

Where Does All Our Garbage Go?

Depending on where we live, our trash travels to many places. Some heads to a landfill, some to a recycling facility, and whatever's left over can end up at a whole slew of different locations.



Landfills

Over half of America's waste will end up in one of 2,000 active landfills. Unfortunately, this outdated method has the potential to cause a number of issues including the emission of dangerous liquids and gasses that pose a danger to both humans and wildlife.

Despite our effort to reduce the amount of waste we make, we are creating more landfill trash than ever before. Americans produce approximately 4.4 pounds of garbage per day. With all this waste, landfills are beginning to evolve as they try to minimize their environmental impact. Here's a breakdown of how today's landfills are constructed.



Bottom Liner

The purpose of a bottom liner is to create a barrier between buried waste and natural soil and groundwater. Many landfills use a bottom liner that ranges anywhere from 30 to 100 millimeters thick and is made from puncture-resistant plastic.

Cells

A cell is the part of the landfill where the waste is buried. They can be as small as a couple acres or can be as big as twenty acres, depending on how large the landfill site is. Cells are filled with waste in a layering process that helps to compact their content, minimizing the space needed.

Leachate Collection

Modern landfills are sloped so that the bottom goes to a singular low point, this is known as a slump. The slump is used to trap liquids that come from the waste, referred to as leachate, and are then collected and removed. Pipes, gravel packs and other absorbent materials like sand are used as part of this collection system that catches the leachate. Once all of the leachate is collected, it is then moved to a holding tank where it is treated.

Stormwater Collection

When it rains, it pours. And when it pours, landfills need to ensure stormwater doesn't leach toxic chemicals into the surrounding environment. Engineers have solved this problem by creating a series of holding ditches known as "sed ponds." These ponds decrease the speed of the overflowing water so that soil particles can settle. After the

particles have sufficiently settled, the excess water is then released to an offsite location.

Methane Collection

As the landfill waste begins to break down, it produces “landfill gas”. This gaseous mixture is comprised of approximately 50% methane and 50% carbon dioxide. This gas needs to be specially treated due to methane’s volatile tendencies. Landfills solve this problem by collecting the gas through a series of pipes that live inside the landfill cell. After the gas is collected it can either be burned or vented.

Cap

After the waste is compacted and inserted into its cell, it needs to be covered. The cover can consist of an alternative cover or six inches of compacted soil. Non-soil covers can be a spray on foam material or a fiber that is fire-retardant. Capping is done to help protect waste from air exposure, wildlife and odor control. When a cell is filled to its capacity, it is permanently covered with a layer of polyethylene plastic, compacted soil and topped off with topsoil intended to support natural plants to help prevent soil erosion.

Recycling Facilities

Society is placing a greater importance on conscious consumerism. This trend isn’t going away anytime soon and recycling facilities are working hard to keep up. Just a few years ago, the recycling landscape looked very different. Many communities didn’t offer recycling programs and those that did were very sparse. Nowadays, recycling facilities are much more robust, capable of processing many more materials. Here’s the general breakdown of what happens after you place your recyclables in the bin.



Transfer Truck

The recycling collection trucks that drive down your street consolidate their recyclables into a larger transfer truck. This transfer truck then transfers the large haul to the recycling plant where recyclables are unloaded onto a hopper that feeds them onto a conveyor belt for sorting.

First Sort

Skilled workers monitor the conveyor belt and hand sort through the recyclable materials, placing them in their respective chutes. This first phase is crucial for removing any potentially hazardous materials from reaching the more delicate recycling machines.

Magnetic Sorting

An overhead magnet is used to capture the steel materials and drop them into a bin. After all the magnetic material is removed, a machine called “the eddy current separator” removes aluminum cans from the belt. This machine works by using a rotor that is magnetized to keep away items that don’t contain iron. The repelling causes the items to jump off the belt and go into a separate bin. Science!

Baler

After all the materials are properly separated into their corresponding groups, a baler machine compacts them into easy-to-transport compact bricks to be shipped off to processing plants where they’ll live their second life as another item.

Everywhere Else

There are special situations where waste doesn't end up at a recycling plant or a landfill. In these special circumstances, our waste gets transported to a few alternate locations where it is processed and often turned into valuable energy.



Incinerators

Incinerators burn waste materials to create heat that is then converted to power. This waste treatment process is one of many waste-to-energy technologies. Incineration is particularly advantageous for the treatment of hazardous waste including clinical waste and toxic wastewater. In addition to hazardous waste handling, incineration reduces waste volume by upwards of 95%. For communities where land is a scarce resource, this makes incineration particularly popular.

Although many nations classify incineration as a renewable energy, it has many negative environmental impacts, most notably the emission of heavy metals including mercury and lead.

Anaerobic Digesters

Anaerobic digestion works very similarly to composting but within an oxygen-free environment. Giant vats house organic waste that gets broken down by microorganisms to produce biogas which includes methane and carbon dioxide. After treatment, this gas is then able to be burned as a renewable energy similar to natural gas.

Because anaerobic digesters are most commonly found on farms, the majority of digesters are filled with common farm waste including cow manure and crop waste

though it isn't uncommon for some digesters to be filled with food waste from grocery stores and small rural communities.