

W Quantifying Milk Waste



Project Overview

Problem:

Starbucks does not have a system in place to measure ingredient waste.

Goal:

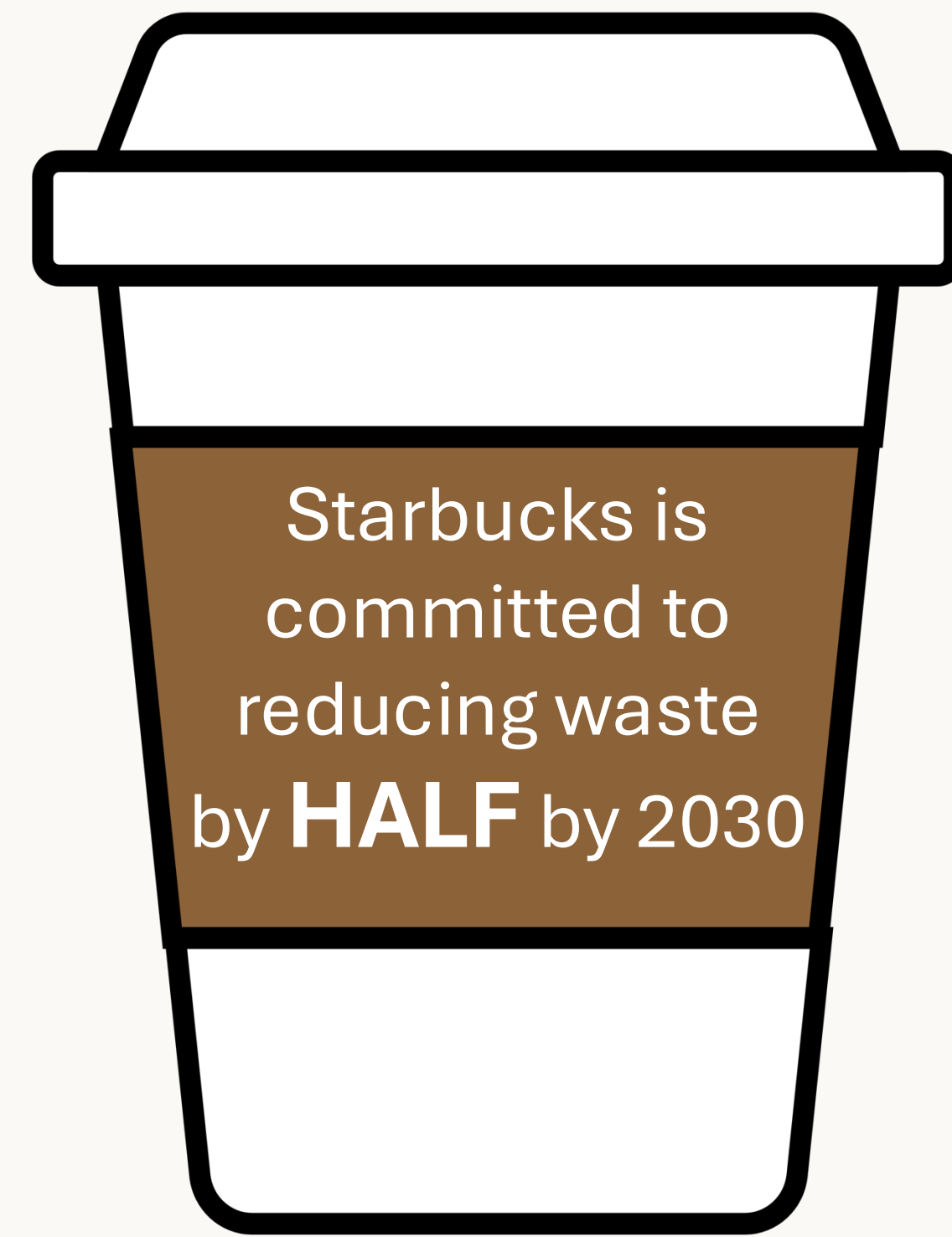
Develop a data-driven model to track and quantify ingredient waste to generate actionable insights for Starbucks.

Scope:

Store: 4147 University Way Avenue

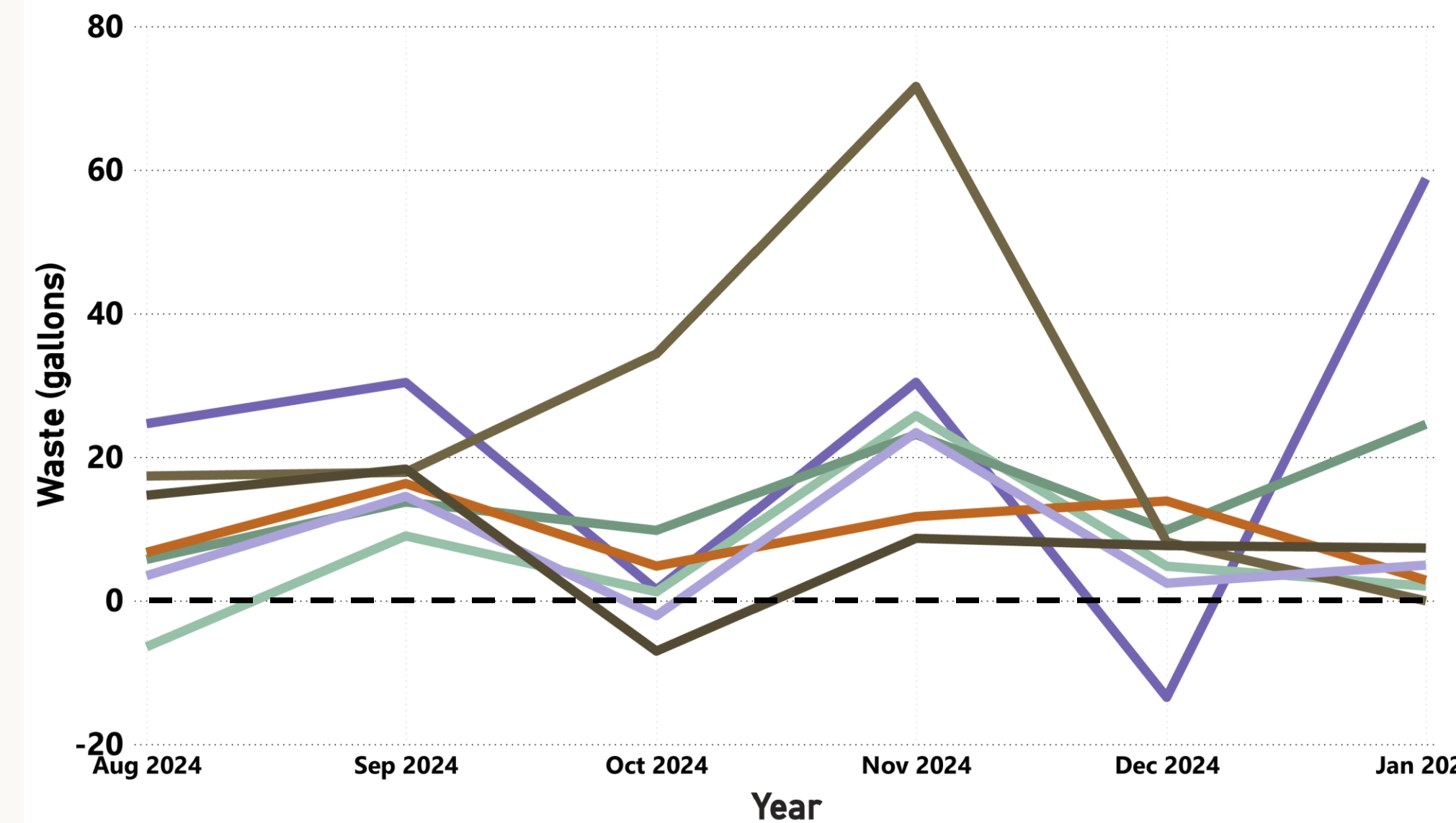
Time Frame: August 2024 - January 2025

Ingredient: Milk



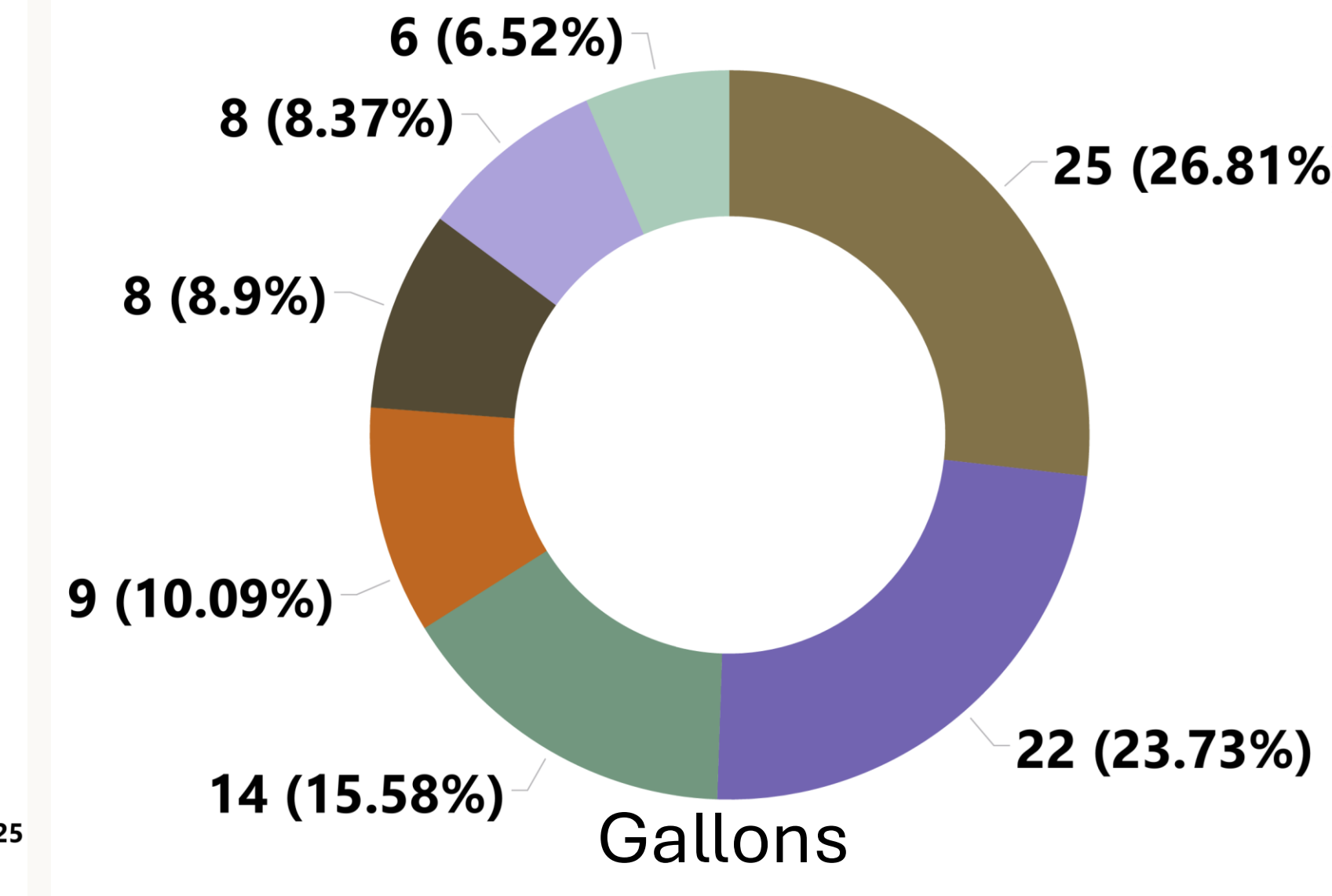
Analysis

Milk Waste by Month



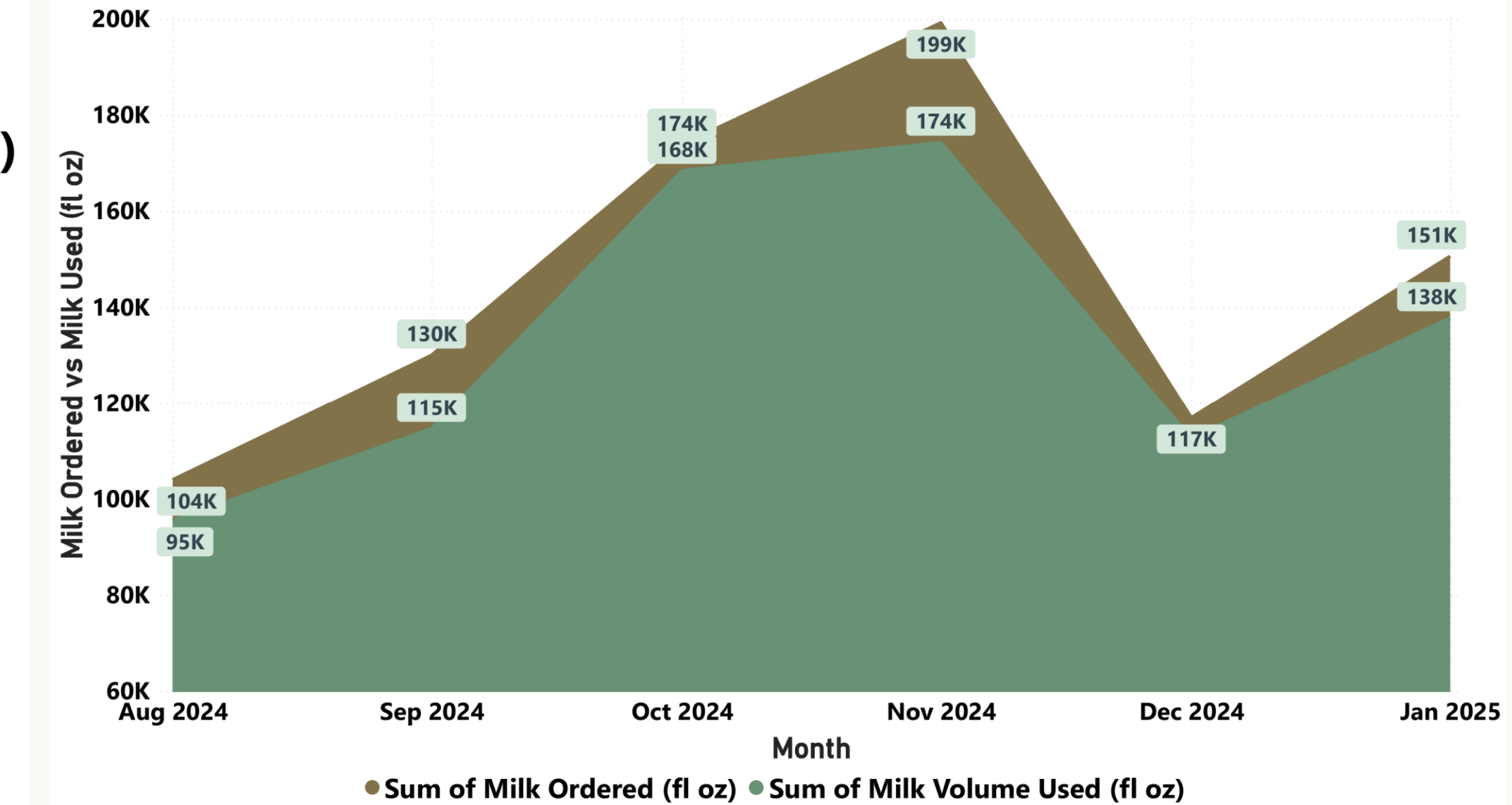
Over the 6-month period, milk waste was **greatest** in **November**

Average Monthly Waste



2% milk & oat milk are the largest sources of waste on average

Milk Ordered vs Milk Used



Milk waste across all types **increases** throughout the **Autumn** of 2024

Milk Type ● Oat ● 2 percent ● Coconut ● Non-Fat ● Whole ● Soy ● Almond

Quantification Model

The model is valid for other Starbucks locations & time periods

Input



Data from SQL

- 1 Milk order data
- 2 Sales data

Output

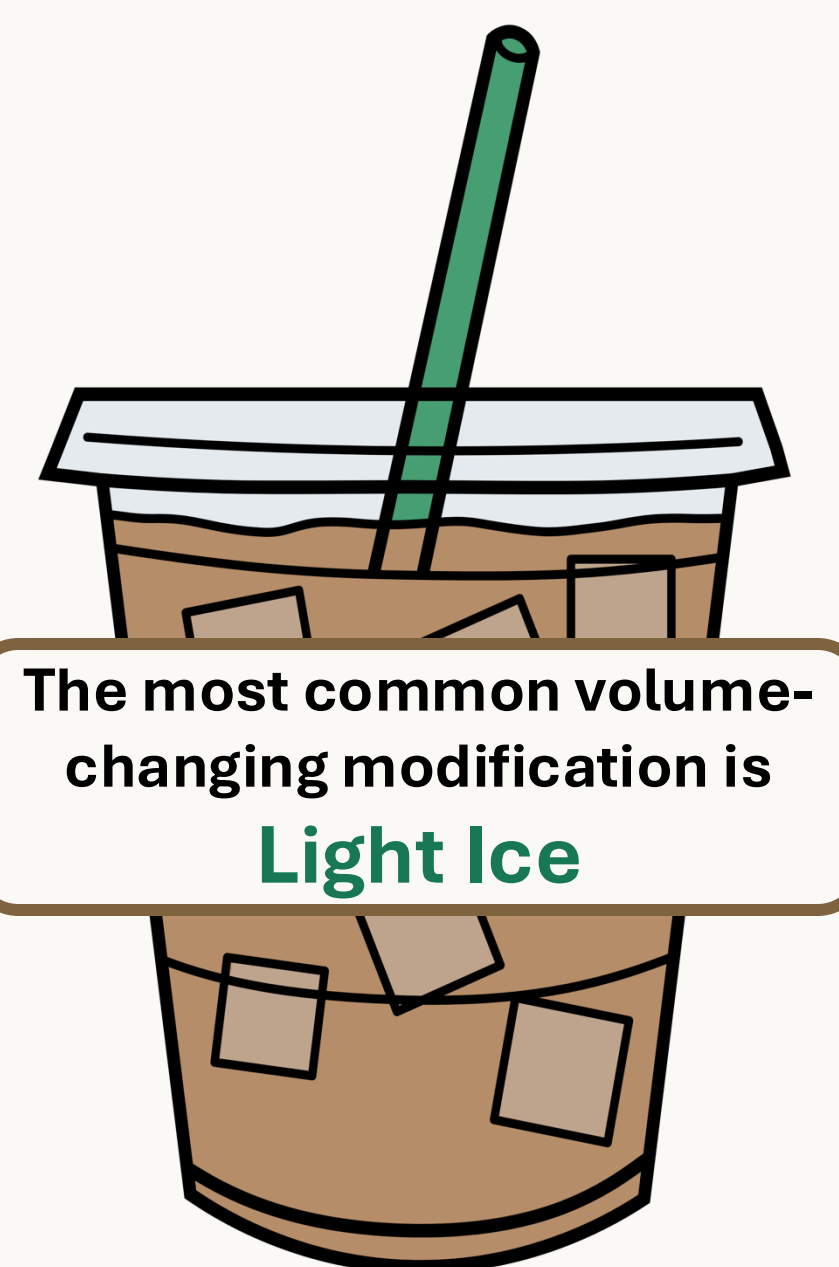
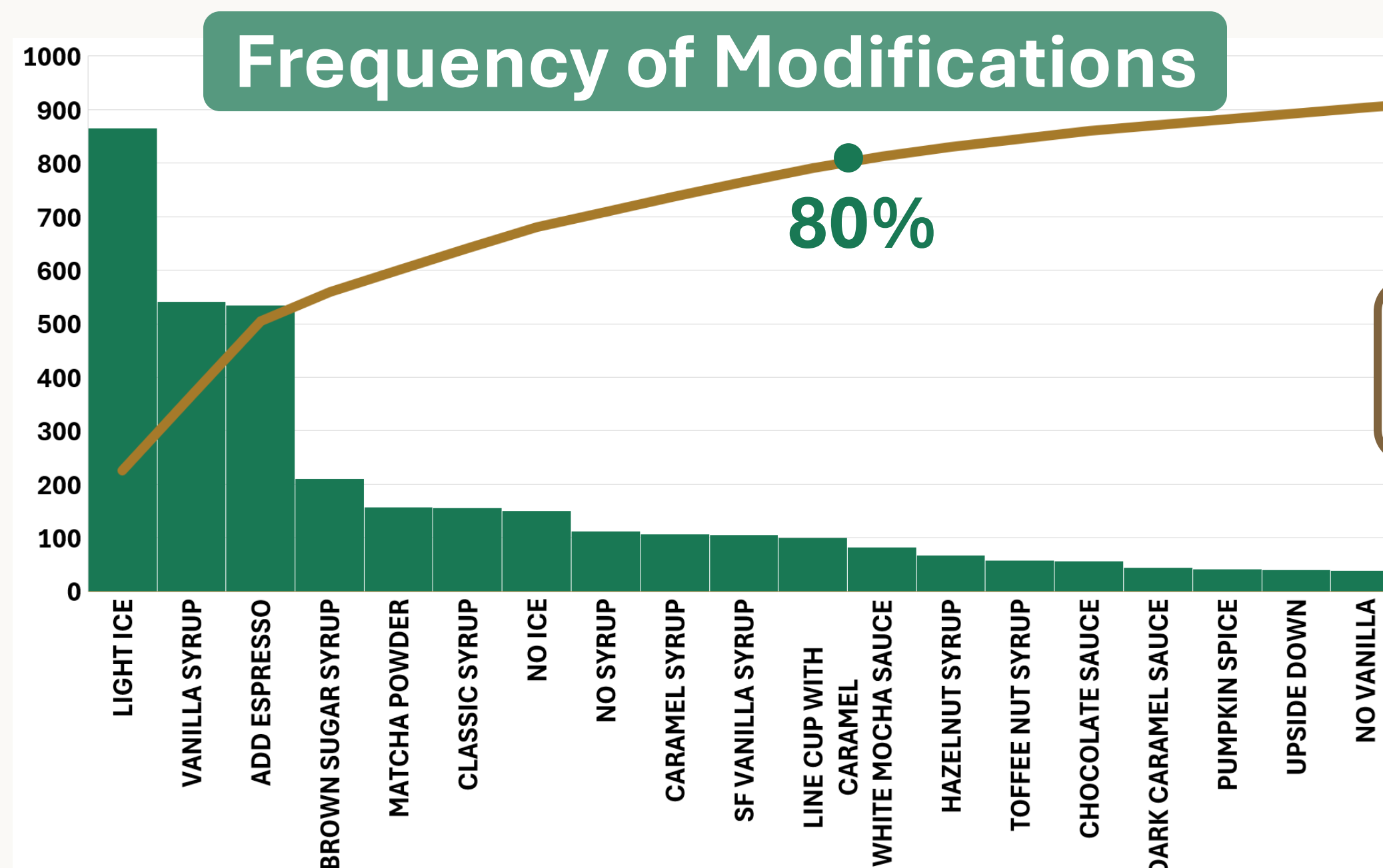


Excel Model & Macro

- 1 Calculates volume of **milk ordered**
- 2 Calculates volume of **milk used**
- 3 Calculates volume of **milk waste** by finding the difference

PowerBI Dashboard

- 1 Trend identification
- 2 Filters for milk type & date range



Validation

3 trials for each group:

Group 1: Ingredient volumes

Group 2: Milk volume used in a 15-beverage sample

Group 3: Milk volume change from ice modifications

Post experiment:

Milk volume measurements were updated in the model, replacing previous placeholder measurements

Milk waste quantified for a 15-beverage sample:



Excel Model

vs



Tryer Center Experiment

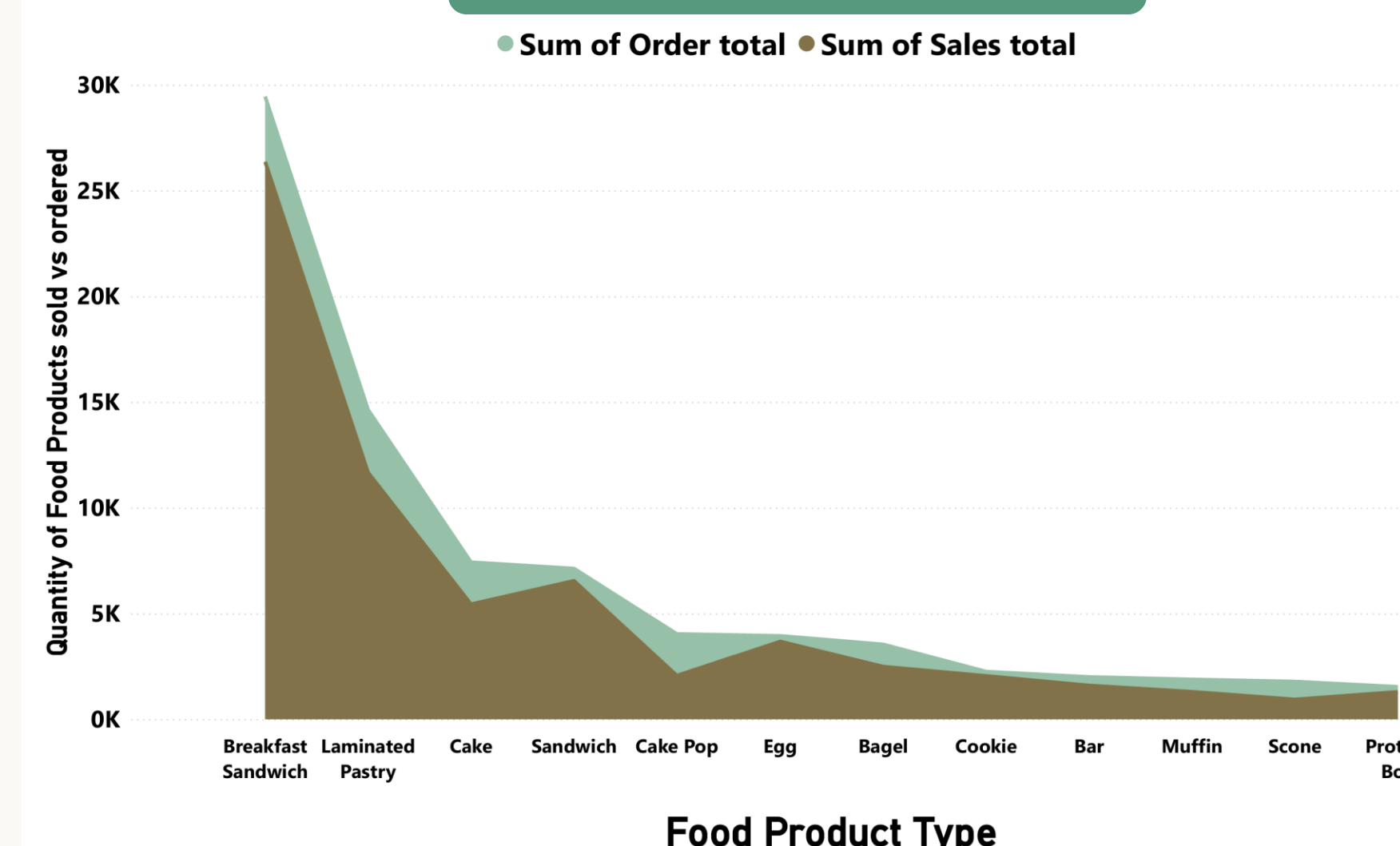
Model overestimates waste by **5.1%**

Recommendations

Future steps:

- 1 Expand the model to quantify waste for **food and other ingredients** such as syrups.
- 2 Use findings from the model to analyze and **reduce waste**

Food Waste



Breakfast sandwiches are the largest source of food waste



Impact

Over the 6-month period for 1 Starbucks store:

550 Gallons of milk waste → **\$2000**

12 bathtubs X 12

Over 6 months & ~11,000 stores nationwide:

6 million Gallons of milk waste → **\$22 million**

9 Olympic sized swimming pools X 9

Thank you to our project mentors, Ben Bourlier and Eric Zagorski, and our faculty advisor, Patty Buchanan, for all the help and support!