



Single-Stream Recycling

Best practices improve quality output, reduce residue and costs

by Janet DeMarcke

"The residue range is within a few points of well-managed two-stream systems, so the city is happy."



Plenty has been written about the pros and cons of single-stream and two-stream residential recycling, including comparisons of product quality, cost-effectiveness, overall diversion and more. For many the debate continues.

From my perspective, based on over a decade as environmental manager responsible for a city residential waste management program, I've learned a lot about what makes single-stream recycling work for us.

Home is Chilliwack, BC — the third oldest municipality in the province (incorporated in 1873). Located along the TransCanada Highway 100 kilometres or so east of Vancouver, Chilliwack has over 80,000 residents. The residential collection service is provided to about 20,000 properties. Our diversion currently sits at 38 per cent and we've set a target of 43 per cent by 2015. If we move forward with a food scrap collection program the diversion rate may be as high as 60 per cent in a very short period.

In 2004, we converted from a voluntary system of 15 recycling depots to a mandatory, residential single-stream recycling program and, frankly, we haven't looked back.

The city examined multi- and single-stream recycling and decided on single-stream for the same reasons that drew other municipalities to take a closer look: convenience, ease and the potential of lower collection costs, along with higher participation and higher recyclables capture rates.

We knew we had to make the program as simple as possible, otherwise residents wouldn't climb on board. It worked. More people participated in recycling and everyone recycled more. Our diversion rate rose from 13 per cent to 34 per cent in the first year.

When we adopted single-stream we didn't go the automated system route because of the increased cost. Instead, we told residents to keep using their garbage-type cans, well-marked for garbage, recyclables and yard waste. Containers without lids and open blue boxes are inappropriate in Chilliwack because of animals and the amount of rain we get on the West Coast. The advantage for us is that the drivers can check the contents of the cans and our contractor of two and a half years, Emterra Environmental, has trained their collectors to take that little extra time to tag and leave behind unacceptable materials. As we all know, once it's in the truck, it's a whole different matter.

Bob Graham, principal of Entec Consulting Ltd., advises clients on how to operate efficient MRFs in Canada, the US and internationally. He says successful single-stream comes down to two things: a combination of a good operator who pays attention to detail and a good MRF design.

He labels looking at the blue bin contents before dumping them into the truck as "single-stream best practice number two," pointing to it as a fatal flaw in many programs. Best practice number one is continuous communication and education directed at residents about what goes in and doesn't go into recycling.

Graham notes that the real cost savings in single-stream are found at the collection stage — typically the largest cost centre in municipal solid waste management. He says that usually larger municipalities will see bigger savings because of economies of scale. In other words, it's about collection efficiency.

"A lot of municipalities have proven that single-stream recycling can save money on the collection side because they were able to move to more efficient and less expensive collection," Graham says, "or to take advantage of co-collecting organics along with recyclables."

"Single-stream gives municipalities a chance to add new materials, too, cutting costs while increasing diversion. Municipalities that pick up only recyclables often can make use of their existing garbage packer trucks, making single-stream collection even more cost effective."

Chilliwack's experience shows that our contractor has been able to use its fleet more efficiently. It uses fewer trucks in the urban area of the city and maximizes the space available reducing the number of trips to and from the transfer station to unload. Emterra was able to cut two trucks out of the fleet needed to serve our municipality. Fewer trucks and fewer trips to the transfer station translate into lower fuel requirements, less GHG emissions and a lower carbon footprint. (According to greenfleetsbc.com, taking two trucks off the road saves an equivalent of more than 180 tonnes of carbon dioxide emissions annually.)

Graham summarizes that "a well designed collection operation can more than offset the increased costs on the processing side typically seen in single-stream."

Single stream's bad rap

Nevil Davies is Emterra's general manager for the BC mainland including Emterra's Surrey MRF where Chilliwack's single stream materials are processed.

"Single stream's reputation for producing poor quality materials was probably deserved in some quarters, but you can't tar every processor with the same brush," Davies says. "The technological advancements from equipment manufacturers in the past five or six years have solved many of the problems processors encountered; for example, fibre contaminated with tiny glass particles."

But even with today's better optical sorters and flexible disc screens, Davies says the answer to a better quality product that consistently meets and exceeds market specs is knowing exactly what the equipment is capable of doing in all kinds of weather conditions, and being able to adjust the equipment on the fly. His cardinal rule is to check material quality regularly (as often as hourly) and if material streams have unsatisfactory amounts of cross-material contamination, slow down the line.

Slowing the line down, though, has a consequence. It results in higher quality materials, Davies says, but at the cost of productivity.



Emterra driver collects recyclables in Chilliwack, BC.

“Processors need equipment for single-stream materials that delivers both speed and quality, no matter what the weather conditions or the initial state of the incoming materials or any of the other variables that can affect how the equipment operates day to day, sometimes hour to hour.” He adds that single-stream processors are managing with the equipment available to them but that they have to be innovative to coax out a better balance of capacity and quality.

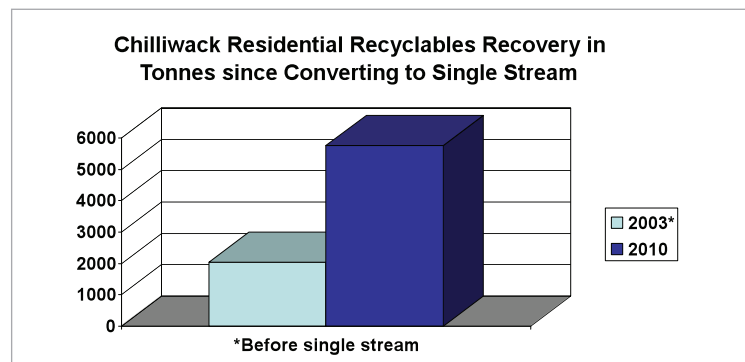
Davies thinks that technological improvements can only come from a willingness on the part of processors to share what they’ve learned about how to bridge the gap between capacity and quality. He thinks the best way to do that is to write contracts that ask for results based on processors’ experience in

using existing equipment.

“When we figure out how to minimize cross-contamination and still meet capacity targets, operation costs will drop and material quality will climb,” he predicts.

Meanwhile Davies says that processors have

their work cut out for them. Emterra reviews and works with processing data in real time, as the lines are running, and then depending on what’s seen, change the speed, change the angle of the screen or alter the amount of agitation in order to get a better product.



Bob’s and Nevil’s 12 Best Practices in Single Stream Recycling

1. Communicate with residents effectively and regularly about what is acceptable (and what’s not) in single stream recycling.
2. When using recycling boxes at the curb, inspect for contamination. Tag and leave unacceptable materials, if possible. (Video cameras are being used in some cases to allow drivers to watch carts being emptied. When unacceptable materials are noted, the address is recorded and a message sent to the householder.)
3. Undertake regular, detailed audits of incoming loads at the tipping floor. If a neighbourhood is consistently producing contaminated loads, initiate remedial education activities.
4. Invest in thorough training for drivers, tipping floor spotters and pre-sort line workers so each knows what’s acceptable and what isn’t.
5. Invest in a good MRF design and proper equipment.
6. Plan for a pre-sort line that is sufficiently long and accommodates enough stations to allow workers adequate time and space to do a thorough pre-sort of incoming mixed materials.
7. Know the capabilities of the equipment in all weather and material conditions and be able to adjust the equipment on the fly to improve material separation efficiency.
8. Monitor the quality of the material being sorted regularly (e.g. hourly) and adjust the processing line (e.g. faster, slower, tilt screens, etc.) to improve material quality.
9. Maintain equipment.
10. Audit the products at the back end of the process to document what is being sent to markets (to avoid being dependant on feedback from markets regarding the quality of the output).
11. Audit the residue stream to assess sorting efficiency and to determine if lower value materials can be removed and marketed to avoid landfilling.
12. Nurture long-term relationships with markets by providing product that consistently meets or exceeds specs.

What is Emterra Group?

If you see the name Emterra Group, you might wonder what it is, who they are, or what they do. For many, the name doesn't conjure up thoughts of "Canadian leader in innovative waste management solutions" — nor that the founder and CEO is the recipient of awards and recognitions that would take five minutes to list if you were introducing her, including the Order of Canada in Recognition of Significant Contribution to Compatriots, Community and to Canada.

Yet Emterra has had a presence in the Canadian solid waste management industry for 35 years. Under different names, it has carved out a niche for itself — and a big niche at that — among the "big boys" of solid waste management.

With 400 trucks, more than 800 hundred employees and 14 material recovery facilities (MRFs) in Ontario, Manitoba and BC, Emterra has a solid presence in the industry. It's the only resource management company that has three single-stream MRFs in the country.

Its corporate commitment promises clients that it will do a better job of collecting, processing and marketing recyclables so that less of their waste goes to landfill, helping them progress steadily toward their Zero Waste goals and reducing their carbon footprint... and doing it all for less.

"Where others see garbage, we see only opportunity," said Emterra's head, Emmie Leung. "We work hard to find the opportunity in every challenge. There is value in everything — even waste."

She built her first business on that philosophy as a newly minted Bachelor of Commerce graduate from the University of Manitoba. One day in 1976, while walking around her Winnipeg neighbourhood, she noticed that local businesses were throwing away a valuable resource — cardboard boxes and other waste paper.

Leung knew she could market these materials so she moved to Vancouver to be closer to transportation hubs and established International Paper Industries (IPI). She wore every hat: truck driver, collector, sorter, baler, forklift operator, bookkeeper, business developer and CEO. From that daunting beginning, she has kept adding services and expanding the business.

As packaging and paper recycling and landfill capacity crises gained momentum, Leung



competed for and began winning contracts to collect both garbage and recyclables for municipalities and the IC&I sector. A believer in sustainability before it became a household word, she looked for ways that she could reuse and recycle in her own operations.

Her tenacity for putting her head down to get the job done, to market materials that met her buyers' specs and to deliver efficient and cost-effective services for her clients earned her the nickname, "the dragon lady." She laughs at it, almost wearing it proudly.

"I had to be tough," she retorts. "I was a woman... and an Asian woman at that, in a man's world."

The company thrived. In the 1990s, IPI grew beyond its BC roots, establishing an offshoot called Halton Recycling Ltd. in Ontario. In 2003, IPI started the company's first single-stream MRF in Manitoba. In 2008 both of these companies, along with the original IPI in BC, were brought together under the new name, Emterra Environmental.

Emterra Environmental, a division of Emterra Group, provides municipal and IC&I clients in the three provinces with integrated resource recovery (collection, processing and marketing of recyclables) and waste collection services.

Serving more than 10 per cent of Canada's population, in 2010, Emterra Environmental's

clients spanned 58 municipalities through 33 municipal waste and recycling collection, processing and marketing contracts. It collected, processed and marketed more than 300,000 metric tonnes of recyclables, 50 per cent through single-stream programs. It also collected 495,000 metric tonnes of organics and waste.

Emterra demonstrates that it consistently measures up when it comes to marketing quality materials, getting letter after letter of testimonials from happy customers. Just one of them is Kevin Andrews, general manager of Merlin Plastics Supply Inc., one of Canada's largest post-consumer plastics processors. He says Merlin has been buying post-consumer plastics from Emterra's BC, Manitoba and Ontario locations for two decades and that Emterra's "excellence in material recycling operations makes ours a partnership of tremendous strength."

Emterra's corporate mission, and the reason they can promise increased waste diversion, goes deeper than mainstream recyclables. They put in extra time to find lesser known, responsible markets that want or can use lower value mixed materials. As a result of those efforts, Emterra Environmental's MRFs have the lowest residual levels in the industry, ranging from 3 per cent in multi-stream collection programs to less than 10 per cent in single-stream.

Striving for sustainability and a reduced carbon footprint in Emterra Environmental is just part of a bigger picture. Emterra has two other divisions, Emterra Tire Recycling and Canadian Liquids Processors Limited. Emterra Tire in Brampton, Ontario is one of only five companies in the province that collects and recycles discarded and unsaleable tires. Through innovative proprietary technology, they process tires into three products — crumb rubber, steel and fibre. Emterra Tire is a certified hauler and processor of tires under the Ontario Tire Stewardship program. Canadian Liquids Processors in Hamilton, Ontario specializes in confidential product destruction, producing ethanol from liquid waste, and packaging and paper recycling resulting in effective and environmentally conscious recycling.


So who is Emterra Group? It appears to be one of the major players in resource management in Canada today.

It's not just about machinery, either. Davies pays attention to the tipping floor spotters' quality control and the number of stations needed along the pre-sort line.

"It's no good coming to the end of the month and reporting to your customer how you failed to produce products that markets will accept," he says.

And Chilliwack couldn't agree more. Reports show our recyclables consistently meet specs. And that means added value.

Through an aggressive program of finding viable markets for lower valued materials, Chilliwack indirectly saves money. For example, instead of landfilling a low value product as residue, the contractor looks for an environmentally responsible market. Even if they give the product to someone for basically the transportation cost, they've saved the tip fee... and it keeps our residue rate in the four per cent to 4.5 per cent range depending on the contamination

coming in at the front end from residents. That range is certainly within a few points of well-managed two-stream systems, so the city is happy. After the experience we've had in Chilliwack, I'm convinced that through these best practices — good product input, attention to detail, maximizing equipment capabilities, meeting quality specs and finding market for lower value materials — single-stream will earn the respect it deserves. 

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SINGLE STREAM RECYCLING



Do you see
waste or
opportunity?™



As a Canadian leader in integrated waste diversion and recycling solutions, we offer municipal and ICI clients choice in recovery methods. When it comes to single stream recycling, we see only opportunity. Since we collect materials with our own trucks and process them at our own facilities, we maximize the opportunity for clients to achieve Zero Waste at a lower cost.

At Emterra, we look at waste differently—not as something to be hauled to landfill but as a resource. Talk to us about how our turnkey, cost-effective single stream solutions can work for you.

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