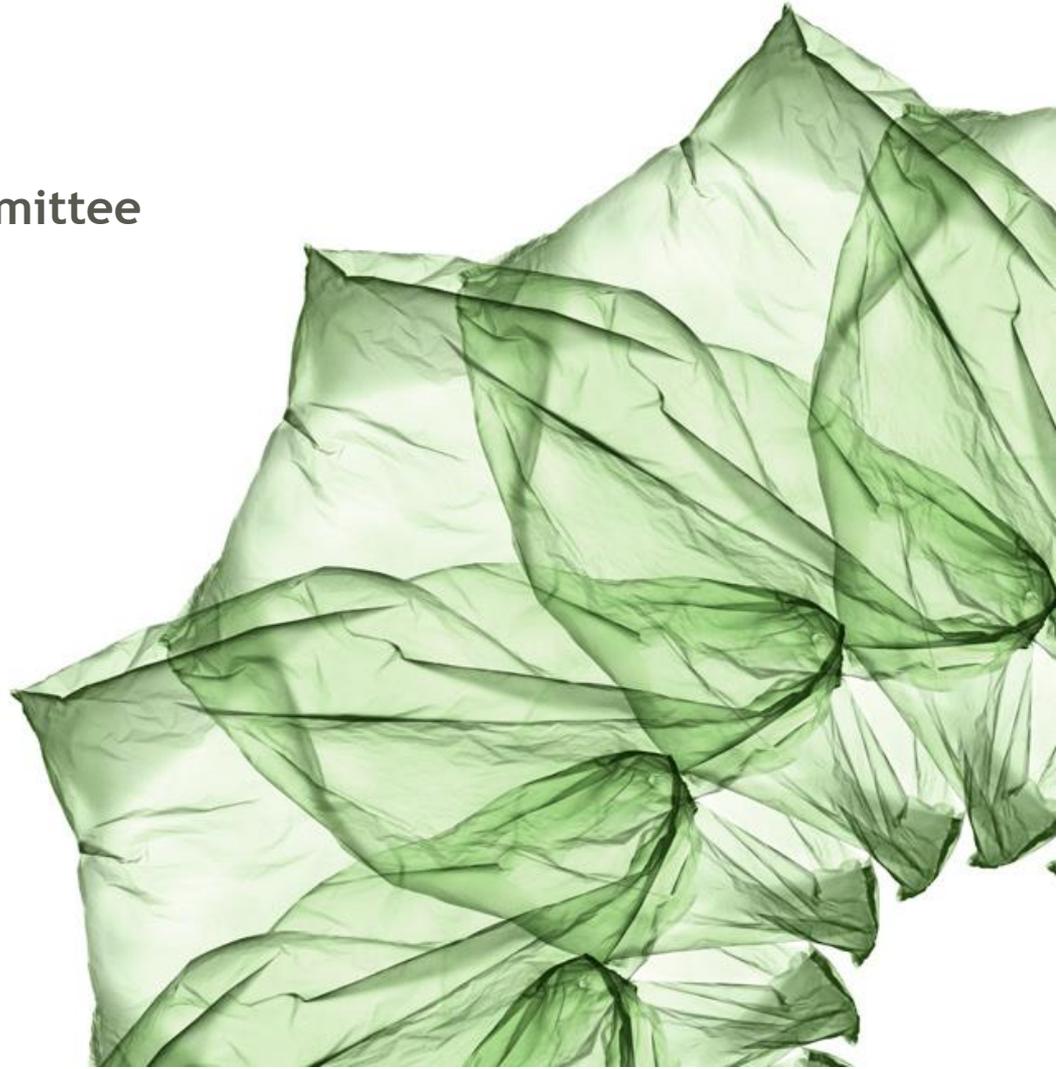


The Changing Waste Stream

Seattle Solid Waste Advisory Committee

Susan Robinson
Federal Public Affairs Director
Waste Management

October 1, 2014



WM Recycling Services

- WM handled over 15 million tons of recyclables in 2013
 - ✓ Over 12.5 million tons of traditional recyclables
 - ✓ 2.5 million tons of organics
- WM handles more residential recyclables than any other company in North America
- The amount of material processed at our single-stream MRFs has tripled since 2002



WM Recycling Facts

- **150 Material Recovery Facilities (MRFs), including:**
 - 50 Single Stream MRFs
 - 12 C&D MRFs;
 - 80 other MRFs
- **50 Organics processing plants**

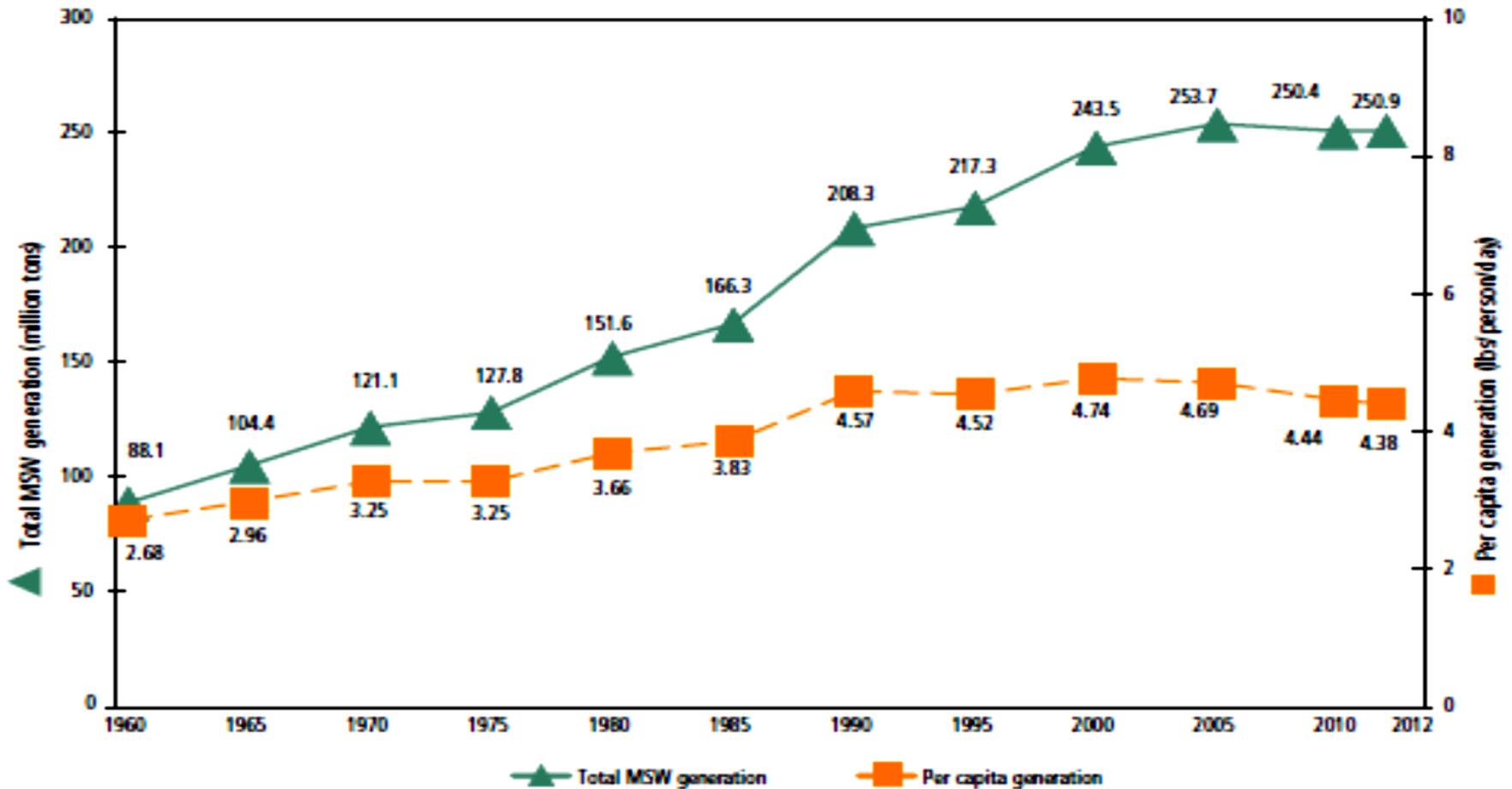
Recycling and Solid Waste in the U.S.

The Evolving Ton

What do these changes mean for recycling?

Where do we go next?

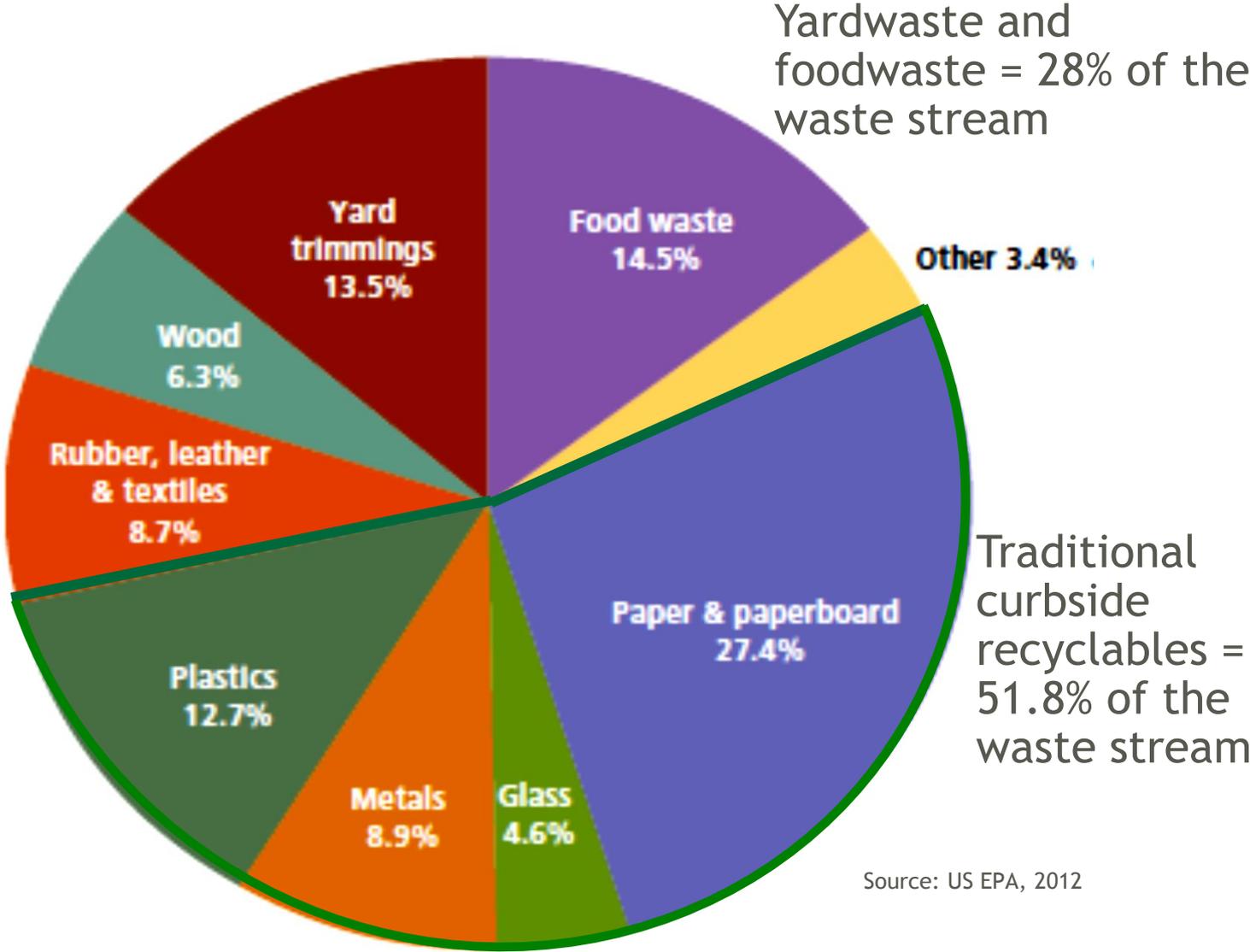
Waste generation and recovery rates in the U.S.



¹ U.S. short tons unless specified.

US EPA 2012 MSW Report

What's in the Waste Stream?



Source: US EPA, 2012



Impacts of changing waste stream on recycling

Trends and the Evolving Ton

Alternatives for hard to handle materials

Where are we going?

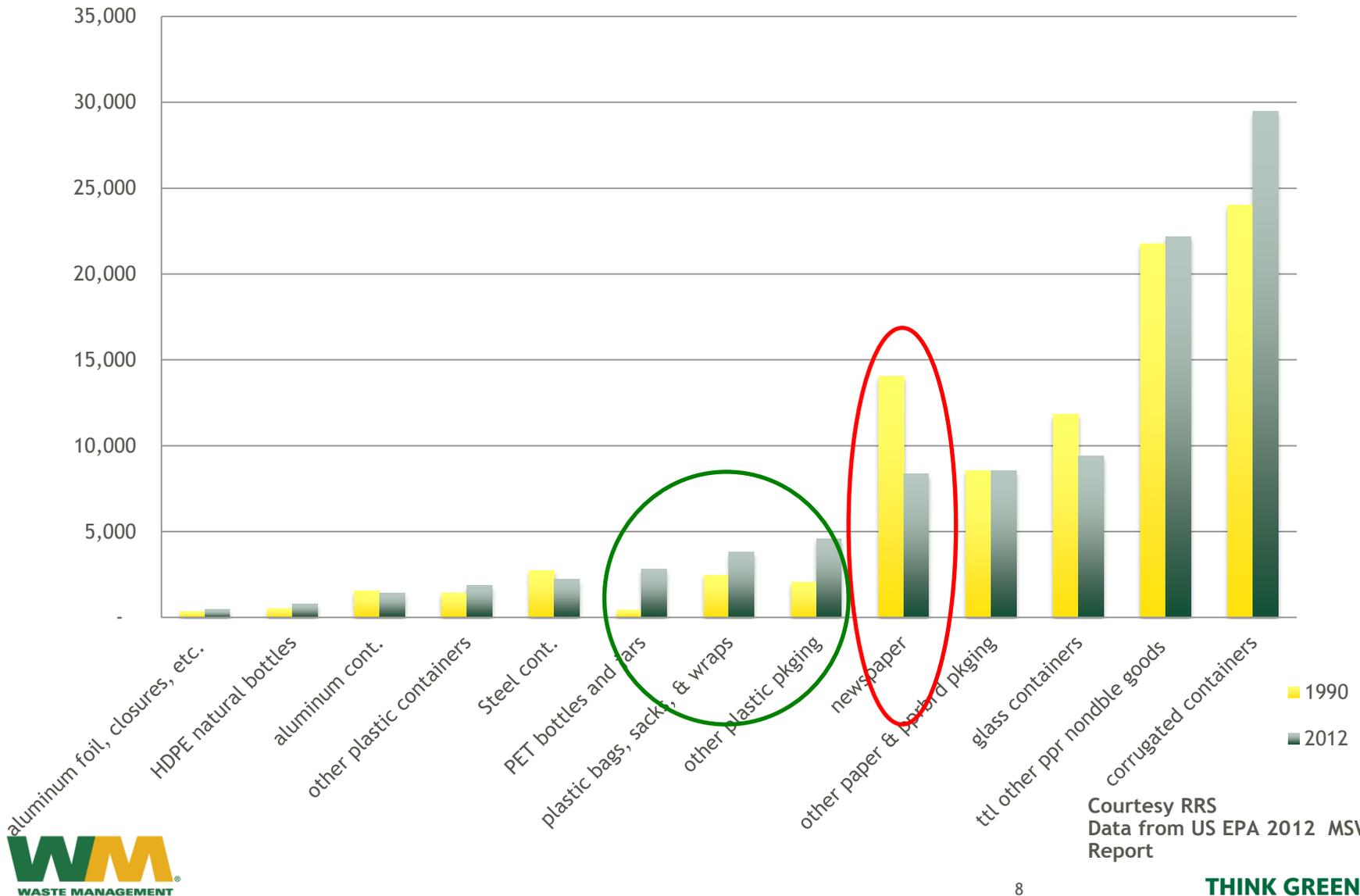
The Evolving Ton

- The materials and products we use in our daily lives have evolved
- Per capita waste generation is down 8% since 2000, affecting recycling, landfilling and waste-to-energy.
- We are seeing less paper, more plastic and no growth in metal.

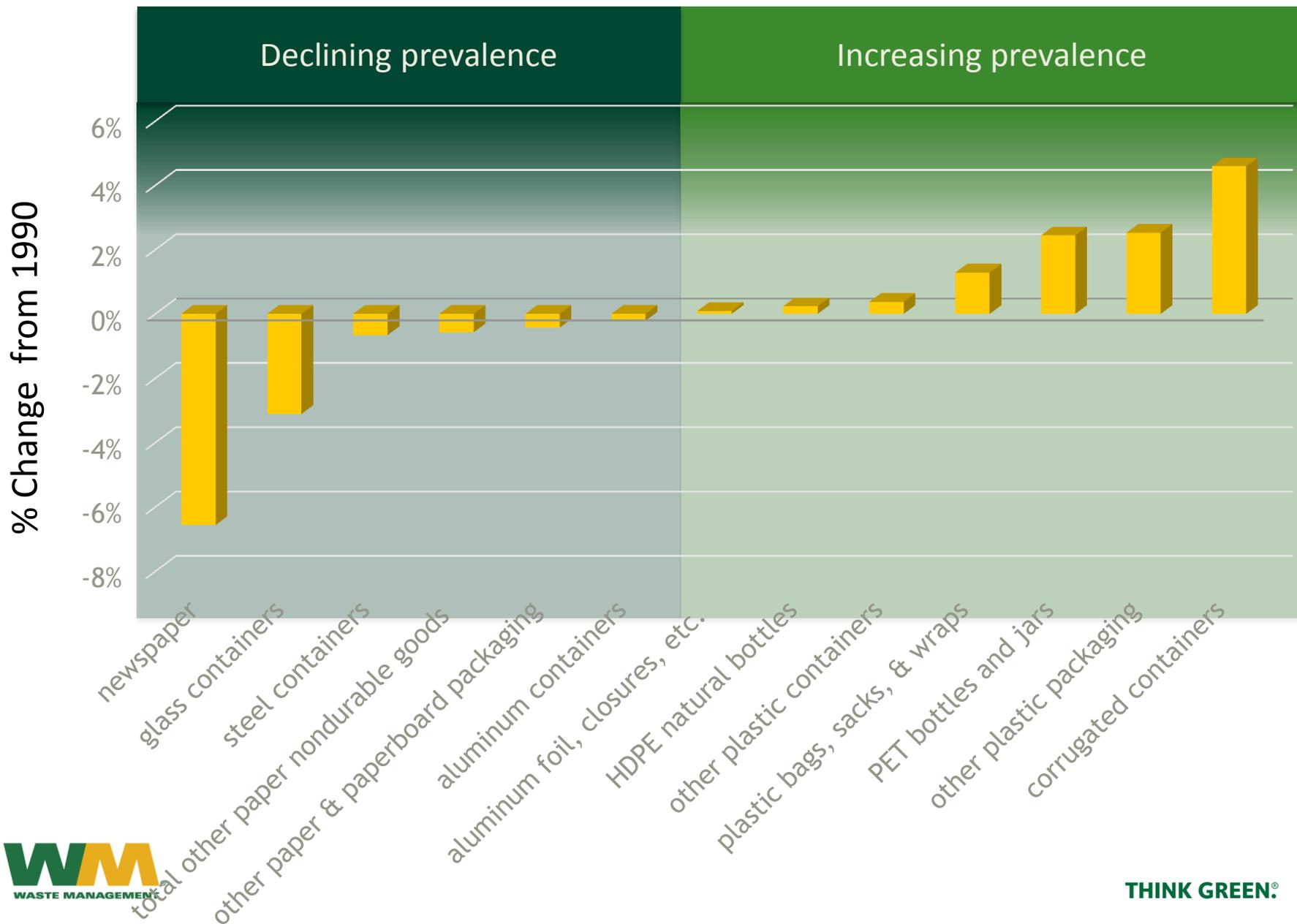


Paper & Packaging Generation 1990 vs 2012

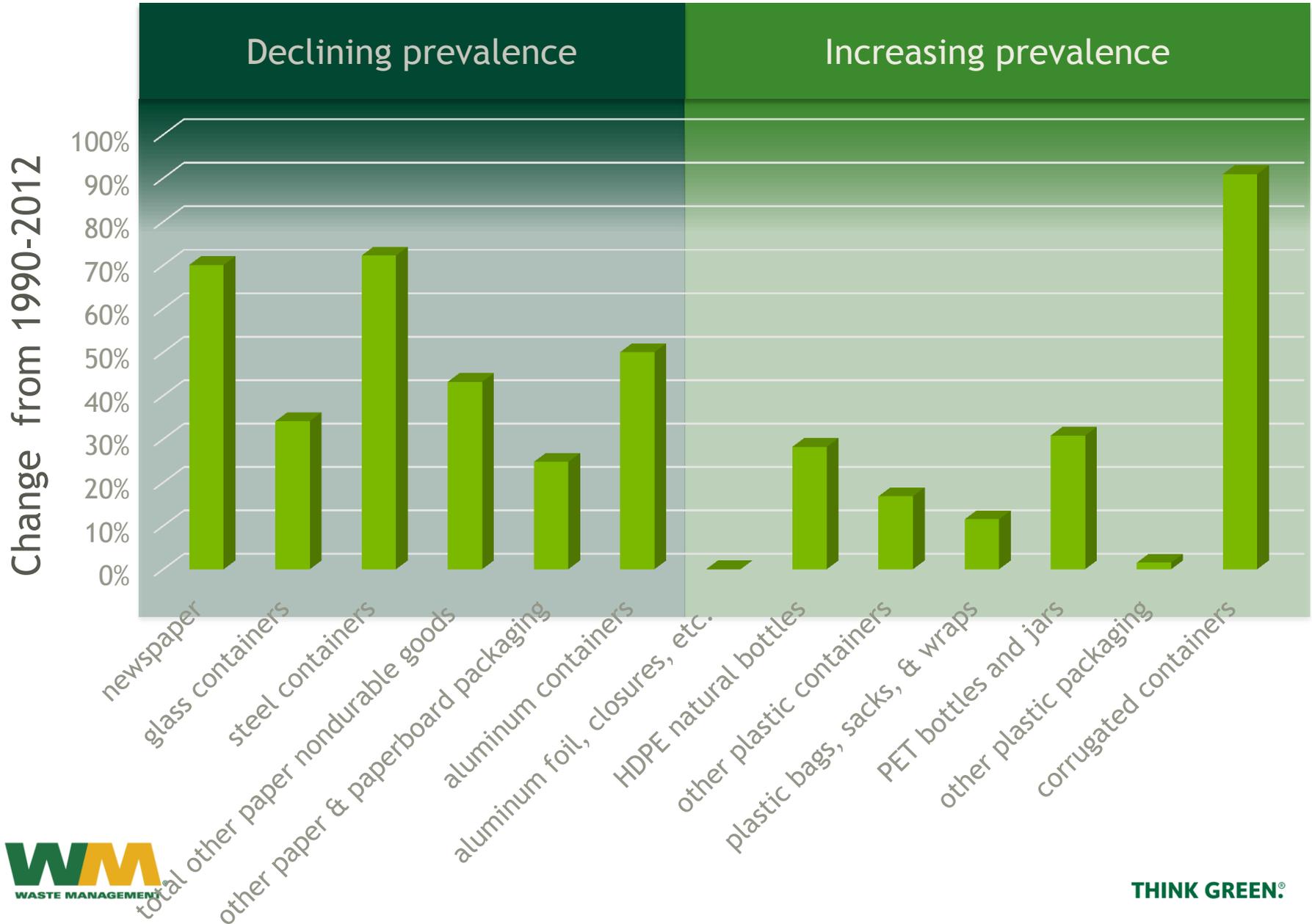
(thousands of tons)



Change in Paper and Packaging in 2012 since 1990



2012 Paper and Packaging Recycling over Changing Landscape



Change in the Recycling Industry

A history of change

Change is not new to our industry:

- Glass to aluminum
- Glass and aluminum to plastic
- Trend from source-separated collection to single stream collection
- Ongoing trend towards domestic market constriction and growth in export markets

What is different/the same in 2014?

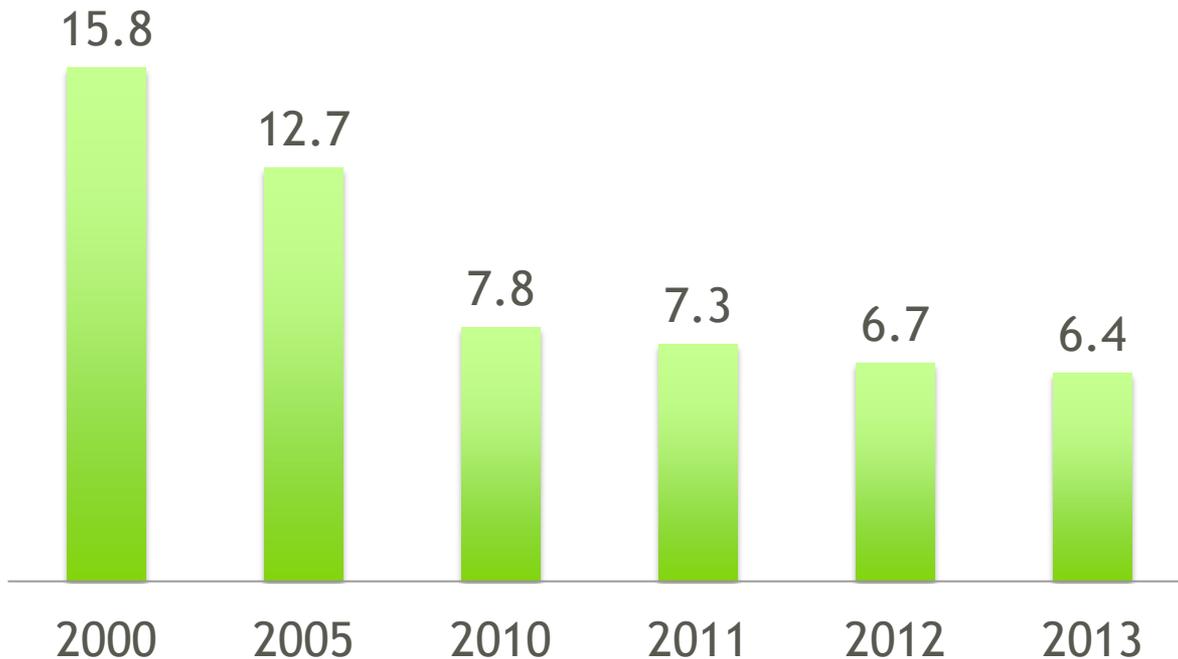
Paper

A changing industry

- **Newspaper** has historically made up 60% of recyclables collected. All types of paper made up 80% of the material we received for recycling.
- A **50% reduction in newspaper** readership in last 10-years resulting in the consolidation/closure of major recycled **newsprint** mills in North America
- There is an increase in residential single stream material which has increased the volume of a grade called **Curbside Mixed Paper**.
- New low cost manufacturing technology in China competes with aging North American machines so more Mixed Waste Paper goes to China

The Shrinking Newspaper

North American shipments of newspaper in millions of metric tons:



Courtesy: Resource Recycling Magazine

- This is a reduction of 50% over eight years
- The crunch created by high export demand, changing consumer practices and a crushing recession has been toughest on the domestic paper industry

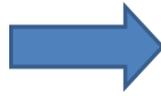
Plastics

Impact of changing market conditions

- At the same time that paper grades have changed, plastics volumes are increasing
- Plastics made up 12.7% of the waste stream in 2011, up from 10.5% in 2010
- The 12.7% plastics in the waste stream by weight makes up over 25% of the waste stream by volume
- Use of single serve containers and plastic packaging is up
- Plastic bottles have “light weighted” - water bottles take up the same space (volume) but weigh up to 25% less
- Recyclers must process more bottles to get a ton, and these tons are more expensive to process.
- Our cost are incurred by volume and our revenue is by weight.

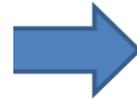
The changing waste stream means we process more volume with less weight which leads to higher processing costs

The evolving package



Glass jars,
metal cap to
PET jar,
PP cap

- Light-weighting
- Flexible packaging expected to grow 3.5% annually in the next few years



HDPE Bottle, PP Cap to multi-layer, flexible film pouch



From steel can,
paper label adhesive to multi-layer, foil-lined flexible film pouch

Packaging comparison

Package	Product Weight	Package Weight	Product: Package Ratio	Emissions Kg CO2 e / 8 oz.
<u>Beverages</u>				
Glass bottles/ cap	8 oz	198.4 g	1:1	0.29
PET/cap	8 oz	22.7 g	01:1	0.18
UBC	8 oz	11.3 g	21:1	0.08
Pouch	6.75	<u>5.7 g</u>	35:1	0.02
<u>Soup Can</u>				
Steel can	108 oz	312.4 g	10:1	1.07
Pouch	108 oz	<u>28.4 g</u>	108:1	0.11

What are the impacts of these changes on our MRFs?

We are starting to see data that verifies trends and can see the implications

Net impact on MRFs: Lighter inbound material

- The volume in a ton has increased with the loss of ton density.
- Inbound material at MRFs is now 45-60% paper and 40-55% containers
- Glass and residue is a greater percentage of our recycling mix

These all have implications on the design of MRFs, and increase the cost of recycling

Impacts of changing waste stream on recycling

The Evolving ton

What makes something recyclable?

What are we doing?

What makes something recyclable?



Collection

1. Convenient recycling collection is important for successful programs. Cart based single stream collection allows for broader collection and more types of materials collected (pro and con). It also increases recycling volumes collected and allows for collection.
2. At the same time, single stream recyclables often are wet, dirty and contains broken glass. The material is flattened during compaction, and the flatten recyclables may be mis-sorted



Processing

1. Processing/sorting single stream recyclables requires both technology and labor.
2. There are physical limitations to what can be recycled. Equipment and staff may not be able to identify or separate certain materials.
3. Film plastic is the single biggest processing problem at MRFs. Food and moisture also challenge the process.



Marketing

1. Robust markets are critical for sustainable recycling. Volume + value = market.
2. Markets are global. WM exports 33% of its material - mostly paper, some PET, HDPE most 3-7 plastics.
3. There is a robust market for clean and dry film plastic film collected in take-back programs. None for film collected at curbside.

Collection

Single stream recycling is growing

Pros

- Convenient so more consumers recycle
- Single stream allows for broader collection and more types of materials collected (pro and con)
- Increases recycling volumes collected
- Allows for collection efficiencies

Cons

- Material gets wet and dirty
- Broken glass
- Flatten materials → mis-sorted materials



Processing

- Sorting requires technology and labor
- Films plastic collected in curbside programs have no markets due to moisture and dirt from collection and processing
- Wet material and food impede recycling, and can contaminate large volumes of material.



The statement “Anything can be recycled” has been taken too far

Screening inbound recyclables



- Stars screens use size and shape to sort containers from paper.
- Containers/smaller items drop through openings



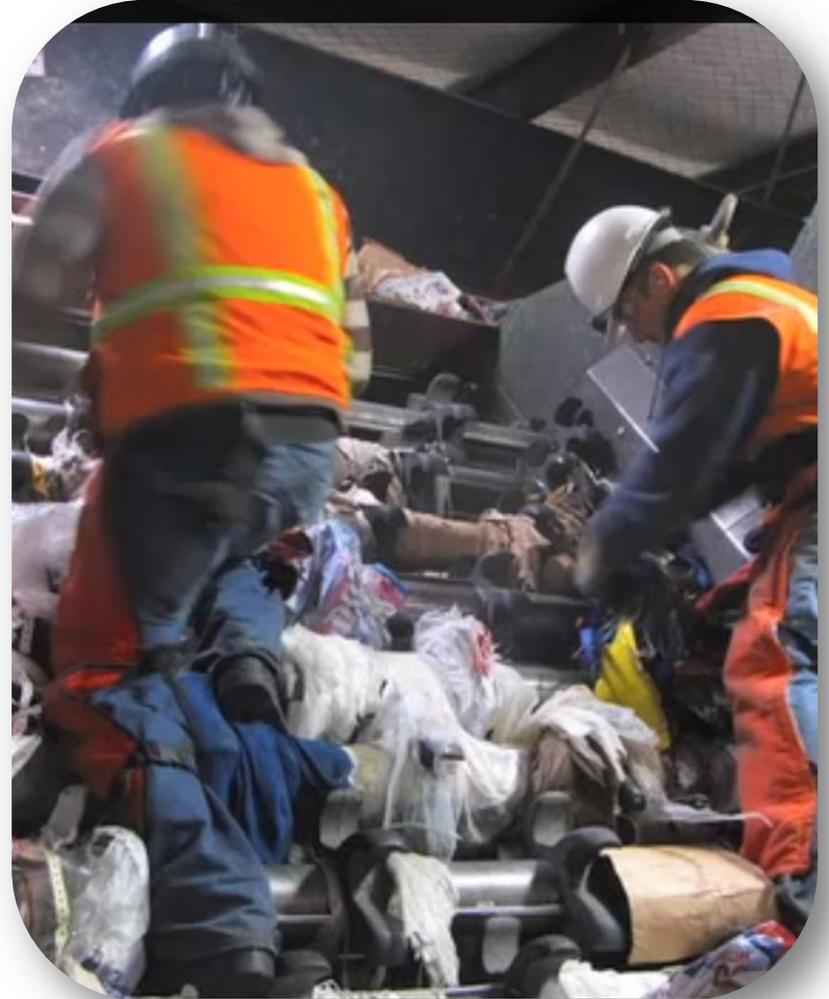
- Pre-sorting does not remove everything
- Contamination wraps around the stars
- Openings are blocked
- Containers can't fall down - they flow along with the fiber

Cleaning the Equipment



- Some of the material removed from the stars
- Staff is needed to remove this material throughout the day

Film Plastics in Disc Screens



Sample MRF #1: The Good

Inbound sorts by customer - averages:

- ✓ About 50% fiber (OCC, ONP, MWP)
- ✓ About 35% glass containers, plastics, metals
- ✓ Plastics is 10% (PET, HDPE and Mixed 3-7 plastics)

Inbound
contamination
averages:
5%

Material	Material Sub	Shape	Color	Product Bale	Sum (lbs)	% of Total
Fiber	Aseptic-Gable Top			Aseptic	12	0.0%
Glass	Glass cullet > 1/4			GP-250	8587	31.1%
Plastic	2 HDPE	Bottle	Colored	HDPE-C	313	1.1%
Plastic	2 HDPE	Bottle	Natural	HDPE-N	324	1.2%
Fiber	Mixed Paper			MixPpr	1469	5.3%
Plastic	Plastic 3-7			MxPlstc3-7	498	1.8%
Fiber	OCC			OCC	3466	12.6%
Fiber	ONP			ONP	9063	32.8%
Plastic	1 PET	Bottle		PET	1068	3.9%
Residue	Residue			Res	1348	4.9%
Metal	Scrap Steel			ScrpStl	152	0.5%
Metal	Tin	Can		Tin	720	2.6%
Metal	Aluminum	UBC		UBC	561	2.0%
Metal	Aluminum	NonUBC		UBC	18	0.1%
UBC	Material Sub-Total: 579					0.0%
					27599	100.0%

Sample MRF #2: The Bad

Inbound sorts by customer Averages:

- ✓ ~65% fiber (OCC, ONP, MWP)
- ✓ ~35% containers (glass, plastics, metals)

Inbound contamination averages:

4-13%

Larger city programs:

7-13%

	City A	City B	City C
OCC	22.3%	30.3%	30.1%
ONP	31.2%	27.1%	28%
MWP	12.8%	5.3%	6.1%
Glass	8.5%*	8.2%	13.3%
Metals (tin/alum)	5.9%	5.6%	3.8%
PET	4.0%	4.5%	2.9%
#3-7 plastics	3.5%	2.9%	2.3%
HDPE (natural + colored)	2.5%	3.6%	2.1%
Film	1.2%	0.5%	1.0%
Aseptic	0.8%	0.8%	0.6%
Residual	7.2%	11.2%	13.3%



Sample MRF #3: The Ugly

Inbound sorts by customer - averages:

- ✓ About 45.5% fiber (OCC, ONP, MWP)
- ✓ About 32.7% glass, plastics, metal
- ✓ Inbound contamination averages: 22.7%

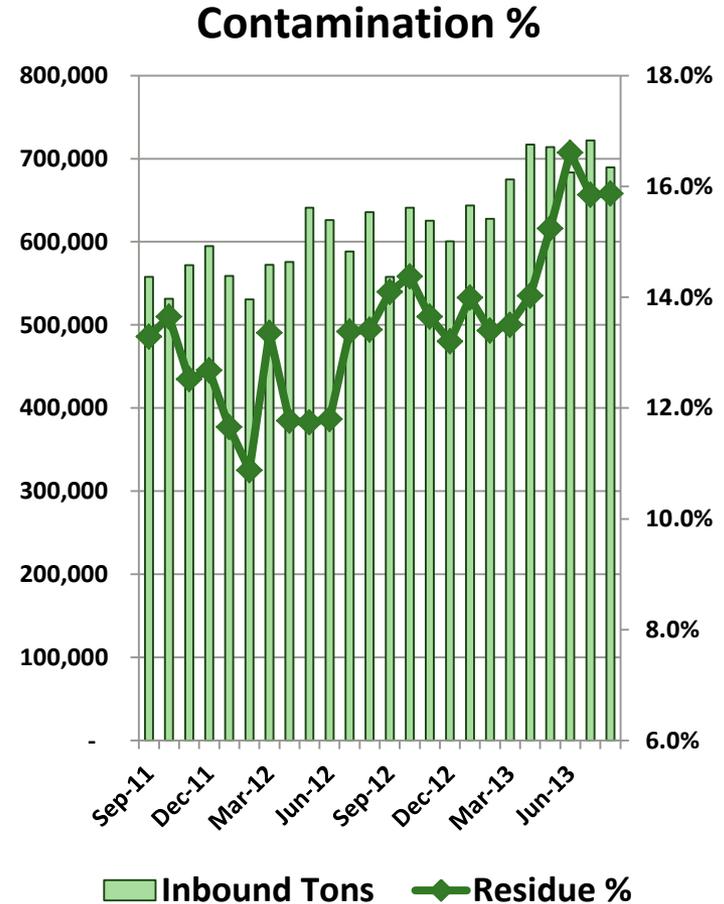
Material	Material Sub	Color	Product	Bale	Min (lbs)	Max (lbs)	Avg (lbs)	Sum (lbs)	% of Total
Fiber	Aseptic-Gable Top		Aseptic		0.0	4.6	0.7	52.1	0.6%
Plastic	Bulky Rigid Plastics		BlkyRgd		0.0	24.0	1.6	127.3	1.3%
Glass	Three Mix Glass > 3/8		GP-3Mix		2.1	76.1	16.8	1329.0	14.1%
Plastic	2 HDPE	Colored	HDPE-C		0.5	11.9	3.2	251.0	2.7%
Plastic	2 HDPE	Natural	HDPE-N		0.2	8.2	2.3	181.2	1.9%
Fiber	Mixed Paper		MixPpr		0.0	18.5	0.4	27.9	0.3%
Plastic	Plastic 3-7		MxPlstc3-7		0.1	13.1	3.3	258.1	2.7%
Fiber	OCC		OCC		2.0	52.2	25.4	2003.2	21.2%
Fiber	ONP8		ONP8		0.0	100.7	26.8	2115.6	22.4%
Plastic	1 PET		PET		0.9	12.1	5.1	404.7	4.3%
Residue	Residue		Res		1.4	71.3	27.1	2137.6	22.7%
Metal	Scrap Metal		ScrpMtl		0.0	17.8	1.1	83.1	0.9%
Metal	Steel-Tin		Tin		0.1	10.6	3.6	281.1	3.0%
Metal	Aluminum		UBC		0.3	8.2	2.3	183.6	1.9%
							Total Sample Weighted	9435.5	100.0%

NOTE: Values calculated by hand will differ due to rounding.



Contamination in Single Stream Recyclables

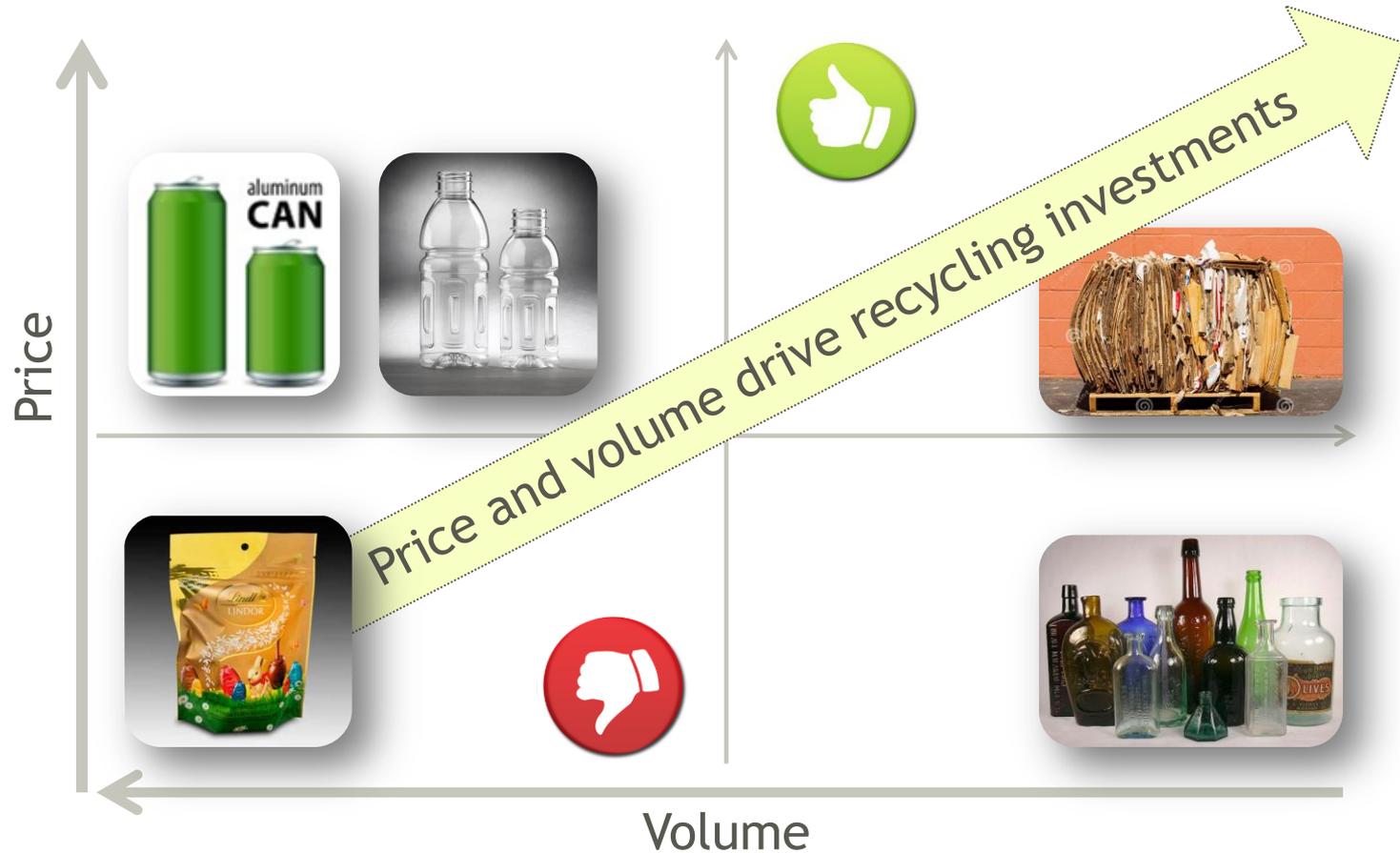
- Contamination of loads is *on average* 16% of inbound tons and increasing
- Contamination can be up to 50% of incoming loads
- Contamination cost an average of \$140 per ton
- Markets are demanding reduced contamination (Green Fence)
- Processing costs have increased by 20% in two years, which is driving up cost to customers



WM MRF Data - 2013

End Markets

Price and Volume



What do these changes mean for recycling?

- The changing waste stream has increased processing cost at MRFs, driving up the overall cost of recycling
- There are more non-recyclable materials in the feedstock - which increases the cost of recycling programs
- There are more low-value materials in the recycling stream, which reduces overall revenue. Communities with revenue-sharing may see less revenue from the sale of commodities.
- A lighter recycling stream makes it harder to increase recycling rates
 - More light-weight plastic
 - More lower value materials
 - Light-weighting of all packaging

Impacts of changing waste stream on recycling

What is recyclable

Alternatives for hard to handle materials

What is next?

Back to the Basics: Public Education and Outreach for Recycling

Recycle Often. Recycle Right.SM

The Path to Sustainable Profitable Recycling



Recycling Education - Key Messages

RECYCLING RULES

1. NO LOOSE PLASTIC BAGS
2. NO CONTAINERS WITH FOOD STILL IN THEM
3. NO LIQUIDS OR SOGGY ITEMS

Certain offenders can slow down the recycling process or even ruin the load.



That bottle in your cup holder today could become a park bench or even filling for a parka one day.



Recycle that newspaper today, and it could return to your home in the form of a cereal box.



Recycle that aluminum can today, and it could be back on the shelf as a new one in just 60 days!



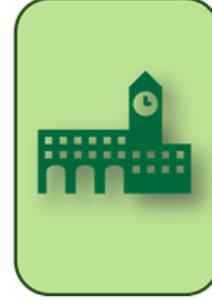
And this piece of paper? Recycle it today, and who knows what story it might tell later.

1. Maximize recycling of all bottles, cans, and paper products
2. Keep items clean and dry
3. No plastic bags



Tools



 <p>Campaign Information</p>	 <p>How to Recycle Right</p>	 <p>PSS Planning/City Implementation</p>	 <p>PSS Toolkits</p>	 <p>K-12</p>	 <p>Research</p>
<p>Campaign Intro-Pass it On! Legal Guidelines Background and Research Stories from the Field RecycleOftenRecycleRight.com</p>	<p>Official WM Video 6 Key Messages Mythbusters & FAQs</p>	<p>Tools at a Glance /All Campaign Tools Campaign Rollout Checklist Annual Public Education Plan Elevator Speech Introduction to City PPT</p>		<p>Intro & Background Curriculum</p>	<p>Best Practices Industry Articles Industry Presentations Studies WM Thought-Leadership Presentations</p>

Add some fun to Recycle Often. Recycle Right.

To reinforce the recycling message and increase kids' involvement, the curriculum includes a package of WM promise cards, tree leaves and ambassador stickers for hands-on projects.



- RECYCLE RIGHT:**
- Keep recyclables clean and dry
 - Keep plastic bags out
 - Include only plastic bottles, cans, and paper products

Act Two.

Recycling gives new life to old materials. A plastic water bottle, for example, can become a park bench or the filling for a new coat. By doing your part, you can help save raw materials which also saves time, energy and expense.

Learn more and become a Recycling Ambassador at:
RecycleOftenRecycleRight.com



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THINK GREEN®



- RECYCLE RIGHT:**
- Keep recyclables clean and dry
 - Keep plastic bags out
 - Include only plastic bottles, cans, and paper products

Can Do.

Recycling gives new life to old materials. For example, the aluminum can you recycle today could be back on the shelf as a new can in 60 days. By doing your part, you can help save raw materials which also saves time, energy and expense.

Learn more and become a Recycling Ambassador at:
RecycleOftenRecycleRight.com



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THINK GREEN®



- RECYCLE RIGHT:**
- Keep recyclables clean and dry
 - Keep plastic bags out
 - Include only plastic bottles, cans, and paper products

New News.

Recycling gives new life to old materials. The newspaper you put in the recycle bin today could return to your house as a cereal box. By doing your part, you can help save raw materials which also saves time, energy and expense.

Learn more and become a Recycling Ambassador at:
RecycleOftenRecycleRight.com



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THINK GREEN®

Webpage

The screenshot shows the Waste Management website homepage. At the top left is the WM logo. The top navigation bar includes links for 'About Us', 'Sustainability', 'Careers', 'Contact Us', and 'Help Center', along with a search bar and 'Login' and 'Register' links. A secondary navigation bar contains 'For Home', 'For Business', 'Industry Solutions', 'Think Green*', and 'Customer Service'. Below this is a 'My Account' section. The main heading is 'RECYCLING SERVICES', with sub-links for 'BENEFITS', 'RECYCLE OFTEN. RECYCLE RIGHT.', 'RECYCLING CENTERS', and 'STATS'. The central visual features three circular wreaths made of recycled materials: white paper, yellow plastic, and grey metal. Below the wreaths is the text 'Start recycling.' and a green 'SIGN UP NOW' button. A row of four service tiles follows: a video player for 'RECYCLE OFTEN. RECYCLE RIGHT.', a 'DOWNLOAD THE GUIDE.' button, 'OTHER RECYCLING SERVICES', and 'WM RECYCLING SERVICES ACCOUNT INFORMATION'. The bottom section contains the headline 'All your recyclables in one place.' and a paragraph: 'We make recycling easier — by leading the way in mixed recycling. That lets people put all their recyclables in one bin and leaves the sorting process to us.' The footer features the WM logo and 'Waste Management Confidential'.



Sustainable recycling requires broad, multi-stakeholder support

Local recycling goals must be realistic. Policies and contract terms must support these goals.

Local regulations and our recycling contracts must be aligned to ensure the development of economically sustainable recycling programs

Sustainable recycling must include public education and outreach to support local regulations and economic realities