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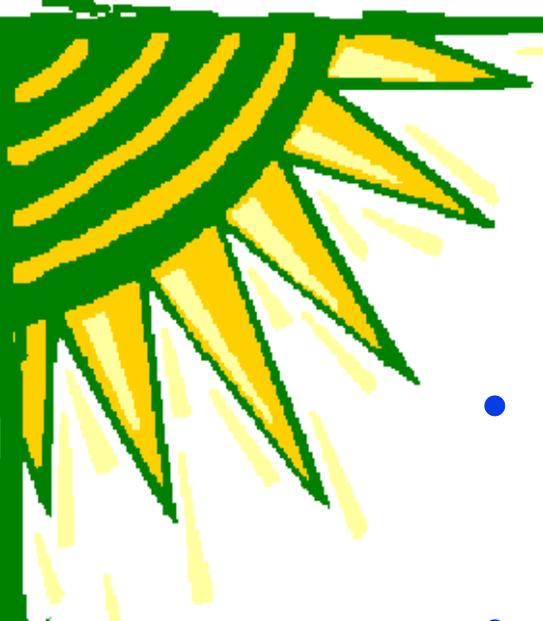
# Climate Change and Waste Management

R'99 Fourth World Congress

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Eugene Lee, Office of Solid Waste

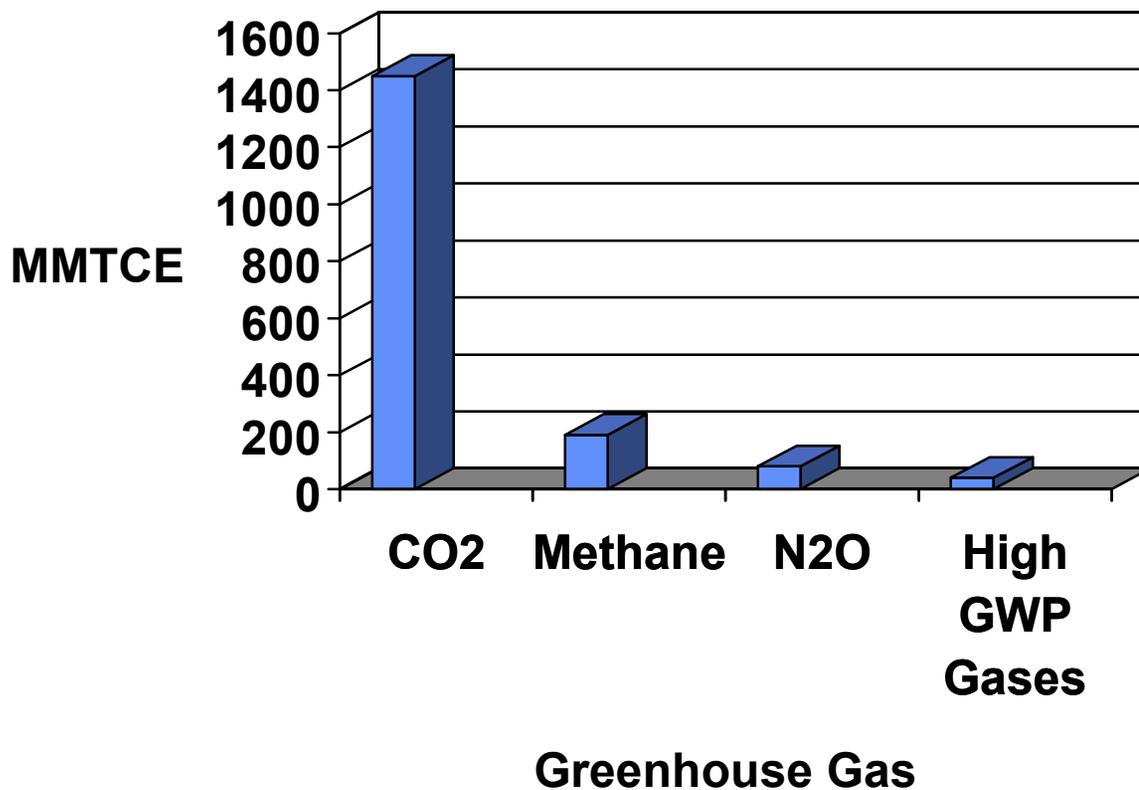




# Session Overview

- *U.S. MSW Management Practices*
- *U.S. GHG Emissions*
- *Office of Solid Waste Climate Program Overview*
- *GHG Emission Factors for Waste Management*

# U.S. Greenhouse Gas Emissions





# U.S. Methane Emissions

- Landfills - 36%
- Enteric Fermentation - 19%
- Natural Gas Systems - 19%
- Coal Mining - 11%
- Manure Management - 9%
- Others - 5%



# Program Objectives

- *President Clinton's Climate Change Action Plan Source Reduction and Recycling initiative targets 5 MMTCE in GHG reductions by 2000*
- *GHG reductions through selected programs: WasteWise, Pay-As-You-Throw, Climate Grants*
- *Research*



## WasteWise Program

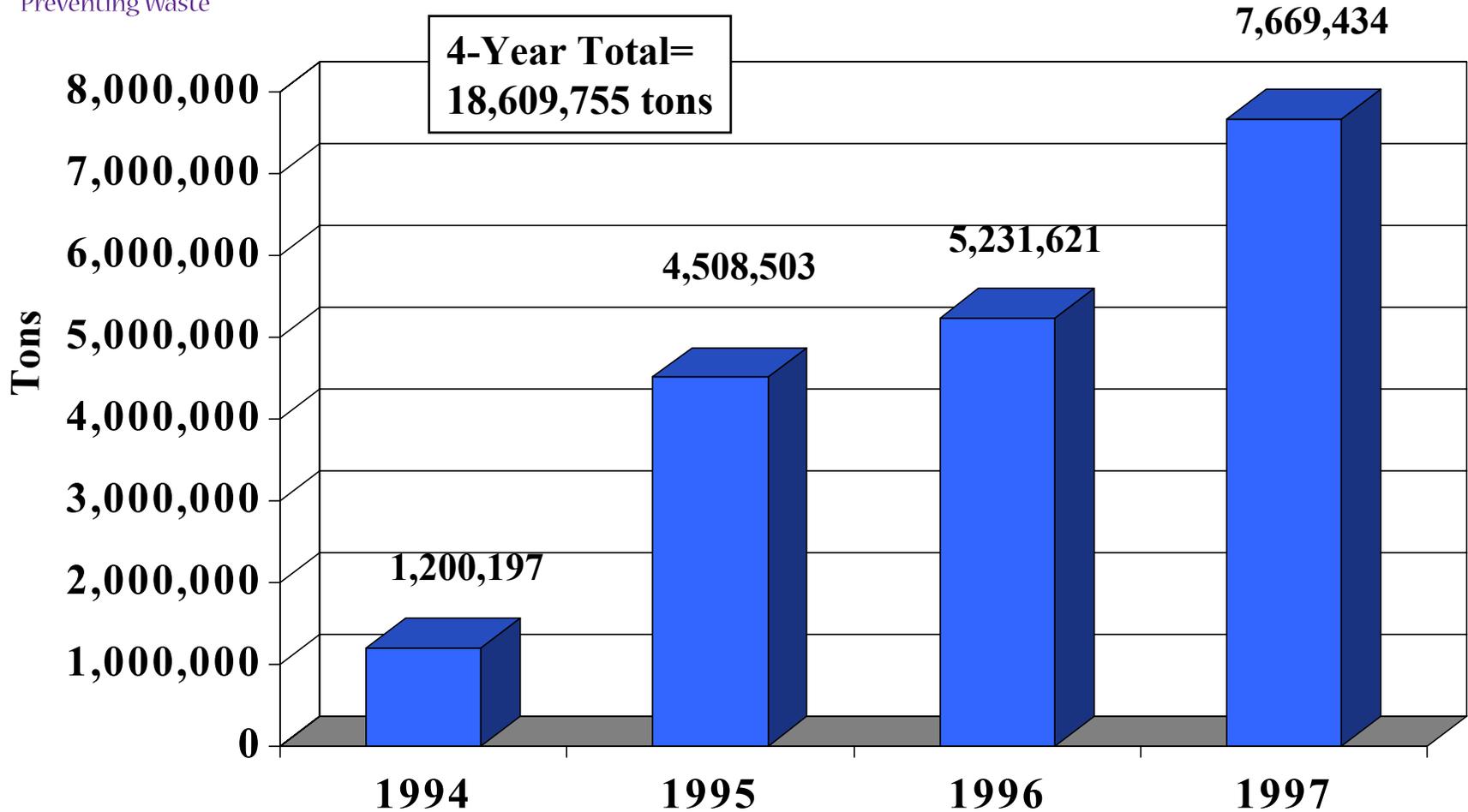
- Voluntary partnership program with over 800 partners
- Goals: waste prevention, buy/manufacture recycled products, and recyclables collection
- Report progress annually





Preserving Resources,  
Preventing Waste

# Waste Reduction Achievements



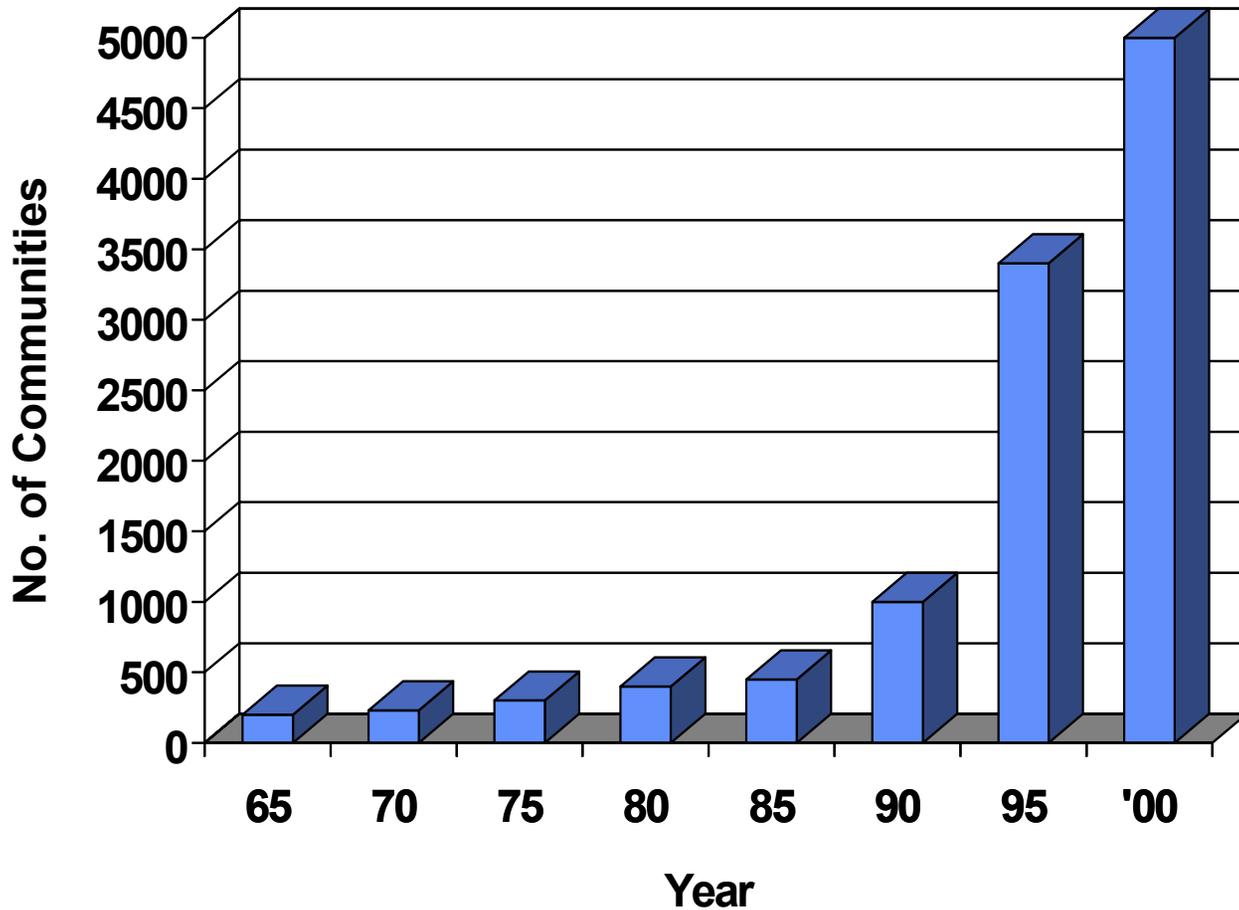
Waste reduction achievements refer to waste prevention and recycling results.

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# Pay-As-You-Throw Program

- Economic incentive program for reducing waste
- Pay for trash like a utility
- The more you throw away, the more you pay
- Provide tools, technical assistance and grants

# Growth in PAYT Programs



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# Climate Innovative Waste Reduction Projects

- Support states and local governments
- Implement innovative waste reduction activities
- 30+ efforts ongoing in 25 States



# RESEARCH

- Provide tools for policymakers and businesses to plan GHG reduction actions
- Developed emission factors to support GHG voluntary reporting activities



# GHG REPORT

- *Waste materials*
  - Focused on major components of MSW -
    - paper (office, news, corrugated, mixed), aluminum cans, steel cans, plastics (HDPE, LDPE, PET), yard trimmings, food scraps, glass
- *5 waste management strategies:*
  - Source reduction, recycling, composting, combustion, landfilling



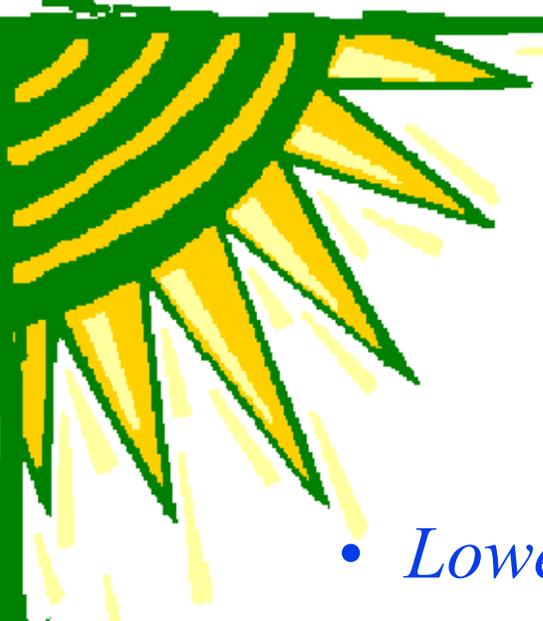
# GHG REPORT METHODOLOGY

- Streamlined LCA—GHG emissions and sinks from MSW only:
  - Process and transportation in raw material acquisition and manufacturing stages
  - Process and transportation when recycling
  - Forest carbon storage from source reduction and recycling
  - Soil carbon storage when composting
  - Non-biomass GHG emissions from waste combustors
  - Decomposition in landfills



# GHG EMISSIONS AND SINKS FROM SOURCE REDUCTION

- *No process or transportation emissions from materials acquisition or manufacturing*
- *Increase in forest carbon storage for paper products*
- *No emissions from waste management*



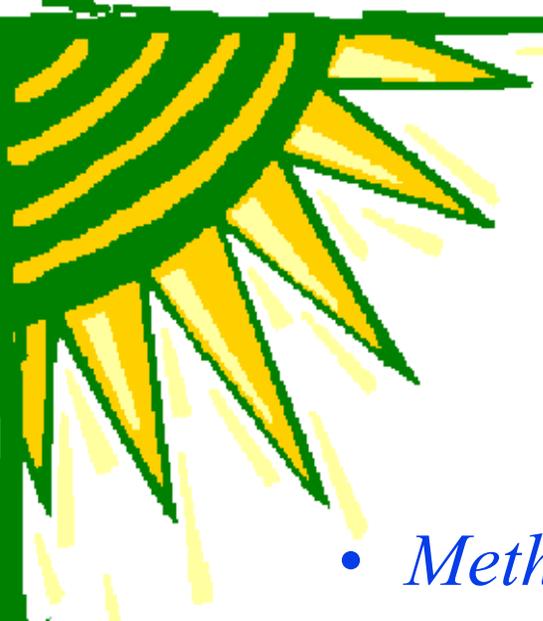
# GHG EMISSIONS AND SINKS FROM RECYCLING

- *Lower emissions in manufacturing with recycled feedstocks*
- *Increase in forest carbon storage with paper products*
- *Some emissions from collection and processing of recyclables*
- *No emissions from waste disposal*



# GHG EMISSIONS FROM COMBUSTION

- *CO<sub>2</sub> and N<sub>2</sub>O emissions from non-biogenic sources (e.g., plastics)*
- *GHG reductions from energy recovery*
- *GHG reductions from ferrous recovery*



# GHG EMISSIONS AND SINKS FROM LANDFILLING

- *Methane emissions*
- *GHG reductions from gas collection*
- *GHG reductions from energy recovery*
- *Carbon storage from undecomposed biogenic carbon*

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# GHG EMISSION FACTOR APPLICATIONS

- Supports climate change mitigation analysis
- Only intended for voluntary reporting of GHG reductions
- Methodology may assist other countries in developing their own emission factors



# GHG Emission Factor Applications

- Emission factors used to measure impact of key EPA waste reduction programs:
  - WasteWi\$e
    - Flagship business waste-reduction program
    - Just expanded to state and local gov't, over 800 partners now participating
    - 1997 results:
      - 6.8 million tons recycled;
      - 816,000 tons reduced
    - 5.0 million MTCE reduced



# Limitations of Analysis

- Manufacturing GHG analysis is based on estimated industry averages
- Forest carbon sequestration values are based on computer modeling
- Combustion analysis uses U.S. averages
- Landfill analysis is based on limited laboratory data



# Looking Forward

- **Future Activities:**
  - Hold dialogues with industry stakeholders
  - Continue work with states and local governments
  - Develop international partnerships