



Tracking Carts: New Directions in Waste Monitoring

Martin Demers

Radio Frequency Identification (RFID) chips are helping change the face of waste management.

RADIO FREQUENCY IDENTIFICATION (RFID) CHIPS are becoming an integral part of the drive to improve service verification solutions, while providing measurable benefits across multiple functions. These benefits are many—from improved customer service to better asset tracking and more accurate billing.

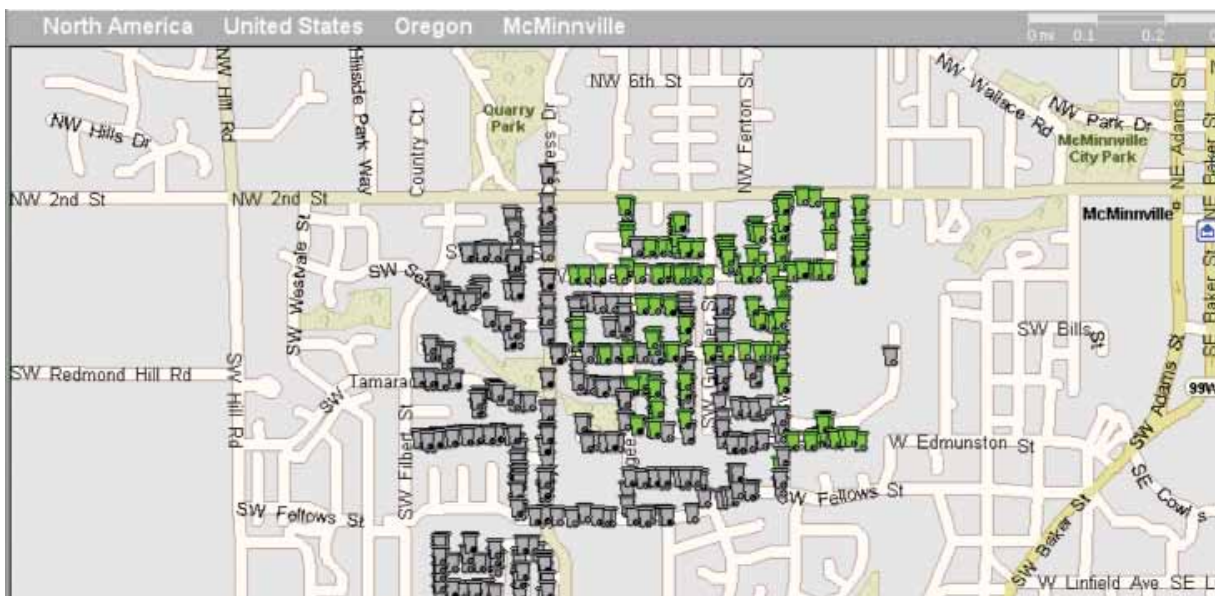
Commonly referred to as “tags”, RFID chips are making their way into refuse and recycling carts that are increasingly being delivered to individual households or commercial establishments. Their use is proliferating primarily because of the growing need to uniquely and positively identify each customer that is receiving waste disposal services.

In some cases customers may be part of a recycling rewards program. In other cases customers may be billed on a “pay for use” basis, or a contract may require that service be verified on a cart-by-cart basis. To achieve the specific association between the service being performed and the customer, each cart—uniquely identified by its RFID tag—is associated with a specific account.

Implementation Considerations And How It Works

To implement such a rigorous system for municipal contracts, you need to plan from the time an RFP is written to the time the carts are actually deployed and serviced. First, the carts will need to be equipped with RFID tags. This process can either be a retrofitting exercise when existing carts are already in use, or specified as part of a new deployment. During the deployment or retrofit phase, handhelds equipped with RFID readers are generally used to associate a specific cart and RFID tag to a specific customer. The database that results from this phase forms the basis for the routes that are created and dispatched to the trucks that perform the collection service.

Having tags on the carts is only a small part of the solution. Each truck will also need to be equipped with an on-board computer system coupled with an RFID reader and antenna that will read the tag, identify the associated customer and verify the service,



Mapping software tracks the location of individual carts. Images courtesy of FleetMind.

Tracking and Billing for Accuracy

Monroe County, MS suspected it was providing waste collection services to non-subscribing customers. However, there was no easy way to identify these “non-customers”. The County rolled out RFID tagged carts to each household on their official customer list and installed on-board computers and RFID readers on their garbage trucks. On collection day, each lift is recorded with each cart scanned making it easy to pinpoint “new customer” opportunities.

The County can now track all waste collected and bill for it accurately. With this system in place, it is possible to identify bagged trash and know which residents do not have a cart and are not paying for service. The County rolled out the FleetMind (Montreal, QC) system to five of their trucks in the summer of 2009. As a result, hundreds of missed billing opportunities were identified, along with more accurate billing information, more revenues, and better routing and service efficiency.



including the time of service and GPS coordinates. In more advanced systems, on-board scales will record the weight of the material being collected, while integrated camera systems attach pictures of contamination or reasons for non-service. Typically, all of this should occur in real-time and provide customer service agents or municipal staff with access to live service verification information at their fingertips.

Additionally, you can track repairs, replacements and new deliveries. Generally, this process should become a regular routine supported by technology similar to the cart delivery equipment. A maintenance route is assigned to a cart delivery and maintenance truck. A driver with a hand-held device is then able to repair, remove, replace or deliver carts by creating, modifying or removing the cart RFID tag and customer association.



New wheeled carts reduce costs and make it easier for collection personnel to handle. Carts are equipped with RFID tags and associated to a specific customer or residence.

Keeping Track of Carts

More and more communities across North America are providing standardized wheeled carts to their residents for waste and recycling or composting to replace traditional garbage cans and plastic bags. These carts can typically be serviced by one person operating a truck equipped with a robotized arm that is designed to lift and dump them automatically. The carts are intended to reduce costs and make it easier for collection personnel to handle.

Supplying these carts can be a sizable investment for a municipality or community—often in the multi-million dollar range. This is typically part of a new initiative such as a “pay per use” or rewards program and therefore requires specific customer identification. Carts that are fitted with RFID tags can be quickly identified during the collection process which makes it possible to highlight situations where “non-paying” customers are getting serviced for free. In some cases, municipalities have found thousands of “new customers” that were using their own carts not equipped with RFID tags.

Having RFID-enabled carts makes it simpler to manage inventory and cart maintenance, repair and replacement. During the collection process, the on-board computer and RFID reader capture the cart’s RFID information, correlates it to the expected RFID tag for the customer being serviced and highlights any discrepancies. The driver also has the ability to notify the sales department of new potential customers or the maintenance department when repairs are needed. All of this is relayed to the back-office system to ensure real-time and automatic service assurance and asset tracking. Using RFID-enabled tracking systems provides the added benefit of automated tracking and management of the cart inventory. This further ensures operational improvements and cost reductions.

Ensuring Accurate Billing

Billing errors or unidentified customers can add up to significant revenue loss for waste and recycling services companies. Linking each lift or service event to a specific customer through the use of RFID can virtually eliminate revenue leaks. By using RFID-tagged carts, service verification can occur in real-time relaying which cart was serviced, its precise location, time of lift and weight of collected material. To complete the solution, some systems also allow the driver to capture an image from the side camera to confirm an exception such as “no can out” or “blocked”, or recycling contamination using the hopper camera. The result—complete accuracy and accountability for the waste and recycling service organization and improved customer service capabilities for residents.

Improving Customer Service

Every waste hauler understands that the time and expense involved with responding to customer inquiries and complaints is a significant cost of doing business. From service inquiries to complaints about service lapses, missing or damaged carts, etc. An on-board computer system coupled with electronic dispatch and real-time service verification through RFID makes life a whole lot easier for customer service personnel. They can now receive real-time pickup



Integrated cameras can photograph issues or items for customer service or dispatch.



New scales can easily be installed on lifts to measure and send waste weight data to the back office.

information from each stop—with images and weight if required—to respond more quickly and effectively to any complaints or inquiries. These features can also be extended to the municipalities contracting for the service to track service levels and respond to questions and complaints from their residents.

Facilitating Repairs

Waste carts are designed for wear and tear, but some damages are a fact of life. With an automated system, drivers can proactively send messages to the back office to alert maintenance crews that carts need to be repaired or replaced. Repairs and replacement data can be dispatched via the cart maintenance and delivery handheld to repair and replace carts as needed with a “maintenance route”.

Complete Visibility

Saving costs comes down to visibility and accountability. Operations personnel need to be able to monitor both truck activity, cart and customer specifics as well as weight at all times. With RFID, GPS tracking, engine telemetry, on-board scales, camera integration and automated lift confirmation, next generation on-board computer systems deliver this complete visibility into all service events and exceptions. Data collected can be analyzed to evaluate service levels, productivity, performance and profitability.

Adding Weight Management to the Mix

As we embrace and demand greener and more sustainable living, it has become increasingly important to encourage consumer behaviors that reduce waste and support recycling. Being able to track waste and recyclables to individual households is the first step. Weighing trash is the next step.

It is likely inevitable that in North America—like so many other parts of the world—we will eventually have to pay for the amount of garbage we generate. This will entail not only tracking garbage and recyclables, but also weighing it and recording data for billing purposes.

Many waste companies are adding scales for residential applications that allow them to collect weight information on a customer by customer basis. Traditionally, these scale solutions have been expensive to install and maintain, and notoriously prone to damage. Now, newer scales versions are appearing in the market that are cheaper, faster to install with minimal calibration or installation requirements. Expect to see this trend continue.

Technology is changing the way we manage our waste and recyclables. It's making waste more personal, accountable and efficient. The ability to track and eventually weigh garbage will drive more responsible waste and recycling behaviours and will help waste management firms run more efficient companies. This is a win-win for all. | **WA**

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“FleetMind provides fully integrated fleet management solutions to help Waste & Recycling firms to improve their operations and maximize their profit potential.”

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Enabling Recycling Rewards Programs

More and more communities are turning to rewards programs to encourage residents to recycle. To implement a recycling rewards program, recycling firms need to be able to track each household's recycling habits. RFID-enabled systems have become a key part of these programs.

In Peachtree and Alpharetta, GA, FleetMind's on-board computer solution with RFID capabilities is being used by Republic Services as part of a new incentive-based program designed to motivate people to recycle. Launched earlier this year to residents of these communities, the rewards program encourages people to engage in greener behaviors by rewarding them with points that are redeemable at local and national retailers, restaurants, pharmacies, grocers and more.

In March 2010, Republic Services provided the residents of Alpharetta and Peachtree City with new 65-gallon recycling carts. These carts were fitted with RFID tags that identify each cart to a residence. On collection day, FleetMind on-board technology reads the tag information, displays the data on an in-cab flat screen and then sends it to the back-office system for processing. The total weight of all recyclables collected on a route is compiled and used to allocate reward points to the reward program's participants.