



# Foodservice Plug Loads

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**The Food Service  
Technology Center**



fishnick.com



# **What is a Food Service Technology Center**

# The FSTC Lab and Standard Test Methods (STM)



STMs generate “MPG” numbers  
for food service equipment

# Commercial Kitchen Ventilation Lab (CKV)

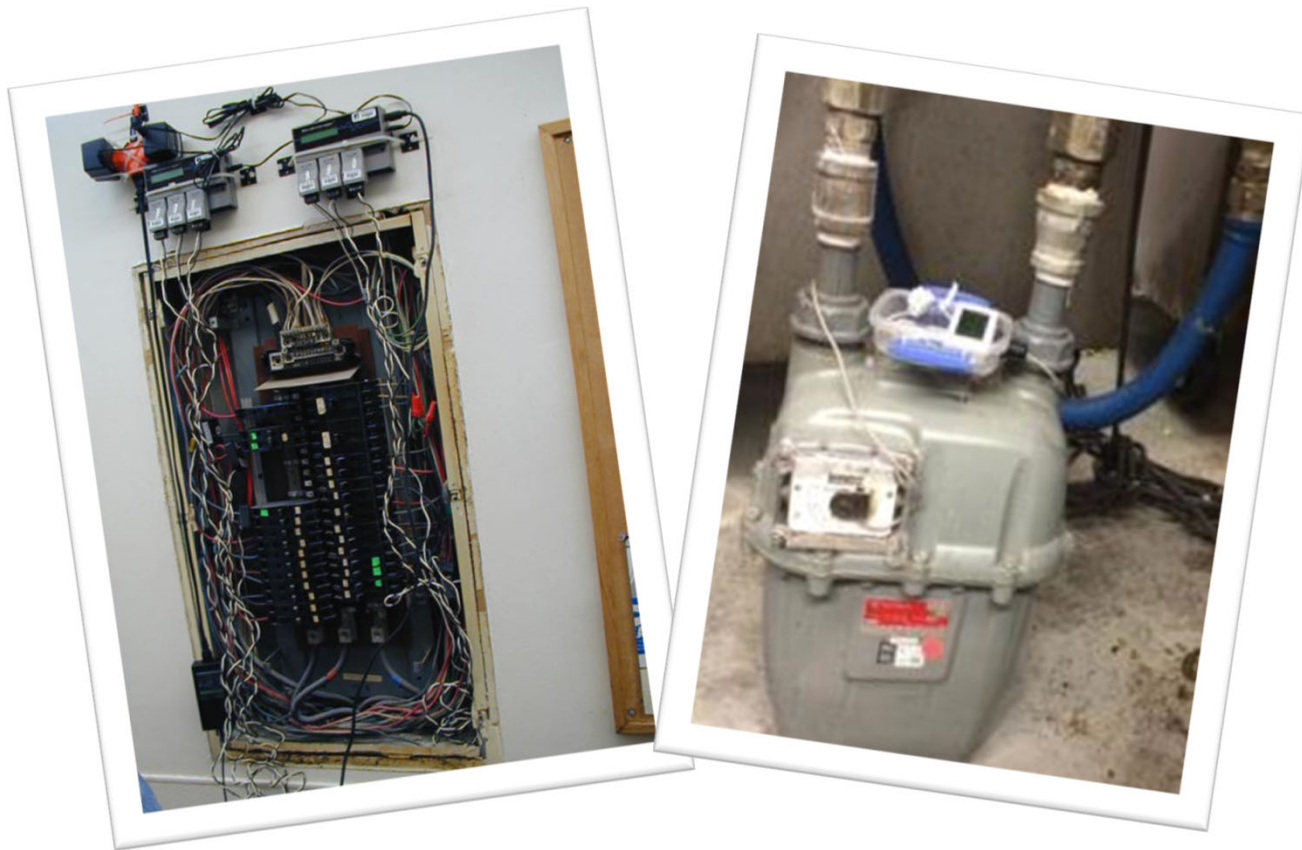


# Direct Customer Support

## Energy Surveys and Design Consultation



# On-site Energy Monitoring





# **Food Service Plug Loads**

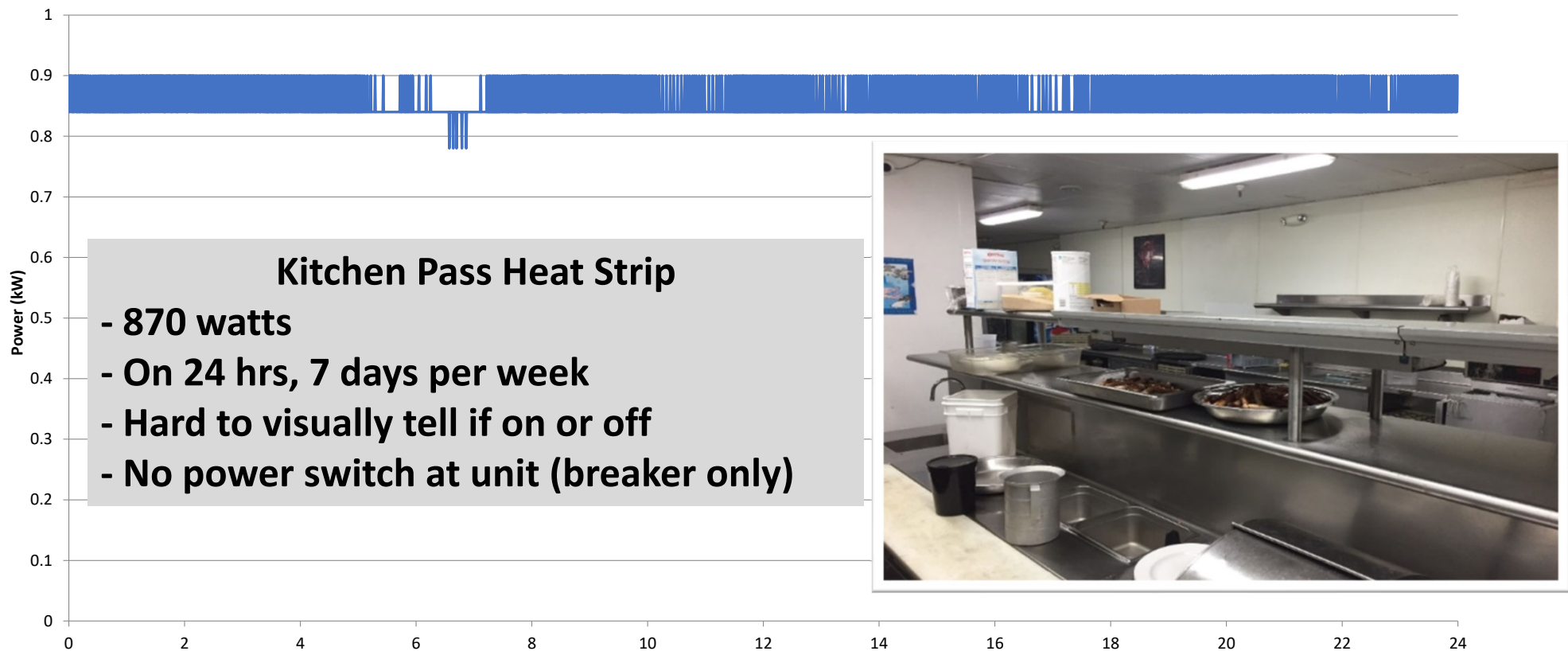
## ***Why We Care***

# Typical Plug Loads

- Computer:
  - Idle: ~50 watts
  - Sleep: ~2 watts
- Light bulbs:
  - Incandescent: ~60 watts
  - LED: ~12 watts



# Kitchen Plug Loads

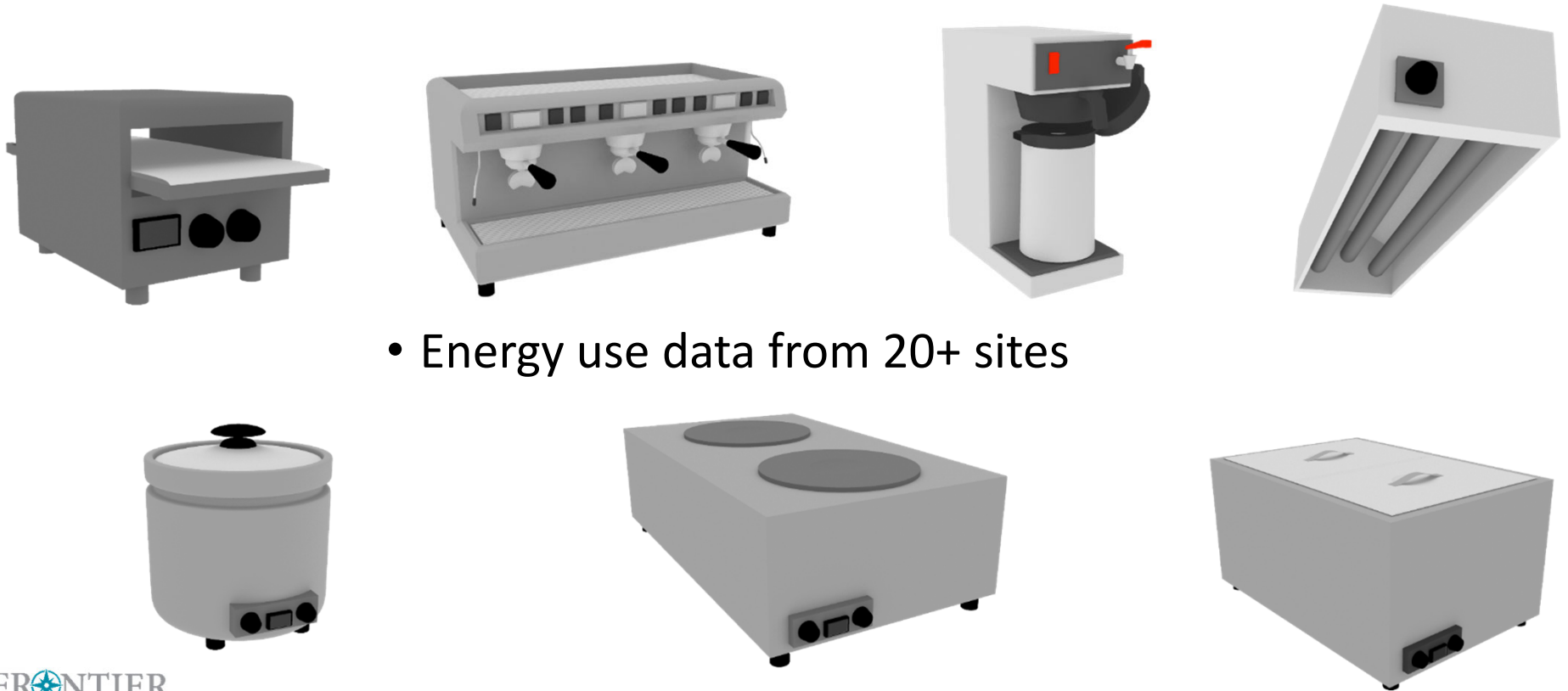


# Foodservice Plug Load Impact

- California has nearly 1 million plug load appliances, consuming 2.2 TWh annually
- Average restaurant has 11 plug load appliances



# CEC Funded Plug Load Study



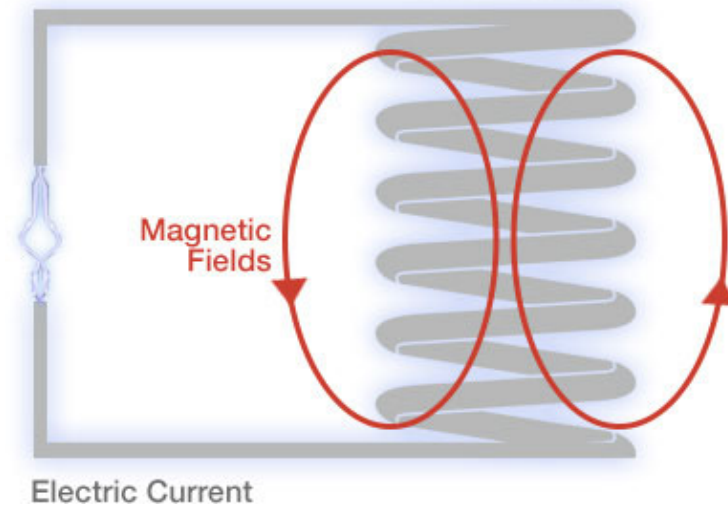
- Energy use data from 20+ sites

# Key Takeaways

- Need to eliminate/minimize energy when equipment not in use
  - Smart tech like induction
  - Smart sensors/timers
- Basic tech like insulation is underused
- Energy savings need to be automatic

# Why Induction?

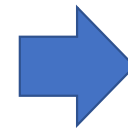
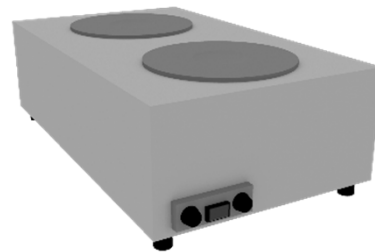
- Only active when compatible cookware is sensed (auto-off)
- Inherently more efficient
  - Induction: ~85%
  - Electric Resistance: ~75%
  - Gas: ~35%



# Real World Induction Savings

- Energy use was reduced by 59%
- Estimated annual energy savings of about \$600

	Baseline	Induction
Average Daily Energy Use	18.2 kWh	7.4 kWh
Annual Energy Cost	\$1000	\$400



## Other Induction Applications

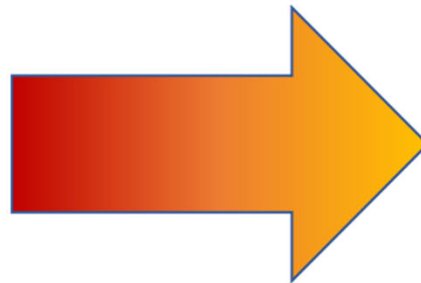
- Induction soup wells – 49% savings
- Heated Wells – 34% savings
- Additional benefits:
  - Better temperature control
  - Less heat to space
  - Easier cleaning



# Smart Sensor Savings

- Automatic is key, manual rarely used

60 kWh/day



30 kWh/day



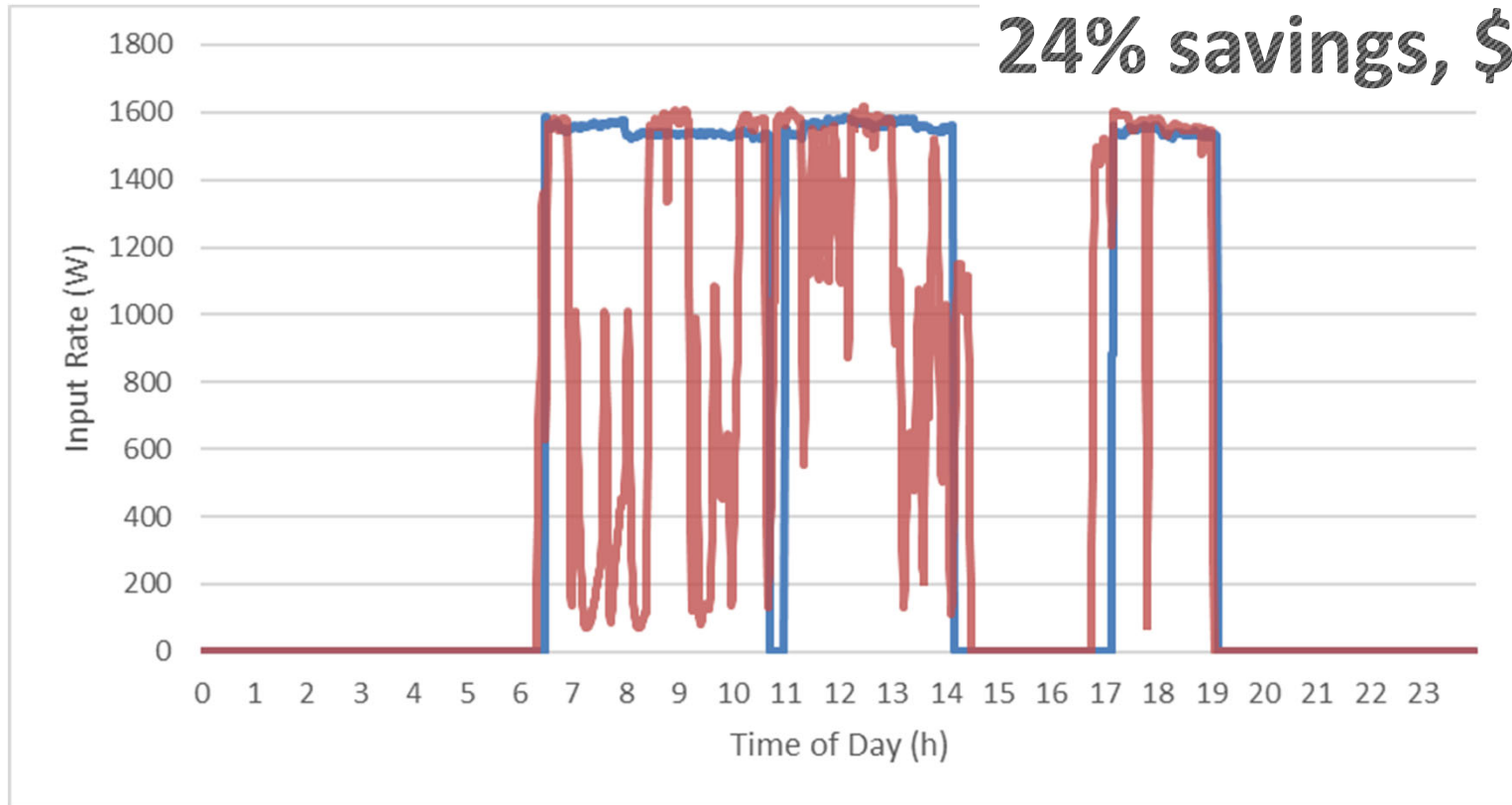
10 MWh/year  
savings!

# College Replacement



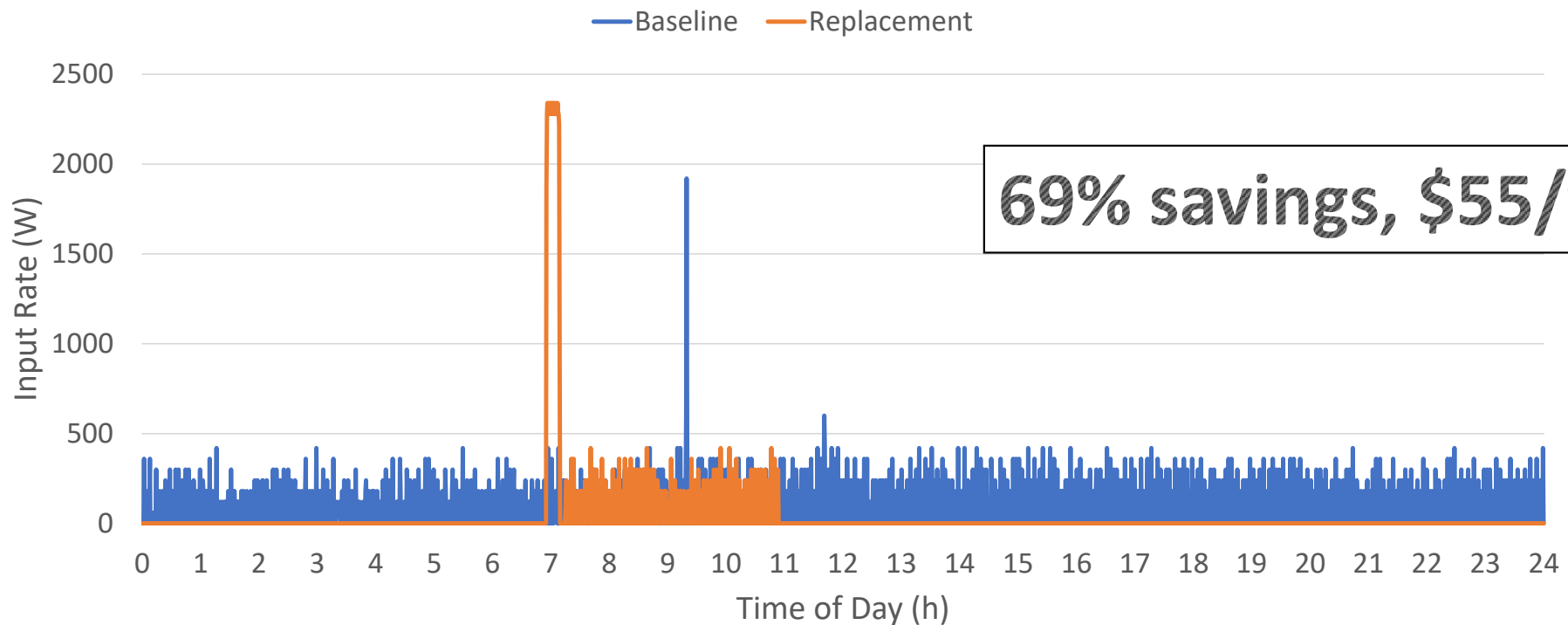
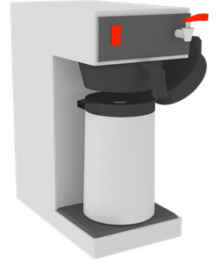
Input Rate Modulation

**24% savings, \$140/yr**



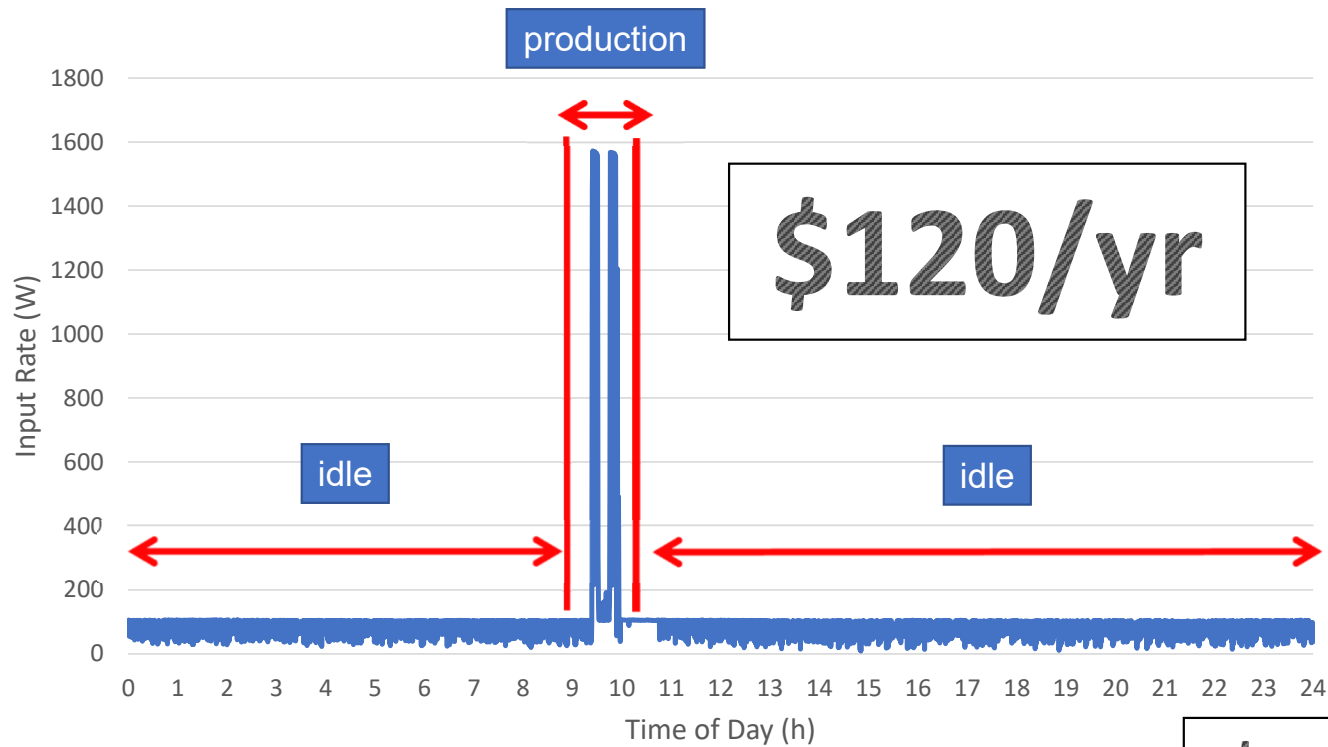
# Activating Setback Modes

- Equipment generally sold with energy save modes disabled



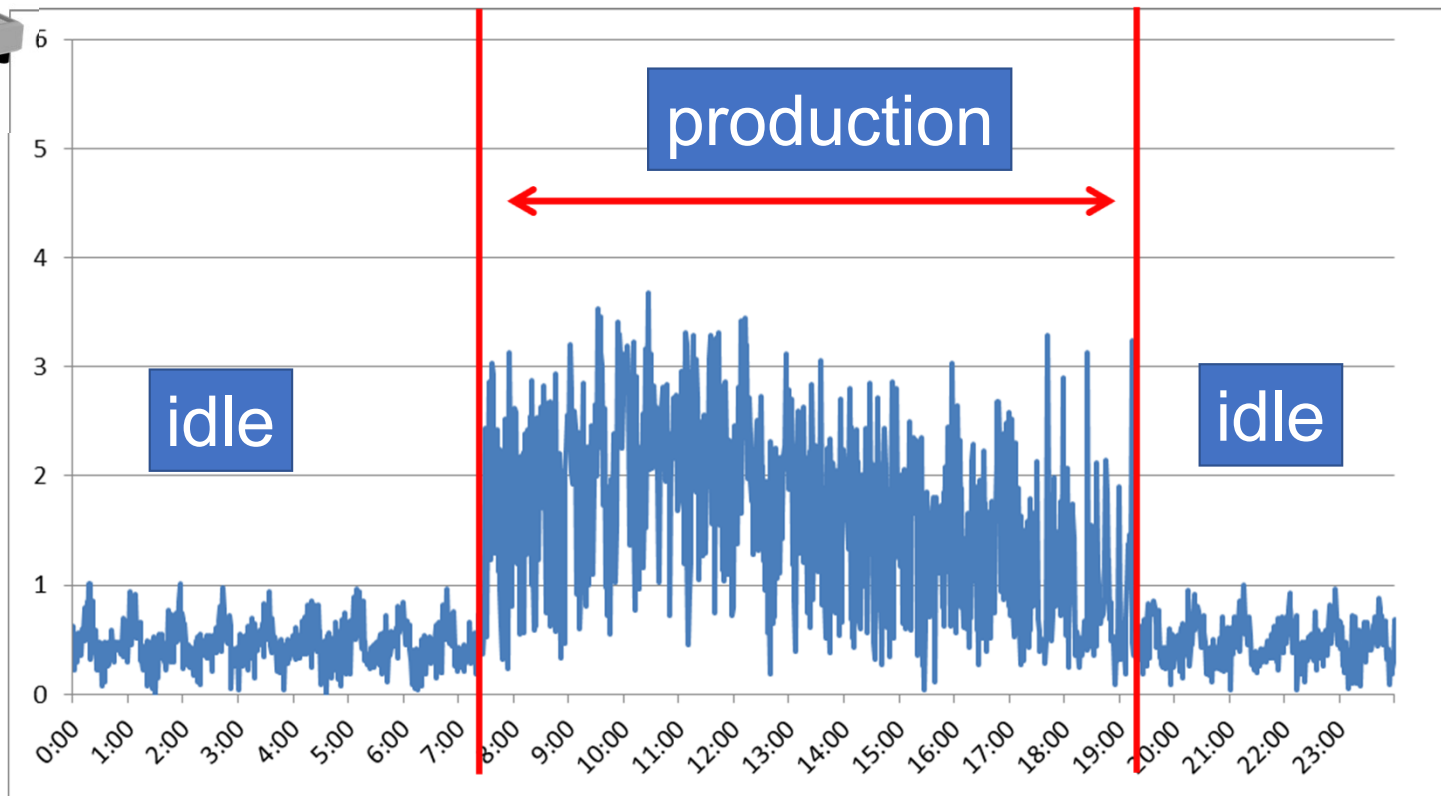
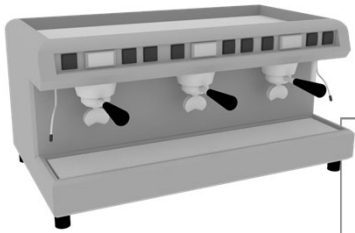
**69% savings, \$55/yr**

# Automatic Timers

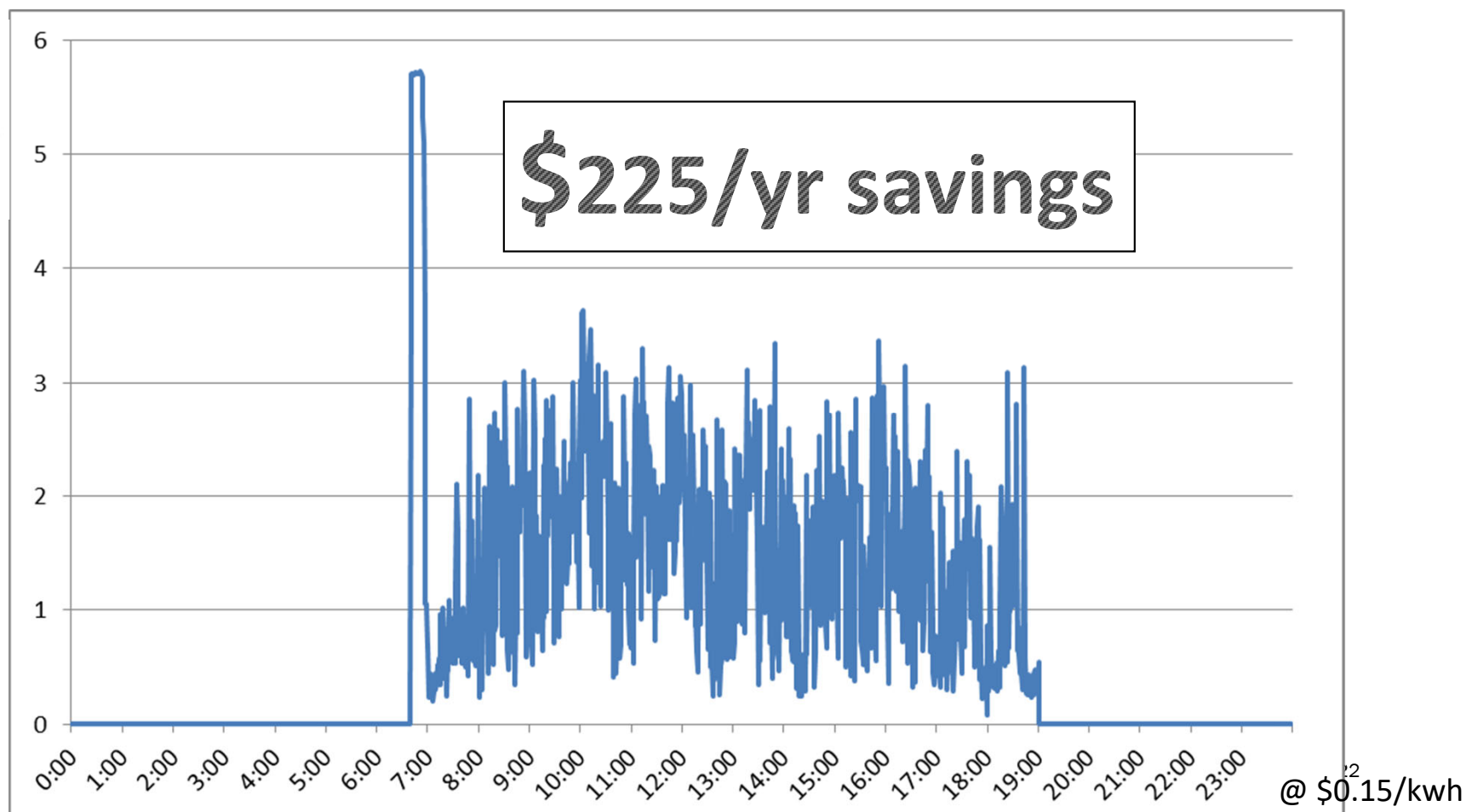
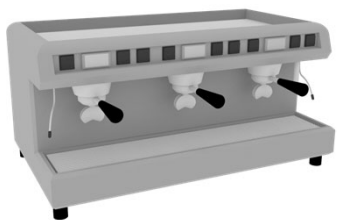


\$98/yr potential savings

# Espresso Machine Challenge – Always ON









# Espresso Machine Controlled with Internal Timer Cut Energy Cost by 33%



# External Solutions: Plug Timers

**Amazon Best Sellers**  
Our most popular products based on sales. Updated hourly.

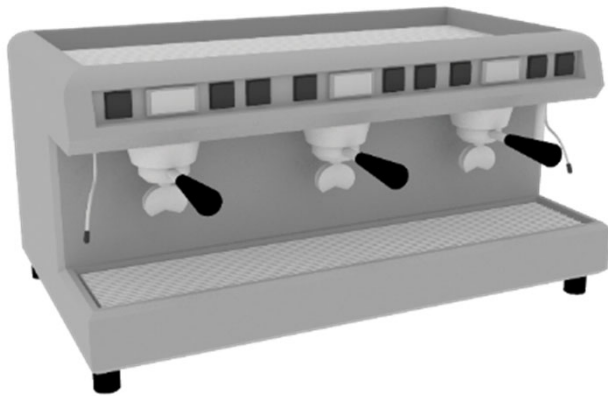
**Best Sellers in Electrical Timers**

<p><b>#1</b></p>  <p>Woods 59746WD Outdoor 24-Hour Photoelectric Timer with Remote Control 3-Outlet, Ideal for... ★★★★☆ 2,300 \$13.03 ✓prime</p>	<p><b>#2</b></p>  <p>Century 24 Hour Plug-in Mechanical Timer Grounded ★★★★☆ 1,436 \$9.99 ✓prime</p>	<p><b>#3</b></p>  <p>Fosmon Outdoor Timer Outlet, 15A 24-Hour Mechanical Light Timer, 3-Prong ETL Listed... ★★★★☆ 143 \$12.99 ✓prime</p>
<p><b>#4</b></p>  <p>TOGOAL TE02 Digital Light Timer Plug, 7-day Programmable Plug-in Electrical Switch with... ★★★★☆ 173 \$25.99 ✓prime</p>	<p><b>#5</b></p>  <p>Century Smart Digital Countdown Timer with Repeat Function ★★★★☆ 277 \$11.99 ✓prime</p>	<p><b>#6</b></p>  <p>Century 24 Hour Mechanical Outdoor Multi Socket Timer, 6 Outlet Garden Power Stake ★★★★☆ 16 \$22.99 ✓prime</p>

- Pros
  - Cheap
  - Accessible
  - Versatile
- Cons
  - Not as precise
  - Programming error possibility

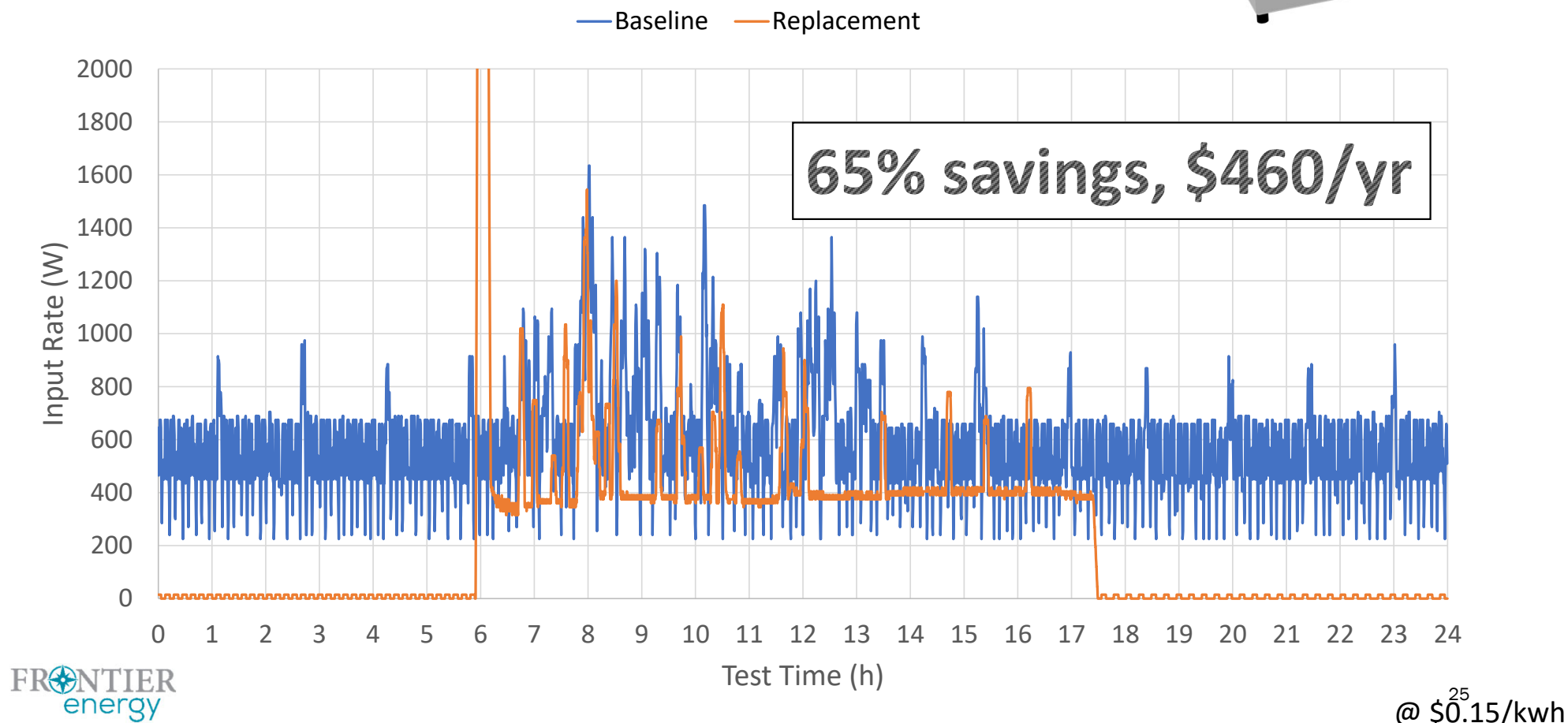
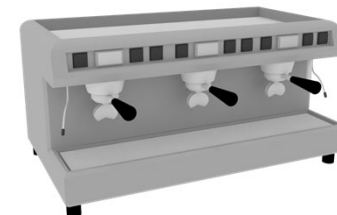
# Reduce Energy Loss

- Insulation!
- Less heat loss = less heating required



# Café Replacement

- Combining insulation and automatic timers



# What Makes a Holding Cabinet Efficient?

- Inefficient

- Glass Doors
- Uninsulated
- Large cabinet for potential small loads



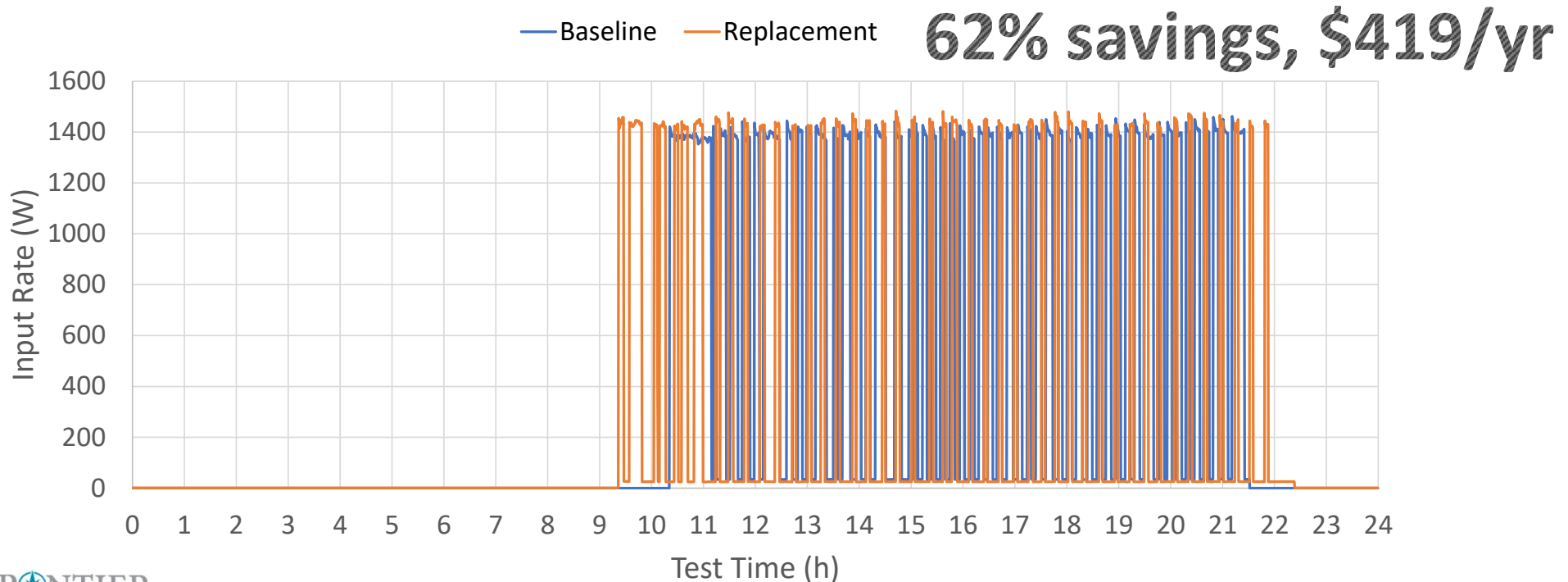
- Efficient

- Solid Doors
- Insulation
- Separately controlled compartments



# Holding Cabinet Savings

- Better insulation = less cycling required to maintain temperature



# Estimated Annual Savings Potential of 51.3 GWh

Appliance Type	Estimated Annual Energy Use (TWh/yr)	Energy Savings From Efficient Alternative (%)	Energy Savings Measure Adoption Rate (%)	Energy Savings Potential (GWh/yr)
Toaster (Pop-Up)	0.01	N/A	N/A	N/A
Toaster (Conveyor)	0.20	21.0%	10%	4.1
Strip Heater	0.52	N/A	N/A	N/A
Hotplate	0.05	29.0%	20%	2.8
Rice Cooker	0.02	N/A	N/A	N/A
Soup Warmer	0.03	49.1%	20%	2.8
Coffee Brewer	0.27	55.3%	10%	15.1
Tea Brewer/Hot Water	0.04	50.0%	10%	1.8
Espresso Machine	0.13	68.7%	10%	9.0
Holding Cabinet	0.12	58.5%	10%	7.0
Tortilla Warmer	0.02	N/A	N/A	N/A
Hot Food (Steam) Well	0.35	33.8%	5%	5.9
Sandwich Press	0.11	44.5%	5%	2.4
Waffle Iron	0.06	N/A	N/A	N/A
Microwave	0.04	N/A	N/A	N/A
Countertop Oven	0.03	N/A	N/A	N/A
Miscellaneous (Other)	0.20	2.3%	10%	0.5
<b>Total</b>	<b>2.19</b>			<b>51.3</b>

Learn More: [fishnick.com/cecplug](https://fishnick.com/cecplug)



## Electric Plug Load Savings Potential of Commercial Foodservice Equipment

FINAL REPORT

SUPPLEMENTAL REPORTS

FACT SHEET


 [Advanced Conveyor Toaster Analysis Report](#)

 [Rapid Cook Oven Analysis Report](#)

 [Induction Soup Warmer Analysis Report](#)

 [Induction Cooktop Analysis Report](#)

 [Conduction Cooktop Analysis Report](#)

 [Silicon Valley Power Plug Load Monitoring & Replacement Report](#)

## Next Steps

- Investigate market gaps for potential savings opportunities
  - e.g., currently no heat lamps with auto-off technology
- Incentivize plug load savings and increase associated market demand
  - Educational outreach
  - Rebate programs
- Investigate plug load preparation equipment
  - e.g., sealers, slicers, processors

# Looking to promote energy efficiency? We can help!



**The Food Service  
Technology Center**

**FRONTIER**  
energy

- ▶ [FISHNICK.COM](http://FISHNICK.COM): Premier foodservice energy efficiency experts with 30+ years of experience
  - ▶ Fuel-neutral, EPA-recognized independent testing laboratory
  - ▶ ISO 17025 accredited

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# Thanks!

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