TOMRA

Enabling a circular economy for plastics

Closing the quality and quantity gaps

Table of contents

TOMRA enables closing the quality and quantity gaps

TOMRA has spent over 50 years advancing its reverse vending and sensor-based sorting technology to enable closed-loop recycling for PET beverage containers. Now, it is time to enable circularity for a wider variety of materials from different resource streams.

Today, only 2% of plastic packaging is recycled in closed-loop systems. By 2030, TOMRA aims to enable the collection of 40% of post-consumer plastic packaging, and the closed-loop recycling of 30% of all post-consumer plastic packaging. To achieve these ambitious commitments, the quality and quantity gaps across the value chain must be closed.

The supply and demand challenge

The need to drastically expand the amount of plastic that is recovered is increasing as consumer demand grows, recycling and recycled content targets become more widespread, and the financial implications of using primary raw materials become more stringent. As it stands, there isn't enough high-quality feedstock to meet this growing demand. TOMRA believes that the advanced mechanical recycling (AMR) process can solve this supply and demand challenge by:

1. Closing the quality gap.
With the existing technology, and the addition of new and enhanced steps to the mechanical recycling process, AMR can produce high-quality recyclate from both source separated waste and mixed waste streams.

2. Closing the quantity gap.
Rescuing a large amount of waste that would otherwise end up in landfills or incinerators and processing it into virgin-like recyclate is imperative to producing sufficient amounts of recycled content. Mixed waste sorting (MWS) can achieve this.

When AMR is coupled with MWS, it is possible to fill the ever-growing demand for high-quality recyclates. To achieve true resource circularity, these solutions must be implemented at scale, therefore, investment in infrastructure is vital.

Now is the time to invest in technology and proven processes that will enable high-quality, closed-loop recycling. Now is the time to invest in a circular future for plastics.

The 8 major gaps along the plastics value chain

Advanced mechanical recycling for high-quality recyclates

Advanced mechanical recycling (AMR) enables the transformation of post-consumer plastic from different material streams (including mixed waste) into high-quality, ready-for-market recycled plastic content.

By upgrading from cold to hot washing, and enhancing flake sorting and extrusion, AMR can provide the market with superior feedstock.

Plastics are sorted based on type, colors and other properties. Foreign materials and impurities are removed.

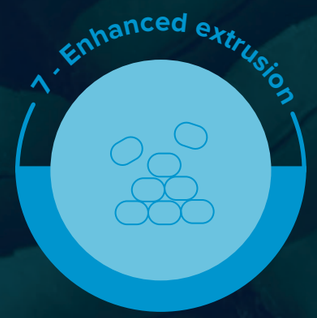
Plastics are cut into shapes and sizes optimal for high-quality washing.

An upgrade from standard cold washing, flakes are hot washed to remove organics, adhesives, inks, and other contaminants.

Plastics are sent to a mechanical and thermal drying process.

Additional mechanical and optical sorting is done to achieve the highest purity levels possible.

Significant odor reduction is achieved by heating the plastic flakes and using vacuum degassing units.



Melt flow filtration, and additional degassing during the extrusion process can further reduce odors and improve pellet quality.

A final purification step could be needed before pellets go into further production.

Holistic resource systems to increase recycled content

To solve the challenges of mismanaged waste, TOMRA joined forces with sustainability consultancy firm Eunomia, and benchmarked waste management systems around the world, then combined solutions from best practice systems into what it now calls Holistic Recourse Systems (HRS). HRS integrates deposit return systems (DRS), separate collections, and mixed waste sorting (MWS).

The combination of these systems, supported by strong extended producer responsibility (EPR) policies, can increase the extraction of valuable materials – keeping them in circulation, and in the market, for as long as possible. The market then has the chance to become less reliant on virgin materials – increasing the resilience of those markets today.

Download Holistic Resource Systems, the white paper that explores TOMRA's framework for collecting, sorting, and recycling waste to achieve maximum resource utilization.

Extended producer responsibility to support plastics circularity

Creating post-consumer sourced feedstock requires legislated well-designed systems to ensure high-quality processing. Extended producer responsibility (EPR) is a policy principle, and a powerful catalyst in financing infrastructure to advance the circularity of plastic.

Under EPR, companies (referred to as producers) that place products and packaging on the market are incentivized to choose and manage their products and packaging sustainably. EPR, with eco-modulated fee structures, make non-recyclable products and packaging more expensive for companies to place on the market, meaning products and packaging that are easy to sort and recycle are incentivized. This significantly impacts how the industry manages and processes waste.

There are different types of EPR schemes for specific products and applications. Deposit return systems (DRS) are one type proven to be the global best practice for beverage containers. Curbside and drop-off systems are another type to effectively manage materials coming from households.

Undeniably, EPR schemes set the stage for a reliable supply of high-quality recyclates that can be used for new products and packaging. However, establishing high-performing EPR schemes requires in-depth knowledge of the waste management and recycling practices that can feasibly integrate into local contexts and circumstances.

With 50 years' experience in circular resource management, TOMRA offers practical insights and economically feasible approaches to high-performing EPR schemes guided by five fundamental design principles: circularity, performance, convenience, producer responsibility, and system integrity. Whether defining roles and responsibilities or dedicating funds to system improvements, TOMRA offers valuable and practical insights to help programs realize the best possible results.

To learn more about high-performing EPR schemes, read the white paper: EPR Unpacked: A Policy Framework for a Circular Economy.

TOMRA has developed state-of-the-art sensor-based sorting solutions that enable the recovery of valuable materials from almost any waste stream.

Read more about TOMRA's sensor-based sorting solutions

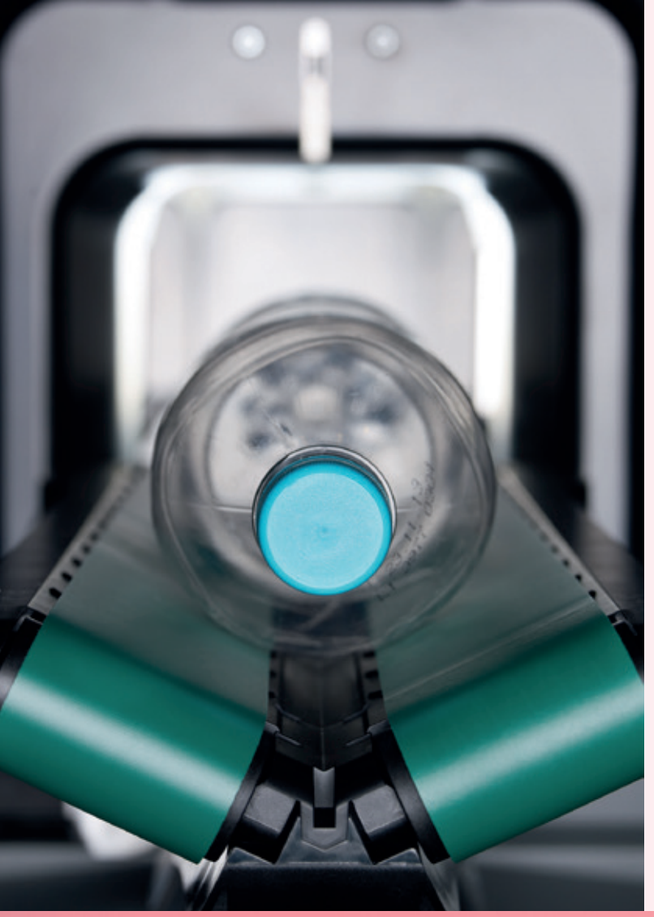
Waste sorting technology

AUTOSORT™
The newest generation of AUTOSORT™ combines cutting-edge features and technologies in one machine. Compact and flexible in construction, AUTOSORT™ allows for an uncomplicated integration into existing and new plants. Equipped with our proven FLYING BEAM™ technology, this next generation AUTOSORT™ enables intensified light information for heightened performance and operational efficiency.

AUTOSORT™ *FLAKE*
AUTOSORT™ *FLAKE* is a high-performance and most versatile flake sorter and offers a unique technology combination consisting of our highest resolution FLYING BEAM™ sensor, a full-color camera, and a highly sensitive metal sensor. The combination of these outstanding technologies enables a fast and simultaneous multi-sensor evaluation of the input material and the precise removal of contaminants such as paper, wood, metal, and all foreign polymers. AUTOSORT™ *FLAKE* is the ideal solution for high-end applications where quality demands are extremely high.

INNOSORT™ *FLAKE*
Designed as the ideal sorting solution for upgrading plastics, INNOSORT™ *FLAKE* combines color and material sorting to recover PO, PET, PVC flakes and many others out of the most contaminated waste streams. Thanks to the high-resolution FLYING BEAM™ technology and a width of up to 2m, it removes unwanted contaminants and detects polymers as small as 2mm. With capacities of up to 6 tons/hour, high performing full-color cameras, and NIR sensors, INNOSORT™ *FLAKE* significantly reduces material losses and increases yield.

TOMRA Insight
One of the most valuable assets for any recycling operation is the data captured by sensor-based sorting machines. TOMRA's cloud-based sorting data platform offers valuable support from a team of specialists, an easy-to-use dashboard, and customizable reporting tools. The near-live monitoring of material streams offers the ultimate control, allowing for quick and strategic decision-making, issue resolution, and the identification of future maintenance requirements.



35 billion
used beverage containers are captured every year by TOMRA's reverse vending machines

Reverse vending technology

With recovery rates of 90% and above, deposit return systems keep PET plastic in use and out of the environment. TOMRA's reverse vending technology is a key enabler of this system.

TOMRA T9 with the new EasyPac
Powered with TOMRA Flow™ - our 360-degree container recognition - the T9 EasyPac has new ultrasonic sensor technology, redesigned core modules, sturdier parts, improved user interfaces, and can be configured for maximum space efficiency. It is also able to match the preferred volume and mix of recyclables at a particular location.

TOMRA R1 and T9 with MultiPac Air
The TOMRA R1 comes with our flagship single-feed and backroom solutions – TOMRA T9 and MultiPac Air – and is able to accept over 100 cans and plastic bottles at once, up to five times faster than traditional reverse vending.

Read more about TOMRA's broad range of reverse vending technologies

TOMRA

TOMRA is a global impact leader in the resource revolution, creating and providing sensor-based solutions for optimal resource productivity. Founded in 1972 on an innovation that began with the design, manufacture and sale of reverse vending machines (RVMs) for automated collection of used beverage containers. Today, TOMRA provides technology-led solutions that enable the growth of the circular economy with advanced collection and sorting systems that optimize resource recovery and minimize waste in the food, recycling, and mining industries.

Visit our Circular Economy Resource Hub

We work for the planet

www.tomra.com