

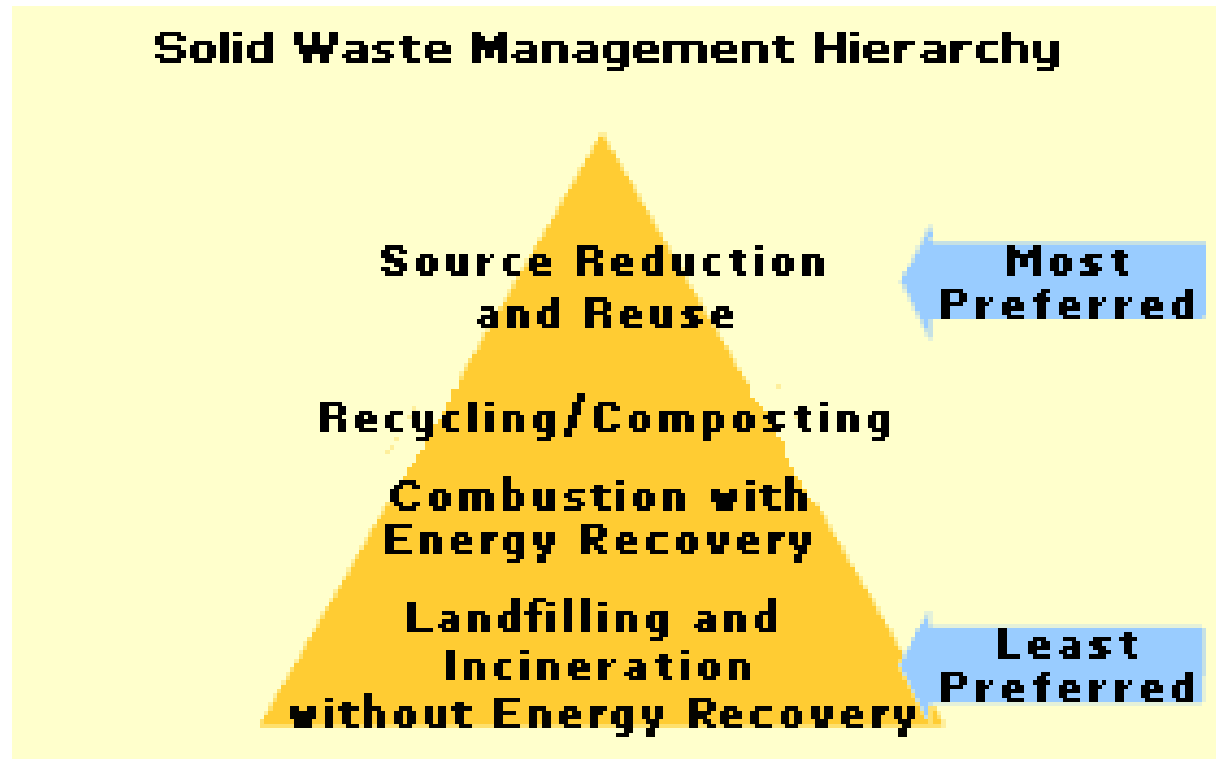
Current State of Landfills in the United States

ISWA Beacon - Buenos Aires
May 31, 2010
James Law - SCS Engineers

Presentation Topics

- US Approach to Solid Waste Management
- SW Generation and Disposal
- Regulations affecting landfills
- Trends in landfilling
- Public Vs Private MSW Landfills
- Export/Import of Waste

US Approach to Solid Waste Management



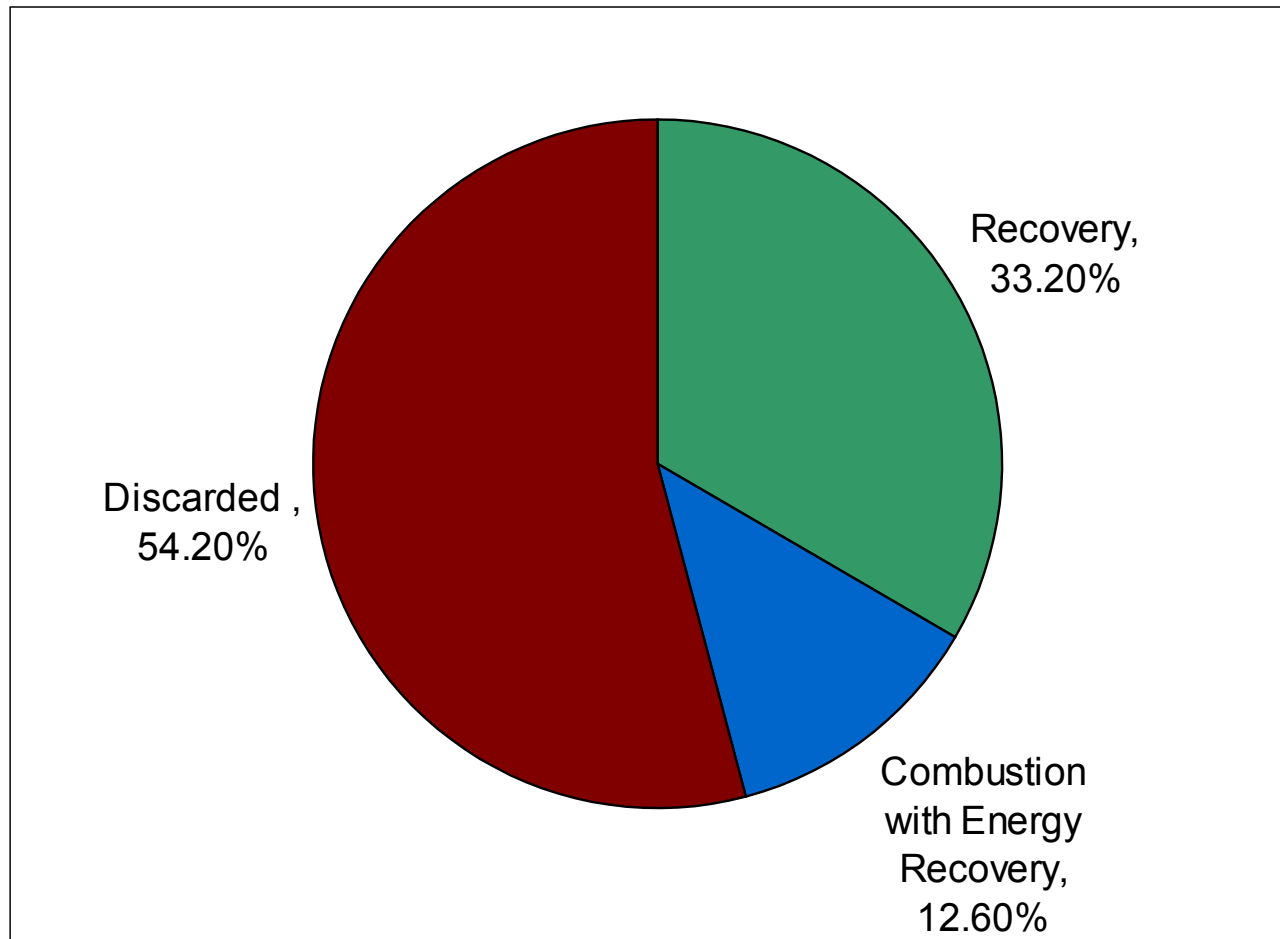
Source reduction / reuse is the most preferred method of solid waste management, followed by recycling / composting, and lastly, combustion and landfilling.

MSW Waste Management in the US (2008)*

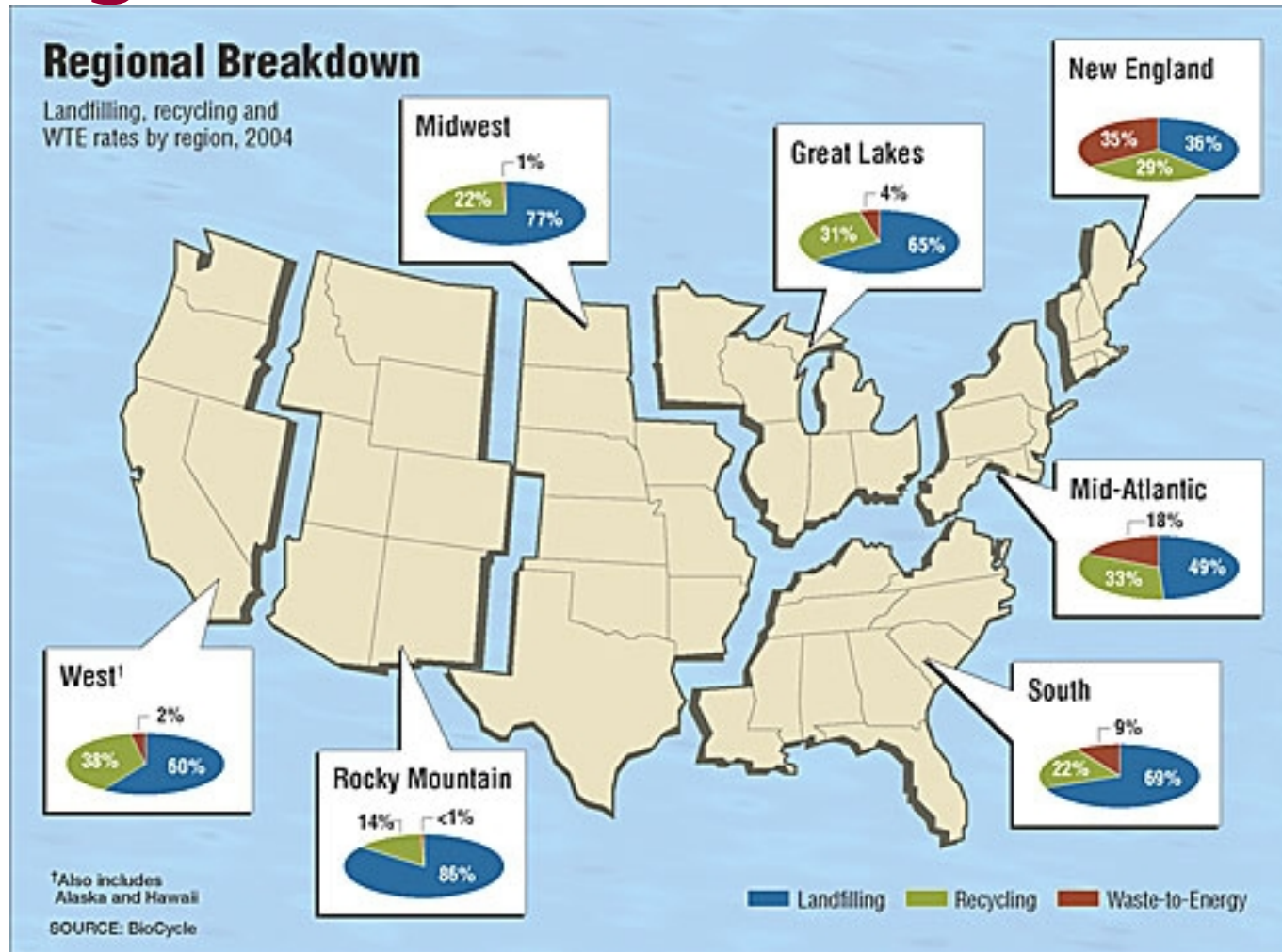
- Generation: Approximately 250 million tons
- Recycled: 57.4 million tons
- Compost: 22 million tons
- Combustion with Energy Recovery: 32 million tons
- Discards: 135 million tons

*EPA, Municipal Solid Waste in the United States:
2008 Facts and Figures

Management of MSW in the US, 2008



Regional Breakdown



SW Generation and Disposal

- Solid waste generation has increased from 3.66 to 4.50 pounds per person per day between 1980 and 2008.
- The recycling rate has also increased – from less than 10 percent of MSW generated in 1980 to over 33 percent in 2008.
- Disposal of waste to a landfill has decreased from 89 percent of the amount generated in 1980 to 54 percent of MSW in 2008.

Recycling and Composting Collection Programs

- Curbside Recycling Programs: Approximately 8,660, down from 8,875 in 2002
- Community Composting Programs: About 3,510 are operational, an increase from 3,227 in 2002.

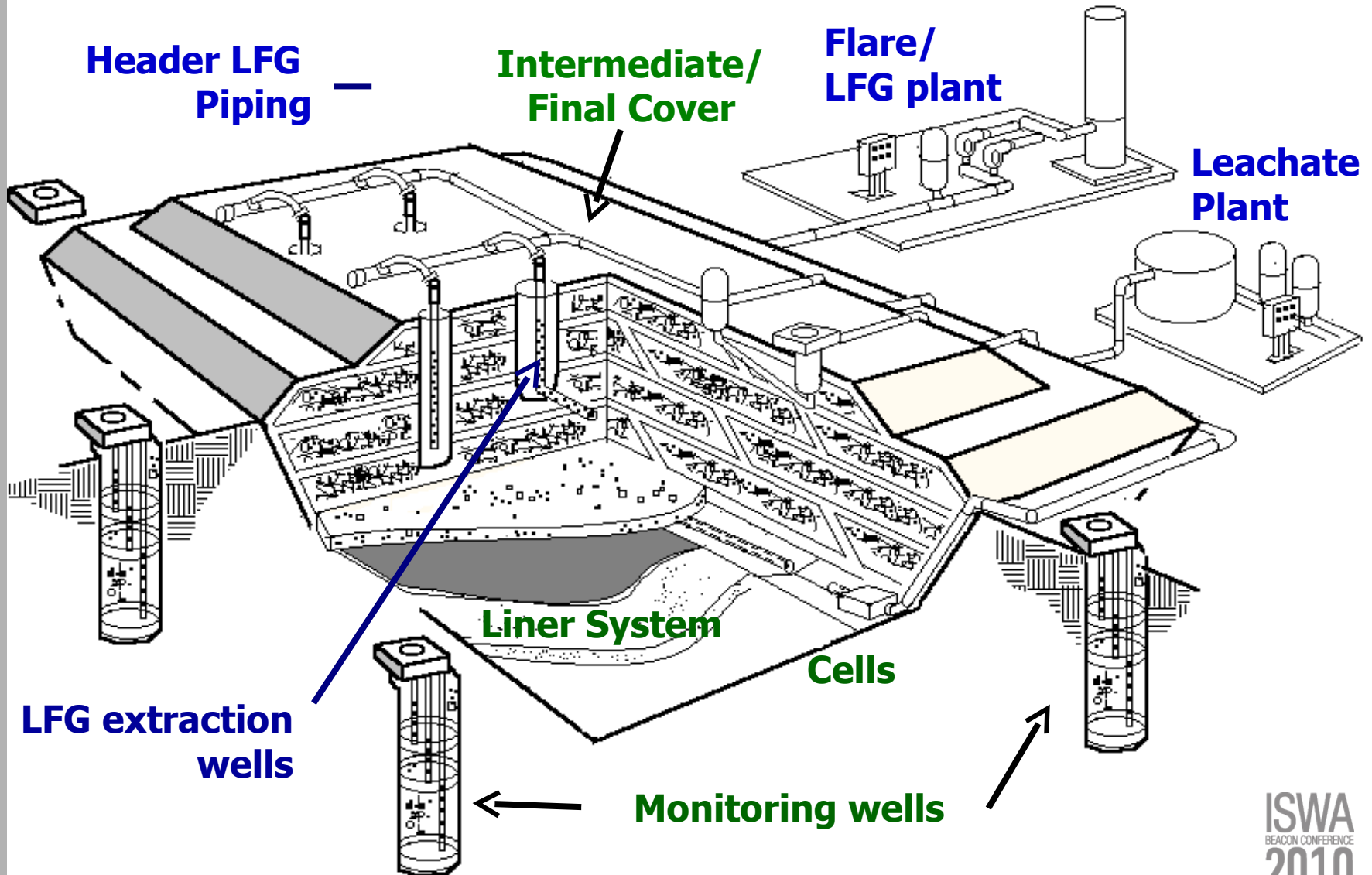
Landfill Regulations

- RCRA Subtitle D
 - MSWLFs: 40 CFR Part 258 or equivalent state regulations.
 - To address open dumps and concerns about GW contamination
 - Addresses non-hazardous waste (Note: Subtitle C addresses Haz Waste)
 - Requires compliance with all applicable Federal rules and regulations (Clean Water Act, TSCA, Clean Air Act)

Federal MSWLF standards

- Location restrictions
- Composite liners requirements
- Leachate collection and removal systems
- Operating practices
- Groundwater monitoring requirements
- Closure and postclosure care requirements
- Corrective action provisions
- Financial assurance

Modern Sanitary Landfill



Other Regulations

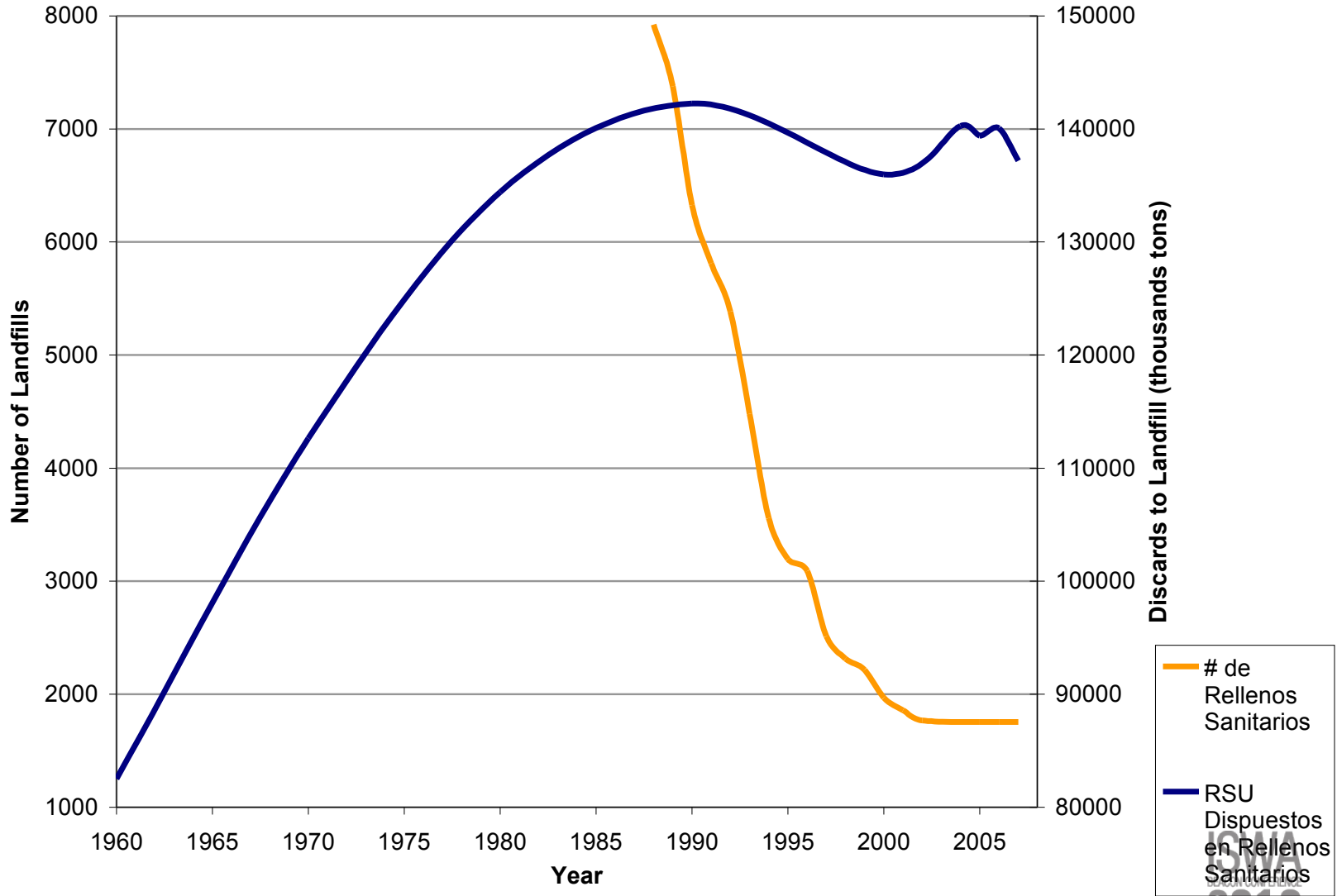
- NSPS and EG
 - To control NMOC emissions from MSW landfills
 - EPA has determined that for MSW landfills BACT is
 - A “comprehensive” gas collection system
 - A control device capable of reducing NMOC emissions from collected gas by 98%
- Other
 - Maximum Achievable Control Technology (MACT) Standard
 - Air Operating Permit (Title V) Program
 - New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

Landfilling Trends

- Number of U.S. landfills has steadily declined over the years, the average landfill size has increased.
- Since 1990, the total amount of MSW going to landfills dropped by about 7 million tons, from 142.3 to 135.1 million tons in 2008.
- The net per capita discard rate* was 2.43 pounds per person per day, lower than the 2.51 per capita rate in 1960, when virtually no recycling occurred in the US.

* After recycling, composting and WTE

Number of Landfills vs. Quantity of Discards



Environmental Benefits of Sanitary Landfills

- Prevent contamination of the ground
- Prevent contamination of surrounding waterways and underground water
- Air pollution control
 - Control of methane and NMOC emissions
 - Odors control
- Recovery and potential use of the LFG
- Other benefits:
 - Vector control

Distribution Landfill Facilities, 2008

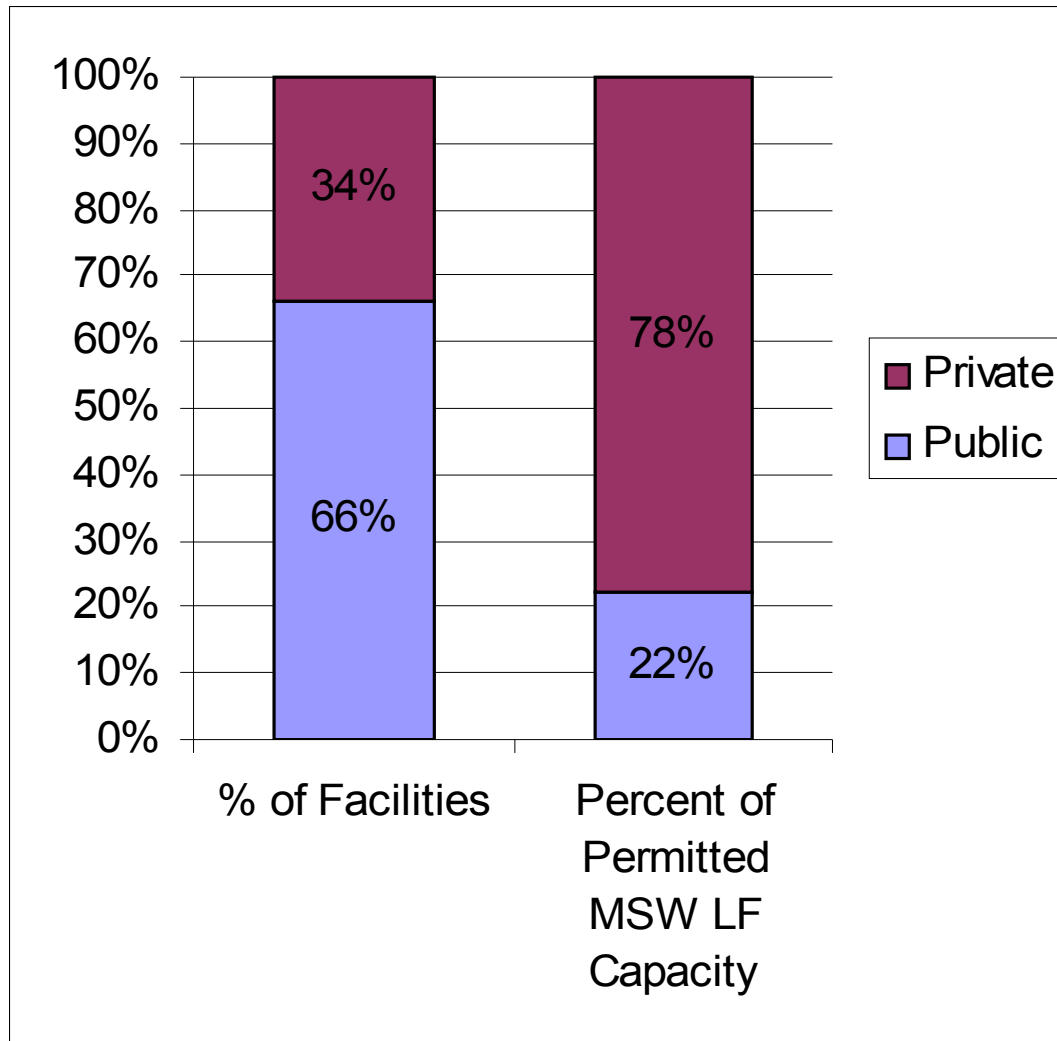
| Region | Number of Landfills |
|-----------|---------------------|
| NORTHEAST | 134 |
| SOUTH | 726 |
| MIDWEST | 416 |
| WEST | 536 |
| US TOTAL | 1,812 |

*Total excludes 10 in Hawaii and 300 in Alaska

Trend Toward the Utilization of Larger, Regional Landfills

- Began with the promulgation of “Subtitle D” landfill regulations in 1991.
- MSW landfills became more expensive to implement and more complex to operate.
- “Economies of scale” savings
- Privately owned

Public and Private MSW Landfills - 2004



Trend toward Rural Location of MSW Landfills

- Scarcity of Land near Urban Centers
- Not in My Back Yard (NIMBY)
- Growth in Rail Haul
- Landfill Host Agreements: contractual agreements between a company seeking to site a SW landfill and a community organization representing the local community.
 - Provide a means of compensating the host community
 - “Host Fee” arrangement: annual revenues that are typically related to the tonnage of waste accepted and disposed in the landfill

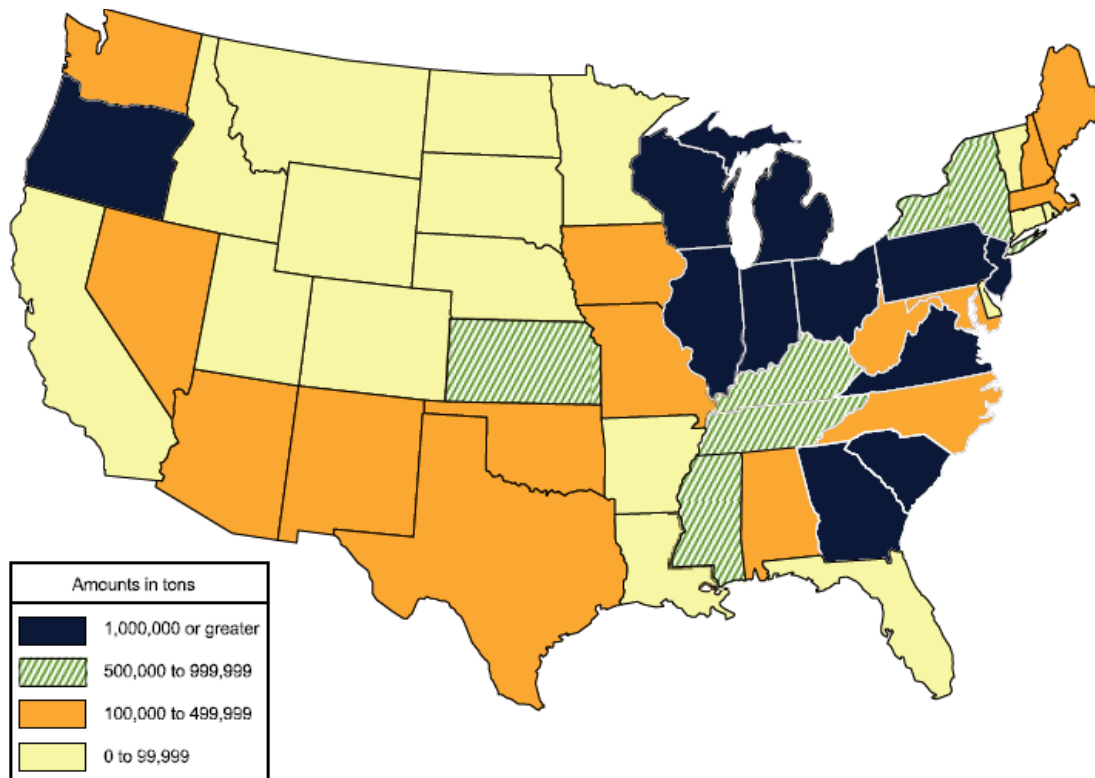
Factors Influencing Private Ownership

- Up-Front Costs and Recurring Capital Costs Associated with Landfill Siting and Permitting
- Difficulties with Intergovernmental Cooperation
 - The host local government exercises leadership and secures cooperation among the other local government members
 - States pass enabling legislation to create regional authorities to implement regional facilities for water, wastewater, and/or waste management
- Local governments cannot regulate the flow of waste generated within their jurisdiction boundaries to designated disposal facilities.
- Political Liabilities Associated with Siting New Landfills

Major Private Disposal Companies History

- In the beginning there were three
 - Waste Management Inc. (WMI)
 - Browning-Ferris Industries (BFI)
 - SCA
- 1984: Waste Management acquired SCA
- 1998 - 1999:
 - USA Waste merged with WMI
 - Allied Waste acquired BFI
 - Republic Services (RS) went public
- 2008: Republic acquired Allied
- And now there are two major companies: WMI & RS

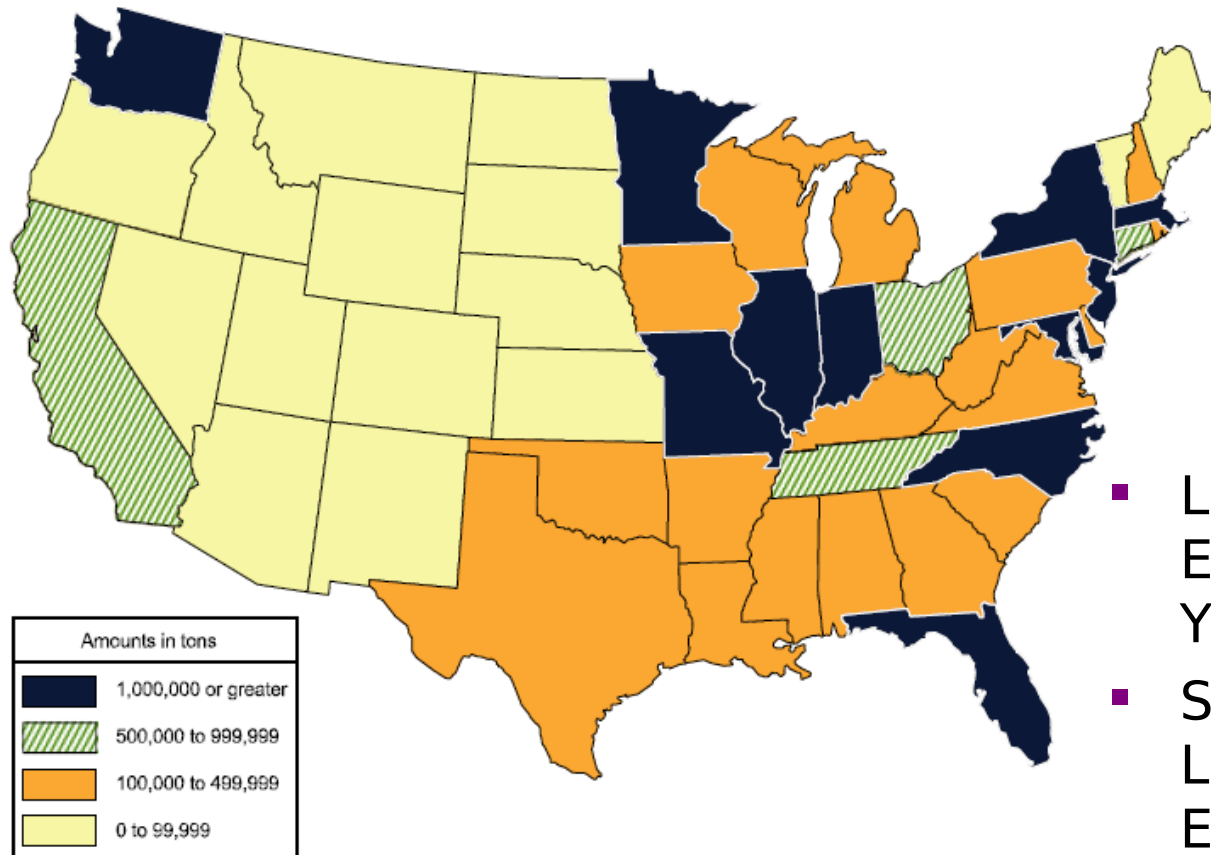
Imports of Municipal Solid Waste - 2005



Source: Map resources. Adapted by CRS Graphics 5/24/2007

- Largest Importer: Pennsylvania – receives 19% of national total (>7.9 million tons of MSW & 1.7 million tons of other non-hazardous waste)
- Second Largest: Virginia (5.7 million tons)
- Third Largest: Michigan (5.4 million tons)

Exports of Municipal Solid Waste - 2005



| Amounts in tons | |
|-------------------------------|----------------------|
| ■ (Dark Blue) | 1,000,000 or greater |
| ■ (Green with diagonal lines) | 500,000 to 999,999 |
| ■ (Orange) | 100,000 to 499,999 |
| ■ (Yellow) | 0 to 99,999 |

Source: Map resources. Adapted by CRS Graphics 5/24/2007

- Largest Exporter: New York
- Second Largest Exporter: New Jersey

Interstate Shipment of Municipal Solid Waste

- In 2005, more than 42 million tons of MSW crossed state lines for disposal, an increase of 8% over 2003
- Comparing 2005 and 2003 data, except for Pennsylvania the 15 largest importers showed an increase in waste imports
- Factors for this decline include the imposition of an additional state fee of \$4.00 per ton on waste disposal and the absence of rail service at Pennsylvania landfills – NYC has adopted a goal of shipping all of its waste by rail

Questions and Answers

James Law, PE, LEED AP
jlaw@scsengineers.com
Mobile: 919-604 6102