement of the electric heater by the powered gas burner system.</p> <p>Gas steamers are approximately 60% of the commercial foodservice equipment steamer market. This is largely due to the fact that for some kitchen designs and remodels, customers simply don't have enough electrical supply, can't afford to install a new electric branch line or in some instances, a new transformer at the pole. Occasionally, customers are financially subsidized by manufacturers for adding more electrical service. The market for boilerless and/or connectionless gas-fired countertop steamers is not very mature, with minimal competitive offerings available. The Evolution gas convection steamer fills this industry product gap, as it is uniquely positioned. The Evolution gas convection steamer will match up with any competitors' boilerless connected gas steamer from a cook-time standpoint, while saving capital investment costs and giving them the flexibility of a Hold feature that no other gas boilerless steamer has. It meets the ENERGY STAR requirements along with being eligible for state and local energy rebates in certain areas, while maintaining AccuTemp's position as a leader in water conservation. With a superior design utilizing fewer parts, AccuTemp has the ability to price the Evolution gas convection steamer very competitively with manufacturers that typically give much greater discounts. The Evolution gas convection steamer will have a broad appeal in several segments. While it will be able to be sold in every segment that AccuTemp pursues, the primary segments will be Schools, Healthcare</p>
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	<p>and Chain Restaurants. Gas equipment in general is very commonly used over electric in certain areas of the country and also in large metropolitan areas as well. Gas equipment and all gas kitchens are very common on the West Coast and the Midwest. Major metro areas like Chicago, New York, Los Angeles, Dallas, Miami, etc. also lean toward gas kitchens because of cost of gas, running new electrical drops is more expensive and electrical capacity is often not available. This will also open up some propane areas where we have been unable to sell steamers, like the many resorts in Hawaii and several areas in Florida, as well.</p> <p>AccuTemp's products are unique, not a commodity. They perform at the top of the industry. AccuTemp is known for creating solutions that no one else provides. AccuTemp has won several industry awards for its products, including the GFEN Blue Flame Product of the Year Award in 2001 for the Accu-Steam Gas Griddle. Tremendous marketing benefits are derived from such prestigious awards.</p> <p>AccuTemp markets its products with the follow methods:</p> <ul style="list-style-type: none"> ➤ Trade magazine space advertising; ➤ Extensive use of press releases and editorial coverage; ➤ Technical and promotional materials, to include brochures, spec sheets, videos, user application stories or testimonials, recipe guides and cooking tips; ➤ Extensive use direct mail, including postcards, fliers, special offers and promotions; ➤ Dealer promotions and incentives; ➤ Extensive trade show promotion and exposure at national, regional, local, chain/franchisee and key association-sponsored shows; ➤ Live cooking demonstrations; ➤ National account programs with multiple national account managers; ➤ Web Site content and promotions; ➤ An equipment leasing program; ➤ Participation in AutoQuotes and the KCL CADalog; ➤ ENERGY STAR Partner program; ➤ GFEN Membership, active partnering with individual gas utilities for equipment demos, customer tests, promotions and mailings; ➤ Frequent use of the Food Service Technology Center for independent lab test reports and subsequent use of these reports to promote our products.
<p>Economic impact</p>	<p>Lead-free alloys and RoHS-compliant materials have been implemented in all necessary opportunities. The simplicity of the design and commonality with AccuTemp's existing Steam 'N' Hold electric convection steamer are minimizing introduction of new materials in the supply chain. AccuTemp's choice of a 6 pan cooking chamber and the Evolution gas convection steamer's performance allows this steamer to have the highest productivity for any published boilerless/connectionless gas convection steamer on the market. With the use of an efficient power burner, ENERGY STAR qualification and low water consumption, operating costs are low. In comparing the life cycle costs of the Evolution gas convection steamer with a connected (steam generator) steamer by using the Life Cycle Cost Estimate Calculator (see attachment) on the ENERGY STAR website, AccuTemp's steamer shows more than \$2,000 savings per year. When comparing AccuTemp's steamer to a competitive boilerless/connectionless ENERGY STAR qualified product (see attachment), AccuTemp saves more than \$2,000 during its life cycle.</p> <p>AccuTemp Products is the market leader in the connectionless steamer market. Its entrance into the gas-fired steamer market should significantly increase the penetration of gas-fired equipment into this business segment. It is expected that first year annualized sales will be an increase of more than 15% of current steamer sales. Sales in the second year will be even higher as we expand marketing plans, position the product with dealers, schools and healthcare buying groups, and offer sales incentives. For AccuTemp, this is incremental business, which at these numbers is significant new business!</p>

Innovative principles:

<i>Creativity</i>	<p>Below are standard features (see picture attachment) that are not available together in the industry today:</p> <ol style="list-style-type: none">1) The cooking compartment capacity is six 2.5 inch deep steam table pans, which is 20% larger capacity than five pan steamers. But the additional capacity does not require more tabletop/countertop space or a special stand, than our standard six pan electric steamer, as the use of a pre-mix burner and a heat transfer plate permits the overall height of the steamer to be minimized.2) The temperature is controlled by an RTD thermostat with a variable temperature hold feature, which is unique in the industry as no other boilerless or connectionless gas steamer has a hold function.3) The digital timer and temperature display has one cooking mode, one hold mode, and an independent timer, for very simple operation. The flush keypad interface has no protruding features and is extremely easy to clean.4) Standard features are automatic water fill and connected drain for maximum operator convenience, while maintaining low water usage. Connectionless models are available as well.5) The burner is constructed of heavy gauge T304 stainless square tubing to be impervious to any water or other physical damage caused by poor cleaning or maintenance habits.6) A finned heat transfer plate is attached to burner side of the cooking chamber to provide increased surface area for heat transfer into the cooking chamber bottom. An exhaust deflector, installed in the exhaust gas passage, creates turbulent flow causing the products of combustion to heat the ramp to the visible infrared spectrum. Heating the exhaust deflector into the infrared heating range, combined with the angle of the ramp, radiates normally lost energy back into the finned heat transfer plate.7) When provided as double stack system on a stand or a single unit on a countertop, the gas steamer is at the same height as an electric model.8) A pressure switch is utilized in the “Cook “mode to only turn the burners on only when the product calls for additional energy.9) The unit uses a patent-pending passive steam distribution system (Steam Vector Technology) in the cooking compartment that provides peerless pan-to-pan temperature uniformity (about 21°F between the first and last pan reaching the 170°F test requirement, versus the typical result of 35°F or more).10) All pans reach the 170°F test requirement within approximately 2 minutes of each other, versus the typical 7-10 minutes for competitive products.11) The patent-pending passive steam distribution system along with the design of the combustion system, results in a cooking energy efficiency of 45% when tested to the heavy load red potato test method described in ASTM F1484.12) These tests (items 9, 10 and 11 above) were run using the ASTM F1484 steam cooker test procedure.
<i>Technology</i>	<p>The Evolution gas convection steamer utilizes a pre-mix burner made of stainless steel tubing with precise laser-cut ports to allow the same burner to be utilized with both natural and propane gases. Between the ports are laser-cut carry-over ports. A finned heat transfer plate is utilized to evenly distribute the heat and provide additional area for heat transfer. An exhaust deflector, installed in the exhaust gas passage, creates turbulent flow causing the products of combustion to heat the ramp to the visible infrared spectrum. Heating the exhaust deflector into the infrared heating range, combined with the angle of the ramp, radiates normally lost energy back into the finned heat transfer plate. Several components of the design were optimized utilizing computational fluid dynamics software. A pressure switch regulates burner activity, based on actual heat demand. The patent-pending passive steam distribution system (Steam Vector Technology), delivers steam to each pan individually, resulting in fast cook times and unparalleled pan-to-pan uniformity.</p>
<i>Quality</i>	<p>The simplicity of the design requires no moving parts in the cooking chamber. Servicing access requires side panel removal only. The steamer operational reliability is high because it is based on the already-on-the-market Evolution electric steamer, which has very low service history. The burner technology is proven in similar applications in the commercial foodservice equipment industry. For temperature and timing accuracy, the temperature controller is digital. The flush keypad interface has no protruding features and is extremely easy to clean.</p>
<i>Environmental</i>	<p>Using a pre-mix burner in conjunction with a finned heat transfer plate provides for a combustion system that has: (1) air free carbon monoxide of 85 ppm; (2) combustion efficiency of 77%; and (3) a flue temperature of 650°F compared with 900°F for an atmospheric burner. This significantly lowers the heat radiated into the ambient environment. The use of a pressure switch to regulate the burner reduces gas usage and the amount of flue products exhausted into the ambient environment. This is because the pressure switch only allows the burners to come on when the product being cooked requires more heat. Since the heat used is based on demand, cold water condensers are not required to cool the steam</p>

	typically pumped down the drain since water usage is also based on demand. Cold water condensers are normally used with steamers operating on a 100% duty cycle. The use of a patent-pending passive steam distribution system (Steam Vector Technology) results in lower energy usage since energy is not required to operate a fan or other electro-mechanical device to distribute steam within the cooking compartment. Low-lead and RoHS-compliant components have been implemented in all necessary opportunities.
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Technology improvements:

Savings	The unit meets ENERGY STAR requirements. In comparing the life cycle costs of the Evolution gas convection steamer with a connected (steam generator) steamer by using the Life Cycle Cost Estimate Calculator (see attachment) on the ENERGY STAR website, AccuTemp's steamer shows more than \$2,000 savings per year. When comparing AccuTemp's steamer to a competitive boilerless/connectionless ENERGY STAR qualified product (see attachment), AccuTemp saves more than \$2,000 during its life cycle. Additionally, the unit doesn't require a cold water condenser to condition the constant flow of steam down the drain. Some competitive models of boiler-based and boilerless steamers use as much as 0.5 gpm to condition the drain water. Boiler/steam generator maintenance is not necessary. Water treatment is not required.
Productivity	Productivity improvements are two-fold: one is cooking productivity and the second is fabrication productivity. Using the heavy load red potato test in ASTM F1484, the Evolution gas convection steamer has a production capacity of 111 pounds of potatoes per hour. Additionally, the time difference between the first pan and last pan to reach 195°F is about 2 minutes. This reduced time to temperature between the first and last pan ensures consistent results and maintains productivity in the kitchen due to the fact that all pans in a batch-cook finish at approximately the same time. Fabrication productivity is achieved by bench assembling the gas train in three distinct modules. By joining all three modules together with pipe unions, the piece-meal component assembly approach normally used is avoided, which provides for a speedier and controlled assembly process. Additionally, the Evolution gas convection steamer utilizes the same steam chamber weldment design as the Evolution electric convection steamer, further reducing the number of unique parts needed for a gas appliance. Computational fluid dynamics software was used to test design ideas, resulting in a faster design cycle, lower assembly manpower cost and materials and fewer preliminary design physical prototype iterations.
Energy	The Evolution gas convection steamer meets the ENERGY STAR requirements. In comparing the life cycle costs of the Evolution gas convection steamer with a connected (steam generator) steamer by using the Life Cycle Cost Estimate Calculator (see attachment) on the ENERGY STAR website, AccuTemp's steamer shows more than \$2,000 savings per year. When comparing AccuTemp's steamer to a competitive boilerless/connectionless ENERGY STAR qualified product (see attachment), AccuTemp saves more than \$2,000 during its life cycle. The Evolution gas convection steamer fits under the AccuTemp Products corporate ECOLOGIX conservation program umbrella.
Safety	The unit will be safety-certified to ANSI Z83.11 and sanitation-certified to ANSI/NSF 4 by Underwriters Laboratories. Additional safety features are: 1) High-limit overtemp switch for the burner system does not allow the gas-fired burner system to operate unregulated. 2) Low water cut-off to protect the steamer from operating without water. 3) High water cut-off to protect the operator from a water overflow condition when opening the door. 4) Door switch turns off the burner system when door is opened, so that steam is not be created and directed at the operator during pan loading and unloading. 5) There are flue exhaust spacer brackets at the back of the steamer to not allow the steamer to be moved too close to an adjacent surface.

Application submitted by:

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*** Please attach/include photos and/ or specification sheet with submittal.**

The granting of an award by GFEN is not intended in any manner to constitute an endorsement of any product or service.

AccuTemp Evolution Gas Convection Steamer Pictures



Front view. Drip tray is one-piece, fixed and spans the entire front face.



Rear view, with the flue above a heat shield on the left and the electric, gas and water connections on the right.



Electronics/hydraulics compartment view.



Finned heatsink is bolted to the bottom of the water reservoir. This heatsink is a key performance component, as it significantly increases the heat transfer area and helps cool the flue gases.



Life Cycle Cost Estimate for ENERGY STAR Qualified Natural Gas Steam Cooker(s)

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Enter your own values or use our default values.

Fuel type	Natural Gas	
Number of steam cookers	1	
Number of pans per cooker	6	
Operating hours per day	12	
Operating days per year	365	
Pounds of food cooked per day per cooker	100	
Gas rate (\$/MMBtu)	\$11.770	
	Competitive ENERGY STAR Model	AccuTemp ENERGY STAR Model
Cost per steam cooker	\$7,090	\$6,600
Percent of time in constant steam mode *	14%	20%
Type of cooker under consideration	Boilerless	Boilerless

* The percentage of time the steamer is operated in continuous steam or constant operation mode instead of timed cooking. When in this mode, the energy and water consumption are the same regardless of the amount of food cooked. On most models the user can choose the mode of operation.

Annual and Life Cycle Costs and Savings for 1 Natural Gas Steam Cooker(s)

	1 Competitive Unit(s)	1 ENERGY STAR Qualified Unit(s)	Savings with AccuTemp ENERGY STAR Model
Annual Resource Costs*			
Energy cost	\$596	\$451	\$145
<i>Energy consumption (therms)</i>	506	383	123
Water cost	\$60	\$40	\$20
<i>Water consumption (gallons)</i>	13,140	8,760	4,380
Total	\$655	\$491	\$165
Life Cycle Costs*			
Energy costs	\$5,592	\$4,231	\$1,361
<i>Energy consumption (therms)</i>	6,075	4,597	1,478
Water cost	\$559	\$372	\$186
<i>Water consumption (gallons)</i>	157,680	105,120	52,560
Total resource costs	\$6,150	\$4,604	\$1,547
Purchase price for 1 unit(s)	\$7,090	\$6,600	\$490
Total	\$13,240	\$11,204	\$2,037
Simple payback period for additional initial cost (years) immediate			

* Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.

Summary of Benefits for 1 Natural Gas Steam Cooker(s)

Additional purchase cost for ENERGY STAR equipment	-\$490
Life cycle savings	\$1,547
Net life cycle savings (life cycle savings - additional cost)	\$2,037
Simple payback of additional cost (years)	immediate
Life cycle energy saved (kWh)	1,478
Life cycle air pollution reduction (lbs of CO ₂)	2,276
Air pollution reduction equivalence (number of cars removed from the road for a year)	0.19
Air pollution reduction equivalence (acres of forest)	0.23
Lifetime savings as a percent of purchase price	35%

Assumptions for Steam Cooker Calculator

Steamer Usage

Operating hours/day - default	12	Food Service Technology Center (FSTC) research on available steam cooker models, 2009
Operating days/year - default	365	FSTC research on average steam cooker use, 2009
Pounds of food cooked per day - default	100	FSTC research on average steam cooker use, 2009
Number of preheats per day	1	FSTC research on average steam cooker use, 2009
Preheat Time (min)	15	FSTC research on average steam cooker use, 2009
Equipment lifetime (years)	12	FSTC research on average steam cooker use, 2009

Fuel Type

Electric	2
Natural Gas	Natural Gas

Default number of pans

Electric	3	FSTC research on available steam cooker models, 2009
Natural Gas	6	FSTC research on available steam cooker models, 2009

Competitive Model - Intek XSG-5

Competitive Model	ENERGY STAR Model
3	3

Water Use Specs

Type			
Connected (steam generator)			
Connectionless			
Boilerless			
Water Use (gal/h)			
Connected / steam generator	45.4	3	FSTC research on available steam cooker models, 2009
Connectionless	3	3	FSTC research on available steam cooker models, 2009
Boilerless	3	2	AccuTemp estimate
Percent of time in constant steam mode			
	14%	20%	Default assumed to be 0%

Electric Equipment Specs

	Competitive Model	ENERGY STAR Model	
Purchase price	\$3,400	\$5,890	FSTC research on available steam cooker models, 2009
Preheat energy (kWh)	1.50	1.50	FSTC research on available steam cooker models, 2009
Cooking-energy efficiency (%)	26%	50%	FSTC research on available steam cooker models, 2009
Production capacity per pan (lb/h)	23	17	FSTC research on available steam cooker models, 2009
Idle energy rate per pan (kW)	0.33	0.13	FSTC research on available steam cooker models, 2009
ASTM energy to food (kWh/lb)	0.0308	0.0308	FSTC 2009

Gas Equipment Specs

	Competitive Model	ENERGY STAR Model	
Purchase price (Comp. Model. est. by AccuTemp)	\$7,090	\$6,600	FSTC research on available steam cooker models, 2009
Preheat energy (Btu)	7,112	4,200	FSTC research on available steam cooker models, 2009
Cooking-energy efficiency (%)	49%	45%	FSTC research on available steam cooker models, 2009
Production capacity per pan (lb/h)	19	18	FSTC research on available steam cooker models, 2009
Idle energy rate per pan (Btu/h)	1,405	328	FSTC research on available steam cooker models, 2009
ASTM energy to food (Btu/lb)	109	109	FSTC 2009

Equipment Specs for Selected Type

	Competitive Model	ENERGY STAR Model
Purchase price	\$7,090	\$6,600
Preheat energy (kWh or therms)	7,112.0	4,200.0
Idle energy rate (kW or Btu/h)	8,432.4	1,970.0
Cooking-energy efficiency (%)	49%	45%
Production capacity (lb/h)	95.8	110
ASTM energy to food (kWh/lb or Btu/lb)	108.57	109.163125
Water consumption rate (gal/h)	3	2

Energy & Water Consumption

	Competitive Model	ENERGY STAR Model	
Daily Energy Consumption (kWh or Btu)	138,690.70	104,946.55	calculated
Average Demand (kW)	N/A	N/A	calculated
Annual Energy Consumption (kWh or therms)	506	383	calculated
Annual Water Consumption (gal)	13,140	8,760	calculated
Annual Energy Cost (\$)	\$596	\$451	calculated
Annual Water Cost (\$/yr)	\$60	\$40	calculated

Utility Rates

Average commercial electric rate (\$/kWh electricity):	\$0.1030	National Average Price of Electricity and Gas: Energy Information Administration, Annual Energy Outlook 2009 (Early Release) edition. (converted from 2007 to 2008 dollars).
Average commercial gas rate (\$/mcf gas):	\$11.77	2006 Water and Wastewater Rate Survey, Raftelis Consulting
Average water and sewer cost (\$/1000 gallons)	\$4.53	

Discount Rate

Commercial and Residential Discount Rate (real)	4%	A real discount rate of 4% is assumed, which is roughly equivalent to the nominal discount rate of 7% (4% real discount rate + 3% inflation rate).
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Carbon Dioxide Emissions Factors

Electricity Carbon Emission Factor	1.54	lbs CO ₂ /kWh	EPA's Climate Change Action Plan (CCAP) number for 2009.
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CO₂ Equivalents

Annual CO ₂ sequestration per forested acre	9,700	lbs CO ₂ /year	EPA's Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html
Annual CO ₂ emissions for "average" passenger car	12,037	lbs CO ₂ /year	EPA's Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html



Life Cycle Cost Estimate for ENERGY STAR Qualified Natural Gas Steam Cooker(s)

This energy savings calculator was developed by the U.S. EPA and U.S. DOE and is provided for estimating purposes only. Actual energy savings may vary based on use and other factors.

Enter your own values or use our default values.

Fuel type	Natural Gas	
Number of steam cookers	1	
Number of pans per cooker	6	
Operating hours per day	12	
Operating days per year	365	
Pounds of food cooked per day per cooker	100	
Gas rate (\$/MMBtu)	\$11.770	
	Conventional Model	AccuTemp ENERGY STAR Model
Cost per steam cooker	\$9,500	\$6,600
Percent of time in constant steam mode *	35%	20%
Type of cooker under consideration	Connected (steam generator)	Boilerless

* The percentage of time the steamer is operated in continuous steam or constant operation mode instead of timed cooking. When in this mode, the energy and water consumption are the same regardless of the amount of food cooked. On most models the user can choose the mode of operation.

Annual and Life Cycle Costs and Savings for 1 Natural Gas Steam Cooker(s)

	1 Conventional Unit(s)	1 ENERGY STAR Qualified Unit(s)	Savings with AccuTemp ENERGY STAR Model
Annual Resource Costs *			
Energy cost	\$1,705	\$450	\$1,254
<i>Energy consumption (therms)</i>	1,448	383	1,066
Water cost	\$901	\$40	\$861
<i>Water consumption (gallons)</i>	198,852	8,760	190,092
Total	\$2,606	\$490	\$2,115
Life Cycle Costs *			
Energy costs	\$16,000	\$4,228	\$11,772
<i>Energy consumption (therms)</i>	17,381	4,593	12,788
Water cost	\$8,454	\$372	\$8,082
<i>Water consumption (gallons)</i>	2,386,224	105,120	2,281,104
Total resource costs	\$24,454	\$4,600	\$19,854
Purchase price for 1 unit(s)	\$9,500	\$6,600	\$2,900
Total	\$33,954	\$11,200	\$22,754
Simple payback period for additional initial cost (years) immediate			

* Annual costs exclude the initial purchase price. All costs, except initial cost, are discounted over the products' lifetime using a real discount rate of 4%. See "Assumptions" to change factors including the discount rate.

Summary of Benefits for 1 Natural Gas Steam Cooker(s)

Additional purchase cost for ENERGY STAR equipment	-\$2,900
Life cycle savings	\$19,854
Net life cycle savings (life cycle savings - additional cost)	\$22,754
Simple payback of additional cost (years)	immediate
Life cycle energy saved (kWh)	12,788
Life cycle air pollution reduction (lbs of CO ₂)	19,694
Air pollution reduction equivalence (number of cars removed from the road for a year)	1.64
Air pollution reduction equivalence (acres of forest)	2.03
Lifetime savings as a percent of purchase price	386%

Assumptions for Steam Cooker Calculator

Steamer Usage

Operating hours/day - default	12	Food Service Technology Center (FSTC) research on available steam cooker models, 2009
Operating days/year - default	365	FSTC research on average steam cooker use, 2009
Pounds of food cooked per day - default	100	FSTC research on average steam cooker use, 2009
Number of preheats per day	1	FSTC research on average steam cooker use, 2009
Preheat Time (min)	15	FSTC research on average steam cooker use, 2009
Equipment lifetime (years)	12	FSTC research on average steam cooker use, 2009

Fuel Type

Electric	2
Natural Gas	Natural Gas

Default number of pans

Electric	3	FSTC research on available steam cooker models, 2009
Natural Gas	6	FSTC research on available steam cooker models, 2009

Competitive Model - Intek XSG-5

Competitive Model	ENERGY STAR Model
3	3

Water Use Specs

Type			
Connected (steam generator)			
Connectionless			
Boilerless			
Water Use (gal/h)			
Connected / steam generator	45.4	3	FSTC research on available steam cooker models, 2009
Connectionless	3	3	FSTC research on available steam cooker models, 2009
Boilerless	3	2	AccuTemp estimate
Percent of time in constant steam mode			
	14%	20%	Default assumed to be 0%

Electric Equipment Specs

	Competitive Model	ENERGY STAR Model	
Purchase price	\$3,400	\$5,890	FSTC research on available steam cooker models, 2009
Preheat energy (kWh)	1.50	1.50	FSTC research on available steam cooker models, 2009
Cooking-energy efficiency (%)	26%	50%	FSTC research on available steam cooker models, 2009
Production capacity per pan (lb/h)	23	17	FSTC research on available steam cooker models, 2009
Idle energy rate per pan (kW)	0.33	0.13	FSTC research on available steam cooker models, 2009
ASTM energy to food (kWh/lb)	0.0308	0.0308	FSTC 2009

Gas Equipment Specs

	Competitive Model	ENERGY STAR Model	
Purchase price (Comp. Model. est. by AccuTemp)	\$7,090	\$6,600	FSTC research on available steam cooker models, 2009
Preheat energy (Btu)	7,112	4,200	FSTC research on available steam cooker models, 2009
Cooking-energy efficiency (%)	49%	45%	FSTC research on available steam cooker models, 2009
Production capacity per pan (lb/h)	19	18	FSTC research on available steam cooker models, 2009
Idle energy rate per pan (Btu/h)	1,405	328	FSTC research on available steam cooker models, 2009
ASTM energy to food (Btu/lb)	109	109	FSTC 2009

Equipment Specs for Selected Type

	Competitive Model	ENERGY STAR Model
Purchase price	\$7,090	\$6,600
Preheat energy (kWh or therms)	7,112.0	4,200.0
Idle energy rate (kW or Btu/h)	8,432.4	1,970.0
Cooking-energy efficiency (%)	49%	45%
Production capacity (lb/h)	95.8	110
ASTM energy to food (kWh/lb or Btu/lb)	108.57	109.163125
Water consumption rate (gal/h)	3	2

Energy & Water Consumption

	Competitive Model	ENERGY STAR Model	
Daily Energy Consumption (kWh or Btu)	138,690.70	104,946.55	calculated
Average Demand (kW)	N/A	N/A	calculated
Annual Energy Consumption (kWh or therms)	506	383	calculated
Annual Water Consumption (gal)	13,140	8,760	calculated
Annual Energy Cost (\$)	\$596	\$451	calculated
Annual Water Cost (\$/yr)	\$60	\$40	calculated

Utility Rates

Average commercial electric rate (\$/kWh electricity):	\$0.1030	National Average Price of Electricity and Gas: Energy Information Administration, Annual Energy Outlook 2009 (Early Release) edition. (converted from 2007 to 2008 dollars).
Average commercial gas rate (\$/mcf gas):	\$11.77	2006 Water and Wastewater Rate Survey, Raftelis Consulting
Average water and sewer cost (\$/1000 gallons)	\$4.53	

Discount Rate

Commercial and Residential Discount Rate (real)	4%	A real discount rate of 4% is assumed, which is roughly equivalent to the nominal discount rate of 7% (4% real discount rate + 3% inflation rate).
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Carbon Dioxide Emissions Factors

Electricity Carbon Emission Factor	1.54	lbs CO ₂ /kWh	EPA's Climate Change Action Plan (CCAP) number for 2009.
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CO₂ Equivalents

Annual CO ₂ sequestration per forested acre	9,700	lbs CO ₂ /year	EPA's Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html
Annual CO ₂ emissions for "average" passenger car	12,037	lbs CO ₂ /year	EPA's Greenhouse Gas Equivalencies Calculator. http://www.epa.gov/cleanenergy/energy-resources/calculator.html