

Circular plastic value chains

Business case:

Design for circularity of food-contact plastic packaging Israel

Challenge

Plastic packaging plays a crucial role in our daily lives, efficiently preserving its contents while engaging consumers. However, the growing issue of plastic waste presents a challenge. The OECD states that global plastic waste production has doubled over the last two decades. Despite the recyclability of materials like Polypropylene (PP) and Polyethylene terephthalate (PET), only a fraction of the plastic packaging on the market gets recycled.

The Government of Israel has set a goal to achieve a 70% recycling rate for packaging waste by 2030. Other governments, including the EU with the Packaging and Packaging Waste Directive, are following a similar path. In response, global brands are now setting ambitious targets to introduce fully recyclable packaging on the market. This shift is also driven by changed consumer preferences towards more sustainable products, resulting in a global increase in the demand for recycled plastic resins.

The scope of the pilot project

In Israel, about 150 million “sleeved cups” are manufactured annually. If the sleeve and cup are not made of the same material, the packaging is misclassified as non-recyclable waste in the automatic sorting lines and, if not corrected during the manual sorting process. Designing for sortability is critical for creating efficient and sustainable packaging solutions.

Since 2019, the United Nations Industrial Development Organization (UNIDO) has, within the regional EU-funded SwitchMed Programme, explored ways to enhance circularity in Israel’s plastic value chain. UNIDO and industry associations, government institutions, and expert organizations engaged local stakeholders to demonstrate a business model for improving plastic packaging applications.

As part of this initiative, a pilot project was undertaken to increase the recyclability of existing plastic packaging by changing its design. The Sustainable Packaging Guide by the Israeli Manufacturer Association and the UNIDO “SwitchMed Sustainable Packaging Tool” were utilized to demonstrate international best practices for a set of products.

The re-design of packaging needs to match the specific technical parameters and limitations of existing waste sorting facilities in the country. Therefore, the participation of the Israeli Producer Responsibility Organization (TMIR) was crucial to the pilot’s success.

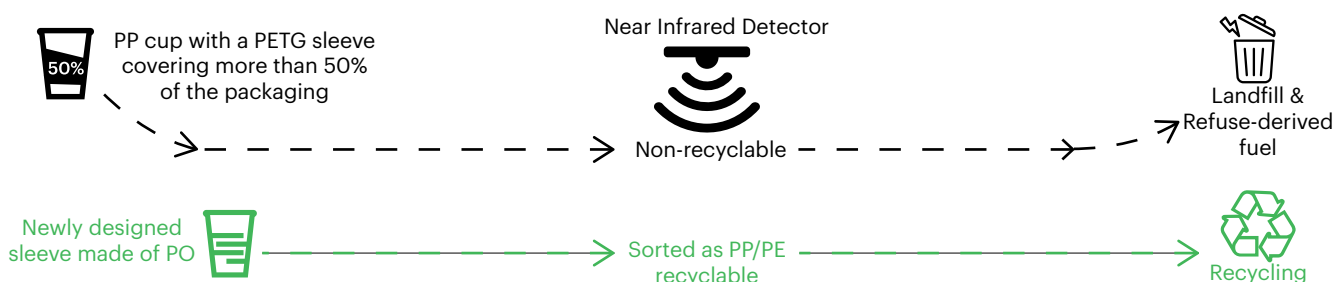
Two major Israeli food and beverage companies, the Strauss-group and Osem-Nestlé were chosen to participate in the pilot project and work was conducted with them to re-design the packaging (yogurt and salad) of two of their flagship products.

The pilot project and solution

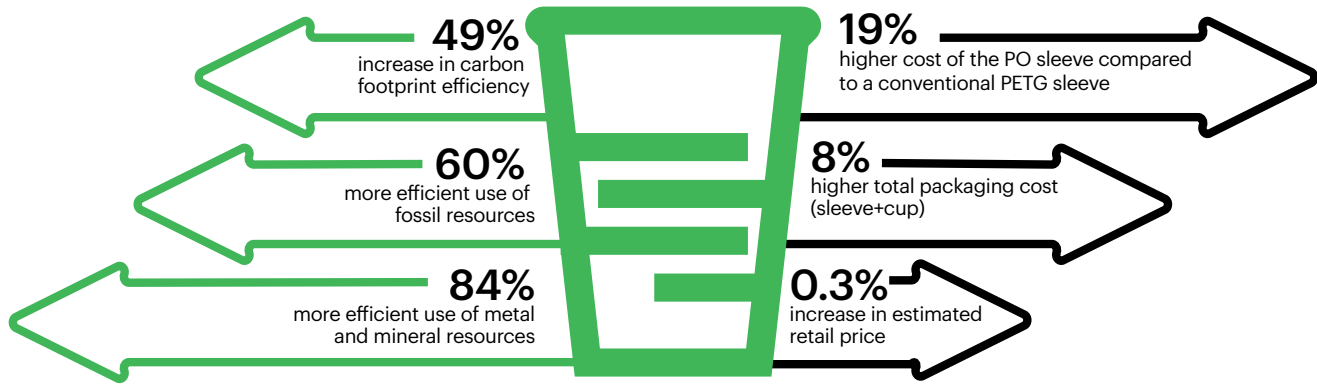
The packaging for the two selected products consists of a PP cup and a Polyethylene Terephthalate Glycol (PETG) sleeve. While PP and PETG are fully recyclable separately, this is no longer the case when combined. Due to the fact that the PETG sleeve covers a large portion of the cup, the infrared sensor (NIR) at the sorting station diverts the product to the non-recyclable stream. Different alternatives were examined, and the selected approach was to change the sleeve material to Polyolefin (PO) so that the entire packaging (sleeve + cup) could easily be identified by the NIR and diverted to the appropriate recycling stream.

During the pilot project, the identified solution was demonstrated to be effective in every stage of the value chain, from packaging manufacturing and sleeving to sorting and recycling. Several value chain actors, including Tadbik (sleeve manufacturer), Madaf Plazit (cups producer and sleeving operator), Osem and Strauss (consumer product manufacturer), demonstrated a strong collaboration and active engagement to perform quality assurance tests to validate the solution’s applicability at every step. These tests covered sleeve manufacturing, sleeving processes, and filling tests, ensuring the consistency and reliability of the re-designed packaging throughout the manufacturing and filling stages.

The newly designed packaging also underwent testing at the TMIR sorting plant. A test plan was carried out on 100 samples, and the new packaging was easily identified and sorted for recycling with a 100% identification rate. The sorting test provided a high level of confidence that the re-designed package is fully compatible with the existing sorting infrastructure, ensuring smooth and seamless integration into the waste sorting process.



Packaging with a PO sleeve compared to a conventional PETG sleeve



Graphic: UNIDO

The results and key takeaways

The life-cycle assessment revealed that the re-designed package is significantly more sustainable. Specifically, when accounting for raw material extraction, production, use, and end-of-life treatment, the re-designed packaging had a 49% lower carbon footprint, 60% lower fossil resource use, and 84% lower minerals and metals resource use compared to the original packaging using a PETG sleeve that was incinerated.

The economic analysis revealed that even if the cost of the PO sleeve compared to conventional PETG sleeve is 19% higher, the cost increase of the total re-designed packaging (cup + sleeve) is only 8%, while the impact on retail price estimate of the entire product is less than 0.3%. This cost difference can be absorbed by brands as the recyclability of the packaging will increase their brand reputation or by the final consumer willing to pay a premium for more sustainable products.

In addition, re-designing the packaging will generate economic benefits for other value chain actors such as TMIR. For instance, instead of paying a fee of 7.5€ per ton of unsorted plastic waste for the landfill of non-recyclable packaging, TMIR can generate an estimated revenue of 250€ per ton of plastic waste sold to recyclers.

Replication initiatives within the pilot project

Building upon the success of the pilot demonstration, one of the two participating brands has conducted additional tests to use PO sleeves in packaging in other food product lines, such as cooking sauces and ketchup bottles.

Following the experience of Osem-Nestlé and Strauss, CBC (Central Bottling Company, official bottler by the Coca Cola Company) decided to replicate the experience by introducing a PO sleeve on a PP cup of one of their flagship dairy products in Israel. Moreover, the company received technical assistance within the SwitchMed project to re-design PET orange juice bottles, categorized at the sorting stage as lower-grade PET due to their colour coating and, therefore, cannot be recycled in Israel. Modifying the sleeve in terms of material and colours allowed the PET bottles to be correctly separated and identified as “transparent PET” at the sorting station. These PET bottles can then be recycled in Israel for Bottle-to-Bottle applications.

Upscaling recommendations

The pilot project demonstrated the feasibility of transforming non-sortable and non-recyclable packaging into sortable, recyclable packaging and pioneered a solution that can be applied to a large number of plastic packages in Israel.

Major food and beverage brands that actively participated in this initiative showed a commitment to “Designing for recyclability” to mitigate the environmental impact associated with plastic packaging and are motivated to continue to review their product portfolio to apply a circular design strategy consistently.

Policy changes can incentivize manufacturers to adopt recyclable packaging solutions. Both regulatory and market-based instruments can be employed, including subsidies and tax benefits. New standards or eco-labels to raise consumer awareness will catalyze the adoption of packaging containing recycled material at scale. Moreover, an advanced economic model has demonstrated that including the recyclability potential of plastic packaging collected in the EPR scheme through the introduction of an eco-modulation fee will make using alternative materials for their packaging more profitable for brands.

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At Osem -Nestlé, we have set goals that by 2025, all our packaging will be recyclable.

Amit Ron – Packaging Manager

Osem-Nestlé

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