Responding To Changing Market Conditions

Carrie Nash

CIF Project Manager

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Current Challenges

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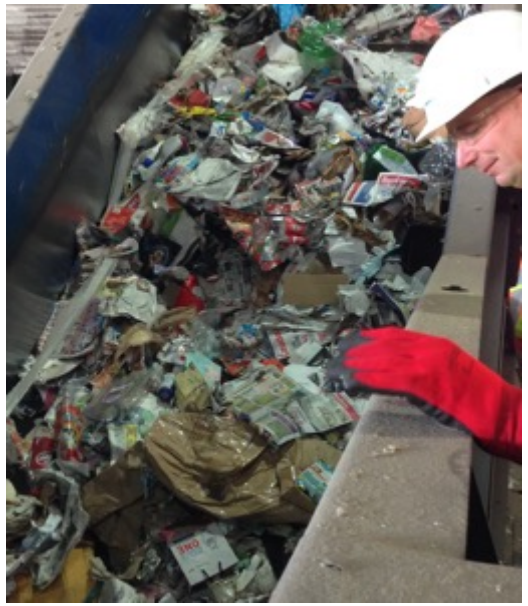
Long Term Implications



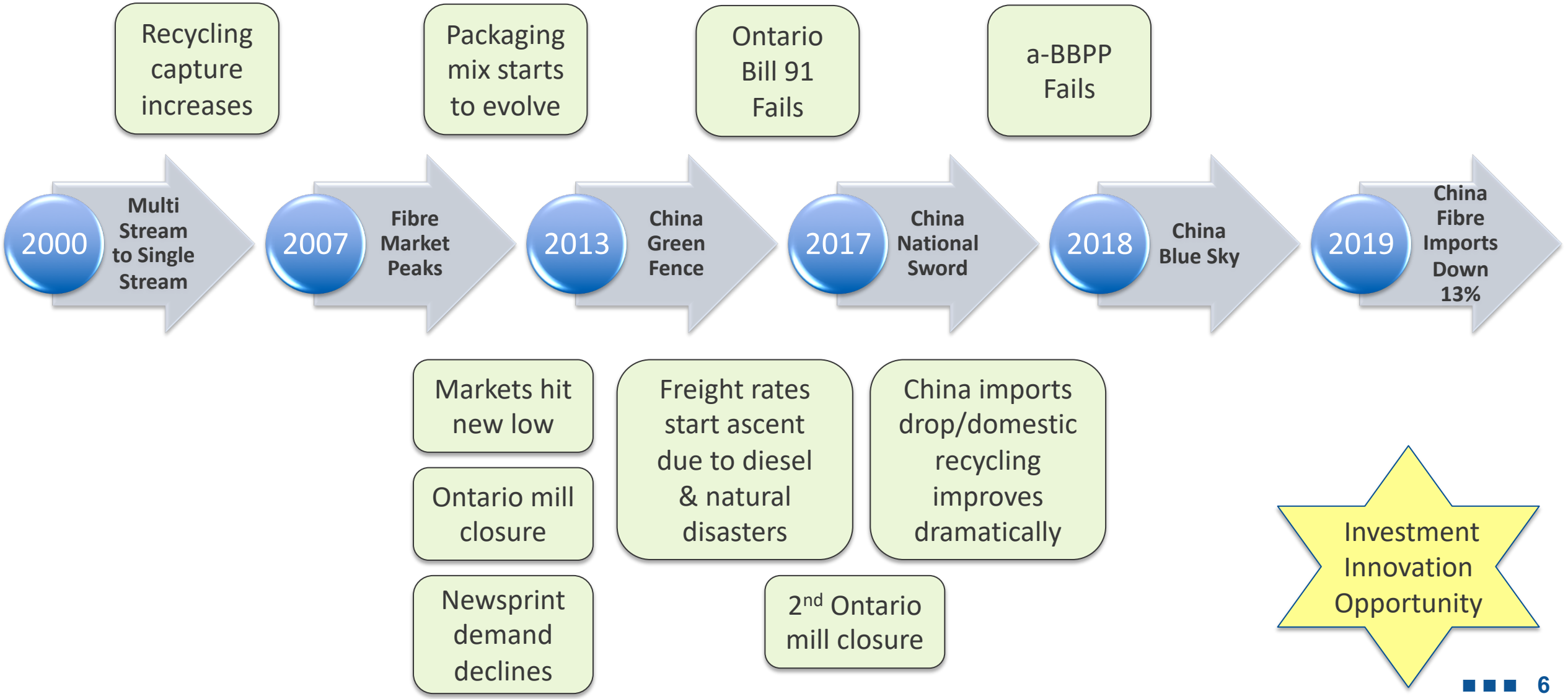
Updates from the Trenches

- Sherry Arcaro, VP Consulting Services & Commodity Sales, ReMM
  - *Fibre Market Stability & Current Trends*
- Eadaoin Quinn, Director, Business Development & Procurement, EFS Plastics Inc.
  - *Mixed Plastic & Film Market Conditions*
- Rodney Libby, District Facilities Manager, Miller Waste
  - *Operational Realities, Managing it all in the MRF*
- Don Holliday, President, Holliday Recycling Technologies
  - *Next Gen Technologies, Opportunities & Practical Limitations*

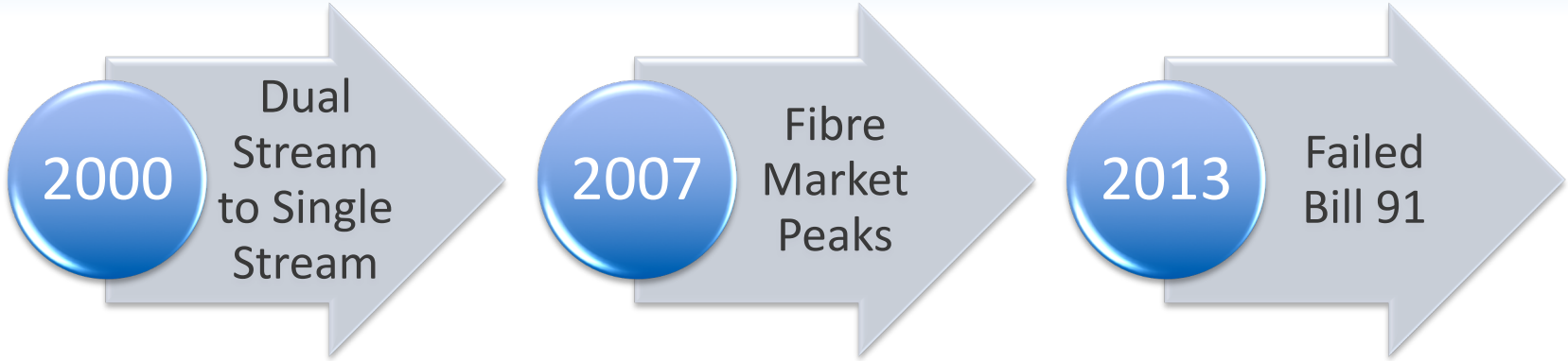
Fibre Market Stability & Current Trends

Sherry Arcaro, VP of Consulting

Timeline of Ontario Fibre Marketing Influences



The Shift to Single Stream & Market Capacity



- Transition of many North American MRFs to single-stream
- Decline in North American newsprint demand
- "China Effect" – increase demand by Asian markets
- Ontario program policy uncertainty

Changing Times in China & the Impact on Ontario

- "Green Fence" intensive load inspections carried out for 10 +/- months
- "National Sword" inspecting bales for quality, permits & smuggling
- Environmental initiatives in China – use own resources
- North American markets benefit from reduced material value
- "Blue Sky" material bans, Chinese investment in N.A. marketplace
- Market flooded, programs landfill or stop collecting difficult to market materials

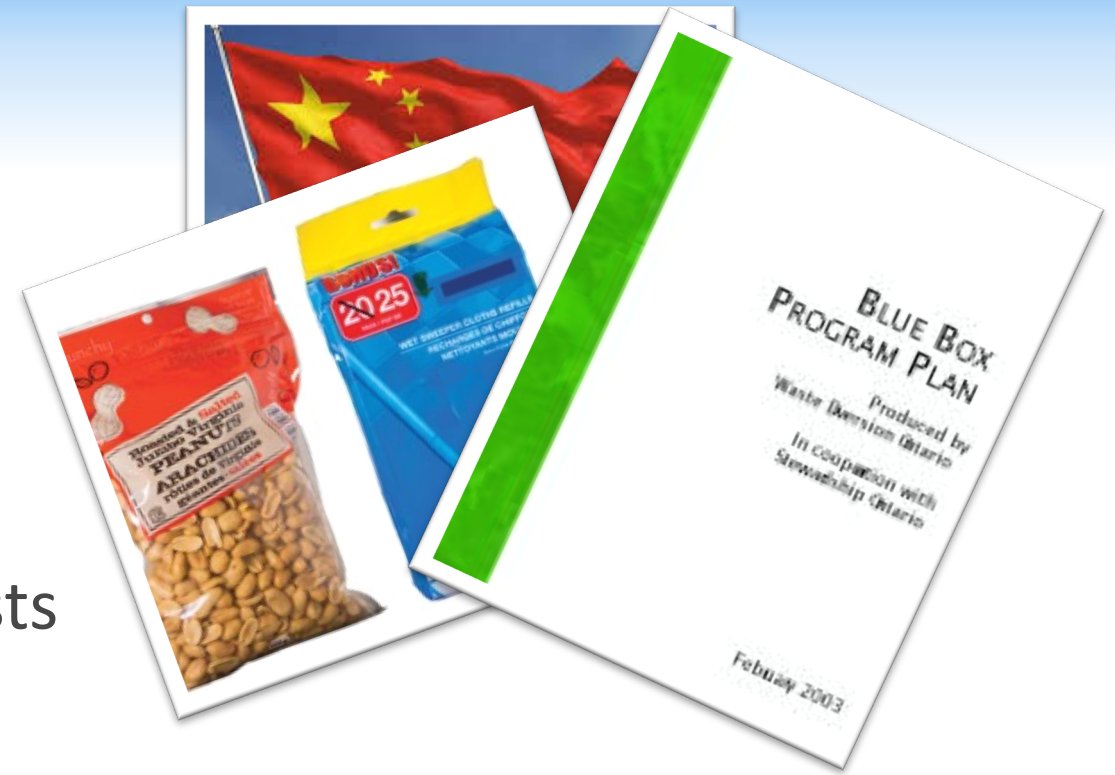
Status of Other Overseas Markets

- South Korea, India, Taiwan, Malaysia, Vietnam
- Took advantage of depressed material values
- Under pressure to tighten imports due to overload & quality

"May 2018 - Vietnamese ports report becoming overloaded with scrap materials, announce they'll temporarily stop accepting loads."

Resource Recycling

The Perfect Storm



- China environmental initiatives
- Uncertainty of Ontario Blue Box Program Policy
- Depressed markets + increased fuel costs = contract price increase requests
- Contract extensions & lack of new investment in infrastructure
- Evolving packaging types require innovation & investment
- New market investments in North America take time to commission

Material Specifications vs. Actual Bale Content

Sorted Residential Papers #56

Sorted newspaper, junk mail, magazines, printing & writing paper & other acceptable papers from residential programs.

Should be free of OCC/OBB & brown grades

Prohibitive Materials – 2%

Outthrows – 3%

Prohibitives

These include any items that are not in the paper category. Examples include glass, plastics, metals & so on

Outthrows

These include any items that are derived from paper but not of the correct grade. Examples include boxboard and/or cardboard being found in a newspaper bale

Prohibitives Found in #56 Sorted Residential Paper

Sorted Residential Paper #56 Audit Findings

Prohibitives must be less than 2%

- The highest percentage was 8.0%
  - This supplier had 19.0% in out-throws
- The lowest percentage was 0.4%
  - This supplier had 8.2% in out-throws

Outthrows must be less than 3%

- The highest percentage was 30.8%
  - This supplier had 3.3% in prohibitives
- The lowest percentage was 5.8%
  - This supplier had 6.7% in prohibitives

16,800 lbs of material sorted from 11 suppliers

Average Prohibitives – 3.3%
Average Outthrows – 19%

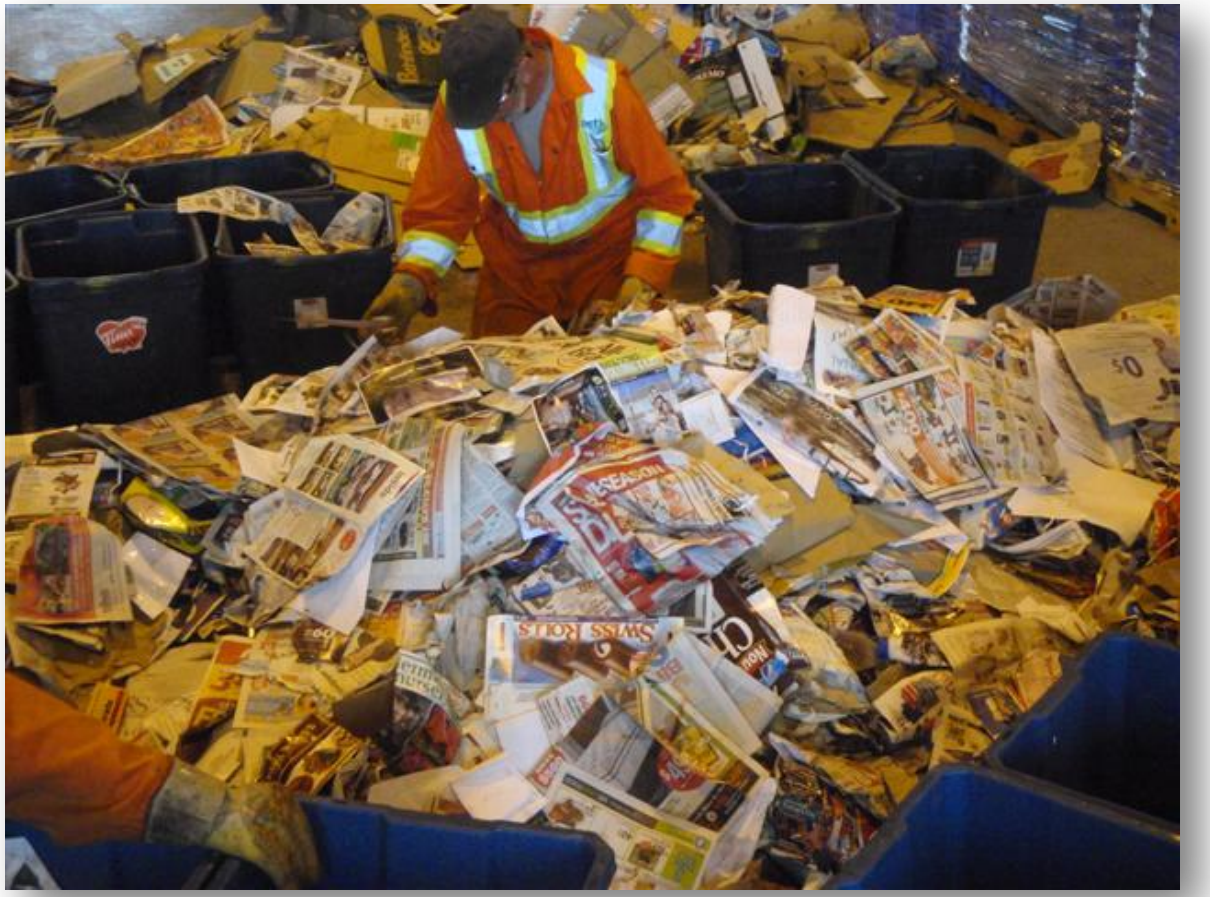
Were We Making the Grade?

Small Urban

#8 News – 45%

Outthrows – 39%

Prohibitives – 16%



Medium Urban

#8 News – 77%

Outthrows – 19%

Prohibitives – 4%

Rural Regional

#8 News – 85%

Outthrows – 13%

Prohibitives – 2%

Large Urban

#8 News – 77%

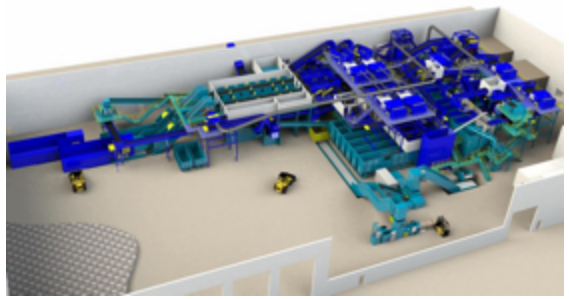
Outthrows – 17%

Prohibitives – 6%

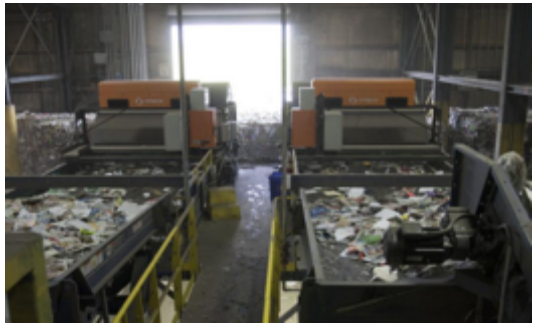
Data based on 27 (50kg+) #8 News samples
2013-16 averaged by municipal type

A Sample of the Investments in Fibre Clean-up

Municipality	Project
Niagara Region	Fibre Optical Sorting System Upgrade
Essex Windsor	Fibre Optical Sorting System Upgrade
Peel Region	Retrofit of the entire MRF – Installation of AI optical sorters
York Region	Mixed Paper Clean Up System – Installation of Ballistic Separator & Optical Sort System



Source: Machinex & CFL rendering of Region of Peel MRF Upgrades



Source: CIF Report Fibre Optical Sorting System Niagara Region

Source: Essex Windsor Fibre Optical Sorting System Report

Source: CIF Report Mixed Paper Clean Up System York Region

North American Fibre Market Expansion

- New opportunities - future capacity, fibre substitution, innovation & incentives
- 6 million (approx.) tonnes of annual fibre capacity in system currently
- 2.5 (approx.) million future capacity coming online 2019 – 2021
- Future capacity needs may offer “back haul” opportunities for Ontario MRFs

**Data source - ReMM Group “Ontario Fibre Capacity Study – December 24, 2018”*

Top Tips to “Make the Grade”

- Understand the quality expectations of multiple markets to decrease dependency on any one market
- Strive towards meeting the most stringent market specification to give flexibility to ship to multiple markets
- Invest in sorting/cleaning systems
- Increase QC on sort line
- Take the time to dress the bales

Thank-you!

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Plastic Recycling Post-National Sword

Eadaoin Quinn

EFS-plastics Inc.

Agenda

- EFS-plastics company overview
- Materials we process & produce

- #3-7
  - Market challenges
  - Market opportunities
  - Options for sorting #3-7 & PP
  - Public messaging
- Film
  - Challenge handling film in MRFs
  - Oversupply in market
  - Need for commitments to Recycled Content Minimum

About EFS-plastics

- **Since 2007**: EFS has specialized in post-consumer plastic film & mixed rigid plastic recycling & compounding
- **Per year**: Converting over 20,000 metric tonnes of mixed rigid plastic & over 10,000 metric tonnes of film per year
- Creating a high quality pellet, which is able to replace prime resin up to 100%

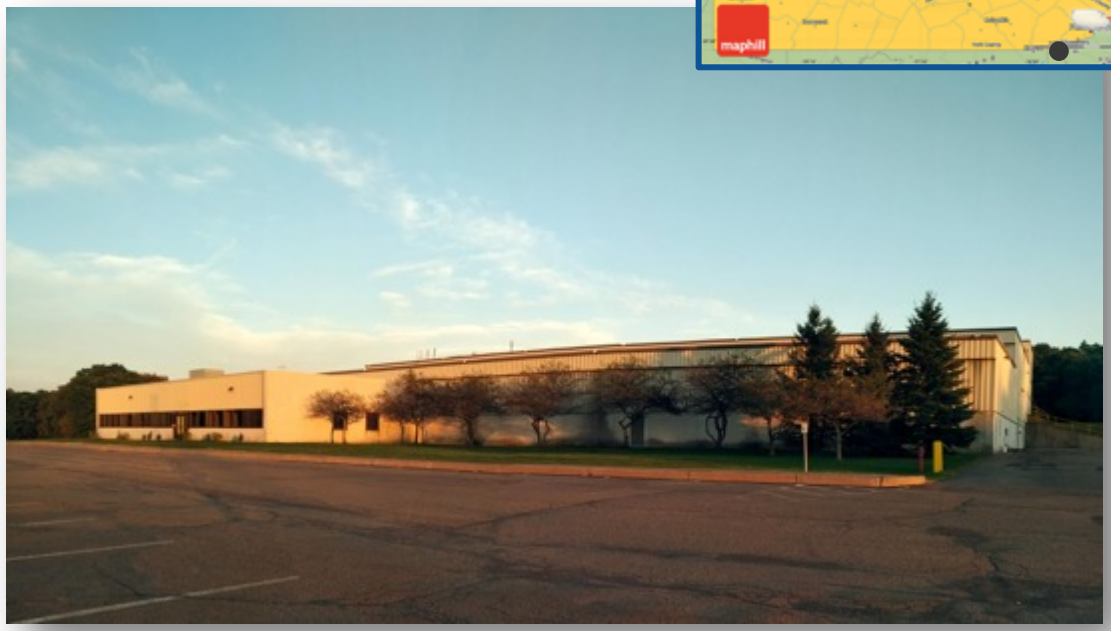
POST-CONSUMER PLASTIC BALE

100% PCR PELLETS

Current EFS Locations (1)

Listowel, Ontario

Hazelton, Pennsylvania



Current EFS Locations (2)

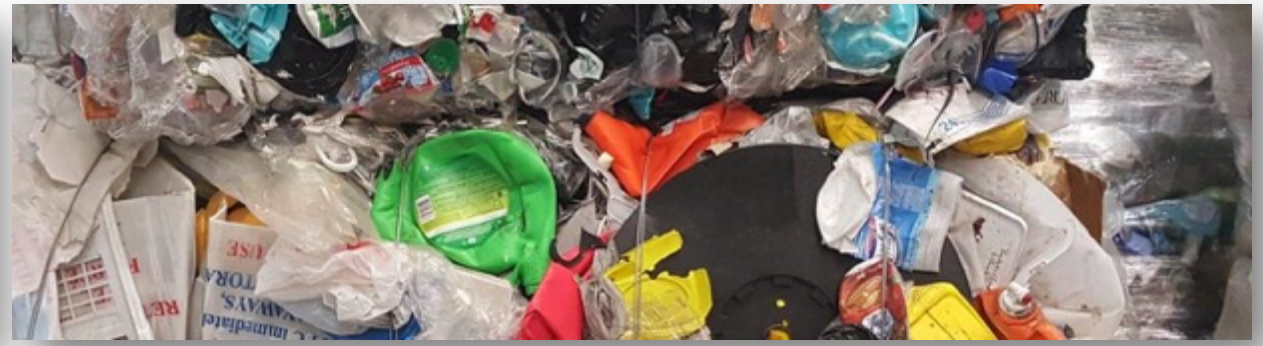
Listowel, Ontario

- Receives MRF grade, post-consumer material
  - Mixed Plastic
  - Film
- 24-6 operation schedule
- ~45 employees
- $15 million investment in equipment & upgrades

Hazelton, Pennsylvania

- Receives MRF grade, post-consumer material
  - Film
- 24-6 operations schedule
- ~17 employees
- $9 million investment in equipment

Material Specifications (1)



Post-Consumer Film Bales	
HDPE & LDPE film (#2; #4)	min 76%
Other plastics	up to 15%
Paper	up to 10%
Sand, Glass, small metal (cans, etc.)	up to 2%
Total contaminants	< 24% by weight

Post-Consumer Mixed Plastic Bales	
HDPE (#2); LDPE (#4); PP (#5)	min 55%
Other rigid plastics (#1; #3; #6; #7)	up to 40%
PE film plastics (#2; #4)	up to 10%
EPS (#6)	up to 1%
Paper	up to 7%
Sand, Glass, small metal (cans, etc.)	up to 2%
Total contaminants	<45% by weight

Material Specifications (2)

HDPE (#2) Bales	
HDPE (#2)	min 85%
PP (#5)	up to 5%
Other rigid plastics (#1; #3; #7)	up to 8%
Film plastics (#4)	up to 2%
EPS (#6)	up to 1%
Paper	up to 4%
Sand, Glass, small metal (cans, etc.)	up to 2%
Total contaminants	<15% by weight

Polypropylene (#5) Bales	
PP (#5)	min 85%
HDPE (#2) & LDPE (#4)	up to 8%
PE film plastics (#2; #4)	up to 10%
Film plastics (#4)	up to 2%
EPS (#6)	up to 1%
Paper	up to 4%
Sand, Glass, small metal (cans, etc.)	up to 2%
Total contaminants	<15% by weight

EFS Recycling Process

- Separate lines for mixed plastic & film
- Fully automated system
- Grind, wash & pelletize

Examples of End Markets for Resin Pellets

- Rigid PE & PP Pellets

- Film LDPE Pellets

Impact of National Sword on Plastics

- Recycled plastics from the U.S. to China dropped by over 90 percent in first few months
  - From 55,000 MT/month to 4, 000 MT/month
- PET, HDPE, PP, Grade A Film
  - Minimal impact from National Sword
  - Most had been sold domestically before the import ban
- Bulky Rigid, #1-7, #3-7, Grade B Film
  - Substantial market shift
  - West coast hit hardest
- PET thermoform, Grade C Film & MRF-grade Film
  - Market evaporation

Chinese customs officials inspect waste materials (REB News)

EFS Expansion

- **Ontario**
  - Installed a second extruder in February; 30% capacity expansion
- **Pennsylvania**
  - Opened facility in May 2018
  - Installing second operations line in April; 50% capacity expansion
- **Third facility**
  - Planning to open new facility closer to west coast in mid-2020

Looking for New Suppliers

#3-7 Mixed: 55% yield PP + PE

- Positive manual sort on container line after bulky, metal, #1, & #2 removed
  - Recover all remaining plastic
- Negative manual sort on residue line
  - Focus on removing paper, metal, film
- Positive optical sort anywhere on container line
  - Shoot on #3-7
  - Shoot on #2, #4, #5
- Negative optical sort on residue line
  - Shoot on paper, metal, film

PP: 85% yield PP

- Positive manual sort
  - Dairy, deli, & take-out containers
- Positive optical sort
  - Shoot on #5

Message Public Receives about Plastic Recycling

NATIONAL GEOGRAPHIC

Plastic Recycling Is Broken. Here's How to Fix It.

THE WALL STREET JOURNAL.

New York Passes a Plastic-Bag Ban

npr

Where Will Your Plastic Trash Go Now That China Doesn't Want It?

KUOW .ORG 94.9

Why some Washington counties may stop recycling plastic

People

Dead Pregnant Sperm Whale Washes Ashore in Sardinia with 48 Lbs. of Plastic in Her Stomach

Vox

China isn't taking plastic recycling. It's creating a crisis.

Today's Plastic Bag Problem (1)

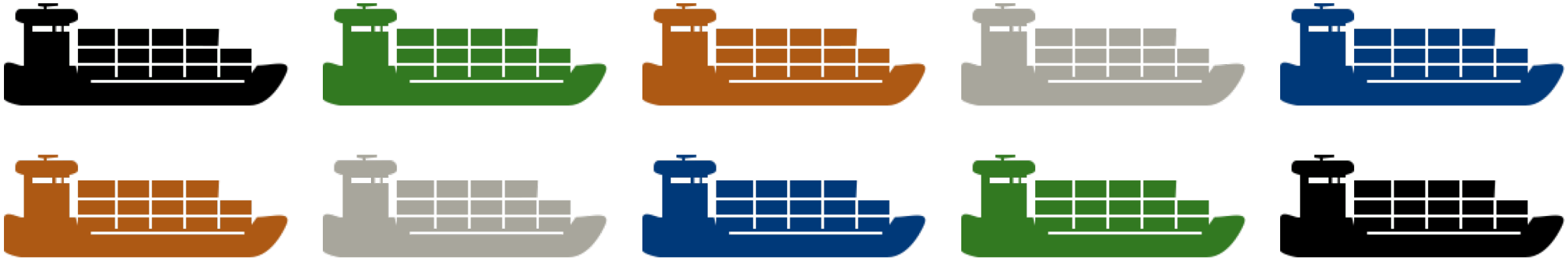
- Before National Sword, half of all plastic bags used to go to China
- Oversupply of PE film available in North America
  - Shortage of recyclers for PE film
  - Extreme shortage of recyclers for MRF-grade PE film

Plastic bag recycling facility in China ("Plastic China", Documentary, 2016)

Today's Plastic Bag Problem (2)

600 million pounds of PE film

collected for recycling in 2018 has been or is destined to be landfilled or incinerated



Opportunity Created by Increased Supply

27 EFS-sized film recyclers

needed to fill the void created by National Sword

Challenge in the Marketplace (1)

- Upfront operational challenges
  - Equipment adjustments needed to handle PCR
  - Increased logistics due to multiple supply sources
- Price of prime resin is going down
  - PCR is often selected for its lower price point

Plastic bag manufacturing (Shutterstock)

Challenge in the Marketplace (2)

- **Over-supply:**
  - How can we prevent millions of pounds of film from being landfilled?

- **Lack of demand:**
  - How can film manufacturers be incentivized to use PCR film?

Recycled Content Minimum for Plastic Bags

- Drafted a “call to action” describing the challenge & proposing solution
- Would like to see government legislation, procurement policy or brand commitments
- Focus on garbage bags & retail carryout bags

Recommended Minimum PCR in Garbage Bags	Recommended Minimum PCR in Retail Carryout Bags
• 10% by 2020 • 15% by 2022 • 20% by 2024	• 10% by 2021 • 15% by 2023 • 20% by 2025

Recycled Content in Plastic Bag Legislation in North America

- California
  - 10% in all trash can liners
  - Currently, 20% PCR content in plastic film bags labelled as reusable
  - By 2020, 40% PCR content in plastic film bags labelled as reusable
- Washington (still pending final approval)
  - By 2020, 40% PCR content in plastic film bags labelled as reusable

Co-signatories on the Call-to-Action

www.recycle**more**bags.com

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MRF Challenges in a Post China National Sword World




Rodney Libby, District Manager, Facilities

MRF Challenges in a Post China National Sword World

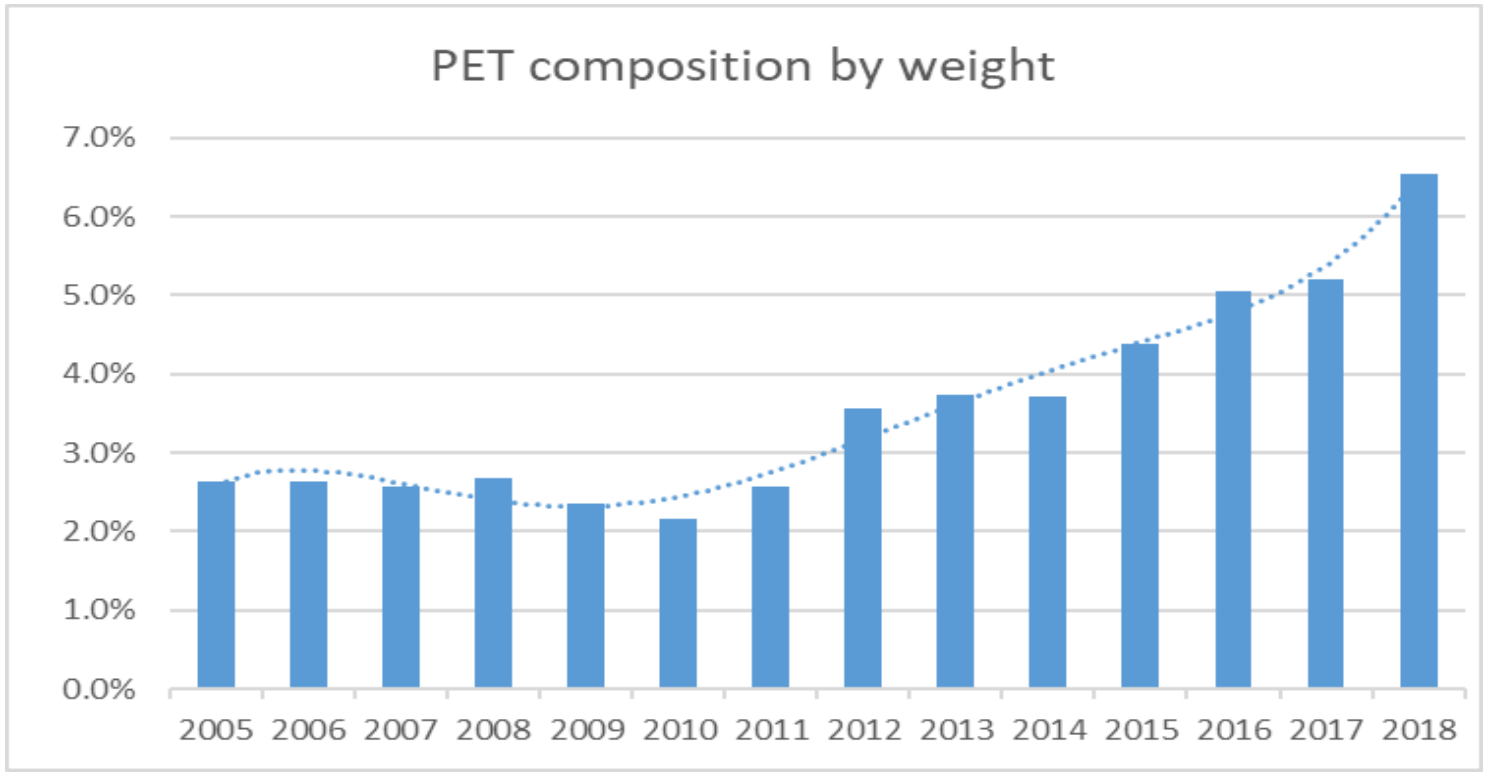
- Some questions being asked today:
  - Why are my processing costs increasing?
  - If I upgraded my MRF would that fix everything?
  - Is my program's contamination level really that bad?
  - If I could only make one change to my program, what would you suggest?

Why Are My Processing Costs Increasing?

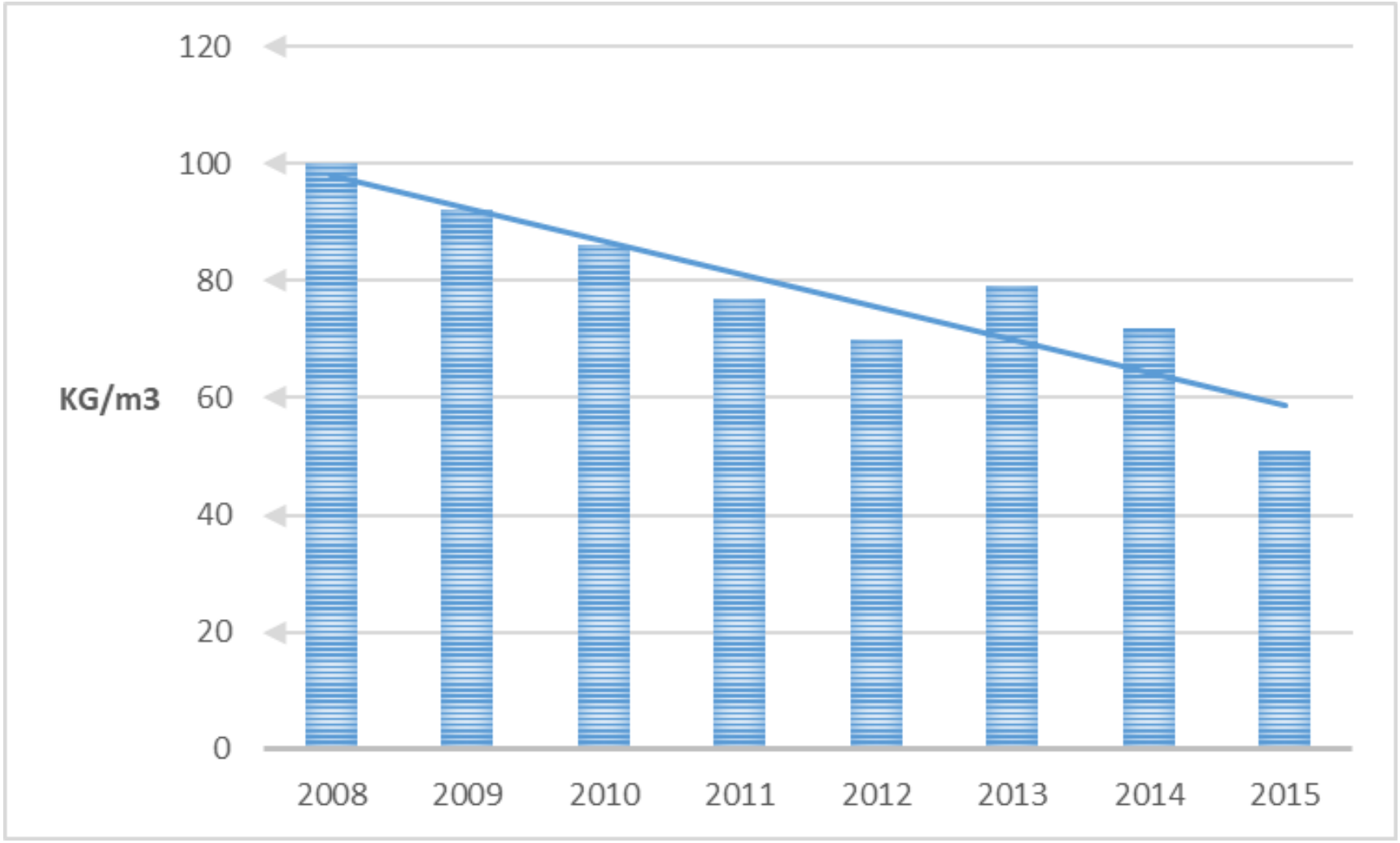
- Material composition has changed dramatically
- Quality specs have increased
- Contamination has increased
- Revenues are volatile

Material Composition is Changing

- For example: the composition of PET by weight has changed drastically over the years (based on marketed tonnes)



Material Density is Decreasing



Contamination Levels Are Rising

- Residue rates have increased & as they do, so will the costs, as it…
  - Decreases throughput levels
  - Increases transportation and disposal costs
  - Increases the risk of quality issues
  - Increases maintenance costs

Marketing – Risk vs. Reward

- Are there profit sharing or contractual obligations tied directly to end markets or price sheets?
- We all know the state the markets are in at this time
- Is your facility strategically located?
- Have you recently done any upgrades to increase quality?

Maintenance Costs

- How old is your facility & its processing equipment?
- How large is your facility?
- Mechanical optimization doesn’t mean cheaper

If I Upgraded My MRF, Would That Fix Everything?

- Upgrades are necessary to stay current with the ever changing Blue Box composition & marketing concerns, however …

Upgrade Considerations

- One specific upgrade is not going to fix everything
  - What is your primary concern?
  - ROI?
- It's an inter-related system
  - A change to one part of the system will have unexpected impacts elsewhere
  - There are different ways of achieving the same outcome
  - Focus on market quality

Remember...

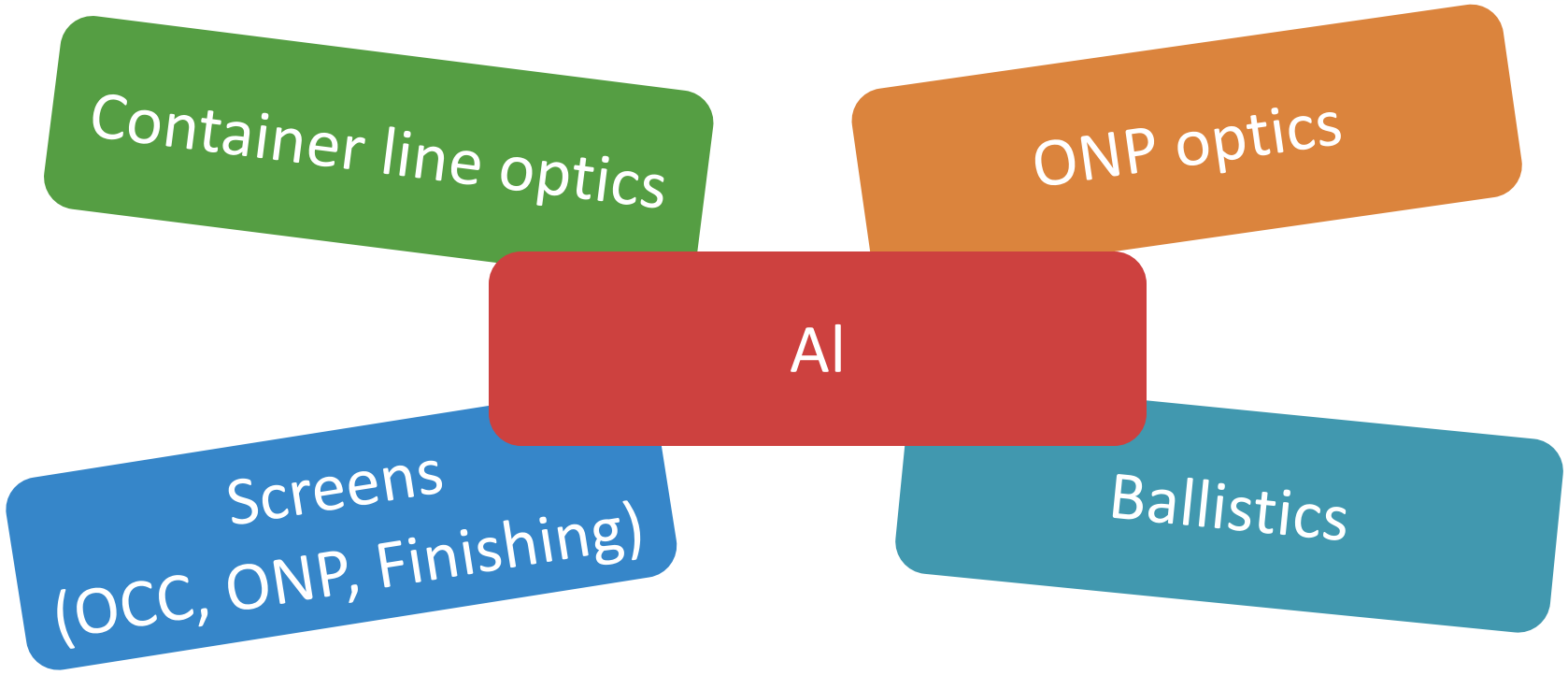
- The targets we are chasing are forever moving
- So be prepared to:
  - Evaluate processes every 3 years; and,
  - Retool every 5 years

Contamination Levels in My Program…What Are They Actually?

- Contamination rates vary for a number of reasons:
  - Single stream vs. 2 stream
  - Bag & tote collection
  - Compaction
  - Resident confusion
  - Poor quality recyclables
  - Cross contamination
- What does 1% of contamination equal in terms of lost recyclables?

If I Could Make One Change to My Program, What Would It Be?

Hmmmm…Is it?



My opinion is …

it all starts with two stream recycling

Thank you!

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Holliday
Recycling Technologies

Next Gen Technologies, Opportunities & Practical Limitations

Don Holliday

Owner/Operator

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The Struggle is Real

- Contamination
- Material changes
- Tightening markets

What can we do?

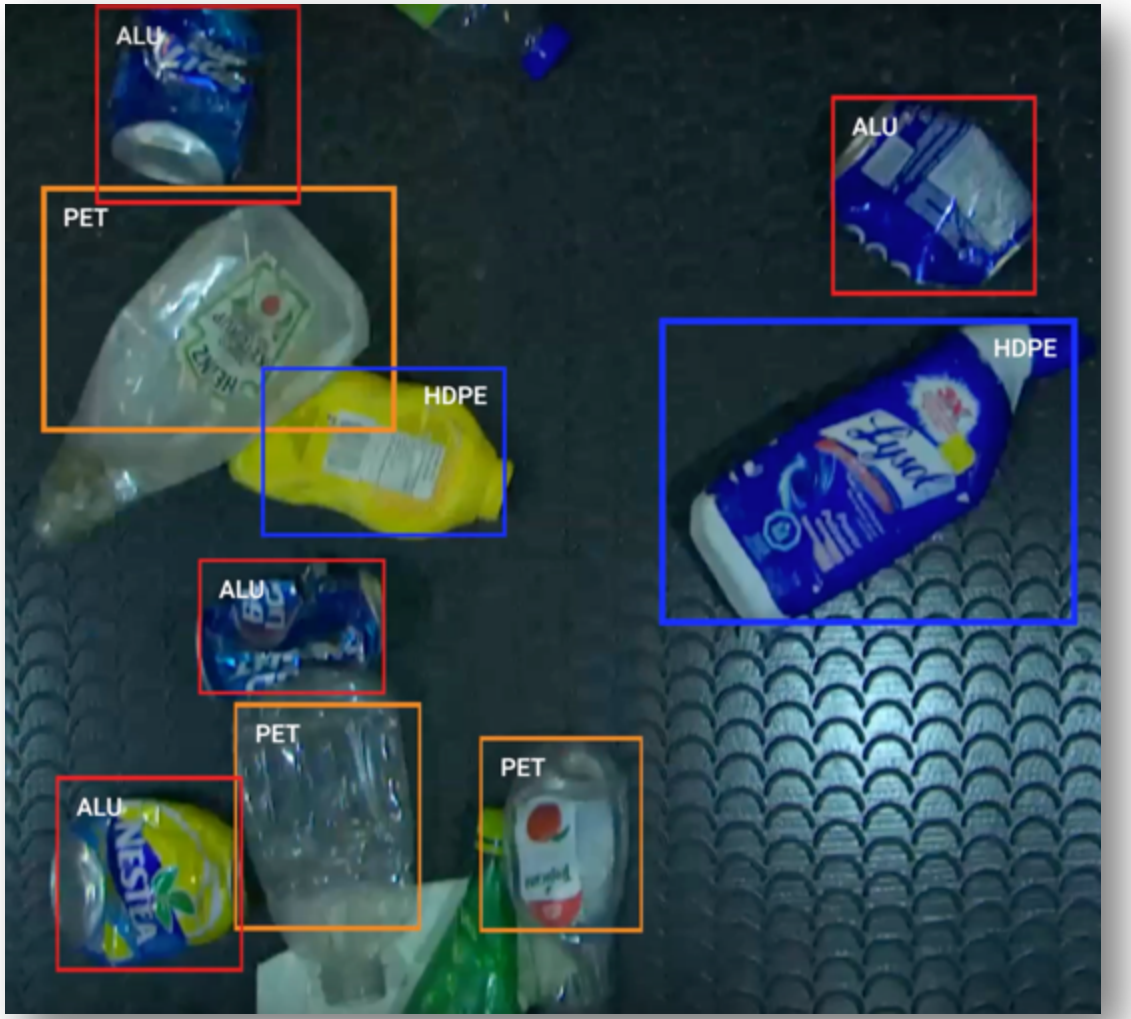
Next Gen Technologies: Opportunities & Limitations (1)

- Outside the MRF Solutions:
- Curbside
  - ‘circular economy bags’
- Re-define Diversion (e.g. pyrolysis)
- Limit Contamination at source

Photo courtesy of City of Guelph

Next Gen Technologies: Opportunities & Limitations (2)

- Inside the MRF Solutions:
- A.I. & robotics
- Ballistic separators
- Optical
- Screens



Effective Non Tech Solutions

- Operational process controls:
- Blend/Blend/Blend the tip floor
- Run “Sweet Spot/Balanced System”
- Keep down time records
- Preventative maintenance program
- Know your markets

Tech vs. Non Tech Approach? Which One When?

Audit to find out:

- Inbound loads
- Baled product
- Key equipment
- Manual sort stations

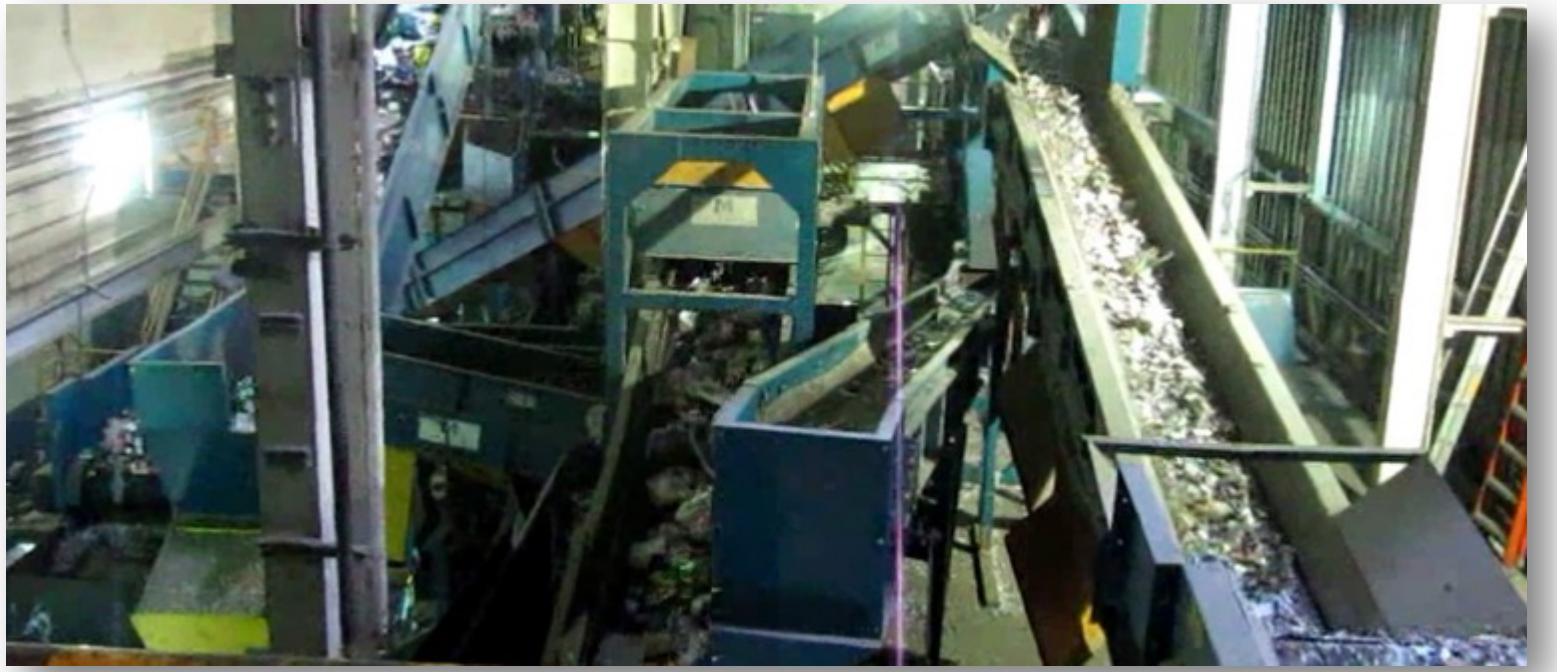


Photo courtesy of City of Toronto

Business Case for Audits

The cost of an audit is only 2 person hours per day

- Use audit results:
  - to market commodities
  - to educate sorters “Pick for Value”
  - to position QC sorters when short handed
  - to remunerate Lead hands
  - to support new equipment purchases

Key Takeaways

- Next gen technology solutions are only one side of the coin
- Process control solutions (i.e. operational competence) is the other side
- The business case will be found in your audit data

Holliday
Recycling Technologies

Thank you

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Questions?

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Closing Remarks for ORW 25!

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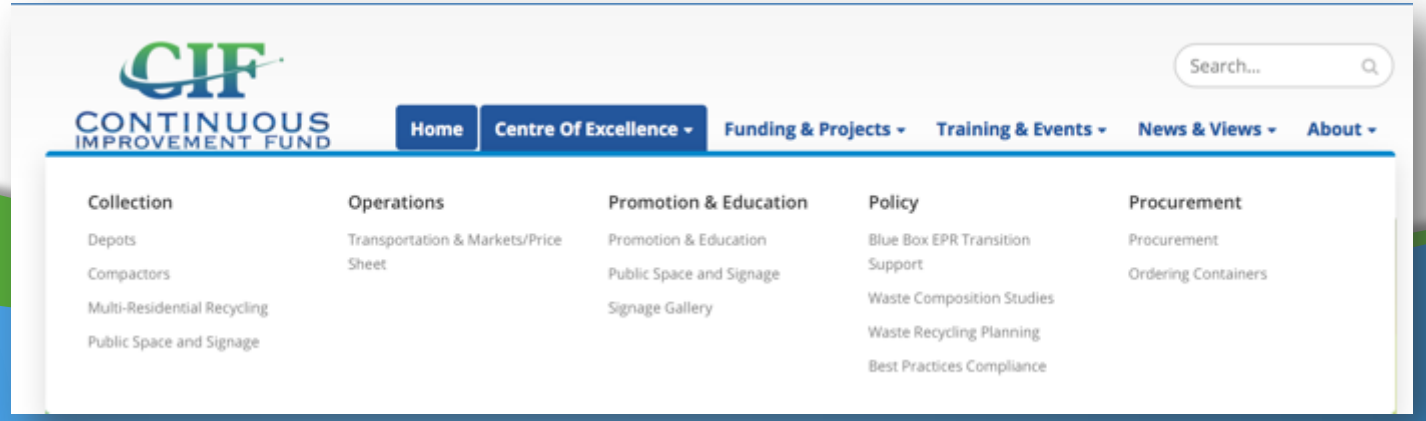
Thank you!

Please complete ORW survey next week

ORW slides & webcast archive: thecif.ca/ontario-recycler-workshop-orw/

For more information:



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