Energy & Store Development Conference

E+SD 2014

September 7-10, 2014
St. Louis Union Station Hotel
St. Louis, MO

FMI®

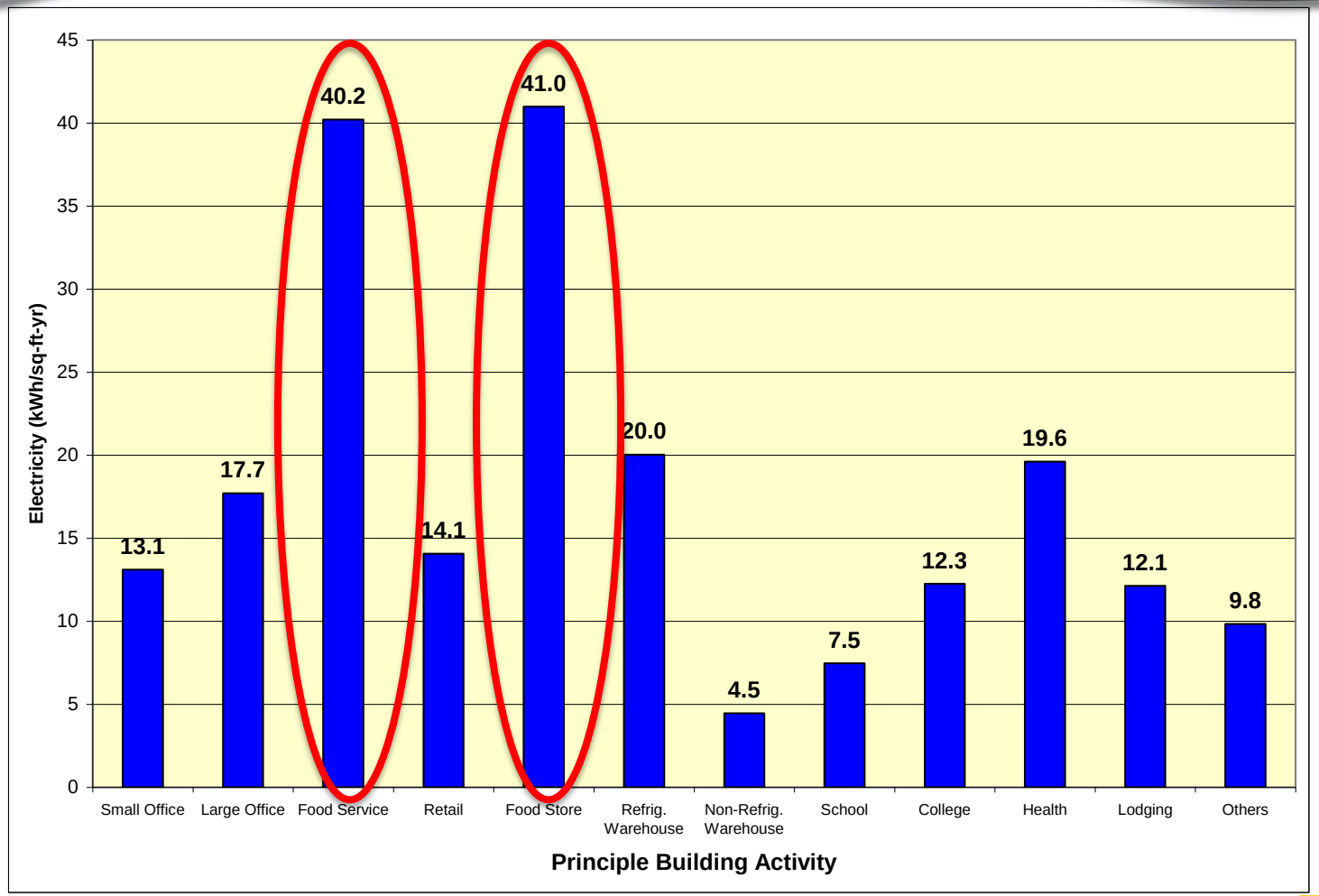
THE VOICE OF FOOD RETAIL

Energy Usage in the Deli/Food Prep Area

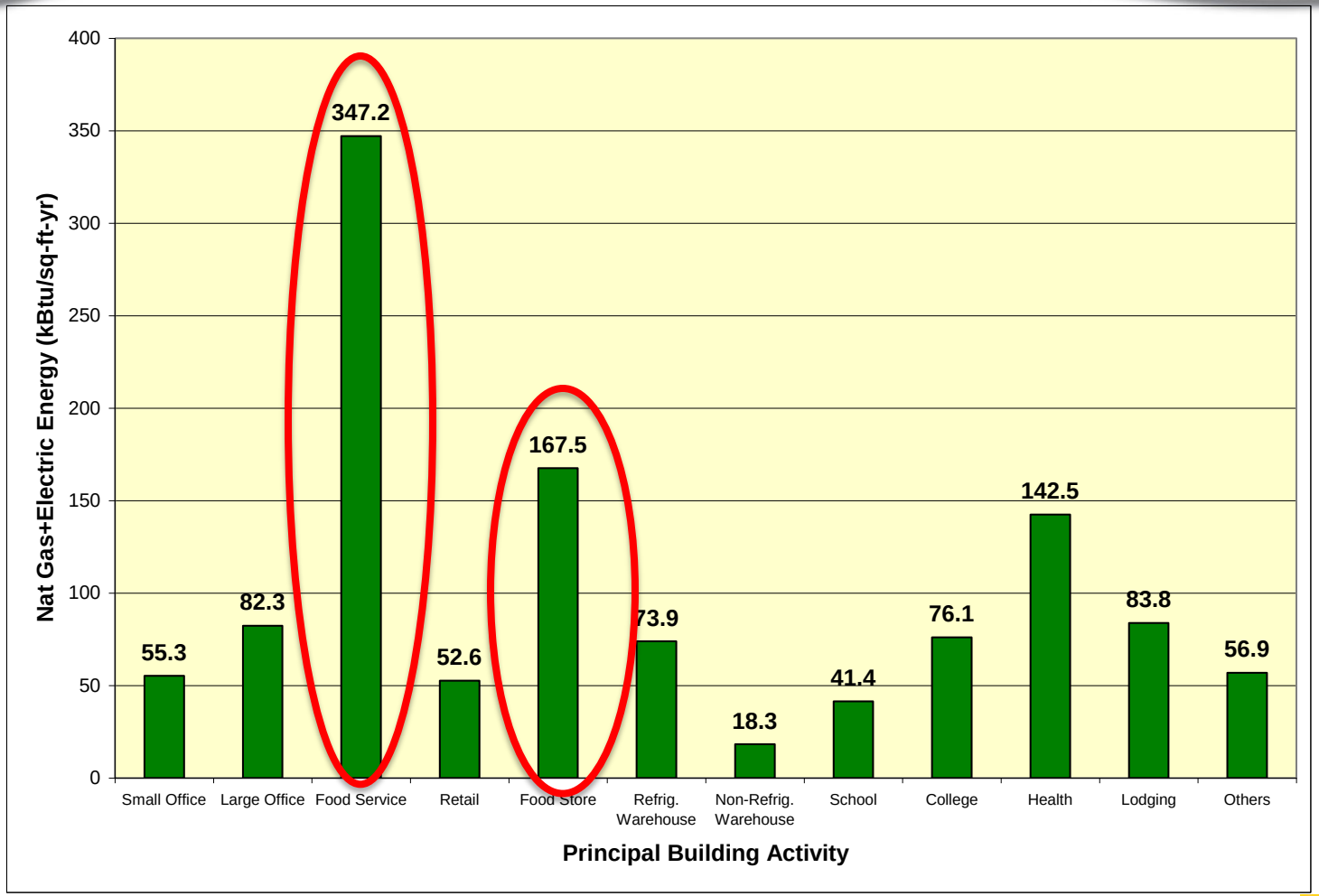
Andre Saldivar

SCE Foodservice Technology Center

Food Service has 2-3 times the energy intensity per square foot of other End Uses



Overview
Electric+Gas Energy Intensity



Common Deli Equipment

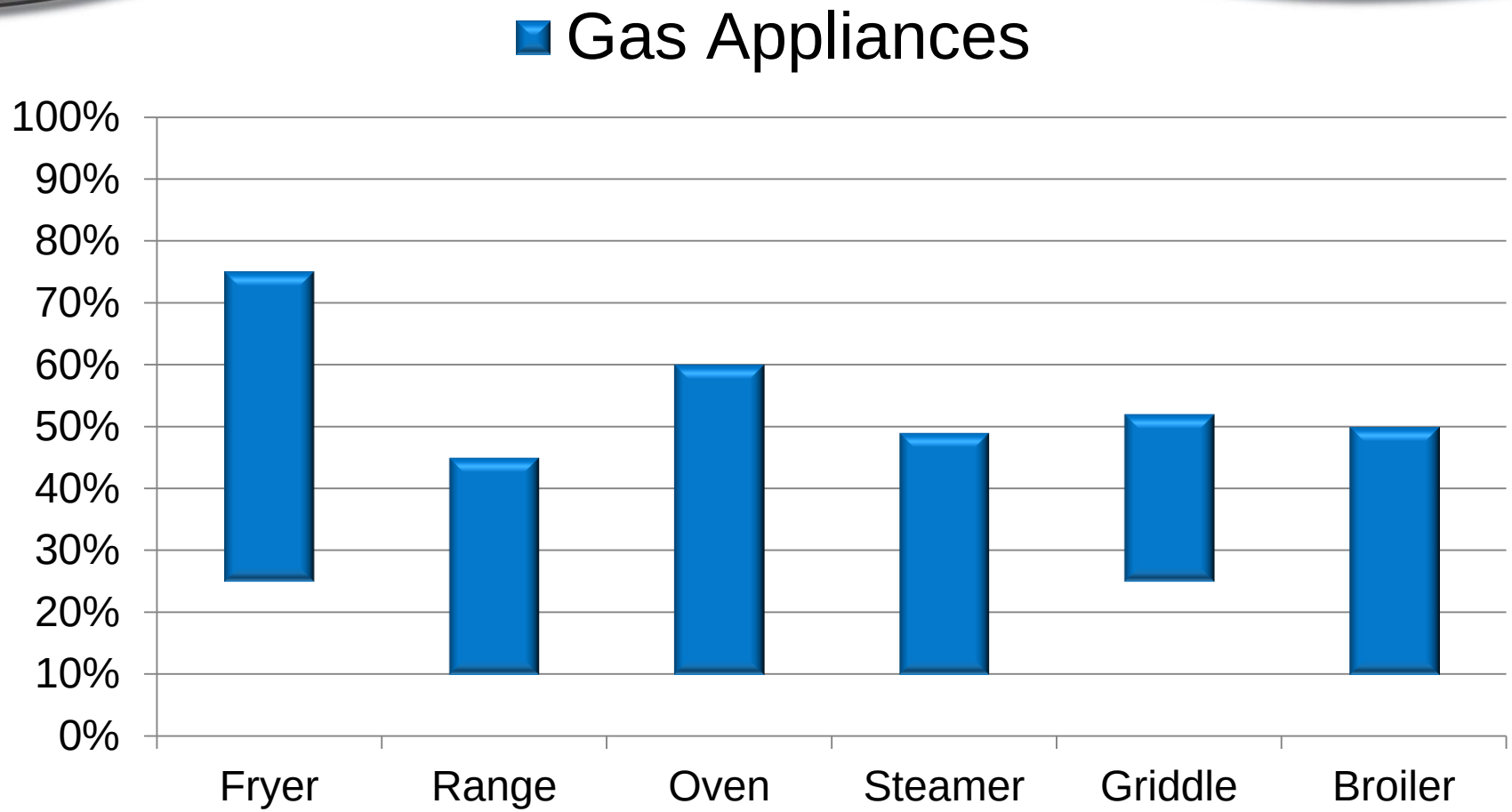
- Rack Oven
- Fryer
- Ice Machine
- Reach-in Refrigeration
- Convection Oven
- Steamer
- Combination Oven
- Wrapper/Sealer
- Ventilation



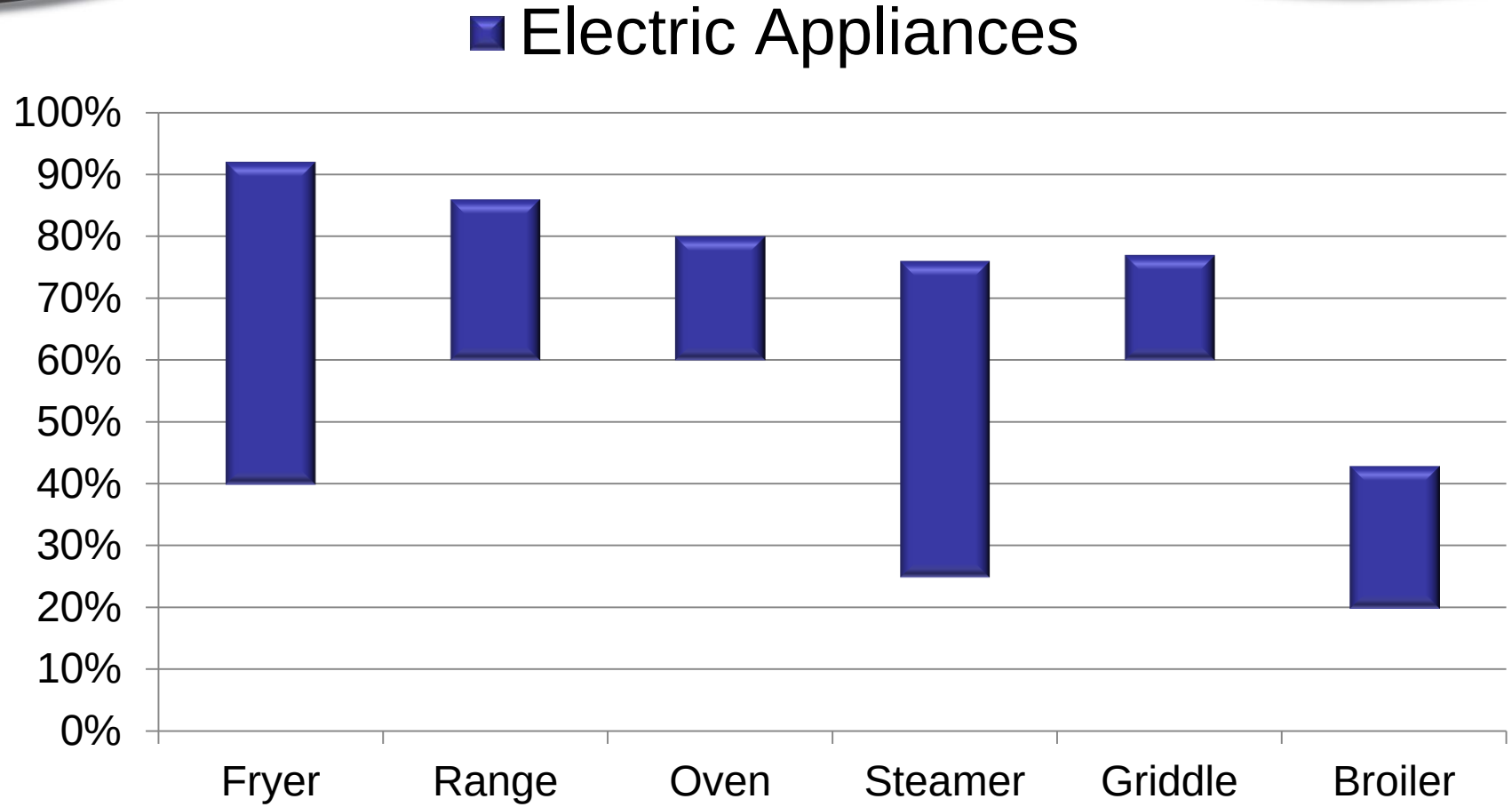





Huge Range in Efficiency!



Huge Range in Efficiency!



Determining Efficiencies: *Customers, Manufacturers and Utilities*

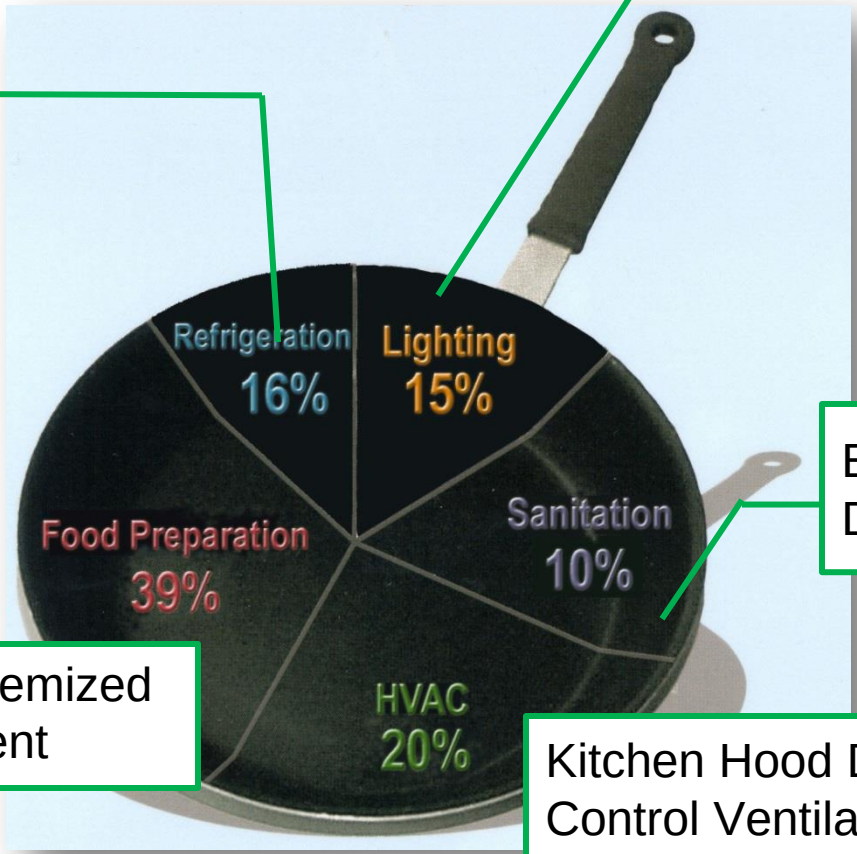
- ASTM Tests
  - Similar to “EPA miles/gal”
- Field Tests
  - Similar to “your miles/gal”
- Tests Help Customers Predict:
  - Energy and water consumption
  - Utility costs
- Tests Help Utilities Set Rebate
  - Steamer – Energy: $1,250 + Water: up to $600

Where Do Your Energy Dollars Go?

❖ Energy Efficiency Opportunities

Track/ Pendant LED Lighting

Ice Machines



Energy Efficient Dishwashers

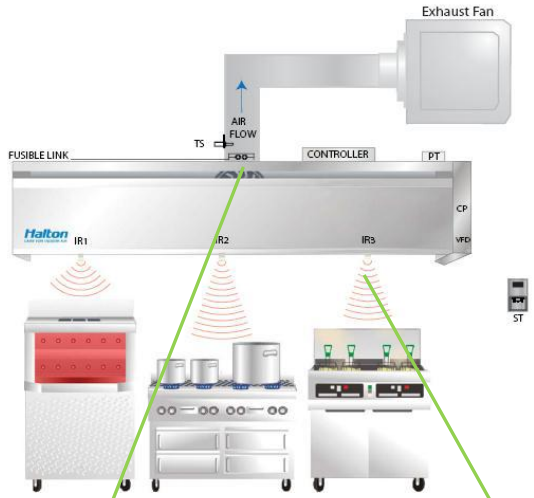
Designated Itemized Equipment

Kitchen Hood Demand Control Ventilation (DCV)

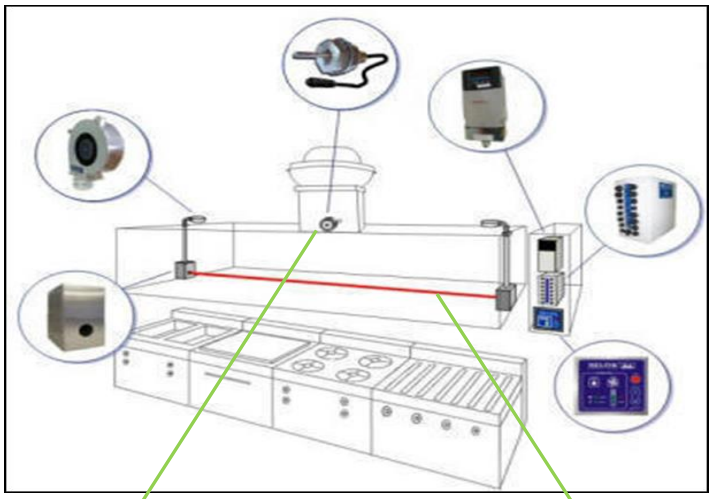
HVAC Strategies

- Ventilation System
  - Hood exhaust & make-up air unit
  - Only run the exhaust and make-up air when needed
  - Make sure the system is air balanced
  - CKV drives 50 – 75% of HVAC energy!
  - Demand Control Ventilation (DCV) system w/ variable speed drives
    - Save up to 75% on fan (make-up & hood) energy

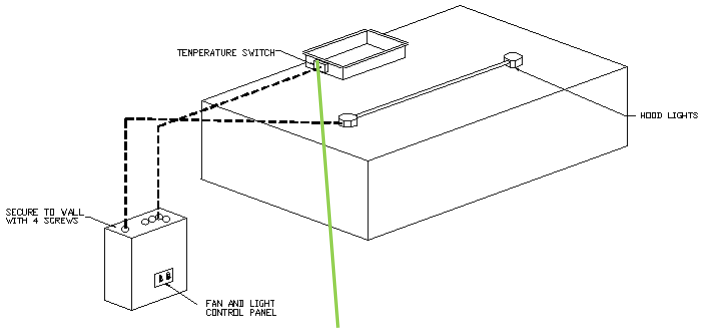
HVAC Strategies
Demand Control Ventilation Technologies



Duct Temperature Sensor & Infrared Sensors



Duct Temperature Sensor & Smoke Detection



Duct Temperature Sensor

Demand Control Ventilation
Test Sites Summary

- Results of Commercial Kitchen Demand Control Ventilation Field Tests

	Institutional Cafeteria	Casual Dining Restaurant	Quick Service Restaurant	Hotel Main Kitchen	Supermarket Kitchen	University Dining
Hood Exhaust (cfm)	9,600	6,400	6,000	22,500	23,800	12,000
Exhaust + MAU (kW)	7.3	3.9	5.1	14.0	6.3	12.5
Energy Savings (%)	75	46	62	62	77	55
Annual Energy Savings (kWh/yr)	26,000	9,150	15,330	76,300	20,900	35,600
Annual Cost Savings ($/yr)	$4,020	$1,373	$2,299	$11,445	$3,135	$5,340

Energy Usage in the Deli/Food Prep Area

Steamer Field Study

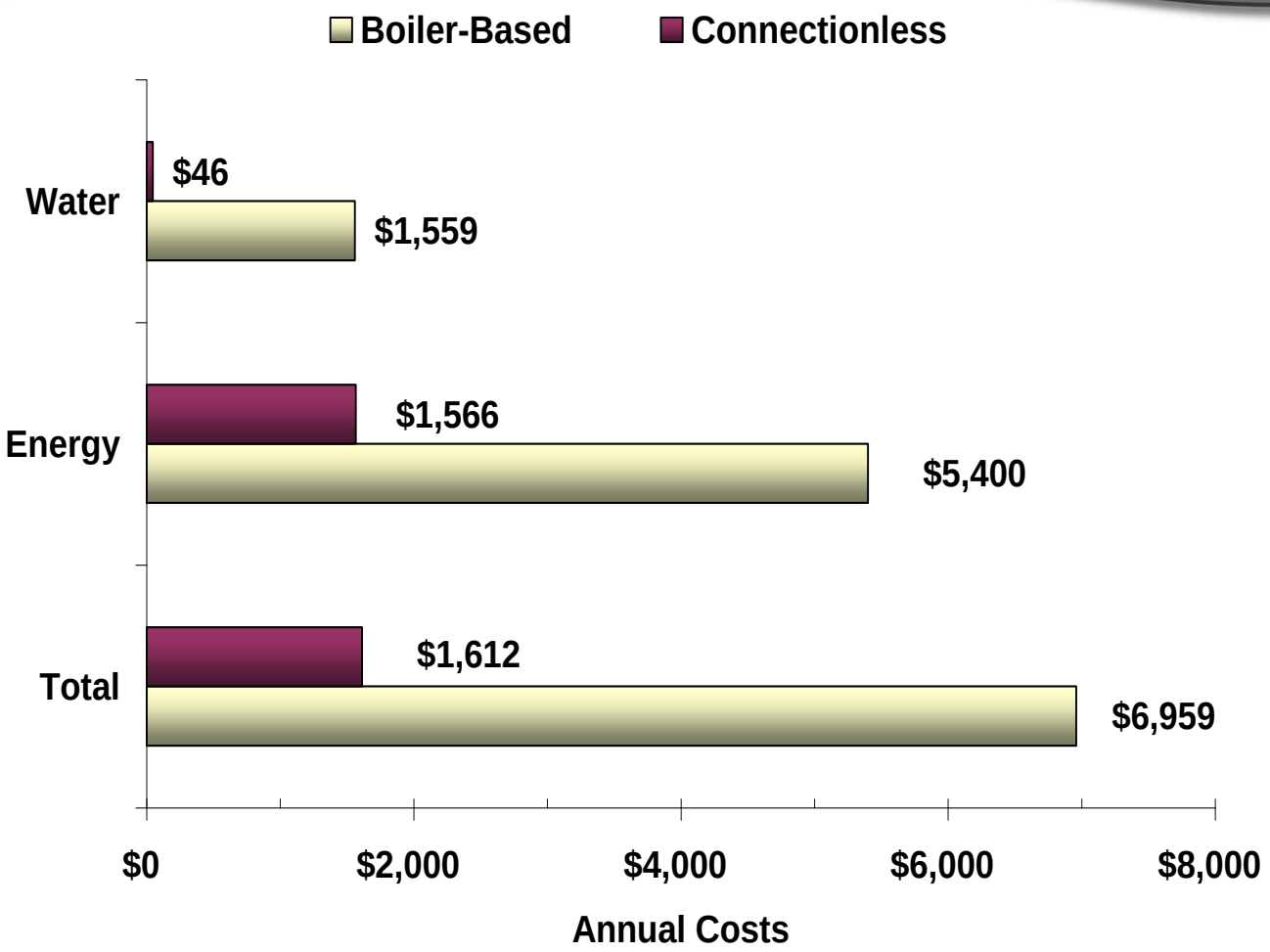
Boiler Based Steamer (low efficiency)
Average Water Usage = 40 gph

Example: Field Testing & Cost Savings
Steamers

- Boiler-Based
  - Casual Dining Restaurant
  - Energy = 100 kWh/day
  - Water = 810 gal/day
    - 62.3 gal/hr
  - Operation = 13 hr/day

- Connectionless
  - Casual Dining Restaurant
  - Energy = 29 kWh/day
  - Water = 24 gal/day
    - 2.0 gal/hr
  - Operation = 12 hr/day

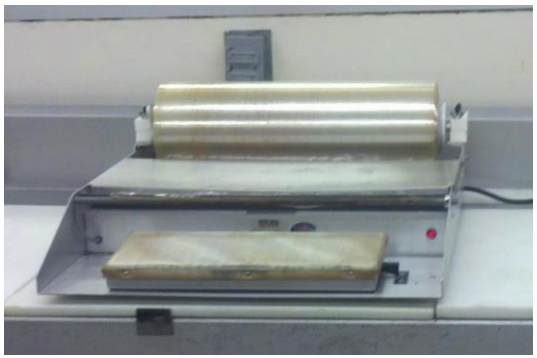
Example: Field Testing & Cost Savings *Steamers*



Based on 365 days/yr operation, $0.15/kWh for energy, and $4.00/100 cu. ft. water & sewer

Wrapper Field Study
6 Test Sites

- Conventional Package Sealer/Wrapper
  - 550 Watt Element
  - Energy = 2061 kWh/yr
  - Demand = .25 kW/yr
  - Operation = 18-20 hr/day



- SMART Package Sealer/Wrapper
  - 2000 Watt Element
  - Energy = 404 kWh/yr
  - Demand = .045 kW/yr
  - Operation = 18-20 hr/day

Wrapper Field Study
6 Test Sites

- SMART Package Sealer/Wrapper
  - Annual Savings
  - Energy = 1657 kWh/yr
  - Demand = .205 kW/yr
  - Energy Cost = 255 $/yr
  - SCE Rebate = $165
  - *** Test Sites had 2-4 per units per location ***

Where to Find Foodservice Equipment

Your online toolbox

- Reports
- Energy saving tips
- Design guides
- Cost calculators
- Energy Star
- Rebates

www.Fishnick.com

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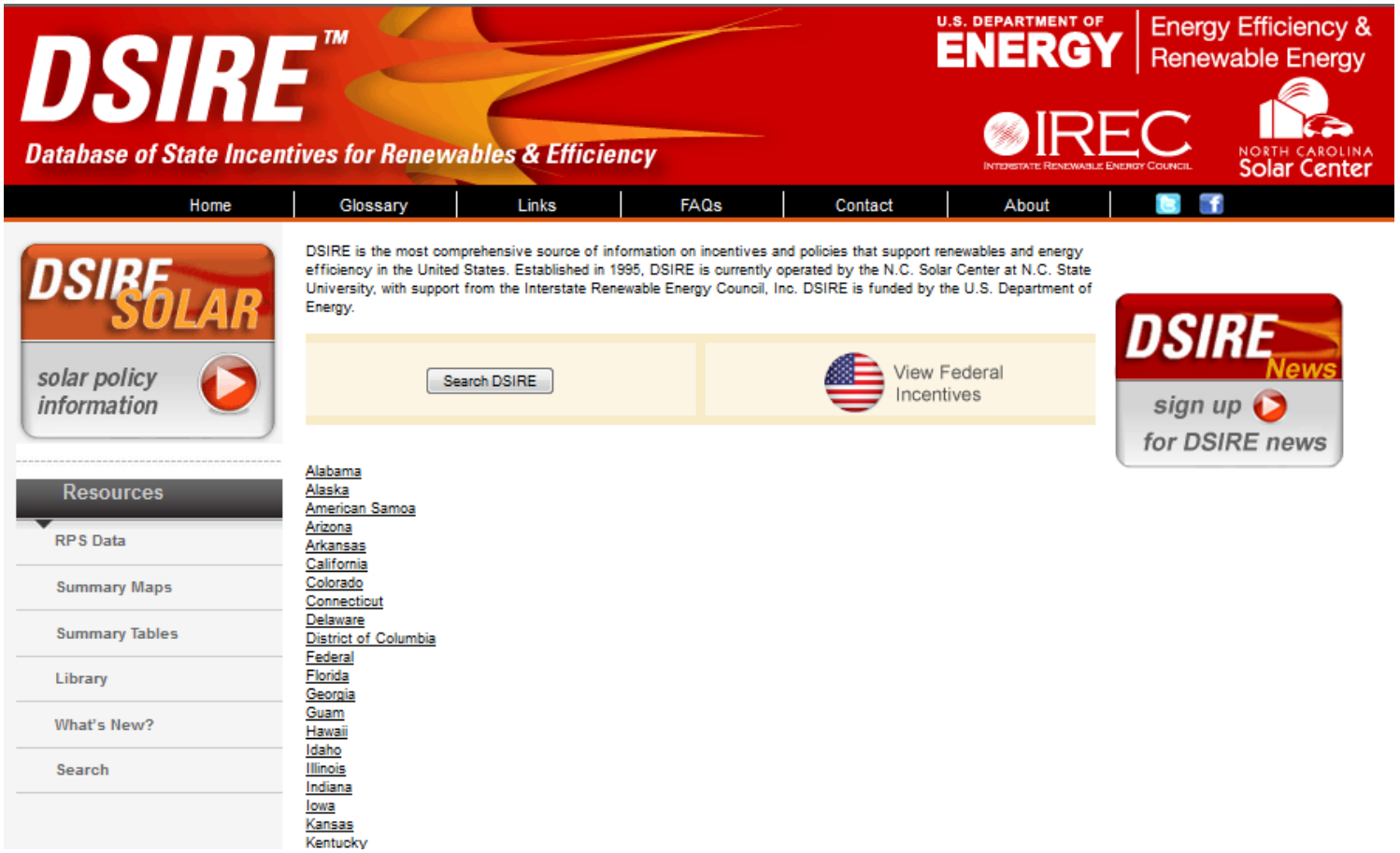
What About Stores Outside California?

www.energystar.gov/cfsrebate_locator

Searchable Database for Renewables & Efficiency



Energy Usage in the Deli/Food Prep Area

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Gas & Electric Utilities Offering CFS Energy Efficiency Rebates

- Avista Utilities-Washington, Idaho, Montana
- California Utilities-PG&E, SCE, SCG, SDG&E
- CenterPoint Energy-Minnesota
- Duke Energy-Ohio, Kentucky
- Efficiency Maine
- Efficiency Vermont
- Energy Trust of Oregon
- Focus on Energy-Wisconsin
- MidAmerican Energy-Iowa
- National Grid-New York, Maine, New Hampshire
- NYSERDA-New York
- Puget Sound Energy-Washington
- Questar Gas-Utah
- SMMPA-Minnesota
- Southwest Gas-Arizona *(conservationrebates.com)*
- Tacoma Public Utilities-Washington
- Vectren Energy Delivery-Indiana
- WE Energies-Wisconsin, Michigan

More programs coming soon to a utility near you…

Energy Usage in the Deli/Food Prep Area

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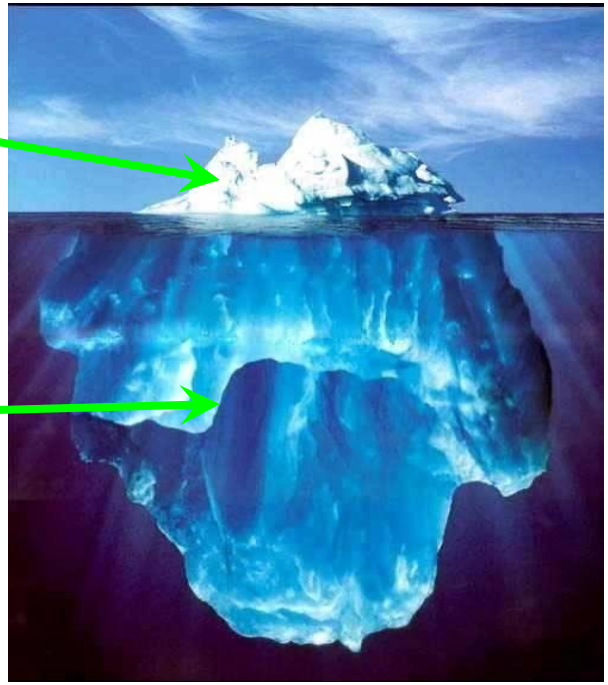
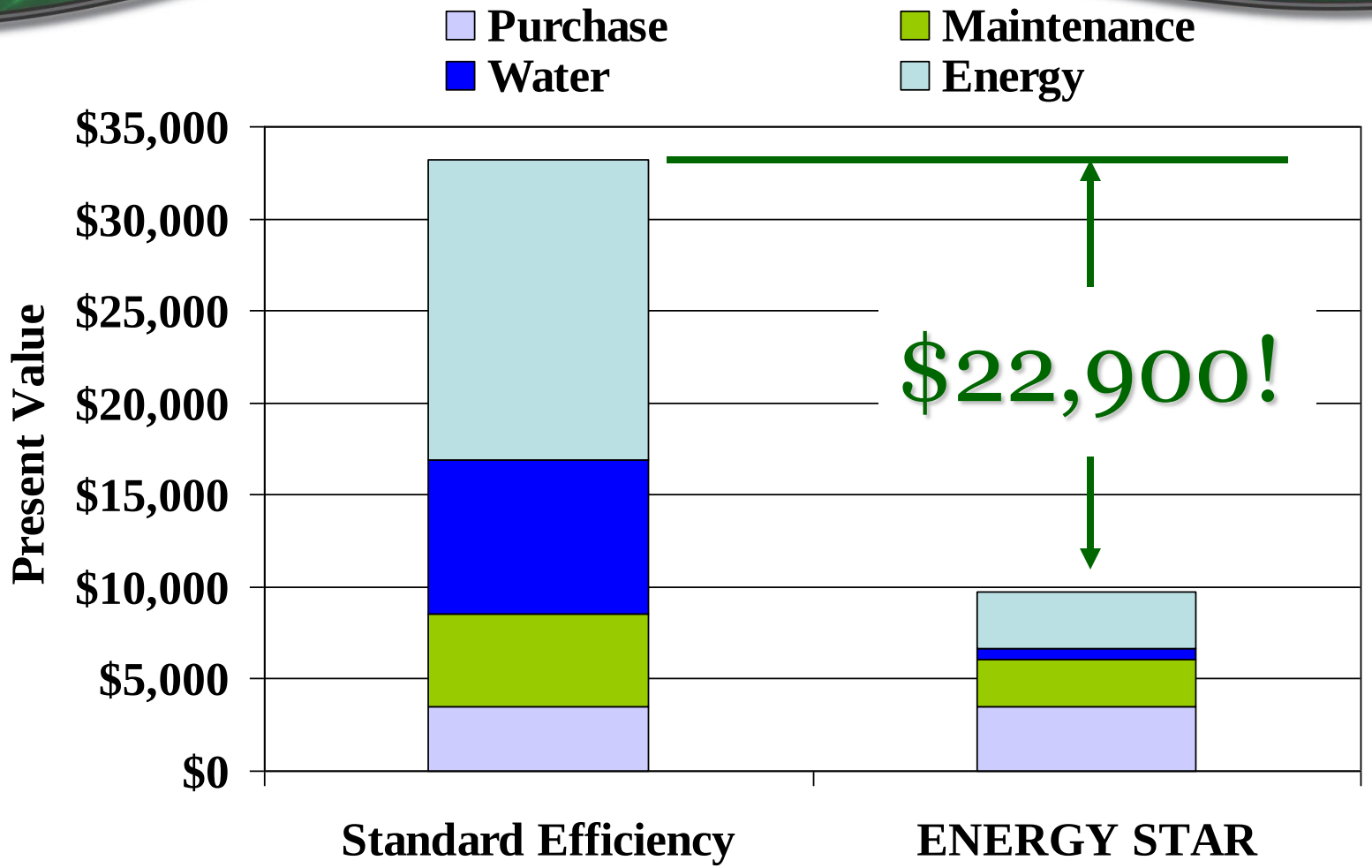
Life Cycle Cost: The Big Picture

Acquisition Costs

Sustaining Costs

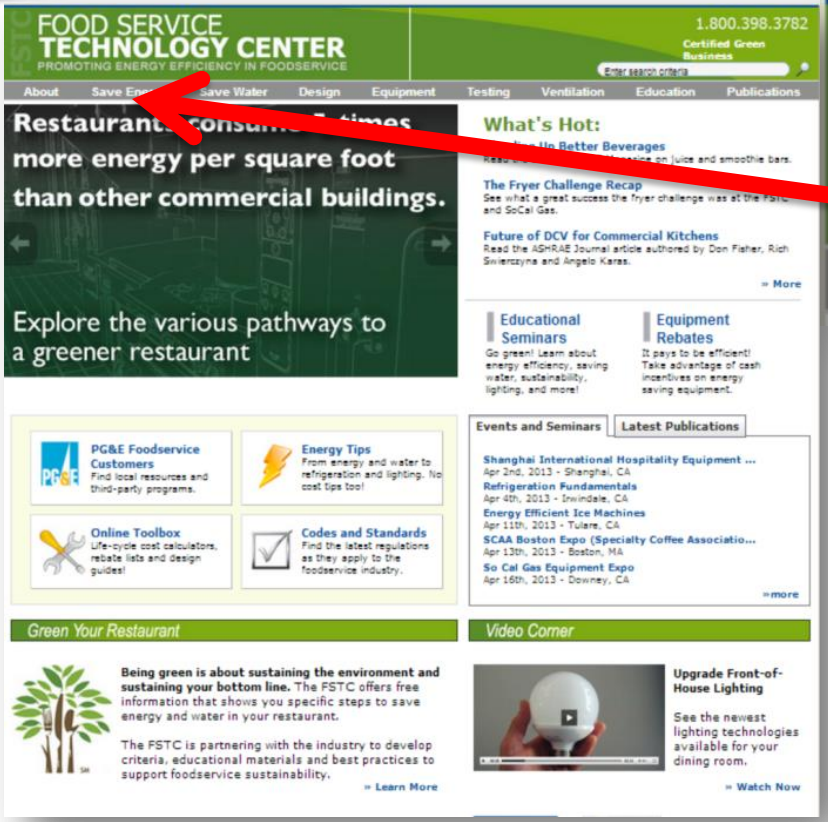


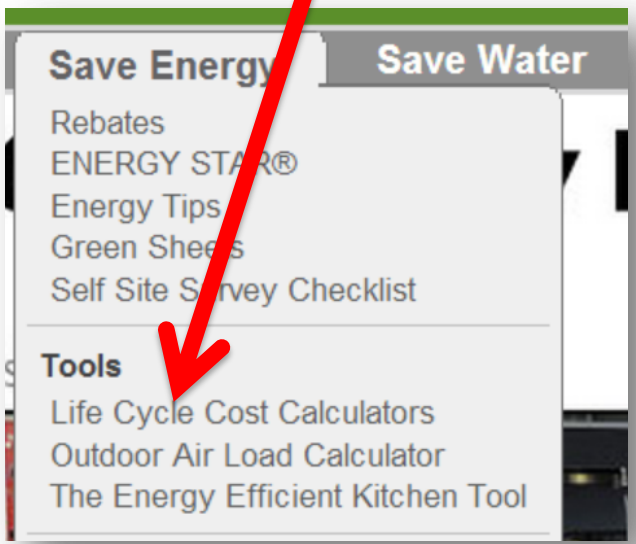
Life Cycle Cost
Connectionless Steamers



8-year life-cycle costs based on 15¢/kWh and 3.1% discount rate

How to Calculate Savings?





Energy Usage in the Deli/Food Prep Area

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Example Appliance: Electric Combination Oven

Electricity

Water

Qualified Combination Ovens

Updated 5/13/2014

Qualifying gas combination oven/steamer models must have a tested steam mode cooking energy efficiency of ≥ 38% and convection mode cooking energy efficiency of ≥ 44% utilizing ASTM Standard F2861, and meet the idle rate equirements in Table 1. Qualifying electric combination oven/steamer models must have a tested steam mode cooking energy efficiency of ≥ 50% and convection mode cooking energy efficiency of ≥ 70% utilizing ASTM Standard F2861, and meet the idle rate equirements in Table 1. Check your utility rebate application for terms and conditions, and effective program dates.

Company Name	Model Number	Size (Steam Pans)	Fuel Type	Preheat Energy (Btu or kWh)	Convection Mode				Steam Mode				Rebate (per oven)
					Idle Energy Rate (Btu/h or kW)	Energy Efficiency (%)	Production Capacity (lbs/h)	Cooking Water Use (gal/h)	Idle Energy Rate (Btu/h or kW)	Energy Efficiency (%)	Production Capacity (lbs/h)	Cooking Water Use (gal/h)	
BKI	HE061	6	Electric	0.93	1.08	73%	61	0.0	0.98	51%	54	10.8	$1,000
BKI	HE062R	12	Electric	1.08	1.28	76%	99	0.0	1.13	66%	126	9.1	$1,000
BKI	HE101	10	Electric	0.98	1.30	76%	111	0.0	1.15	70%	109	11.7	$1,000
BKI	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cleveland	OES-10.20	20	Electric	2.30	1.70	80%	200	29.0	2.60	64%	332	2.2	$1,000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cleveland	OES10-10 Mini	5	Electric	0.54	0.73	75%	50	3.9	1.19	65%	80	2.6	$1,000
Cleveland	OES10.10*	10	Electric	0.97	1.19	78%	104	0.0	0.71	72%	101	0.5	$1,000
Eloma	T12-21E	24	Electric	2.61	2.01	78%	203	0.0	3.55	67%	313	6.5	$1,000
Henny Penny	ESC610	6	Electric	0.60	0.59	78%	57	0.0	1.35	63%	78	5.1	$1,000
Hobart	CE10FD-1	20	Electric	1.56	2.43	71%	166	0.0	3.12	66%	182	3.0	$1,000
Piper	HME061	6	Electric	0.56	1.13	76%	69	0.0	1.69	58%	88	3.0	$1,000
Rational	CMP101E	10	Electric	0.86	1.13	79%	106	3.1	2.19	60%	201	9.6	$1,000
Rational	CMP61E	6	Electric	0.67	0.92	76%	63	2.5	1.69	58%	111	9.0	$1,000
Rational	SCC102E	20	Electric	1.58	2.00	79%	189	-	3.30	61%	367	-	$1,000
Rational	SCCWE61E	6	Electric	0.63	0.99	76%	64	10.9	1.88	57%	115	9.5	$1,000
Rational	SCCWE62E	12	Electric	0.96	1.32	79%	128	11.8	2.00	63%	202	6.7	$1,000

Find an efficient oven from the manufacturer you like in the size that you want.

Example Appliance: Electric Combination Oven

Electric Combination Oven Life-Cycle Cost Calculator

About | How To Use | Definitions

User Inputs			
Choose a Combi: (optional) Cleveland ▼ OES-10.20 ▼	User Input Oven	Base Efficiency Oven	Energy Efficient Oven
Oven Performance *(Based on ASTM Standard Test Method F2861)*			
Number of Steam Pans	20	20	20
Preheat Energy (kWh)	2.30	3.75	2.00
Convection Mode Idle Energy Rate (kW)	1.70	3.75	2.50
Convection Mode Cooking-Energy Efficiency (%)	80	65.0	70.0
Convection Mode Production Capacity (lbs/h)	200	100.0	125.0
Steam Mode Idle Energy Rate (kW)	2.60	12.50	6.00
Steam Mode Cooking-Energy Efficiency (%)	64	40.0	50.0
Steam Mode Production Capacity (lbs/h)	332	150.0	200.0
Water Consumption Rate (gal/h)	2.2	70	30
Oven Usage			
Operating Hours per Day (h/day)	8.0	8.0	8.0
Operating Days per Year (d/year)	365	365	365
Number of Preheats per Day (#/day)	1	1	1
Percentage of Time in Steam Mode (%)	50	50	50
Pounds of Food Cooked per Day (lbs/day)	250.0	250.0	250.0
Utility Cost and Lifespan			
Electric Cost per kWh ($/kWh)	0.110	0.110	0.110
Electric Demand Charge per kW ($/kW)	0.00	0.00	0.00
Water / Sewer Cost per CCF (100 ft³)	7.00	7.00	7.00
Lifespan of Oven in Years (years)	12.0	12.0	12.0
Discount Rate (%/year)	0.00	0.00	0.00
	Calculate!	Reset Fields	

Energy Usage in the Deli/Food Prep Area

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Example Appliance: Electric Combination Oven

Get an Answer

Annual Results			
Annual Energy Consumption (kWh)	12547	27491	18053
Average Energy Consumption Rate (kW)	4.3	9.4	6.2
Annual Water Consumption (gal)	3212	102200	43800
Annual Energy Cost	$1380	$3024	$1986
Annual Water Cost	$30	$956	$410
Total Annual Utility Cost	$1410	$3980	$2396
Input Additional Costs (Optional)			
Maintenance Costs per Year	$0	$0	$0
Initial Cost of Oven	$0	$0	$0
Lifetime Results			
Lifetime Energy Cost	$16560	$36288	$23832
Lifetime Water Cost	$360	$11472	$4920
Lifetime Maintenance Cost	$0	$0	$0
Initial Cost of Oven	$0	$0	$0
Total Lifetime Cost	$16920	$47760	$28752

Compare

Example Appliance: Electric Combination Oven

Electric Combi

- Annual Savings
- Energy = 15,000 kWh/yr
- Demand = 5.0 kW/yr
- Water = 98,000 gal/yr
- Energy Cost = 1,644 $/yr
- Water Cost = 920 $/yr
- **** 12 year Life Cycle Savings ****
  - **Energy Cost = $20,000**
    Water Cost = $11,000

Energy Efficiency Foodservice Rebates

- Future Equipment Rebates
  - Electric Conveyor Ovens
  - Electric Deck Ovens
  - Cook n Hold Ovens
  - Pressure Fryers
  - Any other equipment that we should look into?

Contact Information

- Manager-Product/Project, Andre Saldivar
  - 626-812-7558
  - andre.saldivar@sce.com
  - EECI-FTC@sce.com

California Energy Wise Program