A Holistic View of the Role of Flexible Packaging in a Sustainable World

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Agenda

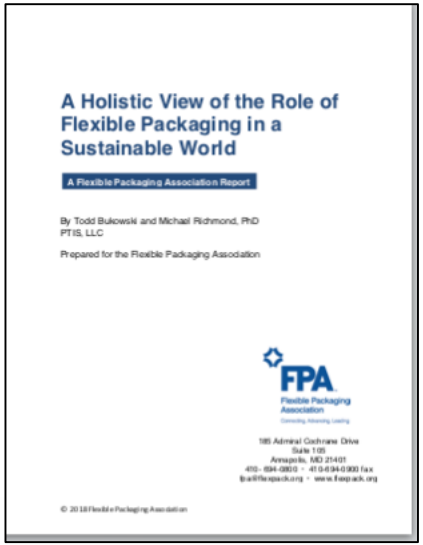
- About the FPA Sustainability Report
- Flexible packaging sustainability benefits
- Waste management
- CE and SMM
- A life cycle view of flexible packaging
- Future legislation & regulations
- Opportunities & needs
- The future for flexible packaging

PTIS overview

- Global management consulting, focused in packaging
- Operating in our 18th year
- 300+ clients from across the value chain
- Recognized Thought Leaders across packaging
- Network of more than 200 packaging and related specialists
- Holistic thinking and solutions focused across business segments and categories
- Future of Packaging programs

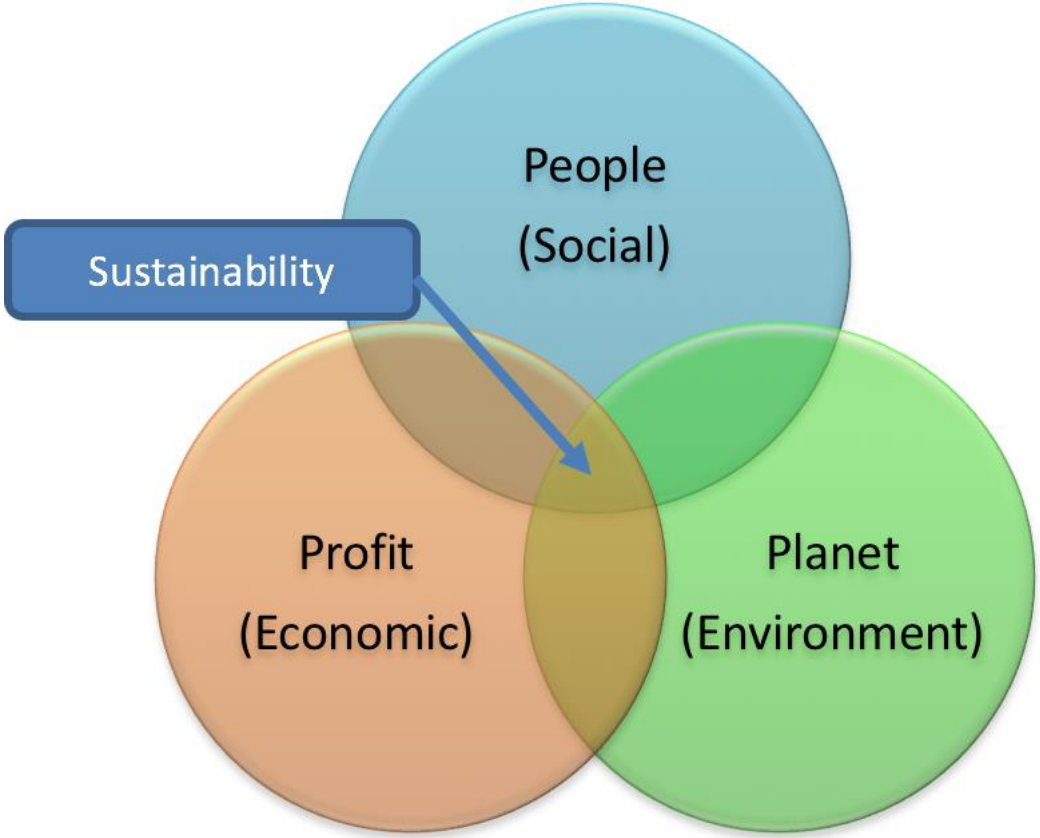
Flexible Packaging Report

- Holistic view of flexible packaging around sustainability
- U.S. focus with global insights
- Life cycle assessment case studies
- Provide foresight



Sustainability & flexible packaging – where does it fit?

- Triple bottom line thinking
- Social component becoming more important
- Driving legislation & public sentiment



Sustainable Packaging Journey

Flexible packaging has focused on materials reduction & energy efficiency. Over time will need to consider Big Systems impacts

Transforming/ Big Systems

- Renewably sourced polymers @ cost/perf of petro polymers
- Natural capital/ carbon accounting
- Green chemistry replacements
- Composting – home & industrial
- Circular Economy
- New Plastics Economy
- Emerging market recovery
- Marine debris collection

Getting Serious

- Refillables
- Product concentrates
- Hybrid bio-based materials w performance
- Brand equity through sustainability
- Transparency
- Anticipatory & emerging issues tracking
- Sustainable sourcing/social considerations
- Extended Producer Responsibility (EPR)
- New technology development/ implementation
- E-commerce returnable packaging

Starting Point

- Recycling/Recyclable materials
- Materials reduction
- Energy efficiency

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Sustainable Packaging Journey

Flexible packaging will need to be ready for the Transforming/ Big Systems challenges and a changing environment

Transforming/ Big Systems
- Renewably sourced polymers @ cost/perf of petro polymers
- Natural capital/ carbon accounting
- Green chemistry replacements
- Composting – home & industrial
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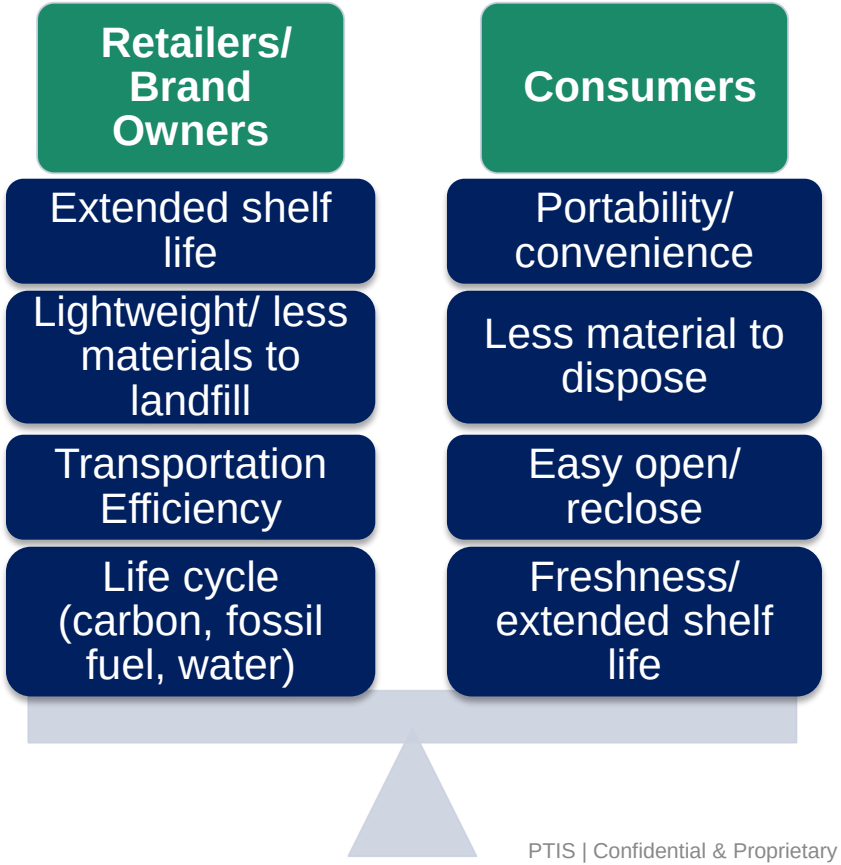
Flexible packaging benefits – sustainability

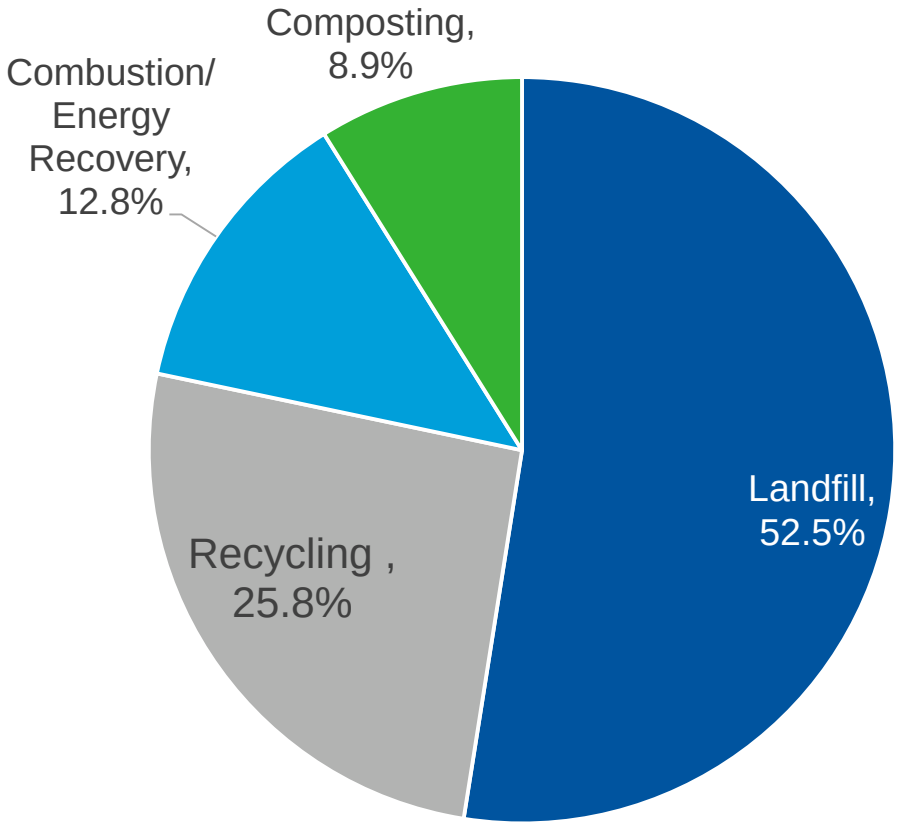
Flexibles offer benefits throughout the packaging value chain

Sustainability is one part of product equation



U.S. waste management

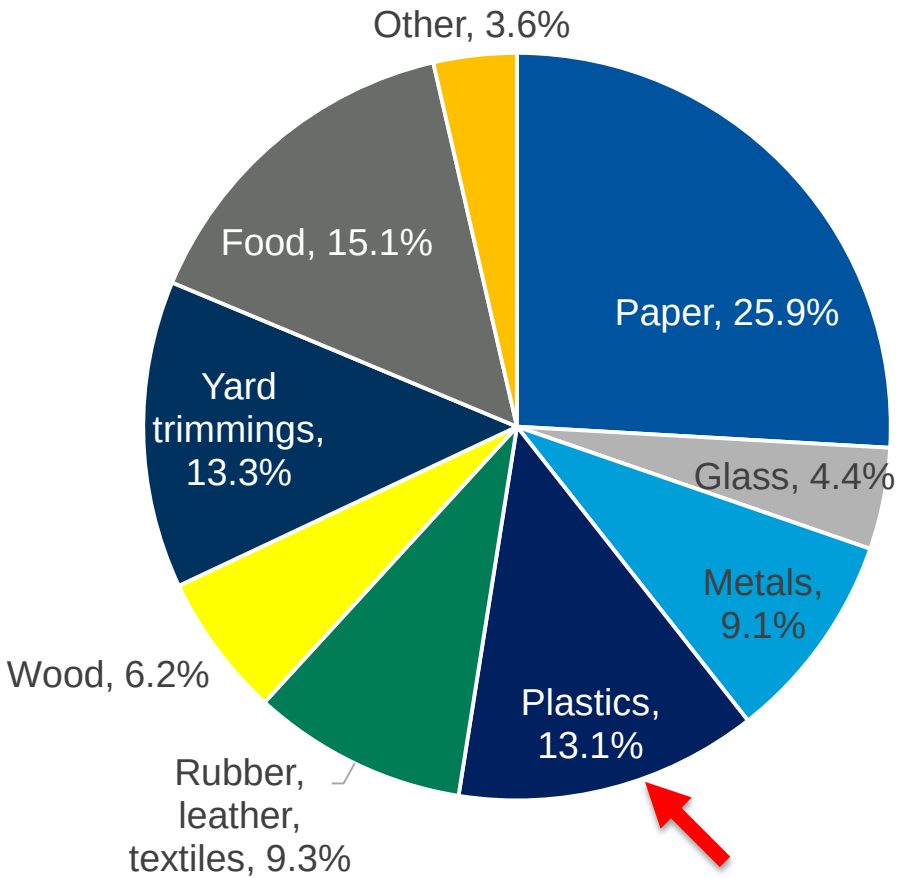
- About one-third of waste in U.S. recycled or composted
- Going up…..slowly
- Energy recovery remaining fairly steady



U.S. EPA (2015)

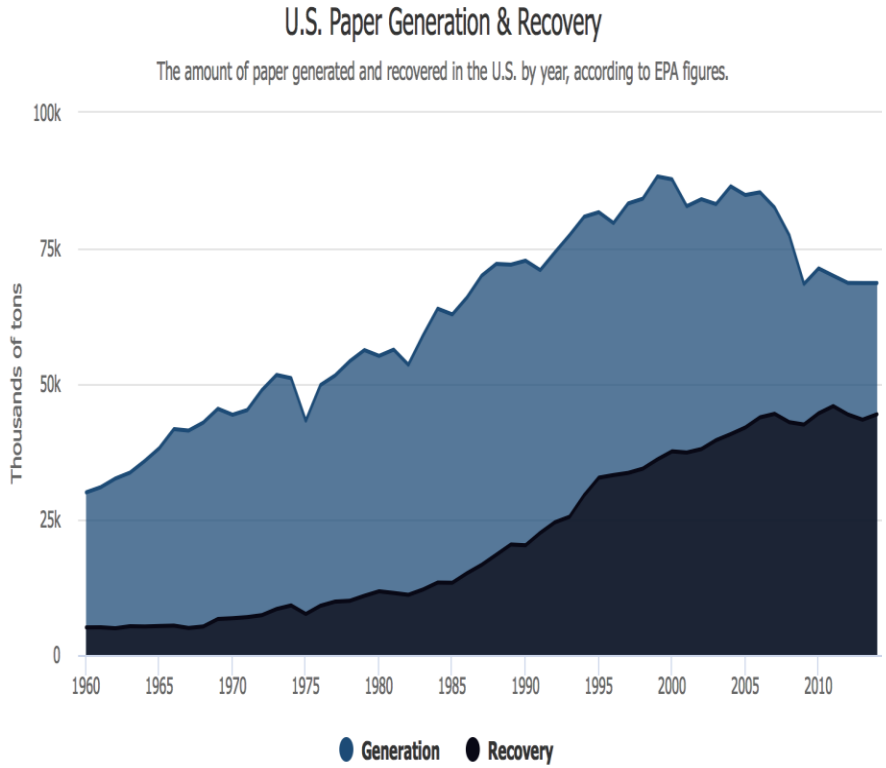
Waste management–flexible packaging impact?

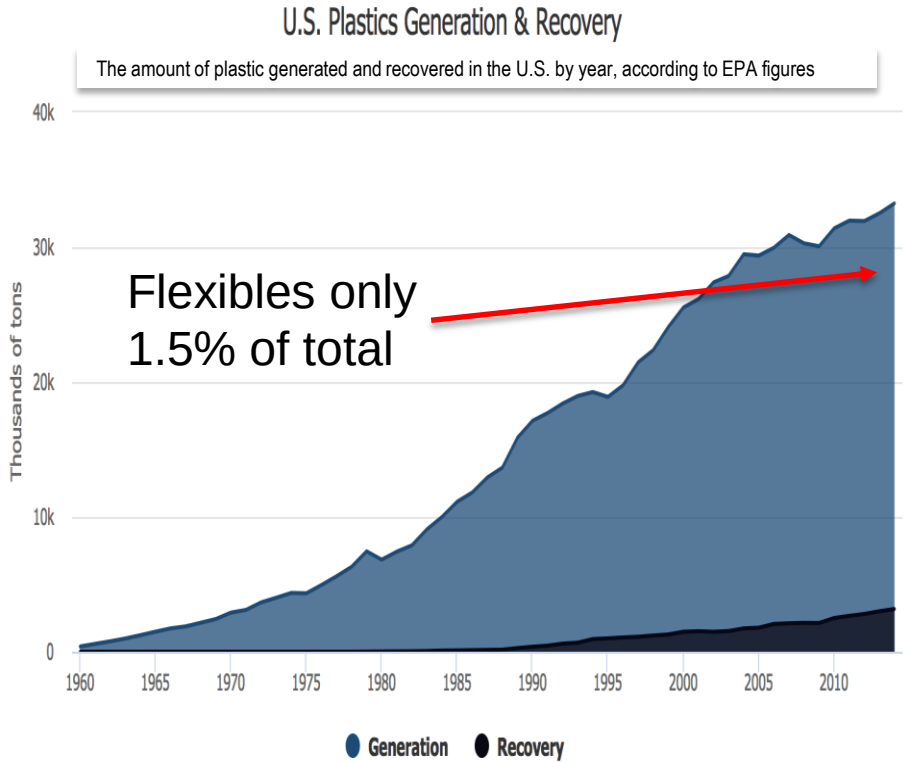
- Plastics about 13% of MSW
- Total plastic flexible packaging about 3%, non-recyclable flexible packaging 1.5%
- Challenge/Opportunity – plastics in general recycled at 9.5% in U.S.



Source: Resource-Recycling

Waste management opportunity





Net: Opportunity to drive plastic recovery

Waste management – new technologies

- Biggest challenge: flexible packaging to be recyclable
- Potential technologies:
  - Mechanical recycling
    - Recyclable mono-layer structures
  - Chemical recycling
  - Waste-to-energy/pyrolysis/ energy feedstock
  - Fuel programs
- Collaborations
- Infrastructure

MRFF
MATERIALS RECOVERY FOR THE FUTURE

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Circular Economy/ Sustainable Materials Management

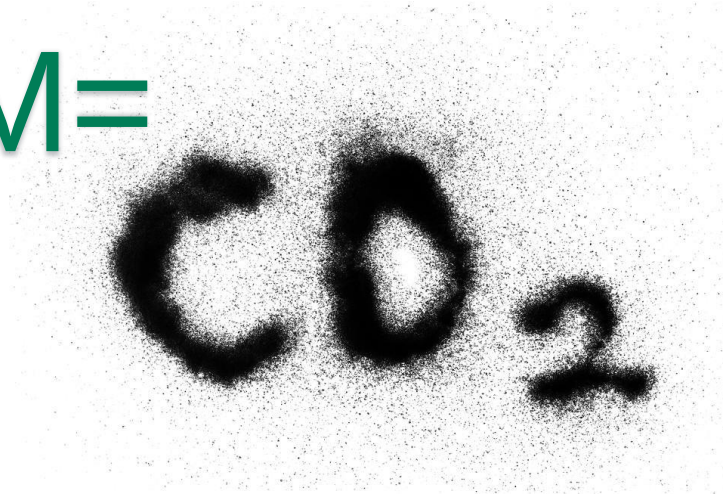
"A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life." - WRAP (UK)

SMM is the "*use and reuse of materials in the most productive and sustainable way across the entire lifecycles by minimizing the amount of materials involved and minimizing associated environmental impacts." - U.S. EPA*

Circular Economy/ Sustainable Materials Management

CE=

SMM=



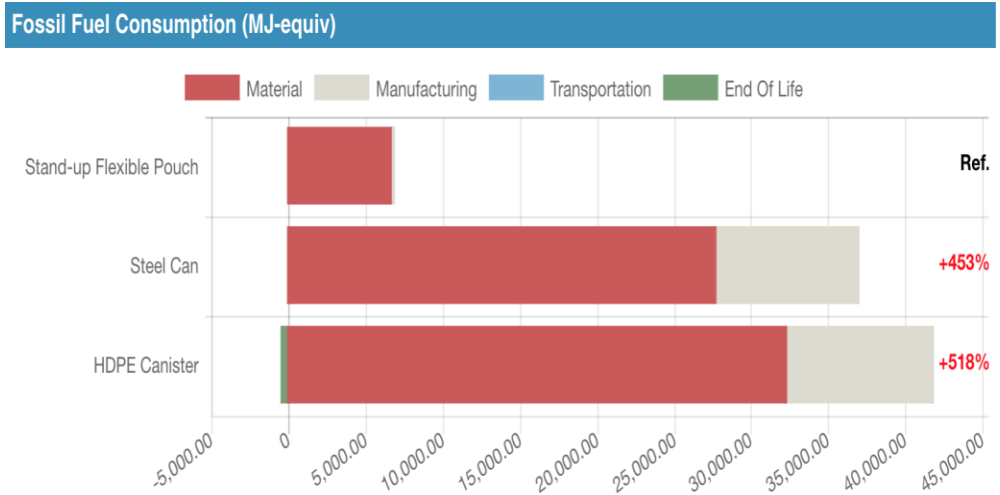
Circular Economy/ Sustainable Materials Management – finding the balance

Circular Economy Principles	SMM Principles
Consumer communication (How2Recycle label program)	Lightweighting/ Resource efficiency
Recyclable structures	Carbon impact measurement/ reduction
Flexible packaging recycling (mechanical, chemical) technologies	Flexible packaging recycling and recovery through Waste-to-Energy or Energy Bag® type programs
Reuse	
Inclusion of Post-Consumer Recycled Content	

Net: Goal to merge toward both CE & SMM principles

Life cycle assessment (light) of flexible packaging

- Developed six different LCA-light using EcoImpact-COMPASS®
- Compared to other package formats
- Targeted fossil fuel usage (energy), carbon impact, water usage
- Also determined product-to-package ratio and material to landfill



Life cycle assessment (light) – case studies

Case Study	Formats Assessed
Ground Coffee	• Stand-up flexible pouch • Steel can • Plastic (HDPE) canister
Motor Oil	• Stand-up Pouch with Fitment • HDPE Bottle
Baby Food	• Pouch with fitment • Thermoformed Tub • Glass jar
Laundry Detergent Pods	• Stand -up Pouch w zipper • Rigid PET container
Cat Litter	• Stand-up bag • Barrier carton • Rigid pail
Single Serve Juice Flavored Beverages	• Drink Pouch • Composite Carton • PET Bottle • Aluminum Can • Glass Bottle

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Life cycle assessment – baby food comparison

Format	Fossil Fuel Consumption (MJ-Equiv)	GHG Emissions (kg-CO2 Equiv)	Water Consumption (l)	Product-to-Package ratio	Pkg Landfilled (g) / 1000 kg baby food
Pouch with fitment	.7349	.03098	.0753	94:6	68,142
Thermoform Tub	.7832 (+7%)	.03305 (+7%)	.04587 (-38%)	92:8	89,381 (+31%)
Glass Jar	1.46 (+99%)	.1245 (+302%)	1.05 (+1294%)	56:44	510,513 (+649%)

All products were 4.0 oz.

Net: Flexible packaging offers better environmental attributes than glass & thermoform tub, and overall less material to landfill

Life cycle assessment – motor oil comparison

Format	Fossil Fuel Consumption (MJ-Equiv)	GHG Emissions (kg-CO2 Equiv)	Water Consumption (l)	Product-to-Package ratio	Pkg Landfilled (g) / 1000 kg motor oil
Pouch with fitment	14.12	.5998	1.03	97:3	26,301
HDPE bottle	38.58 (+173%)	1.52 (+153%)	6.33 (+513%)	94:6	45,501 (+73%)

All products were normalized to 224 fl. oz.

Net: Large benefit across all SMM attributes for flexible packaging option – in a new product category

Life cycle assessment – cat litter comparison

Format	Fossil Fuel Consumption (MJ-Equiv)	GHG Emissions (kg-CO2 Equiv)	Water Consumption (l)	Product-to-Package ratio	Pkg Landfilled (g) / 1000 kg cat litter
Stand-up bag	2,248	125.40	182	99:1	8,941
Barrier carton	3812 (+70%)	540.46 (+331%)	6,684 (+3573%)	93:7	82,015 (+817%)
Rigid pail	34,371 (+1429%)	1,373.85 (+996%)	2676 (+1370%)	89:11	111,610 (+1148%)

All products were normalized to 2720 kg of product

Net: Flexible packaging significantly better environmental attributes than other formats

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Life cycle assessment (light) summary

- Flexible packaging has preferable metrics vs. other package formats in:
  - fossil fuel usage (energy)
  - greenhouse gas impact
  - water consumption
  - product-to-package ratio
  - material to landfill

Net: Flexible packaging aligns very well with SMM principles

Legislation/ regulations

- Packaging legislation being led in Europe – look at as precursor
- EU Circular economy – plastics recycling at 55% by 2030
- Extended producer responsibility (EPR) China National Sword
- Marine debris
- Food waste
- Single use plastic reduction or taxes
- Plastic straw ban (Seattle, Ft Myers)
- Australia - Senate inquiry into ban on single use plastics
- Australia – looking at all packaging reusable, compostable, or recyclable by 2025
- India – environmental minister looks to eliminate all single use plastics by 2022

Net: More legislation likely – with focus on end of life

“Voluntary” Actions

- Grocery Bags - Voluntary (Kroger) eliminating
- Starbucks & McDonald’s – collaborating on recyclable coffee cup
- Starbucks – eliminating straws (& new lid design)
- Iceland Grocer (UK) moving out of plastic on own branded goods
- Aramark – reducing food service plastic
- Major brands (and some converters) setting goals for recyclable/ compostable packaging

Net: Voluntary programs won’t be “voluntary” for long – being pushed by social drivers

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Flexible packaging opportunities & needs

Opportunity: Food waste

Global focus on food waste reduction

- About one-third of all food produced is wasted
- UN, EU, US EPA all have goals to reduce food waste by 50% by 2030 – legislation & voluntary programs

Flexible packaging opportunities to reduce food waste through:

- Portion control
- Tools/ case studies about food waste
- Compostable packaging – food service + fruits/ vegetables
- Enhanced process and packaging technologies (MAP, vacuum, HPP, active/ intelligent)

Opportunity & Challenge - Plastic Free Aisle

- Dutch retailer Ekoplaza has introduced a “plastic free aisle”
- Uses glass, metal, paper based and lots of compostable flexible packaging
- Over 1300 Plastic Free items
- Expanding to 74 stores by end of 2018

Photo from Washington Post & Ekoplaza – 2/28/18

Opportunity & Challenge: Marine Debris

Marine debris issue gaining momentum

- Ellen MacArthur Foundation report raising awareness
- Plastic straws
- Legislation/ taxes on single use plastics – Europe
- Some U.S. states consideration legislation (tax)
- * Note 46% of plastic in Great Pacific Ocean Patch consists of fishing nets

Flexible packaging opportunities to reduce marine debris:

- Support recycling/ recovery programs – particularly emerging markets in SE Asia
- Develop technology for marine degradable structures
- Use of recycled content

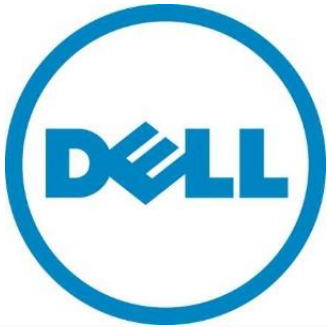
Flickr Cc: Bo Eide

Opportunity & Challenge: Recycling

- Number of initiatives to be aware of (and engaged in):
  - How2Recycle
  - CEFLEX
  - Materials Recovery for the Future (MRFF)
  - DSM/ APK – ”Newcycling” of multilayer films
  - REMADE - advance recovery of flexible packaging and plastic film
  - P&G PureCycle – PP recovery to near virgin level
  - BioCollection – take contaminated PE bags back to chemical level

Opportunity: Preparing for Future

Sampling of brand owners have all set goals for packaging that is recyclable or compostable – by 2025



Are you preparing to meet the needs of brands & consumers?

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Future for flexible packaging

- Bright future for flexible packaging – continue to enhance sustainability profile
- Very good sustainability story
- Consider social side of sustainability
- Collaboration for new technologies & recycling
- Merge SMM thinking with CE principles
- Embrace moonshots
- Educate – consumers, retailers, policy makers
- “A journey of a thousand miles begins with a single step.” - Lao Tzu

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Thank you

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