

Next Generation Organics Management

Global Issues

-  Energy
-  Climate Change-Greenhouse Gas
-  Urbanization-Production Land
-  Water

Energy



Climate Change



Urbanization



Clean Water



Organics

Yard Waste

Food Waste

Human Waste



Recycling Value of Organics

	Energy	Climate Change	Water	Soil
Yard Trimmings	Low	Low	High	High
Food Waste	High	High	High	High
Human Waste	Medium	Medium	High	High

Disposal Methods For Organics

-  Landfill
-  Composting
-  Incineration
-  Land Applying
-  Digestion

Value of Disposal Method

	Energy	Climate Change	Water	Soil
Landfill	None-Low	Negative	None	None
Composting	Negative-Low	Medium	High	High
Incineration	Negative	Low-Medium	None	Minimal
Land Applying	Negative	Medium	Medium	Medium
Digestion	High	High	High	High

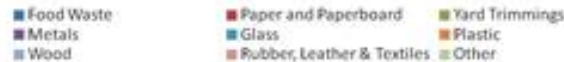
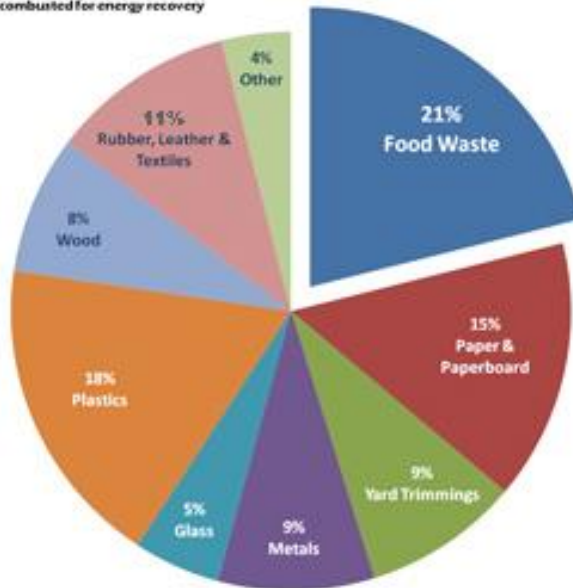
Highest Value Method

- 🌐 Yard Trimmings
 - 🌐 Composting
- 🌐 Food Waste
 - 🌐 Digestion/Soil Amendment
- 🌐 Human Waste
 - 🌐 Digestion/Soil Amendment

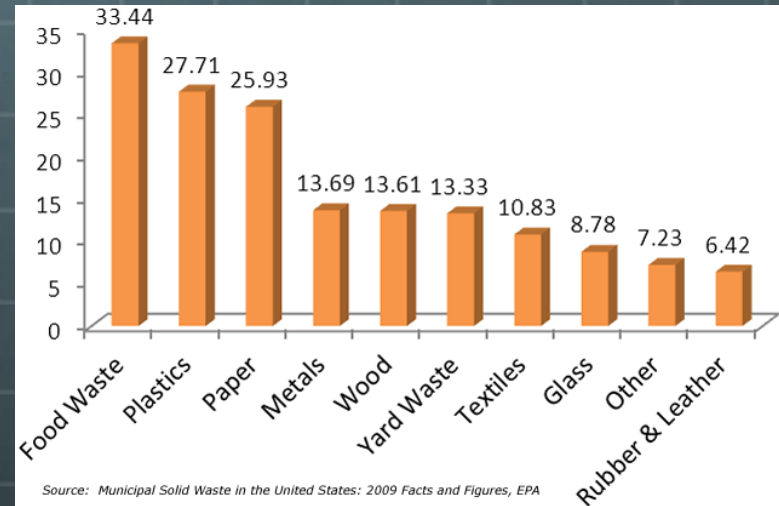
Food and Yard Waste

Food makes up the largest percentage

of waste going into municipal landfills and combusted for energy recovery



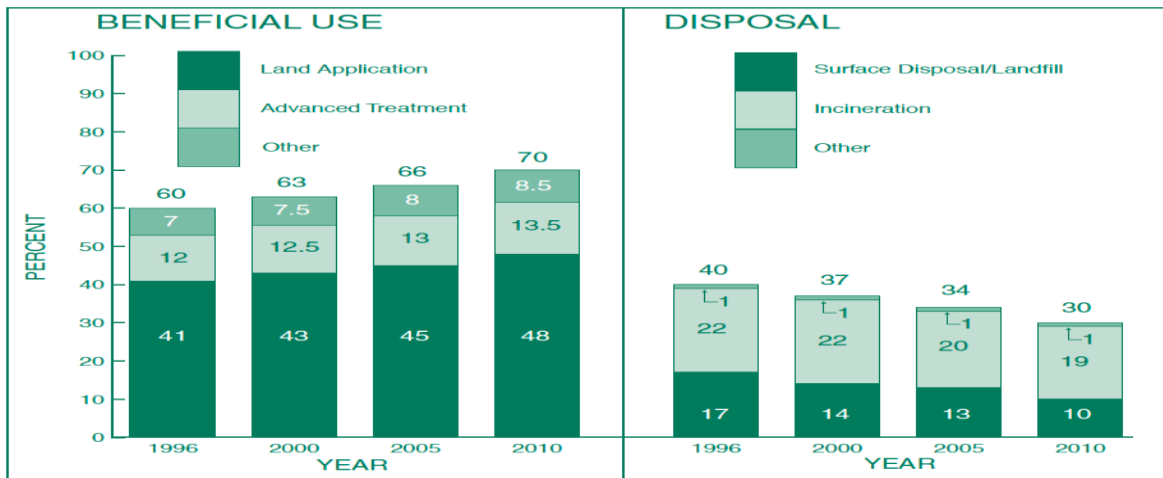
Data from the 2012 Municipal Solid Waste Characterization Report



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

Human Waste

Projections of Use and Disposal for 2000, 2005, and 2010



Projected Quantities of Biosolids Use and Disposal in 2000, 2005, and 2010 (million U.S. dry tons)

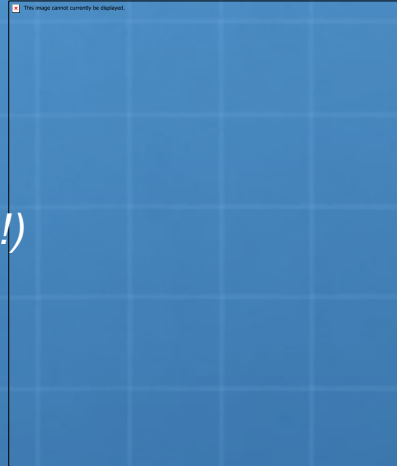
Year	Beneficial Use				Disposal				Total
	Land Application	Treatment/Land Application	Other Beneficial Use	Total	Surface Disposal/Landfill	Incineration	Other	Total	
2000	3.1	0.9	0.5	4.5	1.0	1.6	0.1	2.6	7.1
2005	3.4	1.0	0.6	5.0	1.0	1.5	0.1	2.6	7.6
2010	3.9	1.1	0.7	5.7	0.8	1.5	0.1	2.5	8.2

Advanced Digestion

Project name	Population	Changed from	2010	2011	2012	2013
Bran Sands	1.3 million	Drying	XXX			
Cardiff	0.4 million	Drying	XXX			
Newport	0.2 million	Drying	XXX			
Swansea	0.4 million	Drying	XXX			
Manchester	3 million -Part	Incineration		XXX		
Beckton	1 million -Part	Incineration			XXX	
Crossness	1 million -Part	Incineration			XXX	
Riverside	1 million -Part	Incineration		XXX		
Bradford	1 million	Incineration			XXX	
Newcastle	0.7 million	Lime				XXX
Hull	0.5 million	Drying				XXX
Edinburgh	0.7 million	Drying			XXX	
Total	11.2 million	20% of UK sludge converts to THP in 3 years from energy intensive drying or incineration				

WASTE QUALITY & CHALLENGES

Optimal waste quality
(In your dreams!)



Waste quality as received!
(Get used to it!)



Food Waste Generators

 Food Processors



 Commercial



 Residential



Contamination Removal





 Separating



 Screening



Other Constraints

-  **High Capital Cost**
-  **Committed Volumes**
-  **Low Energy Prices**
-  **Low Landfill Fees**

Leverage

WWTP Flow Rate Range (MGD)	Total # WWTP	WWTP with Anaerobic Digestion	WWTPs without Anaerobic Digestion
>200	10	7	3
100-200	18	13	5
75-100	25	17	8
50-75	24	17	7
20-50	137	82	55
20-10	244	140	104
10-5	452	230	212
5-1	2,262	845	1,417
Total	3,172	1,351	1,821

Government Support

- **Banning of organic's from landfills**
 - **Must be effectively managed**
- **Tax Incentives**
 - **Effective but must be long-term**
- **GHG reductions**
 - **Costly to manage**
- **Grants**
 - **Does not always go to the right people**

Cambi-Ecopro



Harvest Power FLA



Harvest Richmond



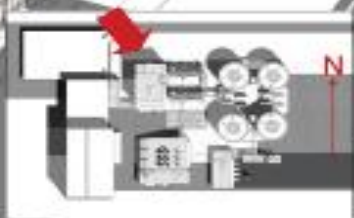
Cambi-Oslo



Harvest Power Ontario



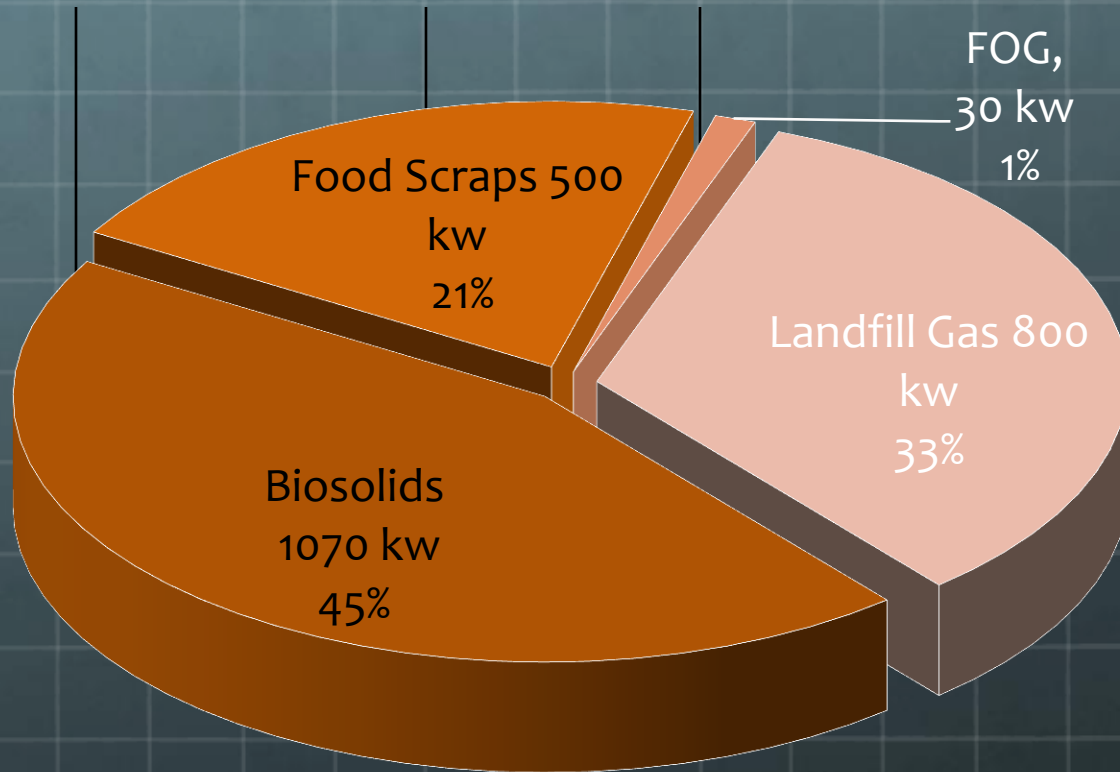
Biosolids Program



“Green” Benefits of the BMP

- Producing digester gas, a renewable fuel containing approximately 60% methane, which will be used to produce heat and electric power (13 MW), thus reducing DC Water’s purchased power by 35%.
- Reducing the quantity of biosolids by over 50%, thus reducing the amount of diesel fuel used for hauling.
- Creating a Class A (pathogen-free) biosolids product, which can be used more widely than the Class B biosolids currently produced.
- 40% reduction of DC Water’s greenhouse gas emissions.

Palo Alto Organics Facility Proposal







2.4MW

Energy Independence Palo Alto

- + Generate 2.4 MW Power if 100% efficient
 - Plants Power use at the 1.8MW including Incinerators
 - + Reduction in incineration power
 - Advanced Digestion
- = >600 kW export of renewable green energy

How do we move forward

-  Encourage Public/Private Partnerships
-  Permanent Tax Incentive
-  Managed banning of organics in landfills
-  Develop community programs around best use options



The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard.