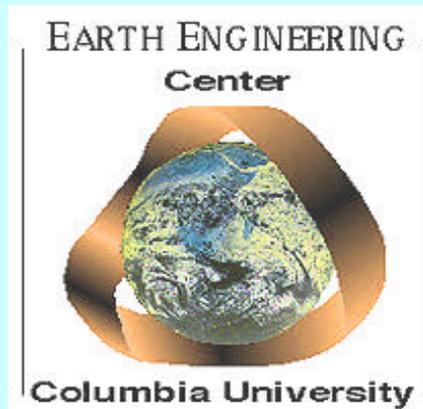


# RENEWABLE PORTFOLIO STANDARD COLLABORATIVE PRESENTATION

April 8, 2003

## OVERVIEW OF WASTE-TO- ENERGY TECHNOLOGY

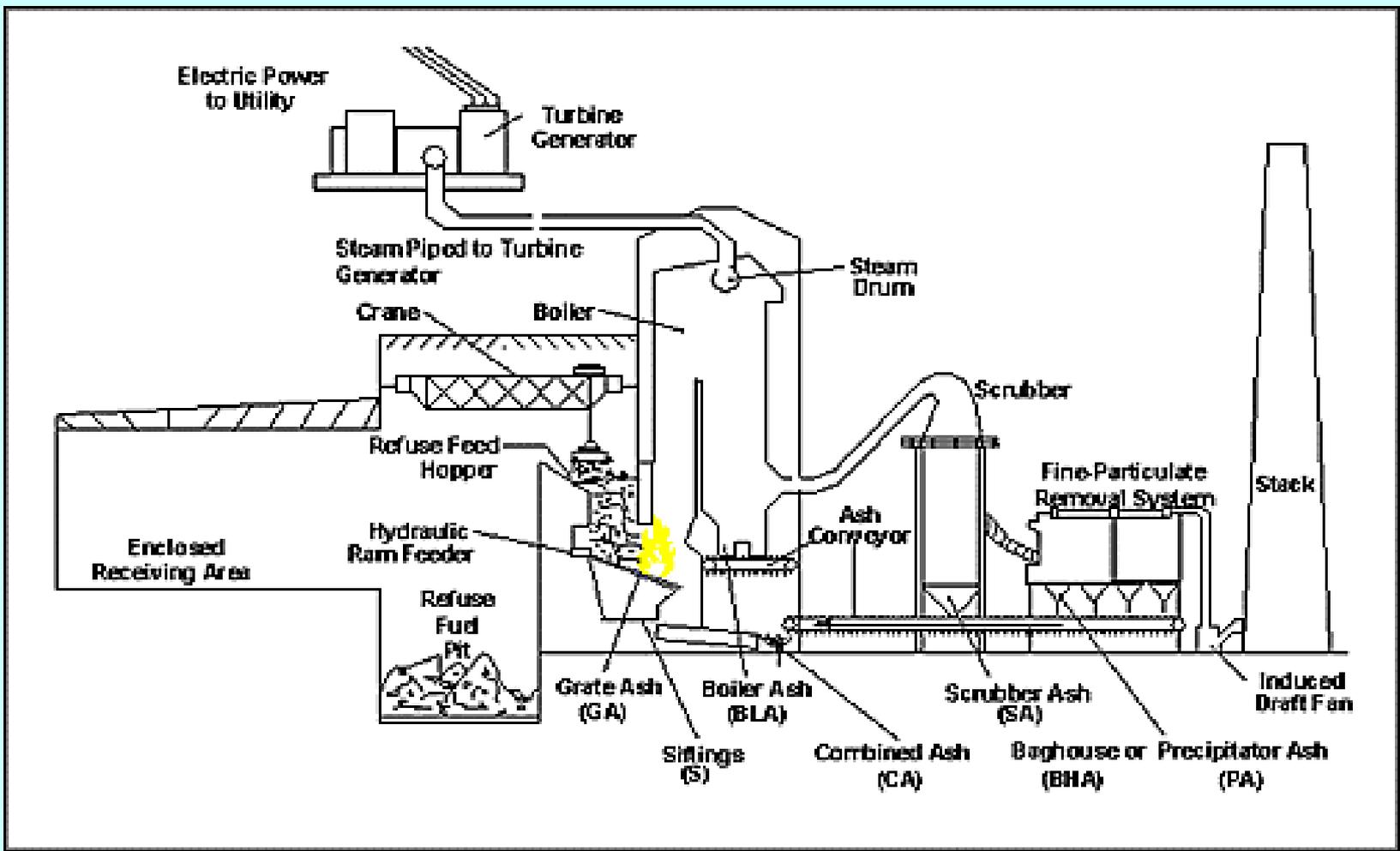
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## World statistics on the use of Waste-to-Energy (WTE)

- ◆ **Number of nations using WTE: 35**
- ◆ **Total Population: 2.6 billion**
- ◆ **Estimated global WTE: 130 mill t/y**
- ◆ **U.S. Waste-to-Energy Capacity: 30 million tons (2,800 MW capacity)**

# Typical Waste-to-Energy Mass-burn Facility



# TECHNOLOGY

Modern, State-of-the-art

Pollution Control Equipment:



- **Combustion Control**
- **Fabric Filters / ESPs**
- **Scrubbers**
- **Nitrogen Oxides Control**
- **Activated Carbon**
- **Continuous Monitoring**
- **Stringent Stack Tests**
- **Ash Test and Management**

# WASTE-TO-ENERGY IN THE U.S.

*98 Facilities, Annual Capacity 30 Million Tons*

- **“Mass Burn”**: 68 Plants, 23 million tons
- **“Refuse Derived Fuel”**: 18 Plants, 6.7 million tons
- **“Modular”**: 12 Plants, 0.4 million tons

# NYS statistics on the use of Waste-to-Energy

- Plant Operating Time: 95%
- Total Megawatts in New York : 300 MW (10 plants)
- Percentage of Power in New York: 1%
- NYS solid wastes generated: 34 mill tons
- NYS solid wastes recycled: 14 mill tons
- NYS solid wastes combusted: 4 mill tons
- NYS solid wastes landfilled: 16 mill tons

# ENVIRONMENTAL PROGRESS MADE

## New Clean Air Act Standards (MACT)

### Air Emission Reductions from 1990\*:

- **Dioxins: Reduction of 99.4% (<.05% of U.S. Inventory)**
- **Mercury: Reduction of 95% (<2% of U.S. Inventory)**
- **Lead: Reduction of 90%**
- **Particulate Matter: Reduction of 89.8%**
- **SO<sub>2</sub>: Reduction of 86.7%**

*\*Source: USEPA 6/20/2002 Memorandum to Docket A-90-45*

**Progress recognized in U.S. EPA  
Assessment of Waste-to-Energy,  
*Letter of Feb.14 to IWSA:***

*“...clean, reliable, renewable power...”*

*“These plants produce 2800 megawatts of  
electricity with less environmental impact than  
almost any other source of electricity.”*

**Joint study of Columbia Schools of Engineering and School of Public Policy for City of New York (“Life After Fresh Kills”) showed that:**

***Landfilling should be limited only to non-recyclable and non-combustible materials***

***because of***

***a) greenhouse gas emissions***

***b) Volatile organic and heavy metal emissions***

***c) Aqueous emissions (reason that Long Island and Florida have adopted WTE).***

# One way for the US to start meeting its Kyoto obligations (i.e., reduce U.S.-CO<sub>2</sub> by 7%) (Basis: 115 million tons of MSW presently landfilled)

## *Carbon equivalent emissions from landfilling:*

- ❖ 3.28 million tons C as CO<sub>2</sub> in landfill gas
- ❖ 0.74 million tons of C from flared methane
- ❖ 1.56 million tons of C from methane use
- ❖ 35.7 million tons of C from non-captured methane

**Landfill carbon emissions: 41.3 million tons C**

## *Carbon equivalent emissions from future WTE:*

- ❖ 35.2 million tons C from combustion in WTEs
- ❖ 69,000 Gigawatt-hour generated in WTEs
- ❖ 24.8 million tons of coal needed to produce same amount of electricity; therefore:
- ❖ 18.8 million tons of carbon (in coal) are avoided

**Net carbon emissions: 10.4 million tons C**

**Projected reduction: 30.9 million tons C =  
= 2% of current U.S. emissions**

## **In addition to 1.99 million tons of methane emissions, U.S. landfills generate annually\*:**

- ❖ 39,329 tons ammonia
- ❖ 39,213 tons sulfides/mercaptans
- ❖ 742 tons toluene
- ❖ 503 tons dichloromethane
- ❖ 201 tons tetrachloroethylene
- ❖ 112 tons vinyl acetate
- ❖ 92 tons acetone
- ❖ 64 tons dichloroethane
- ❖ 65 tons xylenes
- ❖ 63 tons trichloroethylene
- ❖ 51 tons vinyl chloride
- ❖ 36 tons styrenes
- ❖ Smaller tonnages of another ten VOC compounds



*\*Computed from:*

*Landfill gas constituents as per Tchobanoglous Handbook x (106 million tons of MSW x 62 Nm<sup>3</sup>/ton - collected landfill gas as per Berenyi Landfill Yearbook)*

# Why the Earth Engineering Center considers

## WTE to be renewable energy:

*Basis: One ton of typical solid wastes*

- Solid wastes are a home grown fuel that in a modern WTE plant can generate 550 kWh of electricity for sale.
- To generate 550 kWh of electricity in a coal-fired plant would require about 500 lb of coal.
- To produce 500 lb of coal requires mining about 4,000 lb of overburden and coal.
- To generate 550 kWh using fuel oil requires one barrel of oil.

## Why the Earth Engineering Center considers WTE to be renewable energy

- The solid wastes that are combusted presently in NYS save 4 million barrels of oil.
- If all the solid wastes that are now landfilled in NYS were to be combusted, it would save an additional 16 million barrels of oil.
- If all the solid wastes that are now landfilled in NYS were to be combusted, it would reduce greenhouse gas emissions by 19 million tons of carbon dioxide.

# Several States Have Defined WTE as Renewable Energy:

- Connecticut
- Massachusetts
- California
- Maine
- Massachusetts
- New Hampshire
- Ohio
- Oregon
- DC
- New Jersey
- Pennsylvania
- Maryland
- Virginia
- Florida
- New Mexico
- Hawaii
- Washington

*Abroad: The European Union requires member nations to phase out landfilling of combustible materials by 2005.*

## ***In conclusion:***

By defining WTE power as a renewable fuel, NYS will promote both conservation of non-renewable fossil fuels and environmental quality of air and water resources.

### **Federal Law Defines WTE as Renewable:**

- **Federal Power Act**
- **Public Utility Regulatory Policies Act of 1978**
- **Biomass Research and Development Act of 2000**
- **EPA's *Characterization of Municipal Solid Waste***
- **DOE's National Renewable Energy Laboratory**
- **Executive Order for Federal Green Purchase Programs**

# For More Information Contact:

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