

The Landfill

What is the Problem?

We hear that we should reduce the amount of trash we send to the landfill, but why? There are several problems. No one wants to live near a landfill because they are noisy, messy, often smelly, attract vermin and rodents. Landfills permanently remove land from most productive uses and pose environmental problems. The two major environmental problems are greenhouse gas emissions and water pollution from leachates.

Leachates

Monitoring and mitigating the leachates is a costly affair. These costs vary depending on the landfill and for some of the 30 or so closed landfills in WV, can exceed \$100,000 per year. These costs continue for many years even after the landfill is closed. These funds are paid by assessments on every ton of waste deposited in landfills every day. The only way to reduce further increases in expenditures is to reduce the amount of waste being sent to landfills.

Greenhouse Gas Emissions

To understand how the greenhouse gas (GHG) emissions occur and how to reduce them, gets a bit more technical. We have to get down into the nitty-gritty of the make-up of the waste stream, what causes the emissions, and how to eliminate them.

The material in the waste stream is municipal solid waste (MSW), construction and demolition waste (C&D), and industrial waste. In Monongalia County, the large majority is MSW with some C&D, and little industrial. MSW comes from both residential customers and commercial businesses.

According to the EPA, for each person in the county, there is 4.51 pounds of MSW per person, per day. This comes out to be 1646 pounds per year per person. Based on volume through the transfer station, these numbers are a reasonably representative for our county.

Now, let's look to see what kind of materials are in our waste. Before we get to the specifics, for our purposes, there are three categories: biologic in origin, fossil in origin, and inert.

- Biologic materials are derived from plants or animals which were living a few months or years ago. 60.1%
- Fossil materials are derived from coal, oil, or natural gas. 13.2%
- Mixed biologic and fossil materials. 9.7%
- Inert and unknown materials: metal, glass, ceramics, rock and concrete 17%

When biologic materials decompose with sufficient oxygen, the emissions are simply carbon dioxide. While carbon dioxide is a greenhouse gas, these CO₂ emissions from decomposing biologic material are not considered to be a factor in global warming because these biologic materials grew by extracting CO₂ from the atmosphere just a few months or years ago.

However, in the landfill, the oxygen is quickly depleted, and the decomposition reverts to an anaerobic decomposition which produces methane, 21 times more damaging than CO₂ for global warming potential and is thus considered a greenhouse gas.

When considering the collection, handling, and transportation along with landfill decomposition, one ton of municipal waste produces approximately the equivalent of one metric ton of CO₂ in GHG emissions. Based on the population of Monongalia County, our municipal waste in the landfill produces over 200 tons/day of GHG emissions.

How Recycling and Composting could Reduce Landfill Emissions

In a 2017 national survey of recycling and composting, the EPA found that 22% of the waste stream was recycled and 13% was composted. Together, 35% of the waste stream was diverted. Meaning landfill volume was reduced by 35%. Between recycling and composting biological material at these rates, the landfill GHG emissions could be reduced by 43%

The bottom line is that if we could achieve a 22% recycling rate and 13% composting rate, we would reduce landfill volume by 35% and landfill GHG emissions by 43%.

Note that the current recycling rate in Monongalia County is around 5% and there is no composting program.

Next, we will look at an alternative to waste disposal that can more than double the reduction in both landfill volume and emissions.

Resource Recovery Instead of Landfilling Waste

The EntsorgaWV resource recovery facility now operating in Martinsburg, WV, should not be considered a disposal facility, but rather a manufacturing facility that uses municipal waste as a resource to manufacture a solid recovered fuel, SRF. This facility uses a rapid partial composting process, the BioHiTech process, to convert biologic and fossil materials into a mixed, bio/fossil fuel. The waste stream delivered to this facility comes after a local public recycling program and after bulky items are diverted. The remainder is taken to the EntsorgaWV facility where inert materials are removed. The metals are recycled while the other inert materials are currently landfilled. The fuel is dried and sent to a local cement plant. Overall, landfill volumes are reduced by 75% and with 90% or more of the biologic materials removed, GHG emissions are reduced the same amount.

A Secondary Benefit by Displacing Coal as an Energy source

The fossil/bio SRF fuel derived from waste is often used as an energy source displacing coal. Burning SRF fuel produces 60% less greenhouse gas than burning coal to produce the same amount of energy.

Does this Mean We Should Quit Recycling?

No. Combining recycling with the resource recovery system produces even better results.