# Induction Soup Warmer Analysis Report

## Introduction

Soup warmers are found in any businesses that sell soup, as soups are a labor and time intensive product often cooked in batches. Multiple soup warmers are often used in the same location to sell a variety of different soups. These usually operate at a low input rate and typically do their warming via heated water bath. The water bath is heated to create steam, which comes in contact with a soup container placed inside and keeps it warm.

Soup warmers using induction technology for holding are starting to become more common however. These heat the soup pot directly, removing the need for water and often creating a more even heating throughout the soup itself. The research team monitored seven baseline soup warmers and nine induction soup warmers, across six different locations.

## Caffe 817

Caffe 817 is a small local cafe that serves breakfast and lunch fare, including two daily types of soup. The restaurant featured two 120V LiteLine LLW-7 7-quart soup warmers in its front service area, near their register for quick and easy service. After the soups come off the cooktop, they get transferred into one of two soup warmers. Researchers monitored the soup warmer that the operator stated had the higher usage. The data showed that the soup warmer operated for an average of 7.7 hours per day resulting in an average energy consumption of 0.9 kWh per day.

Frontier replaced the soup warmer with a Vollrath 7-quart induction model. The replacement required no additional staff training thanks to the simple digital controls, and the setup/cleanup were simplified since there was no water involved. The increased temperature modulation from the induction technology saved energy by reducing the holding energy to match the decreasing soup volume throughout the day. Over a monitoring period of several months, the induction soup warmer averaged less than 0.5 kWh per day, on an average 5.1 hours of operation. Normalizing for the usage, the soup warmer reduced energy use by 22% as compared to the baseline. For the average $0.15 per kWh cost of electricity, this is equivalent to an annual energy savings of about $7. For this site, the energy efficient replacement had a payback period of 65.7 years, not including the cost savings from the induction warmer's lower product loss. The staff was also very happy with the ease of use and food product quality.

**Figure 1: Caffe 817 LiteLine LLW-7 7-Quart Soup Warmer**

**Figure 2: Caffe 817 Vollrath Induction 7-Quart Soup Warmer**

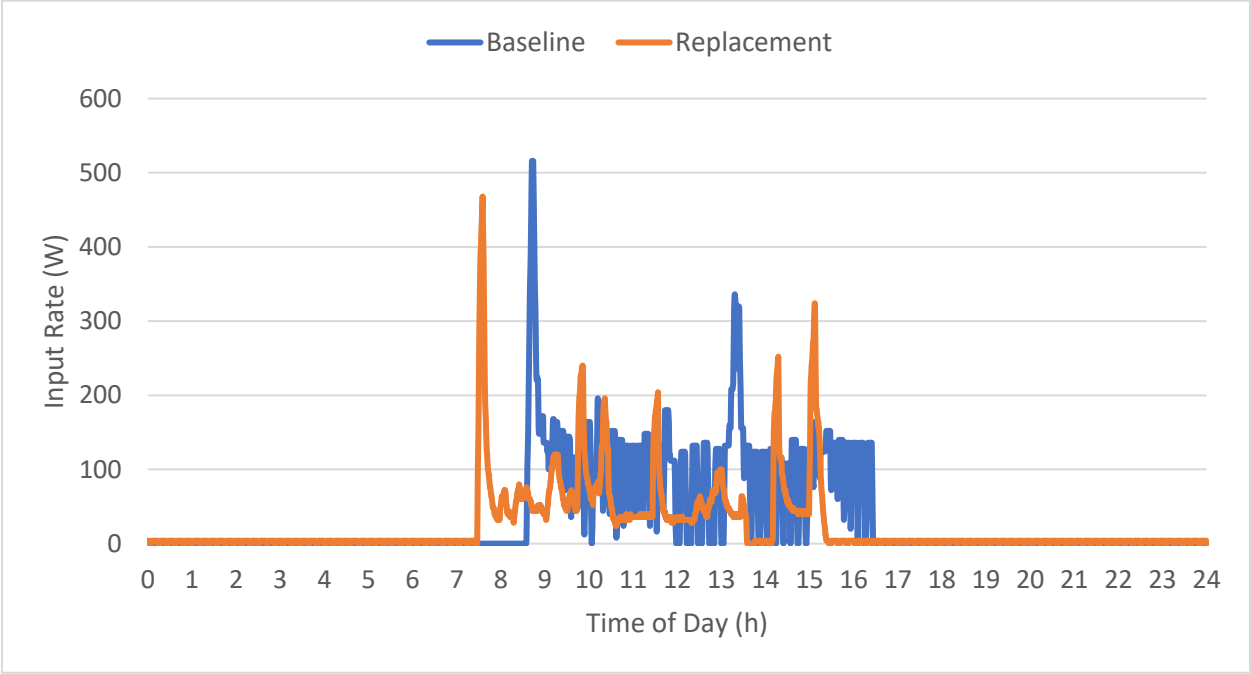


**Figure 3: Caffe 817 Soup Warmer Energy Profile Comparison**

## Mills College (Founders Commons)

The Mills College Founders Commons dining hall features two soup warmers utilized every day during its lunch and dinner services – a 7-quart APW Wyott RW-1V and a 11-quart APW Wyott RW-2V. Both are 120V plugins that keep the self-serve soup warm as students browse the dining options and pick out which items they want. Depending on the menu for the day, either

one or both soup warmers may be used. When meal services are over, the soup warmers are turned off and unplugged. Over a three-month monitoring period, the 7-quart soup warmer used an average 0.6 kWh per day and the 11-quart soup warmer used an average 1.5 kWh per day with an average 8.0 hours of operation.

Frontier replaced the 11-qt soup warmer with a Vollrath 11-quart induction model. The replacement required no additional staff training thanks to the simple digital controls, and the setup/cleanup were simplified since there was no water involved. The increased temperature modulation from the induction technology saved energy by reducing the holding energy to match the decreasing soup volume throughout the day. Over a monitoring period of several months, the induction soup warmer averaged slightly over 0.5 kWh per day, on an average 7.9 hours of operation. Normalizing for the usage, the soup warmer reduced energy use by 63% as compared to the baseline. For the average $0.15 per kWh cost of electricity, this is equivalent to an annual energy savings of about $50. For this site, the energy efficient replacement had a payback period of 7.8 years, not including the cost savings from the induction warmer's lower product loss. The staff was also very happy with the ease of use and food product quality.

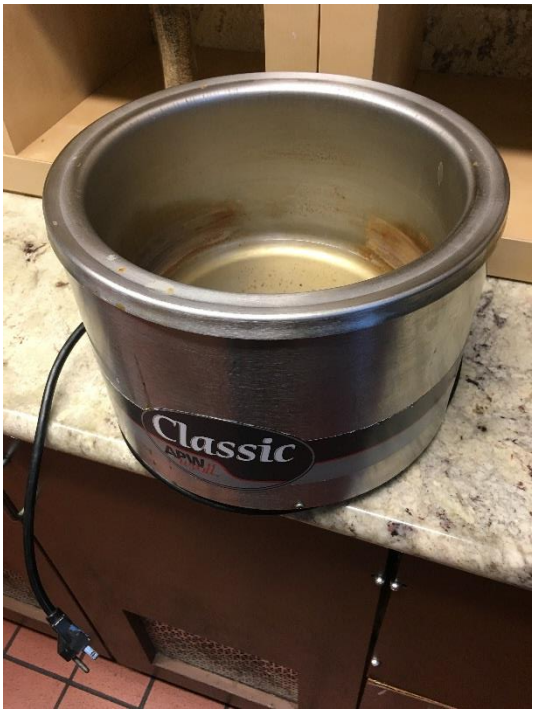


**Figure 4: Mills College APW Wyott RW-2V Baseline 11-Quart Soup Warmer**


**Figure 5: Mills College Vollrath Induction 11-Quart Soup Warmer**

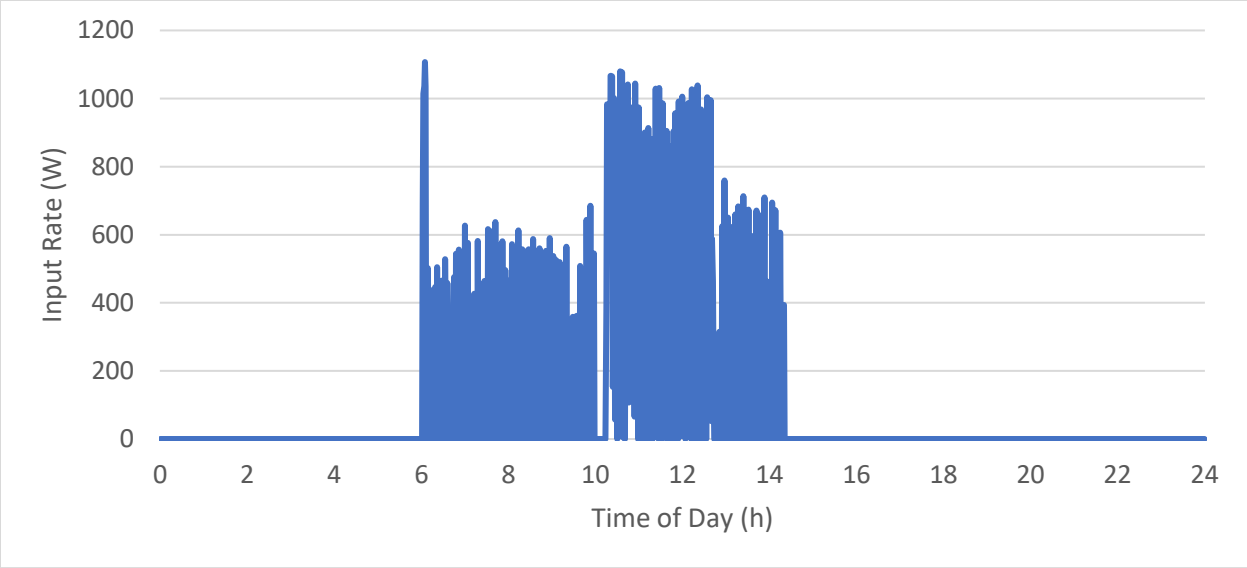


**Figure 6: Mills College Baseline 11-Quart Soup Warmer Operation**

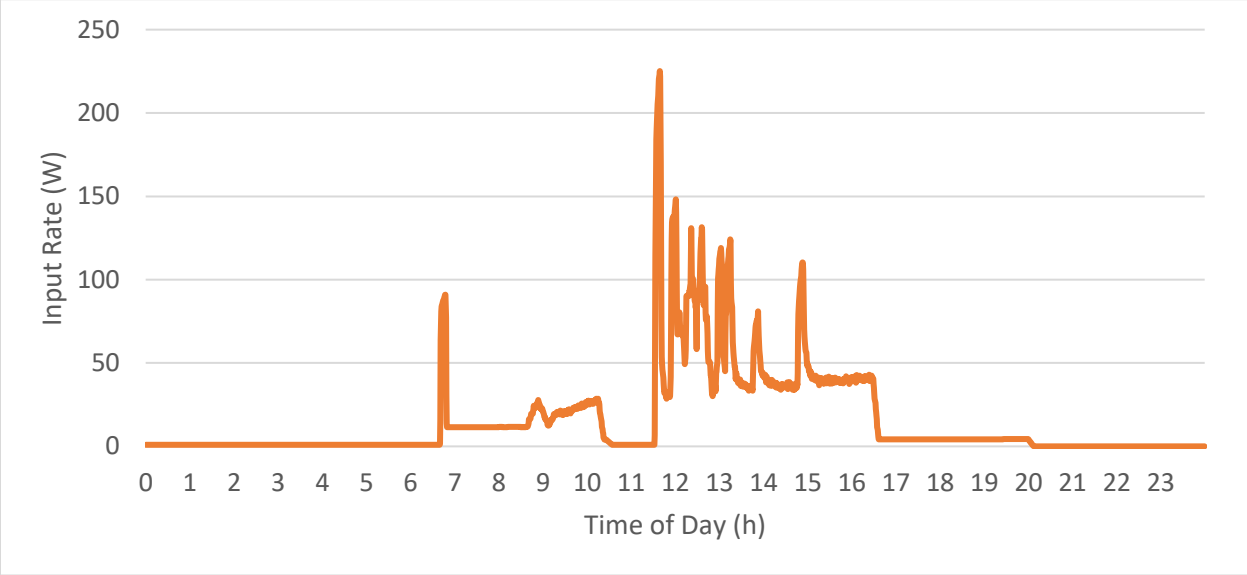


**Figure 7: Mills College Replacement 11-Quart Soup Warmer Operation**

## Spreadz

Spreadz is a specialty sandwich shop that also offers a variety of soups to pair with the meal. They have three 7-quart soup warmers and one 11-quart soup warmer in its front service area, near their register for quick and easy service. These soups are prepared early in the morning and transferred to the soup warmers for holding until ordered. Researchers monitored the 11-quart and two of the 7-quart soup warmers to get a baseline energy consumption. The 7-quart soup warmers averaged of 0.5 kWh/day on 1.9 hours of operation per day, while the 11-quart soup warmers averaged of 0.7 kWh/day on 1.7 hours of operation per day.

Frontier replaced both a 7-quart and 11-quart baseline soup warmer with corresponding Vollrath 7-quart induction model. The replacements required no additional staff training thanks to the simple digital controls, and the setup/cleanup were simplified since there was no water involved. The increased temperature modulation from the induction technology saved energy by reducing the holding energy to match the decreasing soup volume throughout the day. Compared to their baseline units, the replacements resulted in 42% energy savings for the 7-quart soup warmer and 69% energy savings for the 11-quart soup warmer. For the average $0.15 per kWh cost of electricity, this is equivalent to an annual energy savings of about $15 and $50 respectively. For this site, the energy efficient replacement had a payback period of 37.5 and 11.9 years respectively, not including the cost savings from the induction warmer's lower product loss. The staff was also very happy with the ease of use and food product quality, and the bright red aesthetic also represented their brand well.


**Figure 8: Spreadz Baseline Nemco 11-Quart Soup Warmer**

**Figure 9: Spreadz CookTek SinAqua Induction 11-Quart Soup Warmer**

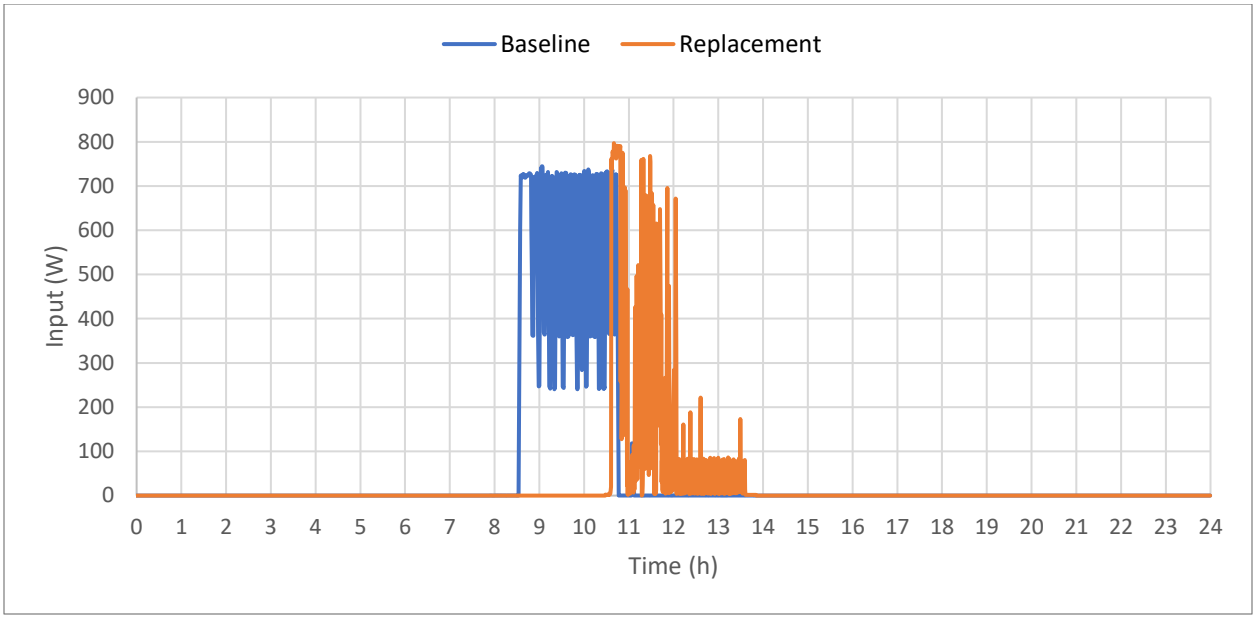


**Figure 10: Spreadz 11 Qt Soup Warmer Energy Profile Comparison**

## Results

Induction soup warmers saved 49% of the energy used by its conventional resistance element counterpart but showed relatively low cost savings per unit due to its low overall energy consumption. Despite this, soup warmers are represented in a significant number of restaurants with an estimated 39,000 units being sold every year - together, they account for a large amount of energy usage. Induction soup wells are also on the rise, which promise sizeable energy reduction. For these reasons, soup warmers represent a good plug load energy savings opportunity despite the relatively low usage.

Overall, the soup warmers had an average energy usage of 0.8 kWh per day with 5.0 hours of operation. Savings could be more significant for sites with multiple units and longer operating hours, but there is also a significant price point difference between electric resistance and induction soup warmers that makes the payback period substantial. Due to the increased cost and the relative novelty of the technology, a utility rebate would be needed to realize the potential energy savings for this category. Utility support would have the added benefit of bringing down the cost of induction cooking appliances by generating demand, which could help more people adopt induction cooktops and ranges. Induction soup warmers are also easier to use and have better holding uniformity, so there is less product loss from crusting. Additional research is advised to quantify the value of this product loss, to more accurately determine the potential savings of induction soup warmers.

**Table 1: Soup Warmer Results**

| Site | Total Average Energy (kWh/d) | Total Average Hours (h) | Average Input Rate (kW) |
|---|---|---|---|
| ***Baseline (Resistance)*** | | | |
| Caffe 817 | 0.9 | 7.7 | 0.117 |
| Mills | 0.9 | 12.0 | 0.075 |
| Mills | 0.6 | 8.0 | 0.075 |
| Mills | 1.5 | 8.0 | 0.188 |
| Spreadz | 0.7 | 1.7 | 0.411 |
| Spreadz | 0.5 | 2.0 | 0.255 |
| Spreadz | 0.4 | 1.9 | 0.217 |
| Average | 0.8 | 5.9 | 0.117 |
| ***Replacement (Induction)*** | | | |
| Dabba | 0.3 | 4.6 | 0.061 |
| Dabba | 0.3 | 5.3 | 0.060 |
| Dabba | 0.3 | 4.1 | 0.073 |
| Dabba | 0.2 | 4.1 | 0.055 |
| Caffe 817 | 0.4 | 4.9 | 0.092 |
| Mills | 0.5 | 7.9 | 0.069 |
| Togo's* | 2.3 | 9.0 | 0.251 |
| Spreadz | 0.4 | 3.2 | 0.126 |
| Spreadz | 0.4 | 2.7 | 0.149 |
| Average | 0.6 | 5.1 | 0.107 |

* high energy consumption may be due to use as rethermalizer, as a different location had a 3 compartment steam table for holding that consumed 8 kWh per day

**Table 2: Soup Warmer Replacement Data Comparison**

| Site | Baseline or Replacement? | Total Average Daily Energy Usage (kWh/day) | Total Average Daily Hours of Operation (h/day) | Normalized Energy Usage Rate (kW) | Normalized Savings (%) | Payback Period (yrs) |
|---|---|---|---|---|---|---|
| Caffe 817 | Baseline | 0.9 | 7.7 | 0.117 | 22.1 | 65.7 |
| | Replacement | 0.4 | 4.9 | 0.092 | | |
| Mill College | Baseline | 1.5 | 8.0 | 0.188 | 63.2 | 7.8 |
| | Replacement | 0.5 | 7.9 | 0.069 | | |
| Spreadz (11qt) | Baseline | 0.7 | 1.7 | 0.411 | 69.4 | 11.9 |
| | Replacement | 0.4 | 3.2 | 0.126 | | |
| Spreadz (7qt) | Baseline | 0.5 | 2.0 | 0.255 | 41.6 | 37.5 |
| | Replacement | 0.4 | 2.7 | 0.149 | | |
| | | | | Average | 49.1 | 30.7 |

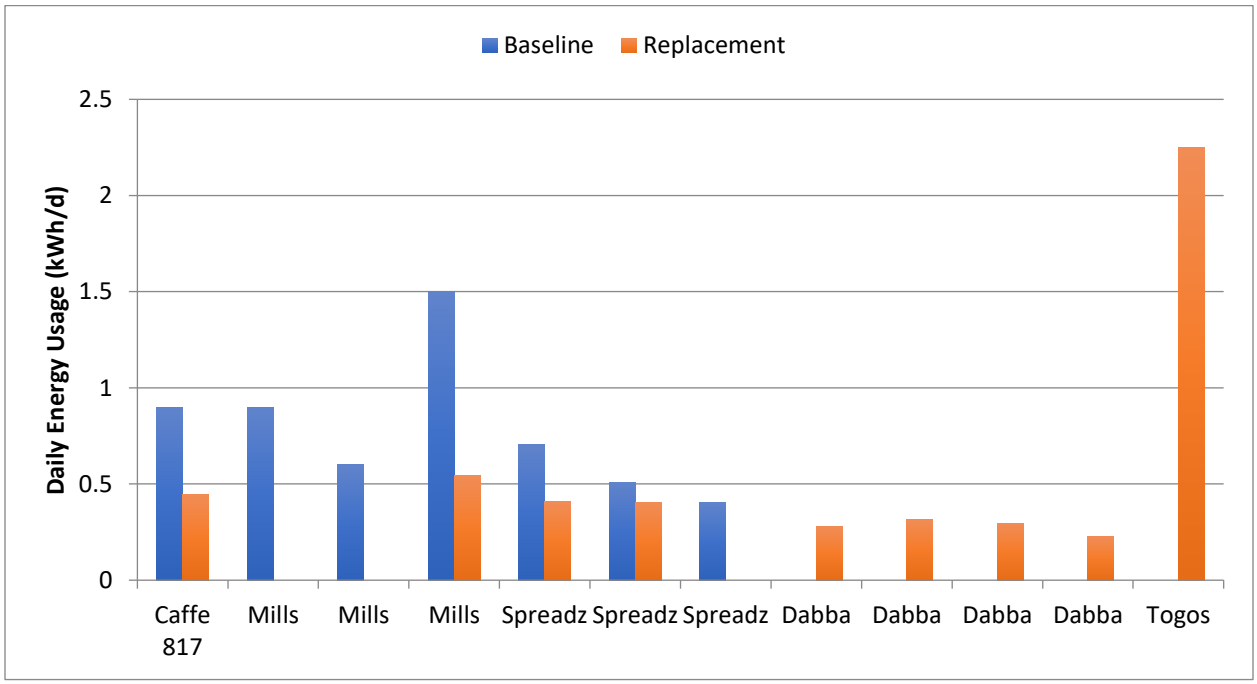


**Figure 11: Soup Warmer Daily Energy Usage Comparison**

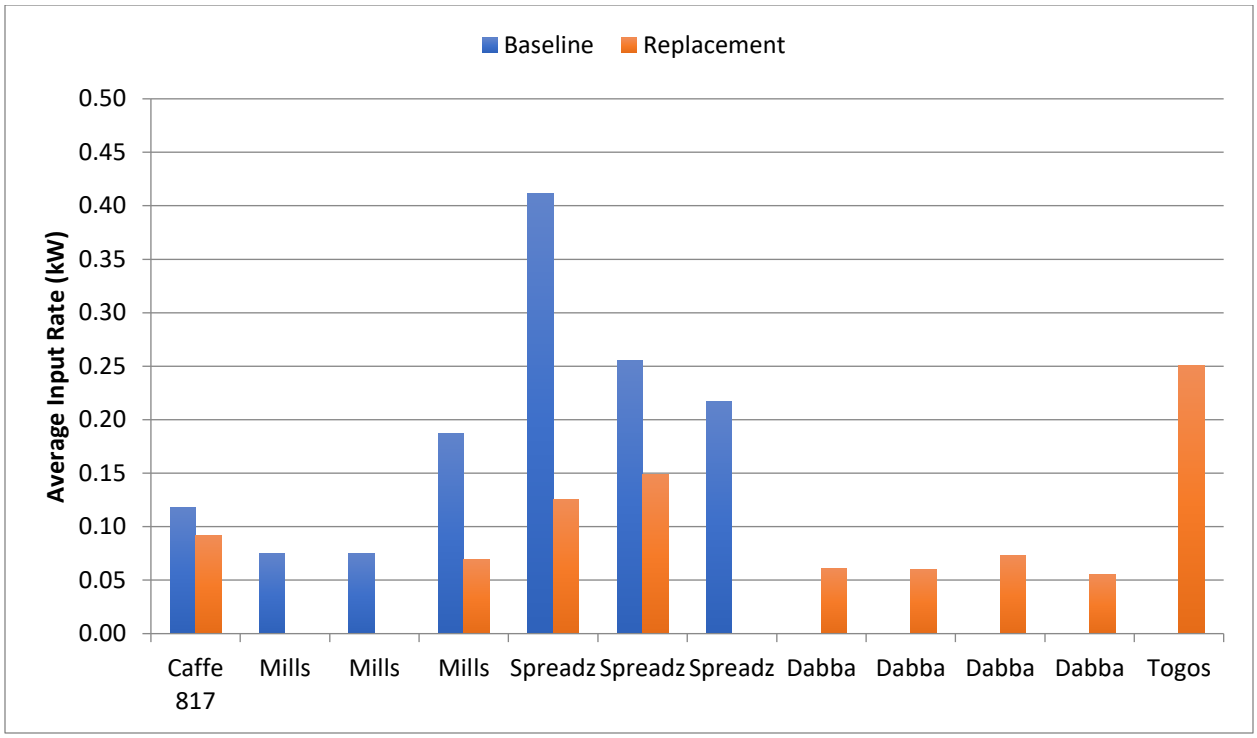


**Figure 12: Soup Warmer Average Power Comparison**