


## Big Gains in Small Appliances: CEC Plug Load Project

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MULTIUNIT  
FOODSERVICE  
EQUIPMENT  
SYMPOSIUM  
MUFES 2020

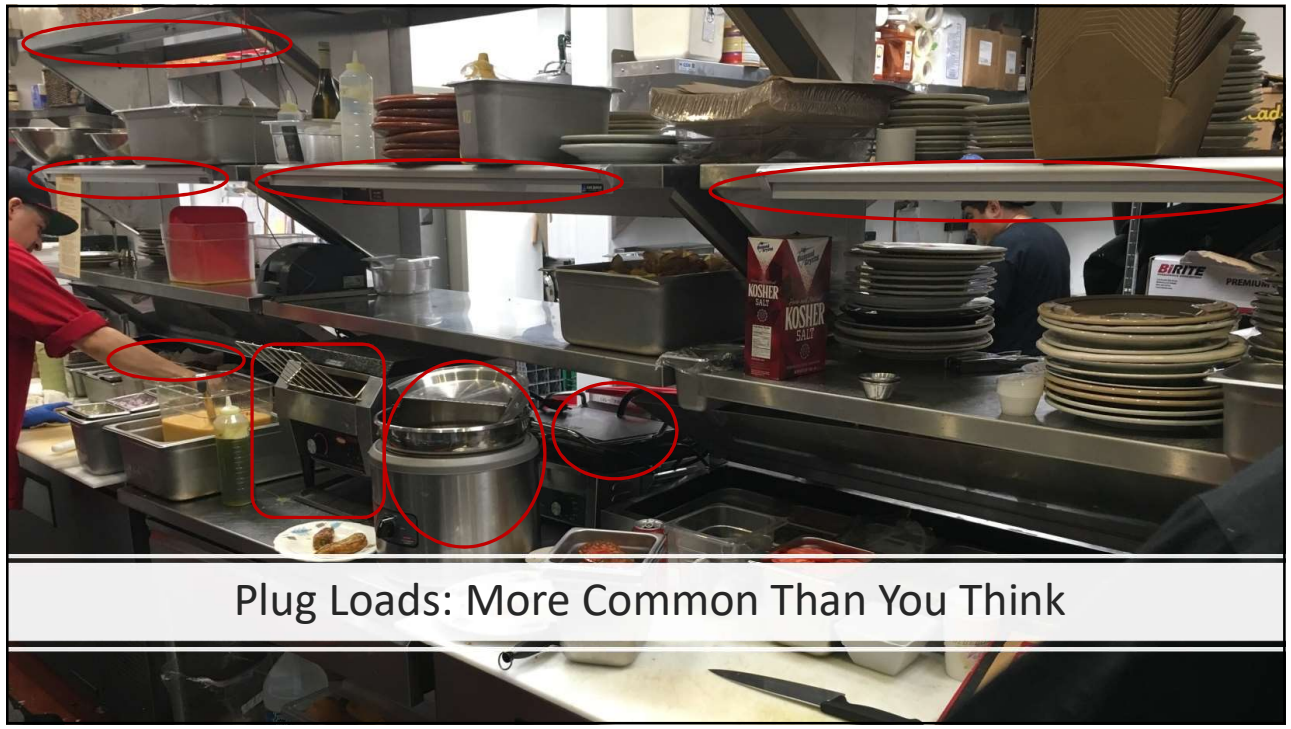
**BIG**  
**Thank You!**  
to the Project  
Sponsors



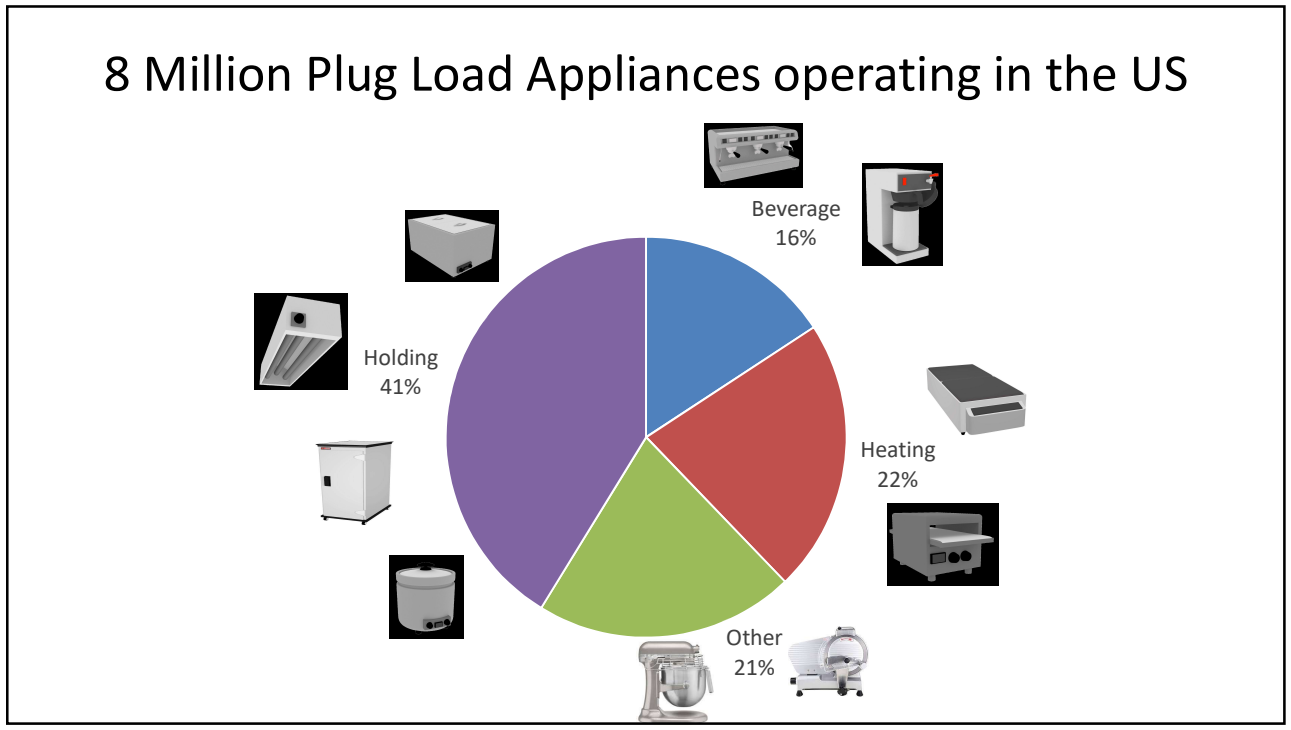
**CALIFORNIA**  
**ENERGY**  
**COMMISSION**







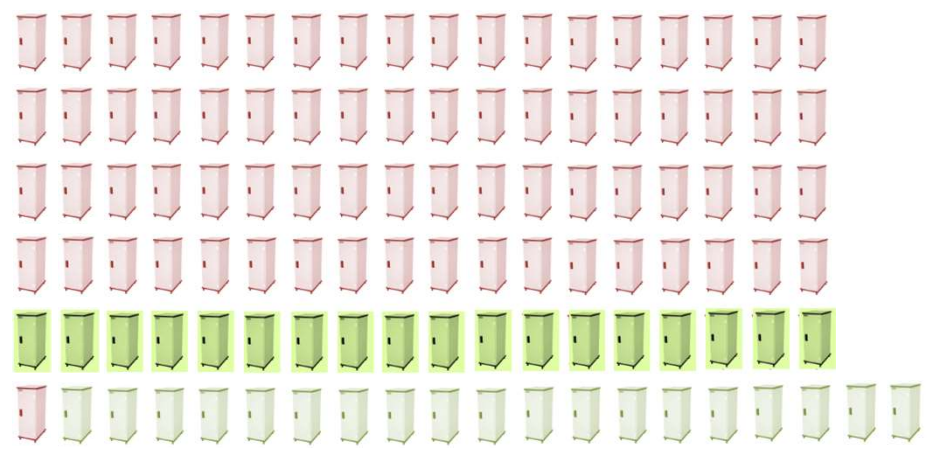
Plug Loads: More Common Than You Think





# Project Scope

- Monitored equipment in **29** different kitchens



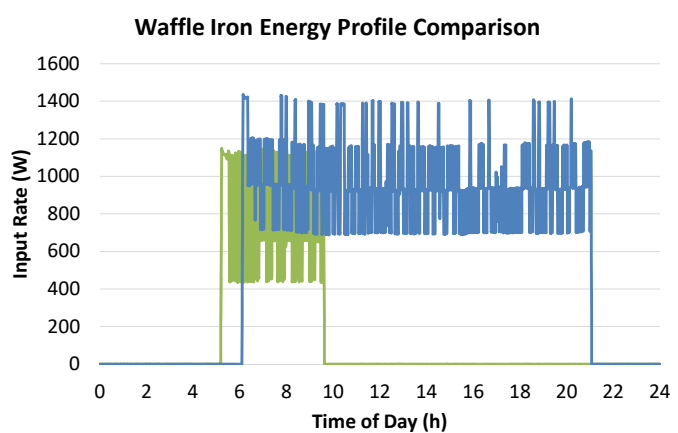
## Representing 22 Different Appliance Categories



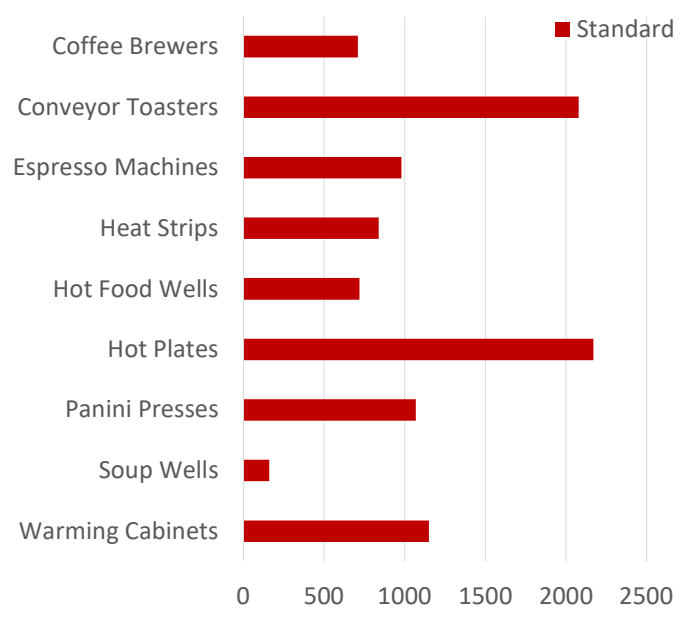
### Project Findings



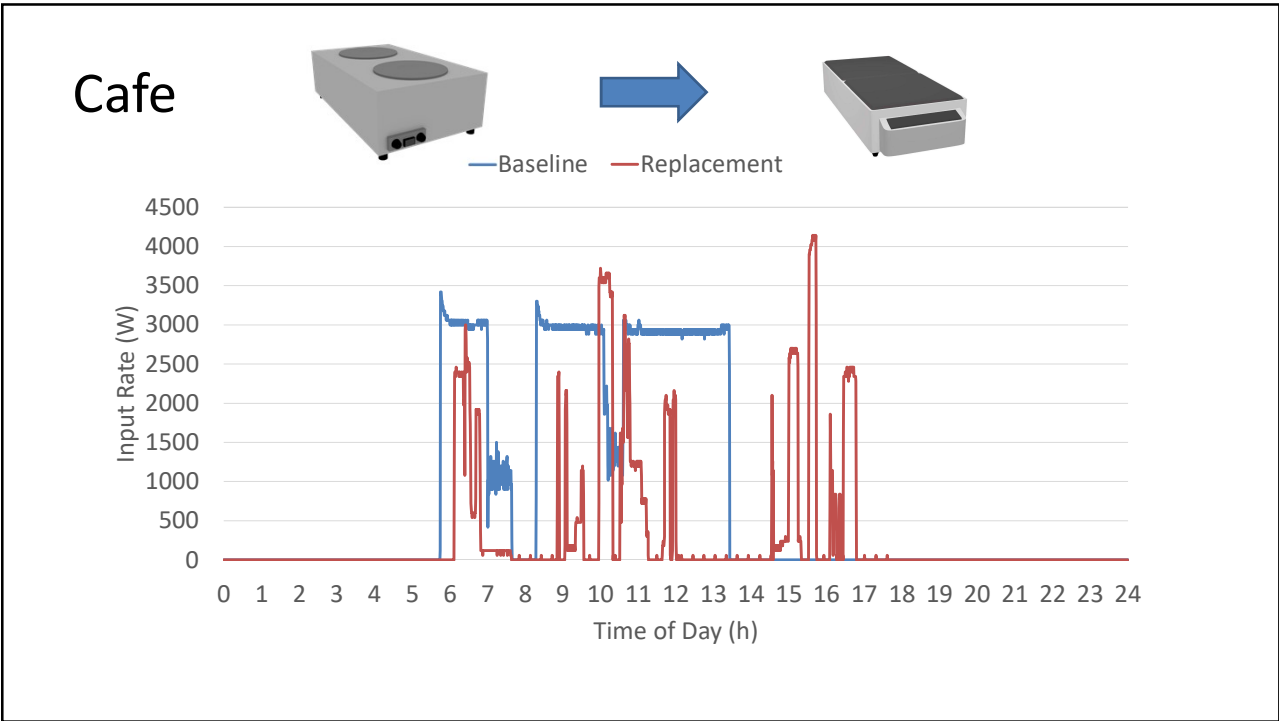
Same Appliance, Different Restaurant



Average Power - Watts



# Heating Equipment



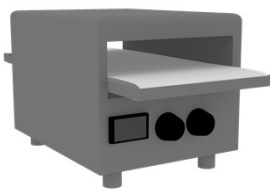


Voltage	120V	120V	208V	208V	208V
Equipment	1	2	3	4	5
Power Per HOB	1.8kW	1.8kW	2.5 kW	3.5 kW	5 kW
Boil Efficiency (%)	82.9	82.0	87.8	90.3	90.4
20lb Boil Time* (min)	33.6	35.42	22.2	19.3	10.5

### Induction Lab Testing

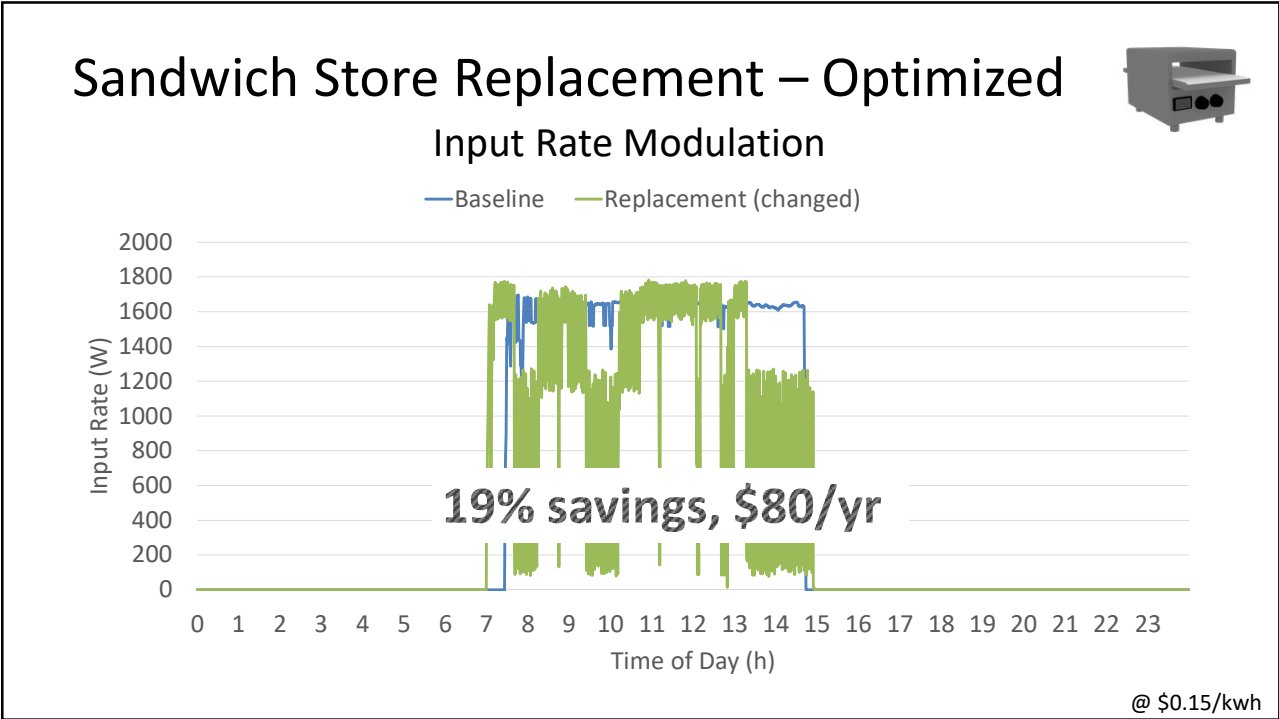
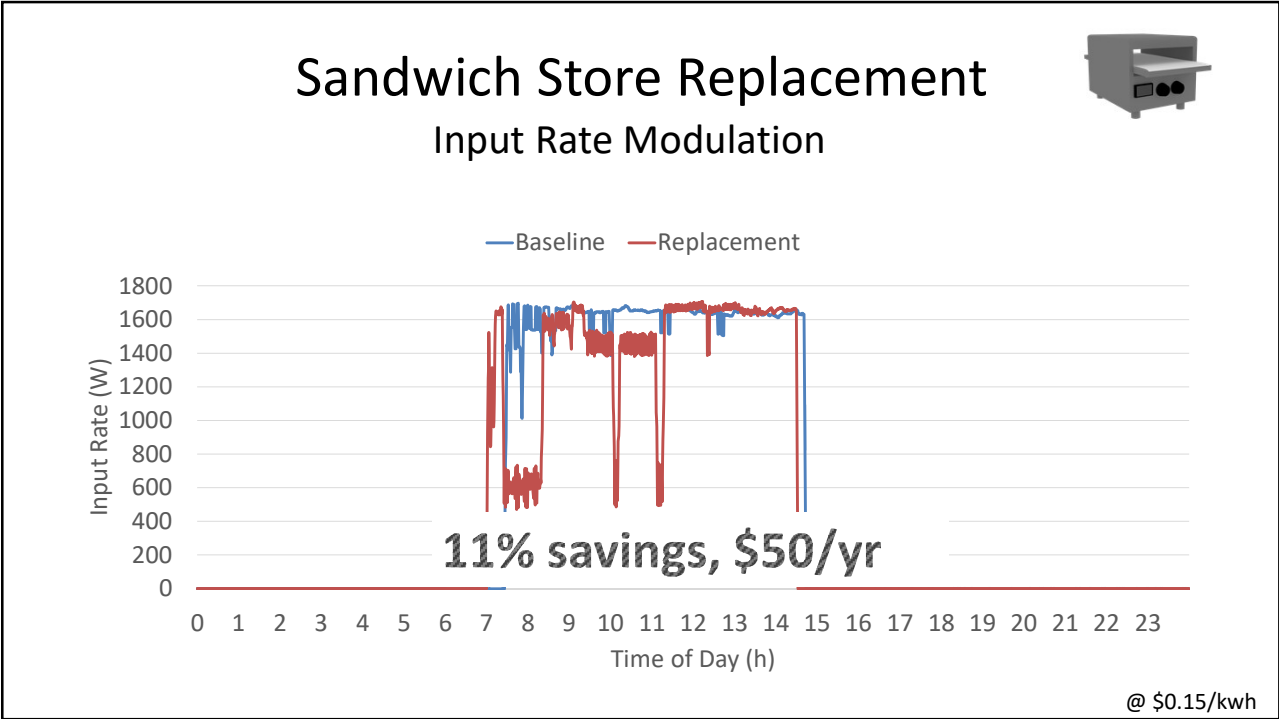
- Cooking energy efficiency test results were performed in accordance with ASTM F1521.
- Time to heat 20lbs of water from 70 to 200 deg F.
- Efficiency determined by the energy to the pot and water over the total energy to the appliance.

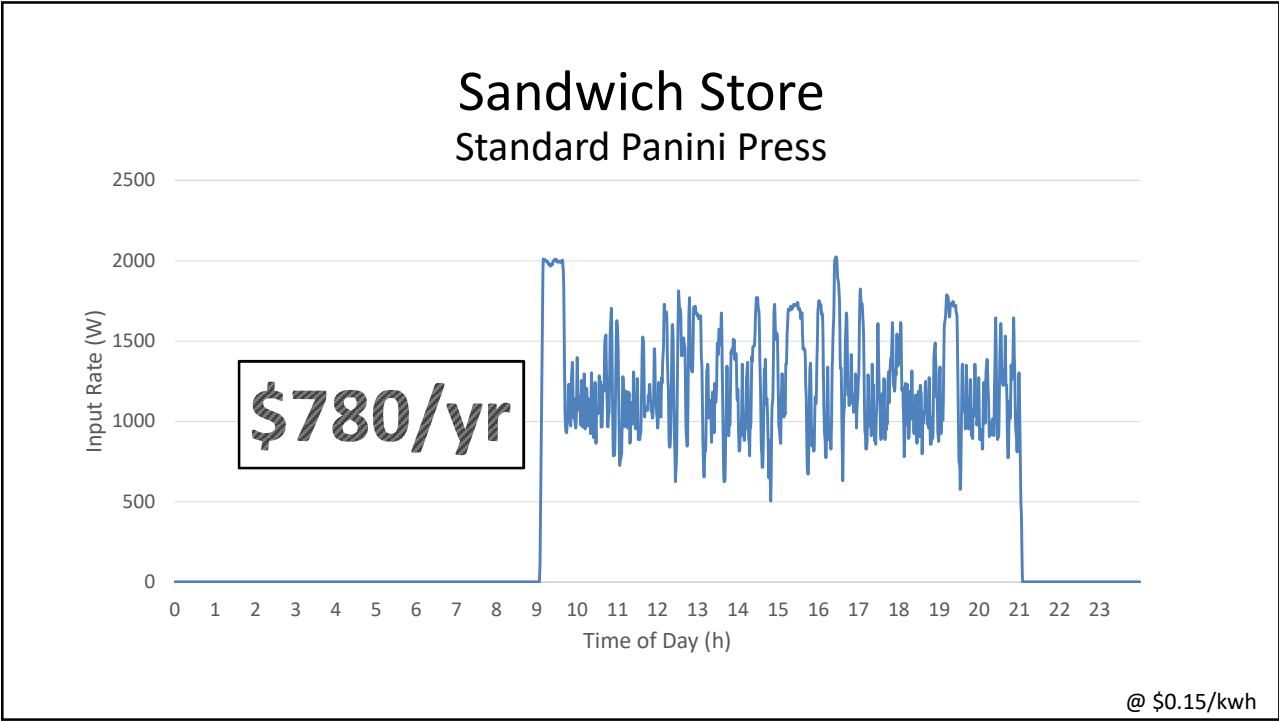
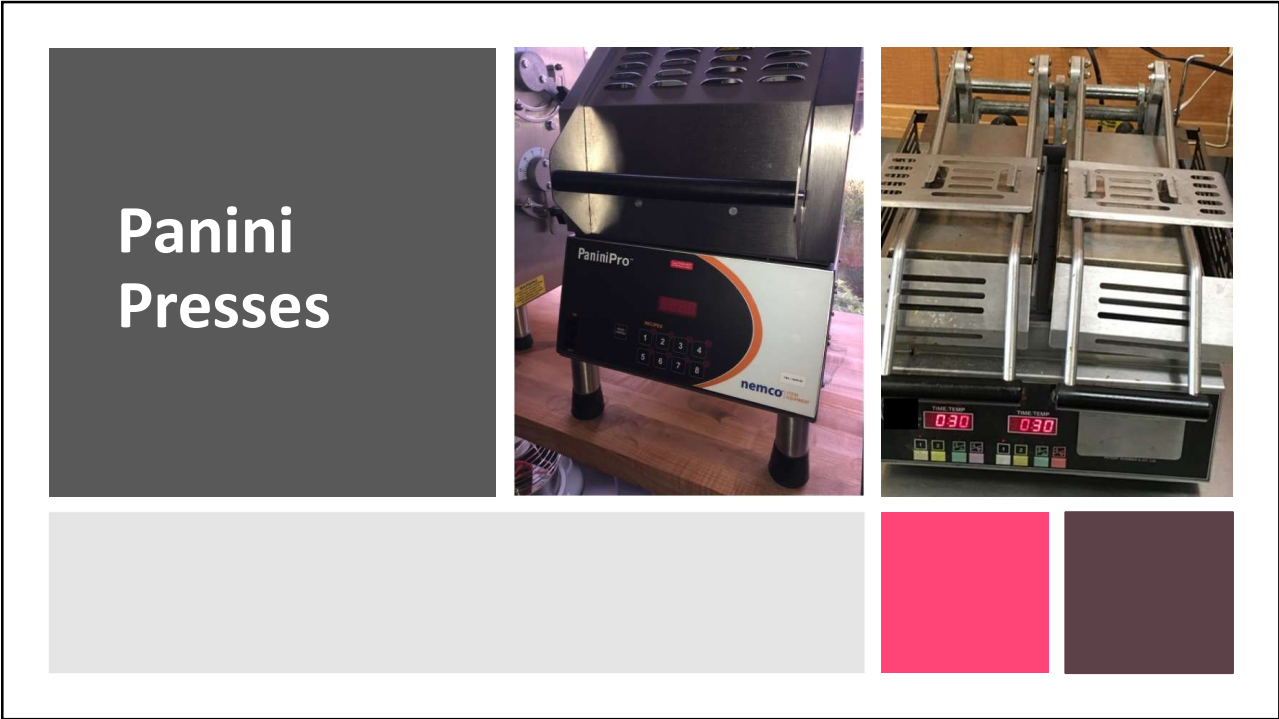
## Conveyor Toasters



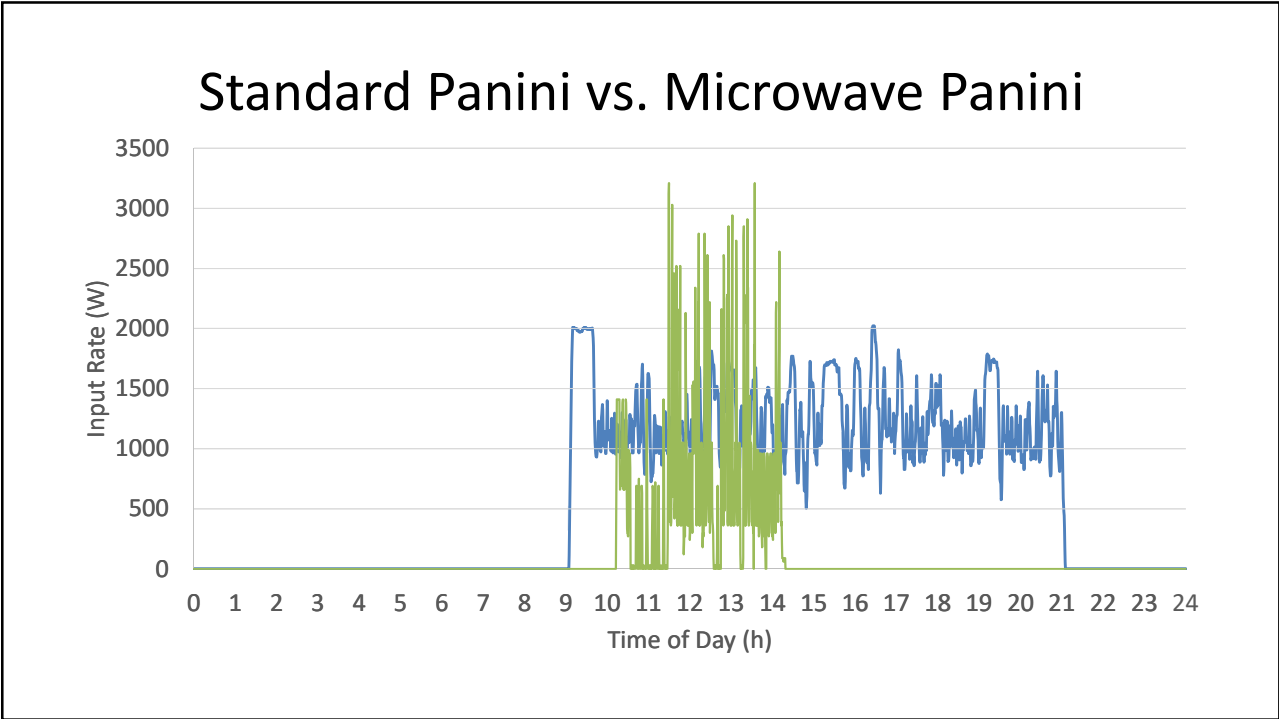
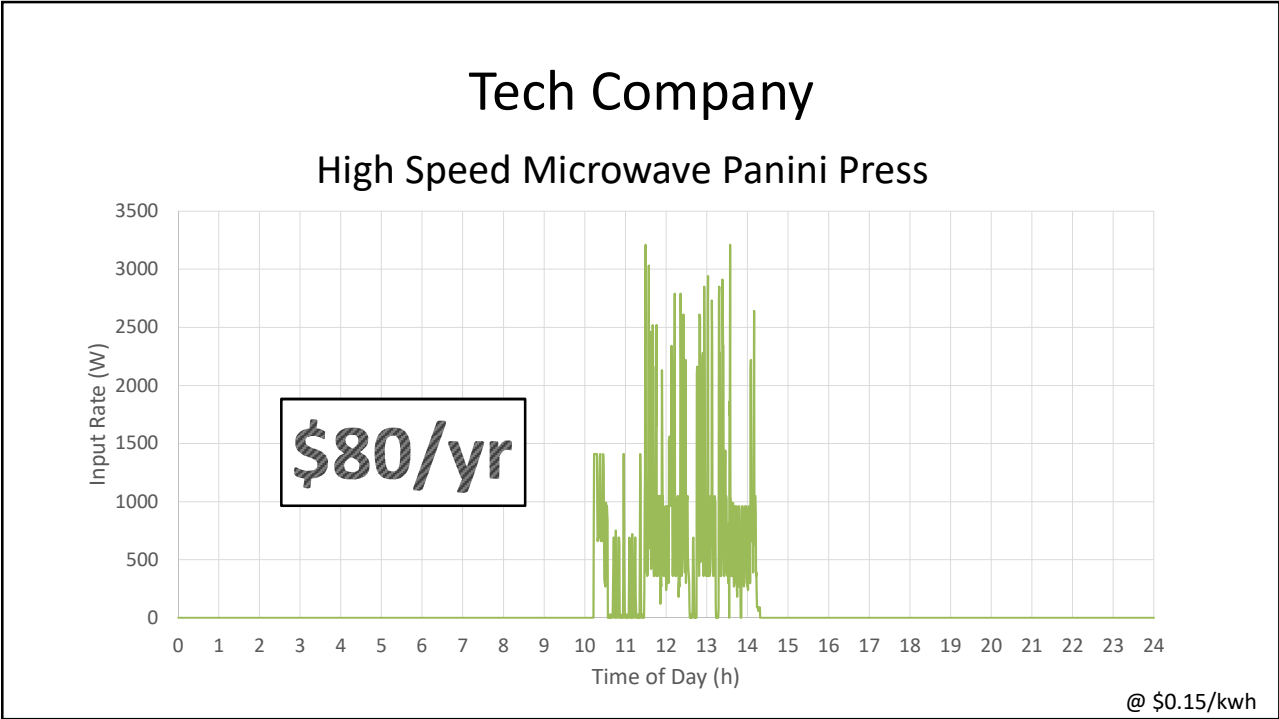
	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	10	19.6	2.08	20.8	21.0	223
Efficient	6	14.0	1.59			

@ \$0.15/kwh










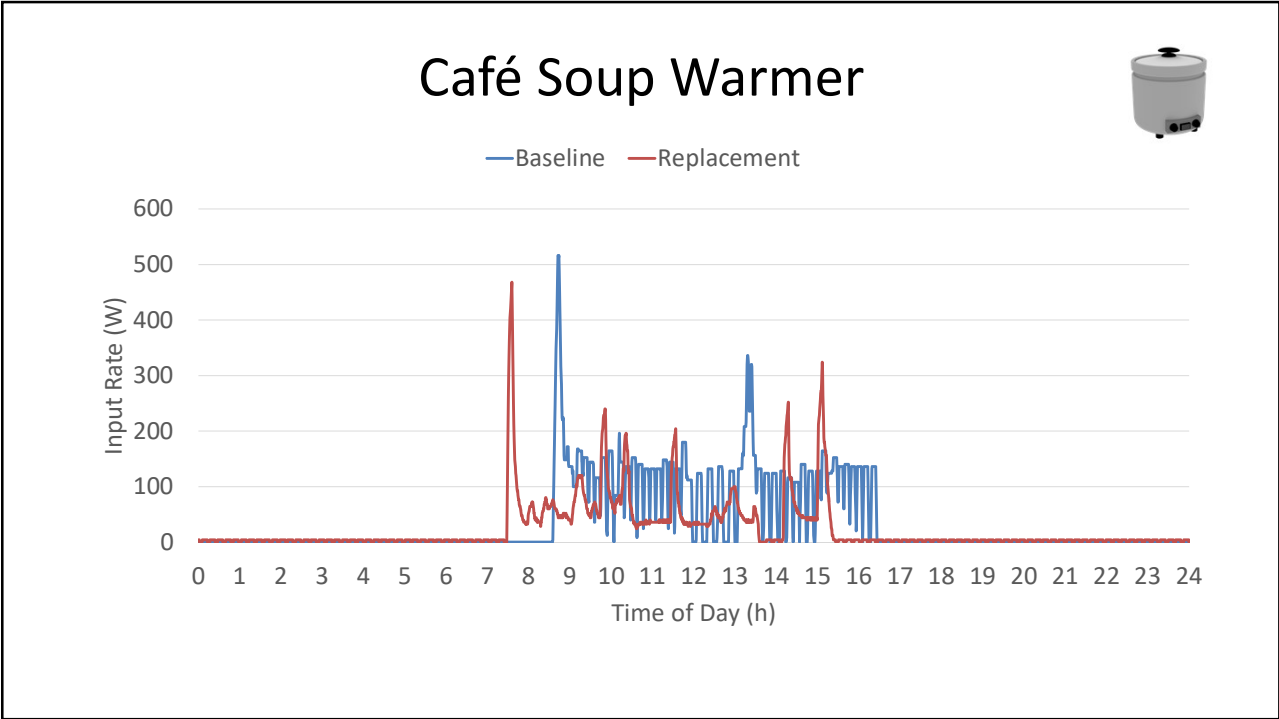
# Holding Equipment

## Soup Wells




	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	7	0.8	0.16	32.9	49.1	21
Efficient	9	0.6	0.11			

@ \$0.15/kwh

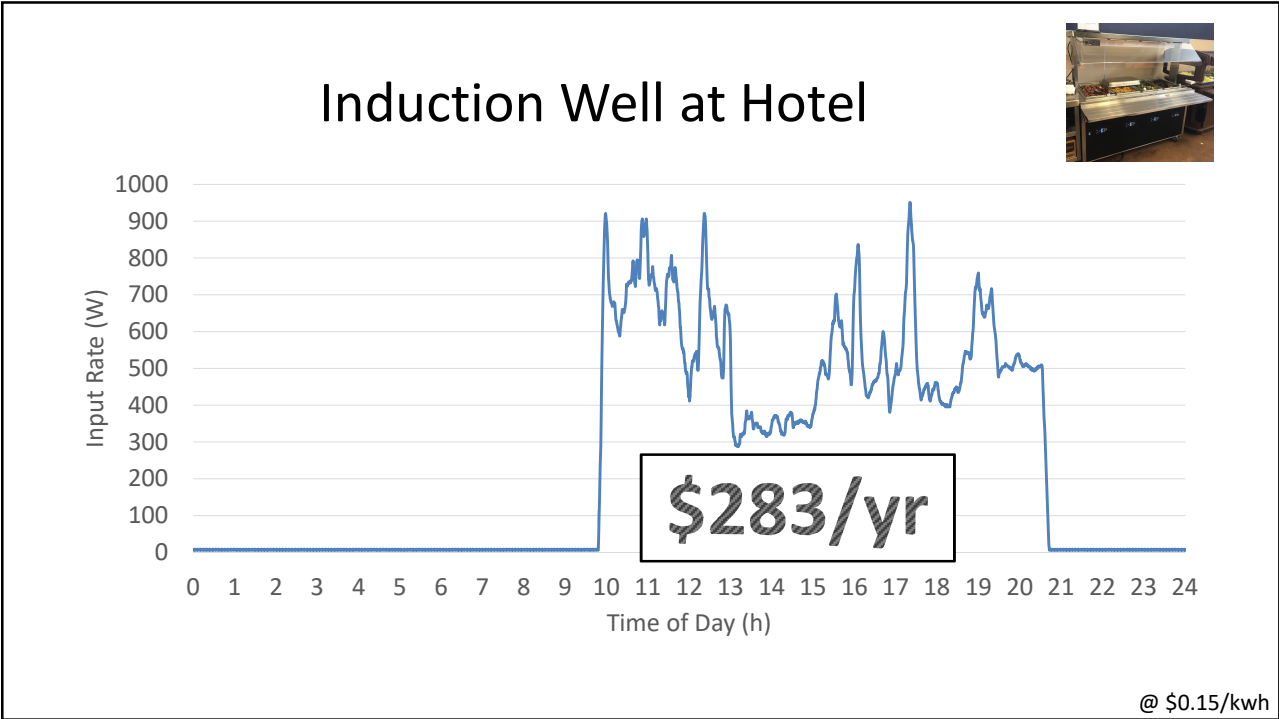
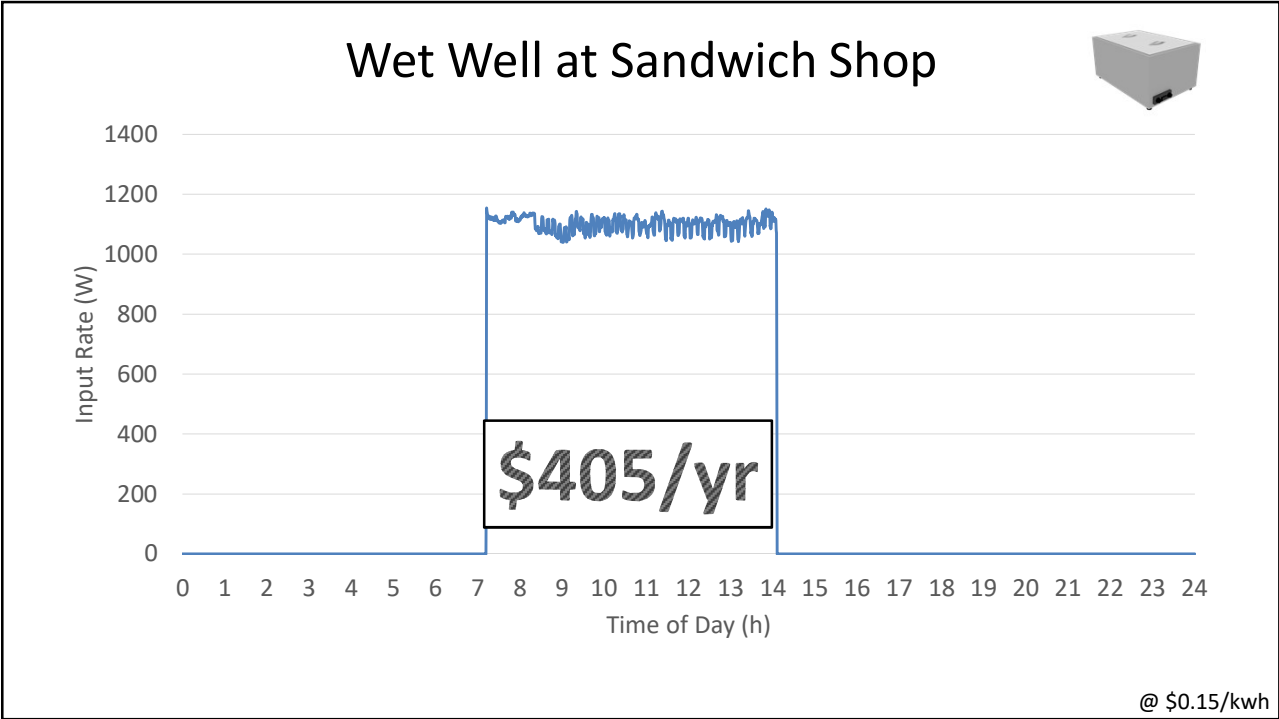


## Heated Wells

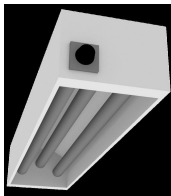


	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	8	5.1	0.72	33.8	N/A	94*
Efficient	1	5.2	0.48			

@ \$0.15/kwh



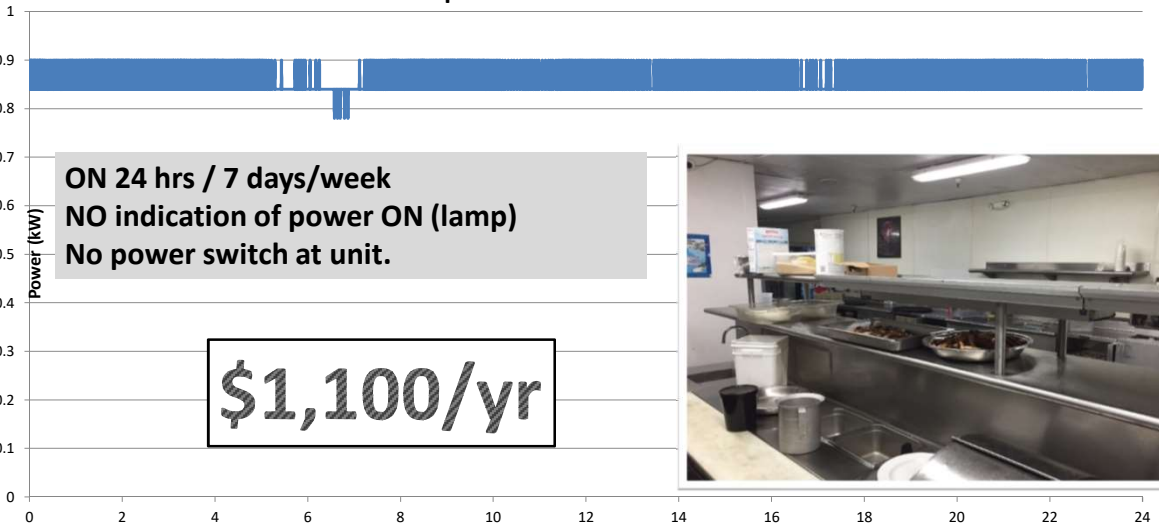
# Heat Strips



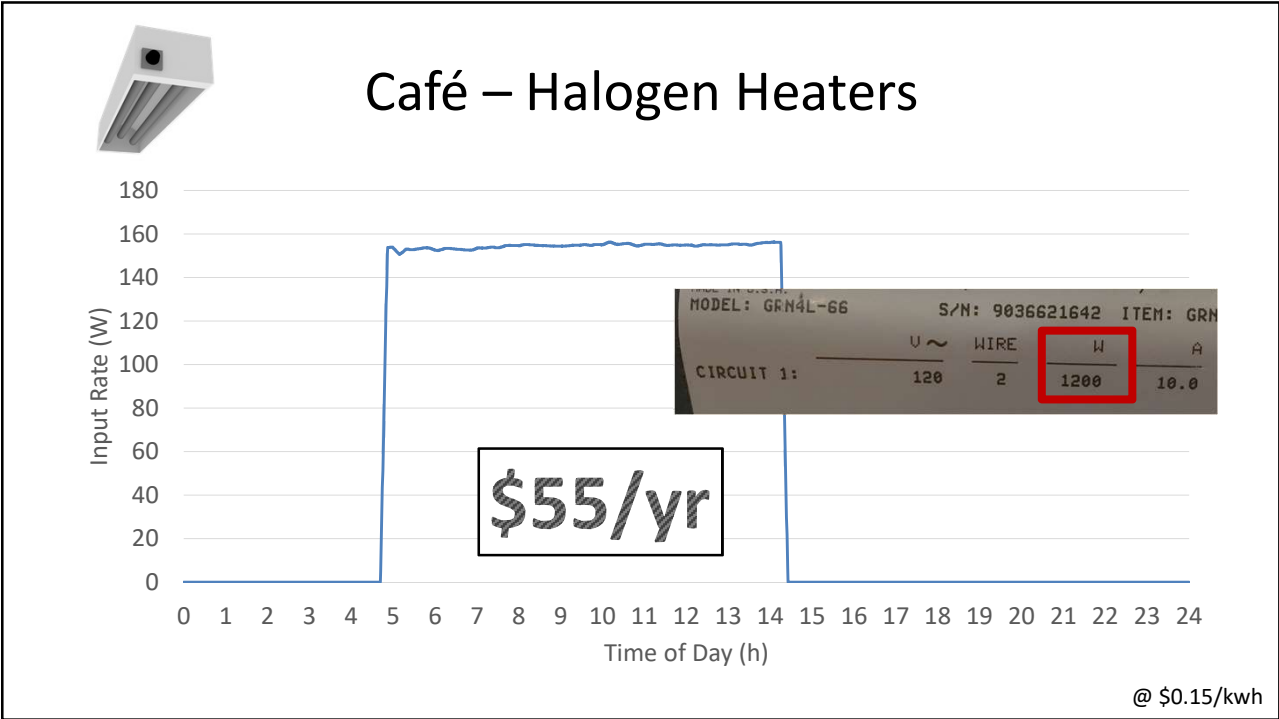
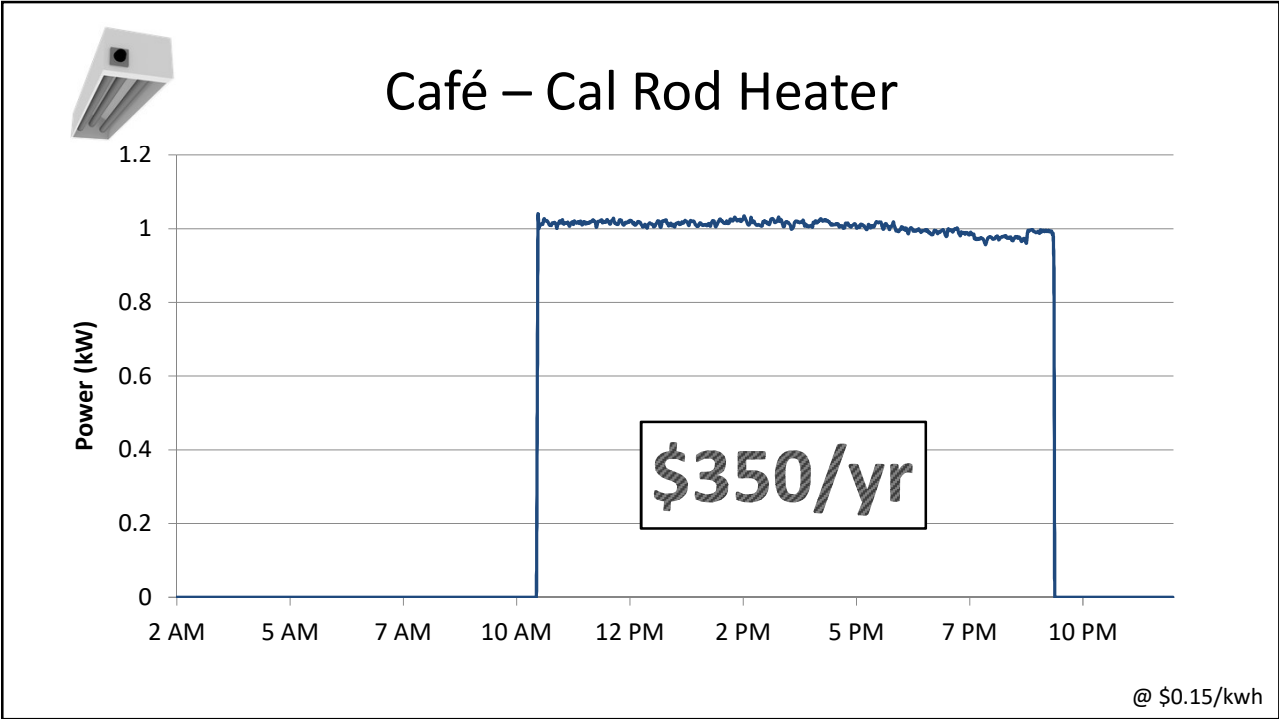
	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	2	13.5	0.84	81.4	N/A	594*
Efficient	1	0.9	0.16			

@ \$0.15/kwh

## Hotel 4ft Heat Strip

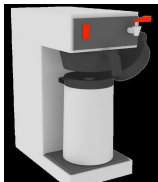


@ \$0.15/kwh



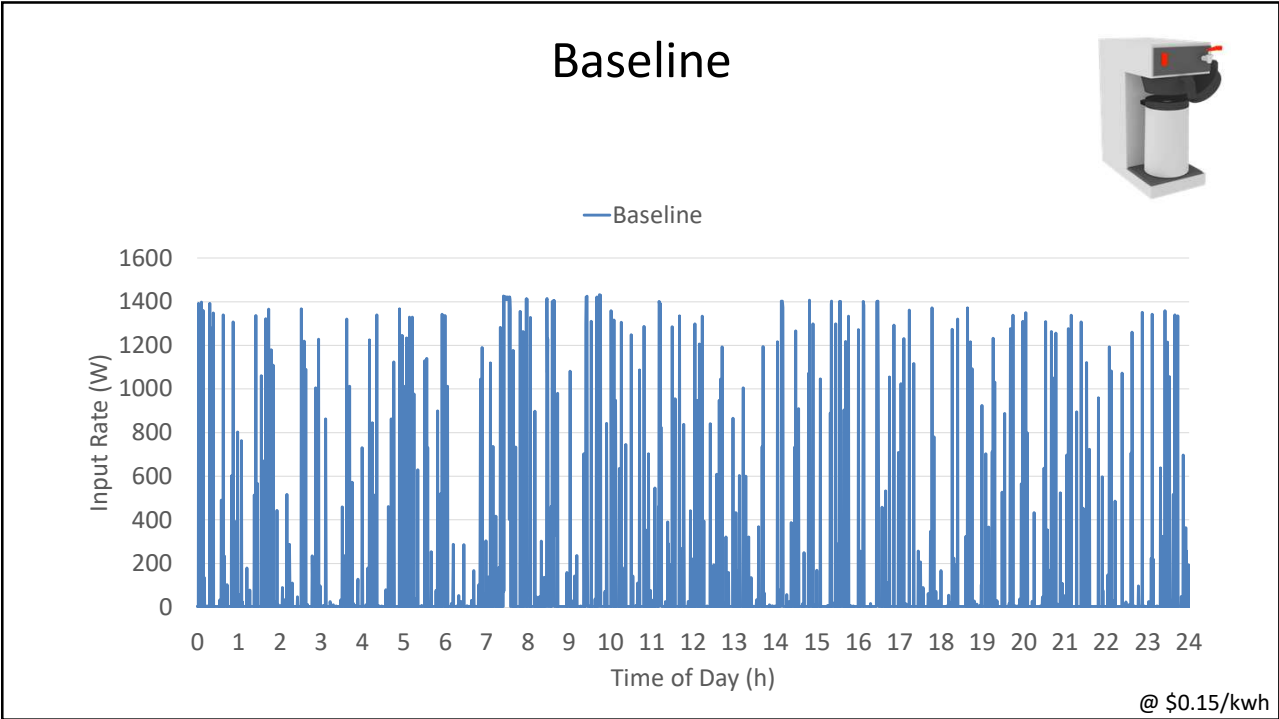
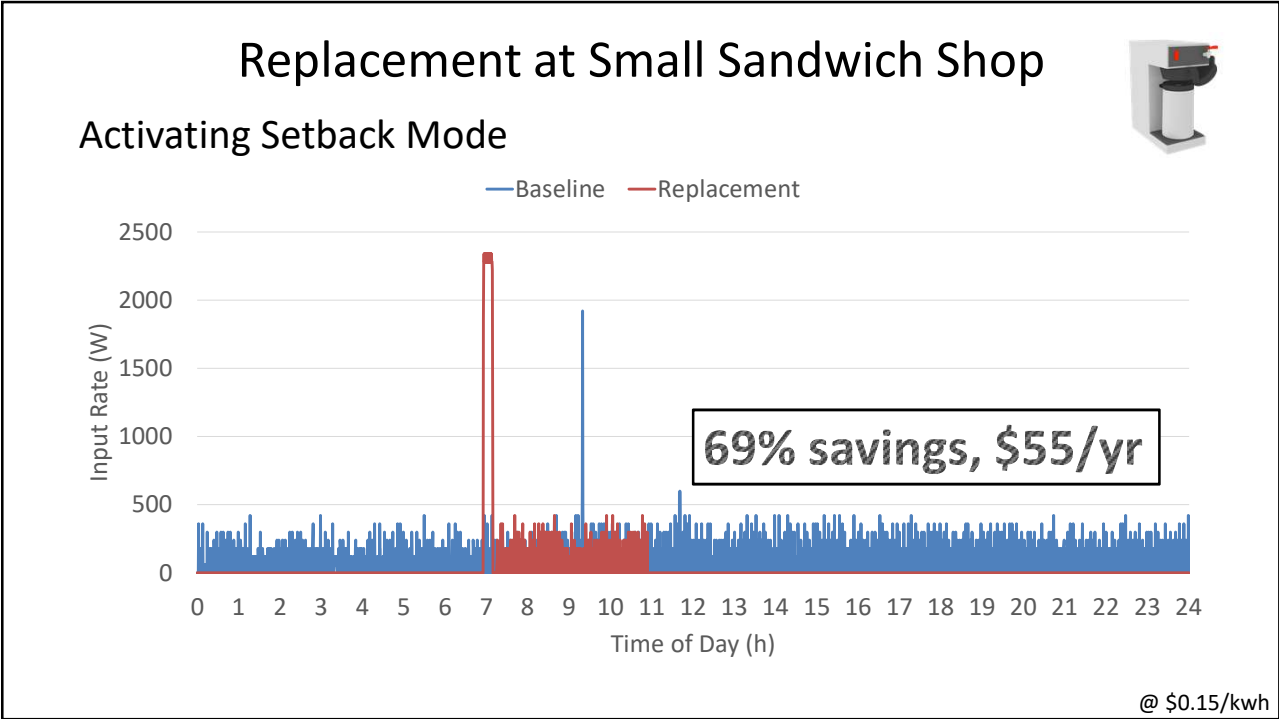
# Beverage Equipment

## Coffee Brewers

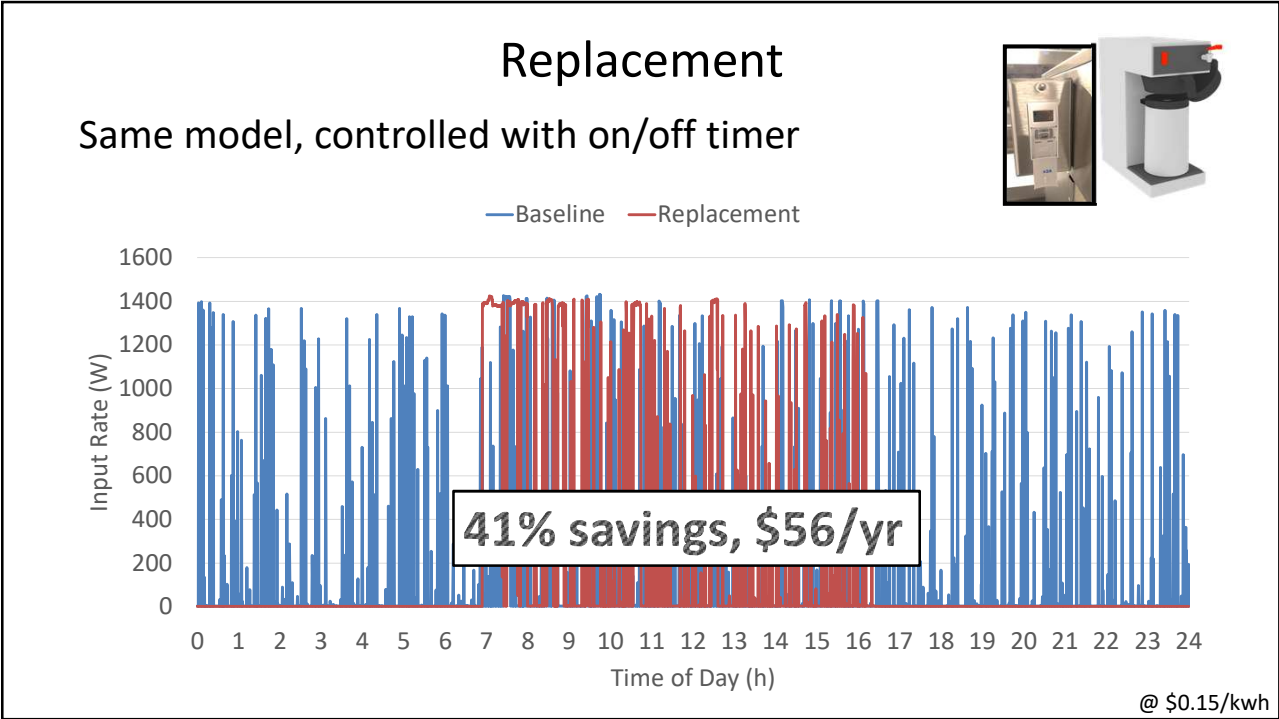


	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	7	9.1	0.71	75.0	55.3	163
Efficient	2	1.0	0.18			

@ \$0.15/kwh






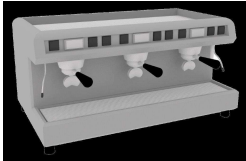


### Baseline vs Replacement

- Overnight idle energy is a substantial portion of total energy use
- Energy savings modes without timers will have delay upon startup
- Controls work best with behavior-change based training



# Espresso Machines

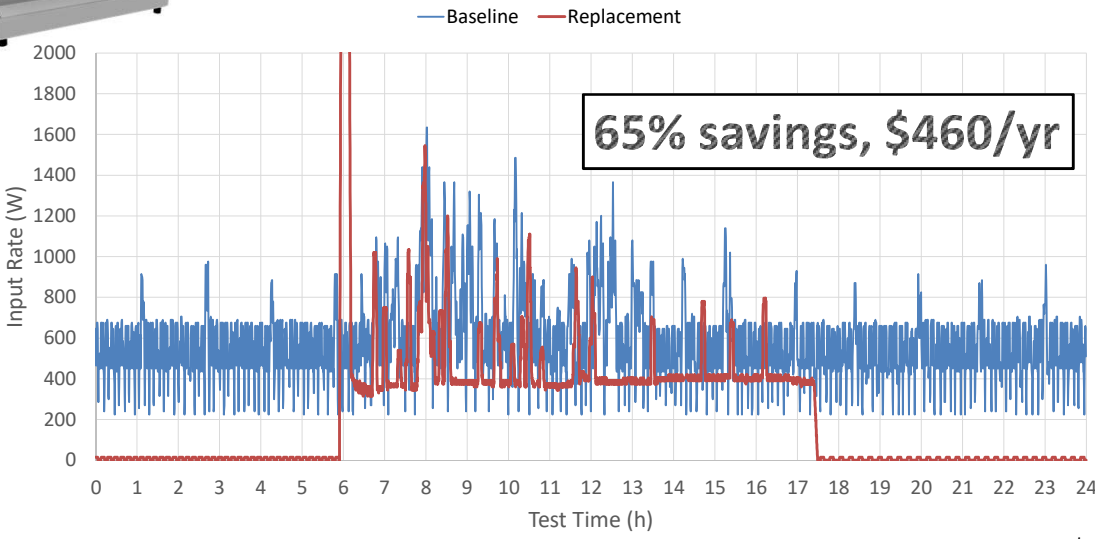


	Number Monitored	Total Average Daily Energy Usage (kWh/day)	Normalized Input Rate (kW)	Average Percent Difference (%)	Direct Replacement Savings (%)	Average Annual Savings (\$/unit)
Baseline	6	13.1	0.98	53.9	65.5	467
Efficient	2	4.5	0.45			

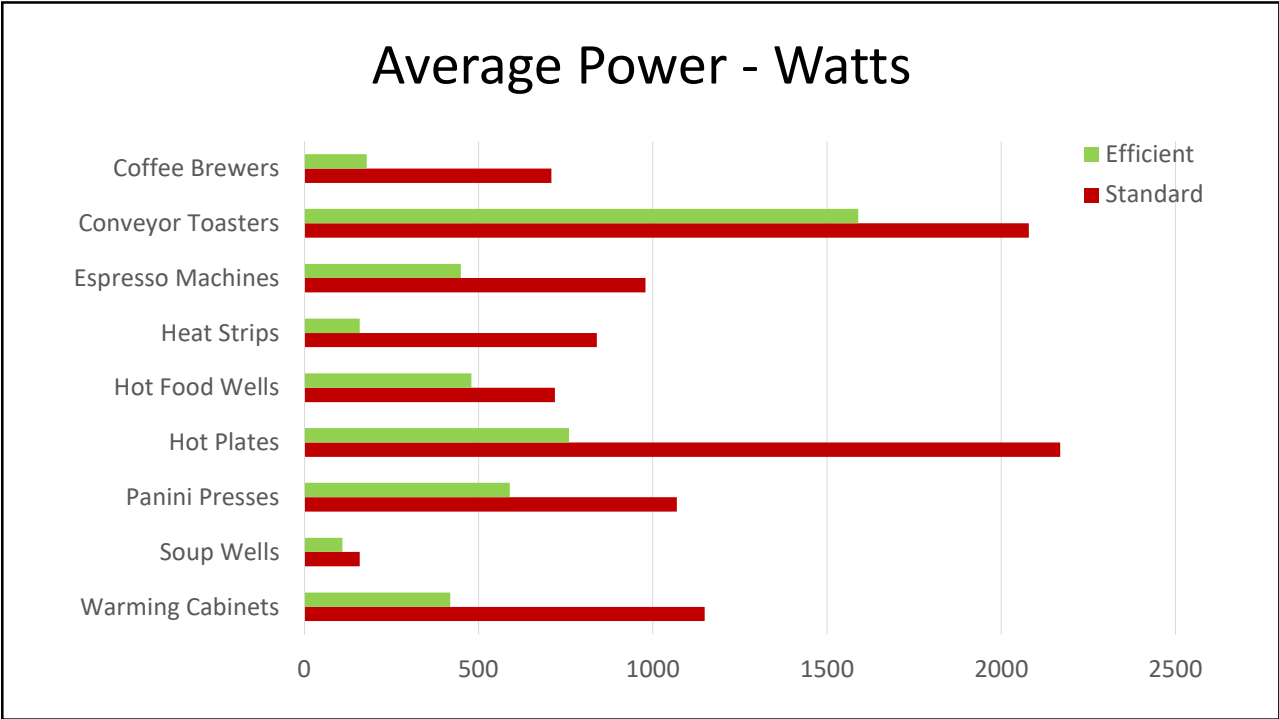
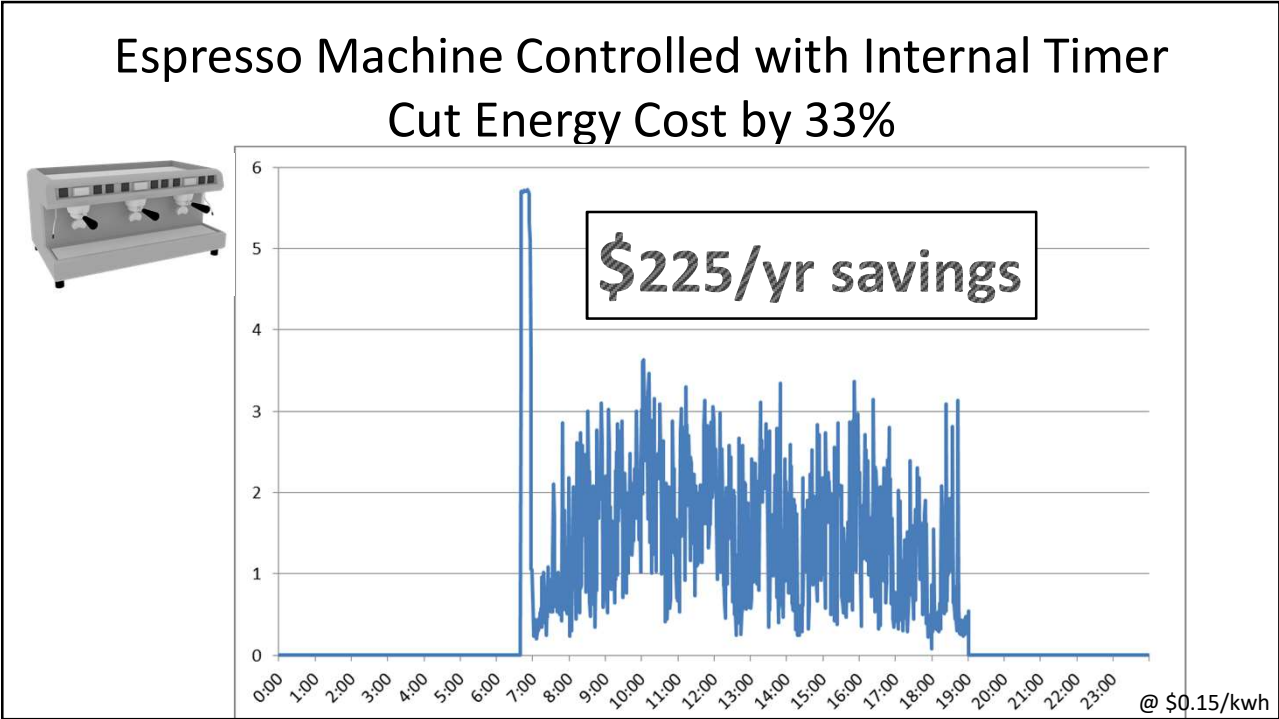
@ \$0.15/kwh



# Café



@ \$0.15/kwh



**Strongest Opportunities**

**% Savings**

Appliance	% Savings
Toasters	20%
Hotplates	30%
Espresso	65%
Holding Cabinets	55%
Heat Strips	80%
Soup Wells	45%

Not all appliances are the same.

Purchase Your Equipment Wisely!

California Energy Wise  
Rebate Qualified

California Utilities Partnering For Energy Efficiency  
Qualified equipment at fishnick.com

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## Key Takeaways

Small Energy Savings Add Up

Output and Consistency

Real World Applications



Electric Plug Load Savings Potential of Commercial Foodservice Equipment

CEC Plug Load Project Web Page

**The primary goals of this research-based demonstration project** is to assess the energy load and energy reduction potential of unventilated commercial plug load foodservice equipment, characterize equipment usage through field monitoring at five different commercial kitchens in Northern California (PG&E service territory), and demonstrate reduced energy consumption through the use of pre-commercial appliance designs and control technologies.

**Technical Advisory Committee:**  
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 Southern California Gas Company  
 Raveena Wisham  
 San Diego Gas & Electric  
 Andre Saldias, CFM, CFSP

**Project Information**