

Menus of Change Principles impact on the Carbon Footprint of Top Dining Meals



Footprint of Top Dining Meals

Maddi Boettner & Megan Jennings



Introduction

Research has shown that our everyday choices, including our diets, are imposing environmental consequences. Farm to gate impacts of beef consumption regularly have the highest emissions equivalent^[1,2,3]. Our project attempts to quantify the impact of top dining meals in Lower Dining Hall at Boston College (BC); Screaming Eagle (Steak and Cheese & Chicken and Cheese subs), The Grateful Burger, and the Salad bar. We also aim to identify which Menus of Change principles and guidelines will reduce BC's impact the most^[4].

Diet is a conscious choice we make often and it is crucial to understand the impact our everyday meals have on the environment including the stages from farm to gate, meaning the impacts of production through when Boston College purchases. We expect that a substantial decrease in beef consumption will be necessary to lower our impact, as research extensively demonstrates that a more plant based diet has substantially less of an impact than diets high in meat protein^[1,2,3].

Objectives

- Identify individual impacts of top dining meals at Lower on an individual and semester impact basis^[1,2,3].
- Leverage Menus of Change principles potential to lower impact through recommended substitutions^[4].
- Compare impacts of each meal against each other and calculate equivalence to GHG emissions^[5].

Methods

- Using the top ingredients in each recipe, we determined the Global Warming Potential (kg CO₂ eq) of each food product through Life Cycle Assessment (LCA) literature. Beef and cheese calculations were made from LCA's in the US^[1,2]. Fresh produce values were taken from median global warming values from 369 studies of 168 fresh produce categories^[3].
- Multiplied the amount (kg) of ingredient in recipe with the CO₂ emission found from the LCA, and sum total impact of each meal, reporting values for individual meal impacts (Fig 1) and 2018 Semester impact (Fig 2).
- Quantify and determine alternatives to lower impacts through Menu of Change principles, and calculated the potential impact of "Serve less red meat less often"^[4] compared to current semester serving regimens (Fig 3).

Results

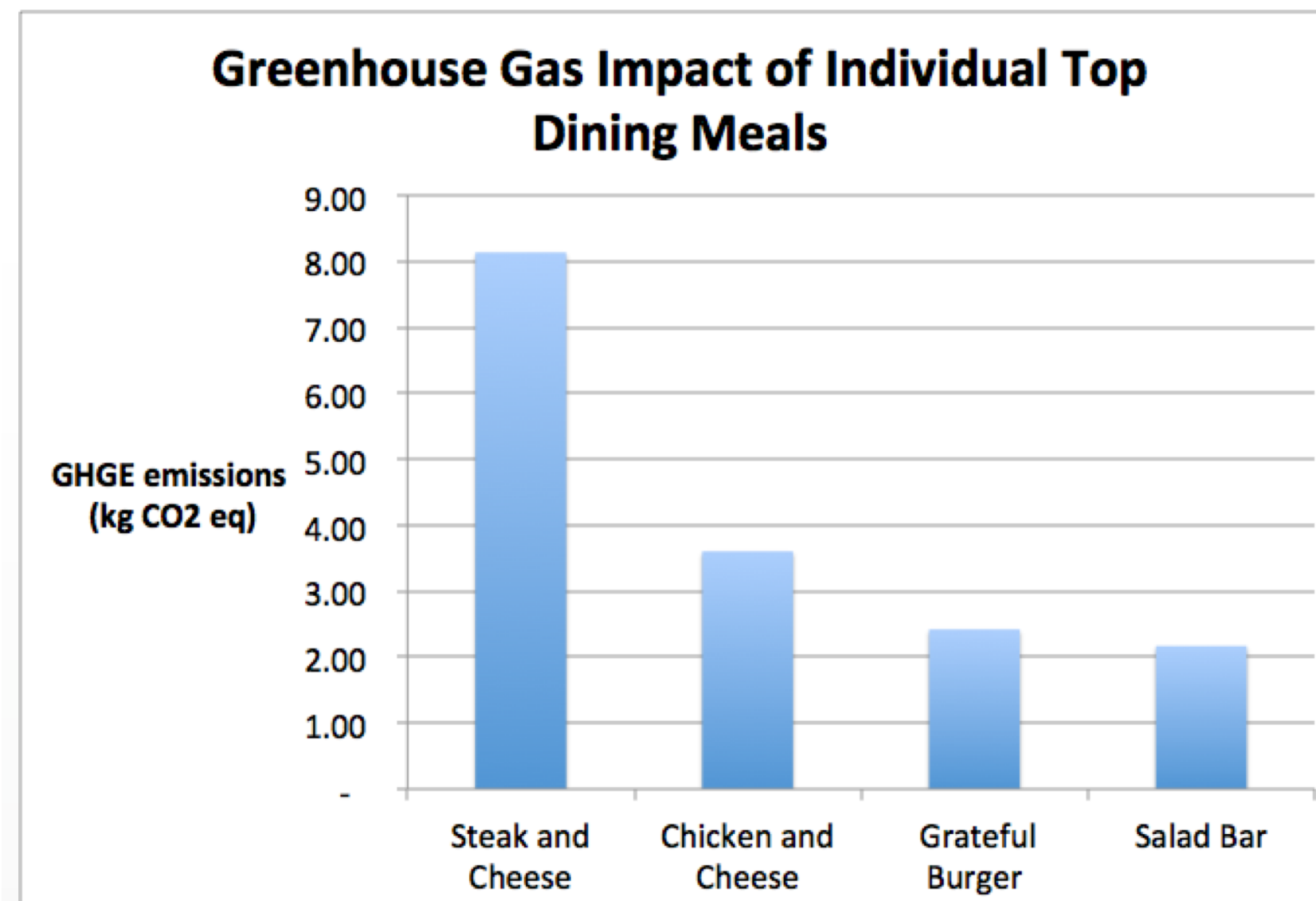


Figure 1: GHG emission equivalents comparison, kg CO₂ eq, of each individual top dining meal.

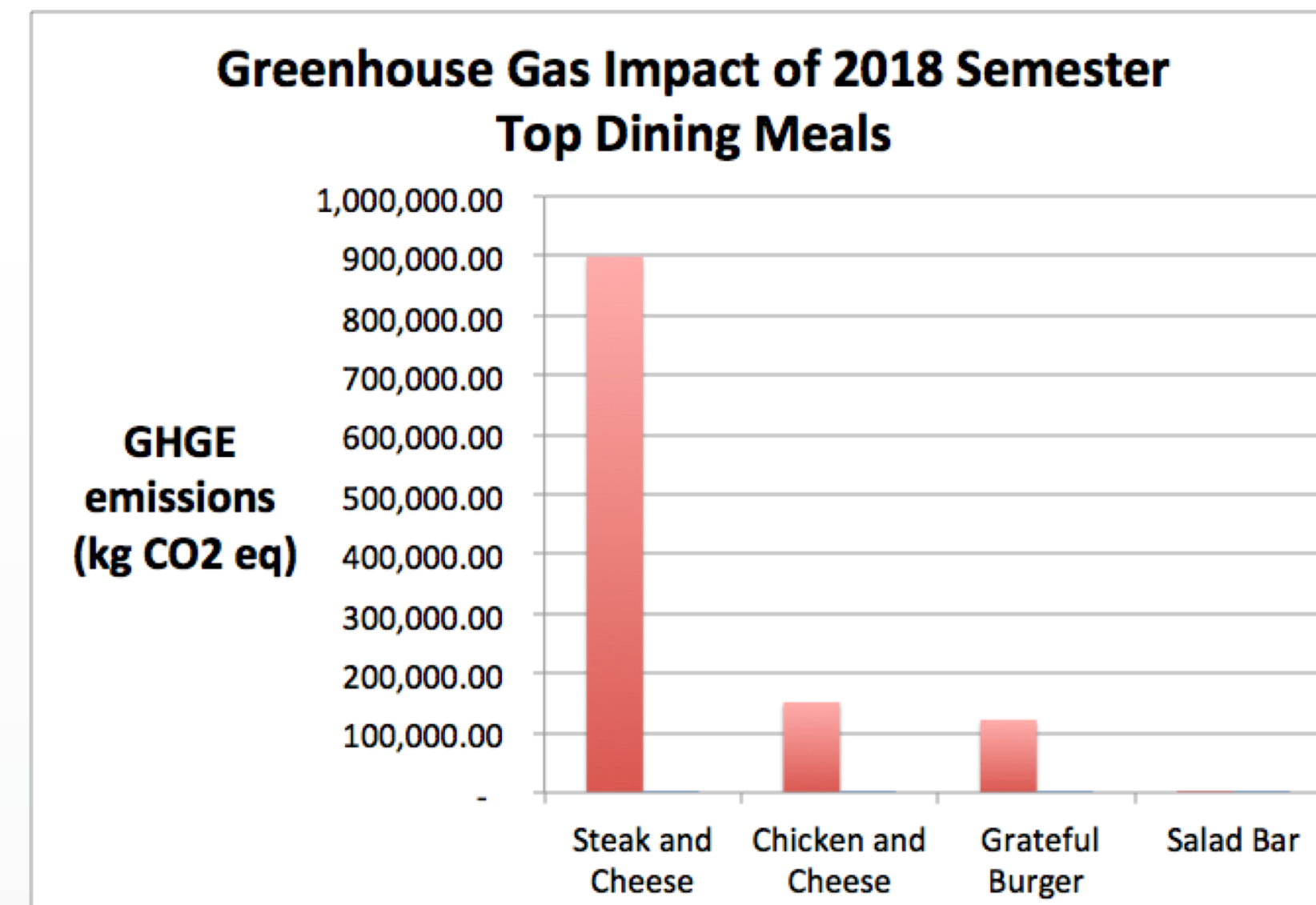
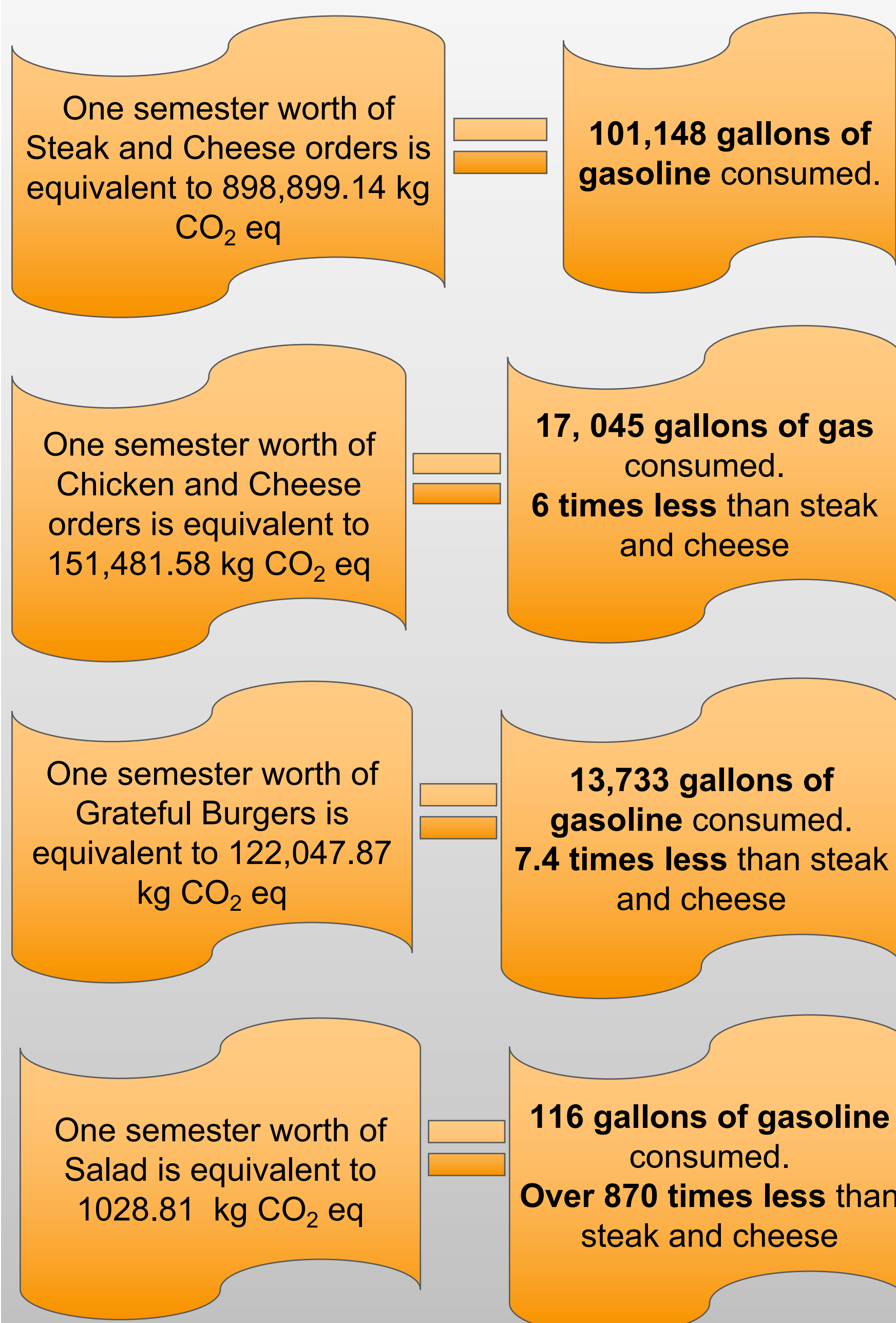


Figure 2: GHG emission equivalent comparison, kg CO₂ eq, of a semesters impact based on number of top dining meals eaten per week.



A semester's worth of top meals calculated to reflect equivalent CO₂ emissions from gallons of gas consumed using the GHG Equivalency calculator from the EPA^[5].

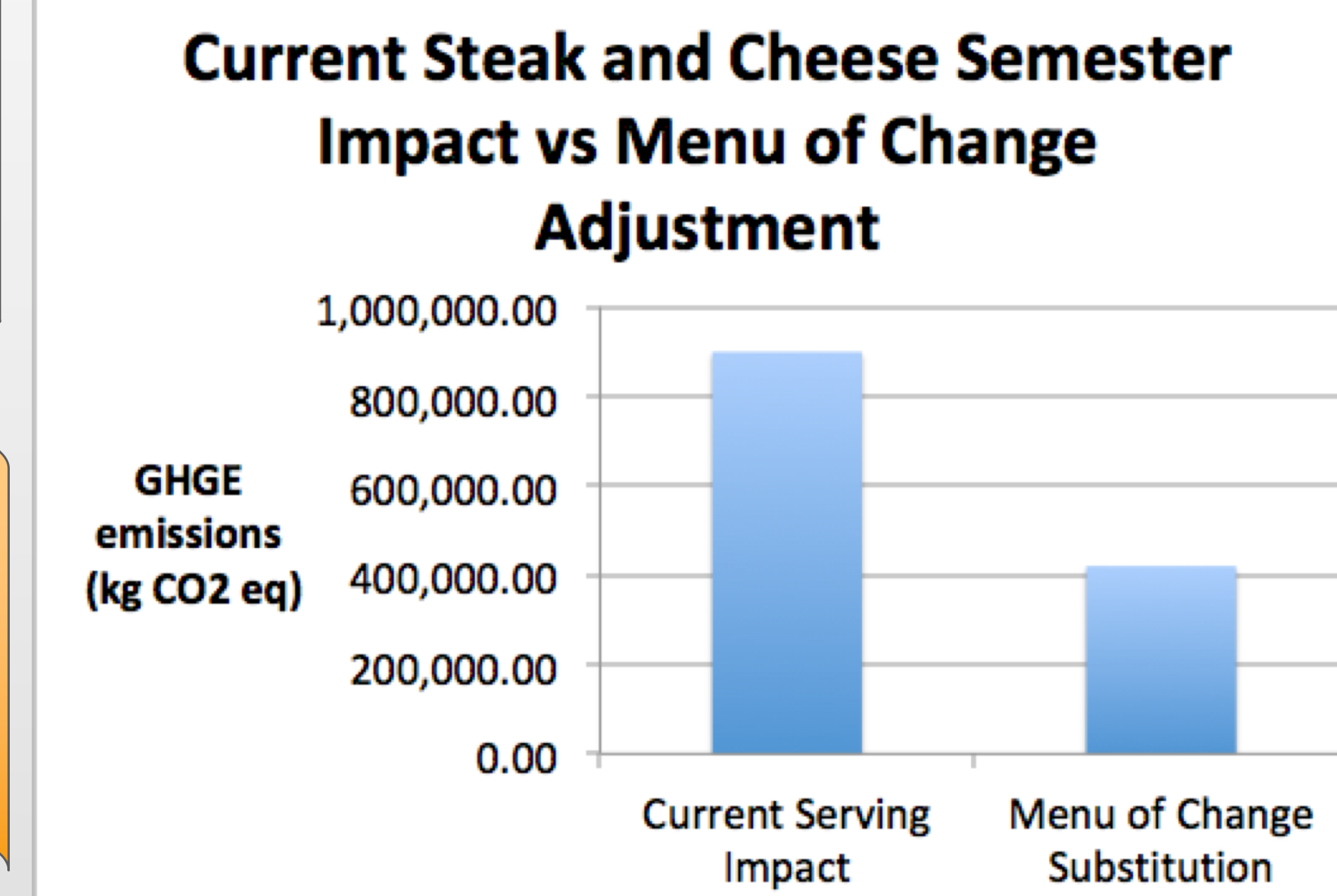
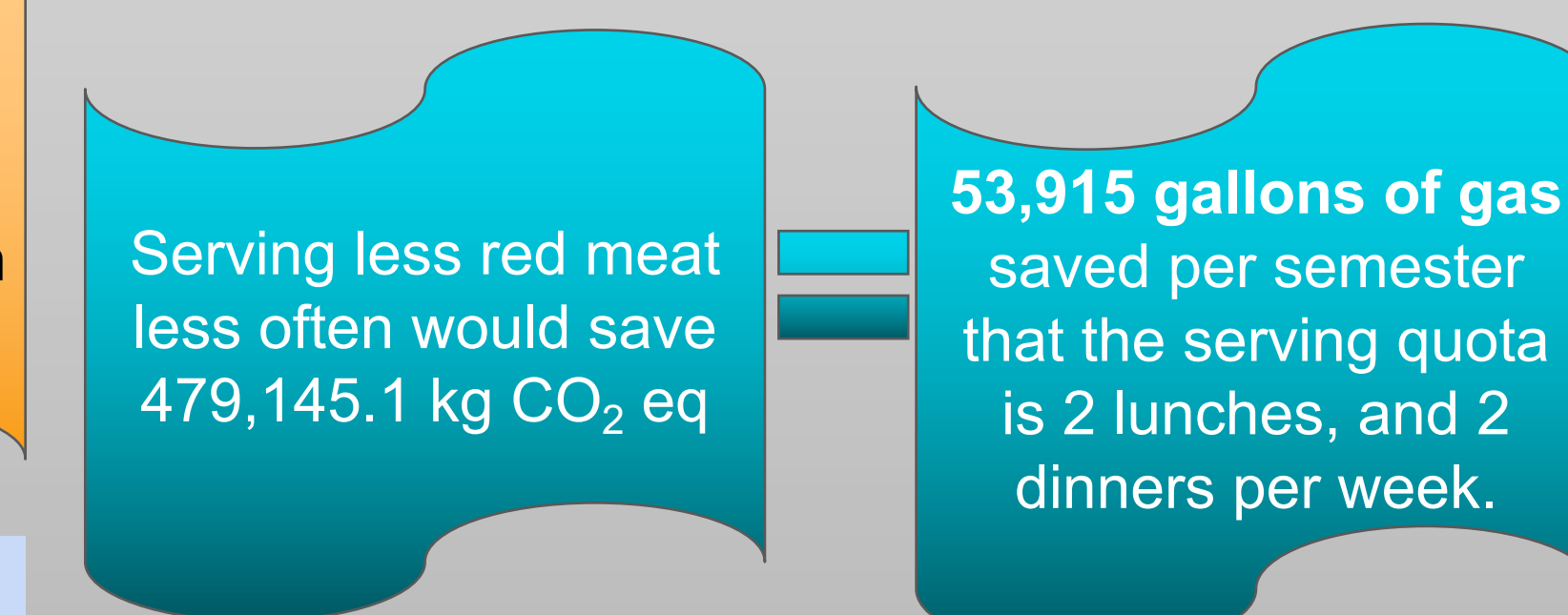


Figure 3: GHG emission equivalent comparison, kg CO₂ eq, of impact based on serving the steak and cheese 4 times a week per lunch and 4-5 times a week for dinner vs. 2 times per lunch, 2 times per dinner in alignment with Menus of Change principle: "Eat Less Red Meat, Less Often"^[4]



Discussion/Conclusions

- Steak and cheese has the highest contribution to GHGE emissions, with two times more than any of the other top meal options at Lower Dining Hall.
 - Individual steak and cheese emissions amount to 8.13 kgCO₂ per serving; two times greater than chicken and cheese, 3.6 kgCO₂; and 4 times greater than the grateful burger and the salad bar at 2.4 kgCO₂ and 2.17 kgCO₂ respectively (Figure 1).
- With Boston College's current menu schedule and student demand, the impact of steak and cheese sums to 900,000 kgCO₂ per semester, over five times of the grateful burger and chicken & cheese, and 870 times the salad bar (Figure 2).
- Switching the menu scheduling of steak and cheese to four times a week, 2 lunches and 2 dinners, per the Menus of Change Principle 10., instead of the current offering at nine times a week would decrease semester emissions by 480,000 kg CO₂ (Figure 3).
- For the purposes of making these GHGE equivalents accessible we used the EPA GHG emission calculator to portray these impacts as gallons of gas consumed. The Menus of change substitution in Fig. 3, would save the equivalent of 53,915 gallons of gas per semester^[5].

Recommendations

1. Students should consider decreasing the total consumption of high GHGE meals such as the steak and cheese, and choosing to enjoy the Grateful burger or Salad bar more often.
2. Boston College should implement Menus of Change Principles, including eat less red meat, less often to directly reduce the emission impact of meals such as the Steak and Cheese.
3. Additionally further research into recipes and their respective individual ingredient footprints should be analyzed for alternatives and strategies that have lower GHGE emissions, totalling to lower total meal impacts.

References & Acknowledgments

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In order of citation:

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