WEBINAR #2 BRIEF

Advances in the Collection and Sorting Technologies for Flexible Packaging

INTRODUCTION TO THE REDUCING PLASTIC WASTE IN CANADA PROJECT

The two-year project aims to deepen knowledge and strengthen the implementation of solutions to reduce plastic waste in Canada through knowledge sharing and peer-to-peer exchanges with European Union (EU) counterparts. The project is part of the Circular Plastics in the Americas Program as part of the EU commitment to the UN Sustainable Development Goal to support the transition toward sustainable production and consumption.

WEBINAR OBJECTIVE

Following Webinar #1 on roadmaps driving flexible plastics circularity, this webinar explores their implementation and innovations to build-up the systems that are in place to collect and sort of flexible packaging in the EU.

SPEAKERS

Michael Jefferson
Moderator
European Association of Plastics Recycling and Recovery Organisations (EPRO)

Joachim Quoden
Speaker
Extended Producer Responsibility Alliance (EXPRA)

Gian Debelder
Speaker
Proctor & Gamble

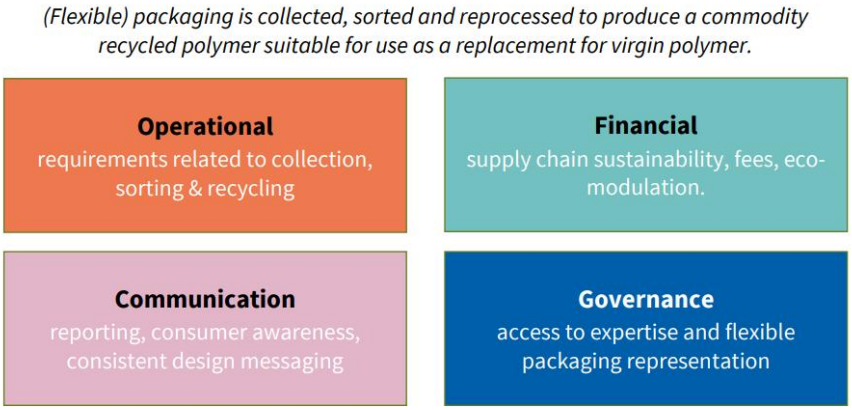
Christian Kampmann,
Speaker
PreZero Germany

Michael Jefferson, European Association of Plastics Recycling and Recovery Organisations (EPRO)

Michael Jefferson set the stage by highlighting the strong drivers for the collection of flexible plastic packaging in the European Union. These include new recycling targets in the Packaging and Packaging Waste Directive as well as signals from the European Commission that all packaging placed on the market by 2030 must be "recyclable". In addition, a European Plastic Packaging Levy must be paid by Member States based on the amount of plastic packaging that is placed on the market that is not recycled. Spain, Italy and the UK further introduced plastic taxes on packaging based on recycled content levels. Lastly, the increasing demand for recycled content for a wider array of products and packaging is forcing higher quality recycling. All of these factors are driving important European investments in collection and sorting infrastructure to maximize the recycling potential for flexible plastics.

Joachim Quoden – Extended Producer Responsibility Alliance (EXPRA)

EXPRA represents producer responsibility organizations (PROs) with EPR responsibilities in Europe as well as elsewhere. EPR is acknowledged as very important approach in facilitating the circular economy by ensuring that industry plays an important role in the design, operation and financing of the systems to collect and manage packaging. EPR relies on industry's knowledge, experience and involvement in the system design. The EPR criteria for circularity include operational, financial, communication and governance elements:



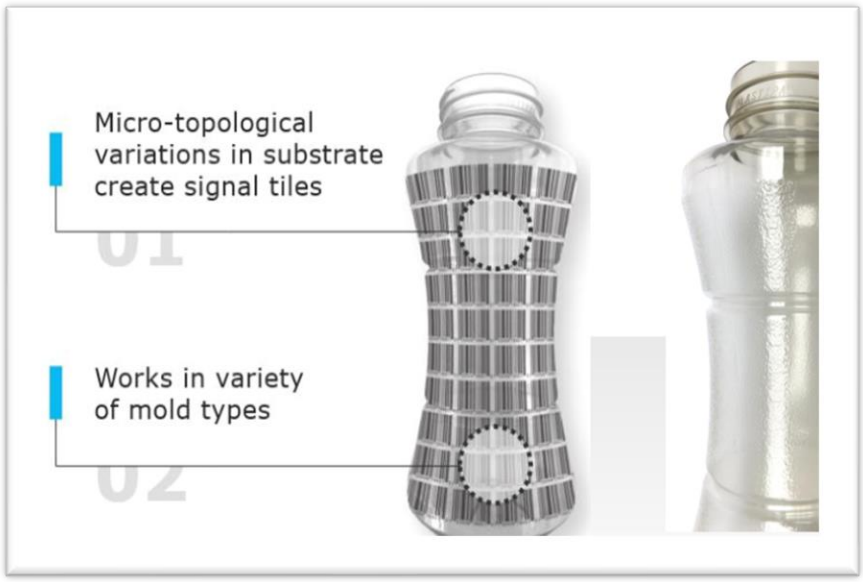
EPR for packaging varies across jurisdictions, as there is a tendency for each country to develop its own unique EPR program. In addition, in many European countries, local authorities have responsibilities in the design of the collection and sorting systems and therefore play a role in the implementation of EPR. PROs in Europe work with local authorities, brand owners (fillers) packaging manufacturers, sorters, recyclers and others by providing insights on what is happening to the packaging as it moves through the system so that brand owners can understand the impact of their upstream design choices on downstream sorting and recycling infrastructure.

EXPRA is a participating stakeholder in the Circular Economy for Flexible Packaging (CEFLEX) initiative, which identified EPR as a key approach to drive the type of flexible packaging formats to be collected (see Webinar #1 Brief). EPR can also influence changes in packaging design to incent mono flexible formats, which can affect bale specifications for flexible plastic packaging to improve sorting outcomes. EPR has also been known to incentivize recycled content in packaging design through fee modulation set by PROs. In Europe, significant changes have been noted attributed to EPR programs influence, with producers now considering design for recycling with more emphasis than before.

Gian Debelder, Proctor & Gamble

Proctor and Gamble (P&G) uses a strategy with four pillars to conceptualize activities to drive circularity of packaging placed on the market.

- ✓ Pillar 1 is centred around design for recycling and circularity (e.g., redesign of flexible packaging formats from a multi-laminate structure to a mono-resin format).
- ✓ Pillar 2 involves ensuring improved access to collection and consistency across jurisdictions
- ✓ Pillar 3 focuses on consumer participation and education.
- ✓ Pillar 4 centers around innovative sorting technology to ensure collected flexible packaging materials are effectively sorted from other packaging formats.



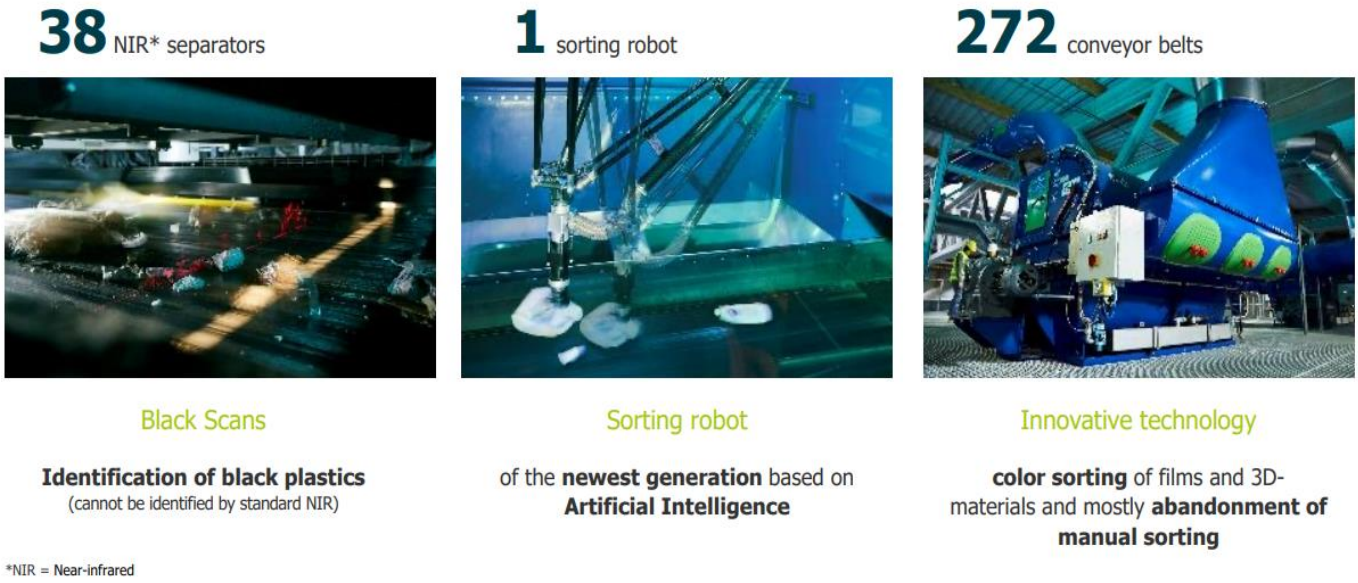
The first pilot scale development of digital watermarks as the most effective option for sorting technology began in 2020 with the New Plastics Economy initiative and was called the HolyGrail project. The technology was developed with many industry players, and through investments in research and development, digital watermarks can now be embedded on packaging in two main ways. Two strategies were tested: the first centered on manipulating the artwork on the packaging to include imperceptible codes; the second one was the inclusion of codes embossed on the container's surface through the blow molding process. In both cases the digital watermark codes are barely detectable to the human eye, and can include multiple types of data (e.g., manufacturer, SKU, resin type, food vs. non food, etc.). The technology uses a high-speed camera module on the Near Infrared (NIR) optical sorting units to detect the digital watermark on the packaging, relate the code to the attributes in a database, and can be programmed to eject a targeted package to a specific stream, for multiple package types.

Holy Grail 2.0 has continued the investment to further develop and test technological options in 2022 with an expanded group of industry players and associations. The project plans to deploy prototypes in a large-scale pilot test in a commercial sorting and/or recycling facility under standard operating conditions. Current work on digital watermarks aims to prove the technical viability of the concept on a wider scale, and its economic feasibility in a variety of business models. The continued research will also aim to examine new options for consumer engagement such as exploring possibilities of integrating this technology to facilitate digital product passports integrated with smart phone applications.

Christian Kampmann, PreZero Germany

The Schwarz Group of companies includes retail chains as well as PreZero, a producer responsibility organisation that operates collection, sorting and recycling activities for packaging in eleven countries in Europe, with seven sorting plants in Germany. PreZero is involved in all parts of the end-of-life value chain for packaging, including collection, sorting, and recycling and is a leading innovator in sorting plastic packaging.

PreZero's new Eitting sorting facility is designed to process up to 120,000 tonnes/year of lightweight packaging using NIR optical sorters and targets all packaging material that is > 20 mm in size. Typical screen size in European and North American sorting plants target materials that are larger than 40-50 mm. The new Eitting sorting facility includes the following new technology features:



Eitting produces four separate flexible plastic commodity streams:

1. transparent low-density polyethylene (LDPE) film
2. coloured LDPE film
3. flexible polypropylene (PP), and
4. mixed flexible polyolefins (MPO).

End markets for PP film are relatively new, and demand is being driven by polypropylene (PP) rigid recyclers, as PP film is compatible with rigid formats and can be incorporated into PP recyclates that can be used to produce rigid plastic packaging.

The primary driver for increasing the capture of smaller pieces of flexible packaging is the higher recycling targets in Germany and the EU Commission's Plastics Strategy. Strategic goal-setting by policy-makers drives technology development. EPR programs and PROs play a very important role in advancing the collection and sorting of flexible plastic packaging, as they can often influence which types of flexible packaging formats are to be collected in the system or can influence the decision of local authorities with responsibilities for collection. An additional driver is the CEFLEX EPR Criteria for Circularity, EPR drives change through adoption of design for recycling guidelines.

DISCUSSION Q & A

Questions from participants focussed on:

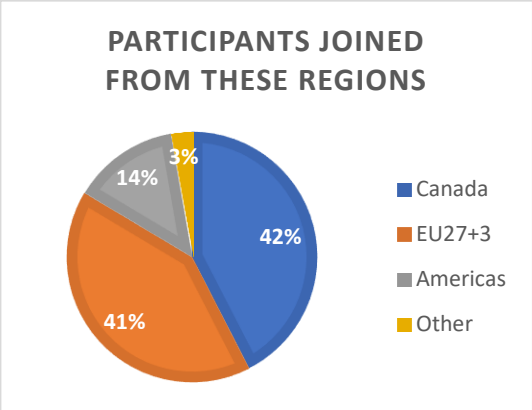
- The HolyGrail digital watermarks project – links to overarching EU directives: the project was driven by EU directives to recycle more and is linked to EU Green Deals.
- The evolution of use of digital watermarks, how the technology will provide more data granularity (e.g. data measured at the entrance to a MRF/sorting facility) to all players in the chain including upstream producers, and how it could eventually be used to modulate producers' fees.
- How Digital watermark technology could be used in the future by consumers to determine recyclability as a form of smart labelling.
- Performance and testing results: The Holygrail 2.0 Project's results to date are promising, with sorting detection rate, ejection rate and purity rates reaching 99%, 91% and 90%.

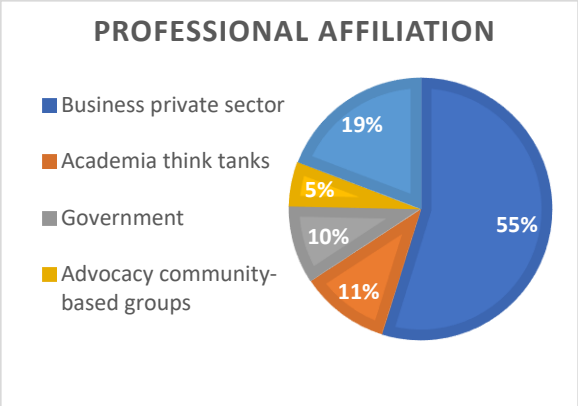
KEY TAKE AWAY MESSAGES

- In the EU, ambitious policies and targets are driving investments and other changes, including upstream design (via design for recycling) and downstream sorting technology research and development.
- EPR's role in driving the collection of materials is well established but continues to evolve and expand as they can influence product design through fee modulations. EPR further ensures that the private sector is invested and involved in designing circular systems.
- The early lesson from Germany where all flexible plastic packaging is targeted for collection in the "yellow bag/cart", sorting of flexibles into separate commodity streams for polyethylene (PE), mixed polyolefins (PO) and more recently PP, will be necessary to meet more stringent recycling targets.
- Digital watermark technology is leading the way to a future with greatly improved packaging sorting, labelling, and recycling opportunities for what are currently difficult to sort packages.
- Industry is leading the research and development of this new technology with support and collaboration from many players in the plastics value chain.
- The webinar was very well received, with a significant number of participants from all areas of the globe, including Europe, Asia, United States, South and Central America, and Canada. The majority of the audience found the webinar useful and 66% provided a rating of "very good" for the information received.

EVENT AUDIENCE

52 Attendees	27% Women	67% Men	6% Prefer not to say





KEY RESOURCES

European Association of Plastics Recycling and Recovery Organisations (EPRO)
https://www.epro-plasticsrecycling.org/
EPRO members

Extended Producer Responsibility Alliance (EXPRA) www.expra.eu | EXPRA members
Email: info@expra.eu

Proctor & Gamble
HolyGrail Initiative: AIM – European Brands Association | AEPW - Alliance to End Plastic Waste
digitalwatermarks.eu | Blog: us.pg.com/blogs/HolyGrail
Email: digitalwatermarks@aim.be

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