



# Six Community Assessment of the Factors Influencing Waste Management Decisions and the Environmental and Economic Impacts of Those Decisions Using EPA's Municipal Solid Waste Decision Support Tool

Jesse Miller, U.S. EPA  
Office of Resource Conservation and Recovery  
[Miller.Jesse@epa.gov](mailto:Miller.Jesse@epa.gov)



# Overview

- This report documents a case-study analysis of the waste management decision-making process in six U.S. communities:
  - Lancaster County, PA
  - Wilmington, DE
  - Tulsa, OK
  - Frederick County, MD
  - Broward County, FL
  - King County, WA
- The report consists of a qualitative and quantitative assessment for each community



# Selection Criteria of the Six Communities

- EPA selected the six communities to show a range of different demographics. Factors considered were:
  - Population
  - Waste management practices
    - Energy Recovery, Recycling, and/or Landfilling
  - Geographic locations
    - Grid Mix



# Summary of Case Study Communities

City or County	Population	MSW Generation (Tons)	Waste Management Strategy	Local Recycling Rate	Subregion Key Energy Sources
<b>Lancaster County</b>	500,000	533,000	Recycling and Energy Recovery	Current: 38%	RPC East 50% coal 38% nuclear
<b>Wilmington</b>	73,000	411,500	Recycling Landfilling (GTE)	Current: 4% (household) 22% overall	RFC East 50% coal 38% nuclear
<b>Tulsa</b>	400,000	373,500	Closed ER Plant in 2007 Landfill	Current: 1%	SPP South 59% coal 34% gas
<b>Frederick County</b>	223,000	321,000	Recycling Landfilling / ER Development	Current: 36% Goal: 65%	RFC West 73% coal 23% nuclear
<b>Broward</b>	1.7 million	2,241,000	Recycling/ ER Landfilling	Current: 25% Goal: 75%	FRCC All 37% gas 26% coal
<b>King County</b>	1.8 million	940,000	Recycling Residuals to Landfills	Current: 46% Goal: "Zero" Waste	WECC NW 49% hydro 34% coal



# Lancaster, PA

- Operated an energy recovery facility since 1991
  - ER facility processes over 500,000 tons of waste per year
- 44 out of the 60 municipalities have curbside recycling
  - County recycling rate is 38%
- Early 1980s the impending closure of the County's landfill motivated the County to consider comprehensive solid waste planning
- The planning process incorporated a formal citizen's advisory committee and lengthy negotiations over location, traffic, among other issues



# Wilmington, DE

- Most waste management in Delaware is governed at the state level
- The Delaware Solid Waste Authority (DSWA) was established in 1975 as an independent statewide solid waste authority
  - DSWA owns all waste management facilities in the state
- Current management strategy relies on landfilling and recycling
- An energy recovery facility did operate from 1988 to 1990 adjacent to the Delaware Reclamation Plant in New Castle County
  - Plant closed due to operational problems
- Currently legislative barriers prevent an energy recovery facility from being built in the state
- The County has a limited curbside recycling program



# Tulsa, OK

- Tulsa recently ended its 20 year agreement with the Walter B. Hall Resource Recovery Facility.
- Tulsa currently contracts with a consortium of local haulers that brings all waste to the Quarry Landfill
- Tulsa initially implemented energy recovery in 1984
- After the plant's construction, landfilling still remained the cheapest disposal option.
- Numerous ownership changes to the facility caused negative impacts on management



# Frederick, MD

- Frederick County's Division of Utilities and Solid Waste Management (DUSWM) was created in 2000 to govern the planning, construction, and operation of the County's solid waste infrastructure
- The current strategy is a combination of recycling and waste transport to out-of-state landfills
- In 1995, Frederick County expanded its landfill with the anticipation of it providing capacity until 2016
  - It has filled faster than anticipated
- Frederick has been in the permitting process of building a 1,500 ton per day energy recovery facility that would serve both Frederick County and Carroll County
- The approval and evaluation process of constructing the plant has been lengthy and on-going





# Broward County, FL

- Broward County's current waste management strategies emerged in the mid-1980s
- Broward has two energy recovery facilities that have operated since 1991
- Contamination in several state landfills prompted officials to pursue energy recovery
- Broward County still landfills a lot of its waste due to cheap tipping fees, however, a new mandate by the state of Florida to achieve a 75% recycling rate may shift this dynamic



# King County, WA

- King County currently manages its waste with eight transfer stations and the Cedar Hills landfill
- King County puts a strong emphasis in extending all efforts to increase the recycling of waste.
- The County has a goal of 70% recycling by 2020.



# Decision Support Tool Model Results



# Three Scenarios Run for Each Community

	Lancaster	Wilmington	Tulsa	Frederick	Broward	King
<b>Current Scenario</b>						
Recycling	35%	6%	1%	28%	30%	33%
Compost	0%	2%	0%	7%	0%	11%
WTE	65%	0%	0%	0%	70%	0%
Landfill	0%	92%	99%	65%	0%	56%
<b>Alternative Scenario</b>						
Recycling	35%	6%	1%	28%	30%	33%
Compost	0%	2%	0%	7%	0%	11%
WTE	0%	92%	99%	65%	0%	56%
Landfill	65%	0%	0%	0%	70%	0%
<b>High Recycling Scenario</b>						
Recycling	50%	35%	34%	30%	45%	44%
Compost	15%	30%	7%	35%	20%	21%
WTE	0%	0%	0%	0%	0%	0%
Landfill	35%	35%	59%	35%	35%	35%



# Lancaster Model Results

Scenario	Estimated Annual Cost	Energy Consumption	Air Pollutant Emissions (PM,NOx,Sox ,CO, Lead)	Carbon Emissions
<b>Current</b>	<b>\$41 Million</b>	<b>7.5 million MBTU savings</b>	10 million Pounds Avoided	<b>47,800 MTCE Avoided</b>
<b>Alternative</b>	\$46 Million	6.5 million MBTU Savings	<b>13 million Pounds Avoided</b>	22,100 MTCE Avoided
<b>High Recycling</b>	\$54 Million	6.4 million MBTU Savings	10 million Pounds Avoided	24,200 MTCE Avoided



# Wilmington Model Results

<b>Scenario</b>	<b>Estimated Annual Cost</b>	<b>Energy Consumption</b>	<b>Air Pollutant Emissions (PM,NOx,Sox, CO, Lead)</b>	<b>Carbon Emissions</b>
<b>Current</b>	<b><i>\$37 Million</i></b>	2.7 million MBTU savings	3.0 million Pounds Avoided	11,100 MTCE Avoided
<b>Alternative</b>	<b><i>\$37 Million</i></b>	<b><i>4.3 million MBTU savings</i></b>	<b><i>6.4 million Pounds Avoided</i></b>	<b><i>46,100 MTCE Avoided</i></b>
<b>High Recycling</b>	\$39 Million	3.5 million MBTU savings	5.9 million Pounds Avoided	19,200 MTCE Avoided

For the modeling of Wilmington a hypothetical situation was used that incorporated Wilmington and New Castle County



# Tulsa Model Results

Scenario	Estimated Annual Cost	Energy Consumption	Air Pollutant Emissions (PM,NOx,SOx,CO, Lead)	Carbon Emissions
<b>Current</b>	<b><i>\$20 Million</i></b>	0.1 million MBTU <u>Released</u>	1.2 million Pounds <u>Released</u>	25,300 MTCE <u>Released</u>
<b>Alternative</b>	\$28 Million	<b><i>3.7 million MBTU Savings</i></b>	2.4 million Pounds Avoided	<b><i>29,200 MTCE Avoided</i></b>
<b>High Recycling</b>	\$24 Million	<b><i>3.8 million MBTU Savings</i></b>	<b><i>5.6 million Pounds Avoided</i></b>	2,700 MTCE Avoided



# Frederick Model Results

<b>Scenario</b>	<b>Estimated Annual Cost</b>	<b>Energy Consumption</b>	<b>Air Pollutant Emissions (PM,NOx,Sox, CO, Lead)</b>	<b>Carbon Emissions</b>
<b>Current</b>	\$23 Million	3.1 million MBTU savings	4.4 million Pounds Avoided	400 MTCE Avoided
<b>Alternative</b>	<b><i>\$21 Million</i></b>	<b><i>4.9 million MBTU savings</i></b>	<b><i>7.7 million Pounds Avoided</i></b>	<b><i>25,600 MTCE Avoided</i></b>
<b>High Recycling</b>	\$29 Million	3.1 million MBTU savings	4.4 million Pounds Avoided	3,500 MTCE Avoided





# Broward Model Results

<b>Scenario</b>	<b>Estimated Annual Cost</b>	<b>Energy Consumption</b>	<b>Air Pollutant Emissions (PM,NOx,Sox, CO, Lead)</b>	<b>Carbon Emissions</b>
<b>Current</b>	<b><i>\$168 Million</i></b>	<b><i>15 Million MBTU savings</i></b>	<b><i>43 Million Pounds Avoided</i></b>	<b><i>97,800 MTCE Avoided</i></b>
<b>Alternative</b>	<b><i>\$166 Million</i></b>	12 Million MBTU savings	38 Million Pounds Avoided	26,600 MTCE Avoided
<b>High Recycling</b>	\$221 Million	11 Million MBTU savings	36 Million Pounds Avoided	32,800 MTCE Avoided



# King County Model Results

Scenario	Estimated Annual Cost	Energy Consumption	Air Pollutant Emissions (PM,NOx,Sox, CO, Lead)	Carbon Emissions
<b>Current</b>	\$71 Million	4.7 million MBTU savings	7.1 million Pounds Avoided	8,800 MTCE <u>Released</u>
<b>Alternative</b>	<b><i>\$58 Million</i></b>	<b><i>9.9 million MBTU savings</i></b>	12.3 million Pounds Avoided	5,500 MTCE Avoided
<b>High Recycling</b>	\$98 Million	<b><i>9.0 million MBTU savings</i></b>	<b><i>15.8 million Pounds Avoided</i></b>	<b><i>42,700 MTCE Avoided</i></b>



# Closing Remarks

- The DST was developed to help communities better evaluate the range of waste management options available to them.
- I have the Waste Tonnage and Composition, Electricity Grid Mix, and Landfill Gas Assumptions that were used in the model runs
- For further discussion or comments on this presentation/paper feel free to contact me at [miller.jesse@epa.gov](mailto:miller.jesse@epa.gov) or (703) 308-1180