

RESEARCH & DEVELOPMENT

Multi-laminated Plastics (Other Flexible Plastic Packaging)

RECYCLE BC CONSULTATION

NOV 15 - 16, 2017



RECYCLEBCTM

WORKSHOP AGENDA

- Presentation #1
 - What is “Other Flexible Plastic Packaging”?
 - Why do we want to collect it?
 - Global initiatives & Recycle BC’s approach.
- Exercise #1
 - Sorting plastics.
- Presentation #2
 - R&D with Merlin Plastics.
 - What is engineered fuel?
- Presentation #3
 - Depot collection information.
- Exercise #2
 - Round table discussion on the proposed approach.



LET'S COMMIT TO SUCCESS

Here are some commitments we can make to one another to ensure we all have a productive experience:

1. Stay curious and open
2. Listen to understand
3. One speaker at a time
4. Disagree respectfully
5. All contributions have value
6. Success is our shared responsibility



INTRODUCTION

Other Flexible Plastic Packaging

WHAT IS “OTHER FLEXIBLE PACKAGING”?

- What is different about multi-laminated plastics?
 - This material is made up of multiple layers of flexible plastic, film, paper, nylon and/or aluminum foil.
 - It is specifically designed to extend product shelf life and reduce packaging weight.
- Why is this format used by manufacturers and brands?
 - Low cost to manufacture and transport; lower energy use & CO² emissions.
 - Ability to keep foods fresh for longer.
 - High shelf appeal.
- Why is it difficult to recycle?
 - The use of multiple layers of different film resin types, adhesives and sealants makes it difficult to separate by resin type.
 - Included in the list of Other Flexible Packaging are other mono-film resins that are not compatible with the PE Film and overwrap category recycling processes.
 - The timeline for R&D is long as plastics are a durable material and require testing over the recycled product's expected lifespan.

WHY DO WE WANT TO COLLECT IT?

- Program Plan commitment:
 - Recycle BC's goal is to collect all packaging types by 2017.
 - To manage the collected PPP according to the pollution prevention hierarchy.
- Why this material?
 - Other Flexible Plastic Packaging is the fastest growing packaging type on the market.
 - It is the largest category of packaging that isn't yet collected by Recycle BC.
 - To stay in-step with the materials stewards are supplying to the residential consumer.



<https://www2.gov.bc.ca/gov/content/environment/waste-management/zero-waste>

GLOBAL HEADLINES

David Attenborough urges action on plastics after filming Blue Planet II

Naturalist says experience making second series of BBC show revealed devastating threat posed to oceans by plastic

www.theguardian.com/environment/2017



Photograph: Will Rose/Greenpeace

There Will Be More Plastic Than Fish in the Ocean by 2050 warned the Ellen MacArthur Foundation.

www.ecowatch.com

38 million pieces of plastic waste found on uninhabited South Pacific island

www.theguardian.com

Fish Ingesting Plastic Waste, Study Finds

www.nytimes.com



Photograph: Paulo Oliveira/Alamy

GLOBAL INITIATIVES

○ Project MainStream

- “Project MainStream leverages the convening power of the World Economic Forum, the circular economy innovation capabilities of the Ellen MacArthur Foundation, and the analytical capabilities of McKinsey & Company.”
- During its first two years, Project MainStream has focused on three distinct initiatives, one of which is the New Plastics Economy.



“The project is trying to bring companies and cities together to coordinate the design of packaging and arrangements for its disposal. The group hopes to come up with a way to standardize the ingredients in plastic packaging, so any company or municipality can easily become part of one process of reusing and recycling packaging.” www.nytimes.com



Redfishrecycling.com

Baltimorecountymd.org

GLOBAL INITIATIVES

- The New Plastics Economy
 - “The New Plastics Economy is an ambitious, three-year initiative to build momentum towards a plastics system that works. Applying the principles of the circular economy, it brings together key stakeholders to rethink and redesign the future of plastics, starting with packaging.”
 - “A radical new approach: Forty years of fragmented, incremental efforts have failed to deliver impact at scale. Rethinking the global plastics economy requires an ambitious, systemic approach.”



“Why a plastics rethink

Plastics are fundamental to industry and everyday life. Yet, they are one of the most wasteful examples of our existing linear, take-make-dispose economy.

Catalysing change in this global material flow will not only create a more effective plastics system, but will also demonstrate the potential for a wider shift from a linear to a circular economy.”

<https://newplasticseconomy.org/>

GLOBAL INITIATIVES

- The Closed Loop Fund
 - In April 2014, Closed Loop Fund launched as a partnership between some of the world's leading companies, including 3M, Coca-Cola, Colgate-Palmolive, Goldman Sachs, Johnson & Johnson, Keurig Green Mountain, PepsiCo, Procter & Gamble, Unilever, and Walmart.
 - The Fund plans to invest \$100 million in the U.S. recycling infrastructure by 2020.
 - Has started to make some investments in Canada for technology.



Closed Loop Fund invests in GreenMantra Technologies

GreenMantra Technologies, a clean technology company that produces polymer products from scrap plastics, has announced Closed Loop Fund will invest up to \$3 million in an expansion of GreenMantra's manufacturing operations in Brantford, Ontario.

July 26, 2017
Recycling Today

GLOBAL INITIATIVES

- Sustainable Packaging Coalition
 - The Sustainable Packaging Coalition (SPC) is an industry working group dedicated to a more robust environmental vision for packaging.
 - Initiative: multi-material flexible packaging recovery: a global database of initiatives and resources to advance recovery options.
 - An index of collaborative projects. These projects are initiatives designed to answer questions around the potential recovery of hard-to-recycle plastics - including multi-material films.
 - SPC characterizes the challenges into: design, collection, sortation, processing and end markets.
 - Initiatives to find effective recycling solutions for multi-material flexible packaging have tackled some, or all, of these challenges.



Generic image of a multi-material package. The number of inner layers will vary depending upon the design parameters of the package.

Image Courtesy Dow Chemical

GLOBAL INITIATIVES

○ ENERGY BAG

- Began as a 2014 pilot program in Citrus Heights, California where material was collected for conversion into oil. Goal: 50 states in 5 years.

ENERGY RECOVERY USING THE ENERGYBAG™

Every year, Americans discard 29 million tons of plastic waste. To help change that, Dow collaborates with municipal and industry partners to implement alternatives for plastic waste with EnergyBag™ programs. EnergyBag™ programs demonstrate that non-recycled plastic items – like juice pouches, candy wrappers and plastic dinnerware – can be collected and converted into energy resources and helps identify a way to keep more material out of the landfill.



www.dow.com

○ RECYCLE READY TECHNOLOGY

- Flexible packaging that can be easily recycled through existing PE film recycle streams.
- RecycleReady Technology enables packaging with the features of typical multi-material, multi-layered pouches, flow wrappers, and barrier film with the added benefit of recyclability.



RECYCLEREADY
TECHNOLOGY
for store drop-off recycling by 

GLOBAL INITIATIVES

- Examples of emerging technologies



Separating composite materials using micro-emulsion

Using specially developed micro-emulsions, Saperatec offers a completely new and unique way of separating composite materials. These micro-emulsions harness the effect of surfactants and ensure the separation process in the appropriate plant technology. The result is reusable individual materials and thus 100% recycling of the composite material.



Recycling plastic aluminium laminates using microwave induced pyrolysis.

Process: shredded plastic aluminium laminates are mixed with carbon. When the carbon is exposed to microwaves, it reaches temperatures of up to 1,000 °C in just a few minutes. This heat energy is then quickly and efficiently transferred to the plastic by conduction.

The fragile aluminium foil remains undamaged during this process. It can be recovered in solid form, clean and ready for reprocessing. The plastic component degrades to form a mixture of hydrocarbons. This mixture is then cooled down and separated into gas and oil. The gas can be used to generate the electricity required to power the process, and the condensed oils can be sold as fuel or feedstock for speciality chemicals.

RECYCLE BC'S APPROACH

○ Research & Development

- Recycle BC's approach is to work with Merlin Plastics on R&D for a viable, stable commercial process at scale for the recycling of Recycle BC's multi-laminated plastic packaging.
- To achieve incremental recovery of PET, HDPE, PP, PE, etc.
- To conduct R&D, Merlin Plastics requires a clean stream of other flexible plastic packaging of sufficient quantity to run tests on the component parts of the multi-laminated material.

○ Goal of R&D

- It is Recycle BC's goal is to enable through R&D the recycling of some, if not all, of the materials categorized as Other Flexible Packaging over time to continue to maintain or exceed our 75% collection rate on behalf of Recycle BC stewards.
- Any material not capable of being recycled will be made into engineered fuel and marketed as an alternative to coal and energy from waste.
- Recycle BC expects the amount of materials sent to engineered fuel to decrease as the technology is tested, refined, and the resulting material marketed to manufactures as feedstock for new products.



EXERCISE

Sorting Flexible Plastic Packaging

SORTING EXERCISE



Tips for sorting:

- Plastic bags and overwrap (Cat 4 film)
 - #2 or #4 resin code
 - It is smooth when rubbed
 - You already know that depots accept it, such as bags for groceries and overwrap from paper rolls
- Other flexible packaging (Cat 9)
 - It has a zipper closure
 - It is crinkly and loud when rubbed
 - It has a resin code other than #2 or #4
 - It has no resin code and isn't Cat 4 film
 - It looks like it is made of multiple layers

SORTING EXERCISE

- Goal:

- To quickly and accurately sort the contents of your bags into three piles:

Plastic Bags &
Overwrap
(Cat 4 Film)

Other Flexible
Packaging
(new category)

?
Not part of either
material group

- The fastest and most accurate sort by a table wins a **PRIZE**.
- **Q:** What are the challenges in categorizing these product packages from plastic bags and overwrap?



MERLIN PLASTICS

Research & Development



COLLECTION

Recycle BC's Approach

RECYCLE BC'S APPROACH

- Proposed collection strategy:
 - Depot collection
 - Segregated from other plastic collection – plastic bags and overwrap, rigid plastic containers – as well as from paper, foam
 - Sorted and stored in a dedicated mega bag provided by Green by Nature
- Proposed collection timeline:
 - Voluntary initial trial beginning April 1, 2018 by interested depots.
 - Formally a new material category with the new Depot Statement of Work and incentive rates after November 2018.



RECYCLE BC'S APPROACH

- Proposed payment:
 - Same depot material collection incentive rate as plastic bags and overwrap (Cat 4 Film).
 - To follow incentive rate increase for plastic bags and overwrap in new depot Statement of Work.

Depot Incentive Rates		Voluntary Trial (existing rates)		New SOW (new proposed rates)	
		\$/tonne	Additional if Baled	\$/tonne	Additional if Baled
Plastic Bags & Overwrap	Cat 4	\$175	\$330	\$500	\$330
Other Flexible Packaging	Cat 9	\$175	\$330	\$500	\$330

RECYCLE BC'S APPROACH

- Post-collection information:
 - Green by Nature will supply additional mega bags for the collection of this new segregated category.
 - Depots that are interested in participating in the voluntary trial should contact Recycle BC to be registered for this category of materials.
 - Once registered, Recycle BC will provide Green by Nature the information on who is participating in order for pick-up to occur.
 - Recycle BC also needs registration for payment on this new category to be made by Recycle BC to the participating depot.





EXERCISE

Round Table Discussion

ROUND TABLE DISCUSSION

- What do you see as the benefits to collecting Other Flexible Packaging?
- What do you see as drawbacks or concerns to collecting this new segregated category?
- How do you suggest messaging this new category to your depot customers?
- How can you help your residents/customers sort multi-laminates from plastic bags and overwrap?
- Are you comfortable with the R&D component of collecting Other Flexible Packaging and explaining engineered fuel?
- Any further comments, feedback or recommendations on this topic you would like to share? (i.e., voluntary start changing to mandatory collection with new Agreements)



Please use the tools provided to record your thoughts and the group discussion at your table.



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