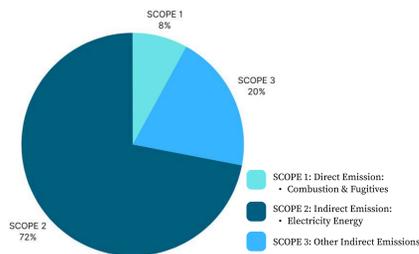


Solid Waste Management and Its Effect on Carbon Footprint in an Industrial Paper Packaging Organization

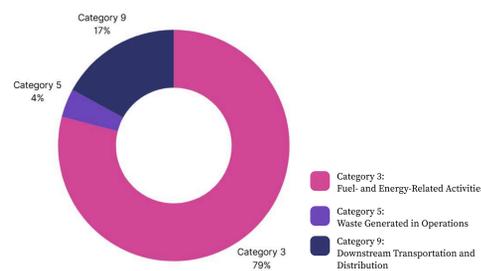
Introduction

Carbon footprint reduction has become a key concern in the industrial sector, particularly in manufacturing. This study focuses on a paper packaging manufacturer, implementing a pilot project to evaluate the impact of general solid waste management on greenhouse gas emissions reduction. Unlike other waste types that undergo treatment or recycling, general waste is disposed of in landfills, where it contributes directly to emissions. By optimizing waste segregation and disposal processes, this initiative can be executed immediately without delays, directly supporting the company's target of a 54.6% reduction in emissions from the 2017 baseline year.

Carbon Dioxide Equivalent Emission of The Organization



Carbon Dioxide Equivalent Emission of Scope 3

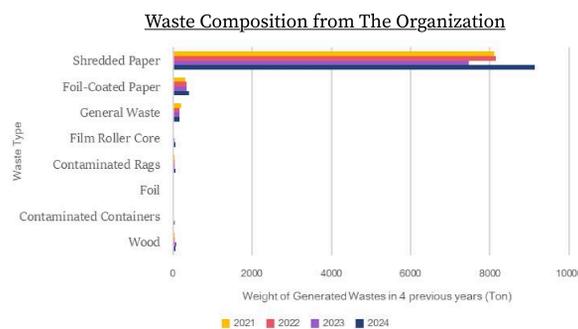


Result

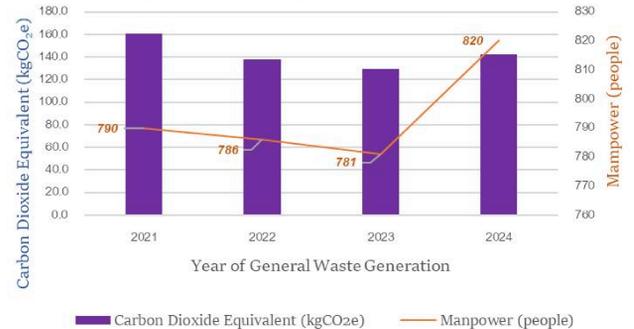
All the solid wastes generation composition in year 2021 to 2024, top 3 generated waste component were challenging to control due to customers driving logistics choices, and sent to recycling treatments, therefore the general waste can contribute the greenhouse gases reduction.

A significant amount of organic/food waste was observed as the highest daily waste stream at 55.2% in average from all components per month. To improve segregation, green bins were introduced for food waste disposal, following the Pollution Control Department (PCD) guidelines where:

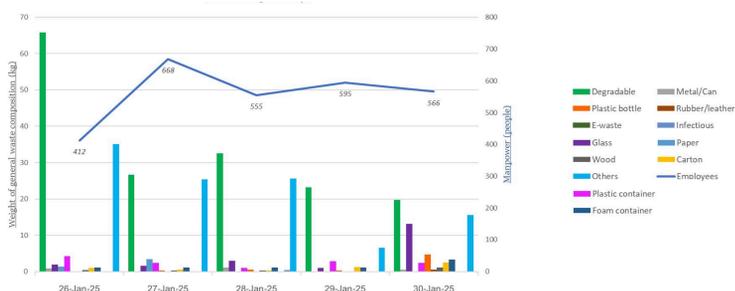
- ✓ Green bins → Organic waste
- ✓ Blue bins → General waste



The carbon dioxide equivalent emission of general waste in 4 previous years align with manpower number



The Relationship of Manpower with Generated Amount of General Waste from Non-production Plants Where They Generate Organic Waste During Workdays



However, blue bins were previously used for foil-coated paper disposal, which could cause confusion. To still align with PCD standards, foil-coated paper bins were changed to pink, ensuring a clear and effective waste management system, including signage improvement.



The waste bins intervention strategy has also been implemented through employee training sessions, daily morning talks, and organized an awareness campaign. These initiatives aim to improve waste segregation practices and encourage active participation in responsible waste disposal, fostering a more sustainable workplace. The project is still onboarding to be collected and observed the result in one month after the intervention, February first was the starting date through December 2025.

Conclusion

The implementation of structured waste management interventions, including waste bins optimization, employees training, and the awareness campaign, is expected to result in a significant reduction in general waste generation and associated carbon dioxide equivalent (CO₂e) emissions.

By enhancing waste segregation through the separation of organic waste, the organization aims to minimize landfill contributions and lower Scope 3 emissions. Based on 2024 data as a baseline, a 27.5% reduction in general waste is expected from February to December 2025, with a maximum of 27.6%, from 55% in usual, of organic waste found from general waste through improved segregation efforts. This will contribute to a measurable decrease in greenhouse gas (GHG) emissions, aligning with the company's sustainability goals. Additionally, enhanced organic waste management will prevent unnecessary landfill disposal, further to mitigating the environmental impact.

These findings highlight the potential of immediate waste management strategies in supporting and improving long-term carbon footprint reduction within the industrial paper packaging sector.

Carbon Dioxide Equivalent Amount Generated from 4 Previous Years and Trend Projection for Year 2025

