



The Evolution of Mixed Waste Processing Facilities 1970 - Today


Presented by
Harvey Gershman, President
Gershman, Brickner & Bratton, Inc.
Presented at
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Evanston, IL
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Harvey Gershman



"Earth Day 1970 first inspired my career to focus on helping do better things with waste. And, I have been able to do just that for the past 40+ years."

Harvey Gershman
President and Co-Founder
Specialties: Strategic thinking and planning; procurement and negotiation assistance; system administration; change management; and project financing coordination.

GBB Quality – Value – Ethics – Results
Founded 1980



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GBB's Waste Consulting Services

- Economic, technical and environmental reviews
- Procurements
- Due diligence third-party reviews
- Waste characterization and sourcing
- Process planning and conceptual designs
- Independent feasibility consultant




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Mixed Waste Processing Report



The Evolution of Mixed Waste Processing Facilities 1970-Today


Prepared for:
The American Chemistry Council

Prepared by:
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April 7, 2015

<http://plastics.americanchemistry.com/Education-Resources/Publications/The-Evolution-of-Mixed-Waste-Processing-Facilities.pdf>



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Mixed Waste Processing Facility (“MWPF”) History

- 1970s: shred and remove ferrous metals
 - RDF for coal fired boilers
 - Chicago, IL; Milwaukee, WI; Rochester, NY; St. Louis, MO
 - None operated into the 1980s
 - Ames, IO - still operating
 - Easier materials to landfill
- 1976: Recovery 1 – New Orleans, LA
 - First comprehensive MWPF
 - Trommel, shred, air classification, screening, magnetic separation, and eddy current separation
 - Demonstrated materials recovery
 - ‘RDF’ landfilled



1980s: RDF –Dedicated Boiler Facilities (20 operating today)



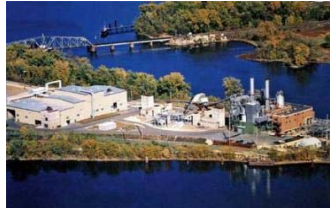
Rochester, MA



Hartford, CT



West Palm Beach, FL



La Crosse, WI



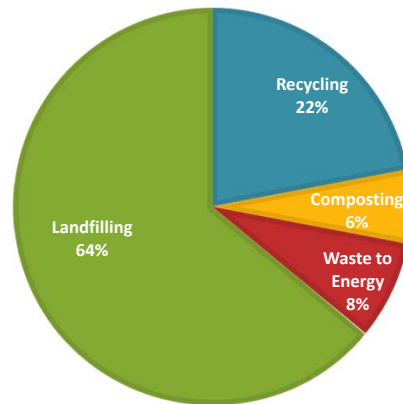


1989: CA AB 939 Creates Demand for Diversion

- Widespread practice of contracting/franchising for 'all' services
- Result
 - Source separation programs
 - Deposit legislation
 - 139 Processing/transfer complexes
 - 56 (or 40 %) process "mixed solid waste"
 - 54 (or 39 %) process "mixed inerts/C&D"




MSW Disposal and Recycling



Source: Columbia University; BioCycle State of Garbage 2013 results; 389 million tons (2011).







U.S. Waste Management Infrastructure

Technology	Number
Curbside Recycling Programs	9,000+
Commercial Source Separation Programs	-No Data-
Material Recovery Facilities (MRF)	736
Of which: Single Stream (as of 2012)	248
Mixed Waste Processing Facilities (MWPF)	51
Composting	2,300
Anaerobic Digestion	19
Transfer Stations	3,350
WTE	85
Landfills	1,908

Source: GBB 2015









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Gasification

- Partial combustion in an air-controlled environment
- Product: Syngas for production of electricity, chemicals/ fuels (ethanol)
- Feedstocks
 - Engineered fuel from MSW
 - Biomass
 - Agricultural waste





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Processing Technology Vendors



AMUT
ES RECYCLING



Infinitus
ENERGY



RRT



BHS
What's next.



LINDNER
America LLC



STADLER
America



CP



M
MACHINEX



VAN DYK
recycling solutions



Mustang
Renewable Power
Ventures, LLC

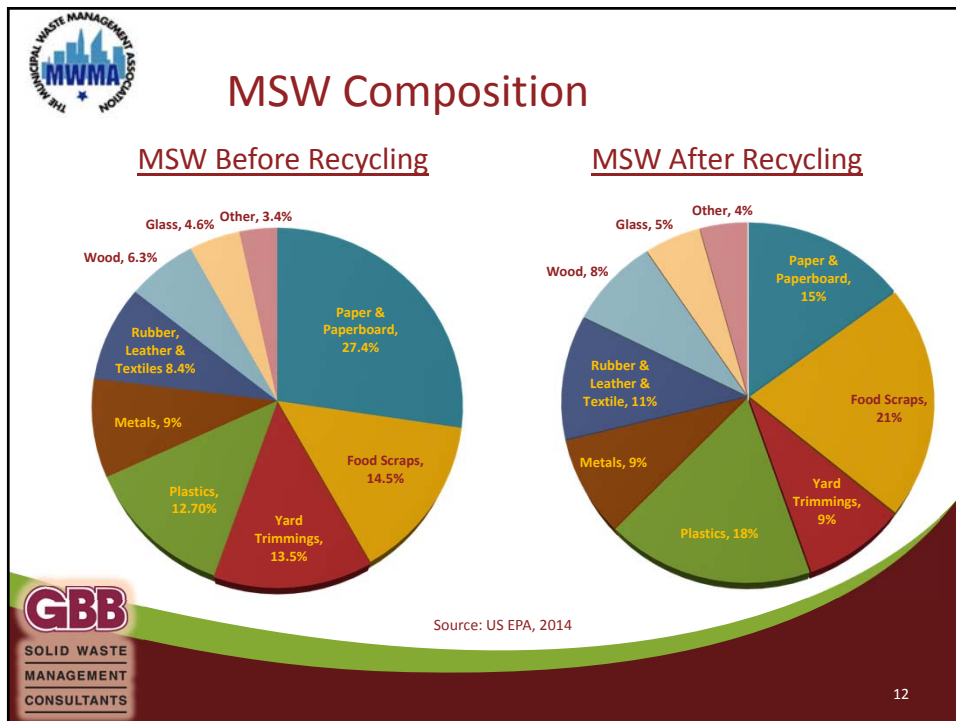


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So, What is the Problem?

- EPA Annual Recycling Numbers Flat
- State's keep increasing Recycling Goals/Mandates
- Too Much Garbage in S-S Recyclables
- Too many Recyclables Still in Garbage
- Citizen's Need to be Continually Educated, w/more \$
- Recyclables Collection Costs are Very Expensive
- Recyclable Material Markets are Volatile (Low \$ now)
- In reality: Recycling is NOT Free!
- Corporate "Agendas" are Everywhere (Is the tail wagging the dog?)



MWPFs for Significant Landfill Diversion

- More recyclables and organics
 - Recyclables can be an additional 15 to 35%
 - Organics can be an additional 20%
- Use cleaner/drier Refuse Derived Fuel in:
 - Existing mass burn facilities
 - Cement kilns, biomass, and coal boilers
 - New dedicated boilers/WTE facilities permitted with MACT
 - Conversion technologies



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10 Types of Major Processing Equipment

1. Conveyors (Metal and Rubber belt)
2. Sorting Conveyors and Bag Openers
3. Primary Shredders
4. Screens
5. Ferrous Magnets
6. Non-Ferrous Magnets
7. Air Separation Systems
8. Optical Sorting Systems
9. Secondary Shredders
10. Densification Systems

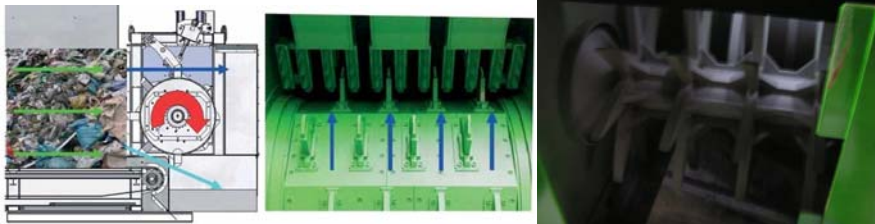


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Bag Breakers

- Open bags but not damage materials
- Offline or Inline
- NOT a shredder!




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 **Primary Shredder Types**
High-Speed Hammermill

 Horizontal

 Vertical

 **Source:** West Salem Machinery, Schutte Buffalo, SC Environmental


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 **Trommel Screen**






 **Source:** CP Group, www.ecocycle.org
Leftovers Report

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 **2D/3D Separators**



Ballistic Screen **Polishing Disc Screen**


 

 **Source: Machinex** **Source: CP**

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 **Air Classification:
Air Drum Separators and Aspirators**

 **Source: BHS, Nihot**

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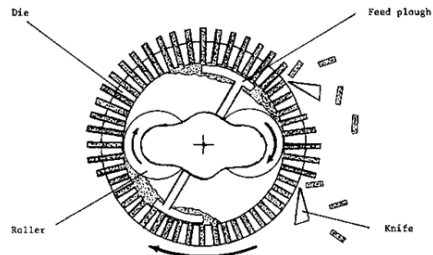
Container Optical Units



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Pellet Extruders



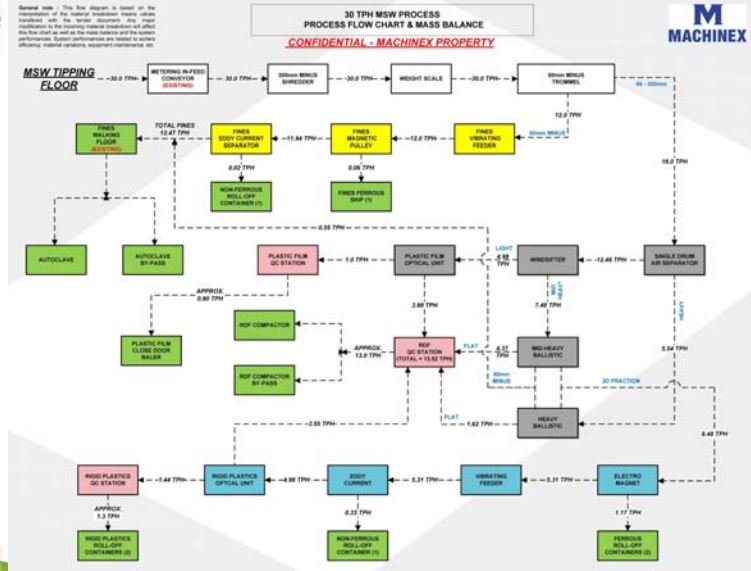
Source: Warren and Baerg, Food and Ag. Org.




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Film and Fiber Optical Units







Potential MWPF Recovery Rates

Material	Highly Mechanical Sorting System, %
Fiber	
Mixed Fiber	50-70
Cardboard (OCC)	65-75
Plastics	
PET	85-90
HDPE	85-90
Plastics #3-#7	75-80
Film	25-40
Metals	
Ferrous	90-95
Aluminum	90-95
Organics Foodwaste, yardwaste	
	80-90

Source: SWANA webinar, July 23, 2014. Title: *Mixed Waste Processing: What Does It Offer?* Presenters: Karl Hufnagel, PE, Civil Engr. – Brown and Caldwell; Eric Winkler, Sales – Bulk Handling Systems




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Overall Objective

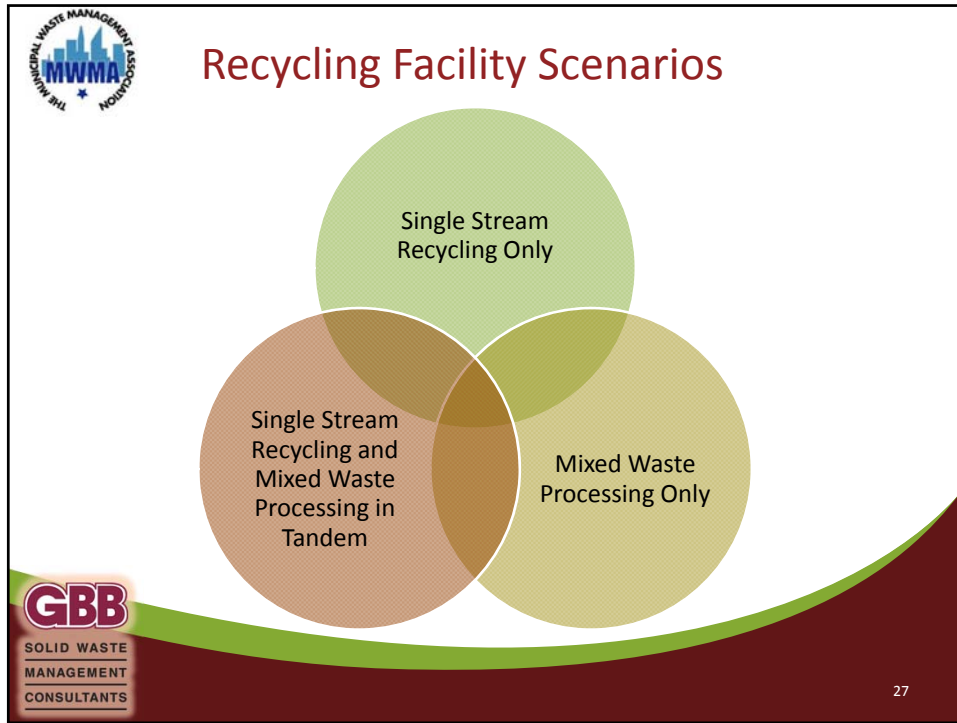
Make Products That Sell and Have Value!



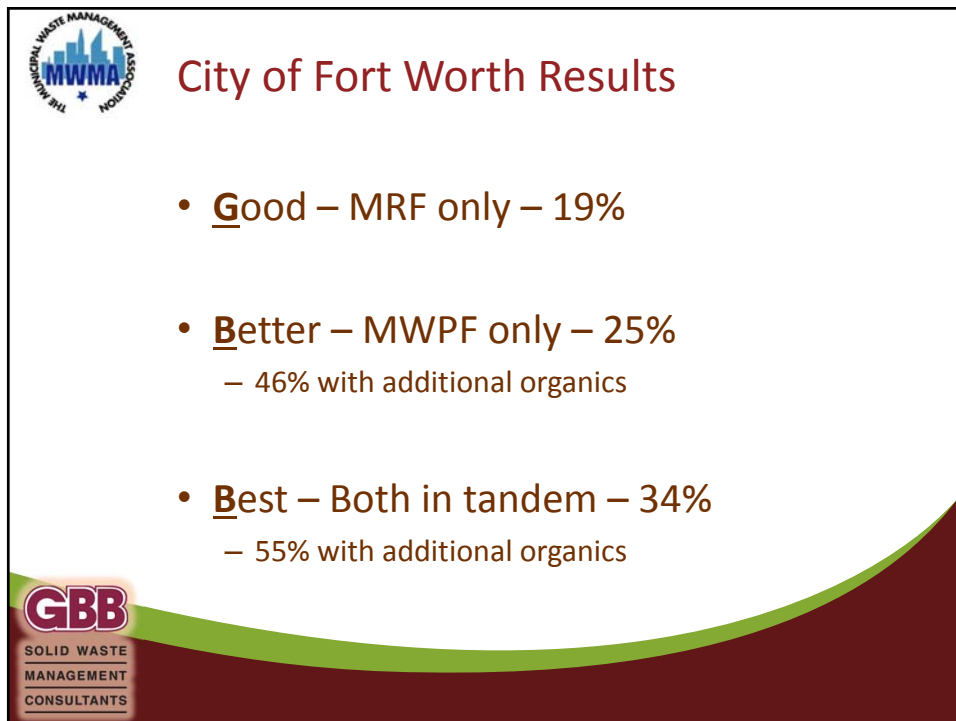
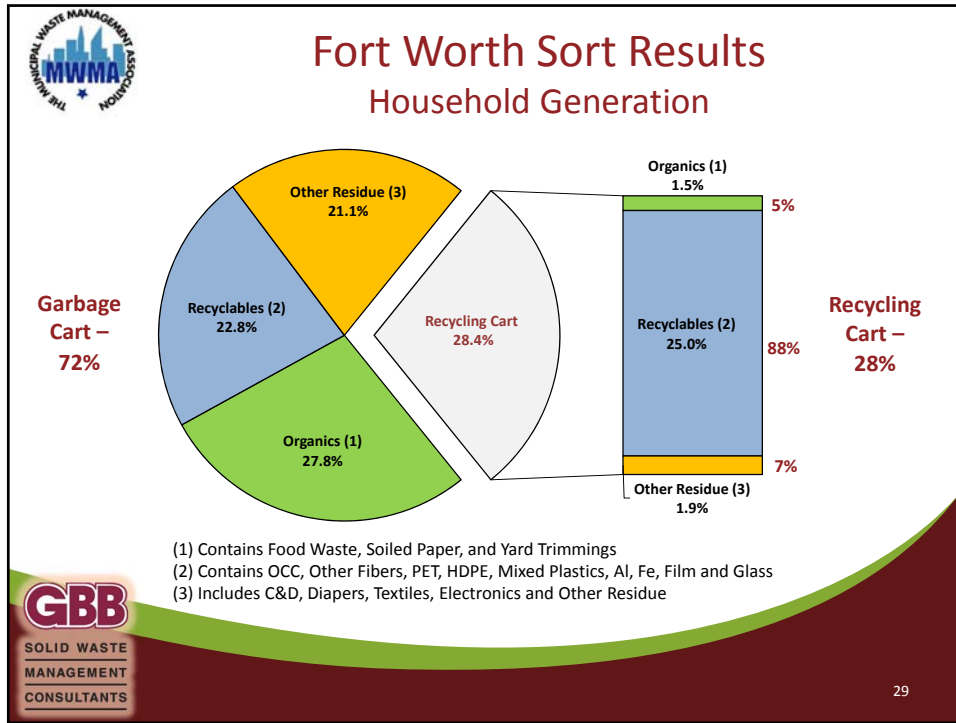
Source: GBB




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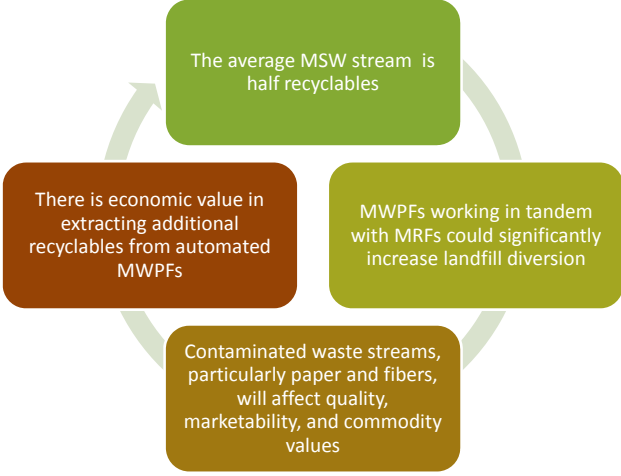


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- City of Fort Worth Residential Recycling and Garbage Waste Sort Results - 2015**
- City residential services:
 - Curbside PAYT 3-cart system for waste, single stream recycling with high participation, and yard waste
 - Evaluated individual set-outs per household in both the waste and recycling carts
 - 75 Houses per day for five days were randomly selected and collected prior to normal pick-up
 - 30 Categories were sorted from both bins
- THE MUNICIPAL WASTE MANAGEMENT ASSOCIATION
MWMA
- GBB
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Key Findings of ACC-GBB Report




The average MSW stream is half recyclables


There is economic value in extracting additional recyclables from automated MWPFs

MWPFs working in tandem with MRFs could significantly increase landfill diversion

Contaminated waste streams, particularly paper and fibers, will affect quality, marketability, and commodity values



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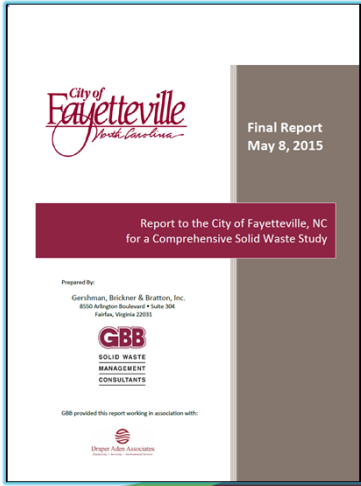


Recent City of Fayetteville, NC Analysis

<http://fayettevillenc.gov/home/showdocument?id=574>

Benefits from the implementation of MWPF

- Reduced GHG emissions
- Reduced collection trucks
- Convenience for the homeowner
- One waste cart to store and set-out
- Less waste destined for disposal
- Higher level of recycling with minimal public relations and 100% participation in the program
- MWPF provides opportunity for regional shared collection service plan





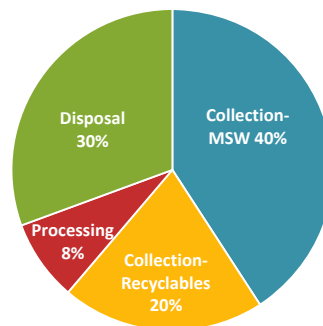
Fayetteville - Recycling is **Not Free!**

- GBB's Fayetteville report reviewed the real cost for curbside single stream recycling...from the curb setout, collection, processing at the S-S MRF through commodity sales (with a little material rebate \$)
- Total Cost Per Ton Recycled - **\$250/ton recycled**



Considering MWPFs

- Look at "system" economics
- Waste characterization very important
- Decide if with or without source separation
- Green waste generally separate
 - Add food scraps
- Outputs – part of ZWL goal
 - Recyclables
 - Organics
 - Fuel



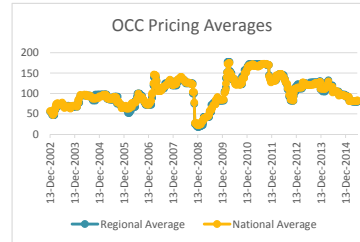
System Cost Components
Source: GBB 2014





What will products sell for from MWPFs?

- IREP (before closing)
 - Paper: sell all at \$5 above SE paper prices
 - Plastics: quality same as from MRFs
- Markets first
 - If you can't sell it, don't make it!



Some Cost Data Points for MWPFs

- IREP - \$28 per ton
 - Temporarily closed
- Recent capex announcements
 - \$30-60 million
- Service Fees
 - \$42-60 per ton with out organics and fuel revenues or back end alternatives





What should you do?

- Prepare objective 'system' analysis to the community and decision makers
 - Is it ok to abandon source separation and the 'conserve' message?
 - Are we willing to pay more?
- Remember, the real numbers come from procuring and negotiating with qualified offerors!



Thank you!!

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