

THE STATE OF GARBAGE IN AMERICA

16th Nationwide Survey of Waste
Management in the U.S.

Earth Engineering Center & BioCycle

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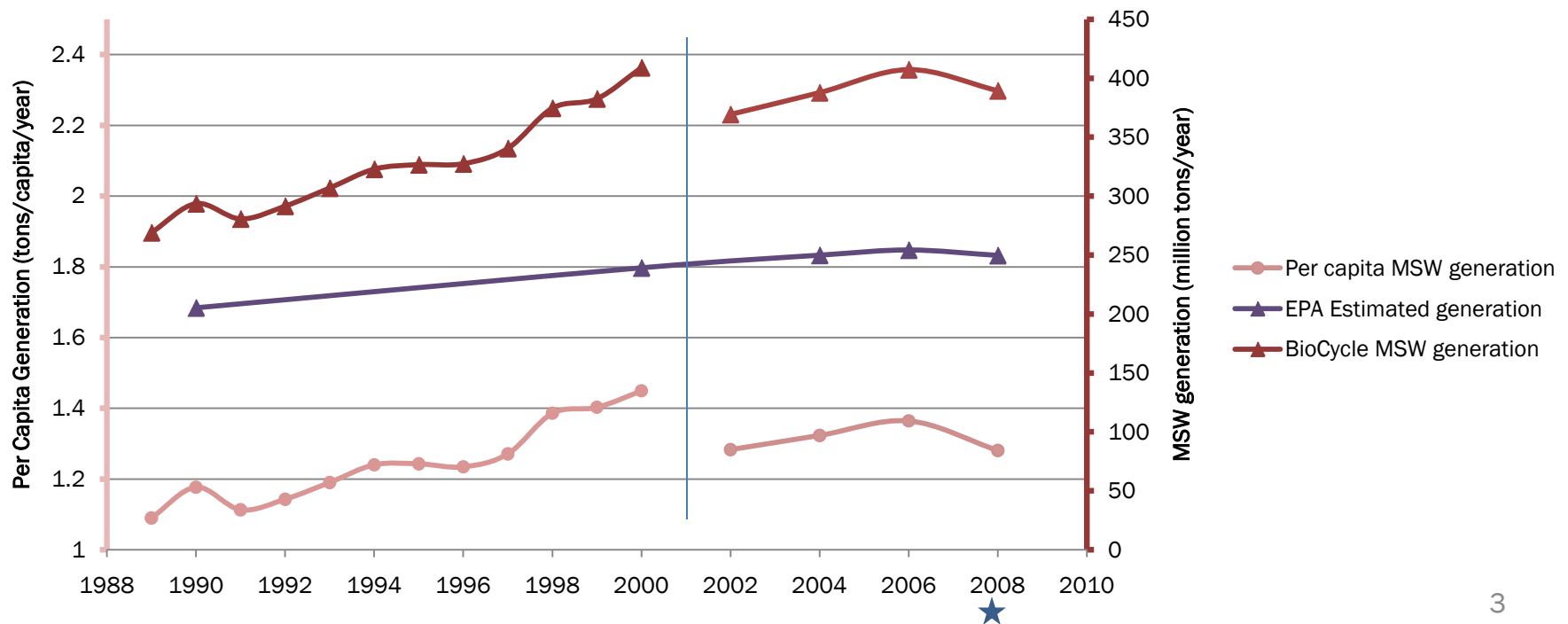
Outline

- History & Development
- Survey Design
- Results
- Trends

History

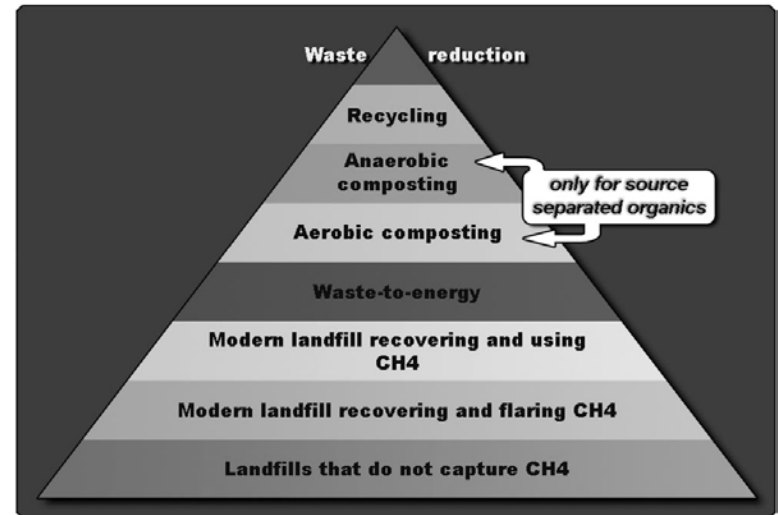
- First SOG survey was on 1989 data!
- Collaboration with EEC since 2004
- Continuous development since 2004

Historical U.S. Waste Generation



Development of survey

- Exclusion of non-MSW streams
 - C&D, automobile scrap, etc.
- Introduction of new disposal/treatment methods:
 - Composting
 - Use of Yard Waste as ADC
 - Landfill Gas (LFG)



Hierarchy of Waste Management

EPA vs. BioCycle (2008 data)

MSW Disposal method	EPA/Franklin (million tons)	BioCycle/Columbia (million tons)	Difference (%)
Generated	250	389	56%
Recovery	83	94	13%
Landfilled	135	270	100%
Combusted in MWC's	32	26	-19%

Tracking Waste Streams

Approach

General Mass Balance Equations

- EPA: Macro-approach
 - National level
 - Materials flow methodology
 - Various data sources



[MSW generation estimate] = f(industry data, waste characterization studies, lifespan of products, import/export)
[Landfilled tonnage] = [MSW generation estimate] – [Recycling] – [WTE]

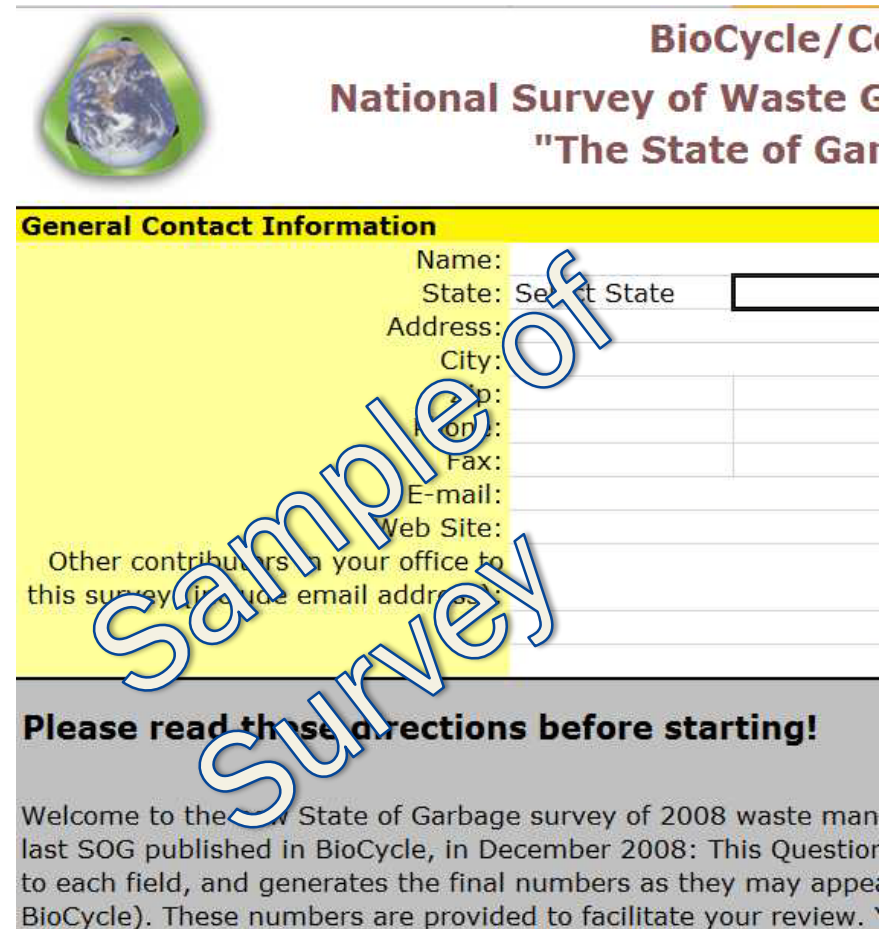
- SOG: Micro-approach
 - State level → National
 - Similar mass-balance method
 - Data from WM departments of all States



[MSW generation estimate] = [Landfilling] + [WTE] + [Composting] + [Recycling]

2010 Methodology

- Contacted 50 States + DC
- Did not respond:
 - Distr. Of Columbia
 - Kentucky
 - Oklahoma
 - Pennsylvania
 - West Virginia
- Survey represents ~281 million people



The image shows a sample of a survey form titled "BioCycle/C... National Survey of Waste G... 'The State of Gar...". The form includes a header with a globe icon and a yellow section for "General Contact Information". This section contains fields for Name, State (a dropdown menu), Address, City, Zip, Phone, Fax, E-mail, and Web Site. Below these fields is a note: "Other contributors in your office to this survey (include email addresses)". A large, diagonal watermark reading "Sample of Survey" is overlaid on the form. At the bottom, a grey section titled "Please read these directions before starting!" contains introductory text: "Welcome to the... State of Garbage survey of 2008 waste man... last SOG published in BioCycle, in December 2008: This Question... to each field, and generates the final numbers as they may appe... BioCycle). These numbers are provided to facilitate your review."

BioCycle/C...
National Survey of Waste G...
"The State of Gar..."

General Contact Information

Name: _____
State: Select State
Address: _____
City: _____
Zip: _____
Phone: _____
Fax: _____
E-mail: _____
Web Site: _____

Other contributors in your office to this survey (include email addresses): _____

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Design of Survey

- Design-principles:
 - User friendly
 - Clear definitions
 - Review last year's data
 - Room for comments
 - Preview to results

Fax: _____
 E-mail: _____
 Web Site: _____
 Other contributors in your office to this survey (include email address): _____

Please read these directions before

Welcome to the new State of Garbage survey of SOG published in BioCycle, in December 2008: Th

3c. COMPOSTING/MULCHING in your State:

This section covers the processing of organic wastes. Again, we

2. Results from the Last BioCycle/Columbia Survey for your State

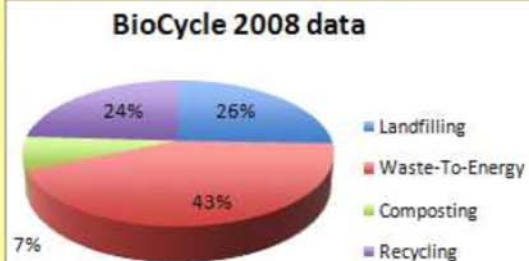
Estimated Waste generated per capita in 2006 (BioCycle 2008): 1.42 tons/capita/year

4. Adjusted estimated tonnages as they may appear in BioCycle/Columbia 2010 State Of Garbage Report.

State	Massachusetts
Population	6,497,967 people
In state generated MSW to:	
Landfilling	2,400,000 tons/year
Waste-To-Energy	4,050,000 tons/year
Composting	680,000 tons/year
Recycling	2,260,000 tons/year
Total estimated generated waste	9,390,000 tons/year
Per capita generation	1.45 tons/capita/year

Comments: Total MSW Disposal = 5,370,000 tons (1.740 mill tons LF + 3.210 mill tons MWC + 840,000

BioCycle 2006 data



Results



- Landfilling



- Waste-to-Energy



- Composting



- Recycling

Landfilling

270 million tons (69% of total)

- 3 million tons higher than in 2006
- 1,908 landfills reported
- ~100 landfills closed during 2006-2008
- Gate fees increased \$2 per ton to ~\$44
- Remaining capacity:
 - 6.7 billion tons from 69% of states ~25 yrs
- LFG extraction: 18% of all landfills in 28 States



Waste-to-Energy

26 million tons (6.7% of total)

- 113 WTE MSW plants reported (?)
- 3 States are increasing WTE capacity
- Diverted wood waste to WTE: 10 “yes”, 13 “no”
0.36 million tons total
- Average gate fee: \$68
- ~\$3 higher than in 2006
- MN: 3 WTEs receive \$18/ton subsidy
- Most tons to WTE: Florida, 3.8 million tons.



Composting

24.5 million tons (6.3% of total)

- In 32 States:
 - ~2,300 yard trimmings composting sites (NJ: 345)
 - 89 permitted to process food residuals
 - ~52 Anaerobic digestion programs
- Similar to EPA number: 22.1 million tons



Recycling

69.3 million tons (17.8% of total)

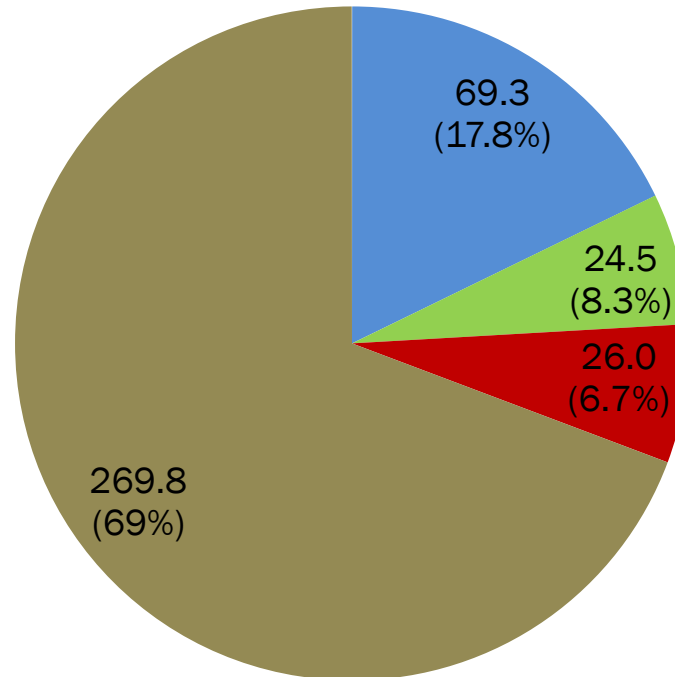
- 36 States reported:
 - ~4,400 curbside collection programs serving 64.3 million people
 - 1,116 MRF's
 - 868 out of 2,363 counties rely solely on drop-off centers.
- 69.3 million tons (17.8% of total)
- Including composting: 24.1% (2006 was 28.6%)



Results

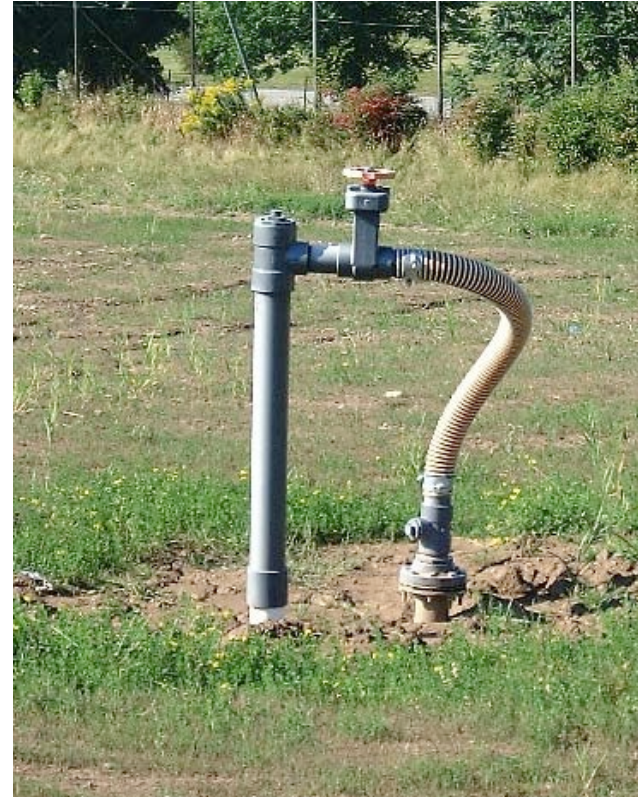
Breakdown disposed MSW tonnages
in Million tons

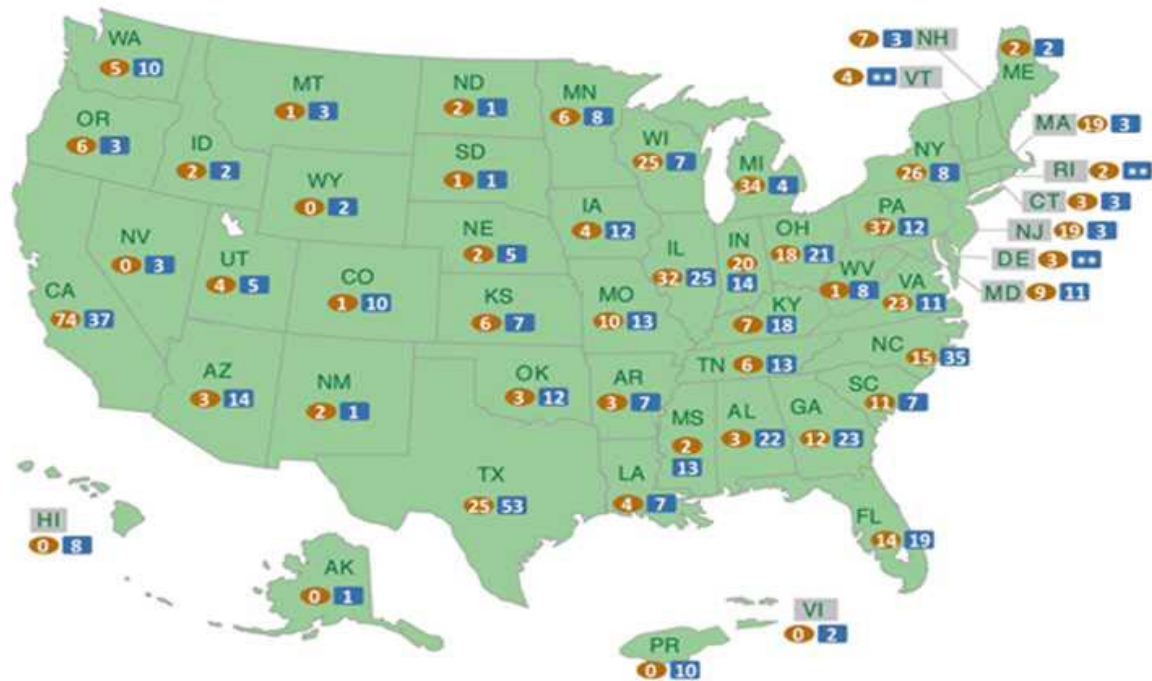
Ranking	Tons/capita
1 Hawaii	2.89
2 Minnesota	1.98
AVERAGE	1.28
50 New York	0.87
51 Missouri	0.82



LFG recovery

- 260 out of 1,414 landfills (18%) recover LFG
- 59.1 Billion scf collected = 30 Trillion BTU
- That is 20% of LFG used in 2004 according to EIA-DOE
- EPA reports 4.9 TWh of electricity generated from landfill gas (~560 MW continuous)*
- LMOP reports 372 Billion scf (epa.gov/lmop)





Nationwide Summary

518 OPERATIONAL Projects
(1,615 MW and 285 mmscfd)

~520 CANDIDATE Landfills
(1,165 MW or 590 mmscfd,
13.5 MMTCE Potential)



OPERATIONAL PROJECTS



CANDIDATE LANDFILLS*

* Landfill is accepting waste or has been closed for 5 years or less has at least 1 mmtons of waste and does not have an operational/under construction LFGU project; or is designated based on actual interest/planning.

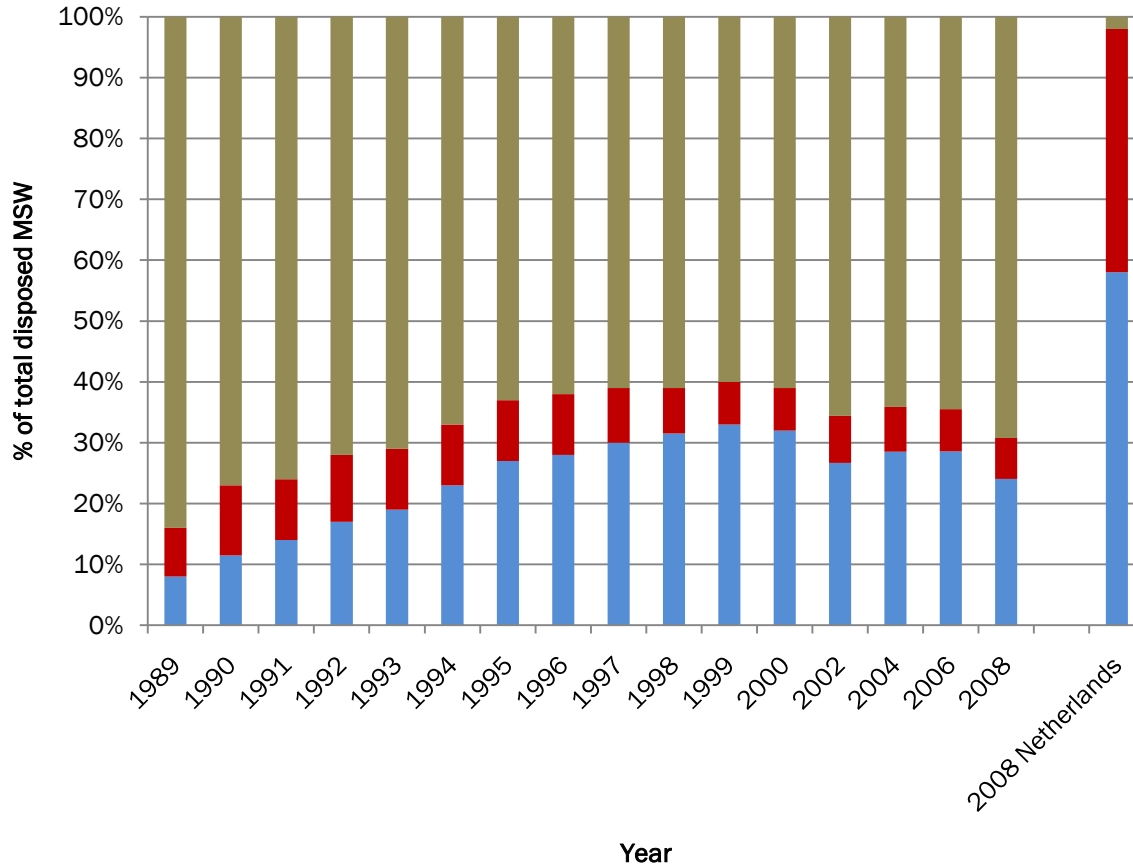
These data are from LMOP's database as of July 6, 2010.

** LMOP does not have any information on cadidate landfills in this state.

Source: www.epa.gov/lmop

Trends

Historical MSW disposal per method

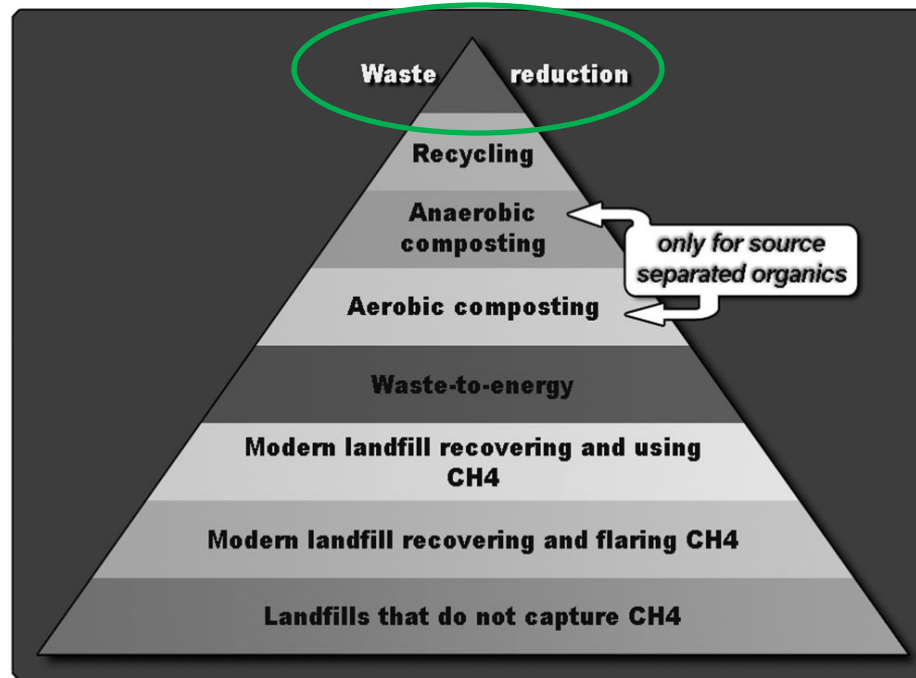


- More landfilling, less WTE and recycling.



- Next survey, more focus on LFG extraction, wood waste burners and use of Alternative Daily Cover (ADC).

1.28 (USA) and 0.69 (NL) tons/capita





EEN BETER MILIEU BEGINT BIJ JEZELF

“A better environment starts with yourself”

THANK YOU!!!!