Solid waste management trends in 2010

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Within the last year, there have been significant changes in the way solid waste is being managed by local government and private contractors. The federal government and a few local solid waste agencies have implemented strategies which appear to have far-ranging implications in terms of overall policies and costs. The purpose of this article is to briefly summarize what we believe will be major trends in solid waste management in 2010.

Declines in waste tonnages

Up until the Great Recession of the past two years, the solid waste industry had been typically considered "recession proof" because solid waste collection and disposal services were needed in good and bad times. However, the recent experiences of 2008-2009 have impacted all facets of the economy and impacted both private and public solid waste agencies. That is, construction of residential and commercial buildings is down, reducing the volumes of construction and demolition debris requiring collection and disposal. With consumers cutting back on purchases, there is less packaging materials deposited curbside and in recycling bins. Less food wastes are being produced since many people are cutting back on eating out in restaurants. Nationwide, the overall trend in waste declines ranges from as much as 30% in California and about 10 to 15% in the Midwest and Mid-Atlantic states. Both public and private agencies are coping with this trend on their finances by imposing serious cost-cutting measures such as layoffs, delays in landfill expansions, and purchases of new replacement trucks, stationary equipment and containers.

2009 saw many organizations storing collected recyclables wherever they could because of poor overseas markets.

Recycling markets

One of the biggest stories of 2009 for solid waste management was the recyclables markets, or lack thereof. In November 2008, recycling markets saw commodity markets hitting rock bottom. Materials that had been selling for over $100 a ton or greater, such as mixed paper, were selling for less than $20 a ton. The scene appeared bleak as materials, which had once been exported to Asia, filled up dock space in major ports along the Pacific. Recyclers began scrambling to locate every available space to store baled materials until a buyer could be found or the markets recovered. If one positive outcome can be gleaned from the current drop in waste tonnages, it is that the amount of material available for recycling has also declined, helping commodity prices somewhat by reducing the stockpiles of material waiting for the economy to improve.

As we write about these news stories a year later, there are still many opinions as to the real reason behind the col-

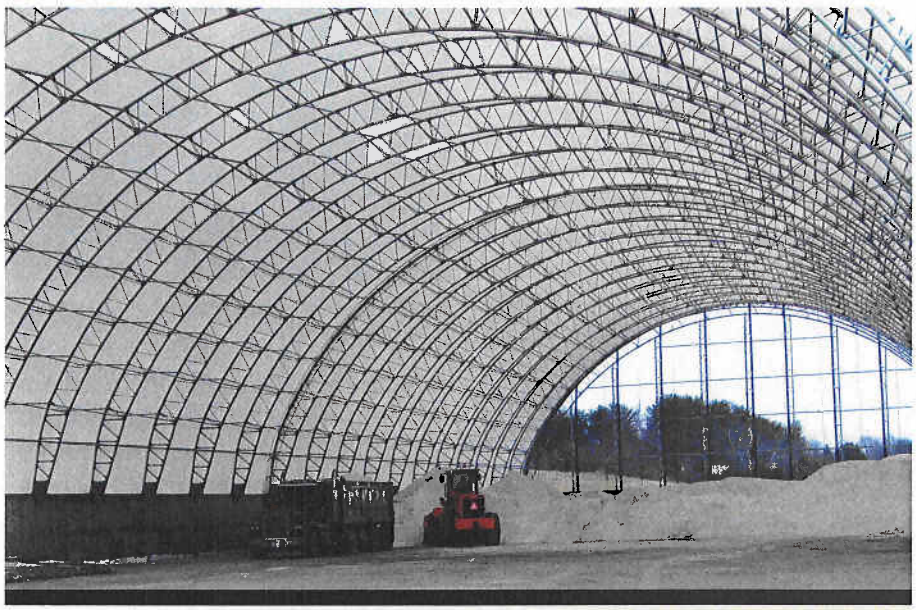
lapse of these markets, which have recovered to some degree. However, one thing is for certain, most recycling programs managed by solid waste agencies or private contractors have been forced to ask hard questions about the economics of these programs. The reality is that such commodity markets have historically been volatile, just as much as the stock market. That is, prices that skyrocket may also come down just as fast. This poses some concerns for operations of municipal recycling programs, which are oftentimes impacted by this volatility. The lessons learned over the past year suggest that communities will need to take a hard look at the collections, processing and marketing for developing long-term contracts.

As source-separated recycling programs continue to gain in popularity and recycling mandates are either established or expanded across the country, there may need to be a change in the way recycling programs are funded so that they can remain financially sustainable despite fluctuations in commodity pricing, and programs can continue without the reliance on a volatile revenue source. That is, we may start to see increases in user fees so that there is less emphasis on commodity pricing with possible revenue sharing between the processor and community. The balance between free market (commodity pricing) and regulatory (mandatory recycling) forces will continue to be a moving target and the industry's ability to adjust will be crucial to the success of programs going forward.

One possible way to reduce the volatility of global commodity prices is to bolster domestic recycling infrastructure. In many instances, recycling traditional (paper, plastic, glass, metals) and special (electronics) wastes cannot be sufficiently accomplished domestically and so materials need to be exported for recycling into new products. There is a need for increased capacity to be developed, and new legislation may make it easier to develop facilities that can handle the various types of municipal solid waste. The majority of fiber recycling may stay offshore, since the recycled fiberboard is used in the packaging of new products manufactured overseas; but for domestically-produced items like beverages, locally-produced containers can be likewise beneficial. Additionally, buying recycled-content products closes the loop and further bolsters recycling commodity markets.

Zero waste initiatives

Achieving a "zero waste" community is an important goal in many solid waste management programs. A grow-



ing number of communities across the United States are developing plans to reduce overall waste volumes and increase recycling rates. One of the first and most notable communities to implement efforts towards zero waste is San Francisco. The City is now diverting over 70% of its solid waste from homes and businesses through a variety of programs, including the country's first and largest urban food scraps composting collection program in the U.S. The program is available to all 335,000 households and is serving over 2,000 businesses citywide. In June 2009, the City passed an ordinance requiring all of San Francisco to separate recyclables, compostables and trash. This new ordinance should help them meet their goal of 75% diversion by 2010. In order to meet their goal of zero waste to landfill by 2020, however, the City will need to look beyond traditional disposal technologies.

Many programs included under zero waste initiatives have the potential to reduce community-wide greenhouse gas emissions and we anticipate more emissions inventories will include solid waste reduction and recycling programs as contributing activities to emission reduction goals and objectives.

Clearly, the sheer volume of solid waste generated by Americans—nearly an estimated 254 million tons—means that zero waste initiatives have a long way to go to increase the overall nationwide levels of source reduction, reuse and recycling of waste and that community-wide efforts like San Francisco's should be encouraged. However, in the near term, the need for disposal alternatives will continue to serve communities until viable alternatives to landfills exist or the need for disposal is reduced.

In addition, extended producer responsibility (EPR) initiatives have emerged as a pushback to the notion that local governments should be responsible for the management of products disposed of in our throwaway society,

Many zero waste programs include comprehensive large venue or special event recycling and composting activities.

particularly those that contain hazardous components. The reasons for these initiatives, it seems, are threefold: (1) the ballooning of household hazardous waste (HHW) program costs with little funding to support the programs; (2) the ever-expanding list of items requiring special handling, usually added to HHW programs by default; and (3) the inclusion of manufacturers in the management of the products they produce by requiring the manufacturer to take back their products for proper handling. While the focus of EPR initiatives has been hazardous substances, this may extend into traditional municipal solid waste, thereby commoditizing them and creating markets for the recovered items.

The future of special waste materials will require collaboration between many stakeholders in order to minimize the impact these items have on the environment. An honest commitment from manufacturers, distributors, local governments, consumers, recyclers and others, each providing expertise from its unique perspective, will make it possible to develop products that are environmentally sound, that can be easily managed and recycled without special handling, that are self-funded, and that can be truly sustainable.

Greenhouse gas regulations

It is apparent that reduction of greenhouse gas (GHG) emissions is becoming an increasingly significant issue for solid waste management programs. Whether the initiative comes via legislative or regulatory action, it is clear that requirements for reduced emissions from a greater number of facilities are going to be a reality in the very near future. While cap-and-trade legislation has been working its way slowly through Congress and while the recent United Nations summit in Copenhagen produced little of immediate impact, the U.S. Environmental Protection Agency (EPA) has been moving forward aggressively to promulgate GHG emission regulations. At the end of 2009, EPA took three actions that have set the stage for increased regulation of GHG emissions—promulgation of the mandatory reporting rule for GHG emissions, the endangerment finding for carbon dioxide (CO_2), and the notice of proposed rulemaking for GHG emissions under the Clean Air Act.

On October 30, 2009, EPA published the final rule for mandatory reporting

of greenhouse gas emissions. The rule established reporting requirements for some 31 different sources, including municipal solid waste (MSW) landfills and waste-to-energy facilities. Under the final rule, all owners or operators of MSW landfills that accepted waste on or after January 1, 1980 and that generate GHG emissions in amounts equivalent to 25,000 metric tons of CO_2 equivalent or more per year must submit an annual report to EPA, beginning with an annual report for calendar year 2010. According to EPA estimates, over 2,500 landfills will be reporting under the rule. It appears that landfills much smaller than those currently regulated under the New Source Performance Standards of the Clean Air Act will be captured by the new reporting rule and by subsequent regulations that are likely to follow.

In the last quarter of 2009, EPA took two additional steps toward regulation of GHG emissions—publication of a proposed rule establishing the 25,000 metric tons of CO_2 equivalent as the emissions threshold for Title V permitting under the Clean Air Act, and announcement of its finding that GHG emissions are a danger to public health and welfare. These actions have sent clear signals that EPA intends to promulgate GHG emission regulations under the Clean Air Act, regardless of what may happen with respect to legislation or to international treaties, and that the mandatory GHG reporting rule has set the stage for those regulations. While EPA is characterizing these proposed regulations as only impacting major sources as defined by the Clean Air Act, we believe that the solid waste industry will find that the annual emissions threshold of 25,000 metric tons of CO_2 equivalent will capture a surprising number of smaller facilities and that implementation of emission control technologies will eventually be required for these facilities. The Solid Waste Association of North America (SWANA) has recently submitted comments to EPA objecting to the proposed emissions threshold as being too low and as not meeting the intent to regulate only major sources. Stay tuned as this rulemaking moves forward.

Experimentation with fuel mixes

Given the uncertainty over the cost of long-term diesel fuel prices, many communities have explored research innovations to "green" their refuse collection trucks. For example, some agencies like the New York Sanitation Department are currently running their fleet on a five percent biodiesel

(B5) blend, which has enabled them to displace roughly about one million gallons of diesel fuel since 2007. The Department is also exploring the use of a B20 pilot program to further reduce potential fuel use in the future. This kind of biodiesel uses a reported soy-based and ultra-low sulfur diesel (ULSD) with less than 15 ppm for the B5 and B20 fuels.

During the last few years, many solid waste agencies and private haulers have demonstrated the feasibility of using compressed natural gas (CNG) and liquefied natural gas (LNG) for solid waste collection. It is expected that increases in the numbers of these fleets will continue unabated. Waste Management, the nation's largest private waste hauler, for example, has deployed more than a quarter of its fleet in California to run on either CNG or LNG and has constructed 18 refueling stations throughout the state.

Further, this past year saw the announcement of the world's largest landfill gas (LFG) to LNG at Waste Management's Altamont Landfill in Livermore, California. This joint venture of Waste Management and Linde Corporation is being designed to purify and liquefy 13,000 gallons of LNG daily, enabling Waste Management to reduce greenhouse gas emissions of more than 30,000 tons per year and help commercialize the use of LFG as a long-term fuel source for refuse collection.

Hybrid collection vehicles

Starting in 2010, heavy-duty engine manufacturers will be required to meet new stringent nitrogen oxide (NO_x) emissions. These regulations, which are being imposed by EPA under the Clean Air Act, are expected to reduce smog and urban air pollution from diesel trucks. These regulations come on top of EPA's air regulations to reduce diesel particulate emissions, which required all new diesel trucks to have diesel particulate filters to help remove and then burn off the uncombusted soot that accumulates on these filters, either through a fuel-rich cycle during vehicle operation or during maintenance. These advanced engine modifications have greatly increased the initial cost of the solid waste collection vehicles, overall fuel economy, and the cost of maintenance.

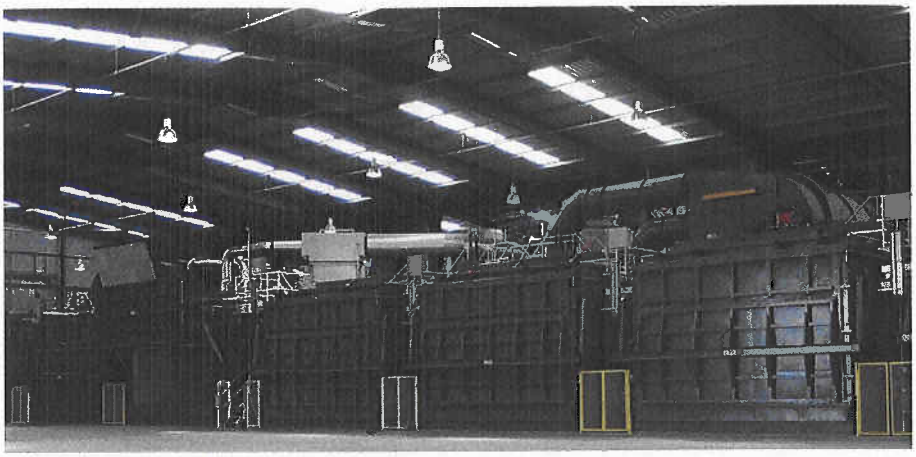
Fuel economy of refuse vehicles has never been good, with averages of less than three miles to a gallon commonplace in most refuse fleets across the country. Given the new EPA air emissions requirements noted above,

there has been increasing interest in developing hybrid engine technology—whether hydraulic or electric—for refuse collection.

Briefly, hybrid-hydraulic vehicles employ devices that recover heat energy from the brakes, storing it in a hydraulic accumulator. The pressurized fluid is then used by the driver as the vehicle accelerates as well as in stop-and-go duty cycles along the route. Theoretically, this would result in less diesel fuel being consumed, fewer vehicle emissions, and decreased maintenance expenses.

Prototypes of these types of refuse vehicles are being tested under CalStart's Hybrid Truck Users' Forum, a group with the goal of commercializing heavy-duty hybrid technologies. In a test in New York City, the hydraulic-regenerative brake (HRB) system is powering a Crane Carrier LET2 chassis and integrates it with a Heil refuse body hydraulic system. In Los Angeles, several American LaFrance Condor LNG trucks in the City's refuse fleet are being evaluated using onboard vehicle data acquisition systems to monitor vehicles' operating conditions.

There is also significant activity in applying hybrid-electric technology in refuse collection. The most prominent of these is being tested by Volvo in Sweden, Paris and London. The City of Fresno, California, is currently testing a plug-in hybrid prototype by Volvo, which is powered by electricity for the main engine and CNG to run all of the lift hydraulics. The hybrid technology consists of a 320-horsepower diesel engine, which shuts down at rest, combined with an electric motor that powers the truck at speeds up to 12 miles per hour. Regenerative braking is used as a means of recapturing energy to recharge the lithium ion batteries. Besides being much quieter in early morning trash pickup duties, the total gas savings and CO_2 emissions have shown to date to drop 20 to 30 percent over current traditional refuse collection trucks. At the end of each shift, the vehicle is plugged into a commercial electrical outlet and charges overnight.



Innovative technologies have entered the marketplace as the waste-to-energy industry has seen an upsurge in the U.S. (Photo courtesy of Waste2Energy)

Waste-to-energy and alternative thermal treatment

Construction of waste-to-energy (WTE) plants hit their peak in the United States in the early 1990s with some 85 plants in operation today. However, until the last few years, no new WTE plants were constructed in the United States. The WTE industry was impacted significantly in our country by controversy over waste flow control, Not-In-My-Backyard (NIMBY) siting issues, and changes in tax law, to mention a few. While construction essentially stopped in the United States, however, such plants continued to be constructed in Europe and Asia where they have increased these nations' renewable energy supplies.

Within the last few years, there has been a rebirth of interest in WTE in the United States. Several large WTE facilities have either been expanded or announced plans to add additional combustion capacity. There also has been increasing interest in alternative, cutting-edge technologies such as plasma arc gasification and anaerobic digestion to reuse solid waste by converting it into energy and recycling valuable metals and slag. There are several pilot facilities, which have been constructed in North America, to test the technical and financial feasibility of such systems. As we write this article at the beginning of 2010, there are many communities which are just beginning the procurement process. Not unlike the experiences of the early efforts with conventional WTE technologies in the early 1990s, these projects will, in our opinion, undergo detailed feasibility evaluations to assess the efficacy of their manufacturers' claims on solid waste throughput, energy conversion efficiency, and overall financial viability. Time will tell which technologies will be able to meet these tests.

Conclusion

From the trends identified, a systems-wide approach to solid waste management will be necessary. A cohesive approach that includes collection, operations, materials and processing, infrastructure, and reporting will ensure that solid waste programs remain sustainable for years to come.

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