GLOBAL POUCH FORUM

A VIRTUAL EVENT

JUNE 8-10, 2021

Recycling Realities for Flexible Plastic Packaging

Betsy Dorn, Principal, Circular Matters LLC

561-337-5790
bdorn@circular-matters.com
https://circular-matters.com

Circular Matters

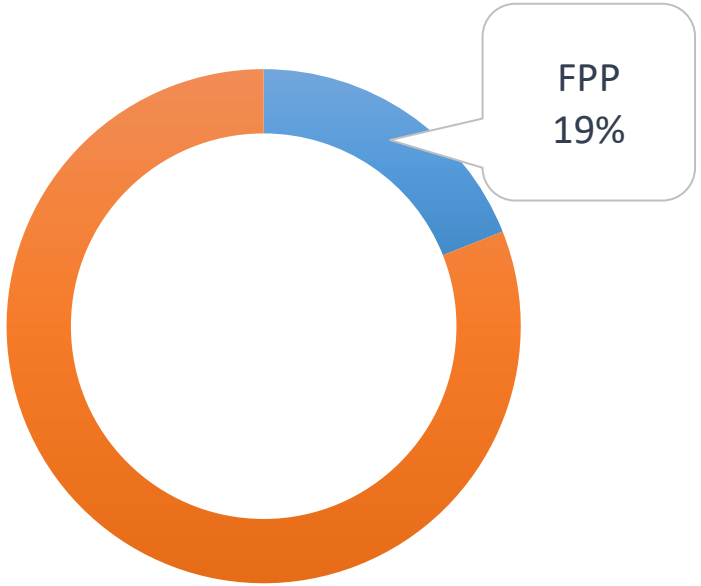
GLOBAL POUCH FORUM
A VIRTUAL EVENT
JUNE 8-10, 2021

Circular Matters LLC

- Dedicated to bringing about the circular economy
- Helping clients achieve their sustainable materials management and circular economy goals
- Services:
  - Recycling strategy development
  - End market development
  - Materials composition, capture and flow analyses
  - Policy analysis and positioning
  - Stakeholder mapping and engagement

Flexible plastic packaging (FPP)

- Second most popular packaging format in U.S. after corrugated cardboard (19% of U.S. packaging sales)
- Market is growing, with most prevalent uses being for food, beverage, and medical/ pharmaceutical products
- 51% of food packaging is FPP (per Flexible Packaging Association)



U.S. Packaging Market Share Based on Sales

Many sustainability benefits

- Uses fewer raw materials by weight – higher product-to-package ratio
- Requires less energy and water to produce
- Before filled, shipped on a roll or flat – achieving transportation efficiency
- Extends product shelf life due to barrier layers and ability to squeeze air out and reclose
- Resists breakage thereby protecting the product

However… needs a sustainable end-of-life solution

Landfill alternatives are limited

Composting:

- Only 15% of U.S. composting facilities accept some form of compostable packaging (SPC)
- Only 11% of the U.S. population has access to composting programs that accept some form of compostable packaging (SPC)
- More suitable for applications such as take out food packaging where food contaminated/potentially mixed with food to be composted

Landfill alternatives are limited

Recycling:

- Consumers like recyclable packaging, but only 13% of all U.S. plastic packaging (flexible & rigid) is recycled (U.S. EPA)
- Recycling rate for post-consumer plastic film – only around 4% for film from residential sources (More Recycling, 2018)
- About 3% of curbside recycling programs in the U.S. accept film (mostly PE film) – or 1% of all households (TRP)
- Recycling of post-consumer flexibles/films almost solely limited to store drop-off and mailback programs (e.g., Terra Cycle) – <2% capture

Recycling via store drop-off

Partially good news:

- Most North Americans have access to film recycling through store drop-offs – reportedly 18,000+ U.S. and Canada locations

Challenges/limitations:

- System was designed for clean, dry PE film only – largely bags and wraps
- Limited acceptance of pouches, due to contamination concerns

Some remedies

- ACC's Wrap Recycling Action Program (WRAP) promotional and best practices assistance
- APR's "Critical Guidance Test Protocol for PE Film and Flexible Packaging"
- SPC How2Recycle store drop-off label

Circular Matters

Store drop-off realities

- Many retailers are not WRAP participants and don't accept all PE materials
- Signs convey limited info – often only in English
- Little promotion in the community
- Containers often are:
  - Hard to locate, not near parking, sometimes inside
  - Full, and with small openings unsuitable for bagged material
- Non-PE/multi-layer FPP will still need a solution

Circular Matters

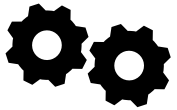
Trend

- Brands starting to promote recycling their packaging via store drop-offs:
  - Use of How2Recycle label
  - Website and advertising instructing consumers to use return to retail
    (Examples: Amazon PE envelope, Nature Valley Granola Bars)

Risks:

- Consumers may not distinguish acceptable PE packaging from non-acceptable multi-material packaging
- Participation and recovery will remain low (currently <2%), but much more volume might cause stores to end their programs

System transformation needed



Mechanical recycling options for “recycle ready” packaging

Chemical recycling options for acceptable packaging – preferably unsuited for mechanical recycling

Collection and processing infrastructure to feed both types of markets

Funding and policy to support system development/use

Circular Matters

GLOBAL POUCH FORUM A VIRTUAL EVENT JUNE 8-10, 2021

Mechanical recycling

- New markets are emerging (e.g., polymer modified asphalt, composite building materials, concrete aggregate); more needed
- Continued progress in design for recycling essential
- Additional reclamation capacity with wash lines needed
- On-pack labeling for consumers needed if separately managed
- Potential use of smart labeling (e.g., digital) to aid sorting

Challenges/limitations:

- Closed loop/circularity difficult to achieve
- Chemical recycling options still needed, since quality deteriorates

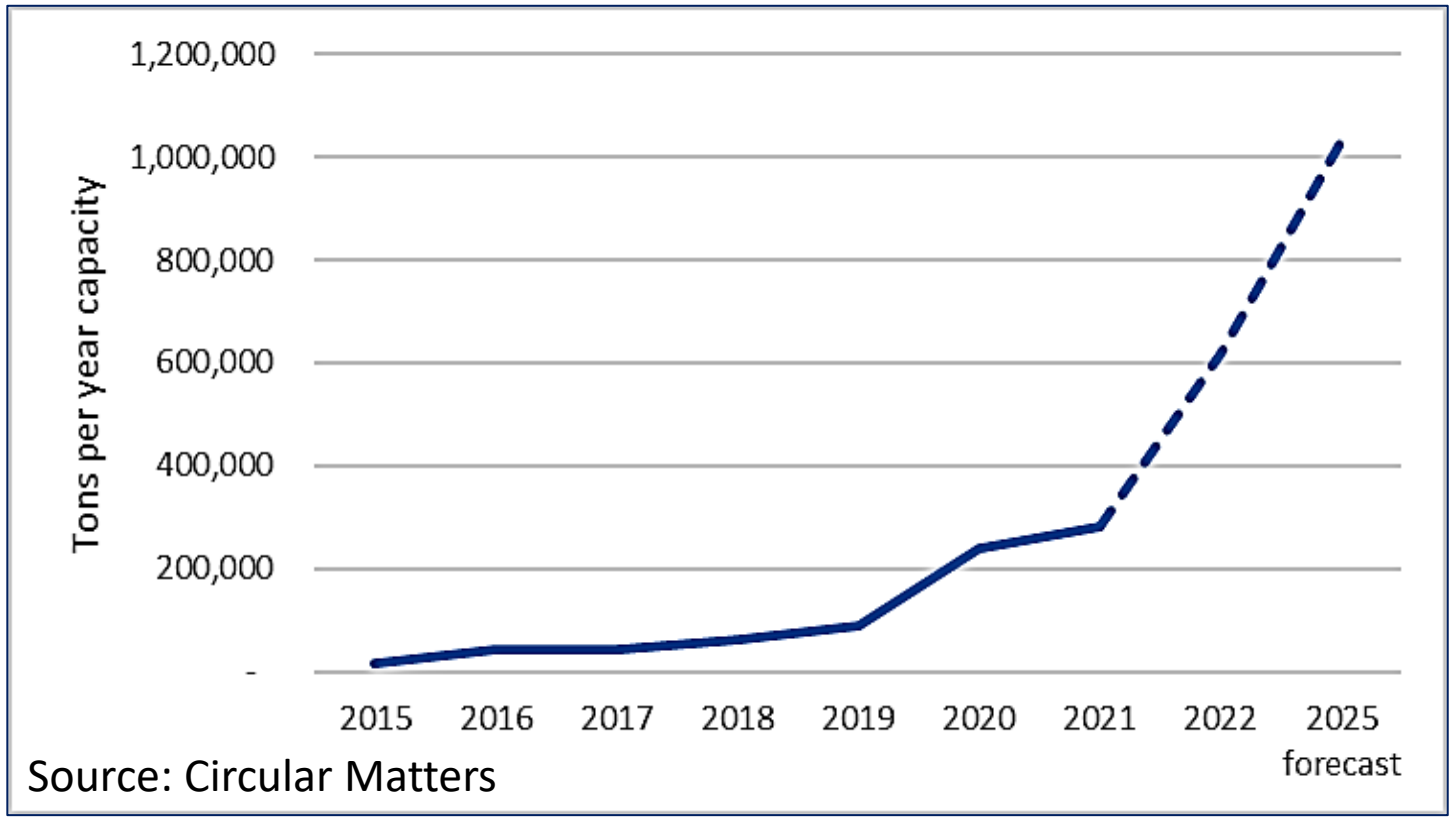
Chemical recycling

- Different technologies need different feedstocks
  - Gasification – unsorted plastics, some food/paper ok
  - Depolymerization – sorted single resin streams (PET, PS, nylons, PLA)
  - Pyrolysis – mixed plastics excluding PET, PVC and nylons
- Can supply resin for manufacture of new packaging

Challenges/limitations:

- Competition from engineered fuel producers
- Capacity in short term is likely to exceed available supply of feedstock
- Costly and will take time to scale up – likely five years or more
- Lifecycle impact questions, concern over competition with mechanical recycling

Chemical recycling growth – North America



Source: Circular Matters

Collection and processing

Options

- MRF of the Future approach for curbside recycling
- Hefty® EnergyBag® curbside recycling approach
- Separate collection (as for textiles in some communities)

Challenges/limitations:

- Solutions needed for rural & urban; single & multi-family; away-from-home
- MRFs and public policy trending towards limiting materials collected curbside
- System will need to supply both mechanical and chemical recycling markets
- Additional pre-processing will be needed prior to end market use

Desired future state

- For all packaging put forth in the market to be compatible with some form of sustainable end-of-life management option that keeps these packages out of waste and in the resource stream - to support the circular economy

What will it take?

- Strategic systems approach to determine actions needed to transition from current to desired future state
- Commitment from all value chain stakeholders to actively support the system, including funding and supporting policies such as recycled content mandates
- Recognition that the flexible plastic packaging recycling system needs to be integrated and compatible with recovery and processing of other post-consumer materials
- Providing consumers with convenient opportunities and incentives to participate in recycling with minimal confusion

Investment Needed for Residential FPP to be Widely Recycled

Expense Element	Cost
Upgraded MRF Investment (establishes loose film processing capacity in 136 MRFs and bagged capactiy in 239 MRFs)	$786,328,000
New MRF Investment (cost of building in film and flexible capacity in new MRFs)	$145,107,000
Bag Supply Over Five Years (all households under bagged systems receiving a supply of bags to participate in collection)	$2,550,972,000
General Education for Adding Film and Flexibles to Existing Collection Programs	$603,780,000
Total	**$4,086,187,000**

Projected tonnage if 50% recycled (U.S. Plastic Pact goal): 2,140,400 TPY

Source: Paying It Forward: How Investment in Recycling Will Pay Dividends
The Recycling Partnership, May 18, 2021

Key questions

- Who will lead system design and strategy development?
- How will other stakeholders be engaged?
- Where will the funding come from?
- What policies will incentivize desired behaviors of value chain players and consumers?

Circular Matters

GLOBAL POUCH FORUM A VIRTUAL EVENT JUNE 8-10, 2021

Leading organizations

- Flexible Packaging Association
- The Recycling Partnership
  - U.S. Plastics Pact
  - Circular Economy Accelerator
  - Film and Flexibles Coalition

The time to act is now – get involved