

The Economics of Recycling: A Collector/Processor Perspective

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November 7, 2016



WM Recycling Services



14 M

Million tons of recyclables
managed in 2015



2,200

Collection contracts
with recycling service
to 7.5 M households



104

Materials recovery facilities
owned/operated by
Waste Management.
200 muni processing contracts
6000+MRF contracts

WM has invested over \$1 billion in recycling
infrastructure

All MRFs - 2016 (104)



- 00712 Red Deer MRF
- 01808 Cascade Recycling Center
- 04959 JMK Fibers
- 02968 Spokane Material & Recycling T
- 01516 Tualatin Valley Waste Recovery
- 01804 RSW MRF (Commercial Row)
- 04969 Sacramento Recycling and Trans
- 02373 Davis St MRF
- 01963 Guadalupe MRF
- 01812 CMC Recycling
- 01814 HSS Recycling
- 02779 East Valley Diversion
- 02780 Downtown Diversion
- 04883 Azusa Transfer Station and MRF
- 01962 Irvine Transfer Station and MR
- 02360 Orange Transfer and MRF Recycl
- 04947 Moreno Valley Transfer and MRF
- 01823 Northwest Regional MRF
- 01021 Salt Lake MRF
- 00576 Grand Junction
- 00310 Larimer County MRF
- 02065 Denver - Franklin St MRF
- 02629 Denver - 48th Ave MRF
- 00309 Colorado Springs MRF
- 02357 Oklahoma City MRF
- 02893 WM of Arlington MRF
- 01832 Houston Clay Road MRF
- 02887 San Antonio MRF
- 04908 Houston Westside SS
- 02464 Paper Valley MRF
- 02455 Milwaukee A-1 MRF
- 02463 Madison MRF Fish Hatchery Rd
- 02460 Janesville MRF
- 02557 South Chicago MRF
- 04943 Shawnee Country MRF
- 04855 Deffenbaugh KC MRF
- 04903 Tulsa MRF
- 04904 Garland MRF
- 02613 Beaumont MRF
- 02897 Gasmer Drive MRF
- 02431 Germantown MRF
- 02911 WM Brown Deer C and D Recycling
- 04920 Monroe Country MRF
- 01831 Seginaw MRF
- 01830 Grand Rapids MRF
- 01800 Lake County MRF
- 04970 RSI
- 01943 Cleveland Oakwood Village MRF
- 04909 Pittsburgh MRF
- 01975 Columbus MRF
- 04924 Nashville RRC Rivergate
- 04923 Nashville RRC River Hills
- 02908 Little Rock MRF
- 04960 Dothan MRF
- 02466 Orlando MRF
- 01853 Syracuse MRF
- 04921 Billerica MRF
- 02276 Avon Spiegel MRF
- 02010 RRT - Springfield MRF
- 00190 Springfield MRF
- 04917 Paterson MRF
- 01849 Newark St Charles St MRF
- 01091 Elizabeth Transfer Stations
- 02861 Philadelphia MRF
- 04892 Philadelphia Transfer Forge
- 02987 Ocean County MRF
- 02976 WMRA Baltimore MRF
- 02563 Elkridge MRF
- 02977 WMRA Capitol MRF
- 00362 Winston Salem MRF
- 02270 Raleigh MRF
- 04926 WM Recycling Sun 4
- 04825 WM Recycling Sun 5
- 04828 WM Recycling Sun 2
- 04827 WM Recycling Sun 3
- 04820 WM Recycling Sun 1*
- 02191 Reuters MRF
- 04976 WM Recycling Miami MRF

Changing economics of recycling

Commodity Markets

- Reduced global market demand
- More stringent quality requirements

Evolving Inputs & Systems

- Packaging material much more complex
- Increase in number of cart-based single stream recycling systems

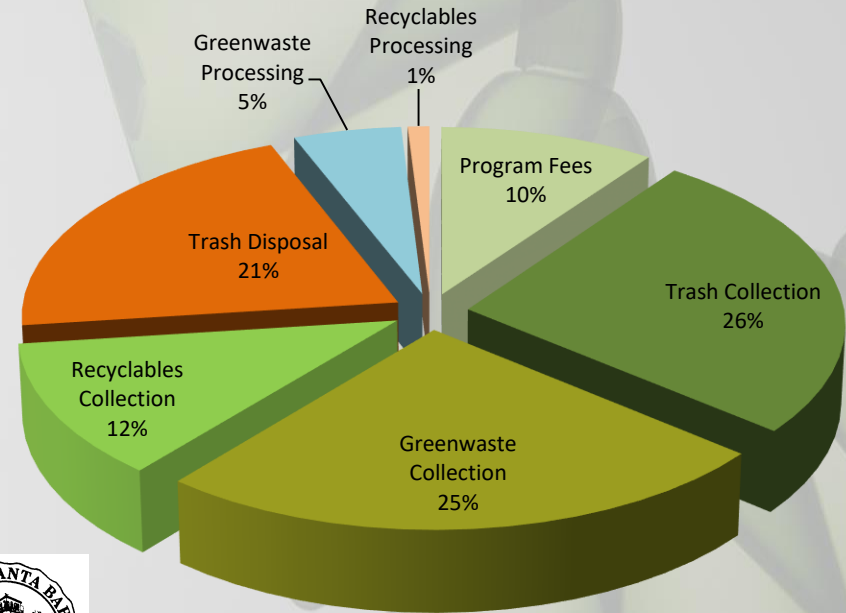
Service cost breakdown

Breakdown of a Typical 3-Can Trash Bill...

Current rates are comprised of:

1. Cost to collect
2. Cost to process/dispose
3. Fees

Disposal cost is between 21-33% of rate depending on jurisdiction



Collections is 60-70% of integrated costs

The Role of Goals

- Weight-based recycling has been our measure of material management performance
- States, cities and corporations have developed 50%, 75% and even Zero-Waste goals
- Cities added more materials and convenient programs to help achieve their goals.

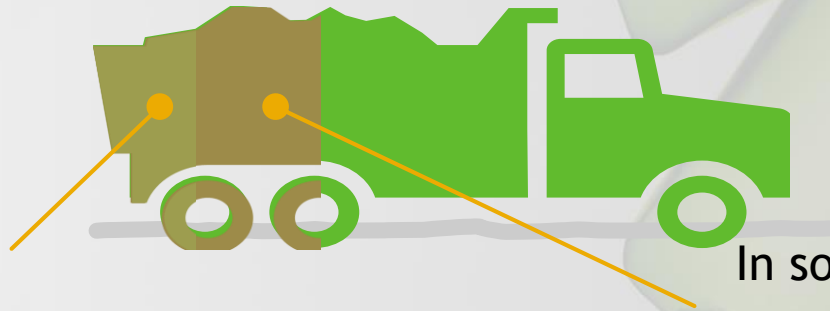
Goals drive programs.
Do we have the right goals?

Contamination: Prevalence and Impacts

Contamination has increased as the waste stream has changed and single stream collection has increased

Processing costs have increased due to more stringent quality standards, resulting in higher customer costs

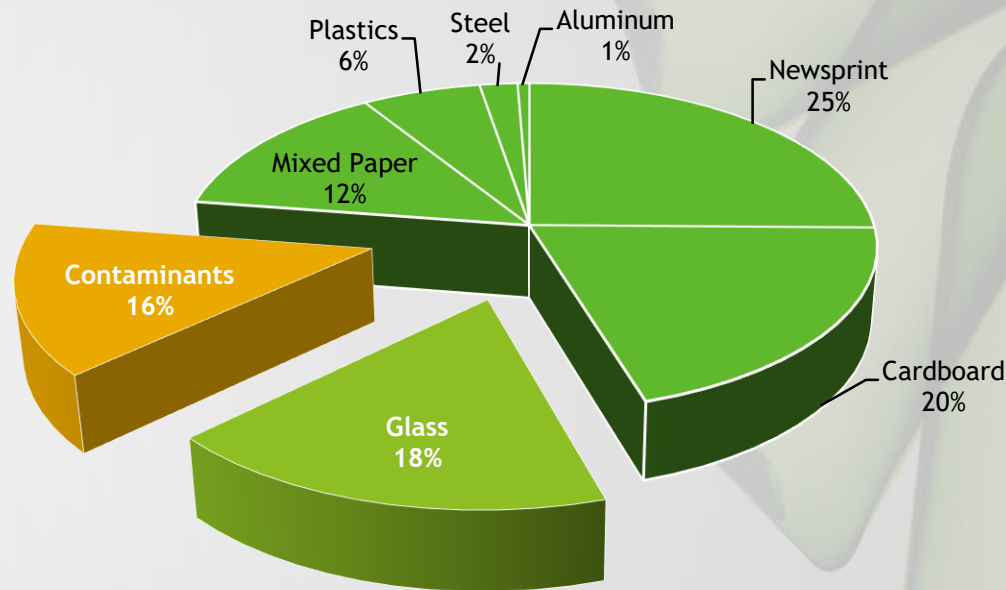
On average, contamination makes up about 16% of collected recycling, by weight.



In some U.S. communities, we see up to 50% contamination, by weight, in materials collected for recycling

MRF Economics - Increasing Costs

Composition of Materials Entering Single Stream MRFs



- 18% of inbound recyclables are glass and 16% are contaminants
- 34% of MRF inbound materials have a net cost not revenue.

Taking it to the streets: Cleaning up the stream

Siler City, NC - 40% contamination

- Provided basic public education
- Drivers tagged contaminated carts, then left behind
- Supported with Facebook ads
- Results were 20% decrease in contamination

Elgin, IL - 40% contamination

- Focused on reducing bagged garbage and foodwaste
- Targeted mailings first to educate
- 6 weeks of tagging
- 15% reduction in target contaminants

Key Take Aways - Expensive but effective

- Provide **real-time feedback** to customers
- Effective education happens at the **cart, point of collection**
- Need the **right tools in place** to execute (cameras, methods to record the data, driver training, etc.)



Wrap up - ongoing trends

- **Factors beyond our control are likely to drive up the cost of recycling** - The changing waste stream, soft global commodity markets and rising business costs.
- **Push to improve inbound quality** - Industry-wide efforts are focused on improving the quality of material being delivered to MRFs. On-route education is the best way to do this in extreme cases, but is expensive.
- **Contract terms** - The business model for the recycling industry must continue to evolve, recognizing the importance of reduced risk, accommodating commodity prices and measuring inbound quality in contracts

Balancing MRF demands with collection cost will drive efforts to improve efficiency and recycling quality