

**2009**

# **Connecticut State-wide Municipal Solid Waste Disposal Composition and Characterization Study**

▣ **Prepared for:**

State of Connecticut, Department of Environmental Protection  
Bureau of Materials Management & Compliance Assurance/Solid Waste  
Management Program

▣ **Prepared by:**

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# Purpose of Characterization Study:

## Connecticut State Solid Waste Management Plan, 2006

- ▣ Plan serves as the basis for Connecticut's solid waste management decision making through 2024
- ▣ Plan has a target of a 58% Municipal Solid Waste (MSW) diversion rate by the year 2024; current diversion rate is 30%
- ▣ Strategy 6-7 of the Plan required CTDEP to conduct a solid waste characterization study for the purpose of better targeting waste disposal diversion efforts
- ▣ CTDEP initiated the first ever Connecticut statewide MSW characterization study in 2009

# Objectives of the Study

- ▣ Develop waste composition data that is statistically representative of the State's generated Municipal Solid Waste (MSW) disposed at permitted solid waste management facilities
- ▣ Quantify the estimated weight of each material type disposed at permitted solid waste management facilities
- ▣ Separately quantify waste composition from Residential and Institutional/Commercial/Industrial (ICI) sources

## Objectives of the Study (continued)

- ▣ Identify potentially recoverable recyclable and compostable materials found in the disposed MSW stream that could be targeted to meet Plan diversion goal
- ▣ Improve existing solid waste programs and plan for the types of facilities that may be needed
- ▣ Design the study so that it can be replicated at a future date

# Sampling Locations



# Participating Facilities

- ▣ **Bristol Resource Recovery Facility (RFF):** 650 ton per day (TPD) mass burn RRF located in Bristol, CT; Owned and operated by Covanta Bristol, Inc.; 16 municipalities deliver waste to this facility
- ▣ **CRRA Mid-CT Project (Hartford) RDF:** 2850 TPD refuse derived fuel (RDF) facility operated by CRRA, resulting fuel conveyed to an adjacent power plant operated by Covanta; accepts waste from 70 municipalities
- ▣ **CRRA Southeast Project (Preston) RRF:** 690 TPD mass burn RRF facility serving communities in southeastern CT around Preston, CT; CRRA owns this facility which is operated by Covanta
- ▣ **New Haven Municipal Transfer Station:** 700 TPD facility accepting MSW and C&D wastes; owned by the New Haven Solid Waste and Recycling Authority; privately operated (under contract)
- ▣ **Wheelabrator Bridgeport RRF:** 2250 TPD mass burn RRF owned and operated by Wheelabrator Bridgeport, L.P. serving the greater Bridgeport area

# Participating Facilities

Bristol Resource Recovery Facility (RFF)



CRRA Mid-CT Project (Hartford) RDF



Wheelabrator Bridgeport RRF



New Haven Municipal Transfer Station



CRRA Southeast Project (Preston) RRF



# Definition of Waste Sectors

- ▣ **Residential** – waste brought to permitted solid waste facilities by commercially or municipally operated vehicles, in which 80% or more of the waste is from single family and/or multi-family residential sources
- ▣ **Institutional/Commercial/Industrial (ICI)** – waste brought to permitted facilities by commercially operated vehicles, in which 80% or more of the waste is from ICI sources. Excludes Construction and Demolition debris, as well as bulky waste
- ▣ **Unacceptable loads** – loads that contain less than 80% of either residential or ICI wastes, and loads originating from outside of Connecticut

# Study Design

- ▣ Statistically valid sampling
  - 98 Residential waste samples
  - 160 Industrial/Commercial/Institutional (ICI) samples
- ▣ Conducted over two seasons
  - February/March, 2009
  - October, 2009
- ▣ Random selection of trucks at each facility
- ▣ Random selection of sample from truck load
- ▣ Sorted into 68 material categories

# Material Categories

- ▣ Paper - 9 subsets
- ▣ Plastic - 14 subsets
- ▣ Metal - 8 subsets
- ▣ Glass - 5 subsets
- ▣ Organics - 6 subsets
- ▣ Construction and Demolition - 8 subsets
- ▣ Household Hazardous Waste (HHW) - 9 subsets
- ▣ Electronics - 4 subsets
- ▣ Other Wastes - 5 subsets

# Material Categories (continued)

Excerpt from the Hand-sort Tally Sheet:

<b>Paper</b>					<b>Organics (wood, yard)</b>				
OCC/Kraft Paper					Food Waste				
Offshore Cardboard					Branches & Stumps				
High Grade Office Paper					Prunings & Trimmings				
Magazines/Catalogs					Leaves & Grass				
Newsprint					Manures				
Phone Books & Directories					R/C Organic				
Other Recyclable Paper					<b>Construction and Demolition</b>				
Compostable Paper					Asphalt, Brick, & Concrete				
R/C Paper					Wood - Treated				
<b>Plastic</b>					Wood - Untreated				
PET Bottles/Jars (non-haz)					Asphalt Roofing				
PET Containers-non bottles (non-haz)					Drywall/Gypsum Board				
Plastic CT Dep. Bev. Containers					Carpet				
HDPE Bottles (non-haz)					Carpet Padding				
HDPE Containers other than Bottles					R/C C&D				
Plastic Containers #3-#7 (non-haz)					<b>Household Hazardous Waste</b>				
Expanded Poly. Non-Food Grade					Ballasts, CFLs, & Other FLs				
Expanded Poly. Food-grade					Batteries - Lead Acid				
Durable Plastic Items					Other Batteries				
Film					Paint				
Grocery/Merchandise Bags					Sharps				
Other Film					Vehicle & Equipment Fluids				
Pallets - Plastic					Empty Metal, Glass, & Plastic Cont. (Haz.)				
R/C Plastic					Pesticides & Fertilizers				

# Study Analysis

- ▣ Composition of each sample represents the ratio of each material weight to the total weight of the sample
- ▣ Sample composition averaged across all samples to derive state-wide waste composition, by percentage for each material
- ▣ Composition percentages applied to total Residential and total ICI waste tonnage to estimate total weight of each material disposed in CT waste stream (Overall statewide = 44% ICI and 56% Residential)

# Loader Delivering a Sample



# Samples Waiting to be Sorted



# Crew sorting sample



# Statewide MSW Disposal Composition: Combined Residential and Institutional/Commercial/Industrial (ICI)

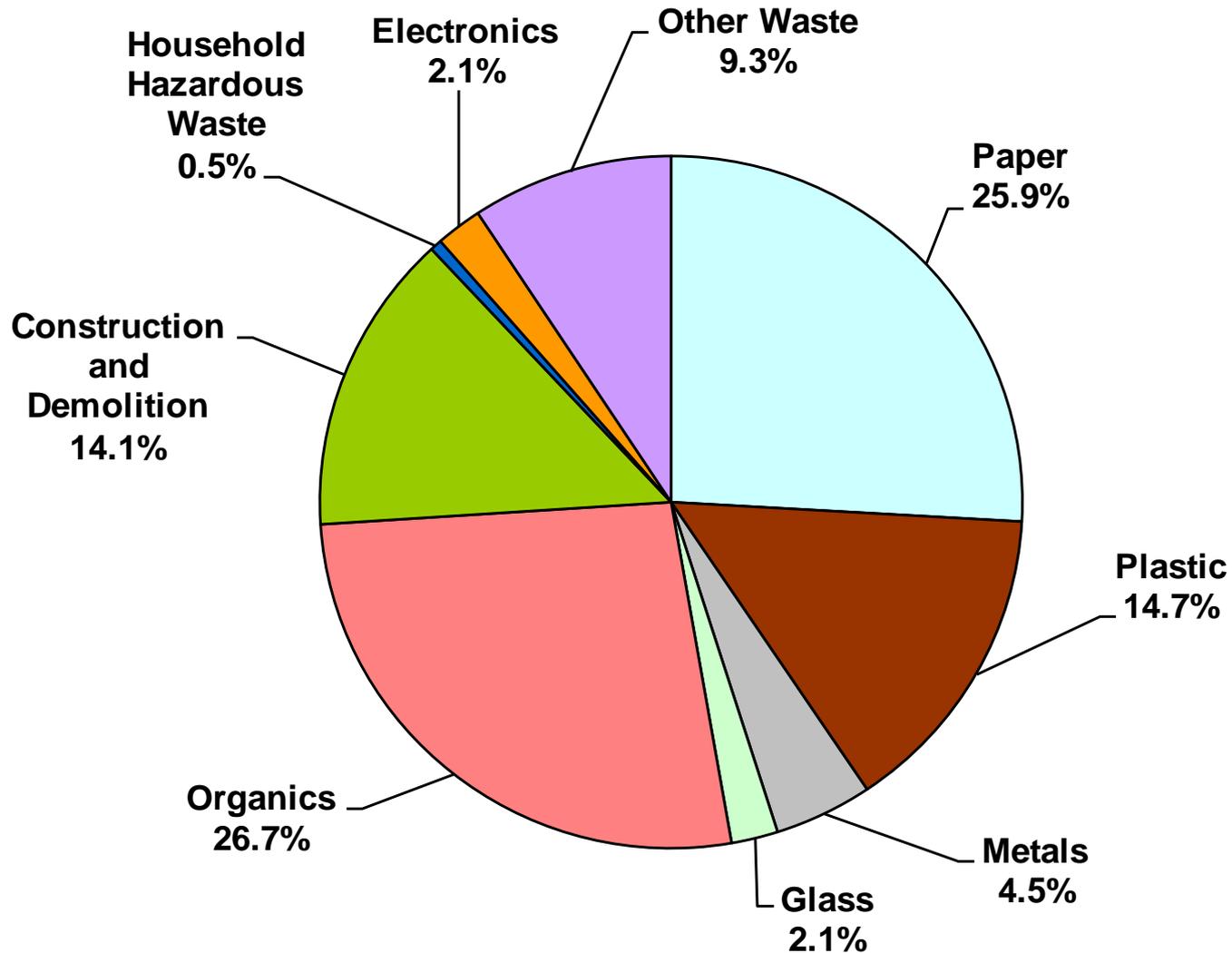
- ▣ Residents and ICI disposed of 2,380,000 tons (rounded) of MSW in Calendar Year 2009
  
- ▣ ~ 80 % of the Overall disposed MSW stream was accounted for under the major material categories :
  - *Organics* at ~ 27% (~623,000 tons);
  - *Paper* at ~ 26% (~617,000 tons);
  - *Construction and Demolition* at ~ 14% (~335,000 tons);
  - *Plastics* at ~ 15% (~350,000 tons)

(Note: % is by weight)

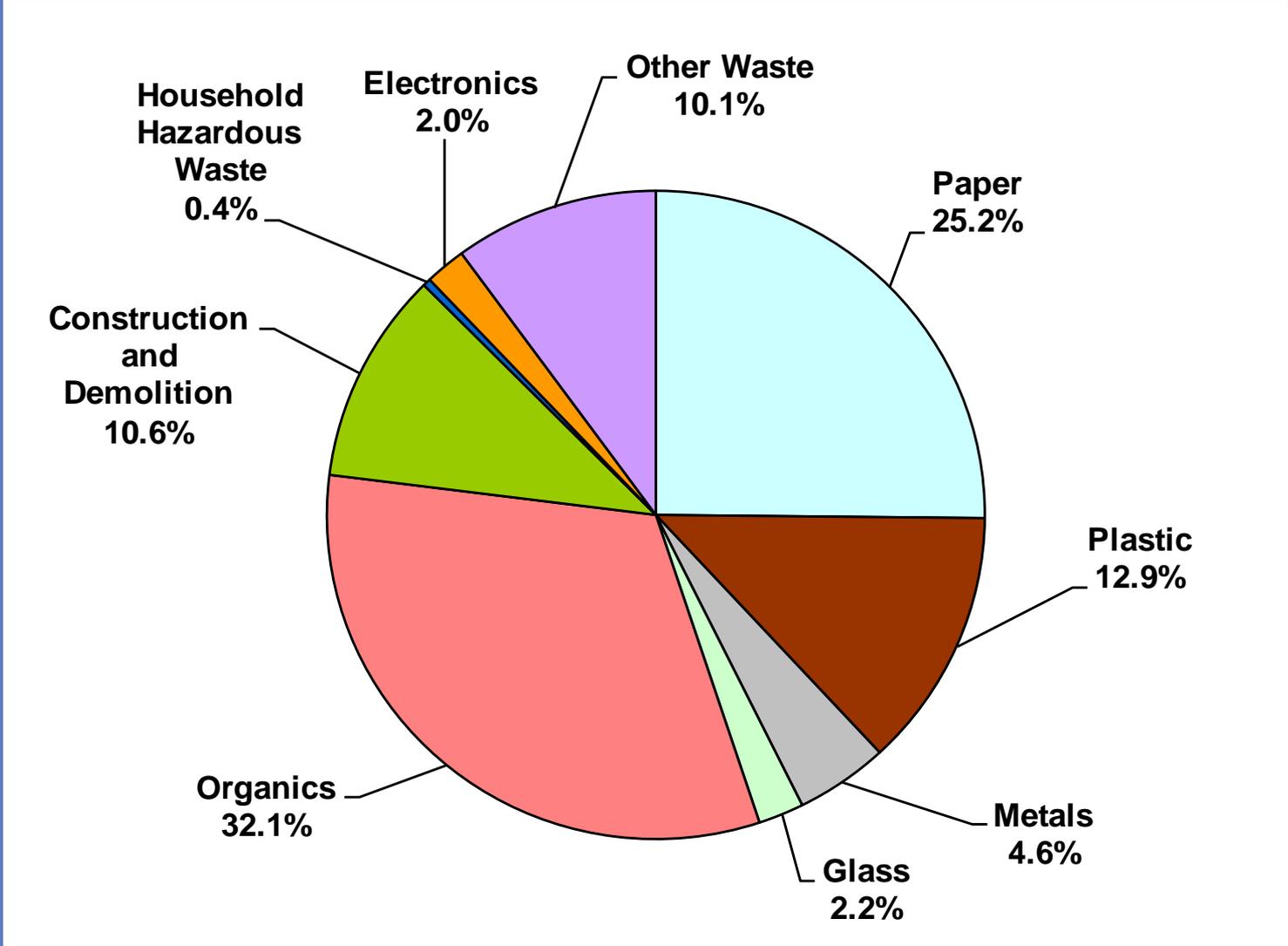
# Most Common Materials, by Weight State-wide Disposed MSW, 2009

Material	Overall Percent	Residential Percent	ICI Percent
Food Waste	13.5%	13.7%	13.2%
Compostable Paper	8.2%	9.8%	6.1%
Leaves & Grass	7.2%	10.7%	2.9%
OCC/Kraft Paper	5.8%	2.7%	9.8%
Wood - Treated	4.7%	3.8%	5.8%
Durable Plastic Items	3.6%	2.8%	4.6%
Other Recyclable Paper	3.6%	4.2%	2.9%
Other Film	3.5%	3.9%	3.0%
Carpet	3.5%	4.0%	2.9%
Remainder/Composite (R/C) Organic	3.2%	4.0%	2.1%
Wood - Untreated	2.7%	0.5%	5.4%
(R/C) Plastic	2.4%	2.0%	3.0%
Prunings & Trimmings	2.2%	3.1%	1.0%
<b>Sum of Percents</b>	<b>64.1%</b>	<b>65.2%</b>	<b>62.7%</b>

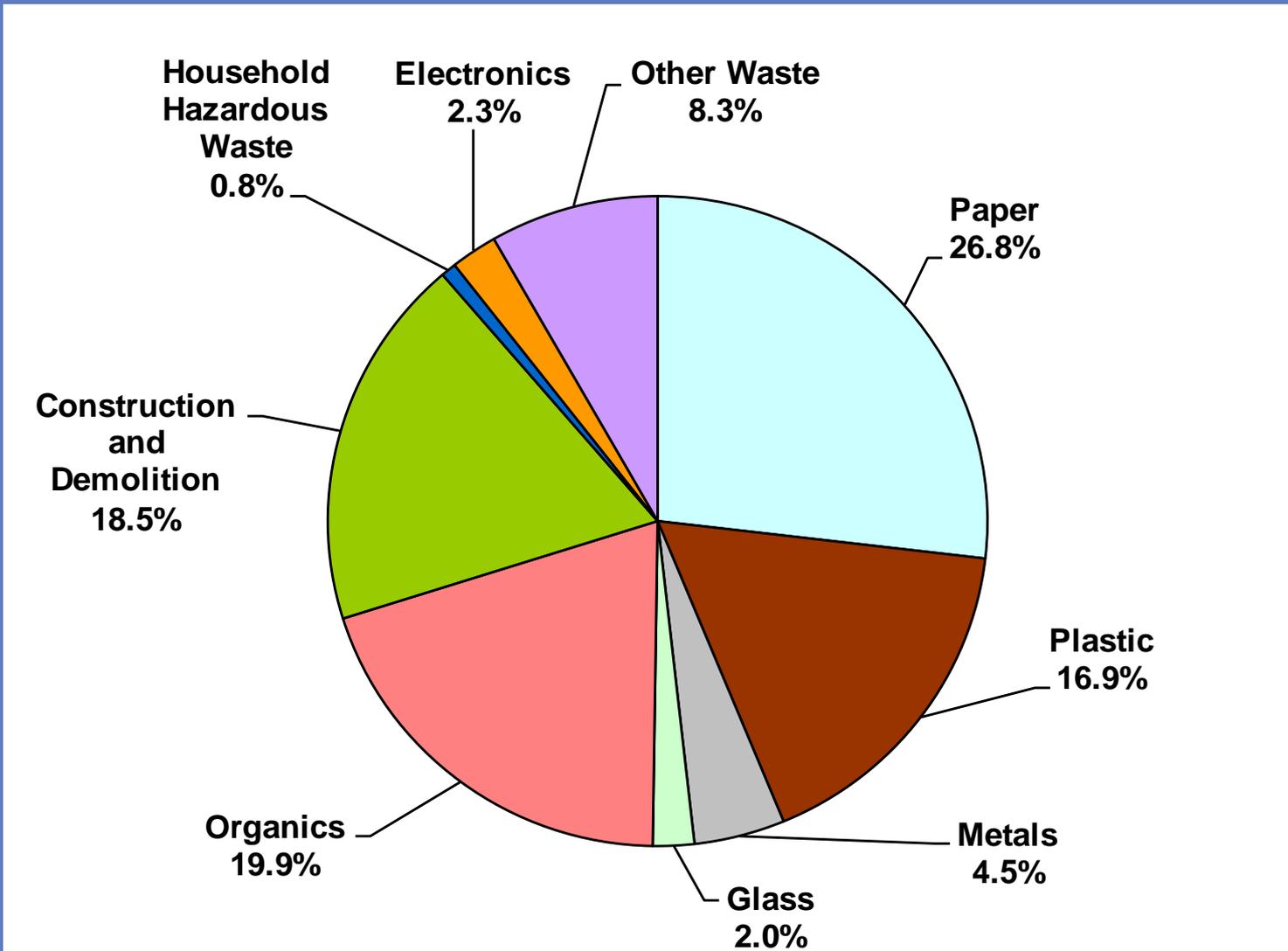
# Overall Composition of Statewide Disposed MSW



# State-wide Residential Disposed MSW Waste, 2009



# State-wide *Institutional/Commercial/Industrial (ICI)* Disposed MSW, 2009



# Recommendations for Future Waste Composition and Characterization Studies

- ▣ Work toward an improved system of tracking and reporting amounts of Residential versus Institutional/Commercial/Industry (ICI) MSW disposed
- ▣ Conduct future waste characterizations on a 7 - 10 year cycle to monitor significant changes in composition
- ▣ Materials categories should remain as close to the ones used in the current Study as possible to assure comparable data
- ▣ Consider more targeted generator samples from different types of commercial establishments
- ▣ Include composition of materials recycled through Connecticut permitted Intermediate Processing Centers

# Contact Information

- ▣ CTDEP website (Final Report and related documents):  
<http://www.ct.gov/dep>
- ▣ Robert C. Isner, Director  
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- ▣ DSM website:  
<http://www.dsmenvironmental.com>

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- ▣ Study could not have been conducted without the cooperation of the following:
  - Bristol Resource Recovery Facility and Covanta
  - CRRA Mid-CT Project (Hartford) and Covanta
  - CRRA Southeast Project (Preston) and Covanta
  - New Haven Solid Waste and Recycling Authority
  - Wheelabrator Bridgeport, L.P.