

# Making More Compostable Trash Will Solve Mountains of Landfill Problems – Part I of 2

## How Compostable Plastic can Assist Municipal Land Use Improvements

By Laura Mauney

Every autumn, millions of families, businesses and municipalities across the two hemispheres (alternately) surmount the daunting challenge of removing fallen leaves from yards, sidewalks, playgrounds, and streets.

Often, the dead leaves are raked up and packed into petro-plastic bags, then shuttled off to landfills. The leaves will biodegrade into nutrient-rich dirt within three months to a year. The plastic bags, however, will not biodegrade.



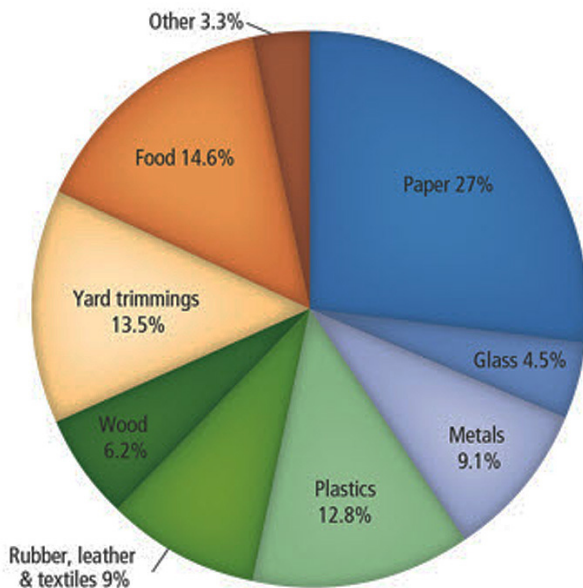
### Plastics Have Become Land Consumers

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Petro-plastic bags merely break up into teeny-tiny plastic bits. The same goes for the millions of other disposal plastic items – cups, bottles, wrapping, liners, glue, sandwich bags, microfiber cloths – that are dumped into landfills every day.

The teeny-tiny plastic bits have turned into a mountainous plastic problem over time. The scenario will not get better unless petro-plastic is replaced.

The Monarch Hill landfill, which slopes high above the pancake flat sandbar otherwise

**Figure 4. Total MSW Generation (by material), 2013****254 Million Tons (before recycling)**

(<http://www.epa.gov/epawaste/nonhaz/municipal>)

known as South Florida, can be spotted

easily from the Florida Turnpike by travelers heading north and south. At 225 feet, Monarch Hill is considered jokingly by some to be the state's highest point above sea level.

One of the country's largest and oldest landfills stands even taller, in Puente Hills, California, just south of the Los Angeles metro area.

In an NPR interview (<http://www.npr.org/2012/04/26/150735732/following-garbage-long-journey-around-the-earth>), Edward Humes, author of the book *Garbology*, says the Puente Hills landfill "actually filled a valley that used to be a dairy farm and is now a mountain built of trash. ... It's 500 feet tall, so when you stand atop it, you're standing on the biggest man-made structure in California."

## The Problem with Petro-Plastics in Landfills

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In 1960, according to the EPA, plastic occupied a mere 0.4% of U.S. Municipal Solid Waste (MSW).

By 2012, plastic comprised 12.7% of MSW. That percentage translates to 31.75 million tons of non-degradable stuff that is growing by 250 million tons per year. All that plastic takes up thousands of acres of space in landfills, and hundreds of years to degrade.

As a consequence, a multitude of "Mount Trashmore" sit famously in locations across the United States.

In most developed countries, landfills are regulated. In the United States, regulation occurs at different tiers of government. Though a municipal or county government usually is charged with managing waste pickup and disposal, landfill siting in the United States is controlled by state governments using [federal EPA guidelines](#)



(<http://www.epa.gov/solidwaste/nonhaz/municipal/landfill.htm>).

Ideally, EPA regulations ensure that landfills do not contaminate soil and water or pollute the air with disease-causing pathogens, toxic chemicals, and greenhouse gasses, dangers that can affect people, animals and vegetation across multiple state boundaries.

Modern landfills are built like bathtubs, designed to hold waste in an impermeable container until it can either be cycled out or covered and abandoned.

According to the EPA, new landfill construction requires that a flexible “geomembrane” be laid over at least two feet of compacted clay soil to prevent toxic chemicals and anaerobic pathogens from contaminating surrounding land and water systems.



Mechanisms are laid to capture landfill natural gas (LFG), which is either piped out or flared off.

Drainage systems are constructed to collect “leachate,” water that seeps down through the garbage. The leachate is also piped out.

Wells are situated around the landfill to enable routine testing for

toxic leaks.

Within this complex scenario, petro-plastics create burdens for landfills far beyond tonnage and land usage.

Petro-plastics can leach toxins. The [many different types of petro-plastics](http://www.epa.gov/osw/conserva/materials/plastics.htm) (<http://www.epa.gov/osw/conserva/materials/plastics.htm>) have different chemical compositions, and some of those chemicals are pretty caustic to the environment.

Petro-plastics pollute the air with non-degradable particulate flakes.

Burning petro-plastic as a means of quick disposal generates air pollution and toxic ash, which require further special handling.

## **What about Recycling?**

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Recycling plastic (or simply not using it) may be the preferred way to deal with the global plastic problem, but people are busy, with families, jobs, home, and business management, and all too often, crisis.

Though MSW recycling practices have become more common in recent years, for most individuals, the task of properly sorting trash into different bins is a hassle often ignored. Only 9% of MSW plastic was recycled in 2012.

Unfortunately, once plastic mixes up with other garbage, including food and yard waste, it becomes nearly impossible to retrieve and recycle. Worse, any organically decomposed material mixed up with the plastic becomes unusable as compost or fertilizer.

Although most U.S. municipalities have developed multi-channel waste diversion systems for recycling certain types of plastic products, the plastic waste problem persists. Most plastic packaging, for example, including bottle caps, safety seals, and the glues that hold boxes together, cannot be efficiently separated for delivery to a recycling center.

### **What Difference will PHA Make?**

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Organic matter that gets tossed into a landfill, including food waste, yard waste, paper, and PHA, will decompose fairly rapidly. Instead of disintegrating into smaller and smaller bits, organic matter is chemically transformed by the microorganisms that eat it as it breaks down.



If the digestion is aerobic (<http://www.mhgbio.com/replacing-plastic-waste-stream-aerobic-anaerobic-decomposition-work/>), the matter is changed into carbon and nitrogen rich soil or humus.

If the digestion is anaerobic (<http://www.mhgbio.com/replacing-plastic-waste-stream-aerobic-anaerobic-decomposition-work/>), the matter is converted to LFG and nutrient-rich matter, called digestate.

Replacing petro-plastic with compostable plastic in the waste stream offers multiple economic and environmental benefits:

- Bioplastic that degrades naturally in a landfill will consume less space than petro-plastic.
- Biogas captured from landfills can be sold as an energy source.
- Digestate created via industrial composting can be sold as a natural pesticide and soil enhancer, or – yes, it's true – a composite filler for plastic products.



When products made of compostable PHA replace every throwaway item made of plastic, almost all the garbage going into landfills will become simultaneously biodegradable and reusable, without special handling.

Replacing plastic with PHA will also facilitate the ability of landfill sites

to compost organic waste industrially.

Food that is disposed of in bioplastic containers can be dumped, container and all, into a compost facility, along with any original bioplastic packaging. Likewise, all those fallen leaves I mentioned earlier, instead of being wasted in a landfill, can be composted along with the bioplastic bags used for leaf disposal.

The EPA and most localities are working hard to create new, sustainable systems of waste management that emphasize recovery and reuse over expanded landfill

construction.

The adoption of compostable PHA packaging by the plastic products industry will enhance the success rates of such sustainable systems by making plastic “disappear” into the waste stream altogether.

*Please read Part 2 of this series: [Making More Compostable Trash Will Help Solve Global Energy Problems](http://www.mhgbio.com/making-more-compostable-trash-can-help-solve-global-energy-problems/) (<http://www.mhgbio.com/making-more-compostable-trash-can-help-solve-global-energy-problems/>).*

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## Does Your Company Manufacture Plastic Products?

*Please visit **MHGBio.com** (<http://www.mhgbio.com/>), to find out more about how biodegradable plastics from MHG can be adapted to a wide range of product manufacturing and packaging requirements.*

***Learn more** (<http://www.mhgbio.com/mhg-sustainability/mhg-certifications/>) about how MHG’s biodegradable PHA plastic is **Certified** (<http://www.mhgbio.com/mhg-sustainability/mhg-certifications/>) for all six levels of biodegradability and compostability.*

To learn more about MSW, check out the following EPA PDF:

### ***Municipal Solid Waste in the United States***

([http://www.epa.gov/waste/nonhaz/municipal/pubs/2012\\_msw\\_fs.pdf](http://www.epa.gov/waste/nonhaz/municipal/pubs/2012_msw_fs.pdf)).

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