

Whole Cycle Tuesday

Key Takeaway

In a comprehensive waste management strategy, incineration works alongside recycling, composting, source reduction, and landfilling. When integrated properly, it provides volume reduction, energy recovery, and a controlled method of managing waste streams.

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"The environment is where we all meet; where we all have a mutual interest; it is the one thing all of us share." — Lady Bird Johnson

Waste Incineration: How the Process Works

Combustion

Prepared waste is fed into a combustion chamber, typically onto a moving grate system. Primary air is introduced beneath the grate to support combustion, while secondary air is injected above the waste to promote complete burning of gases.

Temperatures in the furnace commonly range from 1,500°F to 2,200°F (815°C to 1,200°C). At these temperatures:

- Organic materials oxidize into carbon dioxide and water vapor.
- Pathogens and most organic contaminants are destroyed.
- The overall volume of waste is reduced by approximately 80–90%.

The combustion process generates heat, which is the key resource recovered in modern facilities.

Energy Recovery

Rather than allowing heat to dissipate, WTE facilities capture it in a boiler system. The hot combustion gases pass over water-filled tubes, converting water into steam. This steam drives a turbine generator to produce electricity,

or it can be used directly for district heating or industrial processes.

Facilities across the United States and Europe demonstrate how incineration can offset fossil fuel use by producing renewable base-load power from municipal waste streams.

Air Pollution Control

Modern incinerators are equipped with advanced air pollution control systems to meet strict regulatory standards set by agencies like the United States Environmental Protection Agency.

Typical components include:

- **Scrubbers** to neutralize acid gases (e.g., sulfur dioxide, hydrogen chloride)
- **Fabric filters (baghouses)** to capture particulate matter
- **Activated carbon injection** to remove mercury and dioxins
- **Selective catalytic or non-catalytic reduction systems** to control nitrogen oxides (NO_x)

These systems significantly reduce emissions compared to older incinerators built decades ago.

