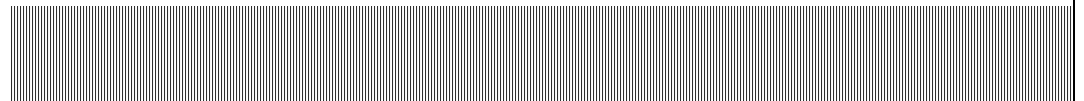


Solid Waste Management Plan Update

FINAL DRAFT

June 2011



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Contents

Executive Summary	1
Background	1
Waste Quantity and Composition	2
Existing Solid Waste Disposal and Reduction System	4
Solid Waste Planning Initiatives	8
Solid Waste Projection	9
Implementation	11
State Support	12
1. Introduction	1-1
1.1. Background	1-1
1.2. County’s Waste Management Practices and Previous Planning Efforts	1-1
1.3. Objectives of the Plan	1-2
2. Planning Unit	2-1
2.1. Introduction	2-1
2.2. Size and Geography	2-2
2.3. Population	2-2
2.4. Major Transportation Routes	2-3
2.5. Significant Factors Impacting Solid Waste Generation	2-3
3. Solid Waste Quantities	3-1
3.1. Waste Generation, Diversion and Disposal	3-1
3.2. Waste Composition	3-4
4. Solid Waste Programs and Planning Initiatives	4-1
4.1. Existing Solid Waste Facilities Inventory	4-1
4.1.1. Brockway Place Transfer Station	4-1
4.1.2. South Columbus Avenue Transfer Station	4-1
4.1.3. Thruway Transfer Station	4-1
4.1.4. Non-County-Owned Transfer Stations and Processing Facilities	4-3
4.1.5. Northern Tier Recyclable Materials Transfer Station	4-4
4.1.6. The Daniel P. Thomas Material Recovery Facility	4-4
4.1.7. The Charles Point Resource Recovery Facility	4-4
4.1.8. Expected Life and Current Operating Status of Existing Facilities	4-6
4.2. Future Solid Waste Facilities	4-6
4.2.1. Retrofit of Daniel P. Thomas Material Recovery Facility	4-6
4.2.2. Household-Material Recovery Facility	4-7
4.2.3. Construction & Demolition (C&D) Debris Recycling Facility	4-8
4.2.4. Closure of Sprout Brook Ash Landfill	4-8
4.2.5. Expected Life and of Future Facilities	4-8
4.3. Current Waste Prevention and Recycling	4-9

4.3.1.	Education	4-9
4.3.2.	Community Recycling Programs	4-9
4.3.3.	Municipal Recycling Programs	4-11
4.3.4.	Organic Yard Waste Transfer Program.....	4-11
4.3.5.	Pay-As-You-Throw (PAYT) and Incentive-Based Pricing	4-12
4.3.6.	Large Municipal Solid Waste Generators.....	4-13
4.4.	Potential Programs	4-13
4.4.1.	Source Reduction/Reuse Strategies	4-13
4.4.2.	Food Waste Recycling Pilot Program	4-15
4.4.3.	Regional Yard Waste Composting	4-15
4.4.4.	Packaging and Product Stewardship	4-15
4.4.5.	Sludge to the CRRF for WTE	4-16
4.5.	Solid Waste Disposal Capacity Out of the Planning Unit	4-16
4.6.	Policy Implementation and Enforcement	4-17
4.6.1.	Enforcement with Other Agencies.....	4-18
5. Technology Evaluation		5-1
5.1.	Existing Waste-to-Energy Technology.....	5-2
5.2.	Emerging Solid Waste Technologies	5-4
5.2.1.	Mechanical Biological Treatment (MBT) Technology Review.....	5-4
5.2.2.	Thermal Conversion Processing Technologies (Pyrolysis, Gasification, Plasma Arc).....	5-5
5.2.2.1.	Pyrolysis.....	5-6
5.2.2.2.	Gasification	5-8
5.2.2.3.	Plasma Arc.....	5-8
5.2.3.	Biological Chemical Technologies (Anaerobic Digestion; Acid Hydrolysis)	5-10
5.2.3.1.	Anaerobic Digestion.....	5-10
5.2.3.2.	Acid Hydrolysis	5-11
5.2.4.	Composting	5-12
5.2.4.1.	Description of Technology	5-13
5.2.4.2.	Leaf and Yard Waste Composting.....	5-14
5.2.4.3.	Mixed MSW Composting	5-15
5.2.4.4.	Source Separated Composting.....	5-15
5.3.	Sewage Biosolids Processing.....	5-15
5.3.1.	Biosolids for Land Application	5-17
5.3.2.	Heat Drying of Biosolids	5-17
5.3.3.	Biosolids for Waste-to-Energy.....	5-17
5.4.	Unsolicited Proposals for MSW and Sewage Sludge.....	5-18
6. Integrated System Selection		6-1
6.1.	Impact of Waste-to-Energy	6-1
6.2.	Impact of Future Programs	6-3
6.3.	Impact of Food Waste Program.....	6-4
6.4.	Impact of Packaging/Product Stewardship	6-5
6.5.	Integrated Solid Waste Disposal System.....	6-5
7. Implementation Schedule		7-1
7.1.	Introduction	7-1

7.2. Administrative Structure.....	7-1
7.3. New Laws and Regulations	7-1
7.4. Financial Mechanisms	7-1
7.5. Implementation Timetable.....	7-2
7.6. Neighboring Jurisdictions.....	7-2
7.7. State Support.....	7-3

List of Tables

Table E-1: Refuse Disposal District #1 Municipalities.....	2
Table E-2: Non-Refuse Disposal District #1 Municipalities	2
Table E-3: Summary of Solid Waste in 2010	3
Table E-4: Projected Recyclable Recapture from MSW Disposed	4
Table E-5: Baseline Municipal Solid Waste Diversion from the Landfill.....	7
Table E-6: Projected Municipal Solid Waste Diversion from the Landfill	9
Table 1-1: Beyond Waste Goals.....	1-3
Table 2-1: Refuse Disposal District #1 Municipalities	2-1
Table 2-2: Non-Refuse Disposal District #1 Municipalities	2-2
Table 2-3: Historic and Projected Population	2-3
Table 3-1: Municipally Collected Solid Waste in 2010	3-1
Table 3-2: Quantity and Types of Solid Waste Generated and Recycled in 2010.....	3-2
Table 3-3: Reference MSW Waste Characterization Studies	3-4
Table 4-1: Description of County-Owned Transfer Stations.....	4-2
Table 4-2: Municipal Solid Waste Received at the Transfer Stations (Annual Tons)	4-3
Table 4-3: Private Transfer Stations and Processing Facilities.....	4-3
Table 4-4: Total IMA Municipal Solid Waste Delivered to the CPRRF Facility (Annual Tons).....	4-5
Table 4-5: Expected Life and Operating Status of Existing Facilities.....	4-6
Table 4-6: Expected Life and Operating Status of Future Facilities.....	4-9
Table 4-7: Summary of Dumped Load Inspections.....	4-17
Table 5-1: States and Territories Defining Waste-to-Energy as Renewable.....	5-3
Table 6-1: Baseline Municipal Solid Waste Diversion from the Landfill	6-2
Table 6-2: Projected Recyclable Recapture from MSW Disposed.....	6-4
Table 6-3: Projected Municipal Solid Waste Diversion from the Landfill.....	6-6
Table 7-1: Implementation Schedule for MSW Reduction	7-2

List of Figures

Figure 5-1: Pyrolysis Treatment	5-7
Figure 5-2: Pyrolysis/Gasification Treatment	5-8
Figure 5-3: Plasma Arc Treatment	5-9
Figure 5-4: Plasma Arc/Gasification Treatment	5-10
Figure 5-5: Anaerobic Digestion.....	5-11
Figure 5-6: Acid Hydrolysis Treatment.....	5-12

Appendices

- A. Population Estimates for Westchester County
- B. 2010 Annual Report, Westchester County Department of Environmental Facilities, Division of Solid Waste Management/Recycling Office
- C. Sample Westchester County Solid Waste and Recyclable Materials Publications
- D. Energy Recovery Council Fact Sheet for Waste-to-Energy and State Renewable Statues
- E. Westchester County Source Separation Laws
- F. Beneficial Use of Inert Ash Residue Letter
- G. Public Comment Summary

Acronyms Used in the Report

C&D	Construction & Demolition
CFC	Chlorofluorocarbon
CPI	Consumer Price Index
CPRRF	Charles Point Resource Recovery Facility
CRT	Cathode Ray Tube
DEA	Drug Enforcement Agency
DCP	Department of Consumer Protection
DEC	New York State Department of Environmental Conservation
DEF	Department of Environmental Facilities
DOH	Department of Health
EESI	Environmental and Energy Study Institute
GBP	Great Britain Pound
H-MRD	Household Material Recovery Day
H-MRF	Household Material Recovery Facility
IMA	Intermunicipal Agreement
MBT	Mechanical Biological Treatment
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
NYCDEP	New York City Department of Environmental Protection
NYMTC	New York Metropolitan Transportation Council
OCC	Old Corrugated Cardboard
PAYT	Pay-As-You-Throw
PPD	Pounds per person per day
PURPA	Public Utility Regulatory Policy Act
PVSC	Passaic Valley Sewerage Commissioners
RDD	Refuse Disposal District No. 1
RDF	Refuse-Derived Fuel
RFP	Request for Proposals
RRF	Resource Recovery Facility
SSL	Source Separation Law
TS	Transfer Station
USD	United States Dollar
USEPA	United States Environmental Protection Agency
WCIDA	Westchester County Industrial Development Agency
WTE	Waste-to-Energy
YJWWTP	Yonkers Joint Wastewater Treatment Plant

Executive Summary

The objective of this Westchester County Solid Waste Management Plan Update (2011 Plan Update) is to define the infrastructure and strategies to manage Westchester County's solid waste for the next twenty years. The 2011 Plan Update will discuss strategies to assist the New York State Department of Environmental Conservation (DEC) in meeting its quantitative goals set forth in Beyond Waste: A Sustainable Material Management Strategy (Beyond Waste) solid waste management plan, published in December 2010. The quantitative goal of Beyond Waste is "reduction in the amount of municipal solid waste (MSW) destined for disposal to reach the ultimate goal of reducing disposal to 0.6 pounds per person per day (ppd) by 2030." The calculation of MSW per capita does not include construction and demolition debris, biosolids, or industrial waste. The goals of this 2011 Plan Update are to discuss:

- Solid waste quantities and composition in the County,
- The County's existing solid waste programs and planning initiatives,
- Solid waste technologies; and
- Integration of new programs to assist in further reduction of County MSW to meet state-wide goals.

Background

Westchester County (County) is located in the Hudson Valley Region of New York State and is comprised of 43 separate municipalities. Prior to 1984, the County used the Croton Point Landfill for disposal for all municipal solid waste (MSW) generated within the County. In 1984, a resource recovery facility began operating in the County to provide additional solid waste disposal for communities within the County. The facility is referred to as the Charles Point Resource Recovery Facility (CPRRF). The County used the CPRRF and the Croton Point Landfill for solid waste disposal for both municipally collected and private carter waste until the closing of the Croton Point Landfill on June 30, 1986.

In 1979, 35 municipalities joined in a special assessment district, called the Refuse Disposal District No. 1 (RDD) and reserved capacity at the CPRRF through Intermunicipal Agreements (IMA). Under the agreements, the municipalities have committed municipally collected solid waste up to a maximum allowable amount to the County solid waste disposal system. These municipalities currently deliver MSW either to the County transfer stations or directly to the County disposal facility. Since the formation of the RDD, the number of IMA municipalities in the RDD has increased to

36, representing approximately 90 percent of the County's population. Seven municipalities elected not to join the RDD. Refer to Tables E-1 and E-2 for lists of the RDD (including Northern Tier) and non-RDD municipalities, respectively.

**Table E-1:
Refuse Disposal District #1 Municipalities**

Ardsley	Irvington	Pelham Manor
Briarcliff Manor	Larchmont	Pleasantville
Bronxville	Mamaroneck (Town)	Port Chester
Buchanan *	Mamaroneck (Village)	Rye
Cortlandt *	Mount Kisco	Rye Brook
Croton-on-Hudson *	Mount Pleasant	Scarsdale
Dobbs Ferry	Mount Vernon	Sleepy Hollow (North Tarrytown before 1996)
Eastchester	New Rochelle	Tarrytown
Elmsford	Ossining (Town) *	Tuckahoe
Greenburgh	Ossining (Village) *	White Plains
Harrison	Peekskill	Yonkers
Hastings-on-Hudson	Pelham (Village)	Yorktown *

* Indicates municipalities that deliver recyclables to the Northern Tier Recyclable Materials Transfer Station.

**Table E-2:
Non-Refuse Disposal District #1 Municipalities**

Bedford	North Castle	Pound Ridge
Lewisboro	North Salem	Somers
New Castle		

The Westchester County Department of Environmental Facilities (DEF) serves as the State's designated Planning Unit for the County's 43 municipalities and manages the RDD. The DEF oversees several solid waste and recycling facilities, as well as countywide recycling and waste reduction programs and services. A description of waste quantity and composition and the County's facilities and programs are described in the following sections.

Waste Quantity and Composition

Westchester County collects solid waste generation data for both municipally collected waste and privately collected waste. In the County, approximately 1,939,581 tons of total solid waste was generated in 2010: 842,709 tons municipally, and 1,096,872 tons privately.

Municipally collected waste quantities are recycled at the Daniel P. Thomas Materials Recovery Facility (MRF) and disposed at the CPRRF for combustion and generation of electricity. Approximately 428,316 tons of the total 842,709 tons of municipally collected waste were recycled. Any ferrous metals remaining in the ash from the CPRRF were removed by magnetic separator and recycled. These ferrous metals are included in the recycled “bulk metal” totals for the County. Deposit containers redeemed from shopping centers within the County under the Returnable Container Act are credited to each municipality on a per capita basis. Approximately 532,216 tons of the total 1,096,872 tons of privately collected waste were recycled, thus bringing the total tons of recycled material to approximately 960,532 tons. The overall recycling rate of the County was 50 percent in 2010. A summary of municipally and privately collected MSW is presented in Table E-3.

**Table E-3:
Summary of Solid Waste in 2010**

Waste Stream Component	Recycled (tons)	Disposed (tons)	Total (tons)	Recycling Rate
Municipally Collected				
Refuse Disposal District and Westchester County	390,221	374,575	764,796	51%
Non-Refuse Disposal District	38,095	39,818	77,913	49%
County-Wide	428,316	414,393	842,709	51%
Privately Collected				
County-Wide	532,216	564,656	1,096,872	49%
Total MSW Collected				
County-Wide	960,532	979,049	1,939,581	50%

Notes: 1. Solid waste quantities in 2010 are based on data provided by the County for waste collected in each municipality within the County and by the County itself.

The County utilized four waste characterization studies to create a profile of the County’s waste stream for disposal. These studies include the New York City Department of Environmental Protection (NYCDEP), Onondaga County, New York State, and United States Environmental Protection Agency (USEPA), prepared by Franklin Associates. Each of these studies provided a percentage of MSW that contains recyclable material that was not removed prior to disposal. The four waste characterization studies were averaged and normalized for the purpose of the Westchester County 2011 Plan Update.

Based on the normalized average percentage of recyclables remaining in the municipal solid waste stream, it is estimated that approximately 45.8 percent of the County’s MSW is recyclable material. The County estimates that it can capture approximately 23.4 percent of the recyclable MSW through increased education and enforcement, a food waste recycling program, and by instituting additional programs and source separation

laws. A summary of the projected recyclable recapture rates from disposed MSW is provided in Table E-4.

**Table E-4:
Projected Recyclable Recapture from MSW Disposed**

Recyclable Material	Normalized Average (1)	Projected Recapture Rate	Projected Recaptured from MSW Disposed	Program
Paper (including newspaper, plain OCC, kraft paper, and other mixed paper)	14.6%	75%	11.0%	Education & Enforcement
Plastics #1 -2	2.2%	75%	1.7%	Education & Enforcement
Plastics #3 -7	2.9%	90%	2.6%	Optical Sorter at MRF
Glass (Clear/Green/Brown)	2.7%	50%	1.3%	Education & Enforcement (Limited by market incentives)
Metals (aluminum cans/foil/ tins)	0.6%	50%	0.3%	Education & Enforcement (Limited by existing high recycling rate)
Yard Waste	4.7%	50%	2.3%	Education & Enforcement
Food Waste (2)	18.1%	23%	4.2%	Food Waste Recycling
Total	45.8%	-	23.4%	

Notes:

1. Normalized average is based on average waste composition from the NYCDEP, Onondaga County, New York State, and USEPA waste characterization studies (refer to Table 3-3).
2. Projected recapture rate of food waste is assumed to equal 50% of commercial/institutional food waste in MSW. Based on Section 7.1.5 of Beyond Waste, approximately 46% of MSW generated in the State is from commercial/institutional establishments. Therefore, the projected recapture rate is 23% of total food waste in MSW.

Existing Solid Waste Disposal and Reduction System

The County currently manages an integrated solid waste disposal system. Non-recyclable MSW from RDD municipalities is hauled either directly to the Charles Point Resource Recovery Facility (CPRRF), located in Peekskill, NY, or to one of three transfer stations where it is compacted into 75 cubic yard trailers and then transported to the CPRRF. Ferrous metals are removed from the ash residue from the CPRRF. A portion of the ash remaining from the CPRRF is hauled to a disposal site by Wheelabrator Westchester, L.P. (Wheelabrator), the contract services provider, where it is beneficially used as alternative daily landfill cover. The remaining ash is disposed of by Wheelabrator. Non-RDD municipalities either deliver their MSW directly to the CPRRF or haul and dispose of their MSW separately.

The DEF implements numerous solid waste reduction and recycling programs described below. The purpose of these programs is to capture and recycle waste that would be disposed of in a landfill or at the CPRRF.

- Recyclable materials including mixed paper and mixed containers (including glass, metal, and plastics coded 1 and 2) are delivered to the MRF by RDD municipalities for sorting, separating and marketing. The Northern Tier RDD municipalities haul their recyclable materials to the Northern Tier Recyclable Materials Transfer Station, where they are transferred to trailers and transported to the MRF.
- MRF Optical Sorting Equipment – In 2011, the MRF will be retrofitted with optical sorting equipment, increasing its sorting capacity from plastics coded 1 and 2 to include plastics coded 3 through 7, further reducing plastics disposed of as MSW.
- Construction and Demolition (C&D) Debris – The County is exploring options for C&D debris waste disposal outlets for municipalities and private haulers within Westchester County. Options include a private, public-private partnership, or fully public C&D facility
- Organic Yard Waste Transfer Program – The County mandates that leaves and organic waste are separated from the waste stream. Municipalities and the County executed an IMA whereby participating municipalities agree to organize, operate and maintain a local transfer site for municipally collected yard waste (i.e. leaves, grass, and brush). Each participating host municipality provides a site where yard waste from that community, as well as others, is collected. To qualify and receive benefits as a host, a municipality must be willing to accept yard waste from other municipalities.

The County arranges for transport of this waste to commercial composting facilities through a contract with City Carting of Westchester at a lower tipping fee than for MSW. The reduced tipping fee encourages municipalities to recycle yard waste. The County, through their planning department, looked to locate a site within the County for County-wide composting. However, due to restrictions including size requirements, proximity of potential sites to schools or nursing homes, and high property value for potential sites, the yard waste is composted at out-of-county facilities.

- Household Material Recovery Day (H-MRD) Program – Collection of household chemicals and items requiring special handling (e.g. cell phones, TVs, fluorescent bulbs, medication) from County residents throughout the year. Disposal services are offered free of charge. Construction of a Household-Material Recovery Facility (H-MRF) commenced in March 2011 in Valhalla, NY to provide a permanent collection site of these materials, which will decrease the number of separate events required throughout the year.
- Electronic Waste or “E-Waste” Events – Collection of electronics, which are a non-processible waste at CPRRF, from County residents throughout the year.

- Mobile Shredder Events – Collection of personal papers from County residents throughout the year for shredding and recycling.
- Treasure Hunt Program – Give-away and pick-up of used but usable household or office items (e.g. furniture, appliances, garden and office equipment) among residents. Fees are not charged by either party and the recipient is responsible for pick-up.
- Boat Shrink Wrap Recycling Program – Collection of plastic used to protect boats on the Long Island Sound during the winter.
- Recycling HelpLine – Dissemination of municipality-specific waste management and recycling programs and information. The 24-hour, 365 days hotline serves as a point of contact for both residents and businesses.
- Toner Cartridge Recycling – Collection and recycling of toner cartridges from County offices in cooperation with *Recycle First* in Loveland, Colorado. The County receives revenue generated from the recycled cartridges. Though this program was once very successful, the increased use of non-recyclable ink canisters has led to a decline in the number of collected cartridges over the years.
- Vegetable Oil Collection - Collection of vegetable oil from County facilities for use as heating oil at the MRF.
- Municipal Electronic Waste Collection – The County provides Municipal Electronic Waste Collection pods to all RDD member municipalities to accept residentially generated electronic waste. The County arranges for the electronic waste to be collected from each pod and recycled.
- Tire Recycling – The County operates an aggressive tire collection and recycling program. RDD municipalities can deliver municipally collected tires to drop off points in Yonkers, White Plains, Mount Vernon, Cortlandt, Mount Kisco, and Yorktown. Residents can drop off tires at any H-MRD event.

In 2010, the County recycling rate was 50 percent after implementation of the County’s current programs and the per capita waste disposal rate for Westchester County MSW was 4.8 ppd (Table E-5, line 9). The rate considers MSW before its use at the CPRRF and other waste-to-energy facilities for energy production and does not include construction and demolition debris, biosolids, or industrial waste. With the addition of source separation of plastics coded 3 through 7, scheduled in 2011, and beneficial use of ash from the CPRRF as alternative daily landfill cover, the per capita disposal rate drops to 4.4 ppd (Table E-5, line 13).

In 2010, 524,957 tons of MSW generated within the County were processed at the CPRRF for energy production. Of this total, 391,189 tons were provided by IMA municipalities, 7,219 tons were provided by non-IMA municipalities, and 126,549 tons were provided by other contracts with Wheelabrator. It is assumed that 14 percent of the remaining MSW generated in the County and not processed at the CPRRF is also diverted for combustion with energy production. This percent is consistent with that

reported in Table 7.1 on page 93 of Beyond Waste. If the portion of MSW diverted to combustion for energy production, excluding the Facility's ash residue disposed of in landfills, is considered to be diverted from disposal at the landfill, the County's disposal rate falls to 2.0 ppd (Table E-5, line 15). It is important to note that if this portion of the waste stream were not classified as diversion, the only way for the County to meet the State's 2030 goal of 0.6 ppd would be to divert waste through other means. This act would require a replacement energy source from fossil fuels. A summary of the County's baseline MSW diversion from landfills based on 2010 MSW quantities and additional source separation of plastics coded 3 through 7 is provided in Table E-5.

**Table E-5:
Baseline Municipal Solid Waste Diversion from the Landfill**

Item	Baseline Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
1	County-Wide Solid Waste Generated	1,939,581	11.2	11.2
2	Construction & Demolition Debris Waste	500,188	2.9	8.3
3	Biosolids (1)	20,780	0.1	8.2
4	Municipal Recyclable Materials (2)	86,567	0.5	7.7
5	Municipal Bulk Metal (3)	20,069	0.1	7.6
6	Municipal Yard Waste	225,723	1.3	6.3
7	Private Recyclable Materials (2)	191,457	1.1	5.2
8	Private Yard Waste	38,171	0.2	5.0
9	Municipal Household Recyclables/Other (H-MRD or diverted to H-MRF) (4)	34,004	0.2	4.8
10	Source Separation Law for Plastics #3-7 (IMA through MRF Retrofit) (5)	10,171	0.06	4.7
11	Source Separation Law for Plastics #3-7 (non-IMA) (5)	11,217	0.07	4.6
12	C&D Debris Recycling Facility (6)	0.0	0.0	4.6
13	Ash Beneficially Used as Alternative Daily Landfill Cover (7)	42,513	0.2	4.4
14	Combustion with Energy Recovery (not including ash produced) (8,9)	408,932	2.4	2.0
15	Total Disposed to Landfill (including Ash)	349,791	2.0	

- Notes:
1. Includes 10,485 tons beneficially used by composting for land application, 3,411 tons beneficially used for strip-mine reclamation, 4,727 tons for incineration, and 2,257 tons disposed.
 2. "Municipal and Private Recyclable Materials" include both fiber (i.e. newspaper, mixed office paper, cardboard, etc.) and recycled commingled containers (i.e. glass, plastics, aluminum cans, etc.).
 3. "Bulk Metal" includes 12,573 recycled tons recovered from the Charles Point Resource Recovery Facility in the year 2010 and is not included in the "Disposed as Solid Waste" column.
 4. "Household Recyclables/Other" includes household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be shredded and other electronic wastes and white goods. The diversion rate for household recyclables upon opening of the H-MRF is expected to, at a minimum, remain the same as diversion rate from H-MRDs. The diversion rate may increase based on participation of local communities.

5. Diversion of plastics coded 3 through 7 is projected to be approximately 2.6% of MSW disposed based on US waste characterization studies and a projected recapture rate of 90%. The diversion rate may increase based on participation of local communities.
6. Quantity of C&D Debris is not factored into the MSW disposed. Diversion and recycling of C&D Debris is expected to increase due to the opening of the C&D Debris Recycling Facility.
7. Ash produced from MSW at WTE facilities is typically 25% of the MSW by weight. The ash from the CPRRF beneficially used as alternative daily landfill cover is currently at 56,000 tons per year (see Appendix F). The proportion of this ash from County supplied MSW is 42,513 tons based on the ratio of In-County to Out-of-County MSW processed at the CPRRF.
8. Combustion with Energy Recovery includes the non-ash portion of MSW reported by the CPRRF as having originated within the County plus the non-ash portion of other MSW generated within the County (approximately 14% of MSW not delivered to the CPRRF). It is assumed that 14% of remaining waste is managed through combustion as reported in Table 7.1 on page 93 of NYS Beyond Waste.
9. New York State Energy Law Section 1-103(12) classifies “wastes” in the definition of a renewable energy resource. The USEPA differentiates between “Combustion with Energy Recovery” and “Discards to Landfill and Other Disposal.”

Solid Waste Planning Initiatives

In addition to the current recycling programs, the County continues to review new technology and programs looking for opportunities to increase recycling, reduce waste, and protect the environment, that make financial sense for the County and its residents. The major strategies that the County must employ to reduce the per capita solid waste disposal rate include source reduction through product and packaging stewardship and increased recovery through enforcement, education, and implementation of a food waste recycling program.

Based on the on the waste characterization presented previously, the County projects that it can capture additional recyclables from the solid waste stream through education and enforcement of source separation laws. In addition, the additional programs identified that can decrease MSW disposal rates are described below.

- **Increased Enforcement** – Enforcement of source separation laws is one the more effective ways to decrease the County’s solid waste disposal rate without expending additional County resources and can be implemented immediately. Enforcement efforts include increasing the inspections of loads delivered to private and municipal transfer stations to identify recyclables mixed with MSW loads or MSW mixed with recyclable loads as well as enforcing source separation laws on the municipal level when haulers collect recyclables and MSW en route. The haulers are the first point of contact with the County residents. Therefore, training hauling crews to identify and notify residents of violations during collection is an efficient method of enforcing source separation laws with minimal expense.
- **Source Reduction and Reuse** – Source reduction and reuse could be applied to many portions of the County’s solid waste stream, and can be effective in eliminating a portion of the waste destined for disposal. These strategies include such options as bans of particular materials/container/packages, taxes on disposal or litter generating items, dry cleaner hanger reuse programs, materials exchanges, food scrap donations as animal feed, etc. More options are included in the Report text.

- **Packaging and Product Stewardship** – Packaging stewardship promotes minimizing the effect that packaging have on the environment by reduction of MSW produced by packaging. Product stewardship directs those involved in the life cycle of a product to take responsibility for the impacts the product has on human health and the environment from its creation through to end-of-life. Both packaging and product stewardship act as source reduction and reuse strategies limiting the generation of MSW before it reaches the MSW disposal system.
- **Food Waste Recycling** – Food waste collection represents significant opportunities in diverting a portion or the entire food waste stream, which makes up 15-25% of MSW disposed based on waste characterization studies. Products from food waste composting programs may include fuel and soil fertilizers, which further provide environmental benefits. The County may implement a pilot program in population and food waste-dense facilities to remove a portion of the food waste from the MSW disposal system. Based on the success of the pilot, the program may be expanded County-wide to assist in meeting the Beyond Waste goals. It is assumed that approximately 50% of food waste generated from the commercial/institutional sector can be captured through this recycling program.

Solid Waste Projection

Solid waste generation and population data for 2010 is used as a basis for determining the solid waste generation per capita factor. To decrease the MSW disposed per capita, the County is considering many programs to increase education and enforcement, and remove additional materials from the MSW stream as outlined above. An example of a program that the County is considering includes additional source separation of plastics coded 3 through 7, recapture of recyclables due to enforcement and education, and food waste recycling from commercial and institutional establishments at the projected recapture rates identified in Table E-4. In addition, the County would incorporate reduction of MSW disposed through packaging and product stewardship by 50 percent to bring the MSW disposal rate to 0.6 ppd. The strategy for reducing the County’s MSW disposal rate based on 2010 MSW generation rates is provide in Table E-6.

**Table E-6:
Projected Municipal Solid Waste Diversion from the Landfill**

Item	Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
1	County-Wide Solid Waste Generated	1,939,581	11.2	11.2
2	Construction & Demolition Debris Waste	500,188	2.9	8.3
3	Biosolids (1)	20,780	0.1	8.2
4	Municipal Recyclable Materials (2)	86,567	0.5	7.7
5	Municipal Bulk Metal (3)	20,069	0.1	7.6

Item	Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
6	Municipal Yard Waste	225,723	1.3	6.3
7	Private Recyclable Materials (2)	191,457	1.1	5.2
8	Private Yard Waste	38,171	0.2	5.0
9	Municipal Household Recyclables/Other (H-MRD or diverted to H-MRF) (4)	34,004	0.2	4.8
10	Source Separation Law for Plastics #3-7 (IMA through MRF Retrofit) (5)	10,171	0.06	4.7
11	Source Separation Law for Plastics #3-7 (non-IMA) (5)	11,217	0.07	4.6
12	C&D Debris Recycling Facility (6)	0.0	0.0	4.6
13	Increased Commingled Recyclables due to Education and Enforcement (7)	117,059	0.7	3.9
14	Increased Yard Waste due to Education and Enforcement (7)	19,332	0.1	3.8
15	Commercial and Industrial Food Waste Recycling (7)	34,303	0.2	3.6
16	Product/Package Stewardship (7)	315,271	1.8	1.8
17	All Ash Beneficially Used as Alternative Daily Landfill Cover (8)	50,297	0.3	1.5
18	Combustion with Energy Recovery (not including ash produced) (9,10)	162,871	0.9	0.6
19	Total Disposed to Landfill	102,102	0.6	

- Notes:**
- Includes 10,485 tons beneficially used by composting for land application, 3,411 tons beneficially used for strip-mine reclamation, 4,727 tons for incineration, and 2,257 tons disposed.
 - "Municipal and Private Recyclable Materials" include both fiber (i.e. newspaper, mixed office paper, cardboard, etc.) and recycled commingled containers (i.e. glass, plastics, aluminum cans, etc.).
 - "Bulk Metal" includes 12,573 recycled tons recovered from the Charles Point Resource Recovery Facility in the year 2010 and is not included in the "Disposed as Solid Waste" column.
 - "Household Recyclables/Other" includes household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be shredded and other electronic wastes and white goods. The diversion rate for household recyclables upon opening of the H-MRF is expected to, at a minimum, remain the same as diversion rate from H-MRDs. The diversion rate may increase based on participation of local communities.
 - Diversion of plastics coded 3 through 7 is projected to be approximately 2.6% of MSW disposed based on US waste characterization studies and a projected recapture rate of 90%. The diversion rate may increase based on participation of local communities.
 - Quantity of C&D Debris is not factored into the MSW disposed. Diversion and recycling of C&D Debris is expected to increase due to the opening of the C&D Debris Recycling Facility.
 - Assumes projected recapture rates from MSW disposed of 75% of paper, 75% of plastics coded 1 and 2, 50% of clear/green/brown glass, 50% of recyclable metals (aluminum cans, foils, and tins), 50% of yard waste, 50% of food waste from commercial and industrial establishments, and 50% of waste reduction from packaging/product stewardship.
 - Ash produced from MSW at WTE facilities is typically 25% of the MSW by weight. The ash from the CPRRF beneficially used as alternative daily landfill cover is assumed to equal 100% of ash produced from County supplied MSW to the CPRRF. Ash beneficially used as alternative daily landfill cover does not include ash produced from MSW combusted at WTE facilities other than the CPRRF.
 - Combustion with Energy Recovery includes the non-ash portion of MSW reported by the CPRRF as having originated within the County plus the non-ash portion of other MSW generated within the County (approximately 14% of MSW not delivered to the CPRRF). It is assumed that 14% of remaining waste is managed through combustion as reported in Table 7.1 on page 93 of NYS Beyond Waste.
 - New York State Energy Law Section 1-103(12) classifies "wastes" in the definition of a renewable energy resource. The USEPA differentiates between "Combustion with Energy Recovery" and "Discards to Landfill and Other Disposal."

Implementation

The County is currently implementing numerous programs and planning future projects to reduce the per capita waste disposal rate to assist the State meet the goals of Beyond Waste. To reach the County's solid waste goal, additional programs, such as the Household-MRF and MRF Retrofit, will be implemented; thereby providing permanent recycling for household waste and plastics coded 3 through 7 within the County. In addition, new programs such as increased enforcement and education, a food waste recycling program, and source reduction through packaging and product stewardship must be implemented. A timetable for implementation of programs to meet the Beyond Waste goals is provided in Table E-7.

The MRF retrofit with optical sorting equipment will be completed in June 2011. The food waste recapture rate is a percent of the total food waste in the MSW stream based on the waste characterization. The packaging and product stewardship rate is based on a total percent of MSW disposed and is therefore dependent on all other programs implemented. As the population of the County increases, the County must work hard to retain projected material and food waste recycling and packaging/product stewardship rates. Westchester County has the administrative structure, laws and regulations, and financial mechanisms in place to implement the comprehensive plan outlined in this 2011 Plan Update. The County will monitor progress of each program each year and amend programs as necessary to maintain progress towards their solid waste reduction goals.

**Table E-7:
Implementation Schedule for MSW Reduction**

Year	Beyond Waste Goal (ppd)	Westchester County Goal (ppd) (1)	Program(s) to be Implemented
2010	4.1	2.1	■ Base Condition
2012	3.8	2.0	<ul style="list-style-type: none"> ■ Add Plastics #3-7 ■ Increase Education & Enforcement ■ Beneficially Use 100% of Ash
2014	3.4		
2016	2.9		
2018	2.3		
2020	1.7	1.1	■ Increase Product/Packaging Stewardship to 10% of Disposed MSW
2025	1.1		
2030	0.6	0.6	<ul style="list-style-type: none"> ■ Increase Product/Packaging Stewardship to 50% of Disposed MSW ■ Increase Food Waste Recapture Rate to 50% of Commercial/Institutional Food Waste in Disposed MSW

Notes: 1. The Westchester County goal assumes that MSW diverted for combustion through WTE and beneficial use of ash from WTE are not considered part of the per capita waste disposal rate.

Based on the implementation schedule, the County does not anticipate any capital costs will be incurred to meet these goals until implementation of the commercial/institutional food waste recycling program after 2025. The current education and enforcement staffing are sufficient as long as it continues to meet recycling and packaging/product stewardship goals.

State Support

The County feels strongly that with the steps outlined above, it can significantly decrease its per capita waste disposal rate. However, to reach the Beyond Waste goal of 0.6 ppd, the County requests that the following recommendations for State assistance be considered:

1. Waste-to-energy is an integral part of the County's solid waste management system. The WTE combustion process reduces the weight of MSW by up to 75 percent and the volume of waste by approximately 90 percent before disposing of the ash. The CPRRF also has an electrical generating capacity of 60,000 kilowatts; the equivalent of supplying the electrical needs of 88,000 New York homes. In addition to diversion of MSW from landfills, WTE reduces greenhouse gas emissions by producing electricity without the significant use of fossil fuels and reducing fuel for transport of the MSW to a landfill. Additional revenue is saved from the decrease in fuel used to transport MSW to out-of-state landfills.

MSW, when diverted to a WTE facility for energy recovery, is considered by the State of New York as well as 24 other states, the District of Columbia and Puerto Rico as a renewable energy source and provides economic and environmental benefits over landfill disposal. The County recommends that MSW disposed of at a WTE facility should not contribute to the County's total per capita waste disposal rate. WTE is an important contribution to reducing MSW disposed, while providing a vital economic boost to the community.

2. The first step to reducing MSW disposed of within the County is to enforce the source separation and recycling laws in place. This includes all laws on the municipal, County, State, and Federal levels. Currently, the County is not authorized to enforce laws preempted by State and Federal laws, such as plastic bag and CFC recycling. The County has had great success in enforcement of County laws by authorizing each individual municipality the authority to enforce County source separation laws and incentivizing the enforcement by allowing the municipalities to keep the fines that they collect. The County recommends that the State authorize the County and municipalities to enforce State source separation and recycling laws, with the ultimate goal of reducing recyclable materials in the solid waste stream.

3. Ash produced at WTE facilities can be beneficially used for many purposes. Currently, approximately 40% of the ash produced at the CPRRF is beneficially used as an alternative daily landfill cover. However, the bottom ash from the CPRRF and other WTE facilities can be used for many other purposes, such as an aggregate for road base or in concrete, such as Jersey barriers or parking blocks.

Part 360 of the Solid Waste Management Facility Regulations specifies that bottom ash residue can be beneficially used if the permittee demonstrates that the material is not a waste, has a known market or disposition, is not accumulated on speculation, is not a public health risk, and that contractual arrangements have been made for use of the material in a production process. Furthermore, the permittee must chemically and physically characterize the ash residue and each finished product, and identify the quantity and quality to be marketed. The County recommends that the State participate to pass regulations promoting or mandating the beneficial use of ash from WTE facilities.

1. Introduction

1.1. Background

The Planning Unit for Westchester County's (County) solid waste is the Department of Environmental Facilities (DEF). Prior to 1984, The County used the Croton Point Landfill for disposal for all municipal solid waste (MSW) generated within the County. In 1984, a resource recovery facility began operating in the County to provide additional solid waste disposal for communities within the County. The facility is referred to as the Charles Point Resource Recovery Facility (CPRRF). At the time that the CPRRF began commercial operation, the County used the CPRRF and the Croton Point Landfill for solid waste disposal for both municipally collected and private carter waste.

At the time of the Croton Point Landfill closing on June 30, 1986, the County established an allocation system to permit private carters operating in the County access to the CPRRF. Capacity at the CPRRF was reserved through intermunicipal agreements (IMA) for municipalities that had joined into a special assessment district, called the Refuse Disposal District No. 1 (RDD). Available capacity unused by the RDD communities was allocated to the private carter-collected commercial waste stream. As the IMA waste quantities increased, the allocation capacity available to the commercial sector decreased. As a result, private carters throughout the Westchester County Solid Waste District sought alternative disposal means for their waste stream. Many carters began to transport increasing quantities out of the County for disposal. As neighboring counties and states began to restrict waste importation, and as landfills in these counties closed, the private carters began transporting the waste further north and west to find available disposal capacity. It is reported that this had increased transportation costs resulting in increased collection and disposal rates to the private sector.

In an effort to respond to the impact on the commercial community resulting from these increased waste management costs, and to address future solid waste disposal needs throughout the entire County, the County developed its Solid Waste Management Plan in 1988 (1988 Plan). The County's Solid Waste Management Plan and subsequent updates are described more in the following section. For additional background and historical development of the County, please refer to the previous Solid Waste Management Plans and Updates described in Section 1.2 below.

1.2. County's Waste Management Practices and Previous Planning Efforts

In 1987, the New York State Department of Environmental Conservation (DEC) set forth an aggressive solid waste management plan for the State of New York with the goal of reducing the state's waste stream by 10 percent and reusing or recycling the waste stream

by 40 percent in ten years. In cooperation with the State's goals, the Westchester County Department of Public Works, Solid Waste Management Division, established the 1988 Plan, consisting of two phases. Under Phase I, the County determined the solid waste produced within Westchester County and estimated projections for future waste generation. Under Phase II, The County laid out the road map to meet the State's solid waste goals. The 1988 Plan Phase II details each of the following topics:

- Review of the solid waste management transport and disposal system,
- Waste quantities and composition,
- Recycling plan of the County,
- Technology review of resource recovery technologies,
- Evaluation of alternative solid waste processing and disposal facilities on a technical, environmental and regulatory basis, and
- Recommendations for site assessment and selection of an alternative to meet the County's solid waste disposal requirements.

The 1988 Plan focused on meeting disposal needs and minimizing reliance on out-of-county disposal capacity, with the ultimate goal of diverting 25 percent of the County's waste stream from the County's disposal facility.

In 1990, the County developed the Solid Waste Management Plan Update (1990 Plan Update). The purpose of the 1990 Plan Update was to establish a comprehensive recycling analysis to further reduce the quantities of solid waste requiring disposal and thereby free up remaining capacity at the existing disposal facilities. The 1990 Plan Update evaluated the existing recycling strategy of the County and strategies and proposed programs to increase recycling in the future. As a result of the County's planning and implementation of recycling programs, the County achieved a 50 percent recycling rate in 2010. A chart showing the historic recycling rates county-wide from 1992 to 2010 is provided at the end of Appendix B.

1.3. Objectives of the Plan

The objective of this Westchester County Solid Waste Management Plan Update (2011 Plan Update) is to define the infrastructure and strategies to manage Westchester County's solid waste for the next twenty years. The 2011 Plan Update will discuss strategies to assist the DEC in meeting its quantitative goals set forth in Beyond Waste: A Sustainable Material Management Strategy (Beyond Waste) solid waste management plan, published in December 2010. The quantitative goal of Beyond Waste is "reduction in the amount of MSW destined for disposal to reach the ultimate goal of reducing disposal to 0.6 pounds per person per day (ppd) by 2030." The calculation of MSW per capita does not include construction and demolition debris, biosolids, or industrial waste.

In 2008, the per capita waste disposal rate for New Yorkers was 4.1 ppd. Beyond Waste outlines the following incremental goals during the planning period.

**Table 1-1:
Beyond Waste Goals**

Year	Quantity of MSW Disposed (ppd)
2010	4.1
2012	3.8
2014	3.4
2016	2.9
2018	2.3
2020	1.7
2025	1.1
2030	0.6

Source: Beyond Waste: A Sustainable Materials Management Strategy for New York State, New York State Department of Environmental Conservation, December 20, 2010, pg. 27.

In 2010, the per capita waste disposal rate for Westchester County MSW was 4.8 ppd before using the solid waste for energy production at the CPRRF. After beneficial use of ash from the CPRRF as alternative daily landfill cover, the County’s per capital waste disposal rate decreases to 4.6 ppd. Calculations for the per capita waste disposal rate are discussed further in Section 6. The 2011 Plan Update will meet the objectives of the County and the DEC through discussing the following topics:

- The Planning Unit,
- Solid Waste Quantities,
- Solid Waste Programs and Planning Initiatives,
- Technology Evaluation,
- Integrated System Selection, and
- Implementation Schedule.

2. Planning Unit

2.1. Introduction

Westchester County is located in the Hudson Valley Region of New York State and is comprised of 43 separate municipalities. The planning unit for Westchester County’s solid waste is the DEF. In 1979, 35 municipalities joined in a special assessment district, called the Refuse Disposal District No. 1 (RDD or District), and entered into an Intermunicipal Agreement (IMA) with Westchester County to dispose of municipally collected solid waste. Under the agreement, the municipalities have committed municipally collected solid waste up to a maximum allowable amount to the County solid waste disposal system. These municipalities currently deliver MSW either to the County transfer stations or directly to the County disposal facility, which is designated as the CPRRF. Since the formation of the RDD, the number of IMA municipalities in the RDD has increased to 36, representing approximately 90 percent of the County’s population. Table 2-1 lists all of the RDD municipalities. Seven municipalities elected not to join the RDD. Table 2-2 lists the non-RDD municipalities.

**Table 2-1:
Refuse Disposal District #1 Municipalities**

Ardsley	Irvington	Pelham Manor
Briarcliff Manor	Larchmont	Pleasantville
Bronxville	Mamaroneck (Town)	Port Chester
Buchanan *	Mamaroneck (Village)	Rye
Cortlandt *	Mount Kisco	Rye Brook
Croton-on-Hudson *	Mount Pleasant	Scarsdale
Dobbs Ferry	Mount Vernon	Sleepy Hollow (North Tarrytown before 1996)
Eastchester	New Rochelle	Tarrytown
Elmsford	Ossining (Town) *	Tuckahoe
Greenburgh	Ossining (Village) *	White Plains
Harrison	Peekskill	Yonkers
Hastings-on-Hudson	Pelham (Village)	Yorktown *

* Indicates municipalities that deliver recyclables to the Northern Tier Recyclable Materials Transfer Station.

**Table 2-2:
Non-Refuse Disposal District #1 Municipalities**

Bedford	North Castle	Pound Ridge
Lewisboro	North Salem	Somers
New Castle		

In 1982, the County enabled the Westchester County Industrial Development Agency (WCIDA) to build the CPRRF, which began operation as the County disposal facility in 1984. Prior to and during the first two years of CPRRF operation, the County also disposed of solid waste at the Croton Point Landfill. When the Croton Point Landfill closed on June 30, 1986, the County relied solely upon the CPRRF for disposal. Ash residue from the CPRRF was disposed of at the Sprout Brook Ash Landfill located in Cortlandt, New York until October 21, 2009. After October 21, 2009, the operator of the CPRRF, Wheelabrator Westchester, L.P. (Wheelabrator), disposes of the ash residue as part of their contract services. Recyclable materials are diverted from the waste stream to the Daniel P. Thomas Material Recovery Facility (MRF). The existing solid waste facilities are described further in Section 4.1.

2.2. Size and Geography

Westchester County is located in the Hudson Valley Region of New York State and covers a land area of about 450 square miles. It is bordered on the north by Putnam County, on the south by the borough of the Bronx, New York City, to the east by Fairfield County, Connecticut and the Long Island Sound, and to the west by the Hudson River.

2.3. Population

Westchester County possesses urban, suburban, and within its northern communities, rural populations. The County has a population of 949,113, based on the most recent United States census from 2010 (Census 2010). This population makes the County the seventh most populous county in New York State, behind four counties in New York City (excluding Staten Island) and two counties on Long Island. After 2010, County population projections are provided by the New York Metropolitan Transportation Council (NYMTC) in Chapter 2 of the 2010 NYMTC 2035 Regional Transportation Plan: A Shared Vision for a Shared Future (2010 NYMTC Plan). The population provided in this report is for the County only and is not separated between the RDD and non-RDD communities. The estimated historic population of Westchester County is provided in Appendix A. The 2010 population, provided in the Census 2010, and the projected future population for the years 2015 through 2030, provided in the 2010 NYMTC Plan, is presented below in Table 2-3.

**Table 2-3:
Historic and Projected Population**

Year	Total
Historic (1)	
2010	949,113
Projected (2)	
2015	987,000
2020	1,019,400
2025	1,045,800
2030	1,065,300

- Notes:**
1. Historic population for 2010 is based on the United States Census 2010 population data.
 2. Projected population for the years 2015 through 2030 is provided by the NYMTC in Chapter 2 of the 2010 NYMTC 2035 Regional Transportation Plan: A Shared Vision for a Shared Future. <http://nymtc.org/rtp/documents/CHAPTER/NYMTC_RTP_Complete.pdf>. The 2010 NYMTC Plan projected population for 2010 was 961,500, which is higher than the actual population based on the Census 2010.

2.4. Major Transportation Routes

Major transportation routes have already been established for each of the County-owned solid waste facilities and consist of Interstate 287 (I-287), Interstate 87 (I-87), Interstate 95 (I-95), and Interstate 684 (I-684). Interstate 287 is a partial beltway around New York City and spans from the northern half of New Jersey, through Rockland County and east in Westchester County to I-95 in Rye, New York. Interstate 87 runs in a north-south direction within the County from the Tappan Zee Bridge into Rockland County to the Bronx, New York City. Interstate I-684 runs in a north-south direction within the County from Putnam County, New York to I-287 in White Plains/Harrison. Interstate 95 runs in a north-south direction from Connecticut to the Bronx, New York City. Each solid waste facility has a transportation plan with a recommended route from each transfer station to the CPRRF or from the CPRRF to the ash landfills chosen by Wheelabrator.

2.5. Significant Factors Impacting Solid Waste Generation

Westchester County, because of its close proximity to New York City and Connecticut business centers, houses many people working outside of the County. However, because of its extensive campus-style office park network situated along the major thoroughfares of the County and commercial activity, many workers migrate to the County on a daily basis as well. The County also includes major urban centers; two of which are located in the City of White Plains and another along the Cross County Parkway and Central Park Avenue of the City of Yonkers. The County has long been, and continues to grow, as a home for corporate America. Many of America's largest corporations are headquartered in the County.

In addition to the County's increased commercial growth and development, a considerable amount of redevelopment and revitalization is taking place throughout the

County. As a result of this growth, as well as the general trend of society to produce, package, and discard more, the County is faced with a growing waste stream if no changes to solid waste management programs are implemented. It is the intent of this 2011 Plan Update to reverse the trend through the implementation of new programs and decrease the County's waste stream.

3. Solid Waste Quantities

3.1. Waste Generation, Diversion and Disposal

Westchester County collects solid waste generation data for both municipally collected waste and privately collected waste. In the County, approximately 1,939,581 tons of total solid waste (including C&D and biosolids) was generated in 2010. Municipally collected waste reported by each of the 43 municipalities and by the County totals approximately 842,709 tons (including C&D and biosolids). Privately collected waste, including waste generated by some communities in non-RDD municipalities that contract private haulers to collect solid waste as well as commercial waste, totals approximately 1,096,872 tons.

Municipally collected waste can be separated between the following generators: RDD communities, Westchester County government sources, and non-RDD communities. RDD communities and Westchester County collected approximately 764,796 tons of MSW in 2010. Of the total solid waste collected from RDD communities and County government sources, approximately 390,221 tons were recycled. The remaining 374,575 tons of waste was sent to the CRRF for combustion and generation of electricity. Any ferrous metals remaining in the ash from the CRRF were removed by magnetic separator and recycled. Non-RDD communities collected approximately 77,913 tons of total MSW, recycled 38,095 tons and disposed of 39,818 tons. A breakdown of municipally collected solid waste is summarized in Table 3-1 below.

**Table 3-1:
Municipally Collected Solid Waste in 2010**

Waste Stream Component	Recycled (tons)	Disposed (tons)	Total (tons)
Refuse Disposal District and Westchester County	390,221	374,575	764,796
Non-Refuse Disposal District	38,095	39,818	77,913
County-Wide	428,316	414,393	842,709

- Notes:
1. Municipally collected solid waste quantities in 2010 are based on data provided by the County for waste collected in each municipality within the County and by the County itself and are approximate.
 2. Ferrous metals delivered with MSW to the CRRF are recovered from the ash by a magnetic separator and is included in the recycled "bulk metal" totals for the County

Of the privately collected waste, approximately 532,216 tons were recycled, thus bringing the total tons of recycled material to approximately 960,532 tons. Recyclable materials currently include mixed paper (i.e., old newspaper, old corrugated cardboard (OCC), etc.), commingled containers (i.e. glass, metal and plastics coded 1 and 2), yard waste, bulk metal and others including: tires, electronic waste, anti-freeze, household

batteries, motor oil, vehicle batteries, and construction and demolition debris. Municipally collected RDD communities haul mixed paper and commingled containers to the MRF in the City of Yonkers, NY for processing either directly or via the Northern Tier Recyclable Materials Transfer Station for processing. Non-RDD municipality and privately collected recyclable materials are diverted from the waste stream separately.

The recycling rate for municipally collected and privately collected solid waste, including biosolids and C&D, was 51 percent and 49 percent, respectively, for a County-wide recycling rate of 50 percent in 2010. A summary of quantity and types of waste generated and recycling in the County in 2010 is provided in Table 3-2 and in Appendix B as an attachment to the 2010 Annual Report, prepared by the Westchester County DEF, Division of Solid Waste Management/Recycling Office. Ferrous metals delivered with MSW to the CPRRF are recovered from the ash by a magnetic separator and included in the recycled “bulk metal” totals for the County. Deposit containers redeemed from shopping centers within the County under the Returnable Container Act are credited to each municipality on a per capita basis.

**Table 3-2:
Quantity and Types of Solid Waste Generated and Recycled in 2010**

Municipally Collected Waste (County-Wide) and Recycling	Quantity (tons or %)
Mixed Paper Recycled	59,975
Commingled Containers Recycled (1)	26,592
Yard Waste Recycled (2)	225,723
Bulk Metal Recycled (3)	20,069
Other: Tires, E-Waste, C.R.T's, Anti-Freezer, Household Batteries, Motor Oil, Vehicle Batteries, Cell Phones, Asphalt, Concrete, and Textiles (4)	34,004
Construction & Demolition Debris Recycled	48,057
Biosolids Beneficially Used (5)	13,896
Total Recycled Waste (excluding biosolids)	366,363
Total Recycled Waste (including biosolids)	428,316
Waste from RDD Communities Disposed (including biosolids) (6)	374,575
Waste from Non-RDD Communities Disposed (including biosolids) (6)	39,818
Biosolids Disposed (5)	6,884
Total Disposed Waste (excluding biosolids)	407,509
Total Disposed Waste (including biosolids)	414,393
Total Municipally Collected Waste (recycled + disposed excluding biosolids)	773,872
Municipal Recycling Rate (excluding biosolids)	47%
Total Municipally Collected Waste (recycled + disposed including biosolids)	842,709
Municipal Recycling Rate (including biosolids)	51%

* Continued on the following page

Privately Collected Waste and Recycling	Quantity (tons or %)
Source Separated Recyclables/Scrap Metal/Fat & Bones Recycled	191,457
Yard Waste Recycled	38,171
Construction & Demolition Debris Recycled	302,588
Total Recycled Waste (excluding C&D)	229,628
Total Recycled Waste (including C&D)	532,216
Municipal Solid Waste Disposed	415,115
Construction Debris Disposed	149,541
Total Disposed Waste (excluding C&D)	415,115
Total Disposed Waste (including C&D)	564,656
Total Privately Collected Waste (recycled + disposed excluding C&D)	644,743
Private Hauler Recycling Rate (excluding C&D)	36%
Total Privately Collected Waste (recycled + disposed including C&D)	1,096,872
Private Hauler Recycling Rate (including C&D)	49%
Waste Generation Summary (including C&D and biosolids)	Quantity (tons or %)
Total County-Wide Recycled Waste (7)	960,532
Total County-Wide Waste Generation (recycled + disposed)	1,939,581
Westchester County Recycling Rate 2010	50%
Municipal Solid Waste Per Capita Per Day (excluding C&D and biosolids)	Quantity
Total County-Wide Recycled Waste (tons)	595,991
Total County-Wide Disposed Waste (tons)	822,624
Westchester County Waste Generation (tons)	1,418,615
Westchester County Recycling Rate 2010 (excluding C&D and biosolids)	42%
2010 Population (8)	949,113
County-Wide MSW Recycled (ppd)	3.4
County-Wide MSW Disposed (ppd)	4.8
Westchester County Waste Generated (ppd)	8.2

Source: 2010 Annual Report, Westchester County Department of Environmental Facilities, Division of Solid Waste Management/Recycling Office

- Notes:**
1. Deposit containers redeemed under the Returnable Container Act are proportionally credited to each municipality on a per capita basis.
 2. The Town of Somers does not provide residential yard waste collection. Residents are encouraged through education programs to backyard compost and grasscycle. Therefore, organic waste recycled tons are not available to bolster municipal recycling rates.
 3. "Bulk Metal" includes 12,573 recycled tons recovered from the CPRRF in 2010 and is not included in the Total Disposed Waste rows.
 4. E-waste includes the electronic appliances, computers, etc. recovered from the County's electronic waste collection program with participation from 26 municipal host sites. E-waste quantities are reported from sites that host a drop-off container.
 5. Quantity of beneficially used biosolids is provided by the Westchester County Department of Environmental Facilities 2010 Sludge Report.
 6. Quantities of disposed solid waste from RDD and non-RDD municipalities are provided by the County.
 7. Ash residue generated at the CPRRF is being beneficially used as alternative daily landfill cover at landfill(s) in Pennsylvania. This quantity of beneficially used ash is not reflected in this Total County-Wide Recycled Waste.

8. Projected population for 2010 is provided by the NYMTC in Chapter 2 of the 2010 NYMTC 2035 Regional Transportation Plan: A Shared Vision for a Shared Future.
<http://nymtc.org/rtp/documents/CHAPTER/NYMTC_RTP_Complete.pdf>.

3.2. Waste Composition

The County utilized four waste characterization studies to create a profile of the County’s waste stream for disposal. These studies include the New York City Department of Environmental Protection (NYCDEP), Onondaga County, New York State, and United States Environmental Protection Agency (USEPA), prepared by Franklin Associates. Each of these studies provided a percentage of MSW that contains recyclable material that was not removed prior to disposal. The four waste characterization studies were averaged and normalized for the purpose of the Westchester County 2011 Plan Update. A summary of these waste characterizations with average recyclable content percentages is provided in Table 3-3.

**Table 3-3:
Reference MSW Waste Characterization Studies**

Item (1)	NYCDEP (2)	Onondaga County (3)	NYS (4)	USEPA / Franklin (5)	Average	Normalized Average
Paper	23.2%	28.2%	25.5%	22.3%	24.8%	24.2%
■ Newspaper	3.7%	3.4%	1.8%	1.4%	2.6%	2.5%
■ Plain OCC/Kraft Paper	1.4%	3.9%	5.7%	4.9%	4.0%	3.9%
■ Other Mixed Paper	8.8%	6.6%	8.9%	9.1%	8.4%	8.2%
■ Paperbacks	0.2%	0.6%	0.4%	0.6%	0.4%	0.4%
■ Other Non-recyclable Paper	9.1%	13.7%	8.7%	6.3%	9.4%	9.2%
Plastics	14.2%	19.1%	16.4%	16.9%	16.7%	16.2%
■ #1 PET	1.0%	1.4%	0.7%	1.2%	1.1%	1.0%
■ #2 HDPE	0.8%	2.1%	0.80%	1.0%	1.2%	1.2%
■ #3 - 7 PVC, LDPE, PP, PS, Other	0.3%	11.0%	0.20%	0.3%	3.0%	2.9%
■ Other Plastics Materials	12.1%	4.6%	14.7%	14.4%	11.4%	11.2%
Glass	2.6%	1.8%	3.3%	6.1%	3.4%	3.4%
■ Clear/Green/Brown Glass	1.9%	1.3%	2.8%	4.9%	2.7%	2.7%
■ Other Glass	0.7%	0.5%	0.5%	1.2%	0.7%	0.7%
Metals	3.5%	4.5%	5.6%	8.0%	5.4%	5.3%
■ Aluminum Cans/Foil/Tins	0.8%	0.7%	0.3%	0.7%	0.6%	0.6%

Item (1)	NYCDEP (2)	Onondaga County (3)	NYS (4)	USEPA / Franklin (5)	Average	Normalized Average
■ Other Ferrous/Non-Ferrous Metals	2.7%	3.8%	5.3%	7.3%	4.8%	4.7%
Organics	47.6%	32.4%	40.1%	43.6%	41.4%	40.6%
■ Yard Waste (6)	9.3%	1.1%	1.9%	6.9%	4.8%	4.7%
■ Stumps/Limbs	0.7%	N/A	N/A	N/A	0.7%	0.7%
■ Food	15.9%	14.6%	25.4%	18.2%	18.5%	18.1%
■ Other Organics	21.7%	16.7%	12.8%	18.5%	17.4%	17.1%
Appliances & Electronics	0.8%	1.2%	1.6%	1.5%	1.3%	1.3%
C&D	7.0%	0.6%	5.1%	0.6%	3.3%	3.3%
Miscellaneous (7)	0.6%	N/A	N/A	N/A	0.6%	0.6%
Household Hazardous Waste	0.5%	0.5%	0.3%	0.4%	0.4%	0.4%
Other (8)	0.0%	11.7%	2.1%	0.6%	4.8%	4.7%
Total	100%	100%	100%	100%	102.1%	100%

- Notes:
- Does not include waste characterization of C&D waste.
 - New York City Department of Environmental Protection waste characterization is based on 2004 data using actual grab samples from residential sources only.
 - Onondaga County waste characterization is based on 2005 data using actual grab samples for residential, commercial and institutional sources.
 - New York State waste characterization is based on 2008 data tabulated using various waste characterization studies across the United States for residential, commercial and institutional source.
 - United States Environmental Protection Agency waste characterization is based on 2008 data using material flow analysis (including imports and exports) for residential, commercial and institutional sources.
 - Yard Waste includes: for NYCDEP: Leaves, Grass and Pruning subcategories; for Onondaga County: leaves, grass clippings and brush; for NYS: includes leaves, grass clippings, and garden debris; and for USEPA: includes leaves, grass, and tree and brush trimmings.
 - Miscellaneous for NYCDEP includes Inorganic materials and Ceramics.
 - Other includes: for Onondaga County: items that are too small and numerous to be sorted individually and which have become mixed during the waste collection process such that they cannot easily be separated from one another. This most often included small pieces of plastic, paper and food. For NYS: Other Durables that often contain products and materials which are composites of a number of individual, dissimilar materials in a single product (e.g. various metals and plastics). For USEPA: mainly associated with disposable diapers. The only other significant sources of materials are electrolytes and other materials associated with lead-acid batteries that are not classified as plastics or nonferrous metal.
 - N/A indicates "Not Applicable" because the material was not tracked separately.

Based on the normalized average percent of recyclables remaining in the municipal solid waste stream, it is estimated that approximately 45.8 percent of the County's MSW is recyclable material. Recyclable material includes newspaper, plain OCC/Kraft paper, other mixed paper, plastics coded 1 through 7, clean/green/brown glass, aluminum, cans, foils, tins, yard waste, and food waste. The County estimates that it can increase capture of additional recyclable materials in the following ways: newspaper, plain OCC/Kraft paper, mixed paper, glass, plastics coded 1 and 2, metals, and yard waste by increasing education and enforcement; plastics coded 3 through 7 by implementing source separation laws; and food waste by instituting additional programs. A summary of the

County's existing and potential solid waste facilities, programs, and initiatives is provided in Section 4.

4. Solid Waste Programs and Planning Initiatives

4.1. Existing Solid Waste Facilities Inventory

Solid Waste generated within the RDD municipalities of Westchester County is delivered to either a resource or materials recovery facility, either directly or via a transfer station. Resource recovery is defined as the extraction of useful materials (i.e., metals) or energy from solid waste. Materials recovery facilities extract paper, glass, and metals that can be reprocessed for reuse. Energy recovery is defined as the use of a variety of processes to capture energy from waste. The County's MSW disposal system currently uses (3) County-owned transfer stations, one (1) County-owned recyclable materials transfer station, one (1) County-owned MRF, and one (1) resource recovery facility. In addition, there are numerous privately-owned transfer stations and processing facilities licensed within Westchester County. The facilities are as further described below.

4.1.1. Brockway Place Transfer Station

The Brockway Place Transfer Station is located in City of White Plains. This station was constructed in 1995 and is capable of handling 600-900 tons of refuse per eight (8) hour shift. Waste that is delivered to this transfer station is compacted into 75 cubic yard trailers (approximately 25 tons) and delivered to the CRRF. White Plains, Port Chester, Scarsdale, Harrison, Rye and Rye Brook deliver waste to this transfer station.

4.1.2. South Columbus Avenue Transfer Station

The South Columbus Avenue Transfer Station is located in the City of Mount Vernon. This station was constructed in 1984 and is capable of handling 600-900 tons of refuse per eight (8) hour shift. Waste that is delivered to this transfer station is compacted into 75 cubic yard trailers (approximately 25 tons) and delivered to the CRRF. Mount Vernon, New Rochelle, Pelham, Pelham Manor, Larchmont/Mamaroneck, and Mamaroneck Village deliver waste to this transfer station.

4.1.3. Thruway Transfer Station

The Thruway Transfer Station is located in the City of Yonkers off Exit 6A of the New York State Thruway on the northbound side of the Thruway. The station was built in 1978 and is capable of handling 900-1,200 tons of refuse per eight (8) hour shift. Waste that is delivered to this transfer station is compacted into 75 cubic yard trailers (approximately 25 tons) and delivered to the CRRF. Yonkers, Ardsley, Bronxville, Dobbs Ferry, Elmsford, Hastings, Irvington, Tarrytown, Tuckahoe, Eastchester, and Greenburgh deliver waste to this transfer station.

Additional information for each transfer station is provided in Table 4-1, including the waste sheds (geographic regions) served by the specific stations during the past year. The County may, at any time, redirect certain municipalities to other Transfer Stations shown on Table 4-1 (or may direct municipalities to deliver MSW to facilities outside the system). Annual total MSW delivered to each County-owned transfer station from 1998 to 2010 is shown in Table 4-2.

**Table 4-1:
Description of County-Owned Transfer Stations**

Description	Transfer Station		
	Thruway	South Columbus Avenue	Brockway
Compactors	4	3	3
Permitted Average Design Capacity (tons per day (tpd)) (1)	900	700	345
Permitted Daily Maximum Capacity (tpd) ¹	1,500	1,050	514
Permitted Weekly Maximum Capacity (tons per week)	5,500	3,850	1,897
County Staff	2	2	2
Area (Acres)	20	5	5
Waste Shed ²	Yonkers Bronxville Eastchester Greenburgh Ardsley Hastings Dobbs Ferry Irvington Tarrytown Elmsford Tuckahoe	Mount Vernon New Rochelle Mamaroneck (T) Pelham Pelham Manor Larchmont Mamaroneck (V)	Scarsdale White Plains Harrison Port Chester Rye Brook City of Rye

- Notes:**
1. The transfer stations are authorized to accept the current permitted daily maximum capacity indicated above, but cannot exceed the current permitted weekly maximum capacity indicated above (which is based on the current permitted average design capacity indicated above for 5.5 days, subject to special conditions contained in the Transfer Station Permits).
 2. During periods in which one (1) or more of the transfer stations are unable to process municipal solid waste as a result of reduced operations or for any other reason, and during periods of emergency at one (1) or more transfer stations, municipal solid waste normally received at these facilities will be directed to other transfer stations designated by the County.

**Table 4-2:
Municipal Solid Waste Received at the Transfer Stations (Annual Tons)**

Year	Total	Thruway	South Columbus	Brockway
2010	306,692	148,082	82,621	75,990
2009	318,639	157,978	82,333	78,328
2008	340,167	166,481	88,962	84,724
2007	382,345	181,713	103,307	97,325
2006	387,917	188,053	102,122	97,743
2005	390,042	189,156	104,040	96,845
2004	396,042	188,715	108,125	99,201
2003	383,159	185,459	108,284	99,415
2002	384,798	198,468	115,769	70,561
2001	378,807	175,167	107,683	95,957
2000	384,938	179,432	108,361	97,145
1999	387,012	179,928	112,478	94,606
1998	380,373	174,374	113,600	92,399

- Notes:
1. The year represents the calendar year of January 1 through December 31.
 2. During 2002, the Brockway Transfer Station was closed for a period of approximately three (3) months as a result of a fire. Additional Municipal Solid Waste was accepted at the Thruway Transfer Station and the South Columbus Transfer Station during this period.

4.1.4. Non-County-Owned Transfer Stations and Processing Facilities

In addition to the three County-owned transfer stations, privately-owned transfer stations and processing facilities licensed within Westchester County are provided in Table 4-3 below.

**Table 4-3:
Private Transfer Stations and Processing Facilities**

Facility	Location	Accepted Materials
Ace Scrap Recycling LLC	Mount Vernon, NY	Scrap Metal
American Independent Paper	Tarrytown, NY	Paper and Cardboard
ARJR Trucking	Yonkers, NY	Rock, Dirt, Concrete and Asphalt
Brookfield Resource Management	Elmsford, NY	Scrap Metal, Paper and Cardboard
Bronx River Haulage Inc.	Mount Vernon, NY	Construction and Demolition Debris
Edison Ave. Recycle Materials Supply Corp.	Mount Vernon, NY	Concrete and Asphalt
J Bass & Sons, Inc.	Mount Vernon, NY	Scrap Metal
Lake St. Granite Quarry	West Harrison, NY	Concrete and Asphalt
Lawton Adams Construction Crop.	Somers, NY	Clean Concrete, Asphalt, Rock and Clean Dirt
M. Miller's Scrap Iron & Metal Co. Inc.	Port Chester, NY	Scrap Metal
Metro Green	Mount Vernon, NY	Dirt, Rock and Concrete

Facility	Location	Accepted Materials
Mount Kisco Transfer Station, Inc.	Mount Kisco, NY	Municipal Solid Waste
Mount Vernon Recycling	Mount Vernon, NY	Dirt, Rock and Concrete
R&F Surplus and Salvage	Yonkers, NY	Scrap Metal
RB Scrap Iron & Metal, Inc.	Yonkers, NY	Scrap Metal
Recycling Industries Transfer Station, LLC	Mamaroneck, NY	Municipal Solid Waste, Construction and Demolition Debris
Rogan Brothers	Yonkers, NY	Construction and Demolition Debris
Somers Sanitation/BRIA Carting Co.	Somers, NY	Municipal Solid Waste, Construction and Demolition Debris
Thalle Construction Co., Inc.	Elmsford, NY	Rock, Dirt, Concrete and Asphalt
Waste Management (formerly A-1 Compaction)	Yonkers, NY	Municipal Solid Waste, Construction and Demolition Debris

4.1.5. Northern Tier Recyclable Materials Transfer Station

The Northern Tier Recyclable Materials Transfer Station is located in Cortlandt, NY and receives recyclable materials collected from the Northern Tier communities. The Northern Tier communities include: Buchanan, Cortlandt, Croton-on-Hudson, Town of Ossining, Village of Ossining, and Yorktown. After receipt of the recyclable materials, the material is transferred via transport trailers for delivery to the MRF.

4.1.6. The Daniel P. Thomas Material Recovery Facility

The Daniel P. Thomas MRF serves as the cornerstone for recycling efforts for the municipalities in the RDD. The MRF, operated by City Carting of Westchester, processes collected glass, metal and plastic containers coded 1 and 2 and mixed paper, which is separated, sorted, and sold into recycling markets. The County is in the process of retrofitting the MRF to accept optically sort plastics coded 3 through 7, as described further in section 4.2.1 below. The MRF processed 74,733 tons of recyclables in 2010. Revenue from the sale of recyclables in 2010 (an 80 percent share, as per contract agreement with City Carting of Westchester) was \$5,877,374.26.

4.1.7. The Charles Point Resource Recovery Facility

The Charles Point Resource Recovery Facility (CPRRF or Resco), located in Peekskill, NY, was built in response to a Federal mandate to close the County’s Croton Point Landfill and local incinerators. In 1982, the County enabled the WCIDA to build the CPRRF. The CPRRF is a waste-to-energy (WTE) facility. In other words, solid waste is incinerated and the heat generated is used to produce electricity. The CPRRF began operation in 1984, providing dependable, environmentally safe disposal of MSW for Westchester County, while generating clean, renewable electricity.

Designed, constructed and operated by Wheelabrator Westchester, L.P. (Wheelabrator), the CPRRF supports County residents by processing up to 2,250 tons per day of MSW.

The CPRRF has a permitted capacity of 710,000 tons per year. It is equipped with a magnetic separation system that extracts ferrous metals from the ash, which is then recycled. A portion of the ash residue generated at the CPRRF is being beneficially used as alternative daily landfill cover at landfill(s) in Pennsylvania (refer to Appendix F for correspondence from the Facility operator). The CPRRF has an electrical generating capacity of 60,000 kilowatts; the equivalent of supplying the electrical needs of 88,000 New York homes.

The CPRRF accepts MSW from all municipalities in the RDD as well as from municipalities outside of the RDD and outside of the County. In 2010, the Wheelabrator invoiced 691,497 tons of MSW and recovered 12,573 tons of ferrous metal at the CPRRF. Wheelabrator reported that RDD municipalities delivered 391,189 tons of solid waste in 2010 to the CPRRF. Private carters and direct haul waste delivered the balance of refuse to the CPRRF.

The incineration of solid waste at the CPRRF provides several Westchester communities the opportunity to reduce the weight of waste disposed in a landfill by up to 75 percent and reduce potential health problems inherent in solid waste disposal. It also provides competitively priced, clean, renewable electricity. Annual total MSW delivered to the CPRRF from 1998 to 2010 is shown in Table 4-4.

**Table 4-4:
 Total IMA Municipal Solid Waste Delivered to the CPRRF Facility (Annual Tons)**

Year	IMA Municipal Solid Waste
2010	391,189
2009	393,908
2008	421,055
2007	470,395
2006	480,395
2005	489,929
2004	492,333
2003	495,659
2002	481,068
2001	465,665
2000	472,255
1999	474,537
1998	466,797

- Notes:**
1. The year represents the calendar year of January 1 through December 31.
 2. IMA municipal solid waste has decreased in recent years due to increased enforcement of source separation laws and changes in the economy.

4.1.8. Expected Life and Current Operating Status of Existing Facilities

In October 2009, the County, acting on behalf of the RDD, entered into a new 10-year contract with Wheelabrator to dispose of the RDD’s solid waste at the CPRRF in Peekskill, NY. The contract includes an initial 5-year renewal period at the County’s sole option and two additional 5-year renewal periods by mutual agreement of both the County and Wheelabrator. The expected life and current operating status of all existing facilities is provided in Table 4-5.

**Table 4-5:
Expected Life and Operating Status of Existing Facilities**

Facility	Expected Life (1)	Operating Status
Brockway Place TS	20 years	Active
South Columbus Ave TS	20 years	Active
Thruway TS	20 years	Active
Northern Tier Recyclable Materials TS	20 years	Active
Daniel P. Thomas MRF	20 years	Active
Charles Point RRF	25 years	Active

Notes: 1. Facilities are continuously maintained to increase life expectancy and as a result, these represent current minimum life expectancy.

4.2. Future Solid Waste Facilities

The County is in the process of introducing new solid waste facilities that will provide increased environmental and economic benefits to residents. These projects include the construction of a household-material recovery facility, opening of a construction and demolition debris recycling facility and retrofit to the MRF. Details of future solid waste facilities are presented below.

4.2.1. Retrofit of Daniel P. Thomas Material Recovery Facility

Westchester County is currently replacing the existing commingled process system at its MRF in Yonkers, NY with a modernized system that includes optical sorting equipment. The optical sorting equipment will expand the sorting capability of plastics from plastics coded 1 and 2 to include plastics coded 3 through 7. The retrofit is expected to be completed by June 2011.

Installation of the equipment is anticipated to increase commingled recyclables by a minimum 10 percent (an extra 200 tons per month). The estimated minimum increase is based on the plastics coded 3 through 7 that are already entering the MRF, without publicizing inclusion of the additional plastics. Once the additional plastics are publicized, the commingled container recycling rate is likely to increase further as

residents and commercial establishments begin including plastics coded 3 through 7 in their commingled recyclables.

The County enacted a local law amending the Westchester County Source Separation Law (SSL) to include plastics coded 3 through 7. The law requires the recycling of these additional plastics by waste generators in the County on or after June 1, 2011. The Westchester County SSL and amendment to the Local Laws to include plastics coded 3 through 7 are attached as Appendix E.

In addition, the new system will increase the throughput of commingled recyclables from 12 tons per hour to 20 tons per hour, allowing the County to solicit recyclables from private hauling companies at a competitive tipping fee to further increase revenue. Efficiency is also expected to increase as the sorting process moves from manual to automated sorting. Impacts of the optical sorting equipment on the disposed MSW are discussed in Section 6.

4.2.2. Household-Material Recovery Facility

In 2010, the County completed the design phase of a project to construct and operate a permanent Household-Material Recovery (H-MRF) facility in Valhalla, NY. Construction of the H-MRF commenced in March 2011. The H-MRF will provide residents with proper collection, disposal, and where applicable, recycling of household materials requiring special management outside of established MSW and recycling programs. The H-MRF will allow the County to maximize recovery, recycling and reuse, where possible, of these materials and to minimize public health and environmental threats posed by their improper storage and disposal.

The self-contained H-MRF will provide a year-round, fixed point for disposal of all materials currently collected through the County's Household Material Recovery days (H-MRDs), E-waste events and mobile shredder events. These materials include household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be shredded, and other electronic and white goods (including washers, dryers and refrigerators). Once the H-MRF is operational, the County anticipates that it will be able to greatly reduce the toxicity and volume of the solid waste disposed.

The H-MRF also supports the Secure and Responsible Drug Disposal Act, S. 3397 signed into law by President Obama on October 12, 2010. Flushing medications into the sanitary sewer concern many in the wastewater community because wastewater treatment plants are not designed or equipped to remove these substances. Therefore, these substances may enter back into the water supply downstream. Under this act, each state's Attorney General would have the authority to authorize groups to take unused, expired, or unwanted medications without the presence of a full-time Drug Enforcement Agency

(DEA) official present, thus removing these medications from the waste stream or from disposal into the sanitary sewer system.

4.2.3. Construction & Demolition (C&D) Debris Recycling Facility

Construction and demolition recovery programs reduce the amount of materials generated and hauled to landfills, decrease worker exposure to hazards, improve worker safety, reduce truck trips and traffic, and improve air quality, thereby enhancing the health, safety and welfare of the residents of Westchester County. However, there is a noticeable lack of facilities within the County that actively employ construction and demolition recovery programs. In 2008, over 178,000 tons of C&D debris was generated within Westchester County, a significant portion of which was transported outside of the County by truck for disposal in landfills. In 2009, the tons of C&D waste generated rose to 895,000 tons, of which, approximately 736,000 tons were recycled. For those reasons, in 2010, the County commissioned a feasibility study for implementation of a deconstruction facility on the County-owned property adjacent to the Daniel P. Thomas MRF in the City of Yonkers, NY.

C&D Debris Recycling Facilities can recover up to 75% of the constituent elements of the materials generated by construction and demolition activity and thereby divert such materials from landfills through processes including deconstruction and salvaging, reuse, recycling and composting. Sorting techniques utilized will include manual sorting and two or three mechanical screening steps where materials are separated by material size. Once separated, additional mechanical and physical separation equipment, engineered for specific material streams, will efficiently recover materials depending on properties that are inherent to specific waste constituents. In addition to the feasibility study, the County is examining alternatives that include the private sector, a public-private partnership, or a County constructed, owned, and operated C&D facility for C&D recycling and disposal.

4.2.4. Closure of Sprout Brook Ash Landfill

The County accepted the last load of ash at the Sprout Brook Ash Landfill in October 2009. Under the present solid waste disposal agreement with Wheelabrator, the County is no longer responsible for disposal of ash residue resulting from incineration of waste at the CPRRF in Peekskill, NY. Wheelabrator is responsible for proper disposal of the ash. Wheelabrator has contracted with a hauling company, City Carting of Westchester, to transport the ash to Waste Management, Inc. operated facilities in Pennsylvania. The County received DEC approval of its Closure and Post-closure Plans for the Sprout Brook Ash Landfill. Bilotta Contracting Corp. has been selected to provide general contracting services for this project. Plans are to complete closure construction in 2011.

4.2.5. Expected Life and of Future Facilities

The expected life of all future facilities is provided in Table 4-6.

**Table 4-6:
Expected Life and Operating Status of Future Facilities**

Facility	Expected Life
Household-MRF	20 years
MRF Retrofit	20 years

4.3. Current Waste Prevention and Recycling

Westchester County offers numerous programs to residents in addition to curbside recyclable pickup to divert recyclable and hazardous materials from the waste stream. The County’s existing recycling programs are listed in the following sections.

4.3.1. Education

The cornerstone of the County’s recycling programs is education. The County has numerous initiatives to inform the public of recycling programs and efforts in all sectors including residential, commercial, industrial, and institutional. The County conducts seminars throughout the year at biannual County meetings and for groups such as municipal and private sanitation crews, businesses, and institutions. The County also produces many publications to inform the public of recyclable materials and the benefits of recycling. Sample publications advertising the County’s current programs are provided in Appendix C.

In addition to publications and seminars, the Daniel P. Thomas MRF Education and Conference Center, located inside the MRF, allows visitors to observe the operation of a MSW and recyclables transfer station and MRF first hand. An educational tour program is available for schools, scout troops, business people, private citizens and anyone else interested in how the County’s MRF, one of the nation’s premier recycling facilities, operates. The MRF Education and Conference Center conducted 163 tours for approximately 5,500 visitors in 2010, including thousands of students from schools throughout the County. Professionals and special interest groups also used the Conference Center throughout the year for meetings. The County is currently planning enhancements to the Education and Conference Center to further benefit the community. Educational efforts are further described in the other County programs listed below.

4.3.2. Community Recycling Programs

The County currently sponsors numerous programs to collect materials not collected at the MRF including: tires, electronic waste, compact fluorescent light bulbs, cell phones, anti-freeze, household batteries, motor oil, vehicle batteries, and construction and demolition debris. The following community recycling programs are described in detail in the 2010 Annual Report prepared by the DEF Division of Solid Waste, attached as Appendix B:

- Household Material Recovery Day (H-MRD) Program – Collection of household chemicals and items requiring special handling (e.g. cell phones, TVs, fluorescent bulbs, medication) from County residents throughout the year. Disposal services are offered free of charge. In 2010, 250 tons of household hazardous materials, 268.5 tons of electronic waste and over 19 tons of tires were collected.
- Electronic Waste or “E-Waste” Events – Collection of electronics, which are a non-processible waste at CPRRF, from County residents throughout the year. In 2010, approximately 65,000 pounds of electronic waste, including 25,000 pounds of cathode ray tube (CRT) containing devices was collected. In addition, 7,000 pounds of air conditioners, 181 pounds of fluorescent light bulbs, and 3,700 pounds of white goods were collected.
- Mobile Shredder Events – Collection of personal papers from County residents throughout the year for shredding and recycling. The County sells the shredded paper for about \$175 to \$225 per ton. In 2010, over 700 tons of paper was recycled.
- Treasure Hunt Program – Give-away and pick-up of used but usable household or office items (e.g. furniture, appliances, garden and office equipment) among residents. Fees are not charged by either party and the recipient is responsible for pick-up. In 2010, the Treasure Hunt phone line received 1,100 inquiries; and over 680 entries were made on the Treasure Hunt website, diverting articles from the waste stream.
- Boat Shrink Wrap Recycling Program – Collection of plastic boat wrap used to protect boats at marinas throughout the County during the winter. The County sells the plastic boat wrap for about \$125 a ton. In 2010, the County recycled 23 tons of plastic.
- Recycling HelpLine – Dissemination of municipality-specific waste management and recycling programs and information. The 24-hour, 365 days hotline serves as a point of contact for both residents and businesses. In 2010, the HelpLine answered approximately 7,719 calls or 643 calls per month.
- Toner Cartridge Recycling – Collection and recycling of toner cartridges from County offices in cooperation with *Recycle First* in Loveland, Colorado. The County receives revenue generated from the recycled cartridges. Though this program was once very successful, the increased use of non-recyclable ink canisters has led to a decline in the number of collected cartridges over the years.
- Vegetable Oil Collection - Collection of vegetable oil from County facilities for use as heating oil at the MRF.

The County expects to continue implementation of all of these programs in the future, with the exception of potentially reducing the number of H-MRD events as quantities of hazardous waste lessen due to the opening of the Household-Material Recovery Facility (H-MRF), described in Section 4.2.1.

4.3.3. Municipal Recycling Programs

The County also offers the following recycling programs to municipal organizations, described in the 2009 Annual Report (Appendix B) to municipalities within the RDD:

- **Municipal Electronic Waste Collection** – The County provides Municipal Electronic Waste Collection pods to all RDD member municipalities to accept residentially generated electronic waste. The County arranges for the electronic waste to be collected from each pod and recycled. In 2010, the County collected 1,549.6 tons of e-waste from 26 municipal host sites.
- **Organic Yard Waste Transfer Station IMA Program** – The County currently participates in a 5-year IMA with RDD municipalities to operate the Organic Yard Waste Transfer Program. This program is described in Section 4.3.4 below.
- **Tire Recycling** – The County operates an aggressive tire collection and recycling program. RDD municipalities can deliver municipally collected tires to drop off points in Yonkers, White Plains, Mount Vernon, Cortlandt, Mount Kisco, and Yorktown. Residents can drop off tires at any H-MRD event. In 2010, approximately 315 tons of tires were recycled.

In addition to the municipal programs described in the 2010 Annual Report, the County also recycles bullets from the County gun range as scrap metal.

4.3.4. Organic Yard Waste Transfer Program

Under the Organic Yard Waste Transfer Program, municipalities and the County executed an IMA whereby participating municipalities agree to organize, operate and maintain a local transfer site for municipally collected yard waste (i.e. leaves, grass, and brush). Each participating host municipality provides a site where yard waste from that community, as well as others, is collected. To qualify and receive benefits as a host, a municipality must be willing to accept yard waste from other municipalities.

The County arranges for transport of this waste to commercial composting facilities through a contract with City Carting of Westchester at a lower tipping fee than for MSW. The reduced tipping fee encourages municipalities to recycle yard waste. The County, through their planning department, looked to locate a site within the County for County-wide composting. However, due to restrictions including size requirements, proximity of potential sites to schools or nursing homes, and high property value for potential sites, the yard waste is composted at out-of-county facilities.

As of January 1, 2011, RDD member municipalities that host a municipal transfer station pay \$15.57 per ton to dispose of organic yard waste under this program, subject to an annual adjustment based on the CPI. RDD member municipalities that do not host a transfer station pay \$25.31 per ton, subject to the annual CPI-based adjustment. Non-RDD members pay \$40.64 per ton, subject to the annual CPI-based adjustment. In 2010, the program diverted 225,723 tons of organic yard waste from the solid waste stream, as

shown in Table 3-2 previously. Residents of the County are also encouraged to recycle grass clippings by leaving them on their lawns after mowing. This program is encouraged through publications supplied by the County.

4.3.5. Pay-As-You-Throw (PAYT) and Incentive-Based Pricing

In communities with PAYT programs, generators are charged a fee for collection of MSW, much like other utilities such as electricity, water, or gas. This concept ties closely with product stewardship. Making solid waste generators conscious and fiscally responsible for the cost of solid waste collection encourages them to reduce the solid waste they produce. The County currently employs economic incentives on the municipal level to maximize recycling. After the County's thorough investigation of PAYT programs, the County has concluded that its current incentive-based pricing program better serves the needs of the RDD, and that incentive-based pricing is a more efficient program based on the structure of the RDD.

The RDD does not landfill any of the residential waste collected by its member-municipalities. The waste is disposed of at the CPRRF at approximately \$71.50 per ton, plus approximately \$13.50 per ton to transport the material to the facility. Municipalities that belong to the RDD pay \$25 per ton, while the difference is made up by the ad valorem tax paid by all residents residing within the RDD based on home value. However, because RDD municipalities pay no fee to bring their recyclables to the MRF, there is a strong incentive for these communities to educate their residents and sanitation crews to separate as much recyclable material as possible from the waste stream. In addition, the District municipalities can also dispose of electronics and used tires for free. The District has provided a similar incentive for the disposal of organic yard waste: rather than pay \$71.50 per ton to dispose of yard waste at the CPRRF or \$43 per ton to transport yard waste to composting sites, RDD members pay \$15 per ton. This is a tremendous economic incentive to recycle yard waste through composting.

Requiring an additional fee for waste disposal would be an unnecessary financial burden. The County also reviewed studies that showed that PAYT programs often resulted in recyclables with a very high contamination rate. This is important because the County markets and sells the recyclables it collects. In 2010, the County realized almost \$6 million in revenue from the sale of MRF recyclables, which is attributed to the very clean recyclable streams commanding maximum prices. Higher contamination rates would either reduce the value of these recyclable materials, or render them un-marketable, resulting in the County having to pay to dispose of the material. The revenue the County receives from the sale of recyclables is legally required to go directly to the RDD; thereby, reducing the ad valorem.

4.3.6. Large Municipal Solid Waste Generators

Westchester County requires all large MSW generators to submit their own solid waste management plan to the County that documents their recycling and disposal programs. A large MSW generator is classified as any establishment with over 100 employees, residents, or students. In this way, the County enforces the ideas of reducing, reusing, and recycling in solid waste management and encourages each establishment to consider the environment when preparing their solid waste management plan. By targeting large MSW generators, the County can provide more benefit for fewer resources spent. It is also a goal of the program to educate a larger percentage of the County's residential and commercial establishments to promote an environmentally conscious population.

4.4. Potential Programs

In addition to the current recycling programs, the County continues to review new technology and programs looking for opportunities to increase recycling, reduce waste, and protect the environment, that make financial sense for the County and its residents. The additional programs identified that are expected to increase recycling rates are described in the following section.

4.4.1. Source Reduction/Reuse Strategies

Source reduction and reuse could be applied to many portions of the County's solid waste stream, and can be effective in eliminating a portion of the waste destined for disposal. Since source reduction and reuse eliminate waste rather than require a method to manage them, there are no technical considerations to be evaluated at this level of analysis.

Grasscycling and backyard composting are effective source reduction techniques for reducing the volume of MSW that enters the waste stream. Grasscycling is the natural recycling of grass clippings by allowing them to fall on the lawn rather than bagging and disposing with MSW. Grasscycling, along with backyard composting, eliminates the need for yard wastes to be managed as a municipal waste. Thus, this method can eliminate the need to site and develop a composting facility, and eliminate the need for collection of such wastes. In practice, it is often necessary to provide residents with the incentive to compost by subsidizing composting devices.

The source reduction and reuse options that have been either incorporated by the County or other entities include the following:

- Media exposure/public outreach;
- In-store activities (posters, labels, special events);
- Conferences/forums;
- School curricula;

- Technical assistance (to business);
- Grants/awards;
- Management priorities in strategic plan;
- Development of source reduction plan;
- Tax credits, exemptions;
- Bans (of material, product, container, or package);
- Payment for disposal directly linked to waste generated;
- Taxes;
 - Disposal surcharge (per ton or by volume);
 - Variable fee/local user fee (per bag or can);
 - On litter-generating items only ;
 - Graduated – on all items or on all items in a product group;
 - On hard-to-handle items only (e.g., tires);
 - On problem materials only (e.g., hazardous materials);
- Deposits;
 - On containers to be refilled;
 - On hard-to-handle items;
- Product specifications;
 - Standards required;
 - Labeling information required;
 - For government procurement;
- Dry cleaner hanger reuse program;
- Supermarket plastic bag drop-off bins;
- Donate products or materials to charity or nonprofit organizations;
- Donate commercial food scraps as animal feed;
- Donate/share excess supplies or building materials to low-income housing;
- Materials exchange for surplus or reusable materials;
- Encourage shopping with waste reduction in mind;
- Buy in bulk, larger sizes, and concentrates to reduce packaging;
- Buy reusable, recyclable, or recycled products;
- Encourage printing double-sided documents;
- Use alternatives to paper communications (e.g., voicemail, e-mail); and

- Reusable china, cutlery, glasses, and mugs in cafeterias.

4.4.2. Food Waste Recycling Pilot Program

Currently, the County is meeting with various institutions, including personnel at the Westchester County Department of Corrections, Westchester Community College and Westchester Medical Center to explore a food waste composting pilot program in such population and food waste-dense facilities. A food waste recycling program would require the generator to source separate food waste from other MSW and recyclables (e.g. metals and plastics) in a separate, water-tight container and would also require a separate collection system to prevent contamination. However, food waste collection represents significant opportunities in diverting a portion or the entire food waste stream, which makes up 15-25% of MSW disposed based on waste characterization studies (refer to Table 3-3). Products from food waste composting programs may include fuel and soil fertilizers, which further provide environmental benefits. Impacts and goals of food waste recycling are discussed in Section 6.

4.4.3. Regional Yard Waste Composting

The County is exploring a regional approach for yard waste composting. The County, along with other neighboring counties, would pursue centrally-located properties for composting, thereby reducing the hauling distance for municipally collected yard waste. Yard waste composting not only reduces yard waste volume, it also produces compost that can be used as soil amendment (contains limited plant nutrients) or mulch. The County will also encourage at-home composting and may also extend yard waste composting from Fall collection to year-round collection. Impacts of yard waste composting are discussed in Section 6.

4.4.4. Packaging and Product Stewardship

Packaging stewardship promotes minimizing the effect that packaging has on the environment by reduction of MSW produced by packaging. Examples of packaging stewardship include the reduction of materials such as plastic wraps around boxes or reducing the volume of plastic used in bottles. Packaging stewardship is the first step in reducing the volume of MSW produced in the County. Based on case studies in Germany in the NYC WasteLe\$\$ Summary Report and NYC Packaging Restrictions Research, packaging waste made up 30% of total solid waste produced. Through directives and ordinances on manufacturer's responsibilities, packaging consumption in Germany was reduced by 13% - 16% over a period of 2 – 6 years (equivalent to 3.9 – 4.8% of total waste produced), based on the two referenced case studies. It is anticipated that packaging stewardship would further lower the per capita MSW generated in the County.

Product stewardship directs those involved in the life cycle of a product to take responsibility for the impacts the product has on human health and the environment from

its creation through to end-of-life. An example of product stewardship is a new ordinance in the City of Seattle, Washington where publishers are required to pay for the City's recycling costs for phone books. This includes collection, recycling and discarding costs. This new law also creates an Opt-Out Registry where residents and businesses can sign up to NOT receive paper phone books. This type of program provides incentive to the publishers not to produce paper waste.

On December 15, 2010, Governor Patterson signed into law a requirement for manufacturer's to take back and recycle rechargeable batteries in a statewide, manufacturer-funded program. These include batteries from laptops, cell phones, and other electronics not including common alkaline batteries or batteries weighing over 25 pounds, such as car batteries. This law supports the State's first product stewardship law, the Electronic Equipment Recycling and Reuse Act, enacted in May 2010. This law removes the toxins found in rechargeable batteries from the waste stream and environment without putting the financial burden on the taxpayers.

Westchester County is in support of product stewardship. Examples of product stewardship within the County include Costco, which sells cardboard after product delivery, and Best Buy, which ships its boxes back with the delivery truck to be reused. The County is actively seeking ways to promote recycling of paint by paint manufacturers. Additional product stewardship options may include returning plastic grocery bags to grocery stores, cell phone recycling and reduced packaging. The County plans to look further into additional product stewardship options and procurement of recycled products in the future. Impacts and goals of packaging and product stewardship are discussed in Section 6.

4.4.5. Sludge to the CPRRF for WTE

Pursuant to the Consent Order with the USEPA and DEC, the County is evaluating the potential of disposing of the biosolids from the Yonkers Joint Wastewater Treatment Plant (YJWWTP) at the CPRRF. For this to occur, the DEC will have to allow waste-to-energy to be considered a beneficial use for biosolids or release the County from its obligations under the Consent Order. This program is discussed further in Section 5.

4.5. Solid Waste Disposal Capacity Out of the Planning Unit

In accordance with the agreement with Wheelabrator for disposal of MSW, if the CPRRF is unavailable for disposal of MSW for an extended period of time, Wheelabrator will transfer the MSW to designated back-up disposal facilities if needed as outlined in their agreement. The back-up facilities will meet all capacity requirements of the CPRRF. Wheelabrator is also responsible for disposal of the ash from the CPRRF. Currently, all of the ash disposal sites are outside of the planning unit.

4.6. Policy Implementation and Enforcement

In 2010, the DEF Division of Solid Waste continued to enforce the provisions of the SSL. The DEF and Solid Waste Commission inspectors observe loads dumped at private and municipal transfer stations to look for recyclables mixed with garbage. During 2010, they inspected 9,282 loads, a 1.5 percent increase from 2009. The inspectors also perform site inspections of commercial and institutional waste generators. They check external garbage and recycling containers to determine if businesses separate waste properly. A summary of dumped load inspections is provided in Table 4-7.

**Table 4-7:
Summary of Dumped Load Inspections**

	Total Load Inspected	Loads Inspected (Dumped by Private Haulers)	Loads Inspected (Dumped by Municipal Haulers)	Site Visits	Violations Issued
2010	9,282	5,508	3,774	493	275
2009	9,145	4,716	4,429	1,121	446
2008	7,144	3,801	3,343	474	205

When inspectors discover an improperly mixed load of garbage and recyclables dumped at a transfer station, they attempt to trace the load back to the location of origin by scrutinizing the contents of the load and obtaining information provided by the sanitation employees who dumped the load. In cases where an inspector is able to trace such a load back to the waste generator, the inspector will visit the waste generator and inspect its external garbage and recycling containers to determine whether the waste generator is complying with the requirements of the SSL.

DEF inspectors also perform waste generator inspections of businesses, schools, apartment and condominium complexes and other facilities and institutions throughout the County, to verify compliance with the SSL.

In 2010, the inspectors performed 493 waste generator inspections, compared to 1,121 performed in 2009. The decrease in waste generator inspections was due in part to increased compliance at the transfer stations. In other words, there are fewer loads that require the inspectors to visit the waste generator. The reduction in waste generator inspections was also due in part to an effort to have an increased presence at the transfer stations. The greater number of transfer station inspections had the desired effect of increasing compliance with the SSL; however, it appears that it may have also resulted in a greater number of private haulers dumping waste outside of Westchester County.

In early 2009, DEF personnel trained Weights and Measures inspectors from the Department of Consumer Protection (DCP) and sanitarians from the Department of Health (DOH) to identify possible recycling violations as they perform their own inspections throughout Westchester County. DCP and DOH supervisors refer suspected violations to the DEF whose inspectors perform follow-up visits. In 2009, DEF inspectors performed 85 follow-up inspections based on these referrals.

Additionally, DEF inspectors investigate suspected violations referred by municipal and private haulers, businesses, and residents. Many complaints are received by the Recycling Helpline ((914) 813-5425).

In 2010, DEF issued 275 Notices of Hearing for recycling violations compared to 446 issued in 2009. Of the violations issued in 2010, 29 were issued to municipal haulers, 69 were issued to private haulers, and 348 were issued to waste generators. Vehicle inspections increased by about 4.4%, while the number of violations decreased 38.3%. This indicates an increase in the overall level of compliance on the part of haulers and waste generators. The DEF collected a total of \$45,375 in recycling violation fines, including \$31,775 for fines issued in 2010, and \$13,600 for fines issued previously. Enforcement will continue in the future as the County continues to focus on problem areas and expand enforcement areas such as multi-family dwellings.

Enforcement of source separation laws is one of the more effective ways to decrease the County's solid waste disposal rate without expending additional County resources and can be implemented immediately. Enforcement efforts include increasing the inspections of loads delivered to private and municipal transfer stations to identify recyclables mixed with MWS loads or MSW mixed with recyclable loads as well as enforcing source separation laws on the municipal level when haulers collect recyclables and MSW en route. The haulers are the first point of contact with the County residents. Therefore, training hauling crews to identify and notify residents of violations during collection is an efficient method of enforcing source separation laws with minimal expense.

4.6.1. Enforcement with Other Agencies

The first step to reducing MSW disposed within the County is to enforce the SSL and recycling laws in place. This includes all laws on the municipal, County, State, and Federal levels. Currently, the County is not authorized to enforce laws preempted by State and Federal laws, such as plastic bag and CFC recycling. The County has had great success in enforcement of County laws by authorizing each individual municipality the authority to enforce County source separation laws and incentivizing the enforcement by allowing the municipalities to keep the fines that they collect.

The County enforces all County SSL and plans to work with State and Federal authorities to enforce additional State and Federal SSLs. Although jurisdiction overlaps exist

between County and State SSLs, the County recommends that the State authorize the County and municipalities to enforce State source separation and recycling laws, with the ultimate goal of reducing recyclable materials in the solid waste stream.

5. Technology Evaluation

This section reviews different solid waste processing technologies and assesses their feasibility for implementing such technologies in the County. The information presented in this section is based on data and information that is available from published sources and vendor information, and is augmented by general industry experience. Accordingly, this section's focus is provided at the level appropriate for planning and evaluating the primary technological aspects of a waste processing system (e.g., the treatment method). This review provides a broad view of the technology options have been considered by the County in addressing its future solid waste processing requirements.

The search was limited to (a) technologies that are capable of processing municipal solid waste (MSW) or portions of the MSW stream on a commercial basis (demonstrated technologies) or (b) technologies that are reported to be developing the capability to become commercially viable for processing MSW (emerging technologies). Both demonstrated and emerging technologies are included to provide an appropriate perspective of the range of potential alternatives that may be available.

This evaluation considers the role of physical separation as complementary to the evaluated technologies. Physical separation, used in conjunction with a processing technology, can improve the quality of the waste feedstock and increase materials recovery. However, physical separation introduces additional risk such as the ability to successfully market separated materials or continuously meet waste feedstock quality tolerances of the processing technology resulting in additional costs and reduced performance.

The solid waste processing technologies are categorized into the following broader categories:

- Waste-to-energy
- Mechanical biological treatment
- Thermal conversion processing (i.e., pyrolysis, gasification, and plasma arc)
- Biological chemical (i.e., anaerobic digestion and acid hydrolysis)
- Composting
- Sewage biosolids processing

5.1. Existing Waste-to-Energy Technology

As discussed previously, MSW is combusted at the CPRRF and the heat generated is used to produce electricity. The combustion process reduces the weight of waste by up to 75 percent and the volume of waste by approximately 90 percent before disposing of the ash. The CPRRF has an electrical generating capacity of 60,000 kilowatts; the equivalent of supplying the electrical needs of 88,000 New York homes. In addition to diversion of MSW from landfills and the revenue from electrical generation, waste-to-energy has several environmental benefits. These benefits include reduction of greenhouse gases and recovery of ferrous and non-ferrous metals.

The WTE process produces a fraction of the greenhouse gases, such as methane (CH₄) and carbon dioxide (CO₂), associated with landfilling. WTE also avoids greenhouse gas emissions produced by the combustion of fossil fuels to generate electricity. By recovering ferrous and non-ferrous metals from waste, WTE reduces greenhouse gases produced from the production of the metals from raw materials. When compared to coal as a power source, WTE produces electricity at a net emission rate of negative 3,636 lbs of CO₂/MWh, based on information provided by the County. In other words, on a lifecycle basis, for every ton of MSW burned at a WTE plant, approximately one ton of CO₂ equivalent is reduced through reducing the use of coal.

The USEPA has recognized the benefits of WTE, indicating its preference for WTE over landfills in its Solid Waste Management Hierarchy. The New York State Energy Law Section 1-103(12) classifies “wastes” in the definition of a renewable energy resource. In addition, Section 27-0403 of the New York State Environmental Conservation Law found and declared that “development and implementation of local programs to conserve energy through sound solid waste management efforts can be of broad benefit to the state” and that “through utilization of resource reuse and other programs, primary raw materials can be conserved, energy savings can be gained, the amount of waste disposed of in landfills can be reduced, and, through proper management of the waste stream, improved operations at waste-to-energy facilities may be realized.” In May 2010, Florida passed similar legislation that promotes the use of WTE.

At this time, 25 states, the District of Columbia and Puerto Rico define MSW, when diverted to a WTE facility for energy recovery, as a renewable energy source. These states are listed in Table 5-1 and referenced in the Energy Recovery Council Fact Sheet for WTE and State Renewable Statutes provided in Appendix D. Similarly, the following regulations also recognize WTE as a renewable source of energy:

- Federal Power Act;
- Public Utility Regulatory Policy Act (PURPA);
- Biomass Research and Development Act of 2000;

- Pacific Northwest Power Planning and Conservation Act;
- Internal Revenue Code;
- Energy Policy Act of 2005;
- Executive Order 13123; and
- Federal Energy Regulatory Commission.

**Table 5-1:
States and Territories Defining Waste-to-Energy as Renewable**

Alaska	Maine	Oklahoma
Arkansas	Maryland	Oregon
California	Massachusetts	Pennsylvania
Connecticut	Michigan	Puerto Rico
District of Columbia	Minnesota	South Carolina
Florida	Nevada	South Dakota
Hawaii	New Hampshire	Virginia
Indiana	New Jersey	Washington
Iowa	New York	Wisconsin

Source: Fact Sheet: Waste-to-Energy and State Renewable Statutes, Energy Recovery Council
<www.energyrecoverycouncil.org>.

Based on information provided by the County, WTE facilities in the United States generate approximately 17 billion kilowatt-hours of renewable energy annually, which is roughly 20 percent of the nation’s non-hydroelectric renewable energy. In Europe, WTE facilities supply enough electricity to power 7 million homes and heat 13.4 million homes. Moreover, WTE generates many more times the amount of energy that can be harnessed from the capture of methane gas from landfills.

The CPRRF is equipped with a magnetic separation system that extracts ferrous metals from the ash, which is then recycled. The WTE process maximizes the capture and reuse of ferrous metals and other recyclables that otherwise would have been buried in landfills. According to a study published in 2003, as provided by the County, WTE plants operating in the US recover almost 800,000 tons of ferrous metals and over 850,000 tons of other recyclable materials (nonferrous metals, plastics, glass, white goods, and combustible ash) annually. The ash that is produced by the WTE process can be beneficially used as alternative daily landfill cover or in road construction.

The ash beneficially used from the CPRRF as alternative daily landfill cover is currently at 56,000 tons per year (or approximately 40% of total ash currently produced) (see Appendix F). The proportion of this ash from County supplied MSW is 42,513 tons based on the ratio of In-County to Out-of-County MSW processed at the CPRRF .

Should the credits for such beneficial use of 42,513 tons per year be recognized, the total MSW disposed drops by 0.2 ppd. If 100% of the ash currently produced by County MSW, approximately 141,658 tons of ash, can be beneficially used, the total MSW disposed would drop by 0.8 ppd. As waste production is reduced by increased packaging/product stewardship and recycling rates, the impact of beneficially used ash on the per capita MSW disposal rate would decrease.

Opponents of WTE argue that it serves as a disincentive to recycle. However, throughout the US and Europe, communities with WTE facilities boast recycling rates above their respective national recycling rates. Westchester's rate is 50% in 2010 and 61% in 2009, which are well above the national average of 34% as reported by USEPA for 2009. This high recycling rate is due, in part, to an economic incentive to recycle. As discussed in Section 4.3.5, waste is disposed of at the CRRF at approximately \$71.50 per ton, or \$25 per ton for RDD members. However, RDD municipalities pay no fee to bring their recyclables to the MRF, incentivizing these communities to educate their residents and sanitation crews to separate as much recyclable material as possible from the waste stream. Furthermore, the County has a continued commitment to manage the waste according to the USEPA's Solid Waste Management Hierarchy.

The following section describes emerging technologies that may be considered by the County in the future as these technologies are further developed. A detailed description of thermal combustion technologies is not included (i.e. WTE or refuse-derived fuel (RDF)) because the County already utilizes a mass-burn waste processed technology at the CRRF.

5.2. Emerging Solid Waste Technologies

The County has explored numerous technologies to manage and dispose of MSW. Each technology presented to the County was evaluated on three criteria: (1) ability of the technology to manage the capacity of MSW currently disposed of at the CRRF (approximately 500,000 tons per year), (2) ability of the technology to generate electricity to compete with WTE, and (3) ability of the technology to demonstrate proven experience of ten years. Of the technologies presented to the County, none have the disposal capacity and proven experience required to guarantee that it would be a valid waste disposal alternative. The County will continue to watch emerging technologies as potential solid waste storage, treatment, and disposal alternatives in the future. The technologies explored by the County are provided below.

5.2.1. Mechanical Biological Treatment (MBT) Technology Review

In 2009, the County's consultant reviewed an emerging MBT technology. This MBT technology was created in the mid 1990's to treat and dispose of the residual fraction of the MSW that remains after recyclables (bottles, cans, glass, cardboard, bulky waste) are separately collected from the waste stream. The technology was developed to maximize

the degradation of this residual fraction and to recover energy from this material. The process is utilized at specialized transfer stations where incoming waste is shredded to 20 cm by 20 cm and stored for up to 21 days wherein the quickly degradable organic components (mostly food remains) are attacked by microorganisms producing a heat that is maintained at 55°C. This process evaporates water and results in the decomposition of some of the organics contained in the waste.

A dry, high energy material is produced. The material can be further processed to recover metals (iron and aluminum), produce a secondary fuel, and feed a landfill bioreactor to generate methane gas that can be used to supply a turbine generator and produce electric power. For secondary fuel, the material undergoes a second shredding process that results in 2.5 cm by 2.5 cm material. This fuel has a high heating value of 9,539 BTU/lb and can be used in plants designed to accept such fuels.

Most existing MBT facilities are located in northern Italy. However, a contract to design and construct a 98M Pound (\$159.5M USD, based on an exchange rate of 1 GBP to 1.627 USD) system of facilities to process approximately 1M tons per year of MSW from areas adjacent to London, England had been obtained by the technology developer. Two facilities in Frog Island and Jenkins have a 280,000 ton per year capacity each and they have been constructed in 2007 as part of this system.

Based on the results of the consultant's analysis, implementing the MBT facility at the proposed costs was not economically feasible. The available land at the proposed site for the MBT facility in the City of Yonkers adjacent to the MRF did not meet the size requirements for the facility and there was currently no local apparent market for the secondary fuel produced by the process.

5.2.2. Thermal Conversion Processing Technologies (Pyrolysis, Gasification, Plasma Arc)

Thermal conversion is non-combustion, high heat process that converts the waste stream to gas and a solid or liquid residue in absence of oxygen. Thermal conversion technologies include pyrolysis, gasification and plasma arc.

Thermal conversion technologies have been most successfully used to process organic waste streams to produce gases and liquids that, depending on the feedstock, have significant reuse potential. For example, waste (other than MSW) feedstocks with highly homogenous organic content, which are generally unstable at elevated temperatures, have been successfully demonstrated to produce usable and marketable syngas (synthetic gas comprised principally of hydrogen, carbon monoxide, and carbon dioxide). Thermal conversion processes generally require feedstocks that meet narrow specifications for organic content, moisture, size, and uniformity.

Use of thermal conversion technologies for processing MSW is a relatively recent development. At this time, there are no known significant thermal conversion MSW processing facilities in commercial operations in the United States at the range required for an alternative waste processing facility.

Thermal conversion technologies produce significant quantities of heat and are largely similar in that endothermic or exothermic chemical reactions take place in highly controlled, oxygen deficient processes. Byproducts include syngas or liquids (typically light petroleum oils), and solids (char/ash residue or vitrified slag). By-products generated are dependent on the operating temperature of the conversion process. Each of these by-products is potentially reusable. Thermal conversion technologies are reported to be capable of generating from 400 to over 850 net kWh/ton, depending on the system and ancillary equipment used.

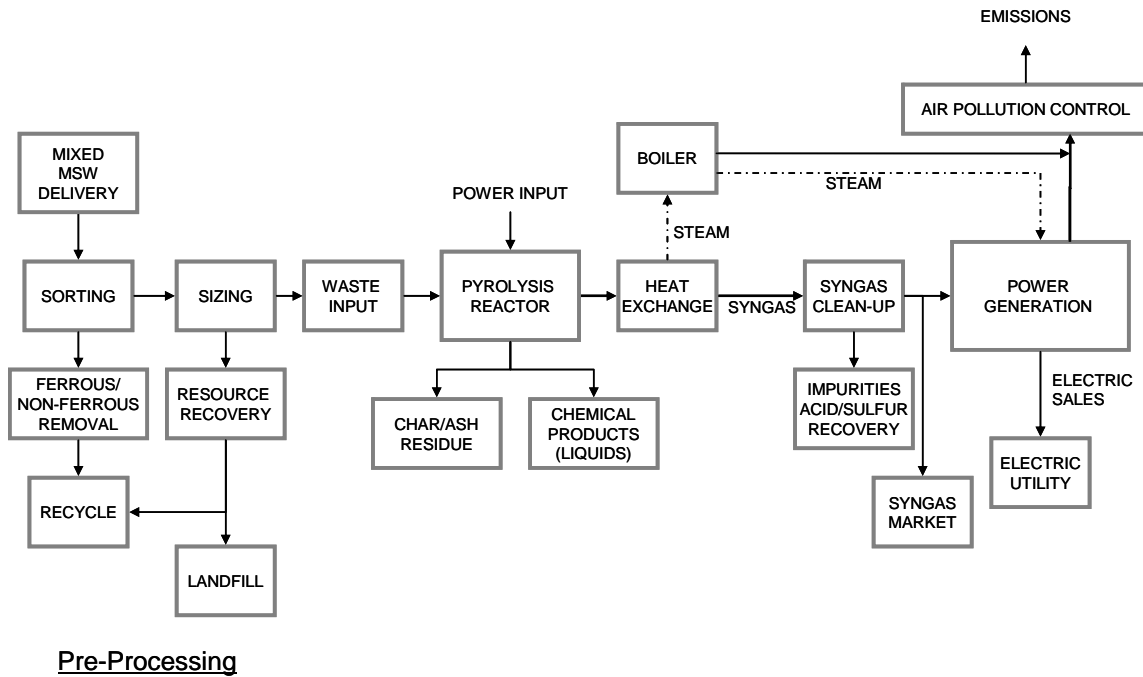
Syngas has potential market value, whether as a fuel or chemical source or a source for electricity production. However, depending on the end use, varying syngas clean-up steps are necessary to remove impurities. These clean-up processes produce air emissions and solid residues. This study has not evaluated potential syngas markets.

Use of thermal conversion technologies for potential MSW applications, in many cases, require pre-processing of the mixed MSW feedstock and would include sorting, separation, shredding/size reduction, densification, and in some cases, moisture reduction. Location near or adjacent to a MRF or RDF plant is desirable. One important risk to be managed for thermal conversion technologies is the marketability of pre-processing by-products. The quality of the pre-processed materials may not meet market specifications for the materials thereby resulting in additional costs for other treatment or disposal. Physical separation requirements of conversion systems are discussed as part of each system.

5.2.2.1. Pyrolysis

Pyrolysis is an endothermic process that requires a source of heat to initiate the thermal reactions. Pyrolysis systems typically use drums, kiln structures, or tubes which are externally heated in a closed system (in the absence of oxygen). Pyrolysis systems operate at a range of temperatures (750°F to 1,650°F), depending on the feedstock and the desired byproducts. At higher temperatures syngas is produced and is potentially reusable as a combustion fuel or as a heat source for the pyrolytic process. At lower temperatures, liquids or oils (typically light hydrocarbons) are more readily produced. Figure 5-1 illustrates the typical process for pyrolysis treatment systems.

Figure 5-1: Pyrolysis Treatment

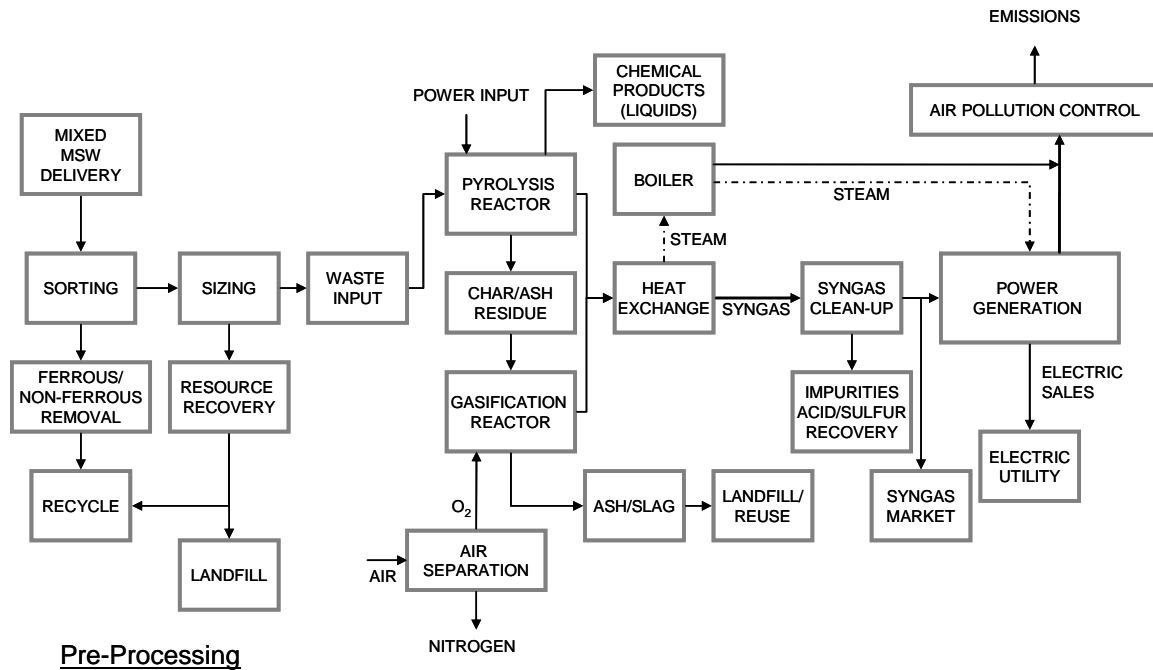


Pre-Processing

For MSW applications, the initial challenge is the heterogeneity of MSW and associated pre-processing requirements. For energy efficiency purposes, it is important to not only render the MSW feedstock to a homogenous organic feedstock, it is also important to remove inorganic materials (e.g., glass and grit) as the inorganic fraction consumes energy in the process. Moreover, the need to remove the char or solid residuals after cooling may interrupt the pyrolytic process and negatively impact potential operational efficiencies.

Pyrolysis can be supplemented by gasification to further process and recover energy from the pyrolysis residues. Pyrolysis/gasification includes pyrolysis as the initial step with the char or solid residue discharged to a gasification reactor. The liquid residue from the gasification process is typically discharged to a water bath and quenched to form a glassy, slag material. The off-gas can be used as a heat source to be processed through a boiler for steam generation and electricity production or as a fuel or syngas. If sulphur is present in the off-gas, it can be recovered as well; however, the potential marketability of recovered sulphur is not certain. The Sulphur Institute reports that U.S. sulphur production, coming mostly from the petroleum industry is increasingly surpassing market demands. Consistent with worldwide markets, this trend is expected to continue as clean air regulations require greater reductions in sulphur emissions. Figure 5-2 illustrates the typical process for pyrolysis/gasification treatment systems. Gasification is further described in the following section.

Figure 5-2: Pyrolysis/Gasification Treatment



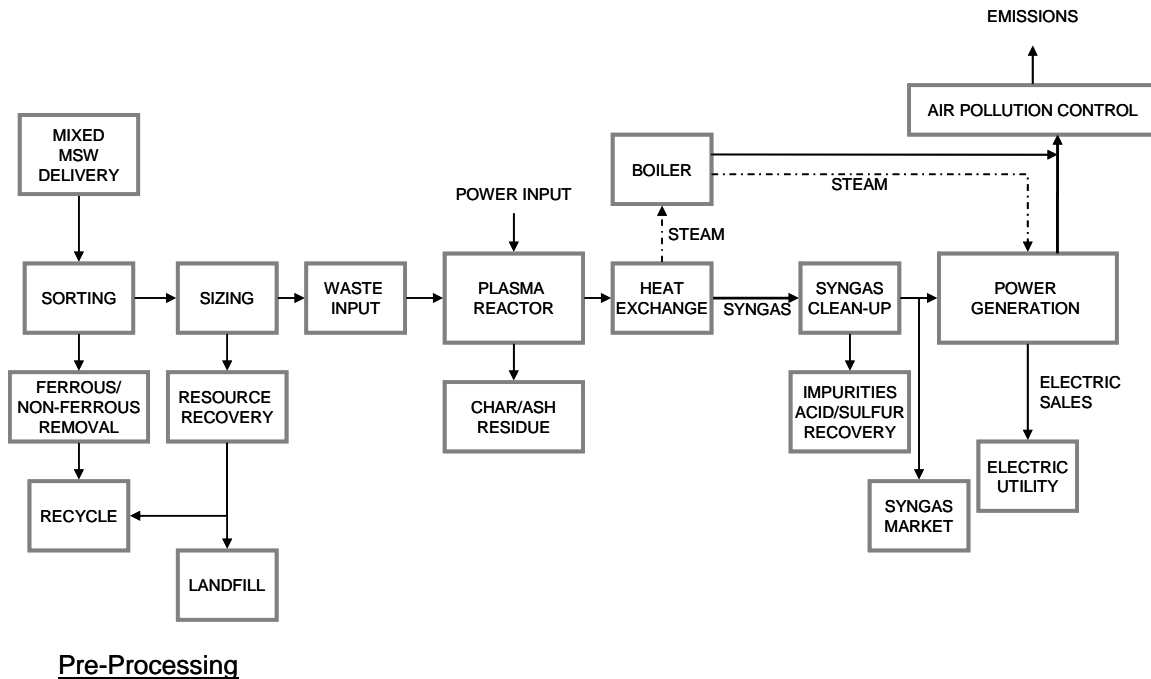
5.2.2.2. Gasification

Gasification includes the partial oxygenation of carbon-based feedstocks to generate syngas. The gasification process has been used for industrial purposes for over 100 years. Gasification is similar to pyrolysis, except that small amounts of oxygen, air or steam are added to promote gasification, forming carbon monoxide, hydrogen and methane. Gasifier systems are horizontally or vertically oriented and of the fixed bed, fluidized bed, or entrained air reactor design. With respect to MSW, gasification was attempted in the early 1980s; however, these early attempts failed due to operational difficulties associated with the heterogeneous nature of MSW. MSW gasification applications require significant pre-processing to remove inorganic materials and often include shredding, screening, air classifiers, drying and ferrous and non-ferrous metals removal. It is reported that these systems require 10-20% moisture in the feedstock; a requirement that may necessitate drying.

5.2.2.3. Plasma Arc

Plasma arc converts select waste streams to slag. The plasma arc system uses electrical current between two electrodes (the arc) to heat a gas (usually air, oxygen, nitrogen, argon, or a combination thereof) up to 25,000°F within the plasma arc reactor. The heated and ionized plasma gas is then used to treat the feedstock. Figure 5-3 illustrates the typical process for plasma arc treatment systems.

Figure 5-3: Plasma Arc Treatment

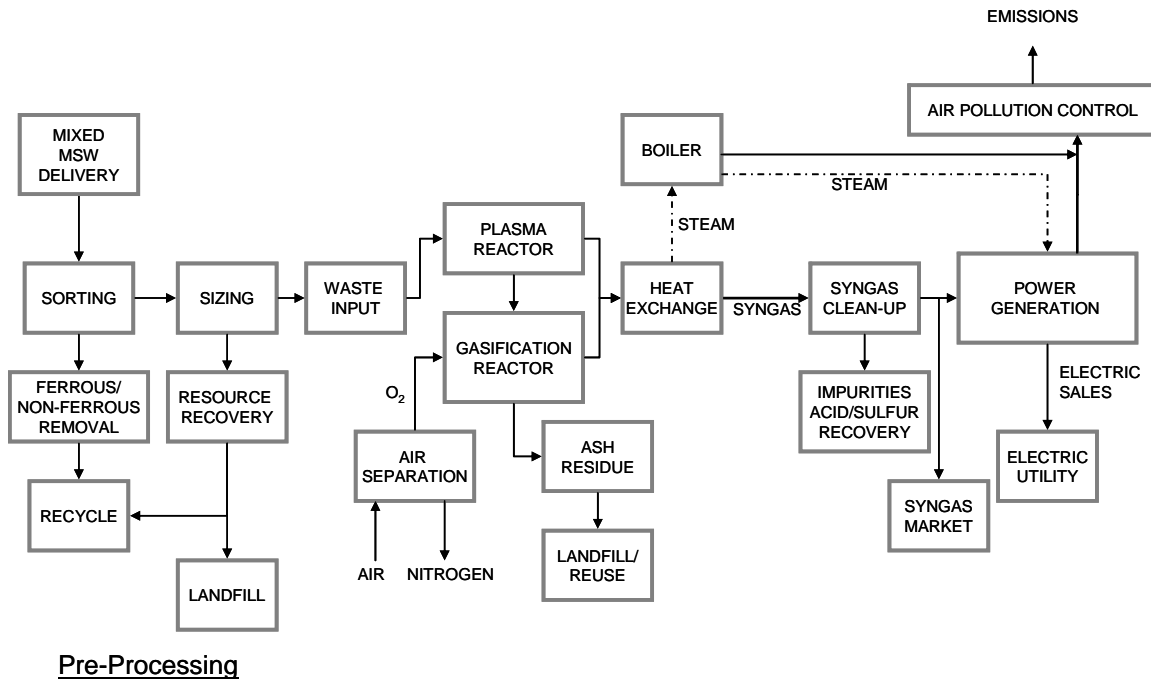


Pre-Processing

Two primary processes, plasma torch and reactor configurations, are used: (1) where the plasma torch is internal to the waste treatment reactor or (2) where the plasma torch is external to the reactor. Coke or lime is often added to the reactor to provide a more reducing atmosphere and to stabilize the slag. Byproducts include syngas and slag. The syngas can be used as a fuel or discharged to a boiler for steam production/energy recovery, similar to modern combustion systems. The residual fraction of the feedstock is converted to a vitrified slag that may be reusable, depending on market availability. Use of plasma arc has not been commercially demonstrated for MSW processing.

Plasma Arc/Gasification includes plasma as the initial step with the char or solid residue discharged to a gasification reactor. The molten residue from the gasification process is typically discharged to a water bath and quenched to form a glassy, slag material. The syngas produced can be used as a heat source to be processed through a boiler for steam generation and electricity production or as a fuel. Sulphur, if present, can be recovered as well. Figure 5-4 illustrates the typical process for plasma arc/gasification treatment systems.

Figure 5-4: Plasma Arc/Gasification Treatment



Plasma processes are energy consumptive processes and are expensive to operate. The process' thermal efficiency (e.g., potential for net energy production) is reportedly attractive in continuous feed systems (data on net electric generation was not discovered to support an evaluation of this capability). However project economics are largely dependent on the systems revenues to offset operational costs. In many cases, energy recovery has not been implemented due to unfavorable economics. As most facilities of this type have been implemented on limited and small scale, the capability for net-electric generation on a commercial basis is not well understood.

5.2.3. Biological Chemical Technologies (Anaerobic Digestion; Acid Hydrolysis)

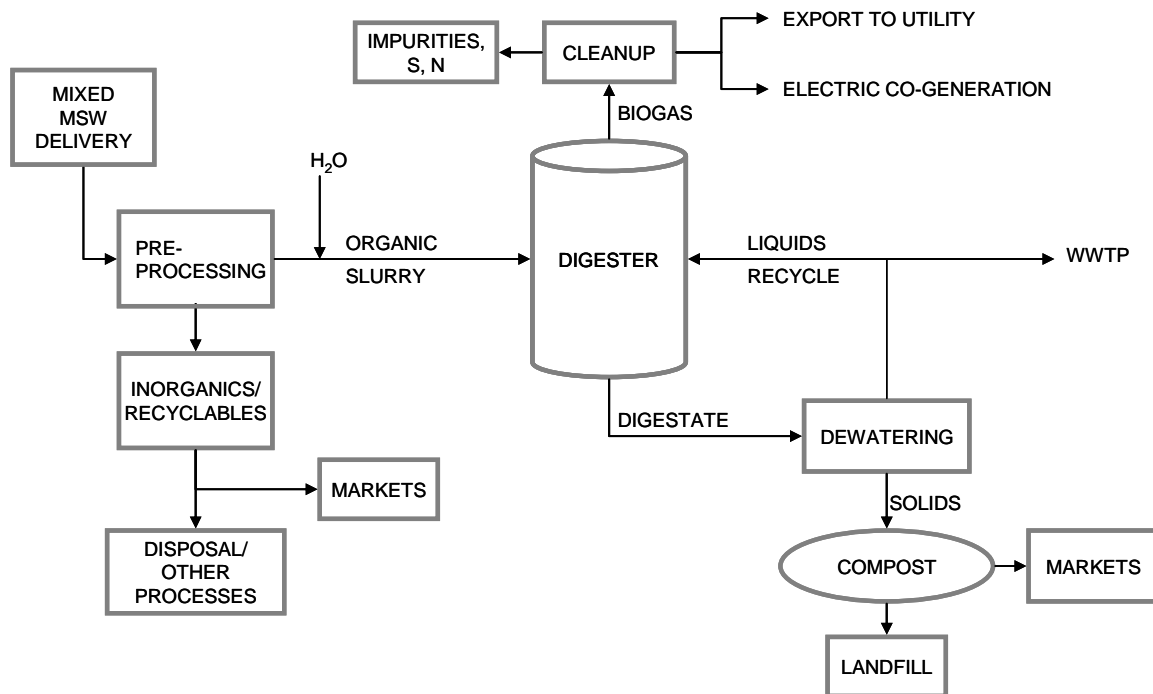
Biological/chemical waste treatment technologies are generally low temperature (several hundred degrees Fahrenheit or less) operations that require a biodegradable feedstock. Many can accept high moisture content materials. For the purposes of this study, biological/chemical processes were limited to anaerobic digestion and acid hydrolysis. By-products of biological/chemical technologies typically include compost, chemicals, and gases.

5.2.3.1. Anaerobic Digestion

Anaerobic digestion of MSW is used commercially in Canada and Europe, mostly using source separated organic wastes. Typical organic wastes include kitchen waste, yard waste, and paper waste. For this process to be efficient with mixed MSW, pre-processing

is required to remove non-biodegradable materials, such as metals and plastics. The feedstock is often shredded and pulped to improve removal of inorganic materials and grit. The resulting organic feedstock (or slurry) is processed in one or more digestion units. Figure 5-5 illustrates a typical process for anaerobic digestion system.

Figure 5-5: Anaerobic Digestion



The anaerobic digestion process produces gas that is approximately 50-70% methane. This gas (or biogas) requires cleanup and can be used in co-generation engines to produce electricity or exported to a utility pipeline. The compost by-product is produced from the dewatered solids left from the anaerobic digestion process, which typically requires aerobic treatment for several weeks. Dewatering effluent can be recycled to the digester or discharged to a wastewater treatment plant.

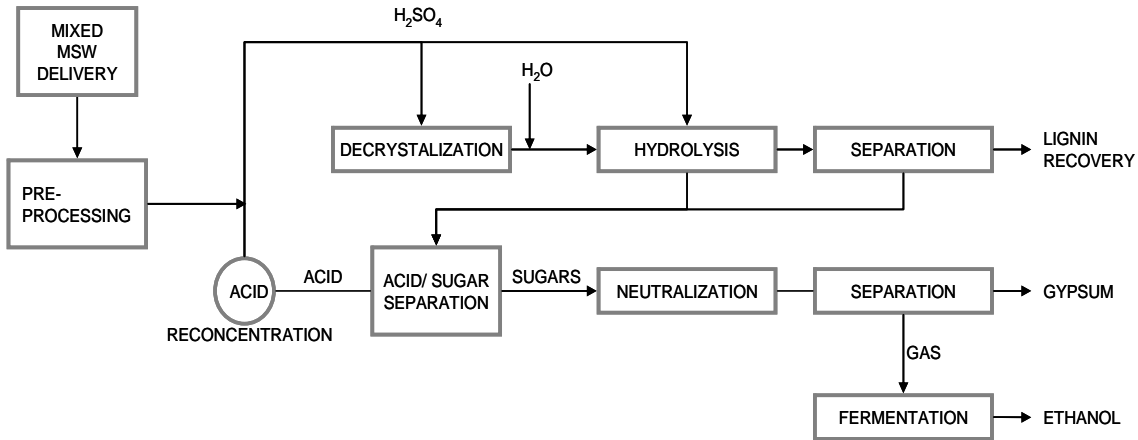
Compost products may be marketable if the material can meet market quality standards and is sufficiently free of objectionable material such as colorful plastic. Otherwise, the solid by-products may be useful as landfill cover. If these materials are not marketable as compost or landfill cover, additional costs for disposal will incur.

5.2.3.2. Acid Hydrolysis

Acid hydrolysis is a chemical process that converts cellulose-based materials to ethanol. The acid hydrolysis process requires significant pre-processing of mixed MSW to

produce a feedstock that is suitable for this system. Figure 5-6 illustrates a typical process for acid hydrolysis treatment system.

Figure 5-6: Acid Hydrolysis Treatment



One proprietary process assessed for this report uses a sequence of material preparation, acid hydrolysis, fermentation and distillation to convert the processible fraction (cellulose) to sugars. The sugars are further processed in a fluidized-bed gasifier for acid separation. The recovered acids are recycled within the process and the gasified sugar stream is fermented with yeast to form ethanol. The ethanol is distilled using unleaded gasoline to produce a standardized fuel grade product. The fermentation process also generates carbon dioxide, which can be collected as a marketable product.

It is reported that the system can be sized to process up to 753 tpd of MSW in multiple units. The overall process includes pre-processing to remove large items, metals, and plastics. Additionally, the process is reported to produce up to 272 pounds of ethanol per ton of MSW processed. Information reported suggests that approximately 10% of the incoming waste forms a residual. While the available information is not clear, it is assumed that the reported residual generation rate excludes materials removed through pre-processing.

5.2.4. Composting

Yard waste, biosolids and the degradable portion of an MSW stream can be biologically processed by microorganisms into a stable humus-like mixture suitable as a mulch, soil conditioner, or landfill cover. In addition to the potential nutritive value of this material for agricultural use, the process allows for the volume reduction of the putrescible portion of the waste stream by 50 to 85 percent. Assuming that it can be used for this intended purpose, this portion of the waste stream can bypass the landfill. Composting could therefore be used in conjunction with other waste disposal methods as long as provisions are made to deal with the metal, plastic, glass, and other non-compostable portions of the incoming waste stream.

5.2.4.1. Description of Technology

Composting systems utilize the ability of aerobic microorganisms such as bacteria and fungi to biologically decompose organic matter. The presence of oxygen and water help stimulate the growth of the bacterial organisms, which then decompose the putrescible fraction of the waste, causing the release of carbon dioxide (CO₂) and energy in the form of heat. If the process is sufficiently controlled and adequate time is allowed for the biological process, the result will be the volume reduction of organic waste and compost that can be used as a soil conditioner or landfill cover. Four typical composting methods are the windrow system, aerated static pile, in-vessel composting, and anaerobic digestion.

Windrow Method: Windrows are long piles of compostable materials, usually 14-16 feet wide and 4-8 feet high. This height is ideal to allow the compost to generate heat and maintain temperature and oxygen to diffuse through the pile. The rows are kept moist and turned over to aerate the system, which promotes uniform decomposition and ensures that all the material decomposes at a satisfactory rate.

Windrows are turned by machines equipped with augers, paddles, or tines. This maintains the porosity of the windrow and moves material on the surface of the windrow to its center to be composted. Machines may also supplement the windrow with water to maintain moisture. Turning also releases heat and moisture in the form of steam. If the windrow is kept too moist, and anaerobic conditions are met in the core of the windrow, turning may also release odors.

Windrow piles generally sit on a hard surface, such as concrete, to facilitate machine turning and may be placed outdoors or under a roof. Placing a pile outdoors increases its exposure to precipitation. If the incoming feedstock already has high moisture content, exposing the pile to precipitation may produce runoff and leachate which must be treated before discharge. Placing a pile under a roof lessens the potential for leachate, but increases initial cost of operation.

Windrows are most commonly used for processing of yard wastes, food wastes, and other organic wastes. However, windrows can be used for the processing of MSW. Many new generation MSW composting facilities install rotary drums as a pre-processing step before the waste moves on to aerated windrows. The rotary drums serve to cut open bags of garbage and mix the organic and non-organic wastes. This process is preferred over shredding, which has been blamed in the past for poor quality compost.

Aerated Static Pile Method: The aerated static pile method is similar in appearance to that of a windrow. The primary difference is the method of aeration. The static pile method does not require turning of the pile, but rather pushes air into or draws through the pile by means of a positive or negative pressure pneumatic blower system. Typically,

air handling ducts are installed in the base of the pile to facilitate this aeration. The blowers are controlled by a timer or a temperature feedback system which modifies air flow to maintain optimal temperatures. The addition of a bulking agent such as wood chips can be used to provide structure to the pile or increase porosity for air flow.

The aerated static pile generally requires less land area than the windrow method. The added structure of the pile and controlled air flow allows piles to be stacked higher; and without the need for turning machines, less space is required between piles. Since the piles are not turned, the material on the surface of the piles may not reach the desired temperature required for composting. To avoid this problem, a 6 to 12 inch layer of finished compost may be placed over the pile to provide insulation.

In-Vessel Composting: The in-vessel method does not use windrows or static piles for the initial composting step, but rather employs an enclosed vessel (such as that employed by the Bedminster technology) into which the preprocessed solid waste is introduced, tumbled, and aerated. The constant movement tends to increase the aeration rate and subsequent decomposition of the waste, thus making it faster than a windrow or static pile method. The most active stage of the compost process takes place in the vessel. After a detention time of one to six days, the composting material is removed from the reactor and is windrowed for curing. An advantage to this system is that environmental conditions can be carefully controlled. Minimal odors and little to no leachate is produced because the process is contained indoors. The major disadvantage of this method in comparison to the windrow or static pile is usually the higher cost of the in-vessel approach.

5.2.4.2. Leaf and Yard Waste Composting

Leaf and yard waste (i.e., grass clippings and brush) is an easily separable component of the waste stream, and is relatively free from contaminants and non-compostable materials, thus can yield a uniform and readily marketable compost product. Since, these wastes can constitute from 15 to 25 percent of the waste stream, composting of leaf and yard waste material results in a significant reduction in the quantity of municipal waste requiring disposal. Leaves and yard waste are generated seasonally; therefore, collection would take place only during certain periods of the year. Processing and storage alternatives for yard waste composting range from backyard composting to centralized facilities for more densely populated areas where space is limited. Backyard composting and grasscycling are discussed in the source reduction portion of this Report.

Centralized compost facilities can employ a range of technologies to effect composting from minimal technology to high-level technologies. The advantages and disadvantages of these various technology levels are related to the relative area requirements, operational requirements, capital and operating costs, and time required to produce the compost product. Land requirements depend on the volume and types of yard waste to be

composted and the type of equipment used for composting. Yard wastes are typically composted by either the “low tech” processing, windrow or aerated static pile method.

5.2.4.3. Mixed MSW Composting

Mixed waste composting is inherently more difficult to accomplish than yard waste composting due to the heterogeneous nature of the waste accepted by the process. The compost product can be significantly contaminated with non-compostable materials such as glass, plastic, metals, as well as trace amounts of household hazardous waste that could render the compost unacceptable for beneficial uses, and thereby require that it be disposed or used as landfill cover. This would defeat the materials recovery purpose of composting, although it would still provide volume reduction. The municipal waste stream typically will require extensive processing prior to composting to remove non-compostable materials. This step may be in conjunction with a MRF. In 2003, Stearns & Wheeler presented for the Federation of New York Solid Waste Associations Solid Waste / Recycling Conference and Trade Show that MSW Composting becomes cost competitive when local disposal rates are in the \$60 per ton range and recycling costs are in the \$100 per ton range (2003 dollars).

5.2.4.4. Source Separated Composting

If residents and certain commercial establishments separate their organic waste properly, source separated organics composting at the point of generation may reduce contamination of compost, thereby eliminating the need for front-end processing, and improving the marketability of the compost product. However, collection of separated food waste will likely require that a special collection system be implemented. Concentrated food waste is very moist and begins to decompose and release odors immediately, attracting vermin more readily. This necessitates special lidded, sealed containers for each waste generator. Collection also needs to be more frequent; a minimum of twice per week. Otherwise the waste can become rancid and cause potential public health problems. Special collection vehicles may also be necessary to better contain liquid runoff from food wastes. A public education program would be required to assist with implementing the facility.

The collection of source separated food waste from the commercial sector may be easier to accomplish because there are fewer generators, with each typically generating larger quantities of food waste. Additionally, collection is often provided more frequently in the commercial sector (i.e., several times per week) due to the large quantities of waste generated.

5.3. Sewage Biosolids Processing

Pursuant to a Consent Order executed with DEC and the USEPA, the County must dispose of the sewage biosolids (sludge) produced by the Yonkers Joint Wastewater

Treatment Plant (YJWWTP) through a method recognized by DEC as a beneficial use. The State defines beneficial use as a process “after stabilization, composting, heat drying, or chemical fixation [where] biosolids can be beneficially used at appropriate application rates as soil conditioners (fertilizers, sources of organic material, etc.) on farmland, forest land, public works projects, landscaping activities, and land reclamation.” (Biosolids Recycling Fact Sheet Number 1, NYSDEC, Division of Solid & Hazardous Materials, Bureau of Waste Reduction and Recycling) Currently, waste-to-energy is not considered beneficial use for sludge disposal.

Sludge produced by the YJWWTP is processed in two steps. The primary sludge is thickened by means of gravity thickeners and anaerobically digested for volatile destruction and stabilization; a process that heats and mixes sludge in vessels and uses microorganisms to break down organic material, producing digester gas. The secondary sludge is thickened by dissolved air flotation thickeners and belt thickeners and anaerobically digested for volatile destruction and stabilization. The digested sludge is further dewatered by centrifuge to between 20 and 30 percent solids. The digester gas, comprised mainly of methane, is harvested and recycled to fuel engines that generate process air to meet the plants process air requirements. Installation of a cogeneration unit to burn excess methane and generate electricity is planned. This project is out to bid and construction is expected to begin in 2011.

In order to comply with the beneficial use mandate, the County contracts with Tully/Hydropress to remove the sludge from the YJWWTP for beneficial use. In 2010, 9,512 dry metric tons (10,292 tons) of sludge was removed from the YJWWTP for beneficial use. An additional 1,831 wet metric tons (2,018 tons) of sludge was taken off site and not used for beneficial use. This sludge came from digester clean out operations.

Sludge from the Blind Brook, Port Chester, Ossining, and Peekskill Wastewater Treatment Plants was beneficially used. In 2010, 3,094 dry metric tons (3,411 tons) of sludge was removed from the wastewater treatment plants by SPECTRASERV, who is under contract with the County. The sludge was transported to the SPECTRASERV Kearny, NJ Residuals Processing and Transfer Facility, where it was mechanically dewatered and chemically stabilized with lime, if necessary. Beneficially used sludge was used for on-going strip-mine reclamation programs and as landfill cover.

Sludge from the Mamaronek and New Rochelle Wastewater Treatment Plans was not beneficially used. In 2010, 4,414 dry metric tons (4,866 tons) of sludge were thickened, dewatered, and removed by truck by Veolia WWTP, under contract with the County, for disposal at either a landfill or incinerator.

As contracts with the existing contractors for the beneficial use of the County’s sludge comes to a close, the County will consider issuing an RFP that is open to other beneficial

use technologies to perform a cost-benefit analysis. The following section describes potential beneficial uses for sludge produced at County wastewater treatment plants.

5.3.1. Biosolids for Land Application

Sludge processed through anaerobic digestion is classified by the State of New York as Class B indicating that pathogens in the sludge have been reduced, but not eliminated. Sludge after digestions is rich in agronomic properties including nitrogen, phosphorus, and organic matter. In New York, agricultural land application for non-food production crops is an accepted use for Class B biosolids. Biosolids are either spread on top of or injected into the soil in a liquid or semi-solid state to provide nutrients for plant growth. Additional options for beneficial use of sludge within the State of New York are limited.

5.3.2. Heat Drying of Biosolids

Biosolids that are hauled out-of-state can be classified as Class A, depending on the state accepting the material. Therefore, other options for beneficial use become available.

Dewatered sludge from the YJWWTP can be heat dried to remove moisture from the biosolids, producing a pelletized product that can be shipped as a fertilizer and may even generate a premium. The Milwaukee Metropolitan Sewerage District markets their pelletized sludge as a popular organic nitrogen fertilizer called Milorganite®.

Alternatively, dewatered sludge can be used in gasification. Small amounts of oxygen, air or steam are added to oxygenate carbon-based feedstocks in a gasifier to produce syngas (carbon monoxide (CO) and hydrogen (H₂)) at temperatures of over 1,000°F. Syngas can be sold on the market or used to generate electricity on-site.

5.3.3. Biosolids for Waste-to-Energy

Currently, WTE is not designated as a beneficial use for biosolids. However, as previously discussed, the New York State Energy Law classifies “wastes” as a renewable energy resource. Designating waste-to-energy as a beneficial use would allow the County to dispose of its sludge at the CPRRF in Peekskill, thereby saving an estimated \$3 million annually on disposal fees for the YJWWTP sludge alone.

Dewatered sludge from the YJWWTP can be used to supplement MSW capacity at the CPRRF. The maximum energy Btu value would be achieved if the sludge were not digested, but only dewatered. This process would discontinue the recovery of digester gas to generate process air and electricity at the YJWWTP. However, if the YJWWTP wished to continue anaerobically digesting the sludge and producing digester gas, the digested sludge could still be dewatered and disposed of at the CPRRF, recovering approximately half of the energy Btu value as it would have before digestion. To use biosolids as a fuel at the CPRRF, the facility would need to be modified to provide an enclosed system for feeding the biosolids directly into the boiler.

5.4. Unsolicited Proposals for MSW and Sewage Sludge

In addition to the technologies explored above, the County has received unsolicited proposals that use composting, gasification, and/or other processes for the handling of MSW, organic materials, and sewage sludge. Some of these processes include the production of biofuel feedstock and electricity. These include technologies from Concord Blue, Emerald Green, Max West, Synagro, We Care Organics, North American Trading House, and the Green-Gen Group. The key factor in implementing such technologies is cost and scale. The County continues to monitor these technologies and is looking to resolve issues of cost, space restrictions and distribution of economic risk.

6. Integrated System Selection

In 2010, the per capita solid waste generation rate for Westchester County was 8.2 ppd (Table 6-1, line 3) after removal of construction and demolition debris, biosolids, and industrial waste. After implementation of the County's existing recycling programs and source separation laws, the per capita disposal rate was 4.8 ppd (Table 6-1, line 9). When the source separation law for plastics coded 3 through 7 goes into effect in July 2010, and after beneficial use of ash from the CPRRF as alternative daily landfill cover; the per capita disposal rate will be reduced to 4.4 ppd (Table 6-1, line 13). This is considered the baseline per capita solid waste disposal rate. The following section outlines steps to further reduce the per capita solid waste disposal rate. This section discusses strategies that the County can employ to reduce the per capita solid waste disposal rate to meet the Beyond Waste goal of 0.6 ppd by the year 2030.

6.1. Impact of Waste-to-Energy

In June 2007, the County and RDD solicited proposals to provide MSW management and disposal services within the District. This Request for Proposals (RFP) invited proposers to submit proposals describing their technical, financial and business approaches to provide long-term capacity to replace the capacity at the CPRRF expiring under the County's Disposal Services agreement with Wheelabrator. The RFP encouraged proposers to evaluate emerging technologies. No proposal was submitted for an emerging technology.

In October 2009, as noted in Section 4.1.8, the County entered into a new agreement with Wheelabrator for 10 years with three 5-year renewal periods, where the first renewal period is at the sole option of the County. Under the new agreement, the County pays a tipping fee of \$71.50 per ton of solid waste disposed of at the CPRRF, subject to an annual adjustment based on the consumer price index (CPI). Pursuant to an IMA between the County and the RDD member municipalities, the RDD members pay the County a \$25 per ton tipping fee for solid waste, subject to an annual adjustment based on the CPI. The difference between the two tipping fees is paid through the District ad valorem tax. Under the new contract, the County does not have a minimum annual solid waste quantity obligation. Additionally, the contract allows the County to divert up to 50,000 tons of solid waste annually to explore new solid waste disposal technologies.

Waste-to-energy is an important component of the County's integrated solid waste management plan. At this time, 25 states, the District of Columbia and Puerto Rico define MSW as a renewable energy source, when diverted to a WTE facility for energy recovery. These states are listed in Table 5-1 and discussed further in Section 5. The

New York State Energy Law Section 1-103(12) classifies “wastes” in the definition of a renewable energy resource. The United States Environmental Protection Agency (USEPA) also differentiates between MSW diverted for combustion with energy recovery and MSW discarded in a landfill or combusted without energy recovery. (USEPA Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2008. <http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2008rpt.pdf>)

In 2010, approximately 524,957 tons of MSW generated within the County were processed at the CPRRF for energy production. IMA municipalities and non-IMA municipalities delivered 391,189 tons and 7,219 tons, respectively, and 126,549 tons from within the County were delivered through other contracts with Wheelabrator. It is assumed that 14 percent of the remaining MSW generated in the County and not processed at the CPRRF is also diverted for combustion with energy production. This percent is consistent with that reported in Table 7.1 on page 93 of Beyond Waste. If the portion of MSW diverted to combustion for energy production, excluding the Facility’s ash residue, is considered to be diverted from disposal at the landfill, the County’s disposal rate falls from 4.4 to 2.0 ppd (Table 6-1, line 15). It is important to note that if this portion of the waste stream were not classified as diversion, the only way for the County to meet the State’s 2030 goal of 0.6 ppd would be to divert waste through other means. This act would require a replacement energy source for the CPRRF from fossil fuels. A summary of the County’s baseline MSW diversion from landfills based on 2010 MSW quantities and additional source separation of plastics coded 3 through 7 is provided in Table 6-1.

**Table 6-1:
Baseline Municipal Solid Waste Diversion from the Landfill**

Item	Baseline Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
1	County-Wide Solid Waste Generated	1,939,581	11.2	11.2
2	Construction & Demolition Debris Waste	500,188	2.9	8.3
3	Biosolids (1)	20,780	0.1	8.2
4	Municipal Recyclable Materials (2)	86,567	0.5	7.7
5	Municipal Bulk Metal (3)	20,069	0.1	7.6
6	Municipal Yard Waste	225,723	1.3	6.3
7	Private Recyclable Materials (2)	191,457	1.1	5.2
8	Private Yard Waste	38,171	0.2	5.0
9	Municipal Household Recyclables/Other (H-MRD or diverted to H-MRF) (4)	34,004	0.2	4.8
10	Source Separation Law for Plastics #3-7 (IMA through MRF Retrofit) (5)	10,171	0.06	4.7

Item	Baseline Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
11	Source Separation Law for Plastics #3-7 (non-IMA) (5)	11,217	0.07	4.6
12	C&D Debris Recycling Facility (6)	0.0	0.0	4.6
13	Ash Beneficially Used as Alternative Daily Landfill Cover (7)	42,513	0.2	4.4
14	Combustion with Energy Recovery (not including ash produced) (8,9)	408,932	2.4	2.0
15	Total Disposed to Landfill (including Ash)	349,791	2.0	

- Notes:**
- Includes 10,485 tons beneficially used by composting for land application, 3,411 tons beneficially used for strip-mine reclamation, 4,727 tons for incineration, and 2,257 tons disposed.
 - "Municipal and Private Recyclable Materials" include both fiber (i.e. newspaper, mixed office paper, cardboard, etc.) and recycled commingled containers (i.e. glass, plastics, aluminum cans, etc.).
 - "Bulk Metal" includes 12,573 recycled tons recovered from the Charles Point Resource Recovery Facility in the year 2010 and is not included in the "Disposed as Solid Waste" column.
 - "Household Recyclables/Other" includes household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be shredded and other electronic wastes and white goods. The diversion rate for household recyclables upon opening of the H-MRF is expected to, at a minimum, remain the same as diversion rate from H-MRDs. The diversion rate may increase based on participation of local communities.
 - Diversion of plastics coded 3 through 7 is projected to be approximately 2.6% of MSW disposed based on US waste characterization studies and a projected recapture rate of 90%. The diversion rate may increase based on participation of local communities.
 - Quantity of C&D Debris is not factored into the MSW disposed. Diversion and recycling of C&D Debris is expected to increase due to the opening of the C&D Debris Recycling Facility.
 - Ash produced from MSW at WTE facilities is typically 25% of the MSW by weight. The ash from the CPRRF beneficially used as alternative daily landfill cover is currently at 56,000 tons per year (see Appendix F). The proportion of this ash from County supplied MSW is 42,513 tons based on the ratio of In-County to Out-of-County MSW processed at the CPRRF.
 - Combustion with Energy Recovery includes the non-ash portion of MSW reported by the CPRRF as having originated within the County plus the non-ash portion of other MSW generated within the County (approximately 14% of MSW not delivered to the CPRRF). It is assumed that 14% of remaining waste is managed through combustion as reported in Table 7.1 on page 93 of NYS Beyond Waste.
 - New York State Energy Law Section 1-103(12) classifies "wastes" in the definition of a renewable energy resource. The USEPA differentiates between "Combustion with Energy Recovery" and "Discards to Landfill and Other Disposal."

6.2. Impact of Future Programs

The County is considering future source separation and recycling programs to further reduce the per capita waste disposal rate within the County. Based on the on the waste characterization presented in Section 3, the County projects that it can capture additional recyclables from the solid waste stream through education and enforcement of source separation laws. Table 6-2 presents the normalized average from the waste characterization in Section 3 and the projected recapture rate of disposed recyclables if these programs are implemented. Programs to be implemented may include increased education and enforcement, optical sorting equipment installed at the MRF, and a food waste recycling program. Using the assumptions presented below, the County projects that it can capture and recycle/compost approximately 23.4% of the solid waste disposed.

**Table 6-2:
Projected Recyclable Recapture from MSW Disposed**

Recyclable Material	Normalized Average (1)	Projected Recapture Rate	Projected Recaptured from MSW Disposed	Program
Paper (including newspaper, plain OCC, kraft paper, and other mixed paper)	14.6%	75%	11.0%	Education & Enforcement
Plastics #1 -2	2.2%	75%	1.7%	Education & Enforcement
Plastics #3 -7	2.9%	90%	2.6%	Optical Sorter at MRF
Glass (Clear/Green/Brown)	2.7%	50%	1.3%	Education & Enforcement (Limited by market incentives)
Metals (aluminum cans/foil/tins)	0.6%	50%	0.3%	Education & Enforcement (Limited by existing high recycling rate)
Yard Waste	4.7%	50%	2.3%	Education & Enforcement
Food Waste (2)	18.1%	23%	4.2%	Food Waste Recycling
Total	45.8%	-	23.4%	

Notes:

1. Normalized average is based on average waste composition from the NYCDEP, Onondaga County, New York State, and USEPA waste characterization studies (refer to Table 3-3).
2. Projected recapture rate of food waste is assumed to equal 50% of commercial/institutional food waste in MSW. Based on Section 7.1.5 of Beyond Waste, approximately 46% of MSW generated in the State is from commercial/institutional establishments. Therefore, the projected recapture rate is 23% of total food waste in MSW.

In addition to recapture of additional recyclable materials from MSW disposal, another strategy to reduce MSW disposed is to beneficially use all of the ash from the CPRRF as daily landfill cover. The impact of 100 percent beneficial use of ash will vary based on the tons of County MSW disposed of to the CPRRF.

6.3. Impact of Food Waste Program

Food waste collection represents significant opportunities in diverting a portion or the entire food waste stream, which makes up 15-25% of MSW disposed based on waste characterization studies. Products from food waste composting programs may include fuel and soil fertilizers, which further provide environmental benefits. Based on the waste characterization in Section 3, approximately 18.1% of MSW disposed within the County is estimated to be food waste.

As discussed in Section 4.4.2, the County is considering implementing a food waste recycling pilot program. Contingent on the success of this program, the County is considering implantation of a full scale food waste program, starting with commercial

establishments and institutions, to reduce the quantity of MSW disposed. Based on Section 7.1.5 of Beyond Waste, approximately 46% of MSW generated within the State is from commercial and institutional establishments. It is assumed that approximately 50% of food waste generated from the commercial/institutional sector can be captured through this recycling program.

6.4. Impact of Packaging/Product Stewardship

A strategy the County is considering to reduce the per capita waste disposal rate is through source reduction and packaging/product stewardship. Based on the projected recapture rates of recyclable materials presented in Table 6-2 above, the County's goal is to increase packaging and product stewardship gradually to reduce MSW disposed to the 0.6 ppd goal of Beyond Waste by 2030.

6.5. Integrated Solid Waste Disposal System

Westchester County has an integrated solid waste disposal system. As discussed in Section 4.1, non-recyclable MSW from RDD municipalities is hauled either directly to the CRRF or to one of three transfer stations where it is compacted into 75 cubic yard trailers and then transported to the CRRF. Ferrous metals are removed from the ash residue produced at the CRRF. Hauling of a portion of the ash remaining from the CRRF to a disposal site is provided by Wheelabrator, the contract services provider, where it is beneficially used as alternative daily landfill cover or disposed. Non-RDD municipalities either deliver their MSW directly to the CRRF or haul and dispose of their MSW separately.

Recyclable materials are diverted from the solid waste disposal system. Recyclable materials including mixed paper and mixed containers (i.e., glass, metal, and plastics coded 1 and 2) are delivered to the MRF by RDD member municipalities for sorting, separating and marketing. The Northern Tier RDD member municipalities haul their recyclable materials to the Northern Tier Recyclable Materials Transfer Station, where they are transferred to trailers and transported to the MRF. The MRF will be retrofitted with optical sorting equipment by June 2011, increasing its sorting capacity from plastics coded 1 and 2 to include plastics coded 3 through 7. Marketing of the recyclable materials is performed by City Carting of Westchester, the MRF contract services provider. Non-RDD member municipalities collect and market recyclable materials privately.

Recyclable materials other than mixed paper and mixed containers are collected at H-MRD days, E-Waste events, mobile shredder events, and various other programs as discussed in Section 4.2. Materials collected and recycled include: household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be

shredded and other electronic and white goods. In the future, an H-MRF will be constructed in Valhalla, NY to provide a permanent collection site of these materials, which will decrease the number of separate events required throughout the year.

C&D debris waste is privately hauled out-of-County. A C&D Debris Recycling Facility feasibility study will be completed in 2011 to determine if a public facility is feasible as a permanent recycling facility for C&D waste and further encourage the County to recycle C&D waste. In addition, the County will also consider private or a public-private partnership for C&D debris recycling services.

Leaves and organic waste are separated from the waste stream. City Carting of Westchester collects yard waste from municipalities around the County. The yard waste is loaded into trailers. City Carting of Westchester delivers the yard waste to merchant compost facilities. Yard waste has a lower tipping fee than MSW, thus encouraging municipalities to recycle yard waste. Residents are encouraged through continuing education to grasscycle with mulching mowers by leaving grass clippings on their lawns. The County is exploring options for handling organic materials within the County.

To decrease the MSW disposed per capita, the County is considering many programs to increase education and enforcement, and remove additional materials from the MSW stream. An example of a program that the County is considering, based on 2010 MSW quantities, includes additional source separation of plastics coded 3 through 7, recapture of recyclables due to enforcement and education as outlined in Section 6.2, and food waste recycling from commercial and industrial establishments at the projected recapture rates identified in Table 6-2. In addition, the County would incorporate reduction of MSW disposed through packaging and product stewardship by 50 percent to bring the MSW disposal rate to 0.6 ppd. A summary of the program is provided in Table 6-3. A schedule for how the County plans to implement these programs is presented in Section 7.

**Table 6-3:
Projected Municipal Solid Waste Diversion from the Landfill**

Item	Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
1	Count-Wide Solid Waste Generated	1,939,581	11.2	11.2
2	Construction & Demolition Debris Waste	500,188	2.9	8.3
3	Biosolids (1)	20,780	0.1	8.2
4	Municipal Recyclable Materials (2)	86,567	0.5	7.7
5	Municipal Bulk Metal (3)	20,069	0.1	7.6
6	Municipal Yard Waste	225,723	1.3	6.3
7	Private Recyclable Materials (2)	191,457	1.1	5.2

Item	Program	2010 MSW Quantity (tons)	MSW Quantity (lbs/person/day)	Total MSW Disposed (lbs/person/day)
8	Private Yard Waste	38,171	0.2	5.0
9	Municipal Household Recyclables/Other (H-MRD or diverted to H-MRF) (4)	34,004	0.2	4.8
10	Source Separation Law for Plastics #3-7 (IMA through MRF Retrofit) (5)	10,171	0.06	4.7
11	Source Separation Law for Plastics #3-7 (non-IMA) (5)	11,217	0.07	4.6
12	C&D Debris Recycling Facility (6)	0.0	0.0	4.6
13	Increased Commingled Recyclables due to Education and Enforcement (7)	117,059	0.7	3.9
14	Increased Yard Waste due to Education and Enforcement (7)	19,332	0.1	3.8
15	Commercial and Industrial Food Waste Recycling (7)	34,303	0.2	3.6
16	Product/Package Stewardship (7)	315,271	1.8	1.8
17	All Ash Beneficially Used as Alternative Daily Landfill Cover (8)	50,297	0.3	1.5
18	Combustion with Energy Recovery (not including ash produced) (9,10)	162,871	0.9	0.6
19	Total Disposed to Landfill	102,102	0.6	

- Notes:
- Includes 10,485 tons beneficially used by composting for land application, 3,411 tons beneficially used for strip-mine reclamation, 4,727 tons for incineration, and 2,257 tons disposed.
 - "Municipal and Private Recyclable Materials" include both fiber (i.e. newspaper, mixed office paper, cardboard, etc.) and recycled commingled containers (i.e. glass, plastics, aluminum cans, etc.).
 - "Bulk Metal" includes 12,573 recycled tons recovered from the Charles Point Resource Recovery Facility in the year 2010 and is not included in the "Disposed as Solid Waste" column.
 - "Household Recyclables/Other" includes household chemicals, pharmaceuticals, cell phones, televisions, computer monitors, mercury containing devices, fluorescent bulbs, rechargeable batteries, car tires, personal papers to be shredded and other electronic wastes and white goods. The diversion rate for household recyclables upon opening of the H-MRF is expected to, at a minimum, remain the same as diversion rate from H-MRDs. The diversion rate may increase based on participation of local communities.
 - Diversion of plastics coded 3 through 7 is projected to be approximately 2.6% of MSW disposed based on US waste characterization studies and a projected recapture rate of 90%. The diversion rate may increase based on participation of local communities.
 - Quantity of C&D Debris is not factored into the MSW disposed. Diversion and recycling of C&D Debris is expected to increase due to the opening of the C&D Debris Recycling Facility.
 - Assumes projected recapture rates from MSW disposed of 75% of paper, 75% of plastics coded 1 and 2, 50% of clear/green/brown glass, 50% of recyclable metals (aluminum cans, foils, and tins), 50% of yard waste, 50% of food waste from commercial and industrial establishments, and 50% of waste reduction from packaging/product stewardship.
 - Ash produced from MSW at WTE facilities is typically 25% of the MSW by weight. The ash from the CPRRF beneficially used as alternative daily landfill cover is assumed to equal 100% of ash produced from County supplied MSW to the CPRRF. Ash beneficially used as alternative daily landfill cover does not include ash produced from MSW combusted at WTE facilities other than the CPRRF.
 - Combustion with Energy Recovery includes the non-ash portion of MSW reported by the CPRRF as having originated within the County plus the non-ash portion of other MSW generated within the County (approximately 14% of MSW not delivered to the CPRRF). It is assumed that 14% of remaining waste is managed through combustion as reported in Table 7.1 on page 93 of NYS Beyond Waste.
 - New York State Energy Law Section 1-103(12) classifies "wastes" in the definition of a renewable energy resource. The USEPA differentiates between "Combustion with Energy Recovery" and "Discards to Landfill and Other Disposal."

7. Implementation Schedule

7.1. Introduction

As previously discussed, Westchester County currently has a solid waste system in place. This system will continue until the integrated system is completed. The County recycling rate in 2010 was 50 percent under the current system. In June 2011, plastics coded 3 through 7 are to be recycled at the MRF; and C&D debris is recycled privately. H-MRDs, E-Waste Events and Mobile Shredder provide for collection of recyclable materials that are not collected at the MRF until the H-MRF is completed.

To reach the County's recycling goals, additional facility construction and improvements, such as the Household-MRF and MRF Retrofit will be implemented; thereby providing permanent recycling for household waste and plastics coded 3 through 7 within the County. Once evaluation of the alternatives of a private, public-private, or fully public C&D Recycling Facility is completed, the County is also expecting a fixed location for all C&D debris recovery. This section outlines the implementation structure and schedule associated with these programs.

7.2. Administrative Structure

Westchester County is the Planning Unit for solid waste in the County. The operating department for solid waste facilities and programs is the DEF. Transport and disposal of MSW to the CPRRF as well as disposal of the ash residue is contracted to Wheelabrator. Operation of the County-owned transfer stations and the MRF is contracted to City Carting of Westchester. Services for future facilities, including the H-MRF, will be provided by contract operators.

7.3. New Laws and Regulations

As discussed in Section 4.2.1, the County enacted a local law amending the Westchester County SSL to include plastics coded 3 through 7. The law requires the recycling of these additional plastics by waste generators in the County on or after June 1, 2011. Refer to Appendix E for the Westchester County SSL and amendment to the Local Laws to include plastics coded 3 through 7.

7.4. Financial Mechanisms

All costs for implementing the integrated system are part of the DEF operating budget, which gets approved on an annual basis. A copy of the budget can be provided upon request.

7.5. Implementation Timetable

A timetable for implementation of programs to meet the Beyond Waste goals is provided in Table 7-1. The MRF retrofit with optical sorting equipment will be completed in June 2011. The food waste recapture rate is a percent of the total food waste in the MSW stream based on the waste characterization in Section 3. The packaging and product stewardship rate is based on a total percent of MSW disposed and is therefore dependent on all other programs implemented. As the population of the County increases, the County must work hard to retain projected material and food waste recycling and packaging/product stewardship rates. The County will monitor progress of each program each year and amend programs as necessary to maintain progress towards their solid waste reduction goals.

**Table 7-1:
Implementation Schedule for MSW Reduction**

Year	Beyond Waste Goal (ppd)	Westchester County Goal (ppd)	Program(s) to be Implemented
2010	4.1	2.1	■ Base Condition
2012	3.8	2.0	<ul style="list-style-type: none"> ■ Add Plastics #3-7 ■ Increase Education & Enforcement ■ Beneficially Use 100% of Ash
2014	3.4		
2016	2.9		
2018	2.3		
2020	1.7	1.1	■ Increase Product/Packaging Stewardship to 10% of Disposed MSW
2025	1.1		
2030	0.6	0.6	<ul style="list-style-type: none"> ■ Increase Product/Packaging Stewardship to 50% of Disposed MSW ■ Increase Food Waste Recapture Rate to 50% of Commercial/Institutional Food Waste in Disposed MSW

Notes: 1. The Westchester County goal assumes that for the 2010 Base Condition, MSW diverted for combustion through WTE and beneficial use of ash from WTE are not considered part of the per capita waste disposal rate.

Based on the implementation schedule, the County does not anticipate any capital costs will be incurred to meet these goals until implementation of the commercial/institutional food waste recycling program after 2025. The current education and enforcement staffing are sufficient as long as it continues to meet recycling and packaging/product stewardship goals.

7.6. Neighboring Jurisdictions

The County has no direct contracts for transport or disposal of solid waste or recyclable materials with any neighboring jurisdictions of out-of-County entities. All impacts to neighboring jurisdictions are provided by vendors contracted with the County. Prime

contractors for operation of County-owned facilities, as outlined in Section 7.2, provide their own subcontracts for services such as disposal of ash from the CPRRF, marketing of recyclable materials, and composting of yard waste.

7.7. State Support

The County feels strongly that with the steps outlined above, it can significantly decrease its per capita waste disposal rate. However, to reach the Beyond Waste goal of 0.6 ppd, the County requests that the following recommendations for State assistance be considered:

1. Waste-to-energy is an integral part of the County's solid waste management system. The WTE combustion process reduces the weight of MSW by up to 75 percent and the volume of waste by approximately 90 percent before disposing of the ash. The CPRRF also has an electrical generating capacity of 60,000 kilowatts; the equivalent of supplying the electrical needs of 88,000 New York homes. In addition to diversion of MSW from landfills, WTE reduces greenhouse gas emissions by producing electricity without the significant use of fossil fuels and reducing fuel for transport of the MSW to a landfill. Additional revenue is saved from the decrease in fuel used to transport MSW to out-of-state landfills.

MSW, when diverted to a WTE facility for energy recovery, is considered by the State of New York as well as 24 other states, the District of Columbia and Puerto Rico as a renewable energy source and provides economic and environmental benefits over landfill disposal. The County recommends that MSW disposed of at a WTE facility should not contribute to the County's total per capita waste disposal rate. WTE is an important contribution to reducing MSW disposed, while providing a vital economic boost to the community.

2. The first step to reducing MSW disposed of within the County is to enforce the source separation and recycling laws in place. This includes all laws on the municipal, County, State, and Federal levels. Currently, the County is not authorized to enforce laws preempted by State and Federal laws, such as plastic bag and CFC recycling. The County has had great success in enforcement of County laws by authorizing each individual municipality the authority to enforce County source separation laws and incentivizing the enforcement by allowing the municipalities to keep the fines that they collect. The County recommends that the State authorize the County and municipalities to enforce State source separation and recycling laws, with the ultimate goal of reducing recyclable materials in the solid waste stream.
3. Ash produced at WTE facilities can be beneficially used for many purposes. Currently, approximately 40% of the ash produced at the CPRRF is beneficially

used as an alternative daily landfill cover. However, the bottom ash from the CPRRF and other WTE facilities can be used for many other purposes, such as an aggregate for road base or in concrete, such as Jersey barriers or parking blocks.

Part 360 of the Solid Waste Management Facility Regulations specifies that bottom ash residue can be beneficially used if the permittee demonstrates that the material is not a waste, has a known market or disposition, is not accumulated on speculation, is not a public health risk, and that contractual arrangements have been made for use of the material in a production process. Furthermore, the permittee must chemically and physically characterize the ash residue and each finished product, and identify the quantity and quality to be marketed. The County recommends that the State participate to pass regulations promoting or mandating the beneficial use of ash from WTE facilities.