

Simple and Smart Designs Save: Dining Hall Trays Affect Energy Consumption

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Abstract

Tray use in dining halls has been linked to higher energy, water, and food consumption¹, because trays are collected by continuously running conveyor belts, require heated water to clean, and allow diners to take more food than they can consume. Trayless dining campaigns at other universities have lowered resource consumption rates while increasing student body awareness of environmental issues. A thirteen-day trial period of trayless dining was held at the Carmichael Dining Hall between March 28, 2010 and April 9, 2010. During this period energy consumption and food waste data were measured by electricity meter readings made available by the Tufts Energy Manager and by detailed three day audit reports given to Tufts Dining Services by the compost hauling company "Save That Stuff." The final results showed that the trayless pilot program at Tufts not only conserved resources, but also influenced student body perceptions of environmental initiatives.

Approximate Visibility and Environmental Benefits of Various Environmentally Conscious Changes

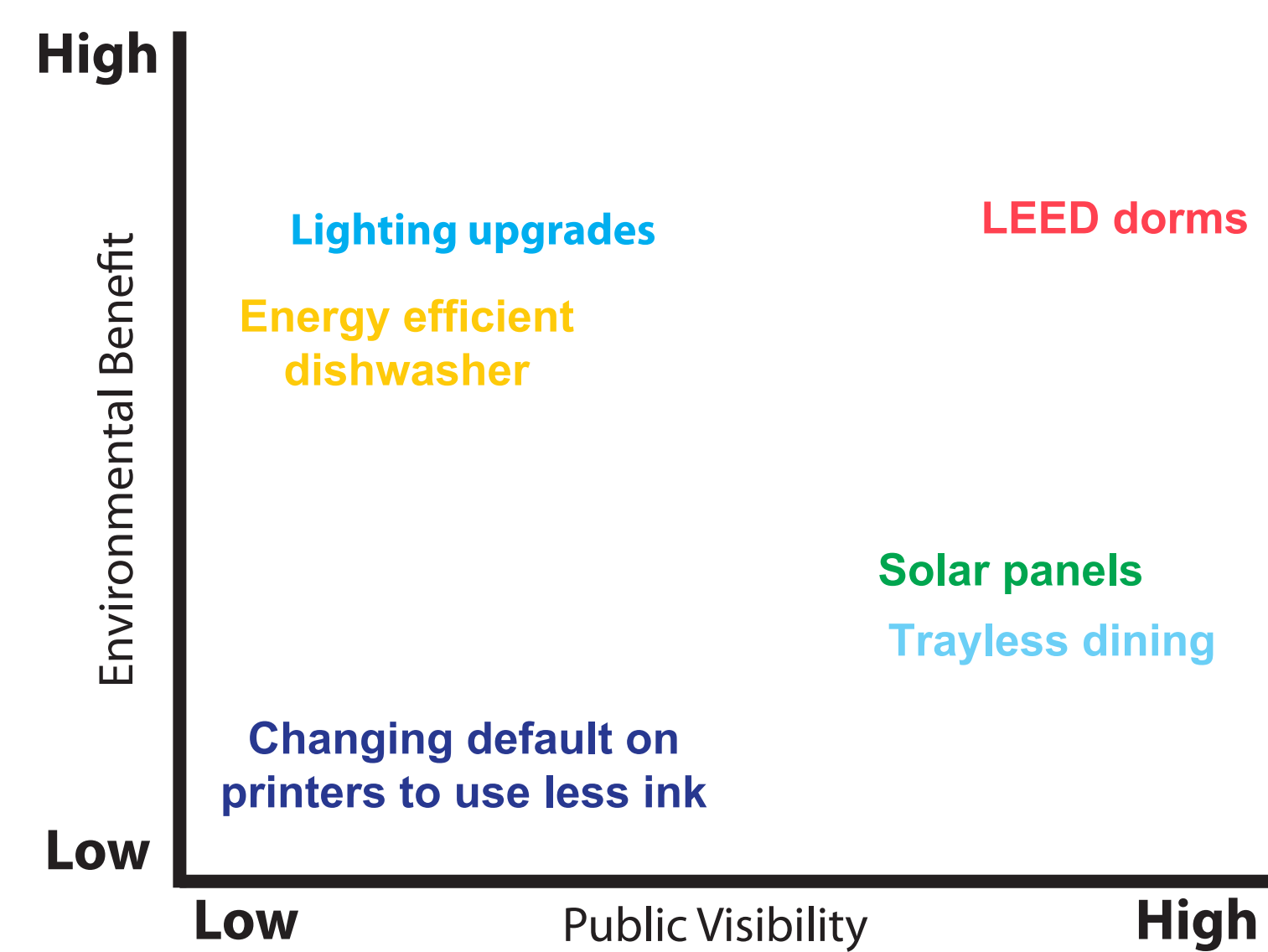


Figure 1: This graph helps illustrate how trayless dining, while offering a moderate environmental benefit, is a highly visible activity. At Tufts in particular, many environmental practices go unseen. Visible signs of sustainable actions increase awareness within the community that Tufts is taking action to decrease its environmental footprint.

Introduction

In 2009, the facilities at Carmichael Dining Hall composted 24.28 tons of food waste, used 365,520 kW-h of electricity, and consumed an average of 450 gallons of water per day for the dishwasher. We predicted that a trayless campaign would conserve significant food, electricity and water resources. While Tufts University has been a leader in sustainable university practices, sentiments of environmental stewardship seemed uncharacteristically low on campus. By implementing trayless dining, it was further predicted that a change in personal environmental attitudes and perceptions of Tufts students as an environmental institutions would occur.

Student Perception: How Eco-Friendly is Tufts?

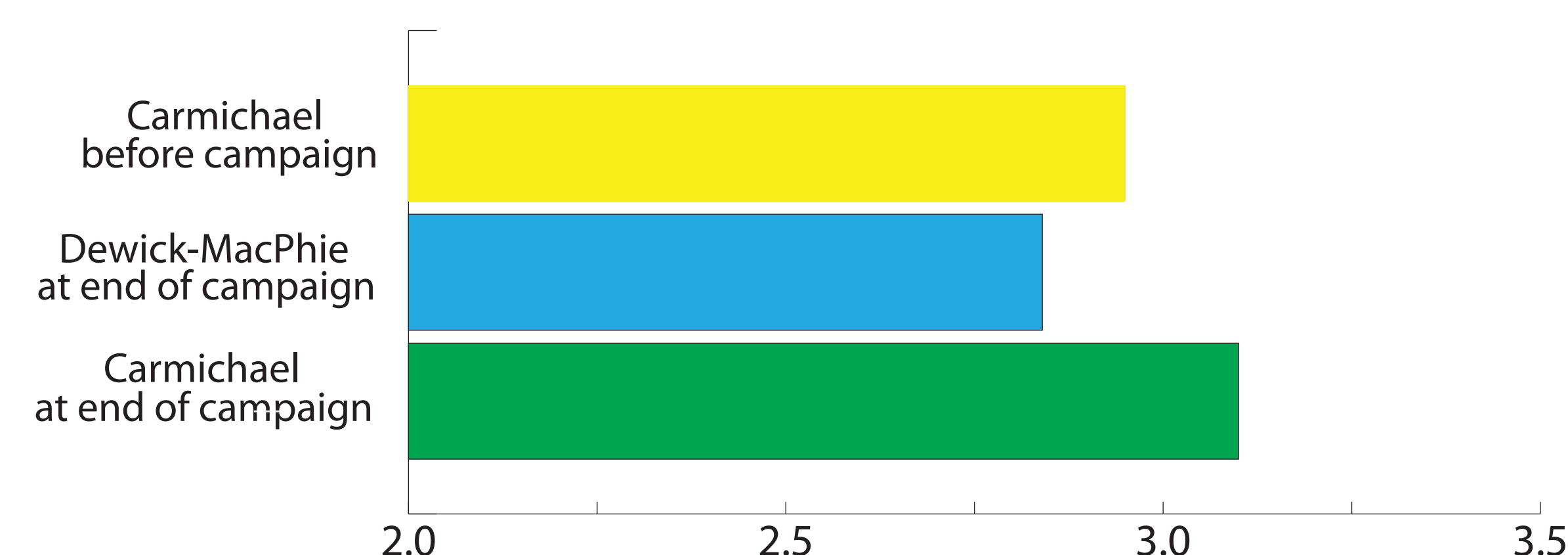


Figure 2: This graph shows a comparison of student perception of environmental responsibility at Tufts based on the survey statement: "I perceive Tufts to be an environmentally friendly university/institution." Responses varied along a scale from 1(Strongly Disagree) to 5(Strongly Agree), and the trends are marginally significant between Carmichael before the pilot and Carmichael and Dewick-MacPhie at the end of the pilot. $t(161)=2.32, p=.02$ and $t(198)=1.73, p=.09$ respectively.

Average Electricity Consumed Per Day

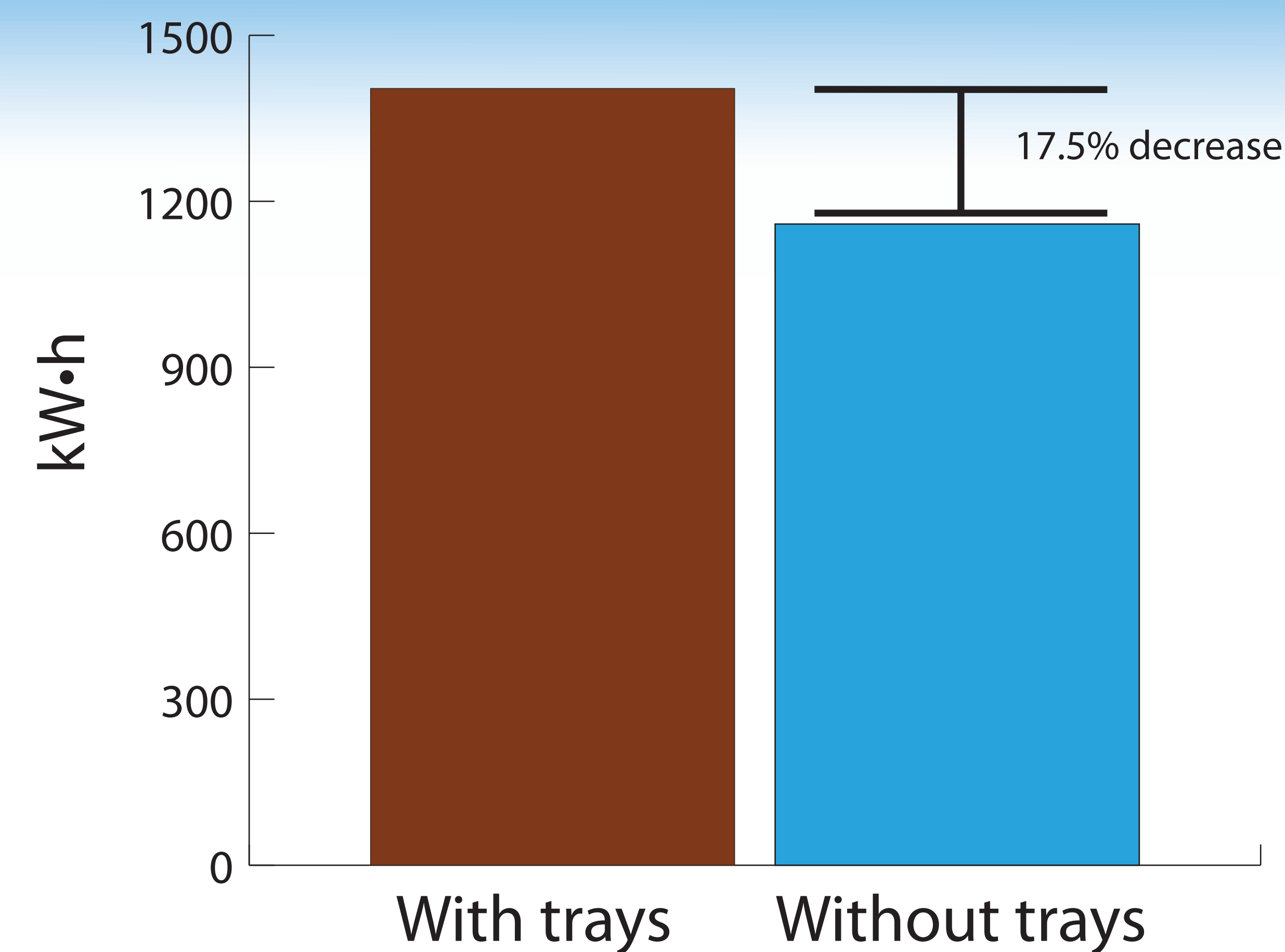


Figure 3: This graph shows the comparison of energy consumed before (with trays) and at the end (without trays) of the trayless pilot period. Weekly energy readings for the trial period were obtained from the Tufts Energy Manager and compared to daily averages from April 2009.

Average Food Waste Per Person

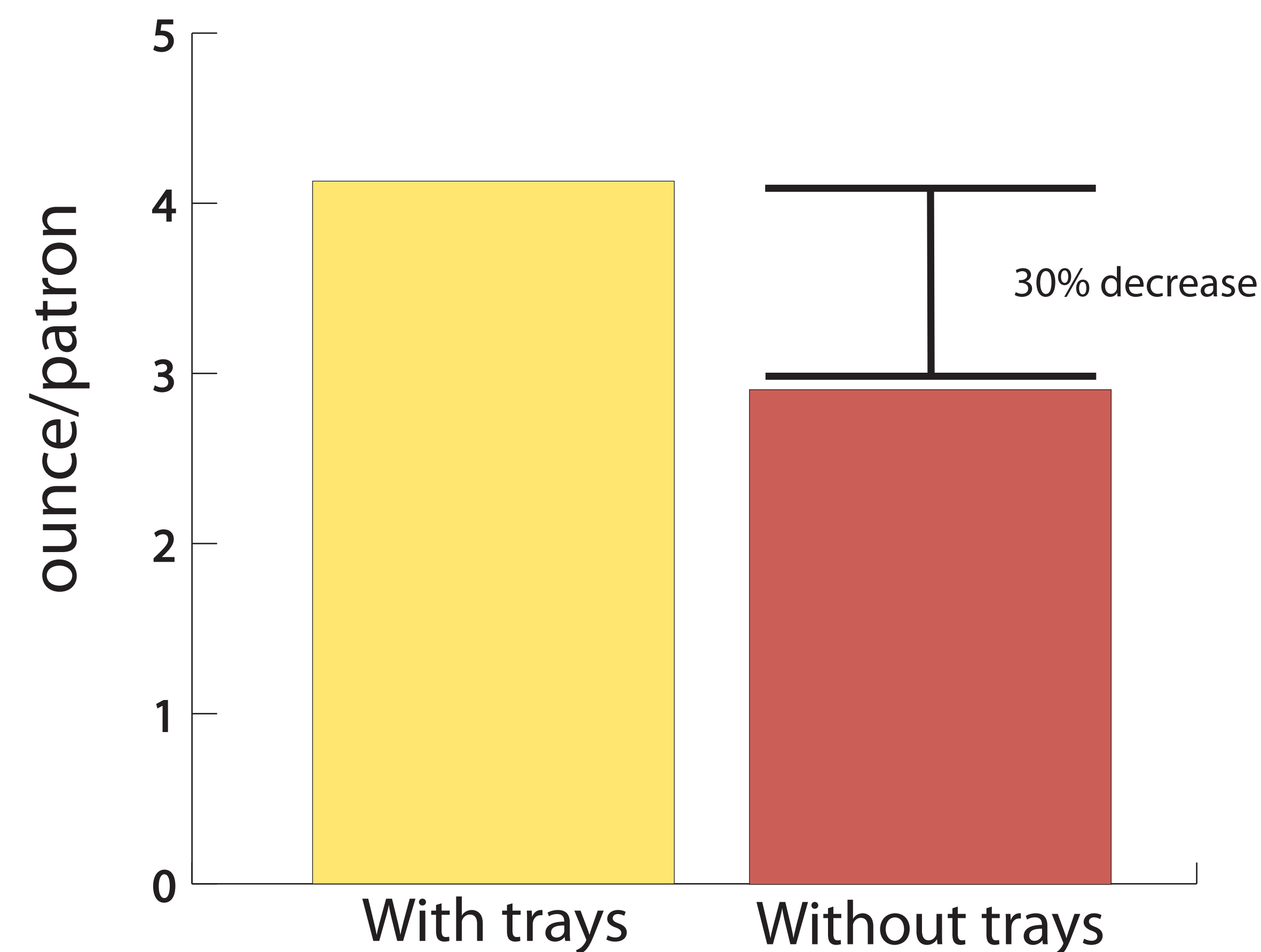


Figure 4: This graph shows a comparison of food waste before and during the trayless pilot period. Food waste weights were provided through weekly reports from the compost hauler "Save That Stuff" and divided by the number of patrons at Carmichael during both time frames.

References

1. Aramark. *The Business and Cultural Acceptance Case for Trayless Dining*. July 2008.
2. US Energy Information Administration. *Average Monthly Bill by Census Division, and State 2008*. Jan. 2010. <http://www.eia.doe.gov/cneaf/electricity/esr/table5.html>

Student Perception: Is Trayless Worth It?

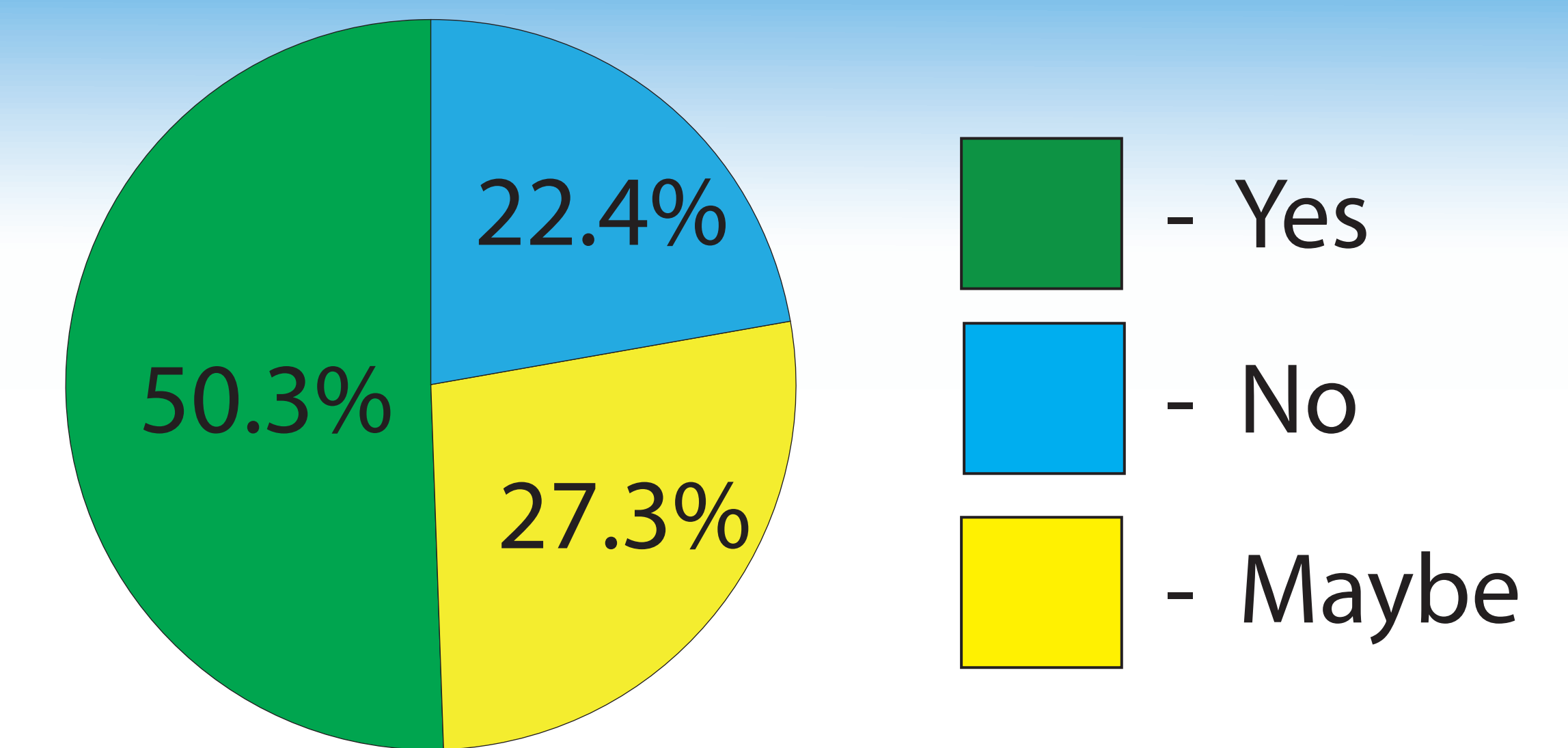


Figure 5: This chart shows how randomly polled students during the trayless pilot period answered the question: "Is the level of inconvenience (if any) acceptable?"

Considerations

- Hot water used in Carmichael's dishwasher is heated by a boiler that does not use electricity; therefore, the energy saved by decreasing the number of wash cycles is not accounted for in this study, leading to an underestimate of the total energy saved.
- The weights reported by "Save That Stuff" were measured in tons, making small differences in weight seen on a daily basis difficult to measure over the short testing period.
- An extended trial period is needed to show if the amount of food purchased over time decreases.
- Water meters in Carmichael do not distinguish between the dorm and dining hall, making an analysis of water savings from trayless dining impossible.

Energy Saved Per Month With Trayless Dining

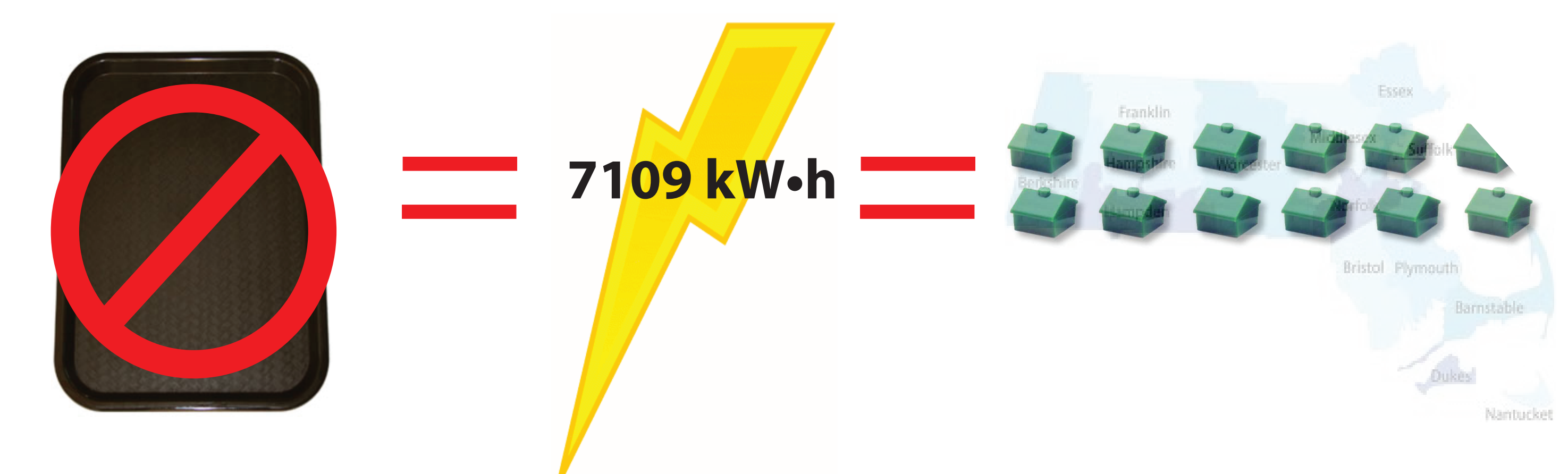


Figure 6: This figure illustrates how in one month, the energy saved by trayless dining in Carmichael alone could power an average Massachusetts home for about one year. (The average home in MA requires 618 kWh/month²)

Conclusions

Removing trays from Carmichael dining hall produced significant resource savings to the university and increased student perception of Tufts' sustainability. As a result of this pilot period and extensive research of programs at peer institutions, beginning Fall '10, both major dining halls will start full-scale trayless dining programs. Furthermore, to better accommodate trayless dining, new, larger cups will be provided, the tray carousel will be retrofitted to better hold plates, and TUDS staff will be reallocated from the dish room to the dining room to increase student/staff interaction and accommodate more spills. .

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