

Recycling is Broken

Year End Update - 2018

Pete Keller – VP, Recycling and Sustainability
Richard Coupland – VP, Municipal Sales

Recap: Trends Strain Existing Model

Trends



2000



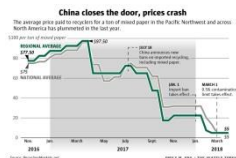
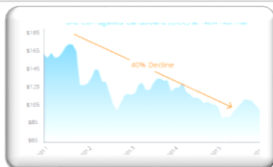
2015



48,000 plastic bottles = 1 ton¹



92,000 plastic bottles = 1 ton¹



Implications

Some material changing faster than capital investment cycles

18M tons in 2000 → ~2M in 2015

Some material has limited end markets

HDPE (Good) → off-spec PET (Limited)

Material light-weighting skews current success metrics

Water Bottles → Almost 2x transactions

Commodity markets have steadily declined

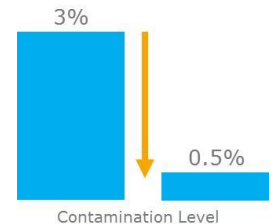
OCC down 40% → Mixed Paper down 95%

Recap: China Sword Explained

For decades, China has been the largest importer of the world's recycled commodity, and the U.S. was 40% of the inbound stream

In 2017, China announced efforts to clean up the country, which included dramatic changes for acceptance criteria of imported recyclables

- A significant reduction in acceptable contamination levels (From ~3% to 0.5%) in any recovered paper and plastic grades
- Additionally, China banned all mixed paper from import, regardless of contamination levels. (20% of historical stream)

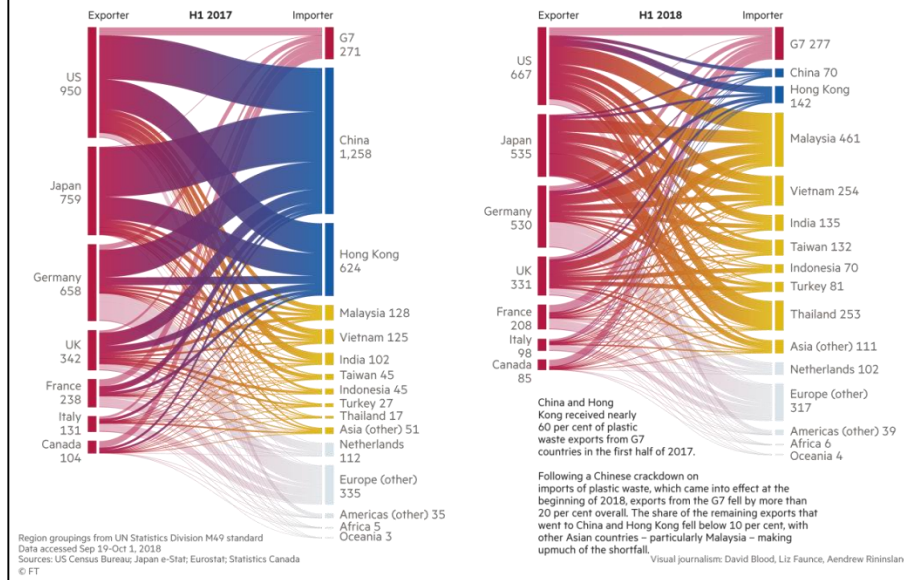


Reductions took effect in March 2018, which drove costs and changes at most recycling facilities in the country to meet new standards

Post-China: Shift in Commodity Markets

How the global river of plastic waste changed course in just 12 months

Exports of plastic waste, parings and scrap from G7 countries ('000 tonnes)

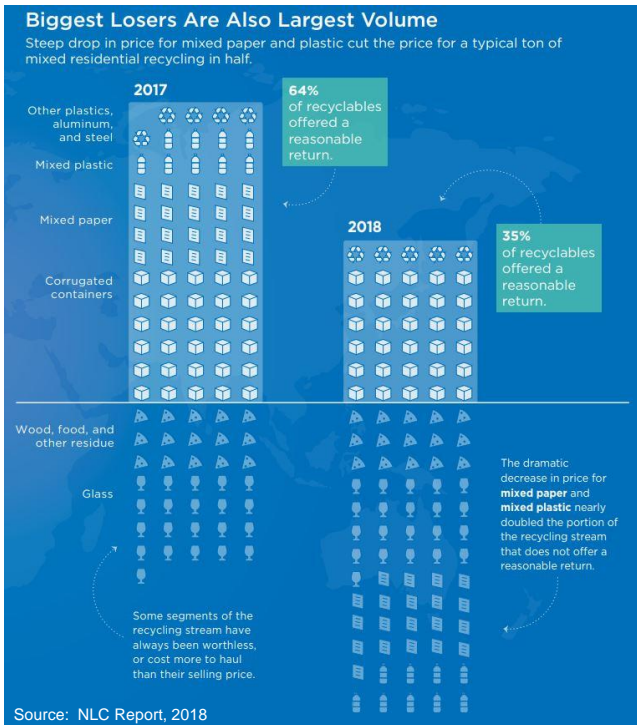


Source: Financial Times, Oct 24, 2018

- China consumed a majority of commodities globally
- Alternate markets are saturated; some countries unprepared for influx

Supply and demand economics kick in as commodities flood alternate markets worldwide

Post-China: Dramatic Shift in Values



- Normal supply and demand theories in play
- Excess material results in low/negative value for most commodities (Mixed Paper and Mixed Plastics)
- Only 35% of processed commodities have current positive value (Metals and OCC)

Recycling processors move the material, but average values are down 50%+ from recent years

Recycling Costs: Then and Now

THEN

Household cost artificially low to foster adoption

Costs lower due to inbound material being cleaner and heavier

Commodity values strong, due to supply & demand and cleaner material

Low contamination averages, attributed to focus on basics and no diversion mandates

Industry Avg

\$2.00/Mo

\$60/Ton

\$200/Ton

\$25/Ton

Net Position

(\$3.00/Mo)

+

(\$1.50/Mo)

+

\$4.60/Mo

+

(\$0.10/Mo)

= \$0.00

COLLECTION



PROCESSING



COMMODITY



RESIDUAL



NOW

Still artificially low despite higher costs to run collection service

Dramatically higher costs from labor, technology and equipment, along with lighter material

Average values down significantly, further impacted by China Sword

Contamination average up to 30%, requiring more transport and disposal

Industry Avg

\$3.00/Mo

\$100/Ton

\$100/Ton

\$50/Ton

Net Position

(\$4.00/Mo)

+

(\$2.50/Mo)

+

\$1.50/Mo

+

(\$0.50/Mo)

= (\$5.50)

Recommended Business Model

Durable Recycling Model

COLLECTION	PROCESSING	RESIDUAL	COMMODITY SALES
<ul style="list-style-type: none"> • Includes costs for truck, driver, container and to collect material and transport to a processing facility • Comparable to trash collection 	<ul style="list-style-type: none"> • Includes costly facility, equipment and labor to separate material and remove contamination • Results in ready-to-ship baled material 	<ul style="list-style-type: none"> • Includes all contaminated or non-recyclable material, which has no marketability and must be transported and disposed at a landfill for additional cost 	<ul style="list-style-type: none"> • Sale of processed material to buyers around the world • Cleaner material has greater value

COLLECTION FEE

+

PROCESSING FEE

+

DISPOSAL OF RESIDUAL

-

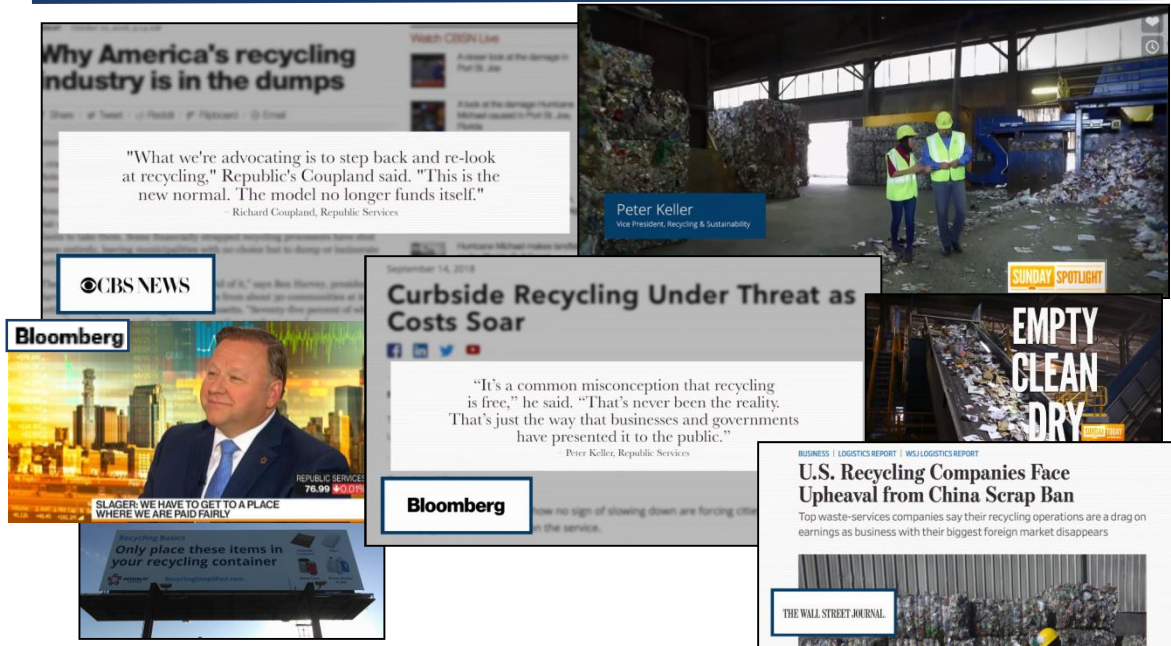
COMMODITY SALES

=

THE COST OF RECYCLING

The cost of a recycling program is the sum of fees for two services; the **Collection Fee** and the **Net Processing Fee**

Informing the Public



- Public needs to understand the issue
- Economic reset is needed for long-term viability
- Public awareness on what and how to recycle

Over 1 billion media impressions on the topic, on articles interviewing Republic Services team alone

Public Education: Clean Up the Stream

New simplified educational collateral that can be distributed to residents and businesses

Container Labels



Container Tags



Door Tags



Reference Guides



Brochures



Post Cards & Bill Inserts



Posters



Billboards



Emails

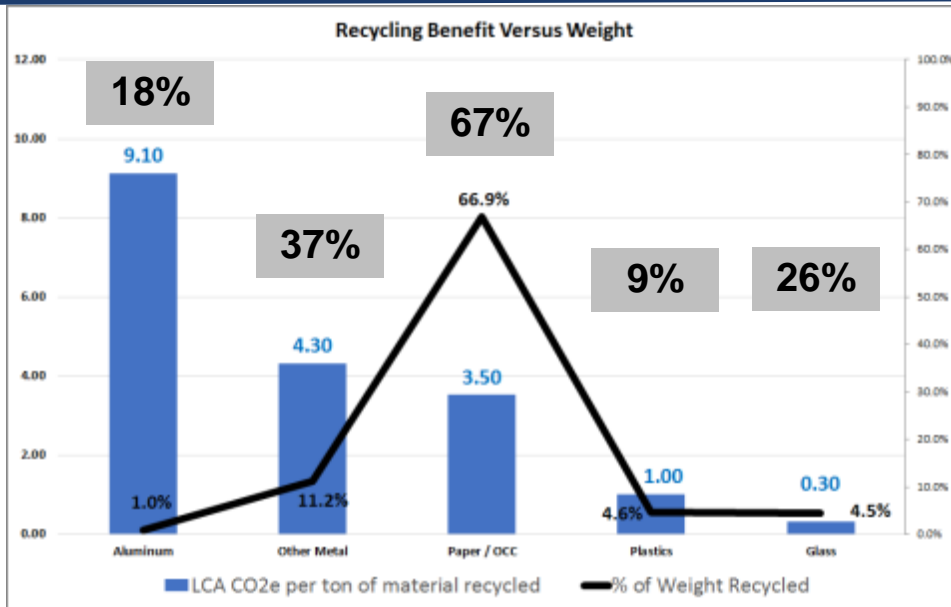


Print Ads



Most collateral is available on www.RecyclingSimplified.com,
or from your Municipal Sales Manager

Measurements of Success



xx% = % of Generation Currently Recycled

Source: Advancing Sustainable Material Management 2015 Fact Sheet, EPA, 2018

- Current metrics focus on weight
- Incentivizes “any” rather than “the right” diversion
- Some of the more beneficial CO₂e materials are lighter

Weight-based goals don't correlate to GHG benefits.

Reconsider “Any Diversion” (weight) vs “Good Diversion” (GHG)

Reassessment of Accepted Materials

- Programs have drifted to focus on total diversion rates, rather than what materials are truly beneficial to recycle
- Some collected materials are recyclable, but lack local end markets, or have a negative recycling value. These realities render the processed materials unmarketable
- Municipalities need to shift program focus to Sustainable Materials Management-based views, which looks at the overall benefits of each accepted material in the stream



Sorted glass has a negative value



Some packages have evolved to less marketable materials

Recycling programs must focus on Sustainable Materials Management, not simply diverting material that may have no beneficial use

Key Topics Going Forward

- Evaluate program recyclables that offer best benefit to planet
- Consider better metrics to track success
- Increase public education, leading to lower contamination and better commodity values
- Update the business model – Two services provided in a recycling program (without reliance on commodity value)

The path to creating a durable recycling program requires multi-faceted approach



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SERVICES

We'll handle it from here.™

Pete Keller

VP, Recycling & Sustainability

e: pkeller@republicservices.com

o: 480.627.2800 c: 206.465.1609

Richard Coupland

VP, Municipal Services

e: rcoupland@republicservices.com

o: 480-718-0384 c: 480-225-0481