How Much Money and Emissions Can Collection Route Optimization Save?

Arlene Karidis | Nov 04, 2021

Rising fuel and maintenance costs are chipping at waste and recycling haulers' bottom lines. As they work to stay financially strong, operators grapple to service as many or more customers with fewer drivers. At the same time, they plug away to put driver safety first. Some operators are turning to digital collection route optimization—automated technology to identify the most efficient course from starting point to destination— for help with this balancing act.

These systems integrate back-office software with RFID hardware and cameras on the truck to enable communication between the field and office. Not only does the technology facilitate improved routing, but it enables scheduling, vehicle tracking and monitoring, work order management, data collection, and reporting. It has environmental benefits too, among advantages.

"Digital route optimization technology can lower operating costs, result in reduction in carbon emissions, and less time planning, freeing up more time to spend with customers, as well as increase route quality and driver satisfaction," Geoff Aardsma vice president of Professional Services, North America AMCS Group said earlier this year at WasteExpo Together Online. AMCS is an enterprise resource planning software company.

Aardsma went on to discuss how the technology allows haulers flexibility for continued growth; helps

reduce risk because more efficient routes mean fewer trucks on the road; and can empower drivers— for instance by providing them a tool to verify service and report damaged equipment. Some companies use it to train drivers, who can gauge the time it takes to run their routes; learn how to respond when they identify contaminated recycling; and get feedback to be able to avoid backing up and other risky driving behaviors.

Gershman, Brickner & Bratton (GBB), solid waste management consultants, have managed several collection route optimization projects, including one that recently wrapped up for Chittenden Solid Waste District in New Jersey.

"We looked at how they could consolidate solid waste collections to be efficient because they had four or five companies crisscrossing.

They could have four companies on one street with overlapping trucks and pickups on different days. The district wanted consistent collections on the same day, with fewer trucks on the road, and to reduce their greenhouse gas emissions," says Jennifer Porter, vice president of Gershman, Brickner & Bratton.

GBB teamed with routing company C2Logix, leveraging the logistics company's resource estimator tool to determine necessary number of routes; how many trucks would be required; and to pinpoint details down to how much time drivers spent in front of each home; number of pounds picked up at each household; and the distance from starting points to the transfer station. They accounted for routing costs and tipping fees, and the data was entered into a model to generate resulting estimated monthly costs for service.

"We modeled different streams and different collection frequencies and said, this is what it would cost if you put the job out to bid, with the assumption there was one hauler per district," Porter says.

When GBB first came into this project, collection service ranged from mid $20s to $40 per month for trash and recycling for 60-gallon containers. With routing adjustments and consolidation, if the two cities involved picked up trash and recycling weekly and added food waste, it was estimated that they could have provided service for about $30 per month. Without food waste the estimates were in the range of the low $20s per month.

"Capital costs of trucks are high – about $300,000 each –so being able to reduce the fleet alone would

result in significant savings. But it's not just savings in dollars; it's a substantial reduction in environmental costs too. We estimated that if there was one truck out per district, they would accomplish 75 percent savings in greenhouse gas emissions," Porter says.

SCS Engineers does route optimization, mostly for cities and towns that operate their own collection fleets and do curbside pickup.

SCS Engineer Ryan Duckett finds that as cities grow and evolve, they don't necessarily have a structured approach to ensure that collections keep pace; so they might not have an optimal way to pick up waste and get it to a dump site.

This is one area where the technology has served well.

"If municipalities need to change scheduling of their curbside collection, it changes potential routes, and we are able to suggest new weekly or monthly scheduling or other approaches for improvement," he says.

Because the technology has the capability to do geo-processing of data, Duckett has found it useful in calculating for instance where to place a new recycle drop off facility or convenience center or helpful in determining the best dump site for a particular collection vehicle.

"But besides serving to do route balancing and optimization that's in step with a municipality's needs, there are more qualitative benefits of the technology. We can leverage it to enhance safety or reduce risk of collection vehicles getting caught in tight spaces. It can be used to design routes to avoid dead ends requiring reversing or multi-point turns to service."

The first step is to do a thorough route optimization analysis.

Haulers should look at their current operation costs, performance metrics, hours, and miles per route, so they can set a baseline to go by to establish future goals– whether to reduce overtime, increase capacity, and/or wherever else they may look to improve operations.

"If you have planned for route optimization thoughtfully, you should have a model to apply for new growth or fleet upgrades," Aardsma advises.

Porter tells municipalities that if they don't have route optimization technology in place, they should figure out how to do this work inhouse, or outsource it to contactors; some specialize in solid waste management.

"I think it's critical to have route optimization as a requirement for onboard truck technology with integration to the back office. That way service managers and district managers can see what's happening on the road and can make necessary changes for training and service improvements," she says.