

# Current technology trends in solid waste collection

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**A**s we write this article at the beginning of 2008, it is not difficult to imagine, that with the cost of oil escalating rapidly towards \$100 a barrel, there undoubtedly will be important changes in solid waste collection. Not surprisingly, public and private haulers will be asked to do more with less and attempt to hold their cost of services level with this increasing onslaught of increasing equipment, fuel, insurance, and personnel costs. How will they try to remain solvent? In part, the answer in our opinion will require an increasing reliance on technology to decrease their costs of operation. This article will briefly discuss some of the major technology advances we believe will occur in waste collection for 2008.

## Automation, Automation, Automation

Automated side-loader trucks were first implemented in Phoenix in the 1970s with the aim of ending the back-breaking nature of waste collection at that time, and to minimize worker injuries. Since then thousands of public agencies and private haulers have moved from the traditional rear-loader method of waste collection to one which provides customers with a variety of choices in standardized, rollout carts. This has enabled communities across the country to significantly reduce worker compensation claims, minimize insurance expenses, while at the same time offer opportunities to workers who are not selected for their work assignment based solely on physical skills.

More importantly, automation has enabled communities to provide services that result in cleaner-looking cities because all of the rollout cans are standardized. Communities and agencies can now offer customized customer services based on disposal need. That is, customers can now purchase different sized containers (e.g., 90, 60, or 30 gallon) based on the volume of waste they generate and how much they recycle.

## GIS

Geographic Information System (GIS) is a powerful tool that agencies or private haulers are using to optimize routes and identify the most efficient way to collect and track solid waste and containers. With the use of GIS, haulers can at any time identify the locations of all their containers and perform route studies based on the amount of containers or estimated volume on a route. A GIS system can run various models and identify the most efficient route by type of material, right turns only, or using any other predefined parameters as local conditions apply. An efficient collection system could lead to fewer trucks on the road, less staff and a bal-

anced workload based on actual data of clients and number of containers on a route for the area covered. All this leads to an economical, efficient operation.

## GPS

A Geographic Positioning System (GPS) helps track/monitor locations of trucks, and with the GIS provides a real-time optimized route and an efficient transport mechanism. Haulers can also track if drivers are deviating from route, if trucks are parked for long durations when they should not, even triggering an alert message for such conditions. Another example where GPS can assist is when a hauler or a city receives a call for a special pickup or a missed pickup, dispatch can locate the nearest truck to the location and dispatch that truck for the call. Such situations save the hauler/agency money and provide great customer service to the client.

## Engine Emissions Standards

The U.S. Environmental Protection Agency (EPA) has promulgated new regulations in 2004 and 2007 under the Clean Air Act on-highway diesel engines, which require significant reductions in nitrous oxide and particulate matter. Manufacturers of solid waste collection trucks have developed engines that meet these new standards, albeit with price increases of as much as \$7,500 to \$10,000 for new 2007 engine designs. To enable the new engine technology, however, fleets must also transition to ultra-low-sulfur diesel (ULSD) fuel and new operating and maintenance procedures. All of these changes have translated into increased maintenance expenses for more frequent engine oil changes, particulate filter cleaning, and treatment system sensor issues.

Federal emission standards for on-highway diesel engines will tighten even further in 2010, requiring additional changes in vehicle engineering and engine technology. Solid waste fleet managers are bracing for the impact of these changes, which undoubtedly require more extensive vehicle maintenance costs, as well as an increase in the initial cost of capital purchases. It is unclear at this stage whether the engine manufacturers will continue to tinker with combustion geometry and/or after-treatment devices or controls, or to follow the Europeans and utilize some sort of selective catalytic reduction technology requiring the use of urea to reduce NO<sub>x</sub> emissions.

## Use of Alternative Fuels

Alternative-fueled trucks represent only slightly more than one percent of the estimated 136,000 refuse vehicles in use today. Most of the alternative-fueled refuse trucks are



currently located in California where air quality concerns mandated the use of such vehicles to reduce air pollution. Increasingly, however, solid waste fleet managers are exploring the use of alternative fuels such as ethanol, natural gas, or biodiesel since these fuels offer an opportunity to provide similar power and performance, while at the same time are increasingly less expensive to operate.

A variety of new federal tax incentives are expected to tip the balance in favor of improved life-cycle cost advantages of alternative fuels over comparable gasoline or diesel-fired units:

- Vehicle Tax Credits – an income tax credit of up to \$32,000 to the buyer or seller (in the case of a tax-exempt entity)
- Fueling Station Equipment Tax Credit – tax credits for the purchase of vehicles and fueling station equipment (up to 30% of the refueling equipment or \$30,000 per year)
- Federal Motor Fuels Excise Tax Credit – provides a seller a payment of \$0.50 per gallon equivalent (gge) motor fuels excise tax rebate even if no excise tax was paid

#### Alternative Methods of Vehicle Purchases

Most solid waste agencies have traditionally purchased their new vehicles out of cash reserves, either as part of an individual city-wide procurement or one from a neighboring

community. With local government budget difficulties, oftentimes vehicle purchases are delayed resulting in increased maintenance and operating expenses.

In recent years, alternative methods of vehicle replacement have emerged in the private sector allowing public agencies to procure new equipment that remains under the manufacturer warranties during the term of the lease, while at the same time reducing the community's vehicle maintenance expenses.

#### Staffing Needs

Lastly, more and more agencies in solid waste collection will be forced to confront the issue of finding workers to staff their collection programs. Much of the potential workforce will have to come from those who do not speak or read English as their primary language. This is a real issue since training and certification programs offered by professional organizations like APWA or SWANA or in-house programs will have to be seriously revised to reach this new workforce. The changes may be more than simple translation into Spanish since many of these workers may not be fully literate in their native language.

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