

This presentation premiered at WaterSmart Innovations

watersmartinnovations.com



Food Service

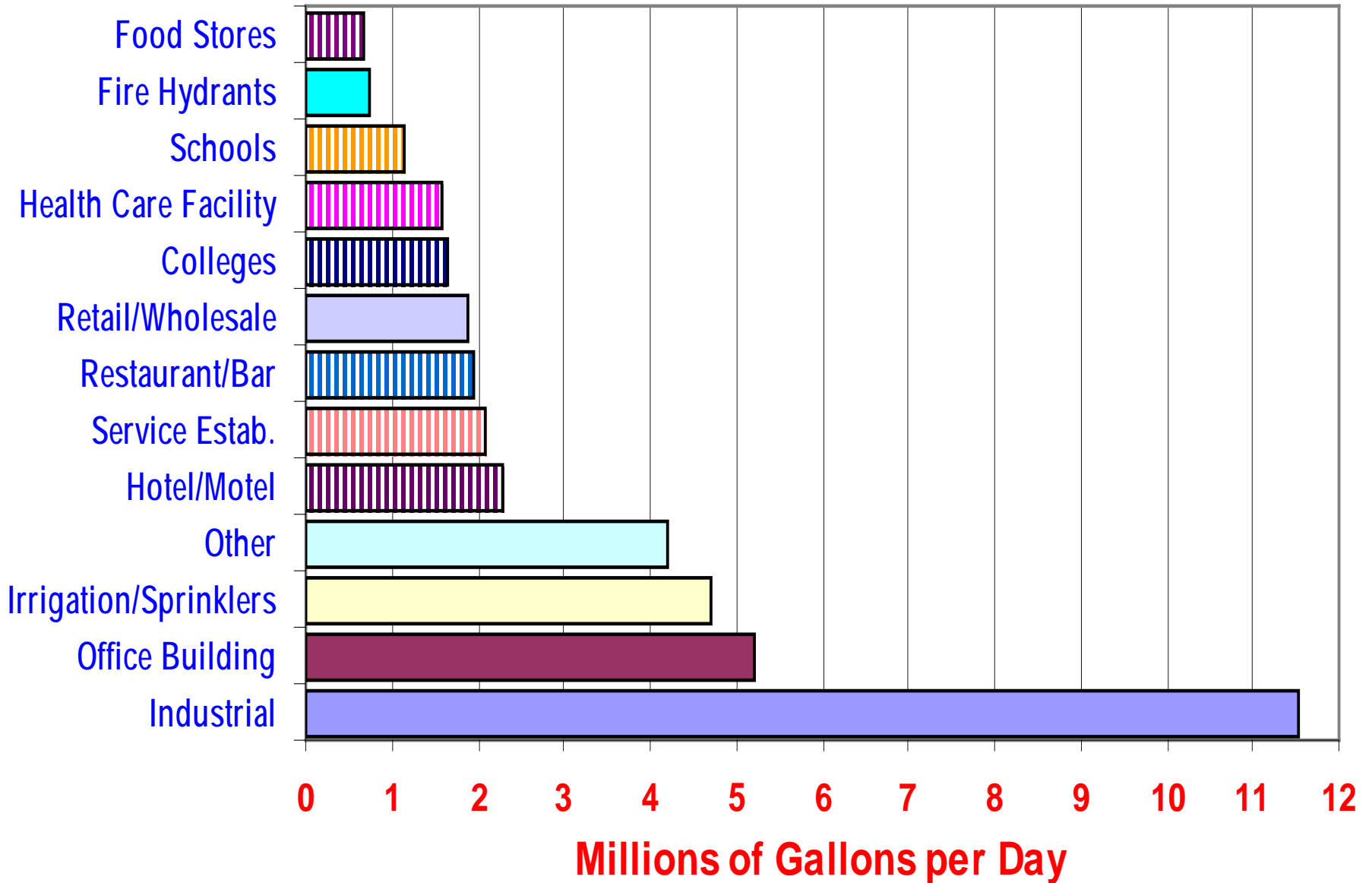
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What Will Be Covered

- **Where Water is Used**
- **Energy – Water Relationships & Costs**
- **Specific Water Using Operations**
 - *Scullery Operations*
 - *Food Preparation*
 - *Refrigeration and Ice making*
 - *Sanitation and Wash down*
- **Other Considerations**

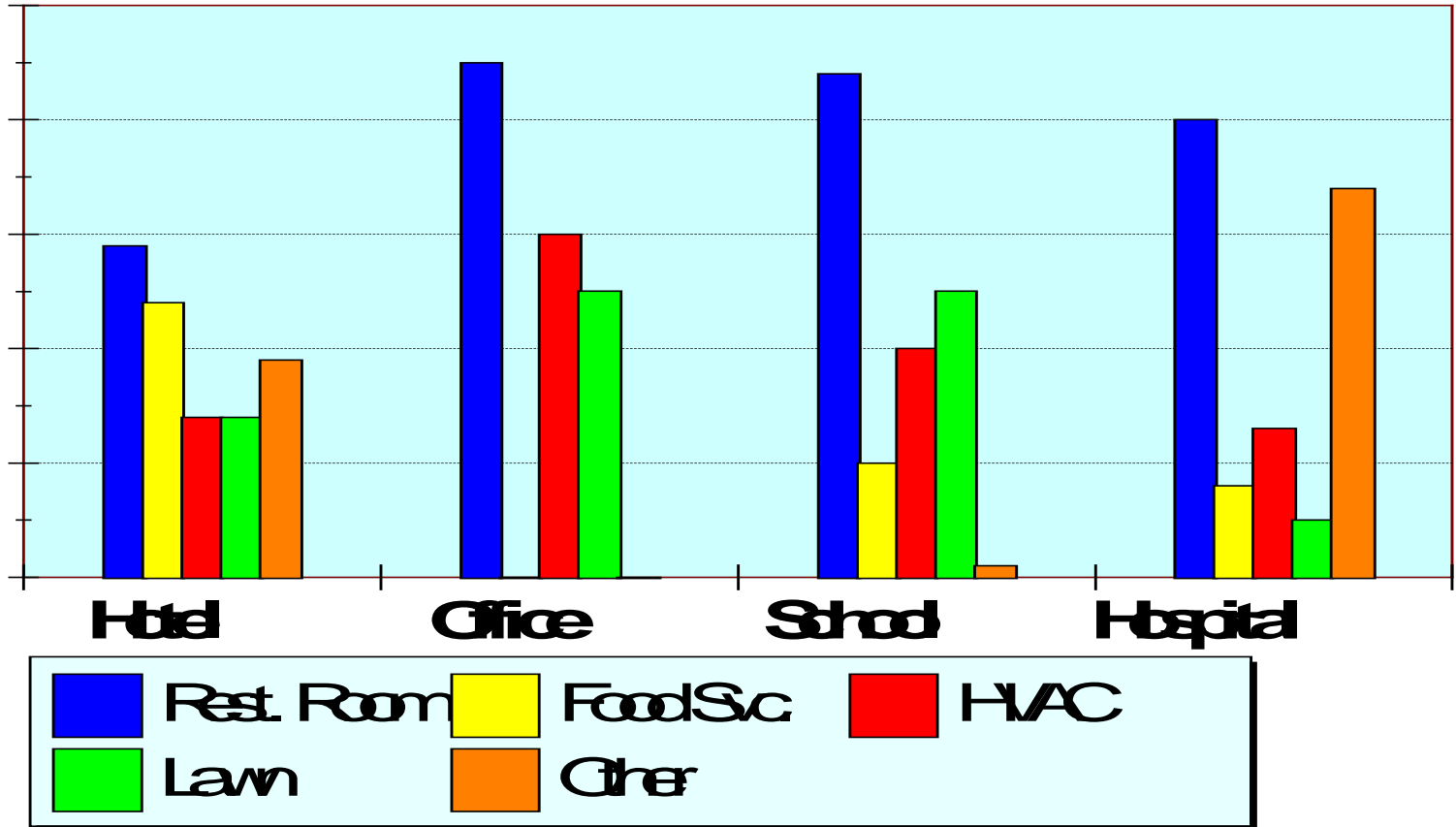
Where Water is Used

Commercial/Industrial Water Use in Austin, Texas 2000-2001



Typical Commercial & Institutional Use

Percentage of Total Use



Energy – Water Relationships

Energy Costs for Heating Water

Cents/kWh or \$/MCF

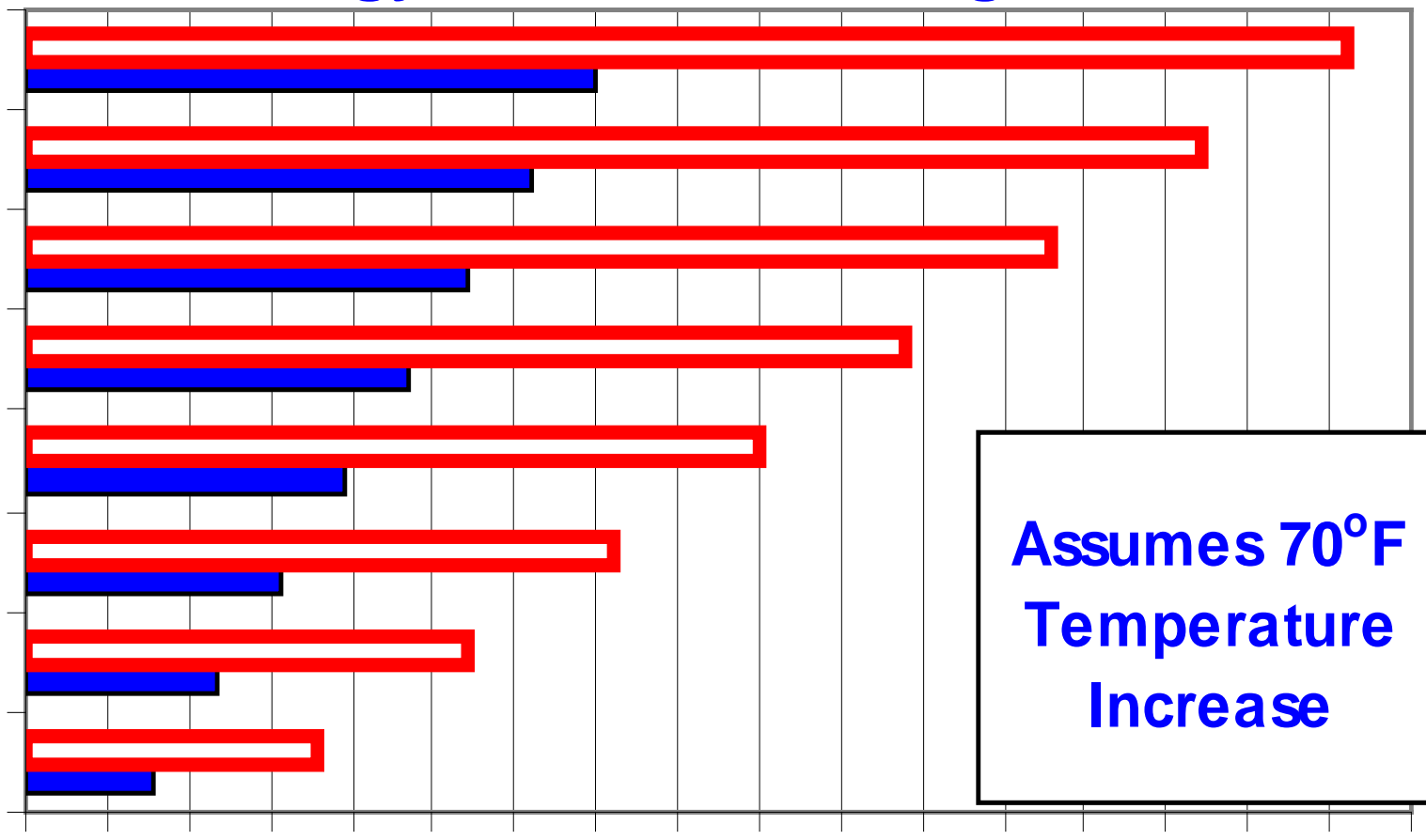
18
16
14
12
10
8
6
4

\$0 \$2 \$4 \$6 \$8 \$10 \$12 \$14 \$16 \$18 \$20 \$22 \$24 \$26 \$28 \$30 \$32 \$34

\$/1,000 Gallons

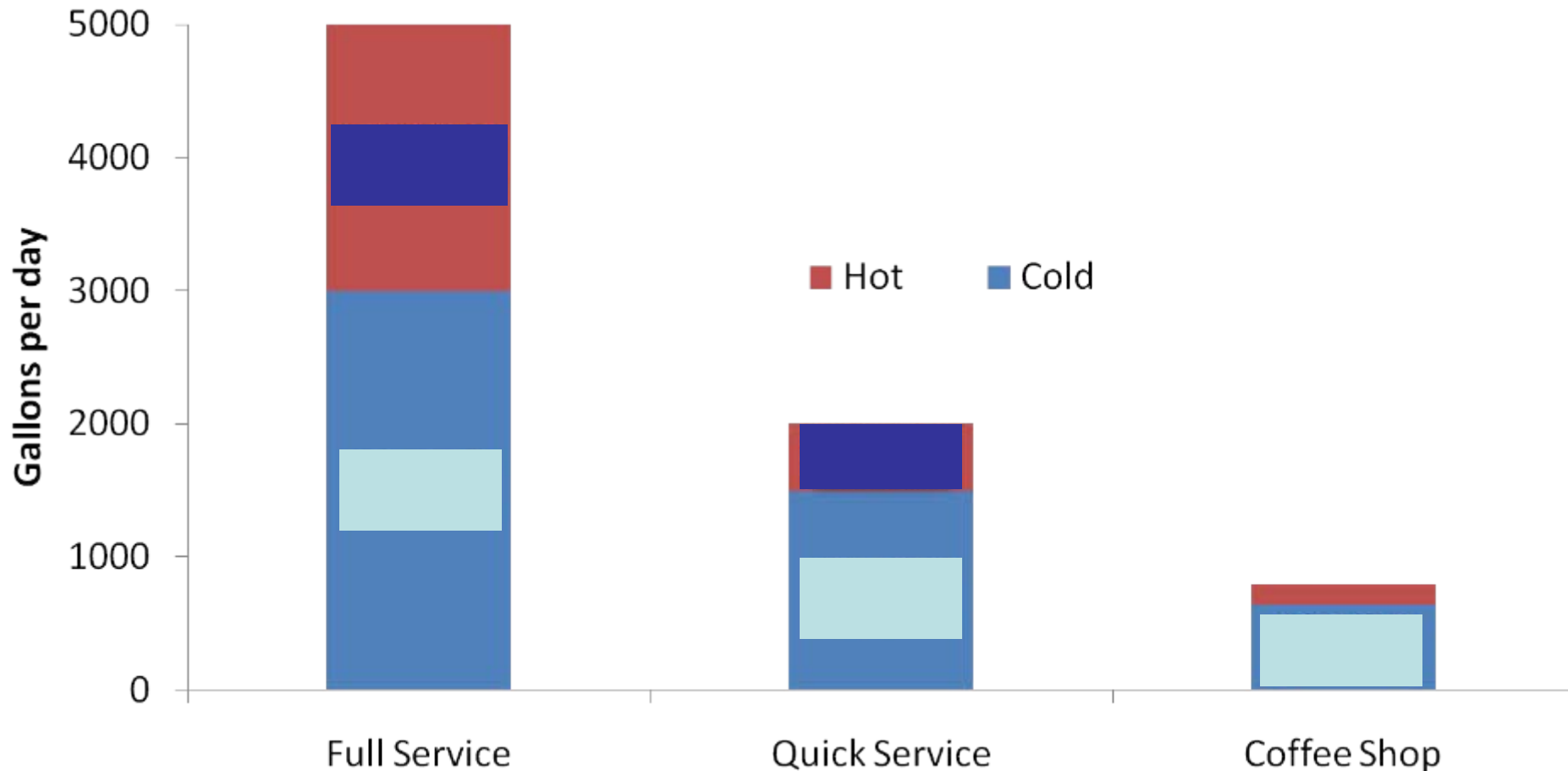
Assumes 70°F
Temperature
Increase

■ Gas □ Electric



Restaurant Hot and Cold Water Use

In full service, hot water accounts for 40% of use and 67% of the cost
In quick service, it accounts for 25% of use and 43% of the operating cost
In coffee shops, it accounts for 20% of water use and 34% of the cost



Food Service Operations

- **Scullery Operations**
- **Cooking and Food-Service Equipment**
- **Refrigeration Equipment**
- **Washing and Sanitation**

Scullery Operations

- **Pre-rinse spray valves**
- **Garbage disposers**
- **Dishwashers**

Pre-Rinse Spray Valves

Old Spray Valve

- ❖ 4-6 GPM
- ❖ 8-12 Cents/Min.

New Energy Policy Act

- ❖ *1.6 GPM*
- ❖ *3.2 Cents/Min.*

New EPA WaterSense??

- ❖ *1.28 GPM*
- ❖ *2.6 Cents/Min.*

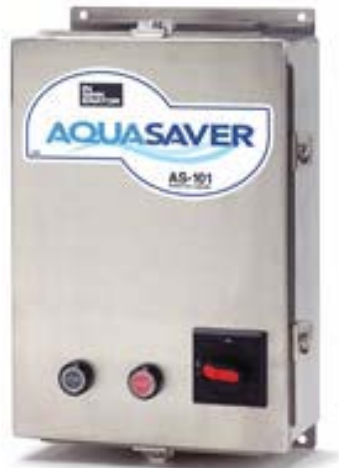


More water
Less pressure



Forceful
Spray

Reducing Water in Garbage Disposers



Dole Automatic Flow Regulator (actual size) 4 $\frac{1}{2}$ " long with $\frac{3}{4}$ " sweat connection

Pulpers & Salvajor



**Hobart WastePro
Pulper**



**Salvajor P914
Strainer**

Scrap Basket Strainers



Old System



Scrap Basket

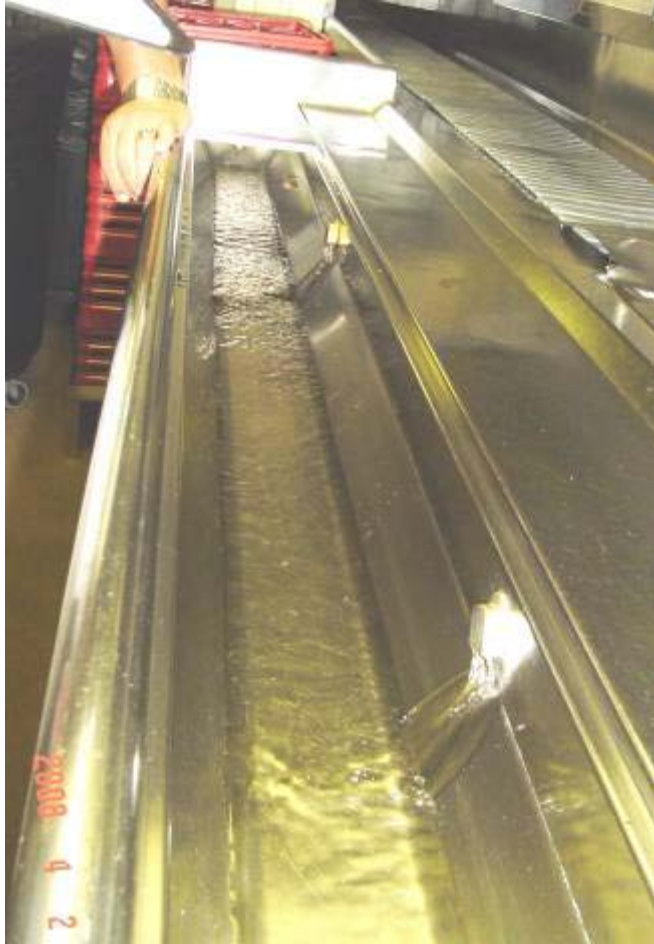
A Retrofit Strainer Basket in a Sink



Garbage Disposal Comparison

	Grinder	Salvajor	Pulpier	Strainer Basket
Solids to Sewer	Yes	No	No	No
Recirculate	No	Yes	Yes	No
Strain Solids	No	Yes	Yes	Yes
Compost Prod.	No	Yes	Yes	Yes
Solid Waste Prod.	No	Yes	Yes	Yes
Flow Restrictor?	Yes	No	No	N/A
HP	1-10	0.75-7.5	3-10	0
GPM (Potable only)	3-8	1-2	1-2	0
Sluice Trough GPM	2-15	2-15 <i>recirculation?</i>	2-15 <i>recirculation?</i>	0

Troughs!



Commercial Dishwasher Types

- Under Counter
- Door-type
- Conveyor-type
- Flight-type



Under Counter



Door-type



Flight-type



Conveyor-type

The Evolution of Ware Washing

Based on conveyor type dishwasher

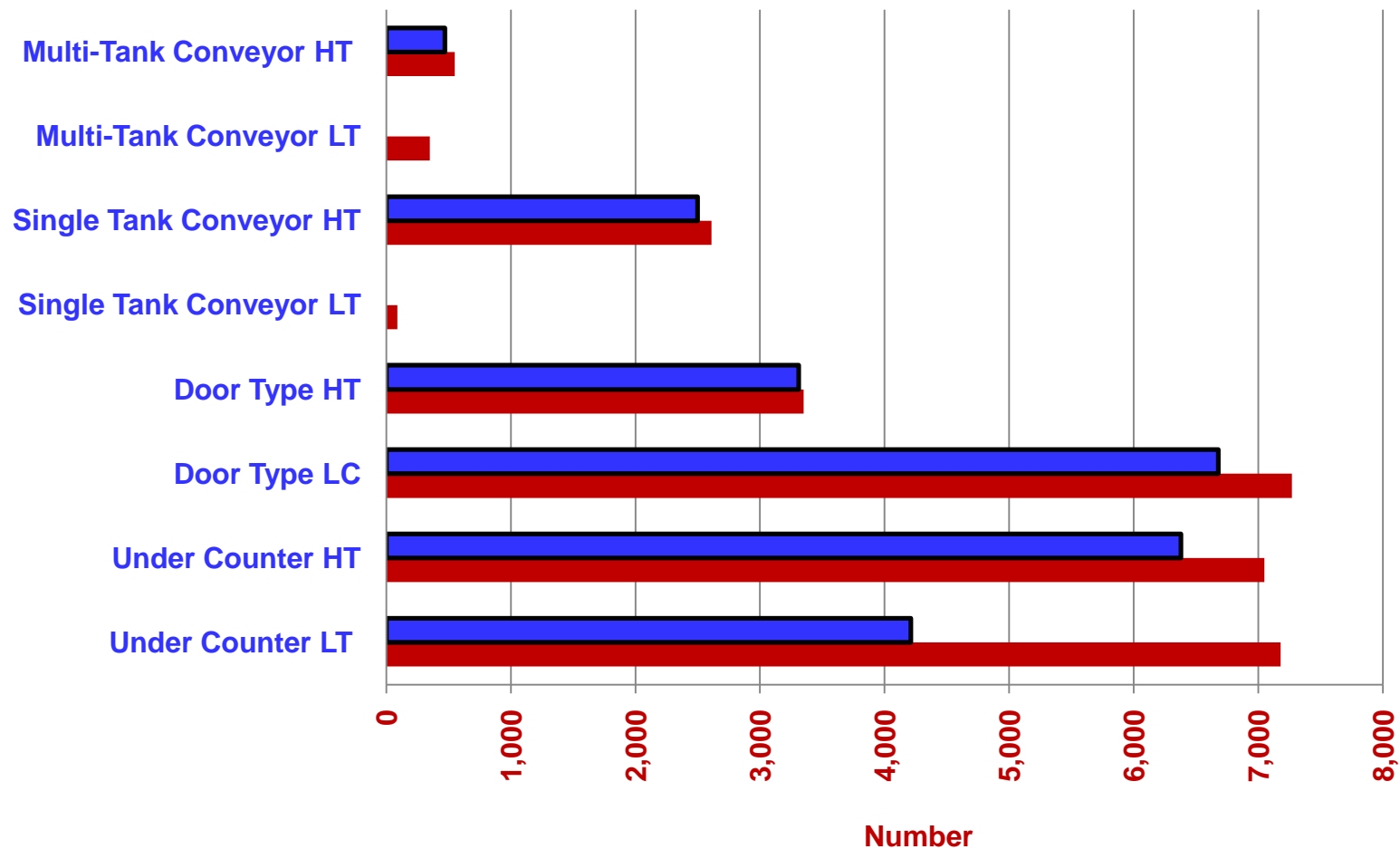
- **1990's - 2.5 Gallons per Rack**
- **2000 - 1.2 Gallons per Rack**
- **2010 most efficient < 0.4 Gal./Rack**

Energy Star Efficiency Requirements for Commercial Dishwashers

Machine Type	High Temp Efficiency Requirements		Low Temp Efficiency Requirements	
	Idle Energy Rate*	Water Consumption**	Idle Energy Rate*	Water Consumption
Under Counter	<= 0.90 kW	<= 1.00 gal/rack	<= 0.5 kW	<= 1.70 gal/rack
Stationary Single Tank Door**	<= 1.0 kW	<= 0.950 gal/rack	<= 0.6 kW	<= 1.18 gal/rack
Single Tank Conveyor	<= 2.0 kW	<= 0.700 gal/rack	<= 1.6 kW	<= 0.790 gal/rack
Multiple Tank Conveyor	<= 2.6 kW	<= 0.540 gal/rack	<= 2.0 kW	<= 0.540 gal/rack

2008 Energy Star Dishwasher Shipments

EPA Energy Star Data

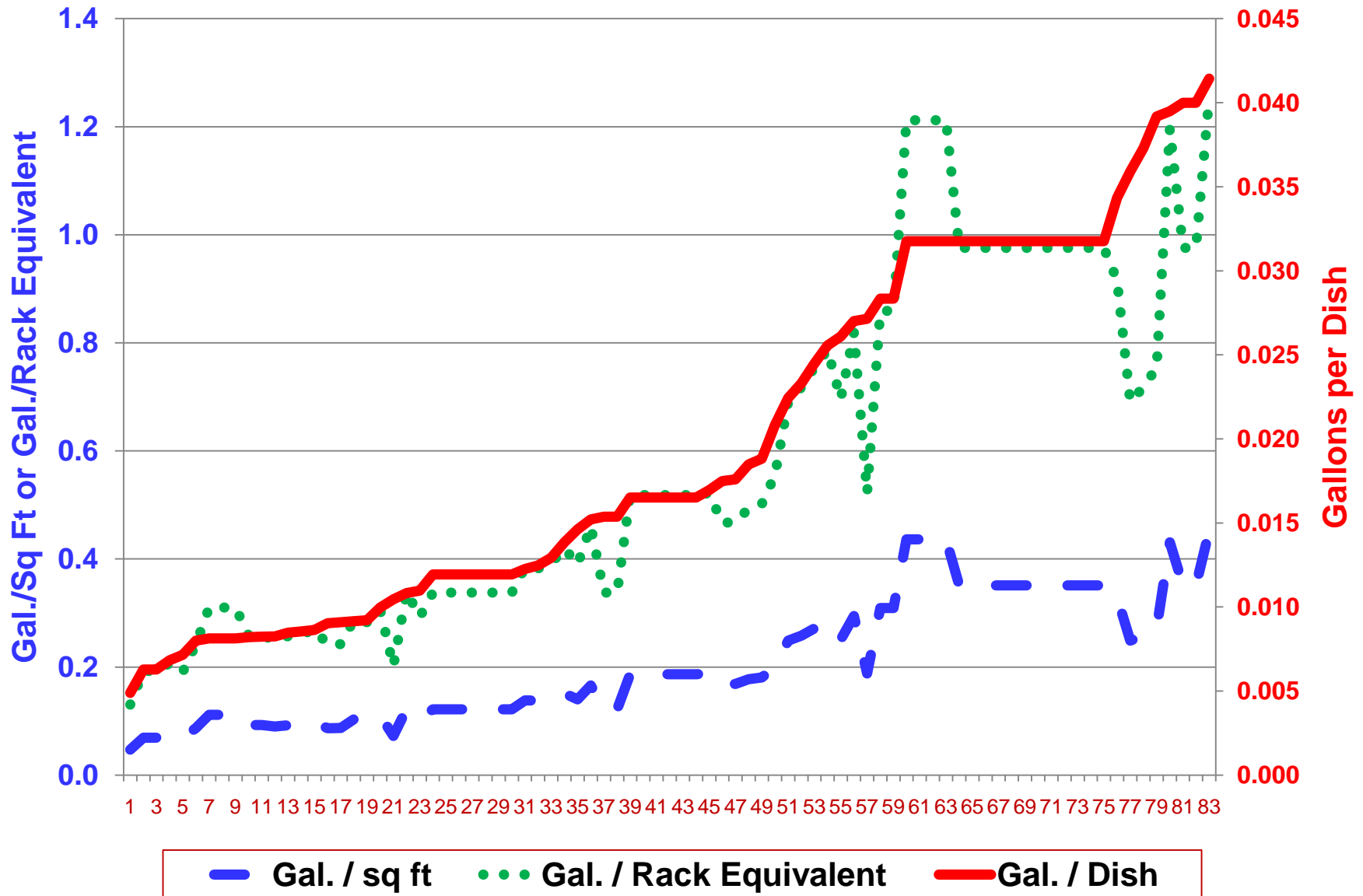


■ EPA Energy Star Qualified ■ Total Shipped

How a Flight Type Dish Washer Works



Multi Tank Hot Water Flight Type Water Use Characteristics for 83 models



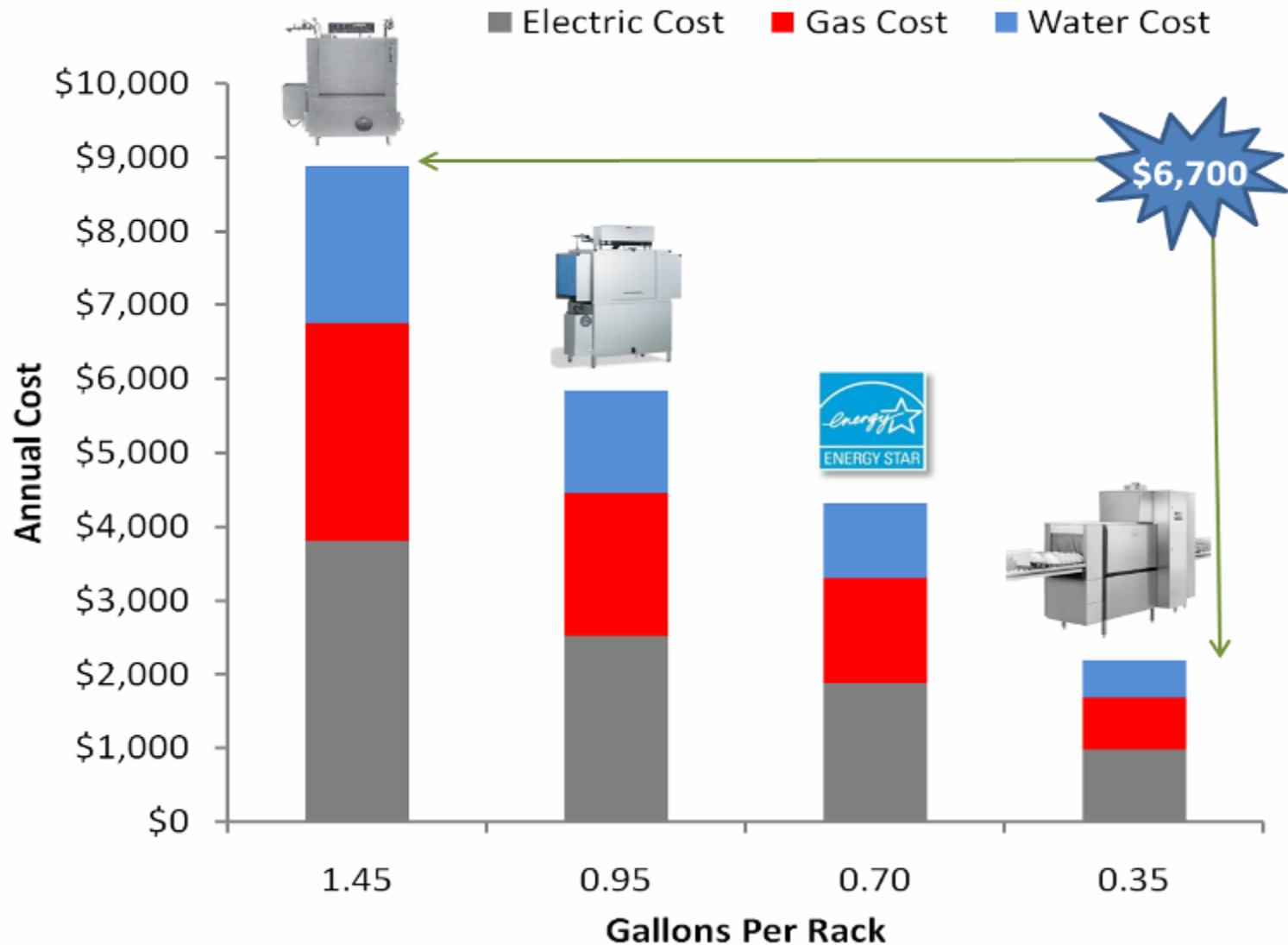
Summary of Commercial Dishwashing Equipment

	Units	75th percentile 2006	75th percentile 2009	Median for 2009 Machines	Median for 2006 Machines	Energy Star® Threshold	Energy Star® 2010 Median
Under Counter	Gal/rack	1.75			1.20	1.00	0.79
Door Type	Gal/rack	1.33			1.18	0.95	0.79
Single Tank Conveyor	Gal/rack	1.12	0.95	0.70	0.94	0.70	0.51
Multi-Tank Conveyor	Gal/rack		1.10	0.77		0.54	0.39
Single Tank Flight	Gal/plate		0.031	0.015			
Multi Tank Flight	Gal/plate		0.032	0.017			

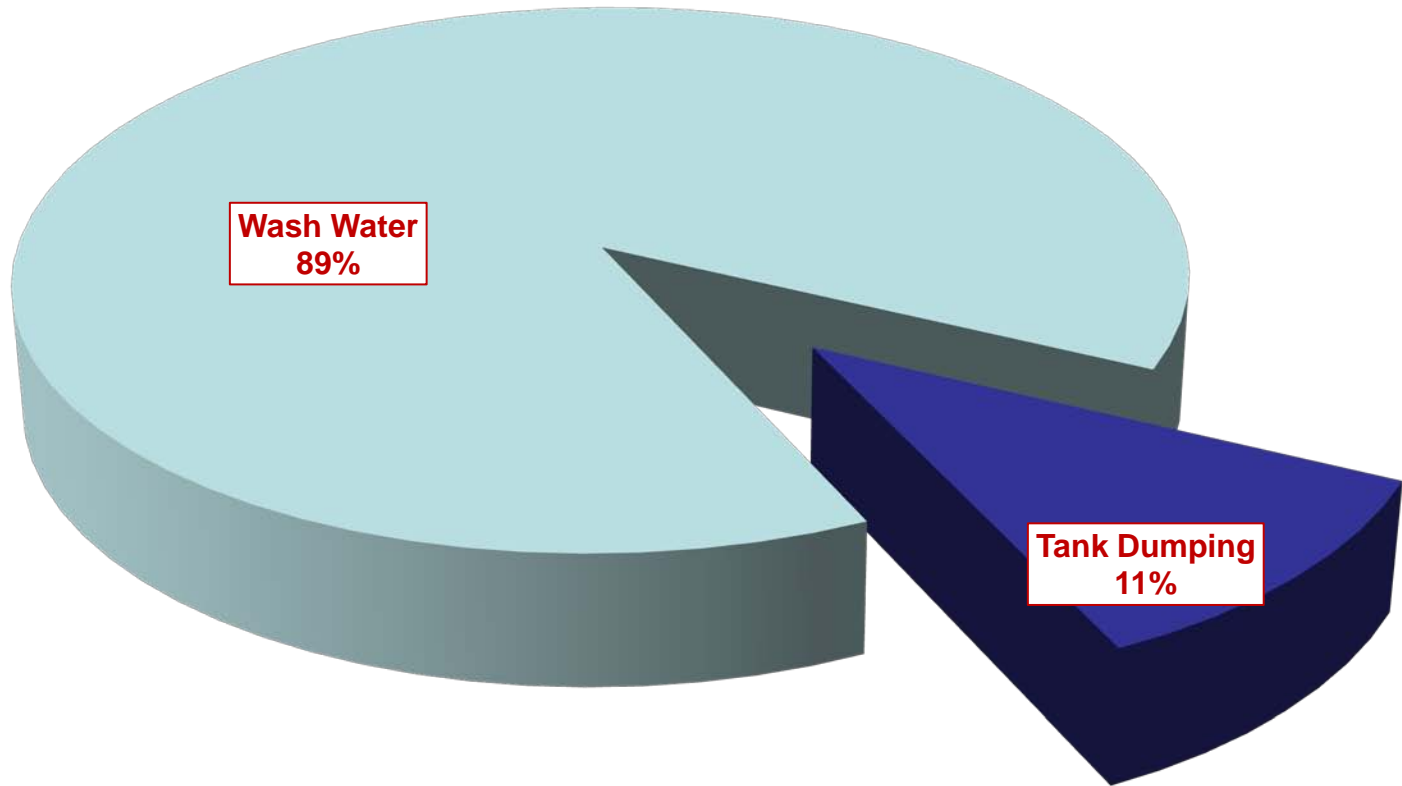
Hot Water Type Dishwashing Machines

Type	Market Median	Energy Star [®] Median	Savings	Measurement
Under- Counter	1.20	0.79	0.410	Gallons per rack
Door	1.18	0.79	0.390	Gallons per rack
Single Tank Conveyor	0.94	0.51	0.430	Gallons per rack
Multi-Tank Conveyor	0.77	0.39	0.380	Gallons per rack
Single Tank Flight	0.015	.010	0.005	Gallons per plate
Multi-Tank Flight	0.017	.009	0.008	Gallons per plate

Conveyor Dish machines



Total Dishwasher Water Use



Cooking and Food Service Equipment

- **Steam kettles**
- **Steamers**
- **Combination ovens**
- **Pasta cookers**
- **Dipper wells**
- **Woks**
- **Steam tables**

Steam Kettles

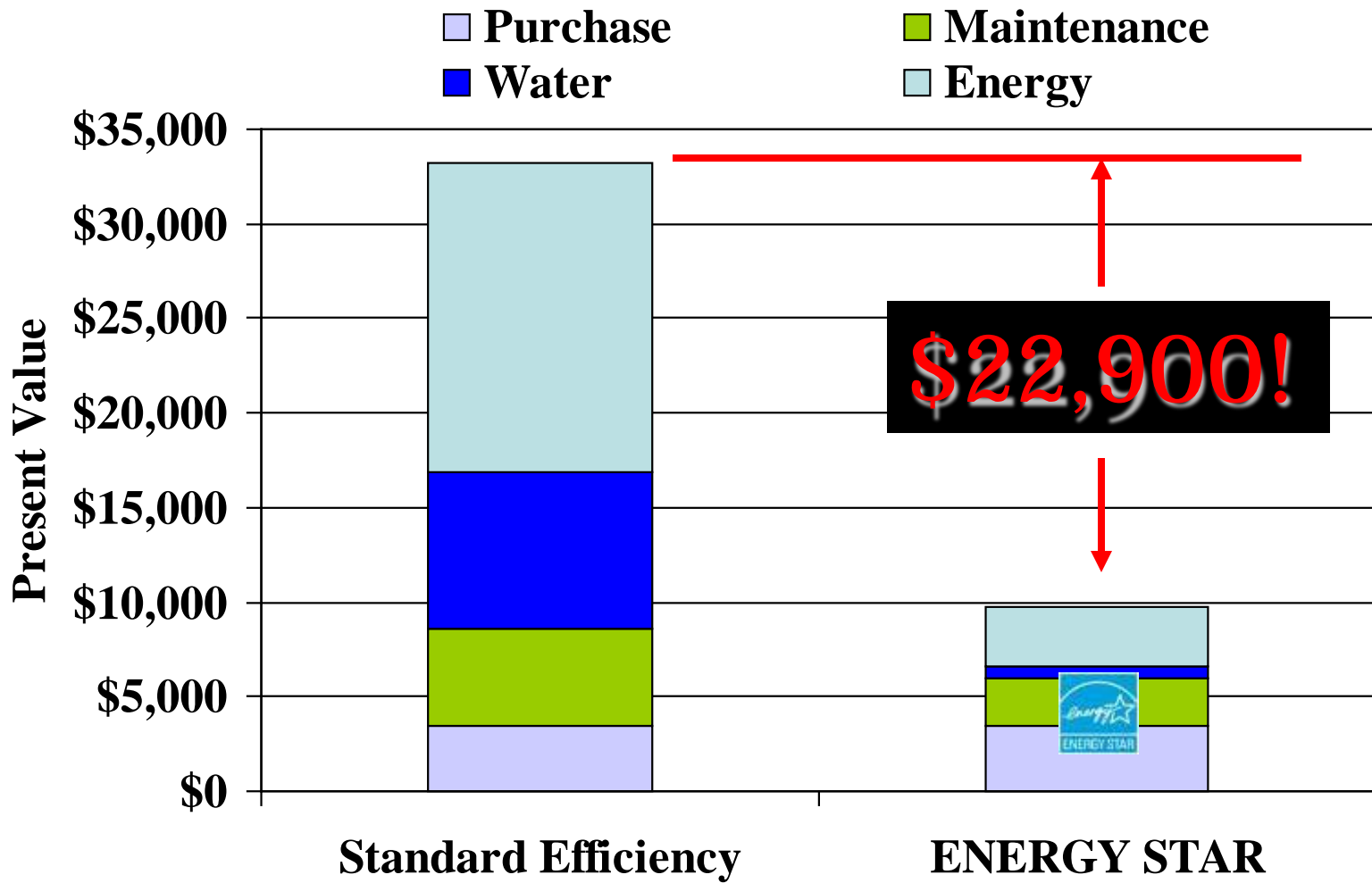


Boilerless Steamers



- **90% less water**
- **75% less energy**
- **No water hookup**
- **No sewer hookup**
- **No vent**

8 Year Life Cycle Cost Analysis



Combination Ovens



- **Boiler and atomizer types**
- **See PG&E rebate list**
- **Should use under 14 gallons a hour.**



**Boiler Based Steamer and Combi Oven
Average Water Usage = 40 gph**

Regulate Dipper Wells

Typical Flow Rate:

- 0.13 gpm
- 51,246 gal/yr
- water/sewer:
\$340



Chinese Ranges (Woks)



***Refrigeration
&
Ice Making***

Cube Ice Machines

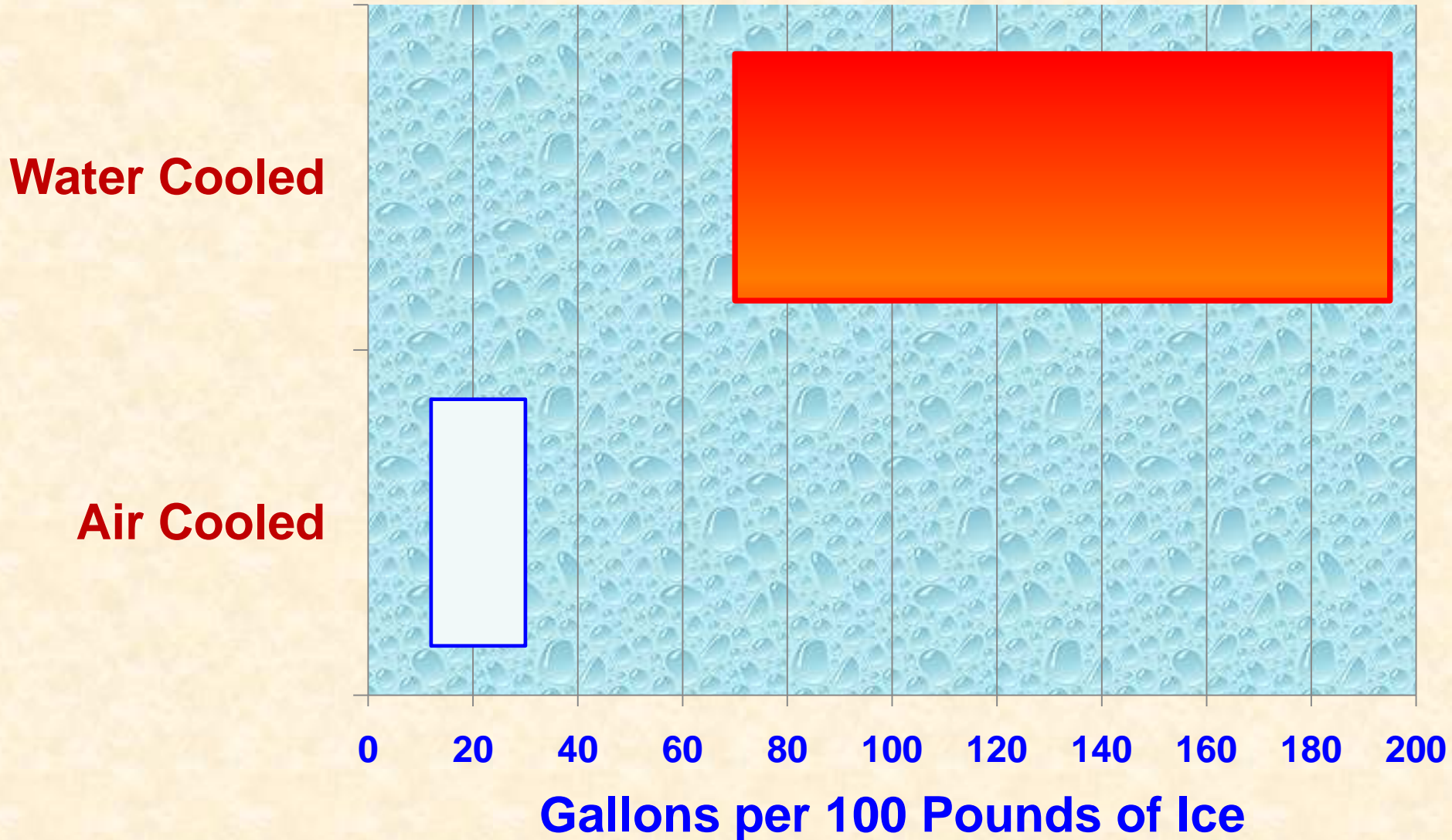
Cube ice machines run water over the freezing ice to remove sediment that forms as water freezes. The portion of this wash water discharged is called Purge.



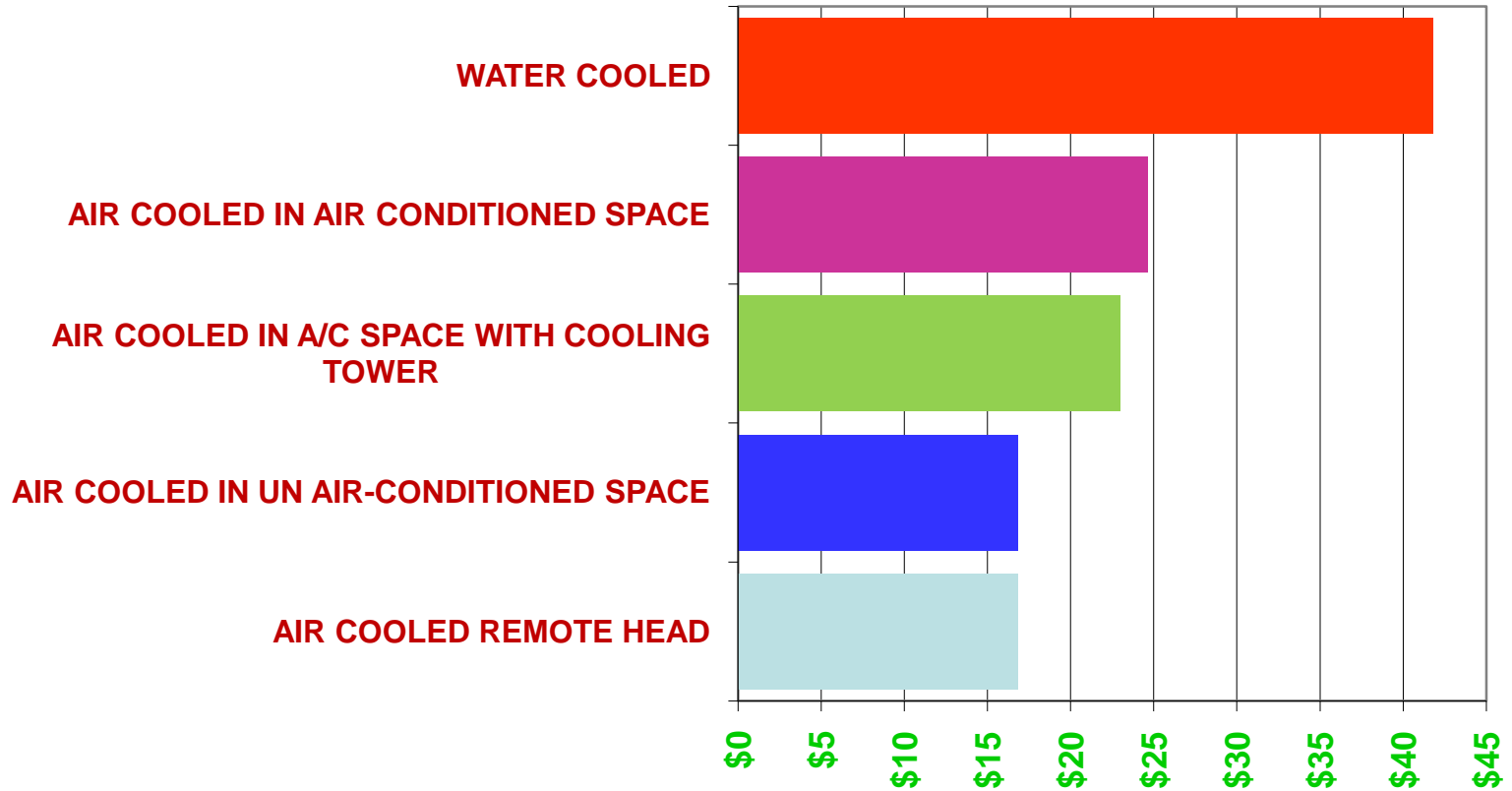
Flake & Nugget Ice Machines

- **Most energy and water efficient**
(12-15 gal./100 lb)
- **Ice can be chewed**
- **Great for icing food and beverages**
- **Machines cost more**

Commercial Ice Machine Water Use

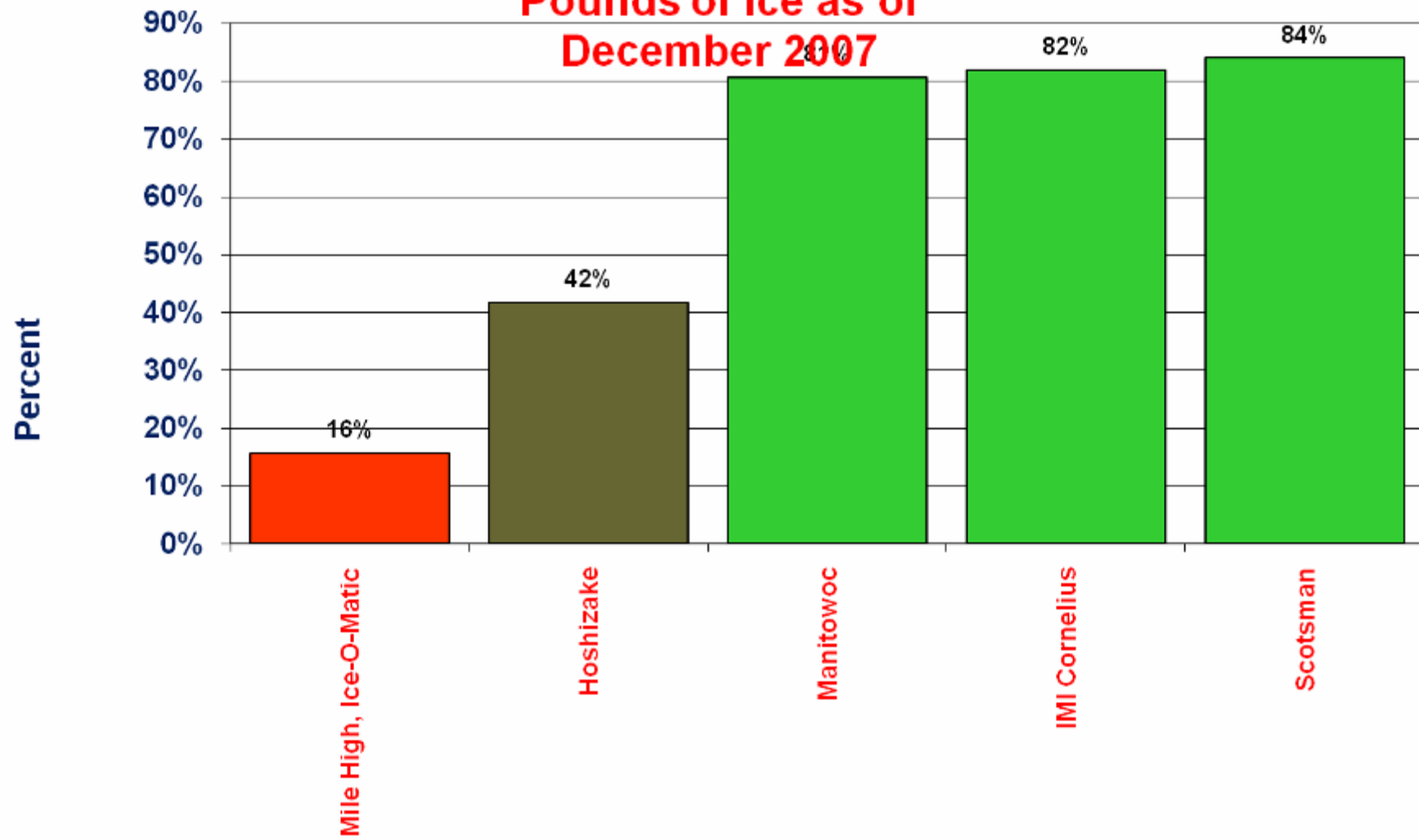


Life Cycle Cost for 800 Pounds of Ice a Day Over 8.5 Year Life of Unit



Thousands of Dollars

Percent of Machines Equal or Under 20 gallons per 100 Pounds of Ice as of December 2007



Source: ARI Directory - 2007

Other Equipment



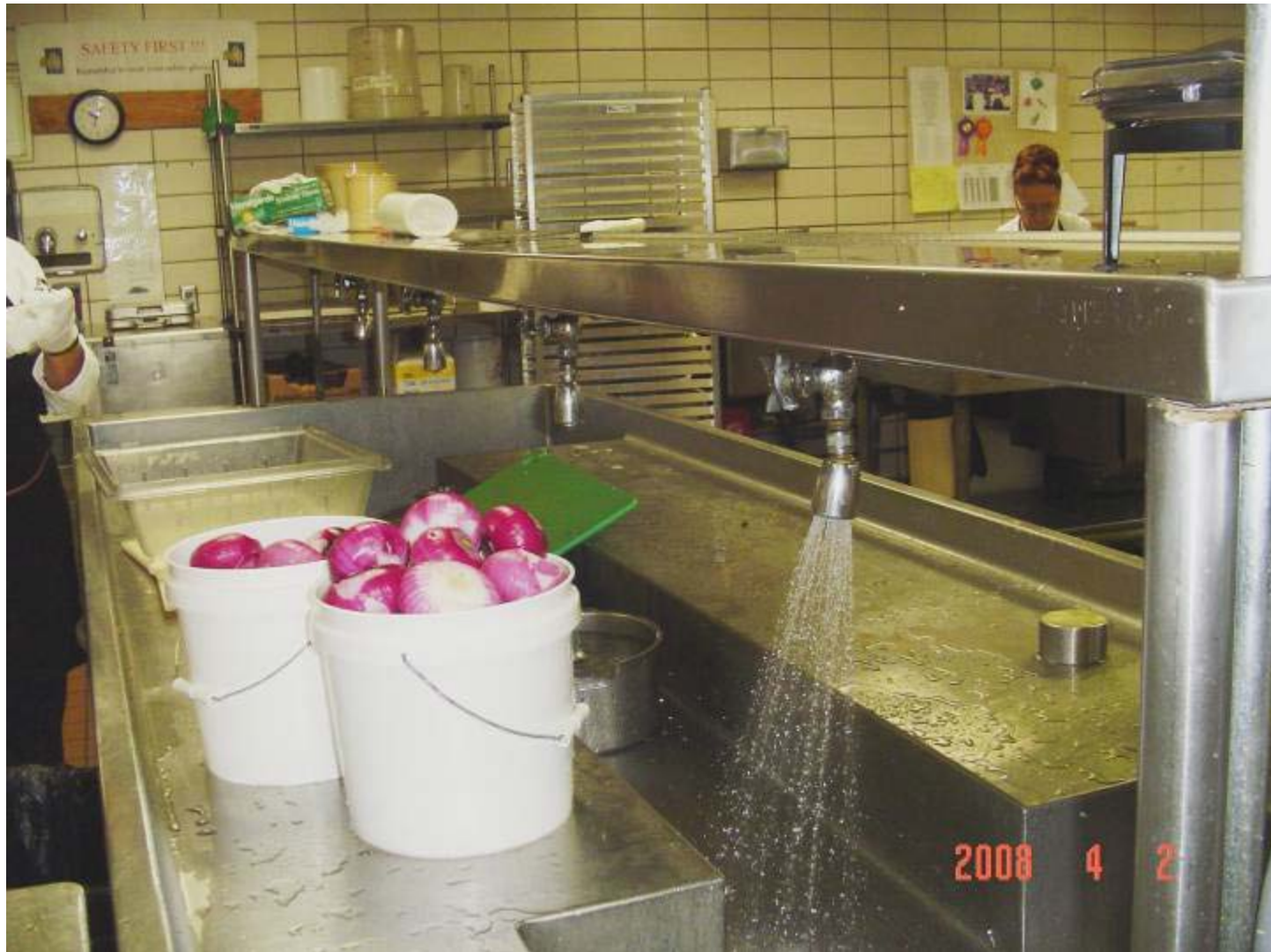
- **Soft serve**
- **Gelato**
- **Shakes & Malts**
- **Frozen Beverages**
- **Margarita Machines**
- **Smoothies**



**Once
through
cooling
from
refrigeration
unit =
30,000
gallons a
day!**

Other Considerations

Vegetable Washing Station



Floor and Area Cleaning





Hotsy Spray Cleaner for Meat Department

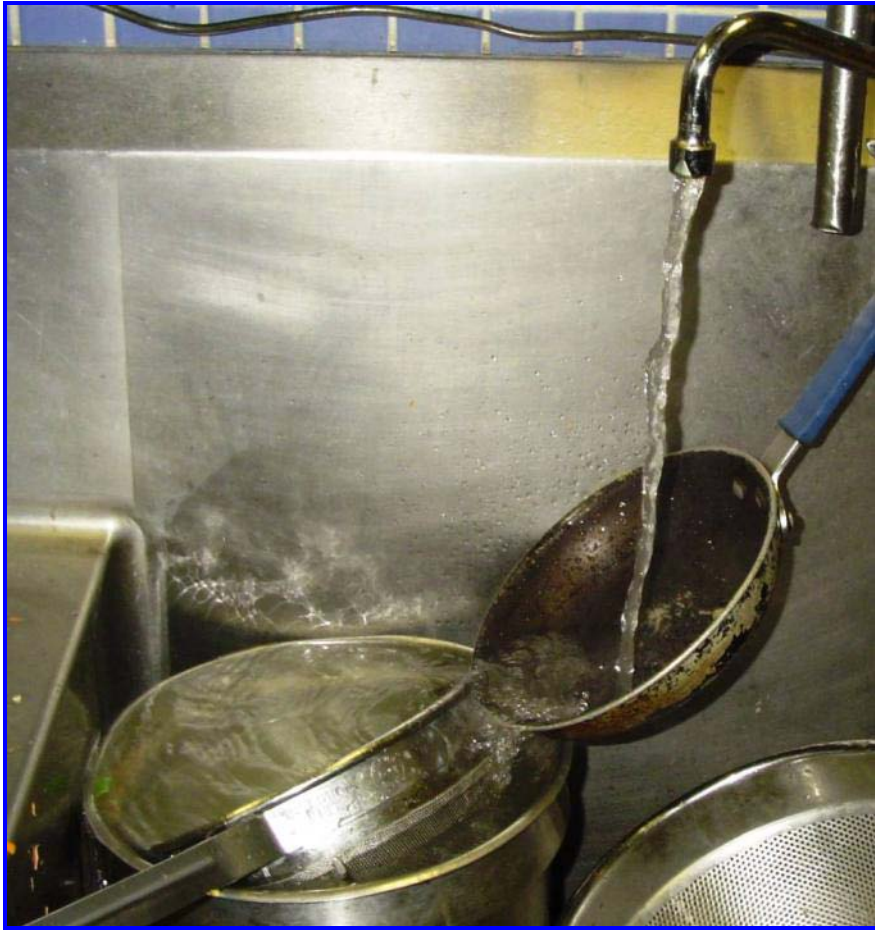


A Wasteful Practice



To minimize the need to thaw under running water, provide for adequate refrigerator space so that food can be properly thawed.

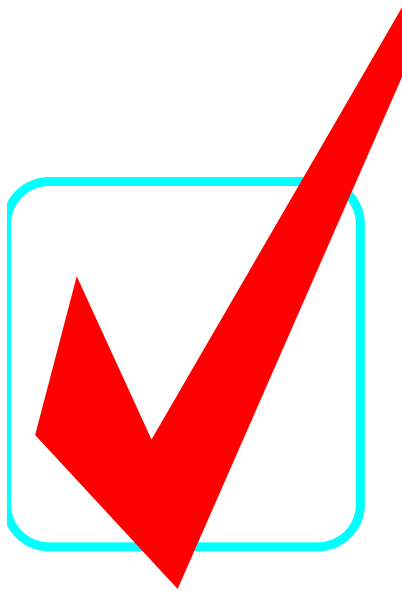
There are better ways.



Leaks Add Up Fast!



The



End

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