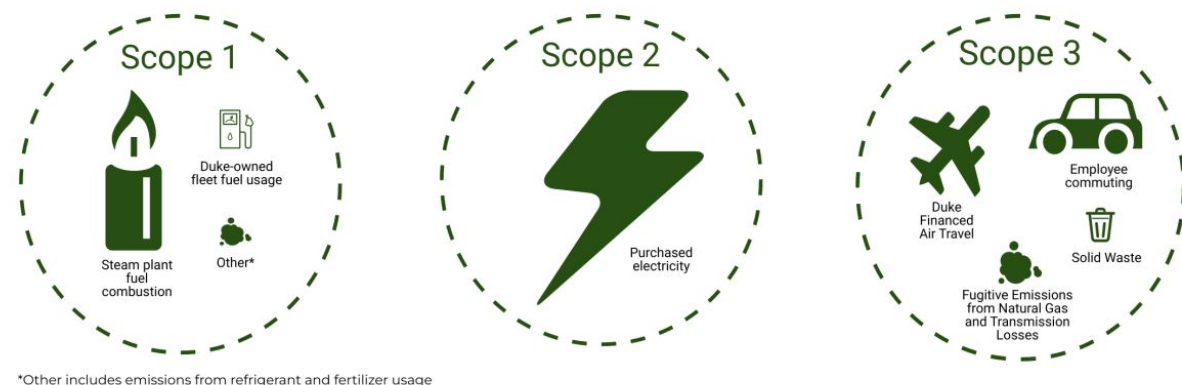


Motivation

- Food = ~25% of global greenhouse-gas (GHG) emissions
- Duke plans **carbon neutrality by 2024**, but does **not** address food

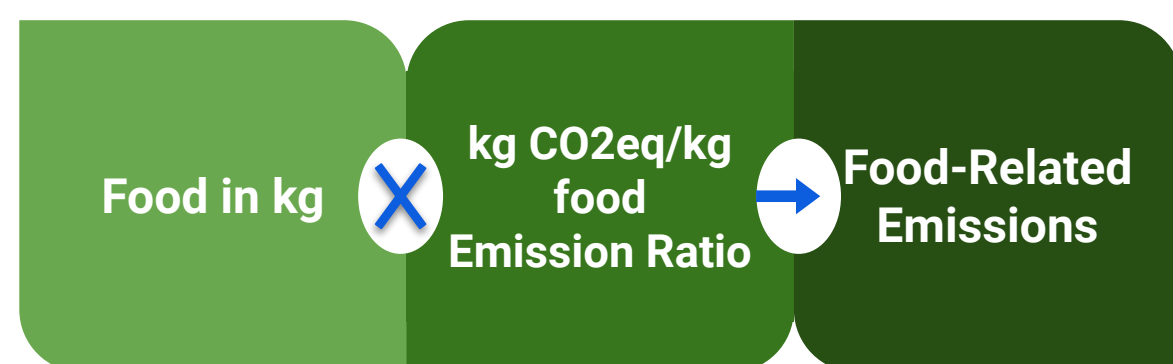


Data

- All purchases from 4 on-campus locations through the Fiscal Years 2019-2023
 - **Marketplace**
 - **Trinity Cafe**
 - **Freeman Center**
 - **Duke Marine Lab**

Methods

- Used **Life Cycle Analysis (LCA)** - all associated emissions from **production to waste** - to find **emission ratios** for each item
- Python code **categorizes** all foods and **standardizes** amounts to kg
- Then, apply corresponding GHG emissions ratio to respective food categories



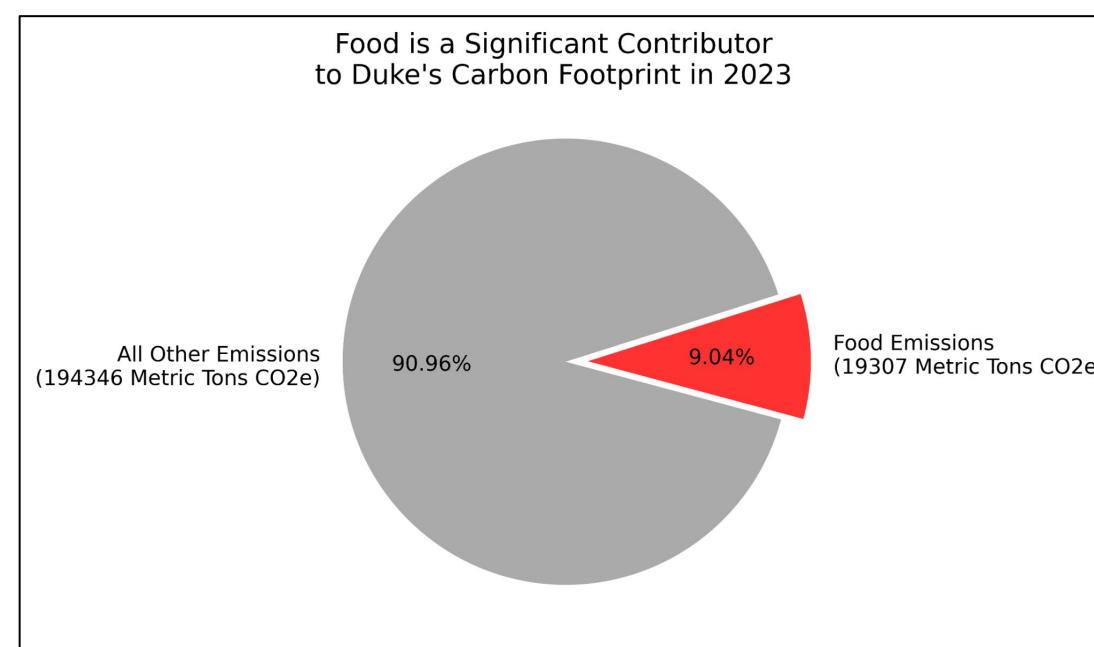
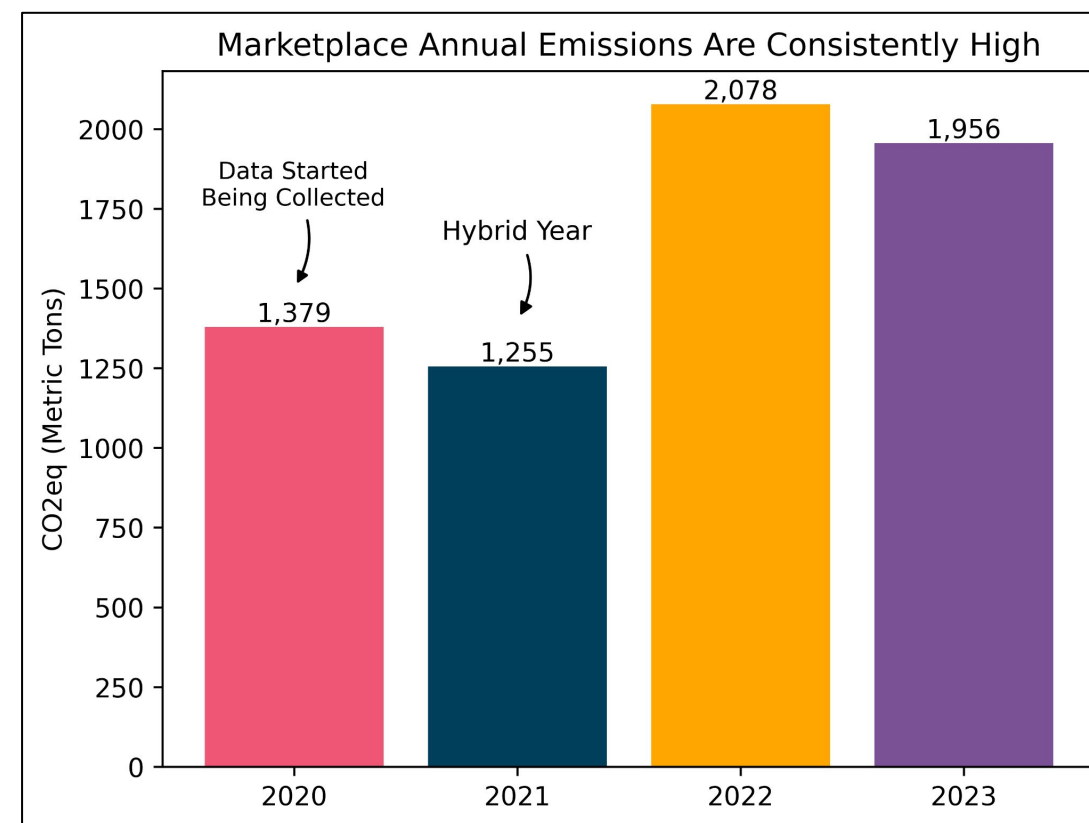
CO2eq = Carbon Dioxide equivalent emissions
= All GHG emissions converted to CO2

Results

CO2eq measured in **Metric Tons (MT)**

1MT = drive from **LA to NYC (~2400 mi)**

3MT = **1 transatlantic round-trip flight**

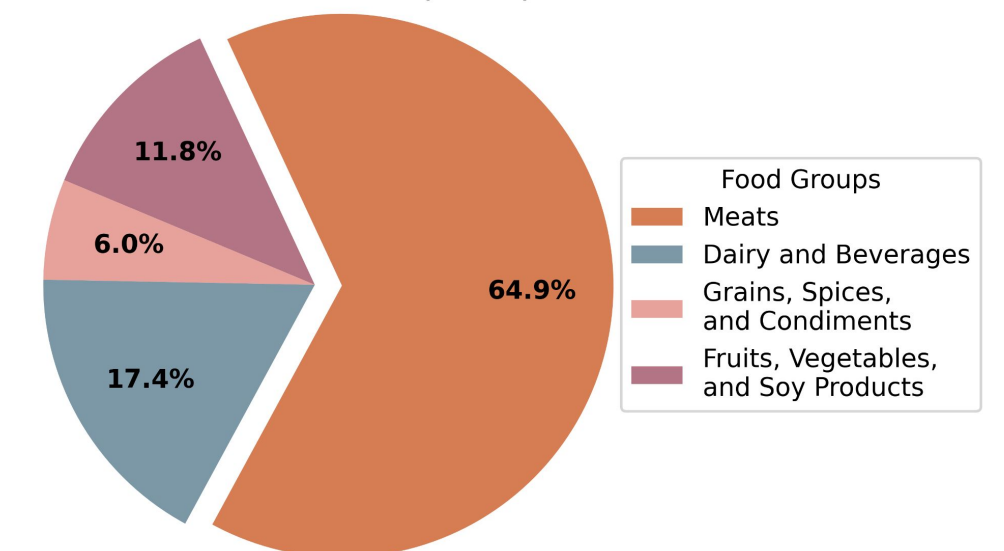


If **6883** undergrads eat on average **2kg food/day**, then using an average of values below = **3.84kg CO2eq/kg food** gives **~40 Metric Tons/day** = **19307 MT/yr** = **~9.04% of Duke Emissions**

No non-undergrads are not included in this estimation, so this is ultimately an **underestimate**

Location	Avg. kg CO2eq/kg of food
Marketplace	4.78
Duke Marine Lab	4.64
Trinity Cafe	1.31
Freeman Center	4.63

Meat is Duke's Largest Source of Food Emissions (FY23)



Meats (especially **beef**) are a **large majority** of all food-related emissions due to high emission ratios.

Cutting down on meat consumption will cause the most impact for cutting emissions.

Conclusion

To reiterate, food is a **significant contributor** to Duke's total carbon emissions, and is not a part of Duke's sustainability framework.

Other universities have already begun **addressing food-related** carbon emissions -

- Shifting towards **plant-based diets**
- Sourcing food **locally**
- Shifting towards **seafood and poultry**

Analysis of food-related emissions on campus can influence future **environmentally-friendly policies and initiatives** through Duke Dining

References

- Bridle, S. L. (2020). Food and Climate Change without the hot air. Bloomsbury Publishing.
- Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. *Science*, 360(6392), 987–992. <https://doi.org/10.1126/science.aag0216>
- Duke, Office of Sustainable. "GHG Emissions | Office of Sustainable Duke." [Sustainability.duke.edu](https://sustainability.duke.edu), sustainability.duke.edu/operations/ghg-emissions/. Accessed 28 July 2023.