Solid Waste

CH_4 emissions are generated through the decomposition of organic waste disposed in a landfill. CO_2 is also generated as materials degrade, but these emissions are considered part of the natural carbon cycle of growth and decomposition. The transportation of waste to a landfilling facility also generates emissions from the combustion of fuel to operate the waste-hauling vehicle. In some cases, organic materials that are landfilled do not completely decompose, allowing for biogenic carbon storage that otherwise would not have occurred. In addition, landfills may capture some of the CH_4 generated by organic materials and combust it to generate electricity, thereby avoiding emissions that otherwise would have been emitted to generate electricity (U.S. EPA 2020).

Emissions associated with landfilling can be avoided through the diversion of waste. Alternate waste management pathways include recycling and composting.

- Recycling is the separation and collection of wastes, their subsequent transformation or remanufacture into usable or marketable products or materials, and the purchase of products made from recyclable materials (U.S. EPA 2020). During recycling, emissions are generated from the transportation of waste to recycling facilities and the operation of machinery to process these materials into new, recycled products. Other emissions may be generated during the recycling process through the purification chemicals or agents. At the same time, recycling offsets emissions associated with the virgin production of materials.
- Composting involves bacterial decomposition of organic matter into compost. Emissions result from the transportation and processing of waste at the compost facility, as well as from the decomposition process. At the same time, compost application can help reduce the use of synthetic fertilizers and increase soil carbon storage.

The methodology used in this Handbook to quantify emission reductions from diverting waste from landfills is based on a lifecycle approach that accounts for upstream and downstream emissions associated with the waste management pathways with and without the measure. This is consistent with the methodology developed by the U.S. Environmental Protection Agency (U.S. EPA) (2020). As a result, users are cautioned in how these reductions are compared to operational emissions inventories, which may not include lifecycle emissions. Additionally, the methodology assumes that all disposed waste will be diverted from the landfill. In reality, recycling and composting programs will likely only result in the diversion of a fraction of disposed waste. Users should consider this when calculating the benefits of implementation of waste diversion programs.

Use the graphic to click on an individual measure to navigate directly to the measure's factsheet.