

ROLLING OUT

the single-stream by Don Ross

Switching to single-stream recycling collection is a decision more and more communities are making these days. Our experts help show how to do it right the first time, raising awareness and participation from the first day of putting the new rollcars to the curb.

It starts, simply enough, with a recycling resident and a single cart. Take that cart and add a materials recovery facility (MRF) that can process commingled recyclables and you have the fundamental elements of a single-stream recycling program. Next, add automated collection trucks and radio frequency identification (RFID) technology to track and manage operations, and you'll have the makings of a recycling collection approach that is gaining momentum around the country.

In Florida alone, over 70 cities and counties have single-stream recycling collection programs, according to data collected by Kessler Consulting, Inc. (KCI), with more starting up every year. With single-stream recycling, as its name implies, consumers can throw all of their recyclables into a single cart. No more dual bins or costly partitioned carts, the approach is easier for haulers too. Instead of drivers standing at the curb, tossing bottles, newspapers and other recyclables into separate bins on a specialized truck, the recycling cart full of commingled materials is picked up and dumped into a single compartment, allowing for the use of a standard collection vehicle.

Cart size matters

We have found that the size of the recycling cart is an important consideration in creating a successful single-stream program. Generally speaking, the larger the cart, the better it is for increasing the volume of materials that can be diverted. Many communities, however, experience a strong reaction when larger carts are introduced, especially the

95-gallon model. Typically, a sector of participants in each community raise concerns about where they're going to store it and how they're going to get the cart to the curb, but, in fact, the largest roll cart, the 95-gallon model, is the same width (28 inches) as an 18-gallon recycling bin and two 18-gallon bins actually take up more floor space than the largest rollcart, yet they hold three times as much material. With a lid to keep material inside, and the rain, wind and any prying eyes on the outside, and wheels to easily roll it to the curb, those objections typically are erased by the time a pilot program ends and participants want to keep the larger carts that they initially resisted.

Many once-a-week recycling programs have used 64-gallon carts, but we are finding that more are converting to 95-gallon models, as the larger carts offer a greater degree of program flexibility, as well as meet the need to increase waste diversion as residents get used to cart size. Florida's 75 percent recycling goal by 2020 is a key motivator behind the construction of new single-stream MRFs and the subsequent implementation of carted recycling programs.

Another critical piece of a successful single-stream program is the ability to measure results – if you don't measure it, you can't manage it. With today's technology, it is possible to consistently collect, track and leverage data to make solid business collection and outreach decisions. Automatic vehicle location (AVL), coupled with RFID, produces valuable data as it provides visibility to collection operations where none had existed before. It is now possible to visualize the date, time and coordinates of every collection event. When tied together, these short strings of data can improve customer service, track vehicle operations and driver performance and,

over time, illustrate the recycling behavior of every household on a route. It also provides real-time, measurable data that allows route planning to be based on actual conditions, enabling local governments and haulers alike to maximize collection efficiencies.

As with other solid waste solutions, a one-size fits all approach will not work in single-stream recycling collection. It takes time and careful planning to design and implement a procurement strategy that meets a community's very specific needs. All solid waste is local and good front-end work such as issuing an invitation to bid, or a request for proposal for carts and equipment, collection or processing services – or all of the above – will result in fewer errors and contractor issues later.

Here's a look at a few places that have launched, or are about to launch, single-stream recycling collection programs and the challenges each faced and resolved.

Charleston County, South Carolina

When officials in Charleston County, South Carolina moved from dual-stream recycling collection to single-stream, they needed to purchase new carts and new collection trucks. The County already had a successful dual-stream curbside bin program, but weren't sure exactly how to tackle implementing a single-stream cart-based program and questions such as: which collection vehicles were best suited to the local area; which education program elements were most effective; and how would residents handle the new carts, needed to be answered. The decision was made that technology would help answer these questions. Trucks and recycling carts would be embedded with tracking technology to provide reliable data to help plan routes and measure results.

In a solid waste industry first, Charleston County did a head-to-head equipment comparison of an automated side-loader (ASL) and automated front-loader (AFL). A right-hand drive, residential front-loader was fitted with a Curotto-Can Slammin' Eagle, converting the standard front load vehicle to an AFL to handle the carts and large recyclables. The Curotto-Can challenges the status quo of traditional side loaders. It has

Table 1 | Standard container sizes: Carts versus cans and bins

	64-gallon cart	95-gallon cart	Traditional 32-gallon round garbage can	Traditional 18-gallon recycling bin
Width	24-26 inches	26-29 inches	26.5 inches	28 inches
Depth	26-31 inches	31-35 inches	26.5 inches	18 inches
Height	41-42 inches	43-45 inches	33 inches	14 inches

as an eyes-forward driver position, a standard front-loading vehicle platform that can also service commercial dumpsters, and it

accomplishes record-setting rates of production. Despite claims that it might be difficult to maneuver or that overhead obstacles



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could present a problem, The Curotto-Can AFL was ideally suited to Charleston County.

RFID data provided on-route statistics that illustrated the AFL was quicker than an ASL in and out of cul-de-sacs, that overhead obstacles were not a time-consuming issue, and that large recyclables such as furniture boxes and rigid plastics could be easily collected using a Curotto-Can equipped AFL. The County also discovered that

curbside recycling is a “take-all” service, and that many times, despite using a 95-gallon cart, items can still be found outside the cart. The ASL did not lend itself to collecting items outside the cart, and sweeper trucks were required to pick up items the ASL was forced to leave behind. The Sonrai Systems collection data helped the County decide to standardize on the automated front-load vehicle using the Curotto-Can, for its single-stream collection program.

The pilot program quickly evolved into a permanent program as the County continues to expand single-stream collection to all 110,000 households. Participation levels with the original recycling collection program peaked at 38 percent. Through Phase IV, approximately 45,000 households, carts and single-stream recycling have increased participation by 68 percent and the materials recovered have increased by 110 percent, by weight. At the same time,

Table 2 | Charleston County curbside recycling household (HH) participation Countywide dual-stream vs. single-stream Phases I – IV (April 2011 – Feb 2013)

Dua-stream (Avg)	Single-stream Phases I - IV (Avg)	Percent change
38 percent participation	64 percent participation	68 percent participation
10 lbs/HH/pickup	21 lbs/All_HH/pickup	110 percent
281 lbs/HH/yr	552 lbs/All_HH/yr	96 percent



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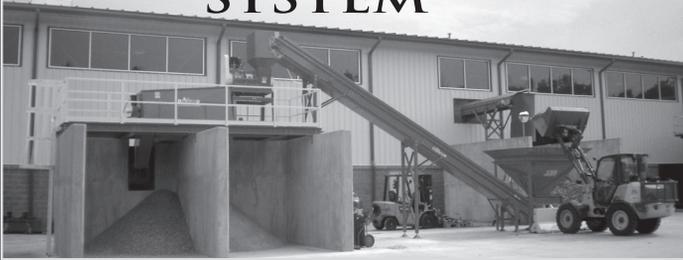


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the right collection equipment has allowed the County to reduce its curbside collection fleet by one third, yet collect 110 percent more materials from 68 percent more homes. With RFID data, the County can deliver targeted programming messages to specific residents. A cart is placed backwards at the curb? Mail just that resident a cart placement notification. Recycling contaminated? Send a "How to Recycle" brochure to this resident. Not participating? Let those residents know how important it is to recycle. Onboard data technology using RFID allows the County to take control of their program.

Deerfield Beach, Florida

For years, the City of Deerfield Beach collected recyclables using 18-gallon curbside bins. Having always been a leader in Broward County's recycling efforts, the City wanted to continue to differentiate them as having a strong recycling collection program.

The City decided to pursue single-stream recycling collection because of the recent, local availability of single-stream MRF processing. Staff considered the program's potential to increase recycling because of the new recyclable materials that can be added, such as Nos. 3-7 plastics, large cardboard, aseptic containers and all fiber, as well as the inherent benefits of carts such as attached lids, wheels, and the larger capacity that the residents were already used to with their current carted garbage service. With per ton disposal tipping fees in the mid \$70s and recycling revenues in the mid \$50s, Deerfield Beach

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Deerfield's "Goes All In" truck

believed they could capitalize on the \$120 per ton swing between disposal costs and processing revenue by changing behavior.

To help fund the program, Deerfield Beach took advantage of a grant from Broward County to purchase fully automated side-load trucks, recycling carts and RFID truck system technology to track recycling participation and on-route productivity.

The City has shown that single-stream recycling collection works for them. The new "ALL In" program has resulted in an average monthly increase of 20 percent in recycling tonnage, and therefore a significant savings in disposal expenses and a similar increase in recycling revenues. A final piece to the program was to answer the call

of key stakeholders who wanted to involve the City's commercial and retail community in the citywide recycling effort. To promote a "buy local" philosophy, and encourage residents to shop at local establishments, the City partnered with Recycling Perks, an affinity program focused on local market retailers and the local businesses that make up the community. Using the RFID on-route participation data, Recycling Perks rewards residents who set out recyclables with points they can redeem at local businesses and even at City-based recreation facilities and events. It is truly a local recycling rewards program.

After just the first month of operation, staff has been able to eliminate four collection routes, while still increasing tonnage

collected. Staff attributes the efficiencies to being able to track and manage mobile assets with the RFID collection data and its built-in automatic vehicle location (AVL) features. As a result of the success thus far, Deerfield Beach is expanding its RFID program to its commercial and multi-family collection operation to improve route efficiencies and ensure that services that are being performed are being correctly tracked and invoiced.

Although having been considered a leader in their local recycling market, Deerfield Beach was challenged with how to increase recycling while making it convenient for residents, how to efficiently manage a mobile workforce, as well as how to

Sidebar 1 – Six steps to single-stream recycling

- Choose the right size cart for your community. Aim to maximize diversion while meeting collection and consumer needs. Bigger is better whenever possible.
- Develop vehicle specifications that match your community's unique needs and operations, and don't be afraid to test a variety of options and challenge the status quo.
- Use a clear and concise public education program to spread the word about single-stream recycling.
- Engage the jurisdiction's staff, elected leaders, and the community at large to create the program's success.
- Like my motto says "If you don't measure it, you can't manage it." Employ technology, such as RFID to track collection data regularly and consistently and then use what you learn to continually manage and improve your program.
- Leverage local market competition by developing and implementing creative procurement strategies. Bids for recyclable processing services should be designed to maximize recycling revenue as well as the materials that can be processed, and in certain cases, create public/private partnerships to procure cost-effective collection services as an extension of city services when local government does not want to expand its own collection operations.

engage the local business community. Their single-stream recycling collection program accomplished all of these objectives.

Hillsborough County, Florida

KCI is currently managing one of the largest rollouts of garbage and recycling carts in the nation in Hillsborough County, Florida. The County is shifting a quarter-million households from manual collection to a 500,000-cart, fully automated, RFID-enabled, garbage and single-stream recycling collection program. Countywide collection is scheduled to begin Oct. 1, 2013, with all areas starting simultaneously.

The County's old agreement had residential haulers retaining the value of curbside recyclables and collecting in one of three service zones. The County decided to have two separate procurements, one for recycling collection and the other for garbage collection. The collection bid revised the existing three service zones to five service districts in an effort to increase competition among haulers. The changes allow the County to receive a more accurate value for recyclables and to know the true cost of garbage collection, resulting in a cost of collection significantly below the old rate as a result of new competitive opportunities.

The collection bid also included a provision aimed at achieving the County's desire to be energy conscious, while protecting its air quality. That provision holds that a hauler's front-line vehicles must be hybrids or powered with alternative fuels in order for the hauler to be eligible for a three-year extension after year seven of the contract.

The requirement was not imposed on Day 1 to give haulers the opportunity to use existing equipment and to avoid a financial burden that might have pushed up costs for the County.

The County plans to utilize the RFID data to not only track and manage 500,000 rollcars, or approximately \$25 million in non-mobile assets, but to also assist with customer service delivery. Every residential or commercial pickup that occurs in the County will be visible to the County through the franchise haulers' system, allowing County staff to visualize collection routes and verify that pickups are occurring as scheduled.

Like the other two programs featured, Hillsborough County was challenged with how to improve its program without burdening stakeholders. In Hillsborough

County's case, they needed to meet a demand to reduce costs and increase revenues, while at the same time, limit the impact on its franchisees that would be required to convert to alternative fueled vehicles. The County accomplished this with a creative approach to procuring both collection and single-stream processing services. The effort reduced contracted collection costs by \$12 million per year compared to the previous year, while increasing processing revenues to the County by an estimated \$1 million, annually.

Beyond the cart

While carts, automated trucks, and RFID play central roles in single-stream recycling, there are other important elements, including stakeholder involvement and public outreach.

Switching from dual-stream to single-stream requires top down commitment and involvement of stakeholders to make the program work. If you want to build a program that will succeed, it is important to engage elected officials, professional staff and the community at large in the process of creating your single-stream recycling col-



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lection program. In the case studies above, all three were successful as a result of getting top-down support from elected officials and senior staff.

One significant advantage available through technology today is the ability to perform specific target-sector marketing. Communication through public outreach can be tailored to specific constituencies, with messages that address relevant issues, especially targeting non-participants.

RFID technology allows information to be gleaned from individual consumers, and messages can then be directed to address issues such as contamination in carts, improper placement of carts and lack of participation. Messages can also be sent to applaud good behavior and encourage more of it.

Data analyzed from RFID technology can provide useful information to decision makers to help them increase their program's effectiveness and conserve budgets.

Technology also has played a vital role in transforming MRFs. Most MRFs are currently either dual or single-stream. Through a combination of sophisticated equipment and skilled employees, the MRFs can sort most types of paper that tears apart and is clean. These MRFs also can handle more plastics through advanced high resolution cameras and optical sorting technology. Before, these facilities were essentially limited to manual sorting and weight-based separation equipment. Now, they can sort seven types of plastic – even rigid plastics, such as 5-gallon buckets. Because the MRFs can process more



The author's personal results with single stream after Dunedin, Florida adopted carted recycling. Who needs twice a week with single-stream?

recyclables, single-stream collection programs typically deliver 64- or 95-gallon wheeled carts to participants, which can hold and handle all materials, versus commingled, source-separated material.

With automated trucks, cart weight is not an issue because drivers use a robotic arm to lift and dump the carts. The drivers stay in the cab, keeping them safe and jurisdictions benefit from reduced workman's compensation claims.

All in one – the eye is in the cart-holder

Small changes in participant behavior can yield tremendous results, and wheeled carts open the door for residents to see that change first-hand. By separating recyclables from waste, they'll likely see that they don't really need garbage pickup more than once a week because they're witnessing the transfer of the majority of their garbage to the larger recycling cart. When customers see that for themselves, they may be more receptive to collection schedules which call for garbage pickup on one day a week and recycling pickups on another.

Jurisdictions that can go to once-a-week garbage pickup can reap tremendous savings – without crippling services. Drivers use the same trucks, drive the same routes and pick up about the same amount of material. At the end of the day, they head to a disposal site on one day of the week and to a MRF on the other. When jurisdictions can achieve these kinds of efficiencies, everyone wins. Whether it's a greener environment or a bottom line with a little more green, jurisdictions will benefit from program innovations like those described above. **RR**

Don Ross is the Director of Operations for Kessler Consulting, Inc., which consulted on all of the detailed programs in this article. He can be reached at dross@kesconsult.com or (813) 971-8333.

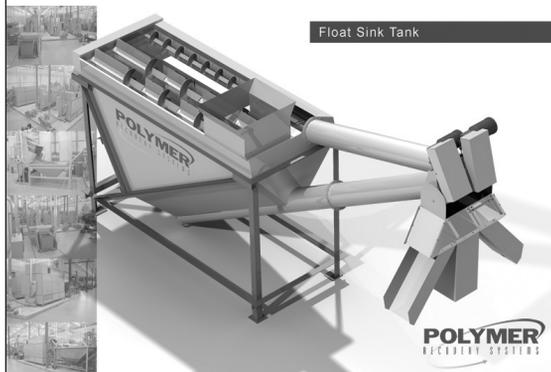
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