



Intelligent Waste Bins to Reduce Food Waste in Differdange: a data-driven approach

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INTRODUCTION



According to the 2024 [Food Waste Index Report \(UNE\)](#), Luxembourg ranks 4th among EU-27 countries in food waste generation per capita, following Portugal, Malta, and Greece. On average, 120 kg of food is wasted per resident per year across restaurants, shops, canteens, and households. This significant level of waste presents both an environmental and social challenge, especially considering the associated greenhouse gas emissions and the missed opportunity to redistribute edible food.

In response, the [city of Differdange](#) (Luxembourg) has taken proactive steps by launching an innovative [pilot project](#) aimed at [reducing food waste in public catering services](#). The project involves the use of AI-powered intelligent waste bins to monitor and reduce food waste in a public kitchen. These smart bins automatically weigh the waste, identify food categories, and provide real-time data that helps kitchen staff and decision-makers understand waste patterns and adjust meal planning and purchasing accordingly.

United Nations Environment Programme (2024). Food Waste Index Report 2024. Nairobi.

ORBISK SMART BINS

Two [Orbisk smart bins](#) were installed in a public kitchen managed by Servior, public establishment responsible for housing for seniors in Luxembourg, tracking kitchen and plate waste over **20 weeks** (October 2024 – March 2025).

A direct service model is used where staff plate, serve meals and collect leftovers from residents.

The AI-driven system analyzed: waste composition, frequency, and weight, collecting data on [total waste volume](#), [financial costs](#), and [CO₂ emissions](#) to provide actionable insights for operational improvements.



This figure shows [Orbisk AI scans waste composition](#).

CONCLUSION: The use of AI-powered waste bins has proven effective in [reducing food waste](#), financial losses, and environmental impact. This project highlights the [scalability and replicability of smart waste management solutions](#), offering a data-driven approach to sustainable food systems and supporting Differdange's climate action strategy.

RESULTS

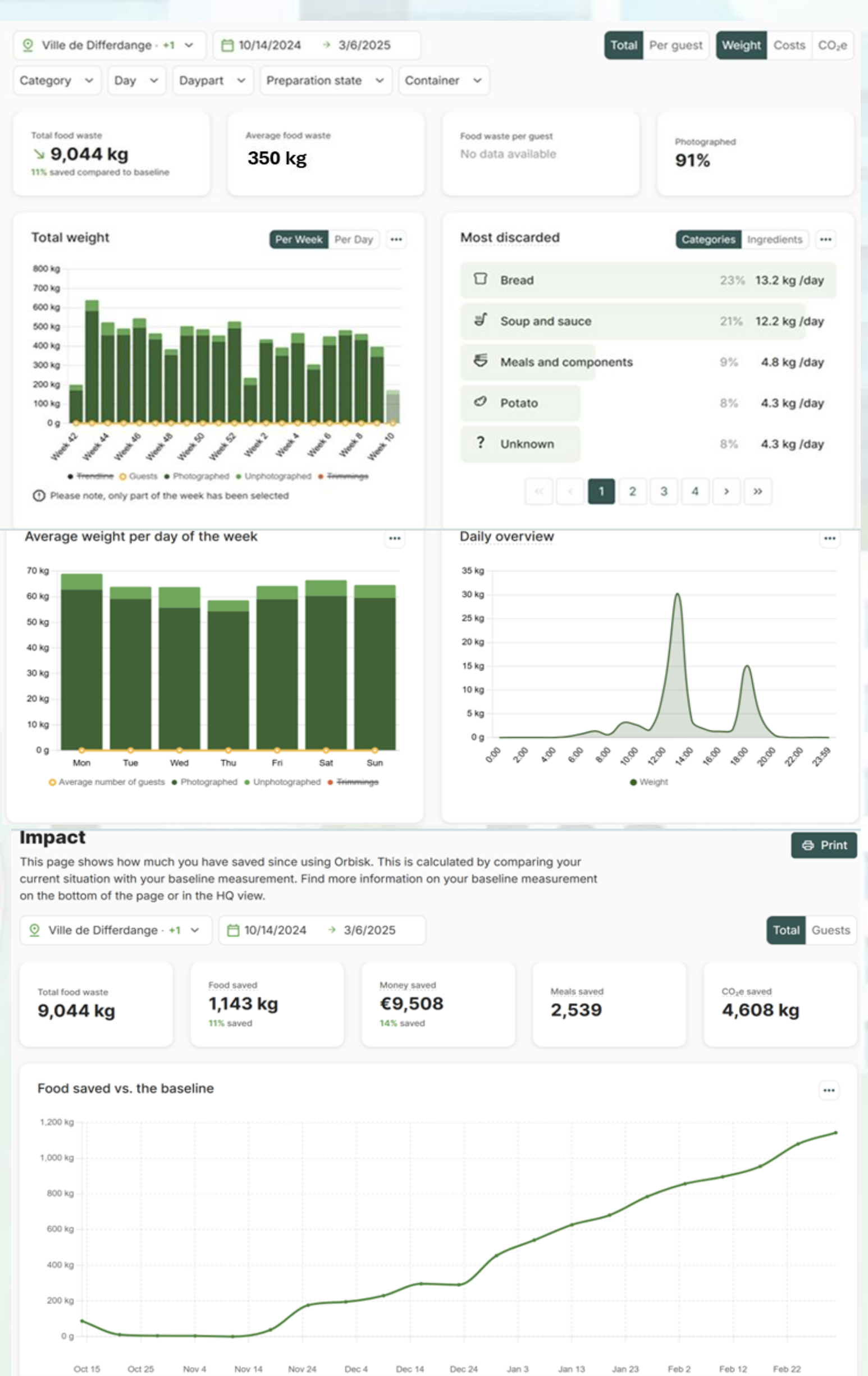
During the 20 weeks of monitoring, **total food waste** was 9 T (11% reduction from baseline), equivalent to almost 60,000 € of cost and 27.000 kg of CO₂ emissions.

On average, **food waste discarded per week** was 350 kg, decreasing by 31% in 20 weeks and resulting in a 33% cost reduction and a 29% drop in CO₂ emissions.

Mondays showed the highest waste levels, with [bread](#), [soups and sauces](#), being the most discarded categories while snacks and drinks were the least wasted.

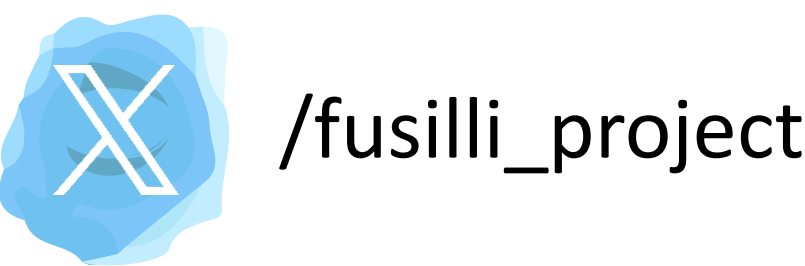
Over five months, **the project saved over 1 T of food**, equivalent to 2,539 meals, translating into estimated savings of 9,508 € and 4,608 kg of CO₂ emissions.

The implementation of AI-powered smart bins in elderly care homes in Differdange has proven to be an [effective tool for reducing food waste](#) and improving kitchen operations. The system has already enabled staff to make informed decisions—such as adjusting bread purchases and modifying menus based on residents' preferences—resulting in measurable environmental and economic benefits.



ACKNOWLEDGMENT

This initiative was co-developed with the [Differdange Food Council](#) and supported by the EU-funded [FUSILLI Project](#) and the [NetZeroCities](#) initiative. It forms part of the city's broader strategy to transition towards more sustainable food systems and contribute to its ambitious goal of achieving climate neutrality by 2030.



www.fusilli-project.eu



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