

Energy Efficiency Opportunities for Commercial Kitchens

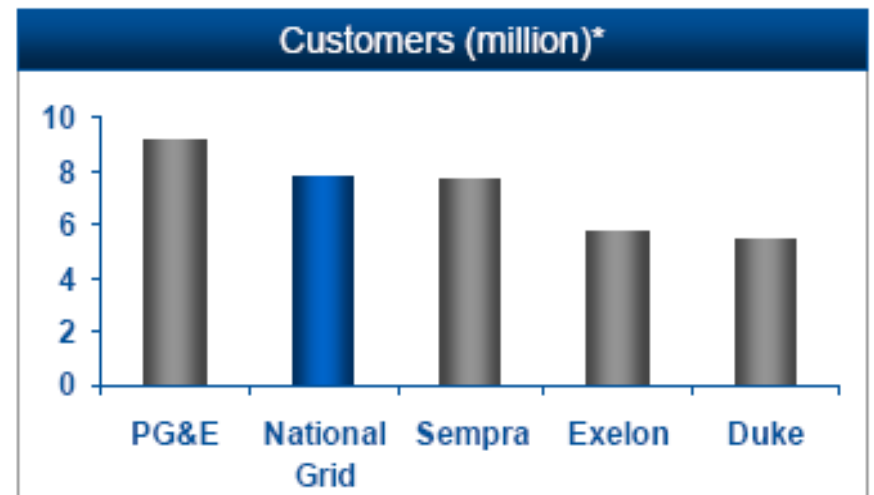
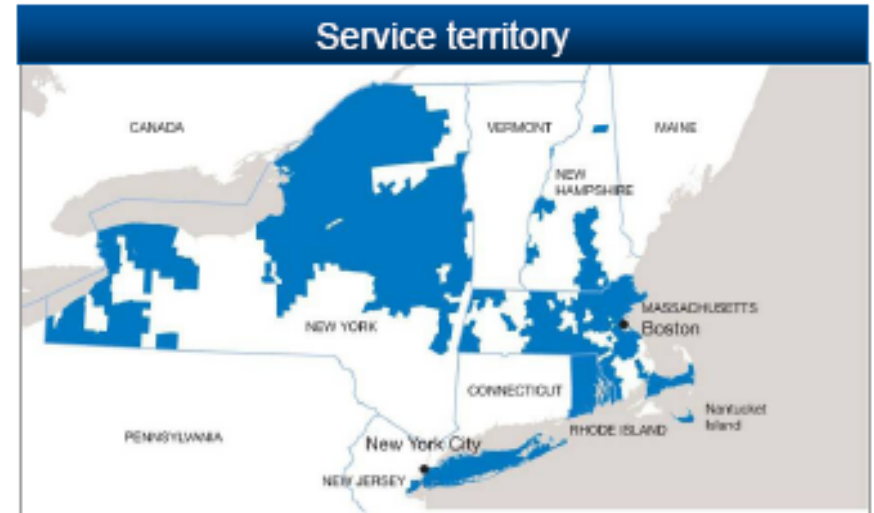
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Agenda

- Prescriptive Incentives
- Spray Valves
- Custom Incentives
- Customer profile
- Energy Savings Examples
- Customer Video
 - <https://www.powerofaction.com/newhampshirecigaskitchenequipment-video/>

National Grid is the second-largest utility in the U.S.

- ◆ The largest distributor of Natural Gas in the northeast U.S.
 - ◆ Approximately 3.4 million customers in New York, Massachusetts, New Hampshire and Rhode Island
- ◆ Delivers electricity to approximately 3.3 million customers
 - ◆ Massachusetts, New Hampshire, New York and Rhode Island
- ◆ Manages the electricity network on Long Island under an agreement with the Long Island Power Authority
 - ◆ Serving 1.1 million LIPA customers



Restaurant Energy Usage

- **According to Pacific Gas and Electric's Food Service Technology Center, as much as 80 percent of the \$10 billion annual energy bill for the commercial food service sector does no useful work.**
- **In addition, They are one of the highest energy consumers of buildings — using approximately 250,000 Btu/sq.ft. This is roughly 2.5 times more energy per square foot than other commercial buildings.**
- **Restaurants that invest strategically can cut utility costs 10 to 30 percent without sacrificing service, quality, style or comfort — while making significant contributions to a cleaner environment.**

Eligible Kitchen Equipment



Combination Ovens



Rack & Conveyor Ovens



Convection Ovens



Commercial Griddles



Commercial Fryers



Commercial Steam Cookers



1.6 gpm

2.6 gpm

4.5 gpm

Spray Valves

Commercial Fryers

Energy Efficiency Requirements for Fryers		
	Gas	
Heavy Load Cooking Energy Efficiency	$\geq 50\%$	
Idle Energy Rate (<i>Based on 15-inch fryer</i>)	$\leq 9,000$ Btu/hr	

Specification effective 2003

Most ENERGY STAR qualified fryers are open-deep fat models with frypots sizes less than 15 inches (standard size).

Also Eligible are large vat fryers

Commercial Fryers

- Incremental cost: \$1,200- \$1,800
- Savings (approximate)
 - up to 30 percent more energy efficient than standard models
 - Gas
 - 500 therms/year
 - \$590 /year
- Unique features
 - Higher quality materials
 - Faster recovery
 - Higher production rate
 - Longer lifespan
- 9 manufacturers with qualified products
- More than 170 qualified products



Commercial Griddles

Energy Efficiency Requirements for Griddles		
	Gas	
Cooking Energy Efficiency	$\geq 38\%$	
<i>Normalized</i> Idle Energy Rate	$\leq 2,650$ Btu/h per ft ²	

Specification effective 2009

ENERGY STAR qualified include: thermostatically controlled, gas and electric, single- and double-sided models

NOT Eligible to QUALIFY include: manually controlled griddles, those with ranges, and fry-top ranges



Commercial Griddles

- Incremental cost: \$650 - 850
- Savings (approximate)
 - Gas
 - 150 therms annually
 - an average of \$170/year
- 3 manufacturing partners with qualified products
- 12 qualified products



Commercial Ovens

Energy Efficiency Requirements for Ovens			
	Convection Oven Full Size	Combination Oven	Rack/Conveyor Oven
Cooking Energy Efficiency	≥ 44%	≥ 44%	≥ 50% (Rack) ≥ 42% (Conveyor)
Idle Energy Rate	≤ 13,000 Btu/h	≤9,000-17,000 Btu/h (size dependant)	Size dependant see qualifying list

Specification effective 2009

ENERGY STAR qualified include: convection ovens

Not ENERGYSTAR but qualify are Combination, Rack, and Conveyor Ovens



Commercial Ovens

- Incremental cost: \$500 - \$8000
- Savings (approximate)
 - 20 percent more energy efficient
 - Gas
 - 300 therms annually
 - \$360/year on utility bills.
- Unique features
 - faster, more even cooking process
 - significant development
- 9 manufacturing partners with qualified products
- More than 20 qualified products



Commercial Steam Cookers

Energy Efficiency Requirements for Steam Cookers				
	Gas			
Pan Capacity	Cooking Energy Efficiency*	Idle Rate (btu/h)		
3-pan	38%	6,250		
4-pan	38%	8,350		
5-pan	38%	10,400		
6-pan and larger	38%	12,500		

Specification effective 2003

Most ENERGY STAR steamers are boilerless (closed loop) but Market Forge has qualified boiler-based steamers.

Qualified models may include countertop, wall-mounted, and floor-models mounted on a stand, pedestal or cabinet-style base.



Commercial Steam Cookers

- Incremental cost: Ranges from \$0 - \$2,500
- Saves energy, water and sewer costs
 - 50 percent more energy efficient than standard models.
 - 330 therms annually
 - \$500 annually
 - Can save 90% or more water (around 170,000 gallons per year)
- Unique features
 - Shorter cook times
 - Higher production rates
 - Reduced heat loss
- Closed loop applications
 - Reuse of water
 - Good for foods with longer cooking time
- 12 manufacturing partners with qualified products
- More than 150 qualified products



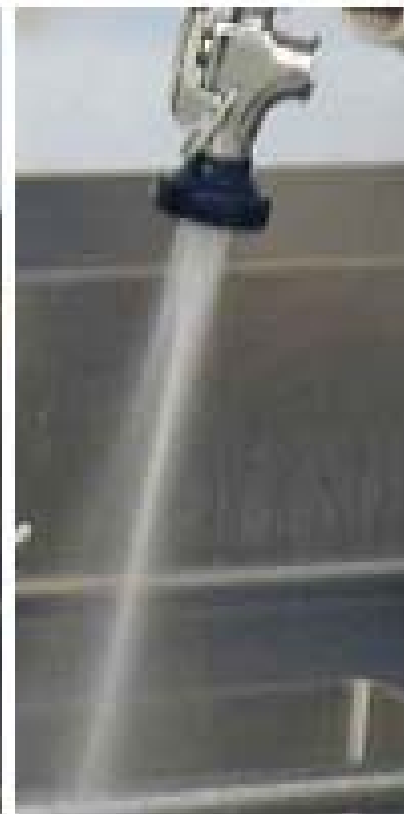
Low efficiency spray valves compared to high efficiency



0.84 GPM



1.15 GPM



2.6 GPM



4.5 GPM

efficiency equipment- High Efficiency pre-rinse spray valve



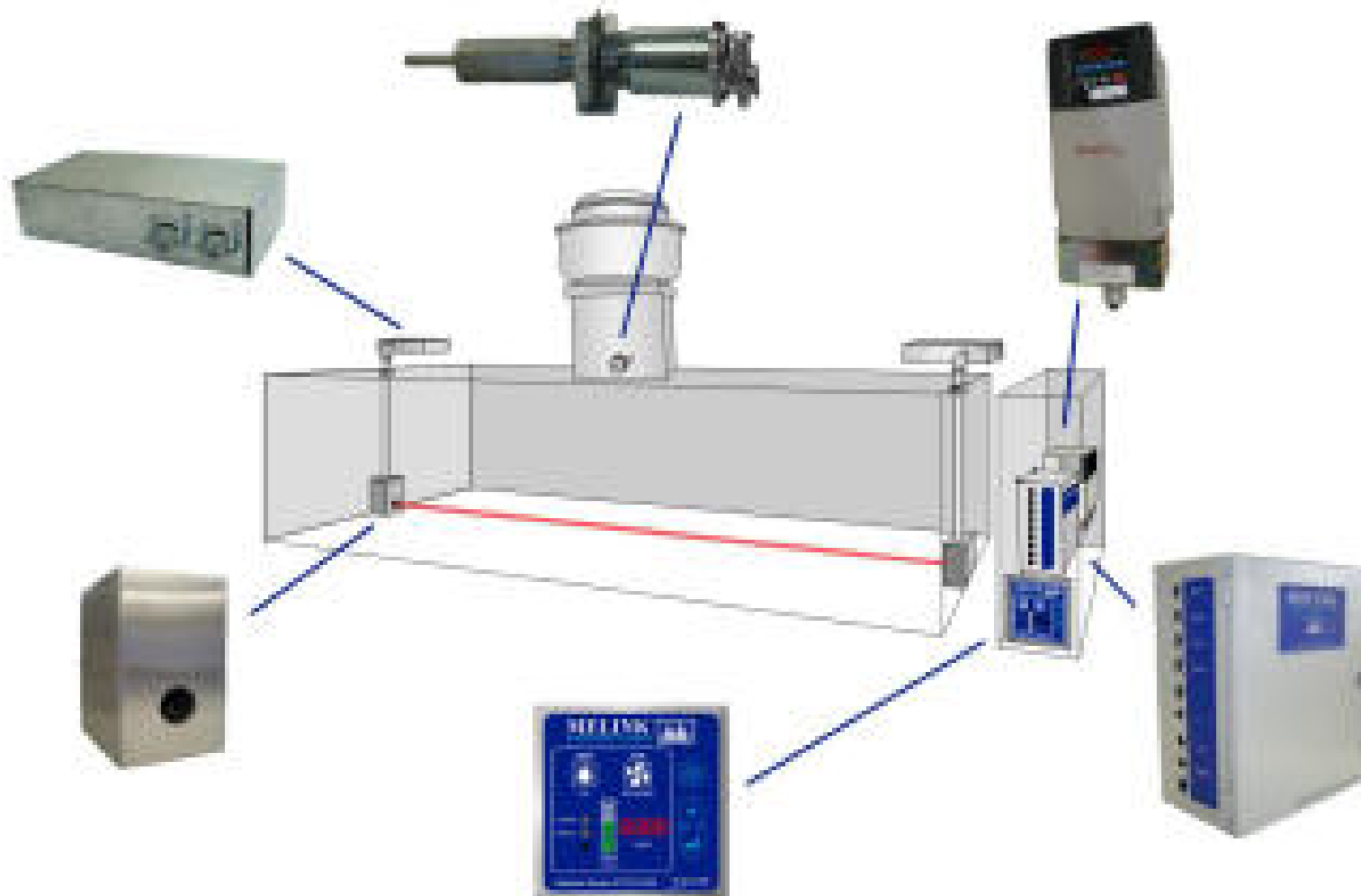
Hours of Spray Valve Usage	Water Savings Gallons/Day	Waste Water Savings Gallons/Day	Gas Savings Therms/Day	Annual \$\$ Savings
1 Hour Per day	60 Gallons	60 Gallons	0.5 therms	\$300-\$350
2 Hours Per day	120 Gallons	120 Gallons	1.0 therms	\$600-\$700
3 Hours Per day	180 Gallons	180 Gallons	1.5 therms	\$900-\$1050

Demand Control Ventilation



Unlike traditional ventilation systems that operate at one speed only, a Demand Control Kitchen Ventilation system responds to changes in equipment usage. In other words, when equipment is idle or only a few are in use, the exhaust fans will reduce speed. When equipment is operating at full capacity, the fans will increase speed. This has a remarkable effect on energy efficiency — and energy costs.

Demand Control Ventilation Set up



Example of Energy Savings from Ventilation Controls



In the table below, sample annual savings are gained by replacing hoods with variable-speed ventilation in an existing facility.

A study conducted by the Food Service Technology Center found that variable-speed hoods significantly reduced energy consumption in commercial kitchens. On average, test case kitchens saved \$775 per month in energy and yielded a payback period of 1.9 years, with an initial cost of \$18,000.

SAVINGS TABLE	ENERGY	\$\$'s
Electric Savings (kWh)	31,375	3,770
Additional building heat (Therms)	3,800	3800
Additional Building Cooling (kWh)	9,900	1,190
Demand Reduction (kW)	6.2	550

Payback Analysis



TOTAL ANNUAL SAVINGS: \$9,310
INSTALLATION COST: \$18,000
SIMPLE PAYBACK: 1.9 Years

NOT INCLUDING INCENTIVES FROM
ELECTRIC & GAS UTILITIES, WHICH
WOULD FURTHER REDUCE
CAPITAL COST AND PAYBACK.

Energy Savings Estimates for using high efficiency equipment



Commercial Food Service - Energy and Water Performance Upgrades

Segment: Casual Dining/Full Service

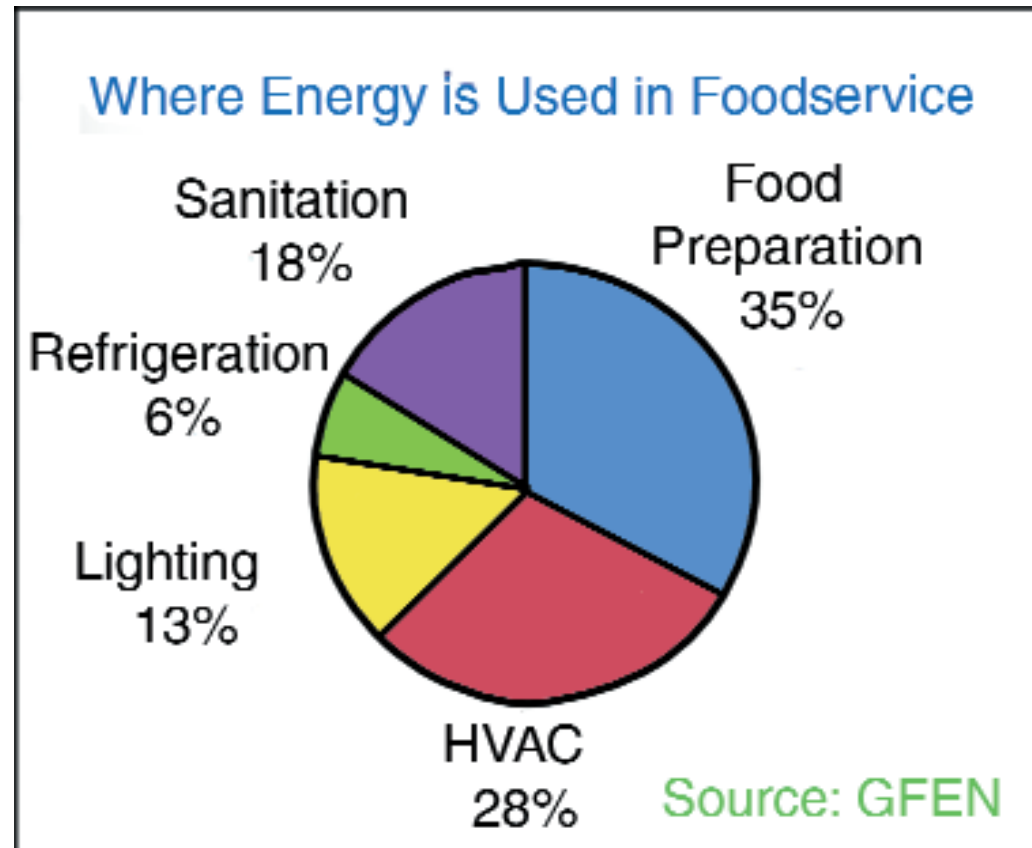
Definition: Sit Down, Expanded menu dining

Energy Performance Upgrades

Rates		
Gas	\$ 1.40	\$/therm
Electric	\$ 0.10	\$/kWh
Water	\$ 2.00	\$/unit
Sewer	\$ 3.00	\$/unit
Ventilation	\$ 1.00	cfm/ft

Technology	Quantity	Standard Efficiency				ENERGY STAR or High Efficiency		Annual Single Unit Savings		Total Annual
		Gas				Gas		Gas	Energy	Savings
		Therms	\$ Costs			Therms	\$ Costs	Therms	%	\$ Costs
1 Fryer	1	1159.8	\$ 1,623.79			799.3	\$ 1,119.01	380.6	31.1%	\$ 504.77
2 Broiler	1	3510.0	\$ 4,913.93			2858.4	\$ 4,001.69	651.6	18.6%	\$ 912.24
3 Griddle	1	1107.7	\$ 1,550.81			1046.9	\$ 1,465.67	60.8	5.5%	\$ 85.14
4 Convection Oven	1	1042.6	\$ 1,459.58			725.4	\$ 1,015.63	317.1	30.4%	\$ 443.96
5 Combination Oven	1	5664.6	\$ 7,930.41			3475.2	\$ 4,865.28	2,189.4	38.7%	\$ 3,065.13
6 Steamer	1	6335.0	\$ 8,869.00			2027.2	\$ 2,838.08	4,307.8	68.0%	\$ 6,030.92
7 Pre-rinse sprayer	1	1066.1	\$ 1,520.52			579.2	\$ 810.94	506.8	46.7%	\$ 709.58
8 Hot Water Heater	1	6473.9	\$ 13,903.04			5477.9	\$ 12,508.66	996.0	15.4%	\$ 1,394.38
								Bundled Savings	Total Est. Savings	
Total									45.9%	\$ 13,146.11

Energy Use in Food Service facilities



Energy Savings from high efficiency equipment

