

WHAT IS GRESHAM'S LAW, WHAT DOES IT MEAN FOR MRFS, CONTAMINATION, AND THE GREEN FENCE



*Global Problems,
Local Solutions*

*Recovering from the
"Race to the Bottom"*

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DEFINITIONS...

COLLECTION



RECYCLING

DIVERSION



RECYCLING



DEFINITIONS...

20% TRASH +
80% RECY



RECYCLING



SINGLE STREAM



DEVIL (☺)



MRFS CAN CLEAN SINGLE
STREAM TO SPEC TODAY



DEFINITIONS...

RECYCLING Does involve use of the
commodity as a Resource

The definitions of materials developed
by ISRI or mills are vital for for defining
"COMMODITY" – an economic **INPUT OF
PRODUCTION**

What we're currently collecting isn't "it"



QUALITY & CONTAMINATION PROBLEM...

- NOT NEW - NOT uniquely SS vs. DS – complaints pre-date single stream... slow decline in quality that accelerated concurrently with SS
 - Mills complained for years
- SS can be sorted now – address with
 - Management attention; processing speed / depth; steps; input quality-BUT NONE SPEC'D FOR 20% TRASH
- Demand for quality (enforced) coming out drives what is delivered – single stream OR dual stream. Partly coincidence of timing...
- China brought a long-standing problem to a head

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MEETING DEFINITION OF A REAL "COMMODITY" IS IMPORTANT⁶ THAT MEANS A USABLE, ACCEPTABLY "CLEAN-ISH" COMMODITY POSSIBLE WAYS....



Source: SERA research

And every MRF "pretties" the bales

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COMMODITY DEFINITION IS IMPORTANT

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Source: SERA research

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THESE STRATEGIES WON'T WORK / NOT ENOUGH

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Market forces at work (Econ 101)

Gresham's Law

BAD BALES DRIVE OUT GOOD BALES

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CONTAMINATION APPROACHES – GRESHAM'S LAW

□ Gresham's Law (applied to MRFs)
➔ **BAD BALES DRIVE OUT GOOD BALES**

unless quality control / or quality rewarded...

□ Comes from "bad money drives out good"

Imagine tin \$1 coins Vs. gold \$1 coins taken the same. TIN only would be in circulation; Gold ones would be hoarded,.Same with dirty vs. clean bales if both taken equally...

- In Economics: "When a government overvalues one type of money and undervalues another, the undervalued money will leave the country or disappear from circulation into hoards, while the overvalued money will flood into circulation."
- ==> **Bad money drives out good**
- ... but only if authorities have chosen to enforce a fixed exchange rate.

*Some options with trust and long-term arrangements, but mutual benefit...
Source: SERA research



Gresham's Law

BAD BALES DRIVE OUT GOOD BALES

Bad bales flood the market; driving good bales out of circulation

IFF

No quality control / enforcement

No reward for quality



Race to the Bottom

Began first time "out of spec" bale not rejected
Irreversible as long as not regularly rejected



Gresham's Law

Rational Actors

- MRFs – no \$ reward to slow down
- No one checking / rejecting

Irrational Actors

- Mills pay more pre-cleaning – but not for cleaner material.
- Same \$! Pay those who are good at cleaning!
- **This is NOT NEW MONEY!! (already in the system / being spent)**

Source: SERA research

Poor Quality



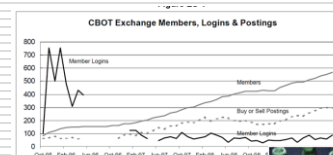
Race to the Bottom

"COMMODITY" (IF ENFORCED) BENEFITS



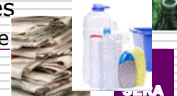
MARKET TRADING

- ➔ Market efficiencies, less risk, more predictable
- ➔ Futures, options, price stabilization



- Recycling on CBOT – Recorded trades
 - Trades & Electronic Exchange on the Inte
 - Not enough users, not active oversight

Source: SERA research



"COMMODITY" (IF ENFORCED) BENEFITS



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MARKET TRADING

- Market efficiencies, less risk, more predictable
- Reduces price volatility / dampens variability
- Allows trades/sales in the future at known price
- Makes community recycling program costs more predictable, less volatile – revenues are known

Commodity like "hard winter wheat" – clear definition

Source: SERA research



ECONOMIST'S SOLUTION FOR RECYCLING MARKETS



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EMBEDDING
EXTERNALITIES

- ❑ Carbon tax (fee, assessment..) solves the recyclables / virgin materials issue
- ❑ How it works
- ❑ Why it helps us
 - Tremendous embedded energy in many recyclables
 - Valuing thru (carbon tax) provides huge benefit to recyclables relative to virgin materials
 - Recyclables become the preferred (and cheaper) input immediately – and consistently
 - Current carbon market estimates: \$40, \$226/MTCO₂e,
 - *OMG - Who would have thought Exxon would be a hero to our cause!!* (NPR 10/10/18)



Source: SERA research



ECONOMIST'S SOLUTION FOR RECYCLING MARKETS



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EMBEDDING
EXTERNALITIES

Source: SERA research



LIFE CYCLE ANALYSIS, UPSTREAM INFORMATION / HIGH LEVEL DECISION INFORMATION

Upstream Production Savings – Long-haul Breakeven Distances	In trips to the Moon
Aluminum	
Plastics (LDPE&PET)	
Steel	
Paper (News, Cardboard, Office Paper)	

Excludes direct market prices

Source: Adapted from Allaway, OR DEQ



EMBEDDED ENERGY SHARES

Energy Saved

Recycled vs Virgin Material



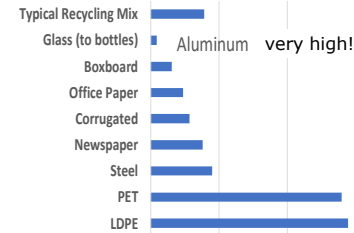
Source: SERA research

ISRI Fact Sheet 2011

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EXTERNALITY ADDER CALCS – BY MATERIAL OR RECYCLING MIX

Attractive per-ton adders beyond virgin prices!!



DRAFT calculations Please do not use / copy / photograph - Business sensitive
Source: Skumatz 2018

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ARE THERE STRATEGIES FOR NOW?



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- Contracts with firms that need your cleanliness of material (local, regional, or farther)
- Split glass – drop-offs plus education may help
 - Possibly consider “editing” materials, but after study, not reactive
- Bag fee or ban
 - To reduce down-time; more effective than education / easier
- Local market development strategies
 - States with effective programs (SC, MN, others – CO Report)
 - “Adding value before it leaves state creates jobs”

Source: SERA research

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ARE THERE STRATEGIES FOR NOW?



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- Control program costs – cost-effective
- PAYT
 - Most effective / cost-effective
 - Incentives, sizes to not leave tons behind
- Bans (11-30x)
- Contracts for lower cost
- Optimize total number of collections (fortnightly)
 - Recycling every other week – incremental tons from 2nd week are about 5x as expensive, according to SERA computations – expensive bragging rights!
 - Collect trash less frequently than organics / food for optimum usage and diversion.

Source: SERA research

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ARE THERE STRATEGIES FOR NOW?



- Education that is effective
 - Education to stop 20% and "wishful recycling" – with caveats about unintended consequences
 - Educate on the local problem materials – Percent recoverables remaining for prioritization
 - PRR, PRR-E, PRR-\$
 - Self-efficacy – messaging that links to individual power – higher recycling levels
 - Tailored messaging – don't use you or your friends – ID what appeals to "next" group – market research
 - Social marketing
 - Feedback

Source: SERA research



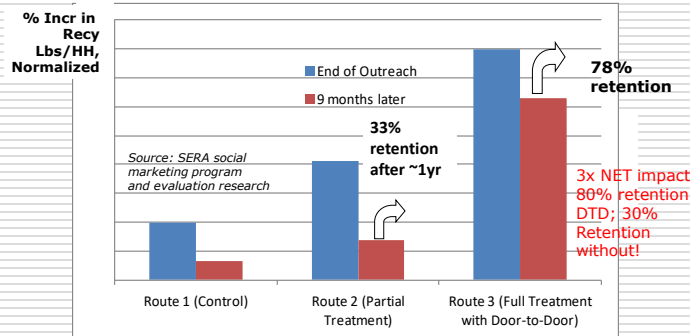
HOW TIDE DOESN'T SELL



Source: SERA all rights reserved



RECYCLING – NET IMPACT & RETENTION CRITICAL...



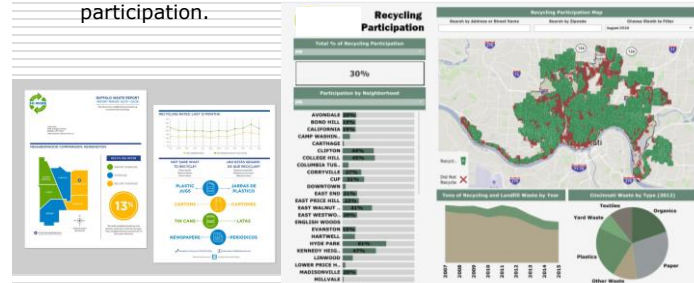
Source: SERA social marketing program and evaluation research

Source: Skumatz Economic Research Associates, (SERA)



FEEDBACK FEEDING NEIGHBORHOOD COMPETITION

- New York community doubled the rate of increase in recycling tonnage.
- Midwestern city's program led to a 15% increase in recycling participation.



Source: SERA research



CREATIVE / (ULTIMATELY AMUSING) FEEDBACK

- Cell phone cameras in trash bins (UK study)
 - Student housing; 18-34 year olds seen as poor recyclers
 - Photo automatically uploaded to Facebook in enviro challenge
 - Shame after disposal (amount, "treats", brands)
 - "Conscience on your shoulder"
 - Banana peels became unexpected feedback



Figure 2. A BinCam bin augmented with a Sony Ericson Xperia™ X10 mini smart phone.

Source: SERA research

Photo and Info Source: Thieme, et al., "We've Bin Watching You..."

CREATIVE / (ULTIMATELY AMUSING) FEEDBACK



Figure 3. Part of the BinCam interface showing images of the bin responsibilities and bin spies to the left, and an enlarged and tagged bin picture in the middle, with a message of participants written on a banana skin.

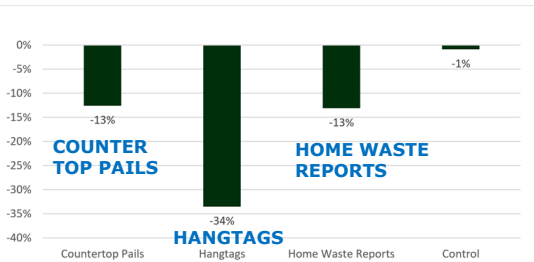
Source: SERA research

Photo and Info Source: Thieme, et al., "We've Bin Watching You..."

Increases in awareness & Thought about waste behavior; Feelings of guilt / design Implications for social persuasion

CALIFORNIA RESULTS ON TRASH FEEDBACK

Figure 3: Percent Reduction in Trash Bin Weight



Hangtags on trash or green bin more effective than Home waste reports

Source: SERA research

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TAKEAWAYS

- China gave time – we wasted it
 - Multiple years of warning, ramp-up
 - 15% of sales (mostly coast) – but spillover effects
 - BUT also abandoned our US manufacturers / end users
- Solution is NOT the rainbow
- Enforcement, market (& carbon tax)
- Short term – a few options
 - Killing single stream is not an answer / technology can sort



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Source: SERA research



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TAKEAWAYS

- Punish dirty bales even if tight market
- Long Term – formal market – trade
 - Stability / less risk
 - US (Canadian) markets, factories, and jobs
 - PREDICTABLE recycling program costs / budgets
- Horizon – Carbon Tax – embedding energy & externalities – Big adder
 - Significant price advantage over virgin materials – recyclables will WIN in most cases!
- Few quick fixes are much help; local industries; make / buy / reward / enforce clean commodity
- DEFINITIONS & Quality matter and have consequences.

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THANK YOU! – QUESTIONS?

Also see Resource Recycling Article 8/2018

Others on cost-effectiveness & social marketing: RR Fall 2015, 11/13, 1/13, 4/10, Waste Adv 2/12

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