

# Landfilling, Waste-to-Energy, Recycling and Hazardous Waste

By investing in and using inventive waste technologies, landfill owners will mitigate the liability, demonstrate good community social responsibility, and most importantly, add value to their bottom line by ensuring stakeholders' environmental sustainable financial risk management.

■ By Tony Nocito

We are rapidly starting to understand the environmental impact, space restrictions and the importance of waste diversion to conserve landfill space by the growing need to install onsite Waste-to-Energy (WTE) facilities, onsite single-stream recycling plants, as well as using non-thermal waste reduction and conservation technologies.

Moreover, landfill owners have a great deal of time, effort and millions of dollars invested in planning and constructing up-to-date, technologically sound landfills. They understand the need to limit the amount of waste to landfill in every practical way possible to prolong landfill life and protect their investment.

The waste industry is at the technical inception of becoming the equivalent to the dot-com industry of the 1990s. Many technologies that will treat and reduce different waste streams are being developed or are coming to market that will produce recyclable and reusable end products.

But one waste stream, hazardous waste, still remains waste industries biggest challenge. We need to stop the devastating effect that hazardous waste has on human health. The question is how to abate human exposure to hazardous waste and constructively turn it into non-hazardous waste that can be recycled and reused?

## Landfilling and Waste to Energy

We all know how easy it is to throw something away, not to worry about its final destination, because someone else becomes responsible for our throw away. Few think of the consequence of discarding an item. Most are not in the waste industry; therefore, they have no idea of the pressing issues related to waste. Landfills have caused, and are causing, a myriad of environmental problems—subsurface chemical reactions that are causing hard to control odors, fires that are difficult, if not impossible, to extinguish, ground water contamination from leachate, erosion run off, greenhouse gas, methane leaks that are 30 times the potency of carbon dioxide—especially if they contain unknown illegally dumped wastes and non-biodegradable wastes. According to the U.S. EPA, “All Landfills Will Eventually Fail” and “All Environmental Liabilities Involve Future Costs”.

Landfills have a high potential to become Superfund sites that are extremely costly to remediate, and when remediated, the waste from that superfund site is taken to another landfill that has the probability of becoming a future Superfund site. Once a landfill has reached its life's end, it is closed and capped; but just closing and capping a landfill is not the end. A closed and capped landfill requires 30 years of post-closure monitoring to ensure that the waste is not escaping and polluting the surrounding environment. Closing a landfill is a very long term expansive process; the owner is responsible for all costs and liabilities. I am not condemning landfilling. Landfills, in one form or another, will always be necessary until technologies are developed and are advanced enough to immeasurably reduce, if not prevent, landfilling.

The mounting landfill dilemma is not only lack of space, but also the “Not in My Backyard” (NIMBY) syndrome. NIMBY will always raise its head when it comes to building a new landfill or expansion of an existing landfill. Worldwide lack of landfill space has created a major issue for European countries, Caribbean Islands, countries with peripheral islands similar to England's Island States of Jersey, Arabia's Bahrain, and Asian Pacific islands,

like Philippines and Japan. These countries have mandated recycling and use of WTE facilities, but hazardous waste, such as asbestos containing material (ACM), is causing extreme problems. In some of these countries, ACM is stored in open space or shipping containers for years, resulting in deterioration of the containers, exposing dangerous ACMs into the atmosphere.

In the U.S., Hawaii and Alaska depend on recycling, composting and WTE facilities for waste disposal. On a daily basis, large populated U.S. cities are confronted with the burden of handling and discarding exorbitant amounts of waste, forcing them to ship the waste long distances to out-of-state landfills, greatly increasing the carbon footprint. The result: waste companies and innovated thinkers are scurrying to solve the overwhelming, copious influx of waste, maximizing the use of their landfills with up-to-date compaction technologies; installing onsite WTE technologies, equipped with sophisticated and compliant pollution control systems, that help abridge the use of fossil fuel by creating heat, electricity and alternative fuels; recycling the ferrous and non-ferrous metals after incineration; using incinerator bottom ash as an alternative daily cover instead of expensive and hard to come by soil, capturing methane gas for use in vehicles; anaerobic digestive systems for organics; composting food and yard waste for reuse as a fertilizer; the use of biogas plants to create methanol and ethanol; inspecting and unloading trucks at the tipping scale to remove recyclables before the truck enters the landfill; and landfill mining to maximize landfill space by removing valuable metals and other recyclables previously dumped.

Every day new waste technologies are being developed that produce different end products. Landfill owners and operators are seeking out these new waste reduction technologies that will support their efforts to prolong landfill life and produce constructive end products for the consumer.

## Recycling

On the other hand, the consumer, who is becoming more aware of preserving our environment, must support the landfill owner by diligently practicing waste diversion rules (the three Rs—reduce, reuse and recycle) as well as finding new ways to conserve, repurpose and turn around everyday products for further use. As environmentally conscious consumers, we understand the important, urgent and immediate need to adamantly recycle all that can be recycled, demand green manufacturing production that produces a green product in green recyclable packaging, consequently inducing manufactures to strive to accomplish zero waste to the landfill. We also need to practice circular economy product production (once used, comes back into production to remanufacture a similar new product), closed loop recycling, manufacture repurposed products for reuse in a different product or a compatible product, extended producer responsibility, sustainable innovation, better waste management practices and environmentally sustainable corporate stewardship.

Because the consumer is demanding better environmental performance of manufactured products, the manufacturer is seeking out and using new technologies to meet the demand for greener facility operations, producing green products that will achieve zero waste to the landfill.

Waste companies are making recycling easier on the customer by installing the latest technologically improved single-stream recycling plants. Single-Stream recycling entails the use of a single container for all recyclables, eliminating the need for multi-recycling containers. Because single-stream recycling makes it easier on the customer, by its very nature it encourages recycling. The advantages of single-stream recycling to the waste companies are that many different types and grades of recyclables can be collected at one time, reducing collection carbon footprint, handling only one container reduces pickup and labor costs, and collection can be automated with the use of a robotic arm dumping mechanism.

With all the activity to prevent waste from landfills, the most encouraging one is teaching children—from preschool through college—how to conserve our environment. Preschoolers have games like Recycle City, while third graders are learning business skills that will protect our environment. Schools are teaching composting with worms, how long trash lasts and the importance of using recycle bins, all with the end goal of creating zero waste. Children who are taught to respect the environment and understand the importance of recycling as part of their curriculum will encourage their parents to recycle, keeping their parents apprised of the fact that the more their parents take care of the environment the healthier the future will be for them, their children and future generations, driving home the fact that environmental longevity and earth preservation is everyone's responsibility.

In New York City, there is a High School for Environmental Studies where the curriculum includes Living Environment, Chemistry, Earth Science and Physics. Colleges are offering environmental studies as not only a major, but also as part of the school's education requirements across all curricula—Environmental Sciences, Natural Resources, Nature and Culture—bringing environmentally responsible sustainability to the community, including sustainable business, sustainable agriculture, renewable energy and Leadership in Energy and Environmental Design (LEED). Although our environmental restoration and recycling efforts have come a long way, we still have a long hard road ahead of us. The saving grace is that our children are becoming environmental thinkers who, in the future, will consciously invent new waste technologies to foster zero waste.

## Hazardous Waste

Hazardous, toxic or regulated wastes debilitate and/or cause death to humans. Although we are on the way and are making progress to better handle landfill waste and reduce, reuse and recycle, we have made little progress in coping with and being able to recycle hazardous wastes, the most important of the waste frontier that must be conquered.

We are at the inception of discovering new ways to recycle E-Waste, a prominent and ongoing effort for recyclers, because it holds the perplexity of recycling hazardous and precious metals. The recapture of precious metals is important, because it curtails mining earth's limited precious metals, which are diminishing quickly. To find a way to repurpose the hazardous metals back into E-products would provide enormous environmental benefits, while the remainder of E-waste components, plastics, glass, etc., is easily recycled. The Hong Kong University of Science and Technology has found a way to use E-Waste to absorb and mop up heavy metal effluent from wastewater generated by the microelectronic industry. Presently, some hazardous wastes can be incinerated, but we should strive to find ways to recycle and repurpose hazardous wastes, either before or after incineration or with non-thermal, chemical, biological or chemical-physical processes.

Landfills are taking in hazardous Hexavalent Chromium in soil and ACM in large amounts that take up valuable landfill space and carry perpetual liability. Hexavalent Chromium in soil is hard to landfill, because it has to pass a certain parts per million (ppm) to meet the landfills criteria. There are also very limited landfills that take Hexavalent Chromium in soil. These landfills are in remote areas that require long distance trucking. There are non-thermal technologies that convert Hexavalent Chromium in soil to Trivalent Chromium. These conversion processes

can be done on the generator's site or at the landfill site, and once converted to Trivalent Chromium, it can be put right back into the generator's site or the landfill can use the soil as alternative daily cover, eliminating use of precious landfill space.

There are non-thermal processes that convert all ACMs, asbestos contaminated related plastics, and peripheral debris to asbestos free. These conversion processes can be done right on the landfill. Once converted to non-asbestos, the end product can be used as alternative daily cover, saving landfill space. All asbestos-free peripheral debris can be recycled.

## Add Value to the Bottom Line

Landfill space is a premium commodity that carries long-term liability requiring guaranteed financial assurance instruments such as a Trust Fund, Surety Bond, Letter of Credit, Insurance, or Corporate Guarantee to prove and ensure that the landfill owner is capable of paying all costs related to landfill cleanup and closure. By investing in and using inventive waste technologies, landfill owners will mitigate the liability, demonstrate good community social responsibility, and most importantly, add value to their bottom line by ensuring stakeholders' environmental sustainable financial risk management. | WA

*Tony Nocito is Managing Member of ABCOV Companies, LLC (New York, NY) and other related companies that provide services for the non-thermal, EPA approved ABCOV® Method of asbestos destruction and conversion to a non-toxic material and the non-thermal process that converts Hexavalent Chromium in soil to the non-toxic Trivalent Chromium in soil. Tony is presently working on a process that reduces overburden and off-specification fiberglass blow and batt insulation to 10 percent of their original volume. He markets and provides these services through his companies. Tony can be reached at (212) 571-9125, via e-mail at [tony@abcov.com](mailto:tony@abcov.com) or visit [www.abcov.com](http://www.abcov.com).*

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