Who We Are

Why Research is Important to Do Now

Our 2016 Research Report

Where We Go From Here
MATERIALS RECOVERY FOR THE FUTURE
Research Collaborative
MRFF FOCUS IS THE PROCESSING ELEMENT OF THE SUSTAINABLE RECOVERY VALUE CHAIN

MAJOR EFFORTS IN THE U.S.

- Dow/FPA Energy Bag
- ACC-FFRG
- SPI FFBD and Recycling Committee
- Materials Recovery for the Future
- APR-Film Committee

Ensuring Sustainable System

Collection

Building Infrastructure

Public-Private Coordination

Supporting Policies

End Markets

Education & Engagement
Flexible packaging is recycled, and the recovery community captures value from it.
Companies are committed to finding recovery solutions for flexible plastic packaging
We don’t want **landfills to be excavated** in 50 years and our flexible plastic bags, bearing our company’s name, show up as “permanent branded litter”… the problem is bigger than one company, so it makes sense to work in a research collaboration.

MRFF PARTNER COMPANY REPRESENTATIVE
CONSUMERS ARE LOOKING FOR PACKAGING THAT CAN BE RECYCLED ACROSS A RANGE OF CATEGORIES

% consumers indicating “recyclable packaging” is very/somewhat important to their purchase of the following types of products

- Household cleaning: 80%
- Personal care: 73%
- Food and beverage: 73%
Consumers are interested in learning about what companies are doing to lessen packaging and reduce the waste they produce

About 1 out of every 2 consumers are interested in learning more about what companies are doing to:

- Use more recycled contents in their products and packaging (46%)
- Use less packaging (45%)
- Reduce the amount of trash and other waste they produce (51%)

Companies have an opportunity to build strong brand loyalty with interested customers that want to see more environmentally-friendly packaging practices.
Products and companies which keep sustainability as a focus are being viewed in a more positive light

Adding tangible benefits to products, such as recyclable packaging, can make a difference in how much consumers are willing to spend on environmentally-friendly products.

<table>
<thead>
<tr>
<th>% general population who completely/somewhat agree</th>
<th>2009</th>
<th>2015</th>
<th></th>
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<tr>
<td>knowing a company is mindful of its impact on the environment and society...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowing...makes me more likely to try their products or services.</td>
<td>52%</td>
<td>57%</td>
<td>MORE LIKELY TO TRY</td>
</tr>
<tr>
<td>Knowing...makes me more likely to buy their products repeatedly</td>
<td>48%</td>
<td>53%</td>
<td>MORE LIKELY TO PURCHASE</td>
</tr>
<tr>
<td>Knowing...makes me more likely to talk with my friends and family about the company.</td>
<td>40%</td>
<td>46%</td>
<td>MORE LIKELY TO INFLUENCE</td>
</tr>
<tr>
<td>Knowing...makes me less concerned with the price of their products</td>
<td>25%</td>
<td>33%</td>
<td>LESS PRICE SENSITIVE</td>
</tr>
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TOTAL LIFE CYCLE MANAGEMENT IS THE EXPECTATION FOR PACKAGING

While flexible packaging performs well from a life cycle perspective, many stakeholders expect end-of-life management options to improve.

*Flexible Packaging: Less Resources, Energy, Emissions & Waste*
THE PACKAGING STREAM IS EVOLVING –
2012 to 1990 Baseline

*% of waste stream | Source: RRS
Flexible packaging currently present in residential recycling stream as contaminant

Acts like paper in a material recovery facility (MRF); ends up in same places

Positive sort for flexibles may:
  • increase quality of MRF paper products while reducing costs of further processing
  • create new MRF flexible plastic bale
THE RECOVERY VALUE CHAIN: COLLABORATION IS KEY GIVEN OVERLAPPING INTERESTS
THE PROBLEM:
Flexible Packaging Presents Processing Challenges for Today’s MRFs
4 KEY QUESTIONS FOR MRFF RESEARCH

1 | ACCESS
Bagged or Loose?

2 | MRF
How can it be affordably sorted at the MRF?

3 | PLASTICS RECOVERY FACILITY
How can increased value be created for the material?

4 | NEW PRODUCTS OR ENERGY
What are viable end markets for the range of materials?
THE KEY PATHWAY FOR OUR RESEARCH – Can loose flexible plastic be separated in a MRF system?

Collection System

Consumer

- Bagged
- Loose

MRF

- Hand-Pulled
- Hand-Pulled
- Auto-Sorted
- Mixed Flexibles Bale

End Markets

- Thermal Conversion
- Marketable Grades

Without affecting the other value streams?
2016 RESEARCH RESULTS

Baseline Test • Equipment Testing
MRF Testing
Baseline Test Conducted November 2015

88% of flexible plastic packaging flowed to the fiber lines.

Optical sorters extracted a relatively clean stream of flexibles from the fiber.

Screens and optical sorters were overwhelmed.
Equipment Tests Conducted December 2015 - March 2016

90% of flexible plastic packaging was sorted from the test stream

Identified ejection and recognition challenges
MRF Test 1 Conducted
May 2016

82%
of the test material flowed through the optical sorters

70%
Optical sorter efficiency

⚠️
Large quantity of paper with the ejected flexible plastic packaging
<table>
<thead>
<tr>
<th>%</th>
<th>Description</th>
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<tbody>
<tr>
<td>85%</td>
<td>of flexible plastic packaging captured by 2 passes of optical sorting</td>
</tr>
<tr>
<td>89%</td>
<td>of flexible plastic packaging captured by 3 passes of optical sorting</td>
</tr>
<tr>
<td>!</td>
<td>Still a sizable quantity of paper with the ejected flexible plastic packaging</td>
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</tbody>
</table>
Airflow control over acceleration conveyor and in collection hood plays a major role in successfully sorting flexible packaging from paper.
IMPORTANT PARTNERSHIPS FORMED: MRF Test Teams

Larry Baner, Nestle Purina
Michael Timpane, RRS
Emmie Leung, Emterra Environmental
Jeff Wooster, Dow
Steve Sikra, P&G
Kerry Sandford, RRS

Brennan Madden, RRS
Chris King, RRS
Jon Pyper, Dow
Susan Graff, RRS
Sandi Childs, APR
Nevil Davies, Emterra Environmental
MATERIALS RECOVERY FOR THE FUTURE
Global Strategy

Address Key Challenges Through Existing Technologies

Conversion
For example, waste to energy. Potential solutions for smaller communities or those that want to target the broad range of plastics not currently recycled

Flexible Plastics Research Program

MRF Equipment Testing Program
2015-2016 research program aimed at testing most feasible solution based on net system costs and adaptation of existing sortation technology

Re-processing, End Markets and Pilot
2016-17 research to refine MRF sorting efficiency, evaluate reprocessing cost/feasibility, and characterize product bale for end market uses

Define System of the Future
Additional work with more diverse recovery value chain partners to conduct demonstration project and develop recovery infrastructure that handles new mix of materials

*Looking for partners to participate in these programs
OBJECTIVE

Demonstrate flexible packaging recycling with a partner at a community MRF, with a plan to sort both PE and all others; and, expecting our MRF partner will require equipment modifications and testing—perform lab testing when necessary in support of the implementation at the MRF.

2017 Work Streams

- End Market Assessment
- Identify Community MRF Pilot
- Equipment Testing
- Communicate & Report Engage the Recycling Industry
WE INVITE YOU TO BECOME PART OF THE SOLUTION

Success depends on broad collaboration to solve for flexibles recycling. Transparent sharing of data.

Join our mailing list to receive MRFF news and research findings.

Join Us! Become a sponsor or research partner that will culminate in a community MRF pilot.
THANK YOU

For more information or to join contact:

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