



Sustainable Collection and Processing of Single-Stream Recyclables

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FCR Recycling



What is Single Stream?



Clean, unsorted recyclables.





Benefits of Single Stream



Collection:

- No sorting at the curb
- Allows for fully automated collection
- Allows for higher compaction rates and load sizes
- Lower workers compensation/injury rates
- Uniform fleet for recycling and MSW

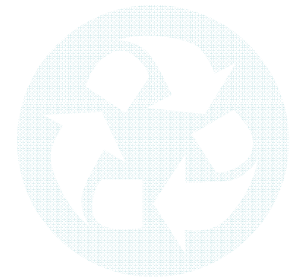
**Collection costs
are reduced by
20%- 130%**

Curbside Collection has come a long way in the last 30 years...





Increased volume and ease of access...



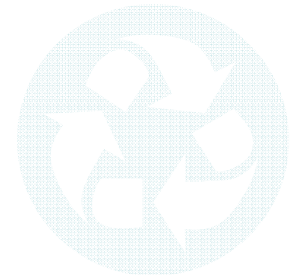


Added compaction...



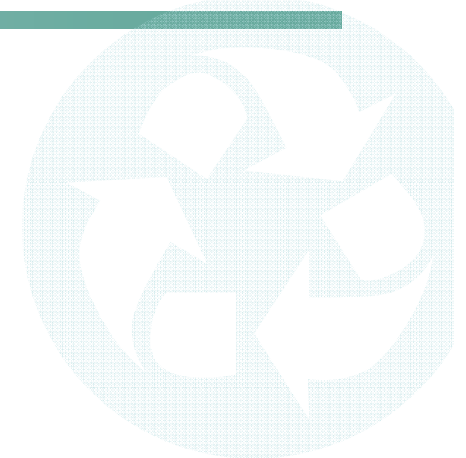


Semi-automated Compacted Containerized Collection...





Fully-automated Compacted Containerized Collection...







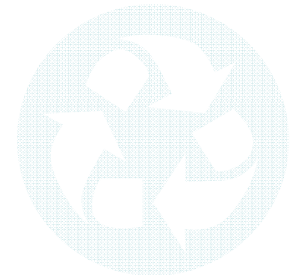
Benefits of Single Stream



MRF Operator:

- Keeps haulers and residents happy
- More volume

**Volumes
typically grow
20%- 70%
per municipality**



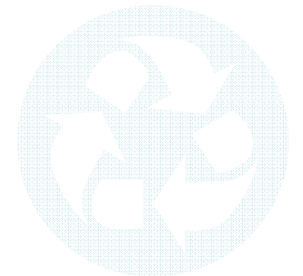


Single-Stream Challenges



Collection:

- You can't see what's in the cart
- New trucks increase efficiency but are expensive
- Carts are more expensive than bins
- Route balancing and transition





Single-Stream Challenges



Residents:

- Where do I put this big cart?





Single-Stream Challenges

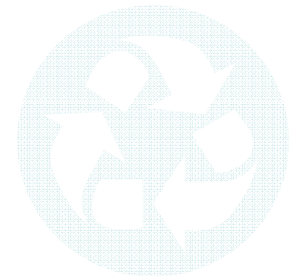


MRF Operator:

- \$6-10 million dollars of equipment are necessary to do the job right
- What do I do with the mixed broken glass?
- New maintenance challenges and higher costs
- Maintaining QUALITY bale production

\$10,000,000

**Hartford Single
Stream System
and Building
Improvements**





Innovation in Hartford



Screens

- More than 7 active disc-screens agitate, flip and separate the fiber from the containers.
- Waterfall configuration of most screens keeps containers and glass fragments from riding on the paper





Innovation in Hartford



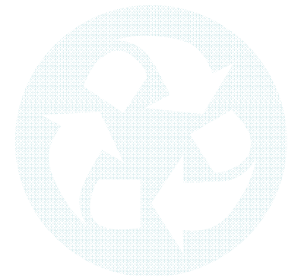
Glass

- Only MRF in the country that has optical sort to remove ceramics and other contaminants from broken glass
- Able to sell glass directly to the glass bottle manufacturer.





Innovation in Hartford





Innovation in Hartford



- Well lit, ergonomically correct sort stations coupled with low burden depth = QUALITY

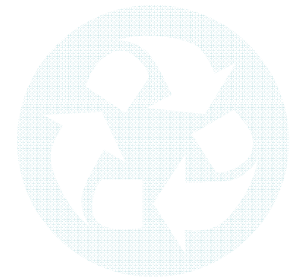




Innovation in Hartford



Manager and team is incentivized based on
1. Safety 2. Quality and 3. Production





Innovation in Hartford



Additional Innovation to foster quality:

- We staff a picker on the residue belt
- We QC our material going into the baler with two sorters.
- We use optical sorters to pull PET (no PLA or PP slips through)
- We QC all material sorted by the optical sort.
- All bales are inspected before they are stacked in inventory and a second time before they are loaded



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Additional Innovation to Foster Quality:

- Our team constantly tinkers with the system to improve quality.
- System is designed with checks and balances—extra sort stations just in case
- Great communication with CRRA to monitor and improve the inbound quality
- Great communication with our end markets— we have been selling to some companies for more than 20 years.