

2013 Annual Recycling Report

**City of Philadelphia
Division of Aviation
Planning and Environmental Stewardship Unit
September 2014**



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Table of Contents

GLOSSARY OF TERMS	ii
EXECUTIVE SUMMARY	v
I. Introduction	1
Environmental Stewardship and Recycling.....	1
Environmental Policy Statement	2
II. 2013 Environmental Accomplishments	4
Recycling and Solid Waste	4
DOA 2013 Waste Disposal and Recycling Tonnage.....	5
DOA Recycling Diversion Rates.....	6
Shredded Paper Recycling.....	11
Construction and Demolition (C&D) Waste	11
SEPTA Platform Study.....	11
Public Outreach and Education	13
Earth Day 2013.....	13
America Recycles Day 2013	14
Messaging on Shuttle Buses	15
Recycling Award and Video Production	15
Recycling Committee	16
Tenant Recycling	16
MarketPlace Philadelphia Management.....	16
US Airways	18
Tenant Pilot Compactor Program	18
Hazardous Waste.....	19
III. Future Goals and Objectives	20
Food Waste Collection	20
Security Checkpoint Waste Reduction.....	20
Partnering Opportunities: Expansion of Tenant Recycling	21
Waste and Recycling Receptacle Placement and Messaging	21
Expansion of C & D Waste Recycling Program	22
Study of the Feasibility of a Source-Separation Facility	22
IV. Conclusion.....	23

GLOSSARY OF TERMS

BigBelly®: a trademarked two-component system made up of a recycling receptacle and a compacting trash receptacle for external use. The solar-powered and software controlled components send a message when a receptacle is reaching capacity, thereby saving money through reduced waste collections.

Construction and Demolition (C & D) Waste: discarded materials generally considered to be not water soluble and non-hazardous in nature, including but not limited to steel, glass, brick, concrete, asphalt material, pipe, gypsum wallboard, and lumber, from the construction or destruction of a structure as part of a construction or demolition project, or from the renovation of a structure.

Envyrozones®: commonly used to describe the Hazelton product line of Envyrozone, Inc., which is a trademarked, interior multiple collection receptacle for trash, paper, bottles and cans. There are 56 “Envyrozones” located throughout PHL’s terminals.

Fullness Usage System: a pressure gauge and electronic monitoring system that tracks a waste or recycling compactor’s activity and reports container fullness levels to a computer. This equipment sends a message when a compactor is reaching capacity, thereby saving money through reduced waste collections. This system also eliminates the need for employees to check and report the fullness level of each container.

Hauling: the transport of waste materials or recyclables in accordance with local environmental guidelines or laws.

Hazardous Waste: waste that is dangerous or potentially harmful to our health or the environment. Hazardous wastes can be liquids, solids, gases, or sludges. They can be discarded commercial products, like cleaning fluids or pesticides, or the by-products of manufacturing processes.

Keep America Beautiful: the nation's largest volunteer-based community action and education organization. With a network of more than 1,200 affiliate and participating organizations, Keep America Beautiful (KAB) forms public-private partnerships to advance programs that engage individuals to take greater responsibility for improving their community's environment.

LEED: Leadership in Energy and Environmental Design. A rating system developed by the U.S. Green Buildings Council for the design, construction and operation of high performance green buildings, homes and neighborhoods.

Marketplace Philadelphia Management (MPM): as part of Development, Inc. (a retail development firm that partners with airports and businesses to develop, lease, and manage retail programs), Marketplace Philadelphia handles the development,

management and leasing of all retail, food and beverage concessions throughout the seven domestic and international terminals at PHL.

MTCO2E: Metric Tons of Carbon Dioxide Equivalent. This unit of measurement represents an amount of a greenhouse gas whose atmospheric impact has been standardized to that of one unit mass of carbon dioxide.

OCC: an acronym that stands for Old Corrugated Cardboard (OCC). OCC is a paper-based material that is widely used in the manufacture of corrugated boxes and shipping containers.

RCRA: Resource Conservation and Recovery Act

Recyclables: Existing waste materials and goods that are able to be reprocessed and reused. At PHL these items consist of recyclable plastics (#1-7), glass, aluminum, shredded paper, corrugated cardboard, C & D waste, tires, and scrap metal.

Recycling Diversion Rate: the rate or percentage of waste diverted to be recycled rather than disposed of in a landfill. It is calculated by dividing the total tonnage of recyclable material by the total generated tonnage of regular waste plus the tonnage of the recyclable material.

Regular Waste: waste that is not considered recyclable or special cleanups that are disposed of in a landfill.

SEPTA: Southeastern Pennsylvania Transportation Authority whose rail, bus, and trolley lines serve Chester, Delaware, Bucks, Montgomery and Philadelphia counties.

Single Stream Recycling: a system in which all recyclable paper, plastics, metal, and glass are disposed in the same container and commingled instead of remaining separate during the waste collection and hauling process. In single stream, both the collection and processing systems are designed to handle this fully commingled mixture of recyclables, with materials being separated for reuse at a materials recovery facility.

Special Cleanups: waste that is generated through specific projects and often consists of, but is not limited to, tree stumps, concrete cinder blocks, street sweeper dirt and other materials not considered regular waste and is disposed of in a landfill.

Transportation Security Administration (TSA): a federal agency established to protect the nation's transportation systems to ensure freedom of movement for people and commerce.

Total Generated Tonnage: the amount of regular waste tonnage plus the amount of recyclables tonnage.

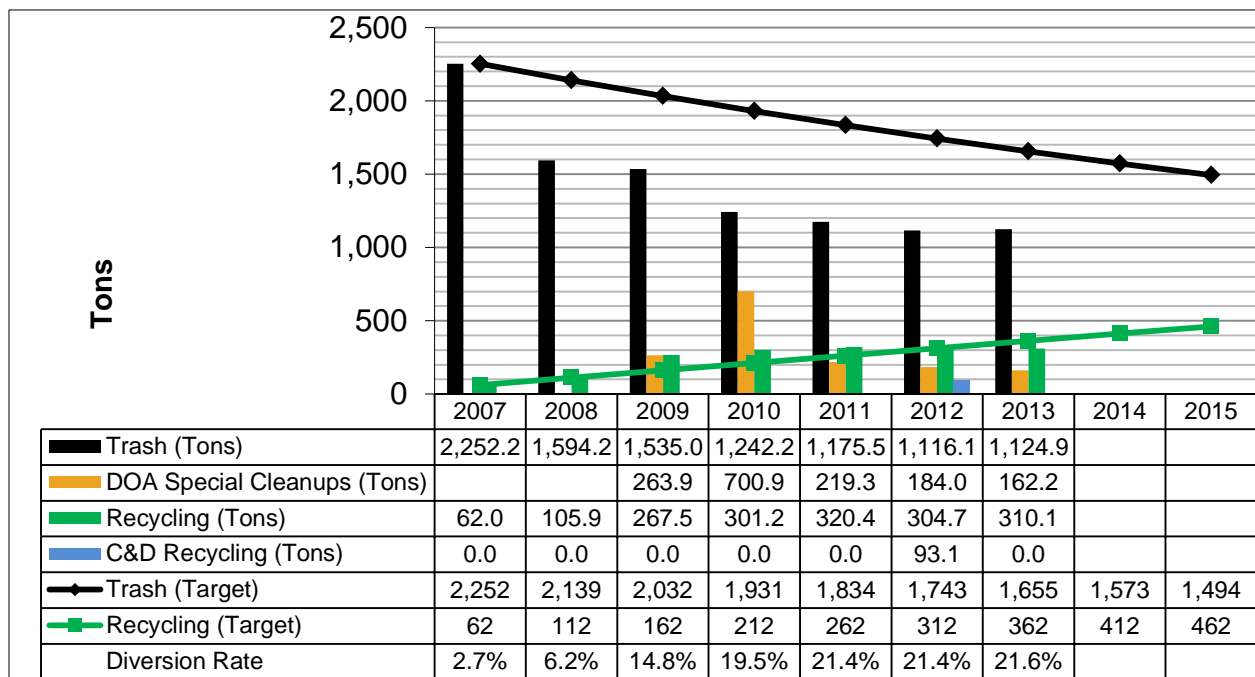
Waste Stream: the aggregate flow of waste material from generation, to handling and transport, to final disposition.

EXECUTIVE SUMMARY

This report provides a summary and analysis of 2013 environmental reporting on recycling and waste management programs under the Philadelphia Division of Aviation’s control. Also included for 2013 is reporting on hazardous and universal waste collections.

In 2013, DOA hauled 1,124.9 tons of waste and 310 tons¹ of recycling, achieving a diversion rate of 21.6%. This is a negligible increase from 21.4% in 2012² but represents significant progress from a rate of 2.7% in 2007.

Annual Total Solid Waste and Recycling Quantities



When combining DOA’s recycling efforts with Marketplace Philadelphia Management and US Airways for 2013, PHL reduced its greenhouse gas emissions by 5,821 metric tons CO₂ equivalent (MTCO₂e) as a result of waste management practices to divert

¹ An additional 29 tons were separated for recycling; however, the hauling company deemed the loads contaminated and were landfilled.

² The 2012 diversion rate was adjusted to exclude C&D waste.

materials from the landfill through recycling initiatives. In 2013, the recycled a total of 1,818 tons of material and sent 7,775 tons of material to the landfill.

PHL Waste Management	Tons	Types of Waste
Recyclables	292.7	single stream recyclables (mixed paper, glass, metal, plastics)
	6.7	shredded paper
	10.4	corrugated cardboard
	0.4	C&D (scrap metal)
Universal Waste	19	electronics
	0.22	batteries (not included)
Additional Waste	29	single stream recyclables (not included because contaminated)
	2	office paper
US Airways Waste Management		
Recycling	936	single stream plus tires, motor oil, toner cartridges and universal waste
Marketplace Philadelphia		
Single Stream - Recyclables	547	assumed mixture of paper, glass, metal, plastics
Electronics Waste Recycling	0.25	electronics
Metal Waste Recycling	3	mixed metals

Total - 1817.5

Philadelphia's Greenworks Plan sets a goal of diverting 70% of the City's municipal solid waste from landfills through recycling or energy generation. Accordingly, DOA is committed to continuing its success by finding new ways to improve the collection, sorting, and diverting of all streams of recyclable materials. In the short-term, there are opportunities to improve the diversion rate through expanded collection and education efforts. In the long-term, DOA will conduct research into the feasibility of building an on-site sorting facility, similar to other airports such as Fort Lauderdale/Hollywood International Airport and Charlotte-Douglas International Airport, where all waste would be collected via one container and sorted for recycling and composting at a single separation facility.

I. Introduction

This report provides a summary and analysis of 2013 environmental data tracked by the DOA, which includes solid waste, recycling, hazardous waste, universal waste, and construction and demolition (C&D) debris.

Environmental Stewardship and Recycling

Environmental Stewardship is the careful and responsible management of natural and cultural resources for the benefit of present and future generations. PHL is committed to operating its facilities and future developments in an environmentally responsible manner so as to conserve the existing resources unique to the Airport and its environs, and to produce a better environment for neighboring communities, for the public at large, and also for PHL's customers, tenants and staff. In defining and applying sustainable design principles, PHL strives to address environmental issues early in the planning process.

Philadelphia International Airport's (PHL) Environmental Stewardship Plan encompasses many green initiatives to reduce the Airport's impact on the surrounding environment. Over the years the recycling program has served as a cornerstone in the Division of Aviation's (DOA) efforts to improve the sustainability of its operations at PHL. As one of the three key tenets (reduce, reuse, recycle) of sustainable solid waste resource management, recycling reduces the amount of waste that is landfilled, and provides cost savings for PHL's tenants and airlines. PHL is committed to continuing to facilitate the expansion of recycling programs throughout the Airport to maximize its recycling diversion rate.

The City of Philadelphia's Greenworks Plan sets a goal of diverting 70% of the City's municipal solid waste. While DOA is working towards a long-range goal of achieving this milestone, others have also set ambitious recycling goals in municipal government or the aviation industry. San Francisco International Airport (SFO) has a goal to achieve 80% solid waste recycling by 2015. In 2012, SFO had achieved a 78% overall recycling diversion rate and recycles over 90% of C&D waste³. Chicago O'Hare International Airport's latest Sustainable Airport Manual provides guidelines for Chicago Department of Aviation projects, with goals of 100% diversion of recyclable, reusable, or

³ Source: ACRP Synthesis 53: Outcomes of Green Initiatives: Large Airport Experience, 2014

compostable waste from landfill and 100% of soils should be kept onsite during construction projects.

DOA also looks for ways to recycle through its capital building program. The City of Philadelphia requires LEED Silver for all new construction or renovations greater than 10,000 sf. Under this program, the Philadelphia Division of Aviation will apply the mandatory credit of supplying storage and collection of materials for recycling to all LEED certified projects. The Terminal F baggage claim building that is currently under construction will offer recycling to the public and employees. In addition, the Construction Waste Management credit is being sought after, which involves diverting 75% of non-hazardous construction and demolition debris. In addition, the building's concrete will contain 30% slag cement or fly ash.

Environmental Policy Statement

On July 31, 2006 the City of Philadelphia issued its Environmental Policy Statement that applies to the Philadelphia Airport System, which includes PHL and Northeast Philadelphia Airport (PNE).

Philadelphia International Airport Environmental Policy Statement

The many natural resources that surround the Philadelphia International Airport and Philadelphia Northeast Airport, which comprise the Philadelphia Airport System (Airports) have helped shape the region's rich history and their use has led to the region's prosperity. The Airport will focus on protection and restoration to reduce resource use.

The Airports transportation and economic mission will be achieved in a manner that demonstrates responsible environmental stewardship. The implementation of proactive environmental management systems will contribute to the economic, social, and environmental well being of the City of Philadelphia and the metropolitan region.

The Airports will comply with all applicable regulations and other requirements, while striving to continually improve environmental performance, prevent pollution, and reduce the potential impact of their activities. This commitment will be tracked through the establishing, implementing, and reviewing of relevant environmental objectives and targets for Airport operations and activities.

Philadelphia Airport System will actively seek resolutions to environmental issues by striving to achieve the following goals:

Compliance and Monitoring: The Airports will fully comply with all applicable environmental laws, regulations and other requirements, and strive to exceed legal and regulatory standards where doing so is consistent with the transportation and economic development mission of the Airports. Using innovative technologies and best management practices, the airport will develop, monitor, and regularly review specific targets for activities and programs that help achieve compliance and improve environmental performance. The Airports will hold tenants responsible for compliance with all the applicable laws and statutes regulating their activities.

Sustainability: The Airports will strive to reduce the impacts of operations and activities to preserve and protect surrounding natural resources through cost-effective energy use, recycling water conservation, waste reduction pollution prevention activities, and procurement of green materials. Airport facilities, where possible will be designed, constructed, and rehabilitated to make use of sustainable materials and green building techniques.

Communications: The Airports will distribute the environmental policy to all on-Airport city employees so they can be aware of and active in implementing this policy. This policy will serve as an impetus to promoting open discussions among all employees about the environmental aspects of their operations and activities and the environmental management system so that they may make informed choices and assist in the accomplishment of the environmental goals. The airports will require all tenants to communicate to their employees the requirements of the environmental management system.

Environmental Stewardship: Current Airport operations and activities will be modified and improved by incorporating sustainable business practices to minimize or avoid impacts to natural resources to the greatest extent possible. The Airports will participate in activities that assist in enhancing the natural environment with a focus on sustaining resources that are vital to local stakeholders. The Airport will improve overall environmental quality through clean up and restoration efforts focused on areas affected by past Airport operations and activities.

II. 2013 Environmental Accomplishments

Recycling and Solid Waste

The City of Philadelphia's Division of Aviation's (DOA) recycling program at Philadelphia International Airport (PHL) has made great progress since its inception in 1999. The year 2013 continued this trend with a modest increase of 0.2% in the diversion rate. DOA also initiated significant cost-savings through the implementation of the *fullness usage system* in the compactors.

Highlights of the DOA's 2013 recycling program include:

- The recycling diversion rate of 21.6%, up 0.2% from 21.4% in 2012.
- Recycling provided a cost savings of approximately \$26,000.
- The study of PHL/SEPTA rail platform recycling containers provided tips for reducing the diversion rate overall.
- Reduction in pickups from recycling compactors using the Fullness Usage System saved approximately \$10,000.
- DOA received the PROP Waste Watchers Award for its public outreach and education program



PHL Waste Hauling Truck



Pressure Gauge on Compactor

At the end of 2012, DOA switched to a system in which the eight compactors were only emptied when sensors indicated they were full instead of once per month. This system reduced the total number of hauls from 112 in 2012 to about 70 hauls in 2013, resulting in a savings of approximately \$10,000.

DOA 2013 Waste Disposal and Recycling Tonnage

In 2013, DOA recycled over 310 tons of single stream recyclable materials that were deposited via eight compactors, which are strategically located around the Airport for ease of use by custodial staff.

The DOA continued to separate special cleanup waste from the overall DOA waste stream, which totaled approximately 162 tons in 2013. Special cleanup waste is generated from non-routine waste sources and includes items such as tree stumps, concrete cinder blocks, and miscellaneous debris. Due to the inconsistent nature of this element of the waste stream, special cleanup waste is tracked separately from the regular waste, which allows the DOA to more precisely monitor the overall waste stream and diversion rate. Both regular and special cleanup wastes are transported to a landfill for disposal. Regular waste tonnage totaled approximately 1,125 tons for 2013.

DOA Recycling Diversion Rates

The DOA tracked and recorded waste and recycling tonnage throughout 2013 (see **Figure 1 and 2**). As mentioned above, solid waste tonnages are separated into three distinct categories: regular waste, special cleanups, and recyclables. Through the continued expansion of its recycling program, the DOA's regular waste combined with special cleanup waste declined in 2013 compared to 2012. Regular waste totaled just over 1,124.9 tons, a 0.8% increase from 1,116 tons in 2012. The total amount of special cleanup waste equaled 162 tons; a 12.0% decrease from 184.0 tons 2012. In all, the total amount of solid waste hauled in 2012 was reduced by 13 tons or 1% in 2013.

The total amount of recycled waste equaled 310.1 tons in 2013; a 1.7% increase over the 305 tons collected in 2012. The previously reported recycling tonnage for 2012 (397 tons) included construction and demolition (C&D) waste. As with the special cleanup category, C&D recycling is inconsistent. Approximately 93 tons collected in 2012 but only one scrap metal disposal weighing less than 1 ton occurred during 2013. The Pavement & Grounds Unit anticipates another series of hauls in 2014. Since this material is not collected on a regular basis, it is included as a separate category to compare annual progress in consistent terms (see Figure 4).

The DOA's annual goals and observed solid waste and recycling totals from 2007-2012 are illustrated by Figure 1: DOA Annual Solid Waste Annual Goals & Totals (2007-2012) and Figure 2: DOA Annual Recycling Annual Goals & Totals (2007-2012).

Figure 1: Annual Solid Waste Quantities 2007-2013

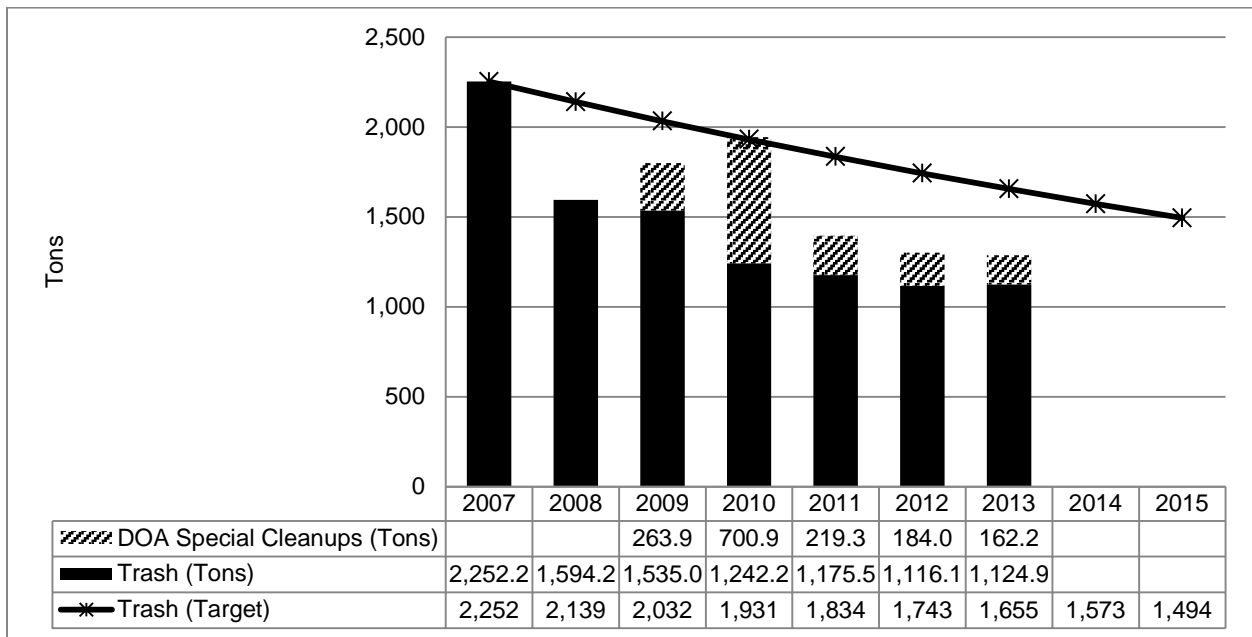
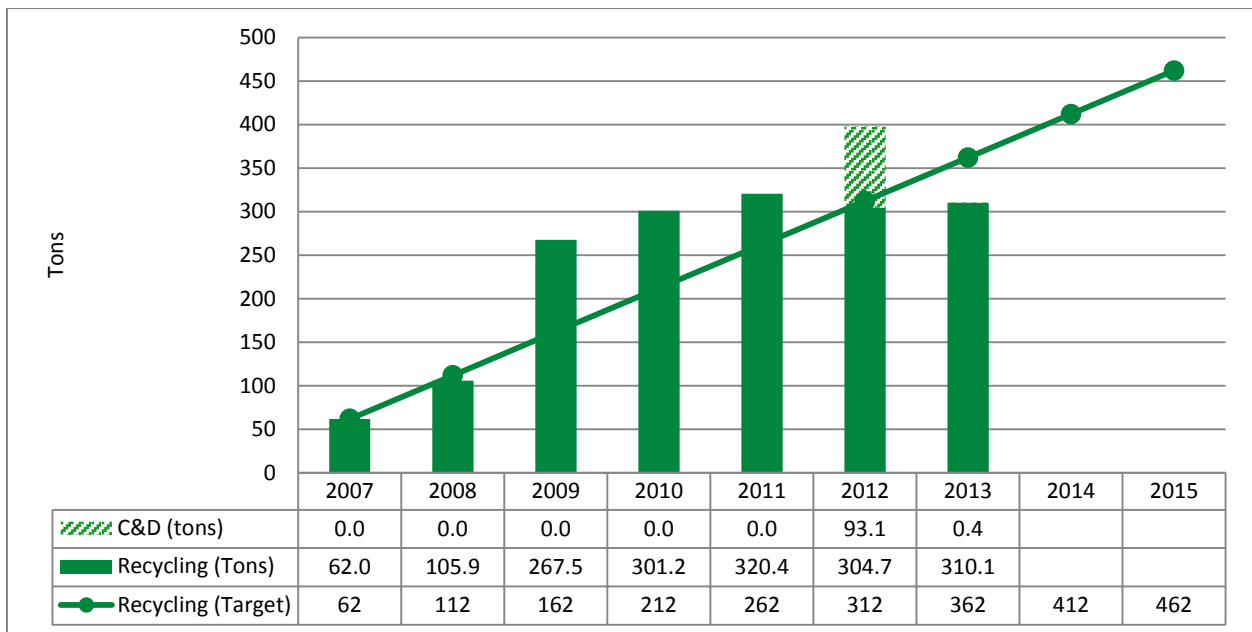


Figure 2: Annual Recycling Quantities 2007-2013

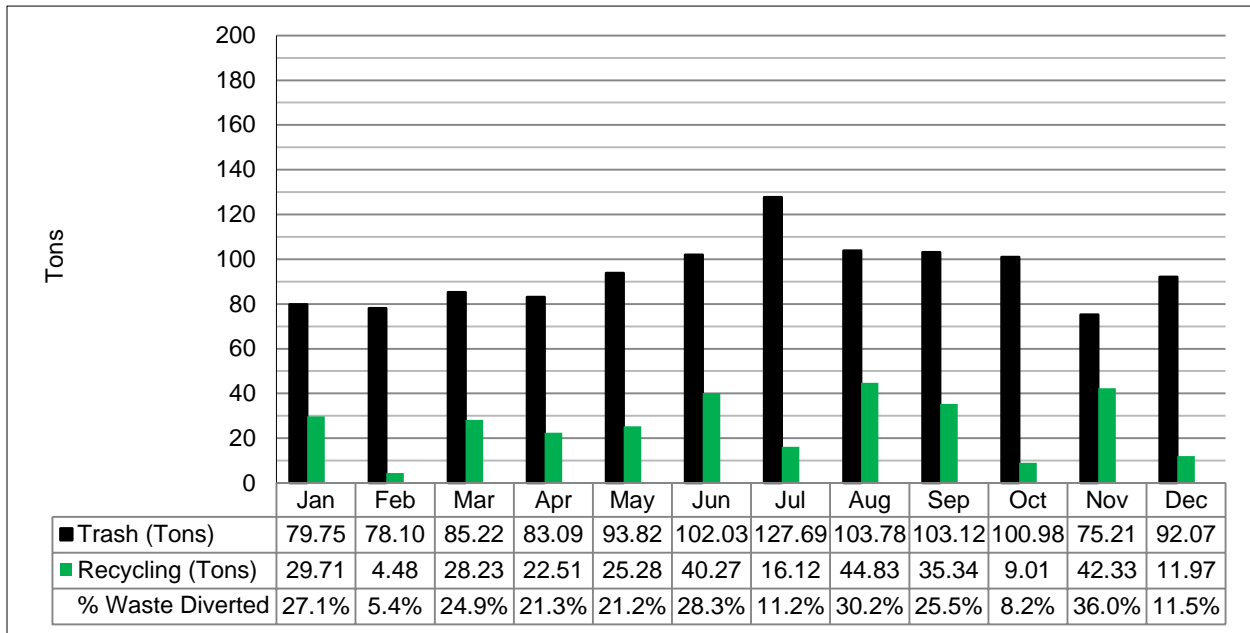


Recyclable materials collected by the DOA in 2013 included: mixed paper, cardboard, glass, metal, plastics (#1 through #7), shredded office paper, and scrap metal. By far the largest component of the 2013 recycling weight total is the 292.7 tons of single stream recyclables that were collected throughout the year. Other noteworthy components include: shredded paper (6.7 tons), corrugated cardboard (10.4 tons), and scrap metal (0.4 tons).

The Planning and Engineering departments completed an office move in 2013 and diverted 8 loads of office paper (8 cy dumpster) from the landfill, approximately 4,000 pounds, which was not included in the annual recycling total as it had to be arranged through a separate contracting mechanism with the recycling hauler where the pick-ups were not weighed.

Also not included in the diversion rate, is the Universal Waste recycled for 2013, including approximately 19 tons of electronics and 440 pounds of batteries that were diverted from the landfill.

To take a closer look at the data throughout 2013, the DOA recycling and trash hauls are tracked on a monthly basis. Diversion rates are calculated by dividing the recycling tonnage by the total generated tonnage, excluding special cleanups. In 2013, the annual DOA recycling diversion rate equaled 21.6%. The monthly diversion rates ranged from a low of 5.4% in February to a high of 36.0% in September (see **Figure 3**).

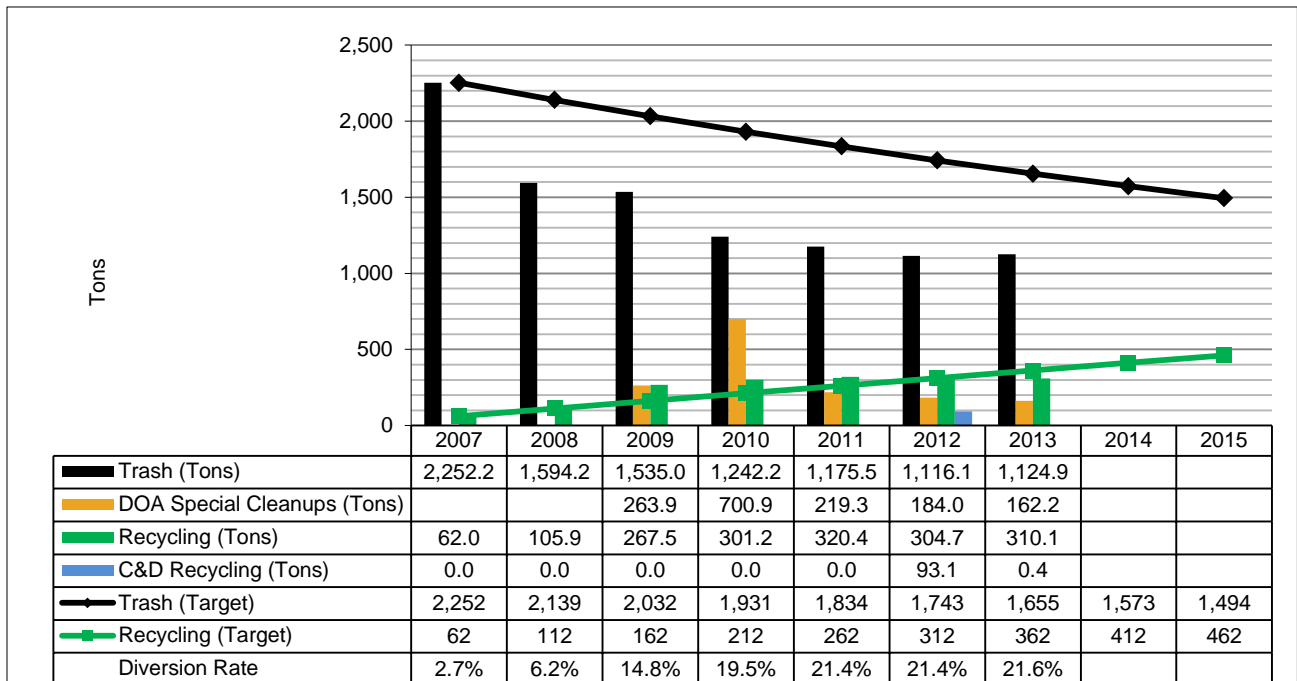
Figure 3: 2013 Monthly DOA Solid Waste and Recycling Quantities

The large degree of variability in monthly diversion rates in 2013 can primarily be attributed to the newly installed (November 2012) Fullness Usage System which now results in the recycling compactors only being serviced when they are full. While this methodology will create a more efficient and cost effective method for recycling pickups, it also increases the variability in monthly recycling returns since the compactors are only picked up when they are at or near capacity each month. For example, in February only one (1) of the DOA's eight compactors was hauled, whereas, in November, six (6) compactors were serviced and one (1) A-LD was serviced twice.

In 2013, the DOA's recycling program provided over \$26,000 in cost savings through avoided landfill fees and recycling rebates. Additionally, approximately \$10,000 was saved in hauling fees due to a change in scheduling hauls only as needed in lieu of once per month. Overall program savings have decreased since 2012 due mainly to the declining price of single stream material. Single stream materials yielded a rebate of \$67.23 per ton at the end of 2011, \$22.39 per ton in December 2012, and \$19.69 at the close of 2013.

Additionally, while the waste reduction and recycling programs significantly exceeded expectations in 2009, 2010, and 2011, in the past few years, the data appear to be leveling-off. Section III of this report identifies several opportunities to improve the diversion rate and move towards achieving the City goal of 70% through new collection, separation, and education strategies.

Figure 4: Annual Total Solid Waste and Recycling Quantities



Shredded Paper Recycling

The DOA uses a separate contractor to shred security sensitive paper documents at the DOA Warehouse and has successfully diverted and recycled approximately 6.7 tons of paper in 2013, which is included in the total 310.1 tons recycled for 2013.



Paper Shredding at DOA Warehouse

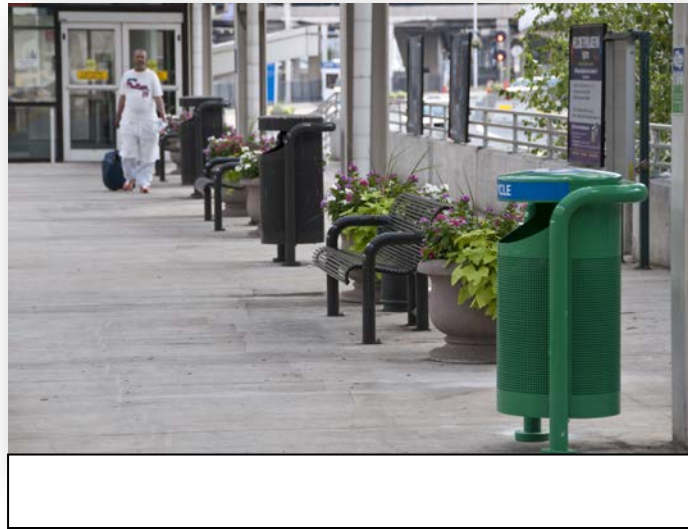
Construction and Demolition (C&D) Waste

DOA started tracking C&D recycling in August 2012. Since this waste consists of heavy materials including steel, concrete, and lumber, it constitutes an excellent opportunity to increase the diversion rate. For instance, the seven hauls in August and September of 2012 totaled 93 tons. There was only one haul of 0.4 tons of scrap metal in 2013, but the majority of construction debris is being stored on airport property to be hauled and is, therefore, currently being diverted from the waste stream. DOA expects to schedule hauls to remove and recycle the accumulated waste in 2014.

SEPTA Platform Study

In summer 2012, the DOA, in partnership with SEPTA, began diverting recyclable materials from the trash stream on all airport rail platforms. In August 2012, DOA conducted a base-line study of the diversion rate initially achieved through this new program. In 2013, DOA conducted an additional SEPTA Platform Waste and Recycling Study to measure any changes in the diversion rate over the previous year, assess the impact of the program on the overall amount of recycling collected at the airport, and identify any patterns that might lead to improvement in recycling policies.

Based on the 2013 data collected, shown in Figure 5, the diversion rates vary significantly for the four platforms with the lowest rate observed on Platform A (4%), to the highest rate on Platform E (44%). This may be partially due to the fact that the ratio of recycling to trash bins increases from Terminal A (2:15) to E (2:7) and the platform areas increase in size.



The potential diversion rate shown in Figure 5 below is the maximum diversion rate that could be potentially achieved based on the surveyed measurements of recyclable materials currently being disposed of in trash receptacles on the platforms.

Figure 5: 2012-2013 Comparison of Diversion Rates by Weight (SEPTA Platforms)

	2012	2013	2013 Potential Diversion Rate
Terminal A	15%	4%	47%
Terminal B	7%	12%	51%
Terminal C/D	13%	25%	53%
Terminal E	20%	44%	68%
Overall	13%	19%	53%

As a result of this study, there are several recommendations to be considered. The placement of bins should be more strategic, with additional side-by-side trash and recycling bins on all platforms, especially Platform A. The recycling to trash bin ratio should be increased to 1:1 and located as close to the entry/exit point for each platform. In addition, SEPTA conductors and contracted landscapers should be briefed and/or given a reminder of appropriate protocol for the purposes of disposing items where appropriate.

Public Outreach and Education

DOA organizes two environmentally-themed educational events each year: Earth Day and America Recycles Day (ARD). The purpose of these information fairs is to demonstrate to employees and the traveling public strategies and innovations in sustainable living.

Earth Day 2013

On April 22, 2013, PHL participated in the 43rd observance of Earth Day. The celebration served over 190 people, including approximately 16 travelers and 168 employees who signed in. Additionally, employees and contractors volunteered to assist in setting up and running the event. Thirteen (13) exhibitors participated in the event offering information, games, and giveaways and are listed below:

- Bicycle Coalition of Greater Philadelphia
- Clean Air Council
- Eva Preston Recycling Artist
- Marketplace Management
- Marriott Hotel
- DOA Noise Office
- The Paradies Shops
- Pennsylvania Horticultural Society
- Pennsylvania Resources Council
- Pennsylvania Integrated Pest Management
- Philadelphia Prisons
- Roosevelt Bassett, Recycling Artist
- US Airways

America Recycles Day 2013

The 2013 America Recycles Day celebration, held on November 15, provided an ideal showcase to highlight PHL's recycling program and demonstrate methods for airport users to help it succeed. The event also provided resources for helping attendees recycle more effectively at home and DOA collected household batteries for recycling.



Battery Collection on America Recycles Day

Eleven (11) exhibitors participated by providing information and activities to the over 100 attendees. (Of the many visitors who stopped by, 21 travelers and 85 airport employees signed in; 15 airport employees and contractors assisted with the event).

The exhibitors for 2013 included:

- Bennett Compost
- Energy Coordinating Agency, Rain Barrel Program
- Marketplace Philadelphia Management (who recruited their clients, Paradies Shops and Tech Interaction)
- NextFab Studio
- Provenance Architectural Salvage
- Recycle Bank
- Revolution Recovery
- Waste Management
- Waste Oil Recyclers

The most popular exhibitor was the Department of Streets' Recycle Bank table, which brought knowledgeable officers to explain the city's single-stream recycling program and gave away 40 large blue recycling bins for residential use.



*Streets Dept Curby Bucket at
America Recycles Day*

Messaging on Shuttle Buses

The DOA has also implemented educational messaging boards, intended to inform employees and travelers about environmental programs at PHL. Messaging boards have been added to employee and parking shuttle buses and provide information on alternative methods of transportation, in addition to other recycling and environmental initiatives at PHL.

Recycling Award and Video Production

In the spring, DOA created a short film highlighting the many facets of PHL's recycling program. DOA entered the film into the Professional Recyclers of Pennsylvania's (PROP) film festival in July. While the film did not win any awards, it continues to serve as a useful community outreach tool demonstrating the value and successes in recycling at PHL.

PROP did, however, award the Division of Aviation's recycling program with the 2013 Pennsylvania Waste Watcher Award for its successes in recycling education. The Pennsylvania Waste Watcher program recognizes organizations which have made a significant contribution in recycling, composting, and waste reduction/reuse efforts during the previous calendar year.

PHL won this award for going above and beyond in the field of recycling by extending recycling to the SEPTA platforms, publishing annual recycling reports on the PHL

website, implementing rotating recycling-themed message boards on airport shuttle buses, engaging a multi-departmental Recycling Committee, and holding annual America Recycles Day and Earth Day events.

Recycling Committee

The DOA Recycling Committee is comprised of DOA staff members representing each of DOA's departmental units. It meets quarterly to discuss the progress of the recycling program, identify future initiatives, and coordinate activities such as the annual Earth Day and America Recycles Day events. The Recycling Committee continues to work towards identifying ways to reduce overall waste within the DOA and tenants, while acting as a liaison to bring recycling information and protocol to their respective units.

Meetings were held in 2013 in the first quarter (March 21, 2013) and the second quarter (June 13, 2013). Due to the retirement of the Recycling Coordinator in the Fall of 2013, the Recycling Committee meetings did not take place in the second half of 2013 as DOA searched for a replacement. Even though the Committee did not meet in the Fall of 2013, Committee members assisted with the planning and organization of the America Recycles Day event on November 15.



Recycling Committee Members

DOA plans for the Committee to return to regular activities in 2014.

Tenant Recycling

MarketPlace Philadelphia Management

While MarketPlace experienced a drop in its recycling diversion rate from 22.4% in 2012 to 17.5% in 2013, it saw an increase in energy savings from the installation of LED light bulbs. In 2013, in addition to its ongoing "Blade Sign" replacements, MarketPlace replaced 198 RMU cart bulbs and 93 B/C food court ceiling lights with LEDs. This accounted to a total energy savings of \$25,213, up from from \$8,713 in 2012.

Figure 6: 2011-2013 Marketplace Recycling and Energy Milestones

(Source: Marketplace Philadelphia Management)

	2011	2012	2013
Single Stream Recycling			
• Total tons of disposal:	2,440	2,350	2,586
• Total tons of recyclables: (Recycler's standards changed in mid-2013)	667	680	547
• Diversion rate:	21.5%	22.4%	17.5%
• Savings from disposal:	\$39,558	\$42,284	\$35,455
• Rebates from recycler: (Market for commodity dropped substantially in 2012)	\$45,341	\$27,005	\$16,305
• Total value from single stream recycling:	\$84,899	\$69,289	\$51,760
Fryer Oil Recycling			
• Total gallons of fryer oil removed:	10,500	11,525	15,745
• Total gallons of bio-diesel produced:	7,350	8,068	11,022
• Savings from disposal:	\$21,150	\$21,150	\$21,150
• Rebates from recycler: (Market for commodity increased substantially in 2012)	\$1,920	\$8,829	\$12,061
• Total value from fryer oil recycling:	\$23,070	\$29,979	\$33,211
Electronic Waste Recycling			
• Electronic waste collected and responsibly recycled, pounds (1st year of program in 2011 had pent-up demand)	900	450	500
Metal Waste Recycling			
• Metal waste collected and recycled, pounds (estimate)	2,000	4,000	6,000
LED Light Bulb Replacements			
"Blade Sign" LED Light Bulb Replacements			
• Total number of Blade Sign LED light bulbs operating:	399	425	425
• Watts saved per bulb per hour (old bulb 20 watts; new bulb 5 watts)	20	20	20
• Total annual electricity savings from Blade Sign LED light bulbs	\$8,200	\$8,713	\$8,713
RMU Cart LED Light Bulb Replacements			
• Total number of RMU LED light bulbs operating:	---	---	198
• Watts saved per bulb per hour (old bulb 50 watts; new bulb 5 watts)	---	---	45
• Total annual electricity savings from RMU Cart LED light bulbs	---	---	\$7,805
B/C Food Court Ceiling Lights LED Light Bulb Replacements			
• Total number of Food Court LED light bulbs operating:	---	---	93
• Watts saved per bulb per hour (old bulb 90 watts; new bulb 24 watts)	---	---	66
• Total annual electricity savings from B/C Food Court LED light bulbs	---	---	\$8,695
TOTAL ELECTRICITY SAVINGS FROM LED REPLACEMENTS	\$8,200	\$8,713	\$25,213
COMBINED VALUE OF ALL PROGRAMS	\$116,169	\$107,981	\$110,184

US Airways

US Airways reports that it recycled 936 tons of its 4,809 ton waste stream in 2013. This amounts to a diversion rate of 19.5%, a big improvement of its rate of 15.3% in 2012. In addition to this single stream diversion, US Airways also recycled tires, motor oil, toner cartridges and universal waste items including fluorescent bulbs and used batteries.

Figure 7: US Airways Total Solid Waste and Recycling Quantities (Tons)

(Source: US Airways)

	2011	2012	2013
Solid Waste	4,598	4,016	3,873
Recycling	1,048	723	936
Total	5,646	4,739	4,809
Diversion Rate	18.6%	15.3%	19.5%

Tenant Pilot Compactor Program

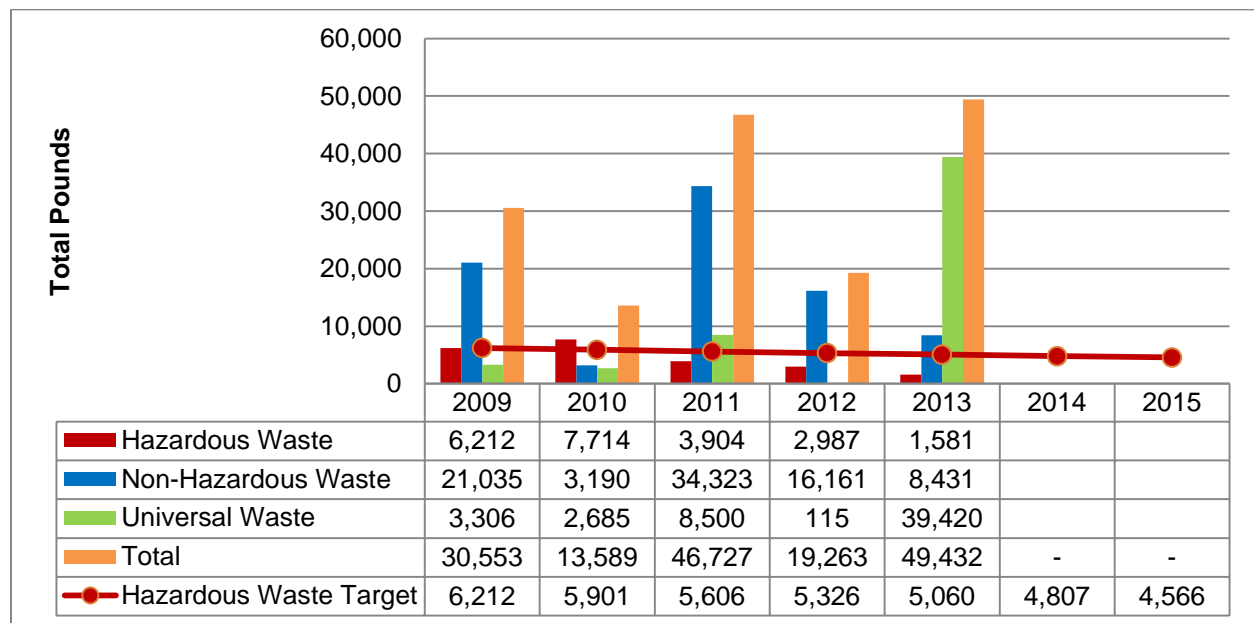
The DOA is continually looking for ways to collaborate with more airlines and other airport vendors and businesses. By cooperatively tracking waste and recycling tonnage with its PHL partners, DOA can implement policies that reduce costs and improve diversion for the entire airport.

To this end, the recycling program was expanded in 2012-13 by offering compactor services to two tenants in a pilot tenant recycling program. JetBlue is using one compactor and TSA's recycling contractor is using another compactor out of the eight compactors on site for recycling. JetBlue's estimated contribution to the recycling program is approximately 400-500 pounds per month from the 3-5 flights per day to and from Boston, MA. DOA expects to provide metrics for tracking this program's progress in 2014.

Hazardous Waste

The Philadelphia International Airport facility is classified as a Small Quantity Generator under the Resource Conservation and Recovery Act (RCRA), which limits on site hazardous waste generation to less than 1,000 kg (2,200 lbs) per month. A total of 1,581 pounds of hazardous waste was generated in 2013, a reduction of 47% between 2012 and 2013.

Figure 8: Annual Regulated Waste Quantities



In 2013, a total of 39,420 pounds of universal waste was managed, including approximately 19 tons of electronics and 440 pounds of batteries that were recycled. DOA also uses a separate vendor to recycle lamps and ballasts. In 2013, a total of 12,425 lamps and 10,293 ballasts were recycled.

III. Future Goals and Objectives

Philadelphia's Greenworks Plan sets a goal of diverting 70% of the City's solid waste from the landfill through recycling, conversion to energy, or other means. Accordingly, DOA is committed to continuing its success by finding new ways to improve the collection, sorting, and diverting of every possible type of recyclable material. Below is a list of long-term goals that the DOA will focus on over the next few years. In the short-term, the current placement of several receptacles will be considered inside the terminal areas and on train platforms. Several operational changes will also need to occur in the short-term to address the recycling contamination issue.

Food Waste Collection

The DOA will continue to support Marketplace's efforts to implement a comprehensive organic waste recycling program at PHL. Such a program would dramatically reduce overall waste tonnage produced by Marketplace vendors, reduce landfill costs, and contribute to PHL's overall commitment to environmental stewardship.

Security Checkpoint Waste Reduction

The DOA has a goal of reducing waste disposed at checkpoints due to security regulations, particularly due to several recycling hauls being reported back as contaminated because of a high volume of liquid mixed in with the recyclables. Resolving this issue will involve changes to security checkpoint recycling operations. Part of the solution includes installing bottle filling stations on the secure side, which are being installed in 2014 during the next phase of restroom renovations. An additional key component of reducing waste at security checkpoints is to provide a means for emptying and retaining bottles to carry through security and to refill on the secure side of the terminal complex. Options are being explored as to how to best provide this service for passengers at PHL and address the contamination issues with the current hauler.

Partnering Opportunities: Expansion of Tenant Recycling

Forging partnerships through the execution of new MOU agreements would serve to increase the efficiency of the recycling processes that take place at PHL. These agreements benefit small recycling generators at the Airport by providing them with the ability to comply with the City of Philadelphia's commercial recycling regulations at a nominal fee. MOU users will benefit by eliminating the need to procure a recycling hauler for their small quantities of discarded materials. The DOA will benefit by maximizing the capacity of their recycling compactors. In addition, MOUs serve as a step toward a more centralized waste management and recycling program at PHL and also reduce the amount of congestion on the airfield and around the Airport as a whole.

New partnerships would assist the Airport in developing a more centralized structure for managing waste and recycling streams, and would also enable the DOA to track program costs and the amounts of waste and recycling from tenants and airlines.

Waste and Recycling Receptacle Placement and Messaging

In 2014, PHL will attempt to raise recycling awareness and compliance through an updated branding and slogan campaign. The new messages will be located on all of the Envirozone recycling receptacles at the Airport. Public Affairs, Arts Exhibit Director, and Planning are working together to develop concepts and explore ideas for this initiative.

New receptacles that provide both waste and recycling disposal are also being explored. The Envirozones that DOA purchased more than five years ago handle several streams of recycling and are outdated now that PHL has switched from 2-3 streams to single-stream recycling. As mentioned above, the SEPTA platform study underscored the value of placing recycling bins side-by-side with waste receptacles. Additional receptacles and better placed recycling containers can increase diversion in several locations throughout the airport that are currently underserved.

Expansion of C & D Waste Recycling Program

In 2012, the recycling of C & D waste served to provide a sizable boost to recycling efforts at PHL. C&D waste was stockpiled throughout 2013 but no hauls were recorded. Over the course of 2014, the DOA will continue to refine this program. C&D waste management guidelines will be developed for contractors to follow during future Capacity Enhancement Program construction projects.

Study of the Feasibility of a Source-Separation Facility

DOA is reviewing research into the feasibility of building a source-separation facility, which could collect and sort all materials (recyclables, trash, and food waste) on PHL grounds. Source-separation simplifies collection and has the potential to increase the diversion rate to 70% or higher.

IV. Conclusion

The recycling program at PHL has continued to make significant improvements each year. While the diversion rate has essentially leveled off for the past three years, (21.6% in 2013 and 21.4% in 2011 and 2012), DOA continued to provide substantial cost savings through the implementation of the automated compactor fullness-usage system. Additionally, ongoing research into the DOA recycling program's operations and comparisons to best practices in the aviation industry are yielding opportunities to improve the facility's diversion rate and work towards the Greenworks Plan goal of 70% landfill diversion rate.

While much progress has been made in 2013, the DOA will focus on the following objectives in 2014:

- 1) Supporting the development of an airport-wide organics waste recycling program, including ongoing discussions with the Philadelphia Water Department and other potential end users of food waste.
- 2) Expanding partnering opportunities to identify new stakeholders and partners to continue to broaden recycling efforts at PHL
- 3) Striving towards a more centralized management structure of the waste and recycling streams through various means, including new MOU's with airport tenants
- 4) Installing "hydration stations" within PHL's main terminal complex area and developing a means for passengers to reuse bottles (empty at security checkpoints), and
- 5) Reducing overall program costs, where possible.

By continuing to reach out to and work with PHL tenants and airlines, the DOA continues to explore recycling initiatives that will help protect the environment and improve and streamline waste management efforts.