



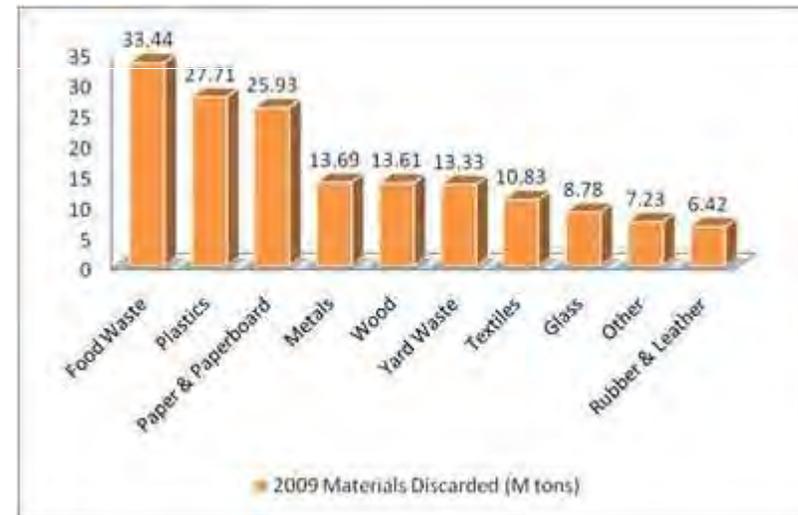
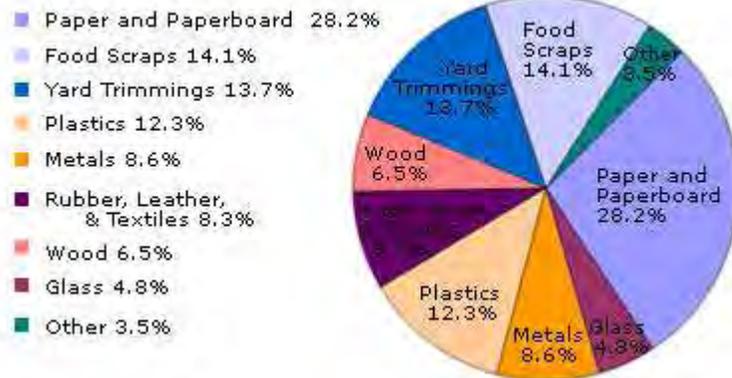
Net Zero Food Waste



Food Waste Facts and Figures

- US generates 34 million tons/year
 - Representing 14% of total MSW stream
 - Less than 1 million tons/year recovered
 - Remaining 33 million tons/year are landfilled/incinerated
- Food waste is the single largest component of MSW stream

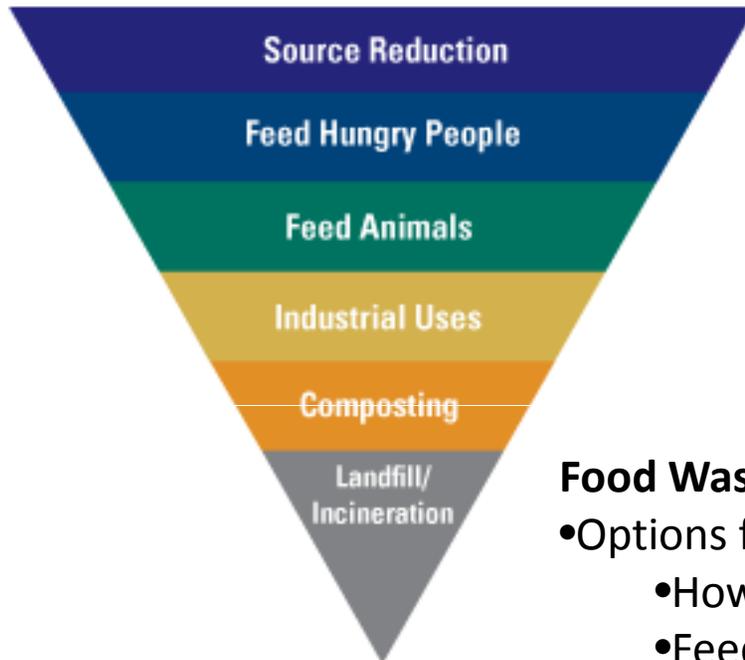
Total MSW Generation (by Material), 2009
243 Million Tons (Before Recycling)



Source: Municipal Solid Waste in the United States; 2009 Facts and Figures, USEPA



Net Zero Food Waste



Food Waste Recovery

- Decreases disposal fees
- Conserves landfill space
- Decreases water and energy requirements
- Creates nutrient rich soil amendments

Food Waste Recovery Hierarchy

- Options for DoD exist at each level
 - However, highly installation specific
 - Feeding people/animals requires coordination
- Composting includes several technologies
 - Vermiposting, digestion, pulping, in-vessel

<<http://www.epa.gov/wastes/conservation/materials/organics/food/fd-gener.htm>>

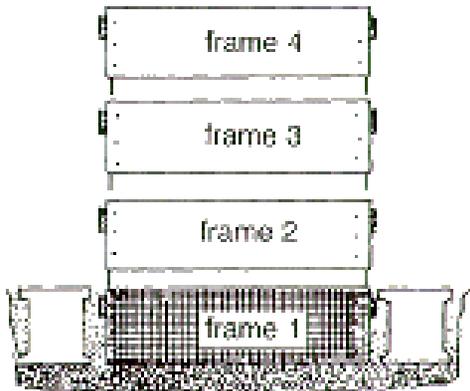


Composting Technologies



Vermi-posting

- Characteristics
 - Simple, near-site, small-scale, educational opportunity
- Throughput
 - 1000 lbs food waste/(year*yd²)
 - 1000 lbs carbon source/(year*yd²)
 - 600 lbs compost/(year*yd²)
- Water Requirement (+)**
- Energy Requirement (-)
- Cost (+)



**

(+) minimal

(++) moderate

(+++)
significant

(-)
no requirement



Composting Technologies



Food Waste Digesters

- Characteristics
 - Simple, on-site, medium-scale
 - Currently being tested at Fort Hood, TX
 - ORCA-Organic Refuse Conversion Alternative
- Throughput
 - 16-100 lbs/ hour
 - 3-15 gallons water/hour
- Water Requirement (++)**
- Energy Requirement (+)
- Cost (++)

**

(+) minimal

(++) moderate

(+++)
significant

(-)
no requirement



Photos courtesy of Totally Green, Inc., Tulsa OK



Composting Technologies

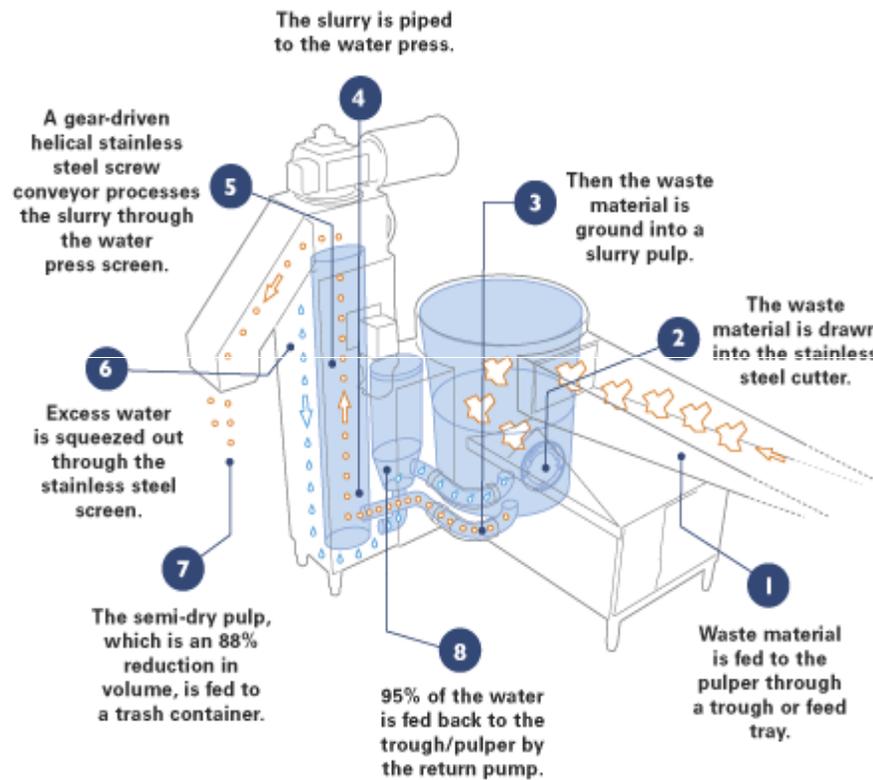


Diagram courtesy of Hobart, Inc.

Food Waste Pulpers

- Characteristics
 - Simple, on-site, medium-scale
- Throughput
 - 700-3000 lbs/ hour
 - Water recycled
 - 80-90% waste volume reduction
 - 80-360 lbs/hour
- Water Requirement (++)**
- Energy Requirement (+)
- Cost (++)

**

(+) minimal

(++) moderate

(+++) significant

(-) no requirement



Composting Technologies



In-Vessel Aerobic Systems

•Characteristics

- Simple to complex, off-site or near –site
- Medium to large-scale
- Carbon source bulking material required
- Efficient with short turnover times
- Several types available
 - Stationary in-vessel
 - Containerized in-vessel
 - Covered , aerated static piles and towers
 - Rotating drums
- Custom designed to meet needs specifications
- End product may require additional curing time
 - Secondary storage facility required



•Throughput

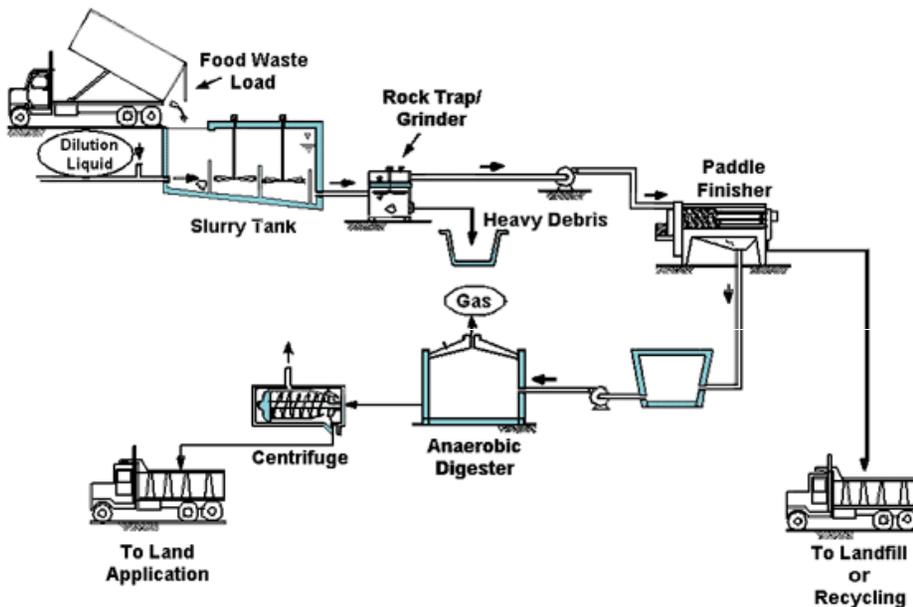
- 1,000-10,000 lbs food waste/week
- Compost retention times vary from 7-21 days
 - Additional, secondary curing times of 6-8 weeks
- Water Requirement (++)
- Energy Requirement (+) to (+++) / Cost (+) to (+++)



Assistant Secretary of the Army (Installations, Energy & Environment)



Composting Technologies



In-vessel Anaerobic Systems

- Characteristics
 - Complex, off-site, medium to large-scale
- Throughput
 - 100 tons/day
 - 360 m³ methane/ton
 - 28 tons/day biosolids for land application
- Water Requirement (++)
- Energy Requirement (++)
- Cost (+++)



Composting Technologies



Many wastewater treatment facilities have an excess capacity in their anaerobic digesters where.



Food waste being unloaded at the EBMUD Wastewater Treatment Plant.

Co-Digestion Anaerobic Systems

- Characteristics
 - Complex, off-site, medium to large-scale co-digestion of food waste with wastewater treatment plants.
- Throughput
 - Unlimited
 - Nearly all wastewater treatment plants have excess capacity
- Water Requirement (+++)**
- Energy Requirement (+++)
- Cost (+++)