

# *Waste-to-Energy: A Possibility for Puerto Rico*



**April 18, 2007**

# Agenda

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1) Overview

2) Why is WTE Controversial?

3) Public Involvement

# 1. Overview: What is the Problem?

- Puerto Rico - 1420 lbs. of Garbage per Person per Year
- US Produces - 1642 lbs. 40,000 Tons of Waste ⇒ 1 Acre of Land Lost
- Puerto Rico has 32 Open Landfills
  - Only 5 are EPA Compliant
- Existing Waste Management Plan is Inadequate



# 1. Overview: Meet Waste-to-Energy

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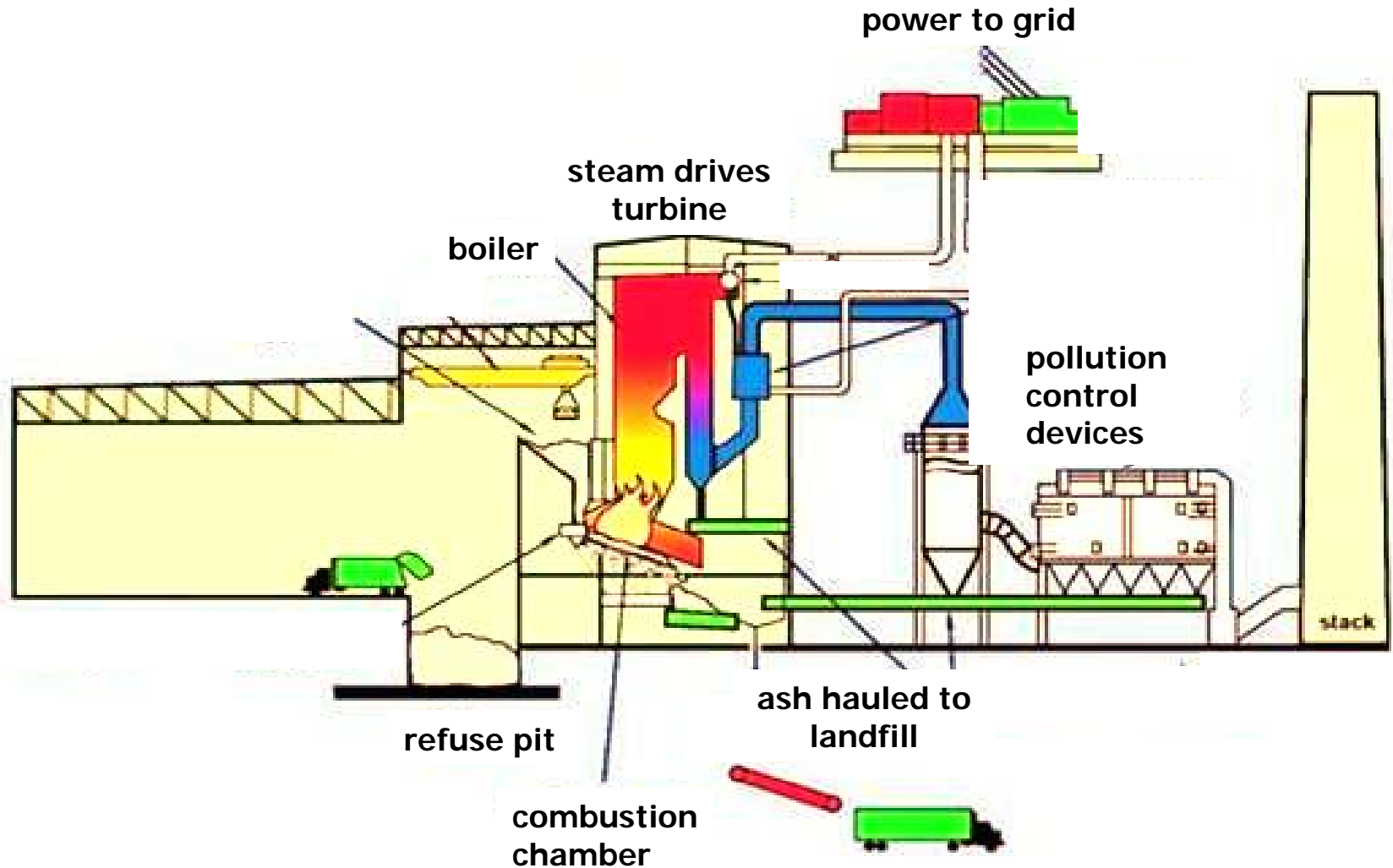
**Waste-to-Energy (WTE):** The Combustion of Trash to Generate Electricity

Reduces the Volume of Waste by 90%

Potential Revenue Streams:

- Renewable Electricity to Grid
- Ferrous and Non-Ferrous Metals
- Residual Ash

# 1. Overview: How Does WTE Work?



# 1. Overview: WTE Worldwide

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Waste Incineration (Per capita, kg/year)



Netherlands

Denmark

Japan

Sweden

United States

**482 kg**

**477 kg**

**314 kg**

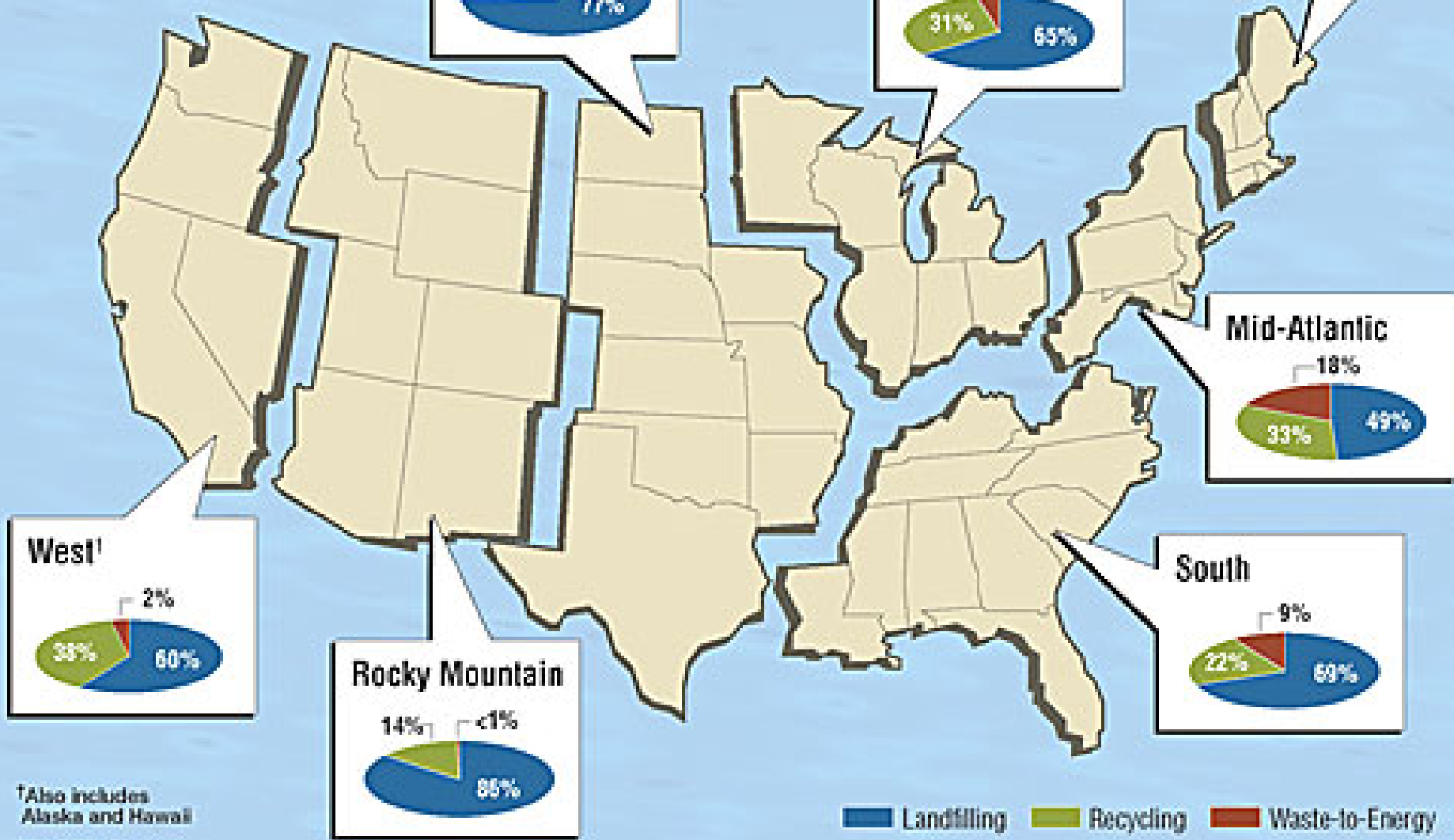
**225 kg**

**105 kg**

Source: WTE CBL Net

# Regional Breakdown

Landfilling, recycling and WTE rates by region, 2004



\*Also includes Alaska and Hawaii

SOURCE: BioCycle

Landfilling Recycling Waste-to-Energy

# 1. Overview: WTE Worldwide

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Islands with WTE:



## 2. Why is WTE Controversial?

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Environmental and Public Health Risks

Economic and Financing Considerations

Compatibility with Recycling

## 2. Why is WTE Controversial?: Environmental and Public Health Risks

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What are the Perceived Public Health and Environmental Risks with WTE?

- Harmful Emissions (Dioxins, NO<sub>x</sub>, Mercury)

How Does Technology Mitigate These Risks?

- Pollution Control Devices

## 2. Why is WTE Controversial?: Landfills vs. WTE

Source: EPA	Landfills	WTE
Tipping Fee	\$35-55	\$45-65
Pollutants	Methane, Leachate	Dioxins, NO <sub>x</sub> , Mercury

• Does Not Include Environmental Effects

• Pollutes Drinking Water

• CH<sub>4</sub> is 21x More Potent than CO<sub>2</sub>

## 2. Why is WTE Controversial?: Landfills vs. WTE

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Tipping Fee	\$35-55	\$45-65
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Dioxin Emissions in the U.S. (2002)	
MSW Incineration	12
Coal-Fired Utilities	60
Residential Wood Burning	62
Diesel trucks	35

• 2% of U.S. Emissions

• 0.22% of U.S. Emissions

• Dioxin Emissions in the U.S. Decreased from 8,887 TEQ in 1987 to 12 TEQ in 2002

## 2. Why is WTE Controversial?: Economic and Financial Considerations

- Can We Afford to Build a WTE Plant?
- Will the Facility Be Cost-Effective?



Annual Revenue	\$71 Million
Annual Operations & Maintenance	<u>-\$30 Million</u>
<b>Net Gain</b>	<b>\$41 Million</b>



Can Be Used to Repay Construction Debt

## 2. Why is WTE Controversial?: Recycling Compatibility

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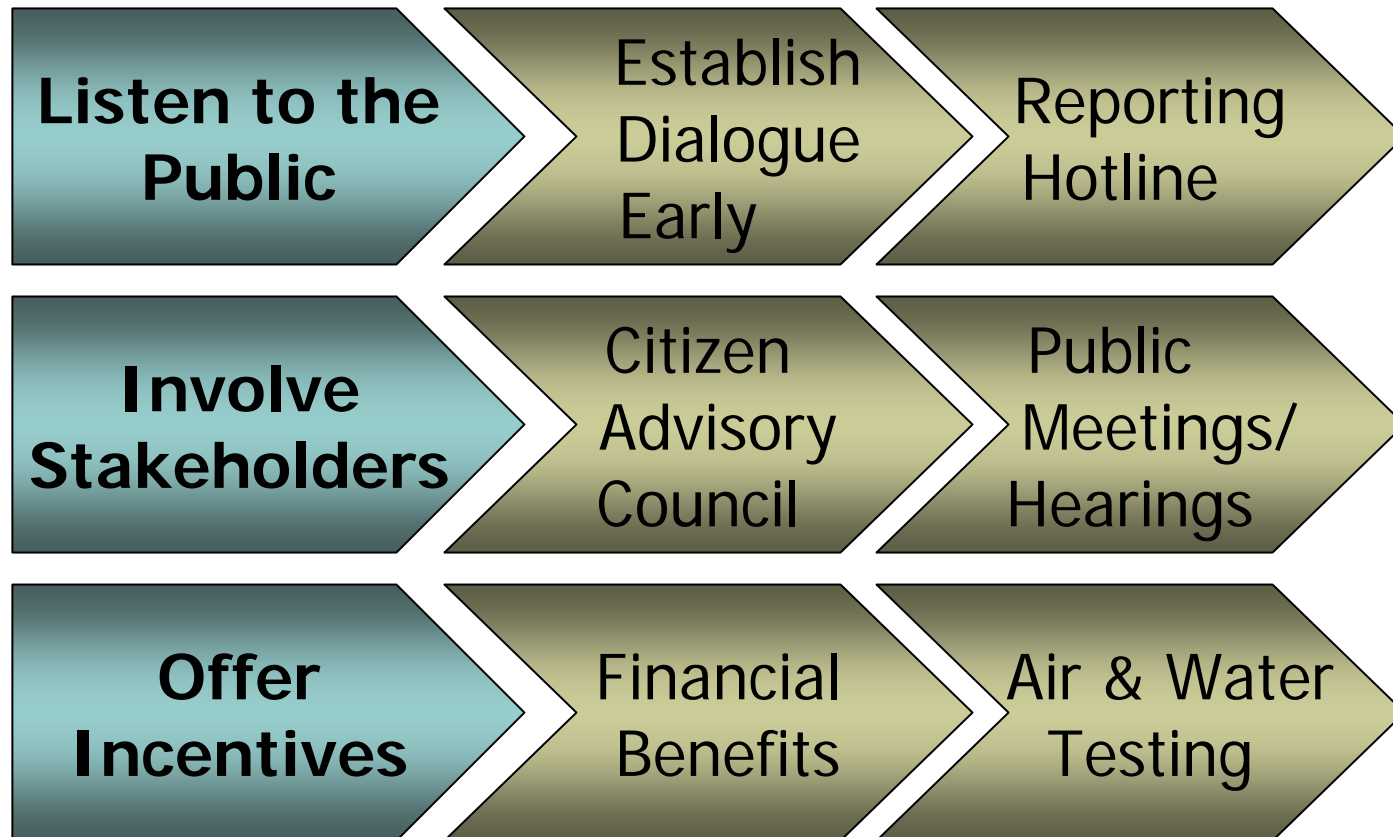
Do Investments in WTE Stymie Recycling Efforts?

- Removal of Metals and Recyclables **Increases** WTE Efficiency
- U.S. Cities with WTE Have **Higher** Recycling Rates



# 3. Public Involvement: Getting the Public Onboard

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# Closing Thoughts

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Puerto Rico Has a Waste Management Problem

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graph TD; A([Puerto Rico Has a Waste Management Problem]) --> B[Public]; A --> C[Environmental]; A --> D[Financial]; B --> E[WTE Provides a Viable Alternative to Current Practices]; C --> E; D --> E;
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The diagram is a flowchart with a light blue oval at the top containing the text 'Puerto Rico Has a Waste Management Problem'. Three arrows point downwards from this oval to three separate yellow rectangular boxes labeled 'Public', 'Environmental', and 'Financial'. From each of these three boxes, an arrow points downwards to a single, wide green rectangular box at the bottom containing the text 'WTE Provides a Viable Alternative to Current Practices'.

**Public**

**Environmental**

**Financial**

WTE Provides a Viable  
Alternative to Current Practices

# Questions:

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