University of Pennsylvania
ScholarlyCommons

Master of Environmental Studies Capstone Projects | Department of Earth and Environmental Science

5-12-2006

The Status of Recycling in Philadelphia: Analysis and Recommendations for Philadelphia's Floundering Recycling Program

Megan Wellington
University of Pennsylvania

Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of Master of Environmental Studies 2006.
Advisor: Professor S. Laskowski

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/mes_capstones/1
For more information, please contact repository@pobox.upenn.edu.

The Status of Recycling in Philadelphia: Analysis and Recommendations for Philadelphia's Floundering Recycling Program

Abstract
The city of Philadelphia was one of the first in the United States to introduce curb-side collection of residential recycling. Since recycling was introduced in 1987 however, Philadelphia has failed to achieve a waste diversion rate (the percentage of total waste from a specified area that is diverted from disposal at landfills through reduction, reuse, and recycling programs) greater than 7%. Currently, Philadelphia is ranked 7th out of 8 in waste diversion programs in American cities with populations over a million. This report analyzes Philadelphia's recycling program, where it has come from and what is preventing it from progressing. Among other suggestions, this report recommends integrating recycling education and collection in Philadelphia public schools, expanding the single-stream pilot program, and reducing the volume of trash collected at curb-side to cooperatively improve the overall success of Philadelphia's recycling program.

Disciplines
Environmental Sciences

Comments
Presented to the Faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of Master of Environmental Studies 2006.
Advisor: Professor S. Laskowski

This thesis or dissertation is available at ScholarlyCommons: http://repository.upenn.edu/mes_capstones/1

THE STATUS OF RECYCLING IN PHILADELPHIA

Analysis and Recommendations for Philadelphia's Floundering Recycling Program

MEGAN WELLINGTON
A Capstone Project
in
Environmental Policy

Presented to the Faculties of the University of Pennsylvania in
Partial Fulfillment of the Requirements for the Degree of
Master of Environmental Studies
2006

Advisor: Professor S. Laskowski

Table of Contents

Executive Summary 3
Research Argument 3
Methodology 5
Literature Review and Theoretical Framework 7
History of Recycling in Philadelphia 11
Case Study Analyses: Baltimore, Los Angeles and Chicago ... 17
Recommendations 22
Conclusion 28
Glossary 31
Bibliography 32
Appendix A 35
Appendix B 36
Appendix C 37
Appendix D 38
Appendix E 47
Appendix F 48
Acknowledgements 56

Executive Summary

The city of Philadelphia was one of the first in the United States to introduce curb-side collection of residential recycling. Since recycling was introduced in 1987 however, Philadelphia has failed to achieve a waste diversion rate (the percentage of total waste from a specified area that is diverted from disposal at landfills through reduction, reuse, and recycling programs[1]) greater than 7%. Currently, Philadelphia is ranked 7th out of 8 in waste diversion programs in American cities with populations over a million.[2] This report analyzes Philadelphia's recycling program, where it has come from and what is preventing it from progressing. Among other suggestions, this report recommends integrating recycling education and collection in Philadelphia public schools, expanding the single-stream pilot program, and reducing the volume of trash collected at curb-side to cooperatively improve the overall success of Philadelphia's recycling program.

Research Argument

What are the hurdles in Philadelphia's recycling program that prevents waste diversion from increasing as other major North American cities have done over the years? Does the stagnancy in the City's waste diversion program give an indication of the overall vitality of this community? This research suggests that residents' ambivalence toward recycling, combined with a city government

---

[1] California Integrated Waste Management Board. *Local Government Glossary*. http://www.ciwmb.ca.gov/LGCentral/Glossary.htm#Diversion. Accessed 04/01/2006.
[2] Truini, Joe. Waste News. *Municipal Recycling Survey*. 03/13/2006. Vol. 11 Issue 22. p12, 8p

that does not encourage residents to meet the standards established when recycling was introduced, produce a recycling program that is failing to meet the increasing demands of environmental sustainability in a modern urban metropolis.

In a previous research project, the writer examined the discrepancies among North American recycling participation, specifically the different ways four cities approach reducing their burden of waste. The discoveries from this research were not nearly as clear as anticipated. In comparing the residential waste diversion services offered in San Diego, Vancouver, Toronto and Philadelphia, the programs differed so greatly in practice that it was difficult to conclude that there was one reason why certain cities were more successful in recycling participation than others. Some of the variables that contributed to recycling participation included:

- Income discrepancies
- Average level of education attained
- Trash disposal limitations
- Policy differences in regards to waste management.
- Different services offered (single-stream vs. dual stream recycling)
- Geography
- Housing structures (affects the efficiency with which waste is collected)

These variables made it difficult to recommend one specific model in which low achieving cities may improve their recycling program. However, there are commonalities among cities which are successful in recycling that prompted a more thorough investigation of Philadelphia's recycling history and current services offered.

Methodology

This study analyzes the history and current services provided by the Philadelphia Streets Department and especially the Recycling Office. The study examines the political nature of the Recycling Office and attempts to analyze what effect this has on waste management in the City through case study analysis with three other American cities. Recommendations are provided to reform sanitation services in the Recycling Office.

The Importance of Recycling and Waste Diversion

Recycling provides a new market for used products. Instead of wasting away in landfills where they take up space and create toxic emissions, recyclable products feed back into the economy. Fossil fuels are saved because no raw materials are needed. Additionally, recycling reduces the amount of trees that need to be cut down to produce paper products and thus increases carbon appropriation in forests. Understanding Philadelphia's stagnant recycling program is important for the purpose of improving the quality of the air in the environment. Waste that is sent to landfills instead of being recycled releases harmful emissions including methane. Methane is a gas that stays in the atmosphere for approximately 9 -15 years and is extremely effective at trapping heat. Methane in the atmosphere is not inherently a problem and only becomes pollution in high quantities, as found in landfills. As humans in industrialized nations produce more garbage and send it to landfills, they also release more methane into the surrounding atmosphere. Unfortunately, the United States and other industrialized nations have consistently increased their waste production

since the Industrial Revolution. As the following figure shows, the average US citizen created 2.68 pounds of trash per person each day in 1960 but by 2003, this poundage had increased to 4.45 pounds. This was an increase of almost 1 ¾ pounds per person each day. It is important to note however, that the levels of waste generation have stabilized since 1990.

Pounds of trash per person per day[3]							
	1960	**1970**	**1980**	**1990**	**1995**	**2000**	**2003**
Generation	2.68	3.25	3.66	4.50	4.45	4.52	4.45
Recovery from Recycling	0.17	0.22	0.35	0.64	0.96	1.00	1.04
Discards after Recovery	2.51	3.03	3.31	3.77	3.29	3.20	3.09
Population (millions)	179.98	203.98	227.26	249.91	263.12	281.42	290.81

If one were to take the increase in refuse from 1960 until 2003 and look at the additional trash that must be managed each day, it becomes apparent that Americans are now creating 446,855,610 more pounds of trash each day. Of this trash, approximately 14.7% was incinerated in 2003, while 55.7% was sent to landfills. The rest (26.6%) was recovered for recycling.

National daily refuse produced not including recycling - 1960 vs. 2003

	Total discards after recovery per day (lbs)
1960 (A)	451,747,290
2003 (B)	898,602,900
Additional discards (B-A)	446,855,610

As a major city in the United States, Philadelphia contributes greatly to the numbers seen above. Also, since residents are unable to recycle on the streets

[3] Environmental Protection Agency. *Municipal Solid Waste in the United States: 2001 Facts and Figures Executive Summary.* http://www.epa.gov/garbage/pubs/msw-sum01.pdf. 2001. Accessed on March 28, 2006.

of Philadelphia, they waste many opportunities to increase the amount of trash sent to be recycled. A breakdown of the products in the waste stream using national statistics are outlined in Appendix A.

Literature Review and Theoretical Framework

The most recent literature of influence written on this subject was Philadelphia City Controller Jonathan Saidel's review of the City recycling program. The audit, published in May 2005 (included in Appendix B) performed by the Controller's Office and a private consulting firm questioned whether the recycling program is "being operated: (1) in compliance with the applicable city ordinance, and (2) in an effective and efficient manner."[4] In his report which he prepared for the Mayor, City council and Recycling Office, Saidel noted that the City falls far short of Philadelphia's recycling ordinance which requires that 35-40% of all solid waste be recycled. Further, Saidel noted that increasing the waste diversion in the City will not only comply with the recycling ordinance but could eventually reap economic benefits for Philadelphia in the neighborhood of $17 million dollars per year through reduced inefficiencies. Among the many recommendations made in the Controller's Report, some of the highlights include integrating single-stream technology[5], increase recycling education and requiring the Recycling Coordinator to make progress reports for the Mayor's Office that needs to "empathetically embrace and support the Recycling Program in

[4] Saidel, Jonathan A. *Streets Department Review of Recycling Program.* http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/Philadelphia%20City%20Controller's%20Report-%20May%202005.pdf. May 27, 2005. Accessed on February 15, 2006.
[5] See Glossary for definition

Philadelphia."[6] In response to the Controller's report, the City Streets Commissioner, Clarena Tolson expressed that Philadelphia could not reach its own goal of 37% (a figure that had been suggested as a midpoint diversion rate in the report) because of cost. As seen in the Mayor's Report however, statistics show that Recycling in Philadelphia accounts for approximately 11% of the overall sanitation budget. If some of the funds from trash collection were gradually phased into the recycling program, there would be money to achieve the higher rates.

The City Mayor's Office also prepares an annual report on City services. In it, the goals of each City department is described. The Recycling Office is part of the Department of Streets and Sanitation. In the FY'05 report (Appendix C), the primary objectives[7] for this department were listed as:

- Ensure that trash collection is reliable and efficient
- Keep streets and lots clean and free of debris
- Provide critical waste management services

Nowhere in these three points is recycling mentioned, nor is it a key point throughout the rest of the Mayor's report.

In addition to the Controller's and Mayor's Reports, many City activists and support groups, most notably the Clean Air Council, have prepared documents outlining the current status of recycling in the City.

---

[6] Saidel, Jonathan A. *Streets Department Review of Recycling Program.* http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/Philadelphia%20City%20Controller's%20Report-%20May%202005.pdf. May 27, 2005. p. 4. Accessed on February 15, 2006.

[7] City of Philadelphia Mayor's Report on City Services. Department of Streets Sanitation Division. http://www.phila.gov/reports/pdfs/FY05MayorsReportHR.pdf. 2005. Accessed on March 15, 2006.

While some see recycling as a means to simply reduce the volume of trash dumped into landfills, there are other ways that recycling contributes to society. Instead of merely considering recycling from a practical standpoint, recycling would be better supported in urban communities if attention was paid to the positive psychological and behavioural benefits achieved from the act of recycling. Across the nation people are asking how to increase recycling diversion rates but few are asking "How can we encourage Americans to change their behaviour?"[8] An effective recycling program does not create itself after the city government simply allocates money for trucks and labour. In order for changes to occur, non-recyclers have to effectively change their ideas and behaviour about the act of recycling.

Attitude, subjective norms and perceived behavioural control in conjunction with the Planned Behaviour Theory were tested by a group of professors at Britain's Cardiff Business School. To find out the psychological reasons behind recycling behaviour and to test the Theory of Planned Behaviour against two other theories, the researchers interviewed a sampling of adults aged 31-65 and asked them to respond to some recycling questions in exchange for £20 or a composting bin.[9] From their research, they found that recyclers and non-recyclers differ in their perception of the relevance that environmental programs have in their lives, the causal connection between human action and

---

[8] McCornack, Penny. "The Psychology of Recycling." The McGraw-Hill Recycling Handbook. Ed: Herbert F. Lund. New York: McGraw-Hill, 2001. 9.1-9.12.

[9] Foxall, Gordon, Davies, Janette and Pallister, John. Cardiff University. Environmental Response: Attitudes, Intentions and Altruism as Predictions of Recycling Behaviour. May 30, 2003. http://www-search.cf.ac.uk/query.html?col=other&qc=other&pw=600&qp=site%3Awww.brass.cf.ac.uk&qt=theory+of+planned+behavior

the problem, and the acceptance of responsibility to do anything about the program. The findings from the research supported the Theory of Planned Behaviour as they explained that recycling intention predicts recycling behaviour. Individual attitudes toward recycling and social norms predict intentions and past behaviour predicts recycling intention and behaviour.[10] If individuals do not believe that they have the power to change a situation, their behaviours will reflect their beliefs. Additionally, if individuals are unaware of the environmental consequence of not diverting waste, their belief may be that waste diversion is unnecessary. For a more extensive review of the psychology and theories that explain recycling behaviour, please see Appendix D.

In an interview with David Biddle, (former Senior Planner in Philadelphia's Recycling Office and current Executive Director of the Greater Philadelphia Commercial Recycling Council) he noted that

> *"A lot of people have a misconception that putting their bottles and cans on the street is a way for the City to make money. If it is true that many people think that recycling is just another way to serve 'the man', there is no way that a recycling program is going to be successful if it is voluntarily based."*

In reality, recycling does not create a profit for the City. In fact, as a part of the wage taxes, citizens pay for recycling services.

Current Recycling Program Specialist in the Recycling Office, Sean Davies noted in an interview that there are certain interesting cultural and mistrust barriers when he tries to educate the Philadelphia community about the benefits of recycling:

---

[10] Ibid.

"It's hard for me as a Caucasian to go into North Philly[11] and educate them about quality of life through recycling and yet at the same time to go to the Northeast and tell them that I'm from the City, there's mistrust there."

One may question how recycling came to be regarded by many with such contempt. The following is an explanation of how waste diversion came to where it is today in Philadelphia.

History of Recycling in Philadelphia

Perhaps somewhat difficult to fathom given its current waste disposal slump, Philadelphia was in fact the very first city in the United States to create a paper recycling mill in 1690. This mill recycled fibres including waste paper and old rags. Seventy years later, Philadelphia's pride, Benjamin Franklin instituted the first municipal street cleaning service, in 1757.[12]

Two centuries later, in 1985, the landfill in New Jersey where Philadelphia had been taking most of its trash reached capacity and closed. Suddenly, there was somewhere between 800,000 to 1,000,000 tons of solid[13] waste per year for which the City needed to find a new location. Costs of trash collection quadrupled overnight because the city was no longer under contract. The Streets Department had been working for a number of years on alternative disposal ideas and in the 1980s after an energy crisis, incineration was the

[11] North Philadelphia has a predominantly African American population while Northeast Philadelphia is typically Caucasian or Latin American.

[12] U.S. Environmental Protection Agency. *Municipal Solid Waste - Milestones in Garbage. A historical timeline of municipal solid waste management*. http://www.epa.gov/msw/timeline_alt.htm. 02/22/06. Accessed on March 18, 2006.

[13] Interview with David Biddle, former Senior Planner in the Streets Department and current Executive Director of the Greater Philadelphia Commercial Recycling Council. 02/14/06. Accessed on March 19, 2006.

preferred method of handling waste. Unfortunately, this was not to be the solution to the waste problems of the city. Not only was it a poor choice environmentally, but the City had built an incinerator in South Philly which led to public outcry and revolt. The incinerator was placed in a working class, low income part of the city. This was perceived by many as a very dishonourable thing to do; an alternate method of trash reduction would have to be found.

Recycling as a method of waste diversion

To reduce waste at a time when dumping fees were so expensive, Philadelphia integrated recycling into a section of the city in 1987. In doing so, the City also made the program mandatory by a city ordinance. In requiring its residents to recycle, Philadelphia was the first city in the United States to have a mandated recycling law[14]. This was strong foundation for what could have been a highly successful program. Early successes in the Recycling Office (1987-1994) were achieved through collective efforts by interested citizen groups, city council, mayoral partnership and residents who were responsive to the advances initiated by the Recycling Office toward diversion. As former Recycling Office Coordinator, Maurice Sampson recounts:

> *"In Philadelphia's early years of recycling, recycling services were better funded and staffed. Despite difficult financial times, Mayors Wilson Goode and Ed Rendell ensured that adequate resources and support for program development were forthcoming."*[15]

---

[14] Use it again, PA! *Greater Philadelphia Area Recycling Information.* http://www.useitagainpa.org/Info/philadelphia.html#1. Accessed on March 20, 2006.
[15] Sampson, Maurice, II. Niche Recycling. *Philadelphia's Recycling Program at the Crossroads: "A Citizen's Report on Recycling"*

An independent Recycling Office and a talented recycling staff were organized under the auspices of the Mayor and Managing Director's Office (MDO). A Recycling Coordinator was hired and nine professionals followed shortly thereafter to bolster the program.[16] City and State laws called for the formation of advisory committees to help increase waste diversion. The Recycling Advisory Committee (RAC) and the Solid Waste Advisory Committee (SWAC) were formed through membership support from citizens, businesses, and city agencies with the collective goal of 40% diversion from commercial and residential waste streams by the year 2000. The goal for residential recycling diversion alone was 47%[17].

In 1989, then Recycling Coordinator Al Dezzi, established a consensus-based decision-making process. This meant that decisions would be made collectively through input from the RAC and SWAC advisory committees, together with the staff of the Recycling Office and Division of Sanitation. The group supported the expansion of residential recycling collection from a 23,000 resident pilot in 1989 to serve 525,000 residents in 1994, making Philadelphia's recycling program one of the largest in the nation. In addition, programs were developed to address leaf composting, commercial recycling, municipal building recycling, and market development.

---

http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/A%20Citizen's%20Report%20on%20Recycling-%20Exec.%20Summ%20(June%202000).pdf. June, 2000. Accessed on March 28, 2006.

[16] Interview with David Biddle, former Senior Planner in the Streets Department and current Executive Director of the Greater Philadelphia Commercial Recycling Council. 02/14/06. Accessed on March 19, 2006.

[17] Sampson, Maurice, II. Niche Recycling. *Philadelphia's Recycling Program at the Crossroads: "A Citizen's Report on Recycling"* *http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/A%20Citizen's%20Report%20on%20Recycling-%20Exec.%20Summ%20(June%202000).pdf*. June, 2000. Accessed on March 28, 2006.

So how did the program flounder given its promising beginnings? In the early days of Philadelphia's recycling story, the Recycling Office (RO) was separate from the Streets Department and was under the auspice of the MDO. In 1998, Mayor Ed Rendell made the decision to move the Recycling Office into the Streets Department because of the commonalities in department interests between Recycling and Sanitation. This move created tension between the Streets Department and the MDO. Essentially, this meant that the authority for the recycling program and its planning were assigned to the Streets Department and the Deputy Streets Director for Sanitation. This decision was met with great objection from both the Streets Department Sanitation Division and the RO. Unlike the MDO, the Streets Department failed to act on RAC resolutions and SWAC recommendations for strategic planning. The Streets Department would not commit to the schedule or allocate the operational resources necessary to achieve the 40% combined commercial/residential recycling goal by the year 2000. The development of the recycling program in Philadelphia came to a halt. Whereas diversion rates were just below 7% in 1995, they subsequently dropped for three years in a row.

In 1998, the Department lost a State grant of $500,000 for recycling education and promotion. Over a 14-month period starting in January 1998, two Recycling Coordinators (Al Dezzi and Joan Batory) both resigned, followed by 80% of the Recycling Office's senior staff. Batory had been Coordinator for just over a year when she resigned. Apparently, the circumstances in which Batory left the RO were sudden:

"Batory left without another job, and said little-at least publicly-about her reasons for the abrupt departure."[18]

After almost a year without anyone filling the position of Recycling Coordinator, the City hired David Robinson. Coming to Philadelphia with years of experience in Chicago both as the Recycling Coordinator (1989-1992)[19] and as president of a public relations firm focused on integrating recycling into industrial waste firms, Robinson was a sign of great hope for the city. From all ends of city government, employees agreed that Robinson would certainly be able to increase the City's recycling diversion rate as he had in Chicago. Robinson recognized the challenges of the past and yet was optimistic about where the program could go. The Philadelphia City Paper noted that:

"The tumultuous history of recycling in Philadelphia did cause Robinson 'to raise an eyebrow,' he said. 'I recognize there are issues, but the constellations really seem to have lined up for the Recycling Office…The opportunities to grow the program were more exciting than the barriers of the past.'"[20]

Somehow however, despite Robinson's optimistic outlook, the recycling diversion rate in Philadelphia failed to improve. From November 2000 when he was hired until August 2005, when he resigned facing federal corruption charges, Robinson was unable to increase diversion rates. While he had wanted to introduce plastics into recycling pickup and to increase citywide pickup of recyclables to be weekly, neither of these suggestions were integrated. Like his forerunners,

---

[18] Shaffer, Gwen. Philadelphia Weekly. *Taking out the Trash: The city's searching for someone to head up its faltering recycling program*. http://www.philadelphiaweekly.com/view.php?id=10443. 09/14/2005.
[19] Shaffer, Gwen. Philadelphia City Paper. *Curby Bucket — and everyone else in the city's Recycling Office — just got a new boss.* http://citypaper.net/articles/112300/cb.citybeat.pickup.shtml. 11/23-30/2000. Accessed on March 28, 2006.
[20] Ibid.

Robinson was unable to create a wave of change in this city. Clean Air Council program director, Emily Linn advocated for Robinson's work but noted that his efforts were not matched with support from the Streets Department or the MDO:

> *"David wanted to do new things, but he had a very small staff-maybe four or five people," Linn acknowledges. "Plus I'm not sure he had autonomy. With the Streets Department traditionally focused on trash, recycling gets lost."* [21]

As a former Philadelphia Recycling Coordinator, Maurice Sampson knows the constraints involved with this job and confirmed that the position has little decision making power:

> *"Good people won't come here [to work in Philadelphia] because the job doesn't have any authority…Rather than treating recycling as an integral part of solid waste management, the Streets Department treats it as an "add-on.'"*[22]

After Robinson, the position of Coordinator was again left vacant, this time for six months until Joan Hicken from Glendale, Arizona was hired in February, 2006. Hicken comes with praise from Arizona and was successful as Recycling Coordinator there. One question however, is how her success in Glendale, Arizona (pop. 218,812)[23] will translate to increased diversion rates in Philadelphia.

While its early development was successful, Philadelphia's residential recycling program has never been able to achieve a waste diversion rate greater

---

[21] Ibid.
[22] Shaffer, Gwen. Philadelphia City Paper. *Recycled Coordinator?* http://citypaper.net/articles/080698/cb.recycle.shtml. 08/6–13/98. Accessed on March 24, 2006.
[23] U.S. Census Bureau. Census 2000 Demographic Profile Highlights: Glendale, Arizona. http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=glendale&_cityTown=glendale&_state=04000US04&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010.

than 7%.[24] Currently the residential recycling rate is 5.5%.[25] A summary of the high and low points in Philadelphia's residential recycling program is found in Appendix E.

Case Study Analyses: Baltimore, LA, Chicago and Toronto

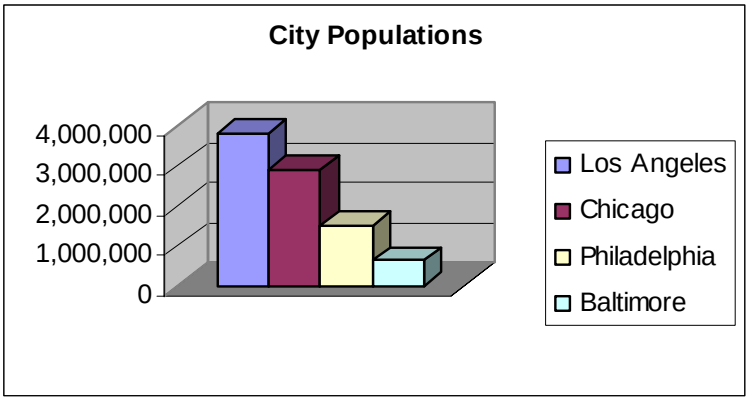
It is important that Philadelphia be compared with other major cities so that Philadelphia's strengths and weaknesses are apparent. The cities chosen for this case comparison study were Los Angeles, Chicago and Baltimore. LA is a great example of a city that is putting a lot of effort into its waste diversion programs. Ranked number one in the country by the Waste News' Municipal Recycling Survey for its high waste diversion rates, LA challenges other cities in the US through its recycling successes. Motivated by a state-wide regulation of 50% waste diversion, LA has been successful despite its large, diverse population. Also, the socio-economic diversity in LA is comparable to that of Philadelphia yet LA makes recycling work. LA uses the "Pay as you Throw" program for waste collection which charges residents directly via taxes for the amount of trash they dispose of each week yet recycling participation is free. Residents who dispose of less waste pay a lower fee for trash collection than others. The City of Seattle also integrates this concept and charges residents different rates for trash pickup depending on how much they produce. Cost conscious consumers in LA and Seattle will likely try to reduce their waste costs by participating in diversion programs.

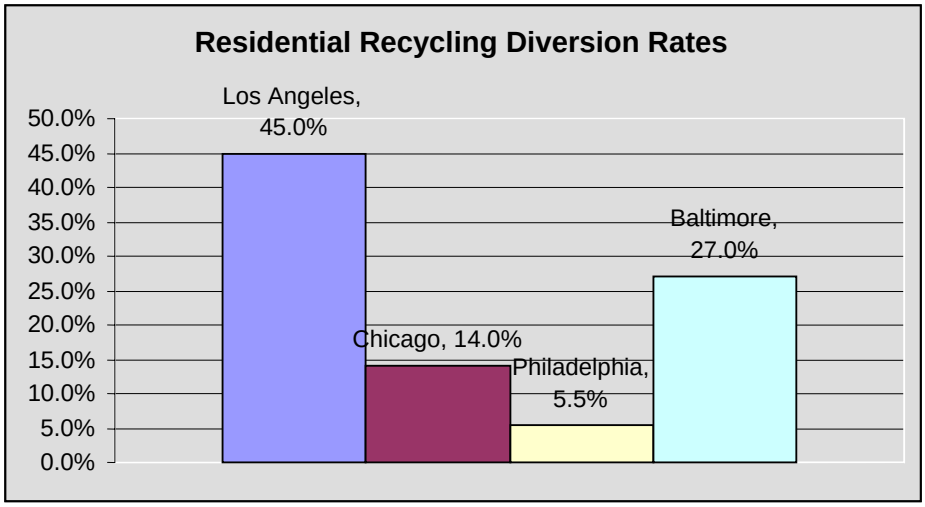
---

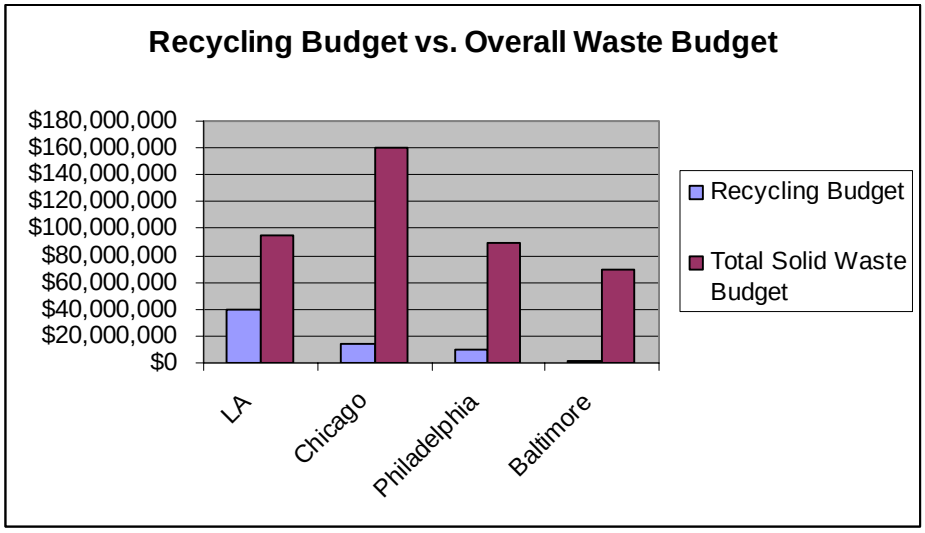
[24] Use it again, PA! *Greater Philadelphia Area Recycling Information.* http://www.useitagainpa.org/Info/philadelphia.html#1. Accessed on March 20, 2006.
[25] Truini, Joe. Waste News. *Municipal Recycling Survey.* 03/13/2006. Vol. 11 Issue 22. p12, 8p

As the graphs below demonstrate, LA is a leader in recycling success. Their budget for recycling is 40% of the overall waste budget and not surprisingly, their 45% diversion rate reflects this investment. Even as the most populated city in the case study, LA succeeds despite urban challenges such as limited accountability to recycle and transient populations. Contrarily, Philadelphia's budget for recycling and waste diversion is only 11% of the total solid waste budget. The figures reflect the negligence in the City's low recycling participation and diversion levels.

The following graphs compare some of the data collected in the Municipal Waste Survey. Each city's complete waste management profile is listed in Appendix F.







Baltimore and Chicago both offer valid alternatives to Philadelphia's recycling program because they have diverse socio-economic populations. Even Baltimore, which allocates only a small fraction ($870,000) of its waste management budget ($70,000,000), has a far greater diversion than Philadelphia's program. This shows that even if Philadelphia does not allocate any more money into its recycling program, it can increase its program success. One of the generally accepted reasons explaining Philadelphia low participation is that in hard-to-reach populations, especially those which are highly transient and low income, recycling is not a priority. While neither Chicago nor Baltimore is

seeing great success in their recycling program, their rates of waste diversion are much higher than those of Philadelphia.

Toronto

While not a city depicted in the Waste News' Municipal Recycling Survey, Toronto is a great comparison for Philadelphia as a benchmark for improvement.

Toronto, Canada is located in Ontario, where Blue Bins were introduced to the world in 1981.[26] Since the City of Toronto introduced residential recycling in 1987, it has become a forerunner in the world of recoverable waste resources. In 2005, Toronto had a 40% residential recycling diversion rate, which was an increase of 4% even just from the previous year.[27] Much of Toronto's success has been achieved through its multidimensional waste diversion approach which provides many different ways for trash to stay out of landfills. These services include a single stream recycling program and a green-bin organics program. The organics program alone last year diverted over 60,000 tonnes[28] of organic compost waste from the landfill.

Toronto's multidimensional high waste diversion approach comes at a cost to tax payers. The city's diversion programs are more costly than its trash program but these programs are widely supported by the residents of the city, and by members of city council. It has thus been social demand that has propelled the insurgence of the city's recycling, not a short-term cost/benefit

---

[26] University of Waterloo. *An Innovative Community.* http://www.environment.uwaterloo.ca/community_highlights.html Accessed on March 8, 2006.
[27] City of Toronto Solid Waste Management Services. *Toronto Staff Report to Works Committee* http://www.toronto.ca/garbage/pdf/residential_diversion_rate_report.pdf. 02/15/06. Accessed on March 8, 2006.
[28] *Attachment A 2005 Residential Waste Diversion.* http://www.toronto.ca/garbage/pdf/residential_diversion_rate_attachment.pdf. Accessed on March 8, 2006.

approach. In 2002, Toronto began to ship its garbage down to Michigan each day as their existing landfill closed and permission to build a new landfill was denied by politicians. Toronto was forced to create a relationship with the state of Michigan for its trash to be shipped south of the border. This current arrangement is only temporary, and is both politically and economically expensive. Residents of Michigan are unhappy with the current situation and while the contract between the two nations is a permissible one through the North American Free Trade Agreement (NAFTA), the sentiment held by many Michigan residents is that of NIMBY – Not in My Backyard!

In an effort to alleviate the high tipping fees associated with this Michigan contract (approximately $118 per tonne[29]) and to be more environmentally sustainable, Toronto has adopted a highly inventive yet costly solution. Currently the operating cost for Toronto's diversion programs, which include the Blue/Grey box, Green Bin and Yard Waste composting programs is approximately $135 per tonne. Clearly while the costs of the diversion program far exceed those of sending trash to Michigan, the contract with the state expires in 2008 and it is reportedly unlikely to be renewed. The City is working toward achieving a diversion rate of 60% by 2008 and 100% by 2012.[30] Statistics showing increased diversion are truly impressive. More than 95% of single-family homes in Toronto recycle, and the city's current diversion rate is right on target with their plan to reduce the amount of trash sent to Michigan. In 2003,

[29] City of Toronto Solid Waste Management Services. *Facts about Toronto's trash*. http://www.toronto.ca/garbage/facts.htm. 11/18/05. Accessed on March 12, 2006.
[30] Ibid.

143 trucks of trash were dumped in Michigan each day and this number has now been reduced to 111.[31]

Toronto's success shows how critical a role the city administration plays in getting a successful diversion program off the ground. Just as there are Philadelphian skeptics now, there were critics in Toronto who thought that expanding recycling could not happen in such a diverse urban setting. Toronto Environmental Alliance spokesperson Gord Perks recounts:

> *"I can remember Toronto City Councilors arguing 15 years ago we would never divert more than 10 per cent,"*[32]

While the city and provincial politicians supported recycling and waste diversion in their policy creation, these representatives were elected officials whom the city chose to represent their concerns. Had the residents of Toronto not elected representatives who would allocate money toward environmental sustainability, the diversion successes would have not been possible.

Recommendations

1. Limit City Trash Collection Services

Philadelphia's unique demography is not a sufficient excuse to explain away why the City is not recycling. Economic and educational factors are not the only factors that predict success or failure (this will be demonstrated later in the example of the current pilot program) in the health of a recycling program. Currently, the City allows households to throw away twelve 30"x37" bags of trash

---

[31] Ibid.

[32] Nersessian, Mary. CTV Toronto. *Debate on Toronto's looming trash crisis spills open.* http://toronto.ctv.ca/servlet/an/local/CTVNews/20051023/toronto_trash_crisis_051023/20060224/?hub=TorontoHome. 10/23/2005. Accessed on March 12, 2006.

each week or six 32 gallon containers.[33] Reducing the amount of trash that the City collects will be an excellent way for Philadelphia to begin a transformation away from trash and toward recycling. When compared with the collection services offered in other major cities, one can see that Philadelphia is much more lenient with its trash collection services:

Los Angeles: (1) 60-gallon trash cart[34]
Chicago: (1) 96-gallon trash cart which includes recycling[35]
Dallas: 2 X (1) 90-gallon trash cart[36]
Toronto: 6 items collected every other week[37]

Additionally, it is necessary for the City to enforce the types of materials they collect. This will encourage residents to take greater responsibility for the burden of the waste that they create. As David Biddle noted from personal observation:

"In the spring, the trucks are picking up mattresses, half of somebody's basement, working TV's, working computers and microwaves. I do know that people who, rather than calling the appropriate people to come and pick up their used appliances, will spend an entire afternoon taking apart the appliance, piece by piece so that they can put it out on the street."

---

[33] Philadelphia Streets Department. *Guidelines for trash collection.* http://www.phila.gov/streets/trash_collection.html. Accessed on March 23, 2006.
[34] The City of Los Angeles. City Services Directory. *Trash/Hazardous Waste/Recycling: Service Description.* http://publiccsd.lacity.org/CSD/index.cfm?QTP=746D23B5-9AE7-0BAB-292CDDF7C4F4CD7E&Fuseaction=viewservice&SERVICE_ID=2674. 02/27/2006. Accessed on March 23, 2006.
[35] Leroux, Charles, Reardon, Patrick T. Chicago Tribune. `*The plastic cart settled our alleys.* http://www.chicagotribune.com/news/local/chi-0511090386nov10,1,3685852.story?coll=chi-archspecials-utl. 11/10/2005. Accessed on March 23, 2006.
[36] City of Dallas. *Residential Garbage Collection.* http://www.dallascityhall.com/dallas/eng/html/residential_garbage_collection.html. Accessed on March 23, 2006.
[37] City of Toronto Website. *Recycling and Garbage basics for single family homes.* http://www.toronto.ca/garbage/single/abc.htm. Accessed on March 12, 2006.

By refusing to collect hazardous waste from the curb-side, and requiring residents to dispose of their waste mindfully, the City will be encouraging its residents to take responsibility for their waste. This will help to engender a city that is more mindful of waste in general.

2. Expand the pilot program and/or integrate single-stream recycling

While some may say that cities with high transient and relatively uneducated populations such as Philadelphia will not recycle, facts prove otherwise. Since 2004, RecycleBank, an incentive-based recycling company has collaborated with the City to integrate a pilot program in two neighborhoods. In exchange for their recyclables, residents in Chestnut Hill and West Oak Lane neighborhoods are given coupons that can be used at various retailers throughout the city. Rather than sorting their recyclables by type, residents in these two neighbourhoods participate in single-stream recycling, which allows them to put all of their recyclables into one 32 gallon cart. The single-stream technology along with the incentives has yielded great waste diversion in both traditionally high income Chestnut Hill, and lower income West Oak Lane. The latter neighborhood had traditionally been an area where recycling had failed. Now, upwards of 90%[38] of residents in West Oak Lane recycle their waste, and do so voluntarily. Chestnut Hill had a 17% diversion rate before the program and West Oak Lane had 5% diversion. Currently, the collective average diversion rate for these two neighborhoods has jumped to 38%. This pilot is ongoing as

[38] DeSimone, Bonnie. The New York Times. *Rewarding Recyclers and Finding Gold in the Garbage*. http://www.nytimes.com/2006/02/21/business/businessspecial2/21recycle.html?ei=5070&en=fa1af6c8ca675801&ex=1143867600&adxnnl=1&adxnnlx=1143745750-Uh969SBvG7P6ALY0/a20QA. 02/21/2006. Accessed on March 30, 2006.

the City and RecycleBank are in negotiation to increase this program by two thousand more homes. The following depicts the change in waste diversion from before the pilot program to the present:

City of Philadelphia: RecycleBank Incentive Based Recycling Pilot						
Neighborhood	December 2004			June 2005		
	Participation	Recycling Rate	lbs/household/month	Participation	Recycling Rate	lbs/household/month
Chestnut Hill	NA	16.7%	NA	90%	NA	110 lbs
West Oak Lane	NA	4.5%	NA	90%	NA	70lbs
Average/Estimate:	25%	10.6%	14lbs	90%	38.6%	85lbs

As remuneration has been integral to the pilot program, one cannot be certain that residents would recycle if there was not a material incentive attached. Some may argue this is not an accurate portrayal of behavioural change. While the incentive-based program has been successful in encouraging residents to participate now, if the City decides to cancel its partnership, recycling may again fall to a low point. At the very least, even if the City were to decide that they would not move forward with RecycleBank, it would still be essential that they expand single-stream recycling throughout the entire city. City wide single-stream recycling will afford all residents a way to recycle their plastics and corrugated cardboard, which they now have to take to one of the bi-weekly drop-off sites throughout the city. This will greatly increase the volume of recyclables gathered and subsequently decrease the overall cost of recycling. Other cities have already tried and succeeded in integrating new technology. Seattle, Denver, Toronto and Los Angeles along with many other cities have successfully

improved and facilitated their recycling programs through single-stream recycling. Single-stream encourages even the most disinterested of City residents to participate in recycling.

3. Place recycling receptacles throughout streets

As one walks through the streets of Philadelphia, they may notice that there are trash cans everywhere but no recycling receptacles. This means that shoppers, tourists and residents have no option to recycle publicly. They can either hold on to their recyclables until they retreat indoors, (which is inconvenient) or they can throw them away in any number of the trash receptacles in the city. Recycling has been tried in public spaces, most notably in Rittenhouse Square, which is a hub for shoppers and tourists. Unfortunately, the City reclaimed these containers, noting that the contamination (trash that is put into recycling containers which lowers the quality of the recyclables) rates were too high and they discontinued the program. Contamination however, is not a problem that other major cities have not already faced. Instead of preventing citizens from recycling in public spaces, more attention should be given to education in the community, with clear signage to depict recycling. Also, specialized receptacles must be used in order to reduce contamination. Making recycling a visible part of life in Philadelphia so that every resident knows that they can recycle wherever they travel within the city will encourage behavioural change and participation.

4. Reintroduce ticketing program for non-recyclers

For four months in 2002, recycling was enforced by the City. Residents who chose not to recycle were warned and then fined if they chose not to participate in recycling. This program reflected the City ordinance that requires mandatory recycling participation in Philadelphia. While the program was supported by many and the City immediately saw an increase in recycling participation, some citizens were disgruntled and began calling their City council representatives and the Mayor's Office. Instead of standing firm and insisting that ticketing was a concrete way to encourage recycling; Mayor John Street cancelled the program after only four months. By abandoning the ticketing program, the Mayor compromised the efforts of the already struggling Recycling Office. Residents soon saw that there was no sincerity upon the part of the City to encourage recycling and recycling participation fell to an all time low.

The motto of the Recycling Office is: "Recycle. Don't litter. It's the law"[39] but since this law is not been enforced, it has little integrity. Support from the Mayor's Office will be required if the City is serious about increasing their recycling participation. Collectively, if a program of enforcement is supported by the Mayor and City council representatives, participation and waste diversion will increase. If no enforcement for recycling is to be integrated, the slogan for the recycling in Philadelphia should be changed to truthfully reflect the program.

[39] City of Philadelphia Recycling Website. http://recyclingpays.phila.gov/. Accessed on March 30, 2006.

5. Expand education program

Recycling is not collected from any of the City's public schools. Children in Philadelphia do not grow up learning how to recycle at school. By foregoing recycling education in Philadelphia public schools, the City is encouraging the next generation of residents to be as equally unknowledgeable about waste diversion and as unwilling to participate in recycling as the current. Successfully educating youth about the intrinsic benefits of recycling and an environmentally conscious lifestyle will prepare them to be leaders in their community in the future. As an integral part of Philadelphia's recycling reformation, the youth in Philadelphia must be taught how to recycle and have the opportunity to see their teachers and schoolmates participate which will increase the normalcy of recycling as an everyday activity and also increase each student's accountability to participate.

Conclusion

Philadelphia has missed out on many of the primary and peripheral benefits of recycling for far too long. What started as an ambitious beginning through the City mandated recycling ordinance and an amply staffed Recycling Office, has fallen away to a mere shell of what it once was. While Philadelphia can continue to lag in its performance with a 5.8% waste diversion rate, this will require forgoing many of the positive opportunities for recycling improvement in the City. As recycling is not on the radar of the municipal government as shown in the Mayoral Report of City Services, committed citizens must continue to push toward their desired recycling goals. Philadelphians concerned about the current

waste diversion problem must be vocal in communicating with their City council representatives. City representatives receive no shortage of telephone calls from residents who did not have their trash picked up. Similarly, if residents were as passionate about recycling collection as they are trash, recycling would become a priority for City government. As recycling is arguably not an essential city service, it may continue to sit at the bottom of the City's priorities until residents become relentless in their pursuit for an efficient, twenty-first century waste diversion program.

The inter-departmental politics between the Sanitation Division, the Managing Director's Office, the Mayor's Office and the Recycling Office have hindered the progress of the City's recycling program. For the collective goal of increasing waste diversion, inter-departmental politics need to be put aside through better communication and mediation. To acknowledge the growing demand for urban sustainability, Philadelphia must realize that success will require a collective partnership between the different City departments and residents. The most successful cities outlined in this study (Los Angeles and Toronto) have strong direction from talented leaders in City government who advocate and stand behind recycling. Philadelphia needs a strong advocate in City government with some decision making power who believes in the pursuit of recycling, even if doing so means thinking outside of the annual budgeting box. Residents can aid in this process by making informed election choices and speaking to their current Council representatives about their desire for a better program.

It is essential that Philadelphia representatives take heed to suggestions made by the Controller's internal audit, and the recommendations from Community interest groups. Successful recycling in Philadelphia will require both a financial and political commitment along with a firm belief that recycling improves present and future quality of life.

Now is the time for the City of Philadelphia to join the many other cities that have already benefited from recycling. Cleaner streets, decreased taxes, and a more involved residential population are within reach for the City. It is time for Philadelphians to experience the satisfaction that comes from being part of a greater movement toward sustainability by participating in recycling.

Glossary

Bale: A compacted and bound cube of recycled material

Contamination: Trash that is put into recycling containers which lowers the quality of the recyclables.

Diversion Credits[40]**:** A financial incentive provided to municipalities or private recycling operations based on the tonnage diverted from the waste stream.

Emission: A substance released into the air. Usually refers to gases.

IBR: Incentive Based Recycling

MRF: Materials Recovery Facility. This is where recycling trucks take recyclables to be separated and sorted. It is at the MRF that recyclables are baled and then sent to processors.

Municipal Solid Waste (MSW) Residential and commercial trash and/or garbage generated by a particular municipal area.

Single-stream: A term which describes a type of recycling collection and sorting in which the separation of recycling materials is done at the MRF which enables consumers to place all of their recyclables into one container without sorting. Typically this form of recycling collection is effective because it yields greater volumes of recyclables and increases waste diversion rates. It also reduces the number of trucks on the road and decreases the overall time needed in collection. Some who are not in favour of this type of collection argue that single-stream recycling decreases the quality of the recyclables as they become contaminated when they are mixed with other types of recyclables.

Waste Diversion Rate: The percentage of its total waste that an area diverted from disposal at landfills and transformation facilities through reduction, reuse, recycling programs, and composting programs.

[40] Global Recycling Network. *Glossary of Recycling Terms.* http://grn.com/library/gloss.htm. Accessed on April 4, 2006.

Bibliography

California Integrated Waste Management Board. *Local Government Glossary.* http://www.ciwmb.ca.gov/LGCentral/Glossary.htm#Diversion. Accessed 04/01/2006.

City of Dallas. *Residential Garbage Collection.* http://www.dallascityhall.com/dallas/eng/html/residential_garbage_collection.html Accessed on March 23, 2006.

City of Los Angeles. City Services Directory. *Trash/Hazardous Waste/Recycling: Service Description.* http://publiccsd.lacity.org/CSD/index.cfm?QTP=746D23B5-9AE7-0BAB-292CDDF7C4F4CD7E&Fuseaction=viewservice&SERVICE_ID=2674. 02/27/2006. Accessed on March 23, 2006.

City of Philadelphia Mayor's Report on City Services. Department of Streets Sanitation Division. http://www.phila.gov/reports/pdfs/FY05MayorsReportHR.pdf. 2005. Accessed on March 15, 2006.

City of Philadelphia Recycling Website. http://recyclingpays.phila.gov/. Accessed on March 30, 2006.

City of Philadelphia Streets Department. *Guidelines for trash collection.* http://www.phila.gov/streets/trash_collection.html. Accessed on March 23, 2006.

City of Toronto Solid Waste Management Services. *Attachment A 2005 Residential Waste Diversion.* http://www.toronto.ca/garbage/pdf/residential_diversion_rate_attachment.pdf. Accessed on March 8, 2006.

City of Toronto Solid Waste Management Services. *Facts about Toronto's trash*. http://www.toronto.ca/garbage/facts.htm. 11/18/05. Accessed on March 12, 2006.

City of Toronto Solid Waste Management Services. *Recycling and Garbage basics for single family homes.* http://www.toronto.ca/garbage/single/abc.htm. Accessed on March 12, 2006.

City of Toronto Solid Waste Management Services. *Toronto Staff Report to Works Committee* http://www.toronto.ca/garbage/pdf/residential_diversion_rate_report.pdf. 02/15/06. Accessed on March 8, 2006.

DeSimone, Bonnie. The New York Times. *Rewarding Recyclers and Finding Gold in the Garbage*.

http://www.nytimes.com/2006/02/21/business/businessspecial2/21recycle.html?ei=5070&en=fa1af6c8ca675801&ex=1143867600&adxnnl=1&adxnnlx=1143745750-Uh969SBvG7P6ALY0/a20QA. 02/21/2006. Accessed on March 30, 2006.

Foxall, Gordon, Davies, Janette and Pallister, John. Cardiff University. Environmental Response: Attitudes, Intentions and Altruism as Predictions of Recycling Behaviour. May 30, 2003. http://www-search.cf.ac.uk/query.html?col=other&qc=other&pw=600&qp=site%3Awww.brass.cf.ac.uk&qt=theory+of+planned+behavior

Leroux, Charles, Reardon, Patrick T. Chicago Tribune. *`The plastic cart settled our alleys*. http://www.chicagotribune.com/news/local/chi-0511090386nov10,1,3685852.story?coll=chi-archspecials-utl. 11/10/2005. Accessed on March 23, 2006.

McCornack, Penny. "The Psychology of Recycling." The McGraw-Hill Recycling Handbook. Ed: Herbert F. Lund. New York: McGraw-Hill, 2001. 9.1-9.12.

Nersessian, Mary. CTV Toronto. *Debate on Toronto's looming trash crisis spills open.* http://toronto.ctv.ca/servlet/an/local/CTVNews/20051023/toronto_trash_crisis_051023/20060224/?hub=TorontoHome. 10/23/2005. Accessed on March 12, 2006.

Saidel, Jonathan A. *Streets Department Review of Recycling Program.* http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/Philadelphia%20City%20Controller's%20Report-%20May%202005.pdf. May 27, 2005. Accessed on February 15, 2006.

Sampson, Maurice, II. Niche Recycling. *Philadelphia's Recycling Program at the Crossroads: "A Citizen's Report on Recycling" http://www.cleanair.org/recyclingalliance/pdfs/Recycling%20Reports/A%20Citizen's%20Report%20on%20Recycling-%20Exec.%20Summ%20(June%202000).pdf.* June, 2000. Accessed on March 28, 2006.

Shaffer, Gwen. Philadelphia City Paper. *Curby Bucket — and everyone else in the city's Recycling Office — just got a new boss.* http://citypaper.net/articles/112300/cb.citybeat.pickup.shtml. 11/23-30/2000. Accessed on March 28, 2006.

Shaffer, Gwen. Philadelphia City Paper. *Recycled Coordinator?* http://citypaper.net/articles/080698/cb.recycle.shtml. 08/6–13/98. Accessed on March 24, 2006.

Shaffer, Gwen. Philadelphia Weekly. *Taking out the Trash: The city's searching for someone to head up its faltering recycling program*. http://www.philadelphiaweekly.com/view.php?id=10443. 09/14/2005.
.
Truini, Joe. Waste News. *Municipal Recycling Survey.* 03/13/2006. Vol. 11 Issue 22. p12, 8p

University of Waterloo. *An Innovative Community.* http://www.environment.uwaterloo.ca/community_highlights.html Accessed on March 8, 2006.

U.S. Census Bureau. Census 2000 Demographic Profile Highlights: Glendale, Arizona. http://factfinder.census.gov/servlet/SAFFFacts?_event=Search&geo_id=&_geoContext=&_street=&_county=glendale&_cityTown=glendale&_state=04000US04&_zip=&_lang=en&_sse=on&pctxt=fph&pgsl=010

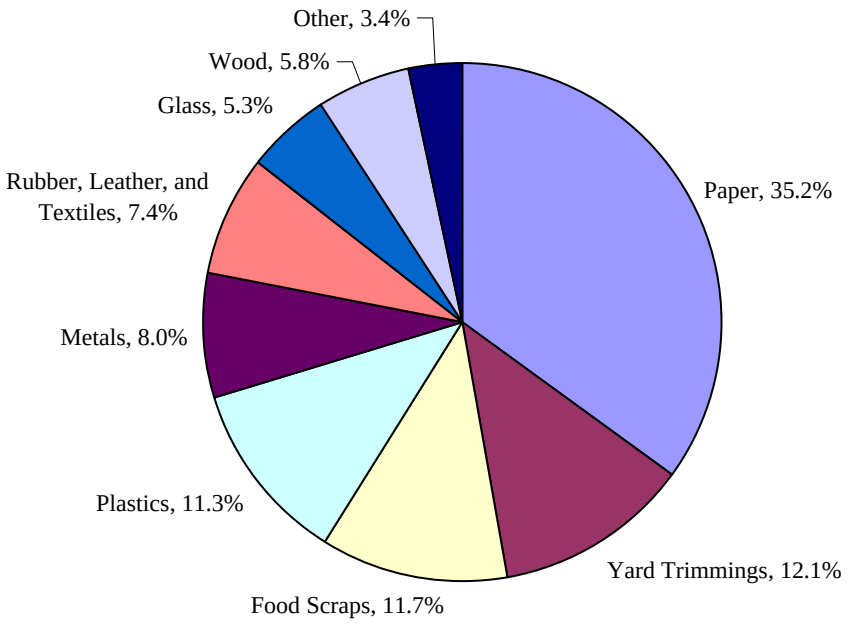
U.S. Environmental Protection Agency. *Municipal Solid Waste in the United States: 2001 Facts and Figures Executive Summary.* http://www.epa.gov/garbage/pubs/msw-sum01.pdf. 2001. Accessed on March 28, 2006.

U.S. Environmental Protection Agency. *Municipal Solid Waste - Milestones in Garbage. A historical timeline of municipal solid waste management*. http://www.epa.gov/msw/timeline_alt.htm. 02/22/06. Accessed on March 18, 2006.

Use it again, PA! *Greater Philadelphia Area Recycling Information.* http://www.useitagainpa.org/Info/philadelphia.html#1. Accessed on March 20, 2006.

Appendix A

2003 National Municipal Solid Waste Generation 236 Million Tons
(before recycling)[41]



[41] Environmental Protection Agency. *Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 2003.* http://www.epa.gov/msw/pubs/msw05rpt.pdf. Accessed on March 29, 2006.

Appendix B
Philadelphia City Controller's Report on Recycling

May 2005

Appendix C
Philadelphia Mayor's Report on City Services:
Department of Streets Sanitation Division

Fiscal Year 2005

Appendix D

Planned Behaviour, Determinism and Environmental Psychology.

Increasing recycling participation involves lifestyle and behavioural change. While governments have to be held responsible to make the most efficient recycling programs available to their residents, ultimately, it is the individual that makes the choice whether or not to participate in recycling. For a better understanding of how to encourage positive behavioural changes, one may question how this belief is formed.

The theory of Planned Behaviour suggests that decisions that we make as humans lead towards actions that are products of previous attitudes and perceptions we have about performing the actions. Determinism argues that our decisions are practically forgone conclusions as exterior influences are primary driving forces in decision making. Both theories can be applied to the study of recycling behaviour and practice as they give insight into the factors that influence decisions.

Planned Behaviour

According to the theory of Planned Behaviour, human behaviour is guided by three kinds of considerations: beliefs about the likely outcomes/consequence of the behaviour and the evaluations of these outcomes (behavioural beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors

that may facilitate or impede performance of the behaviour and the perceived power of these factors (control beliefs).[42]

Behavioural beliefs lead to a positive or negative attitude toward the behaviour. For example, suppose one were to start a personal exercise regime. If their belief about working out was that time spent exercising led toward positive outcomes such as a healthier, fitter body, their performance in the exercise regime would be assisted by their belief of a positive outcome. Normative beliefs, or the expectations of others, produce social/subjective norms and control beliefs give rise to perceived behavioural control. In combination, attitude toward the behaviour, subjective norms, and the perception of behavioural control lead to the formation of a behavioural intention. The more favourable the attitude and subjective norm, and the greater perceived control that humans have, the stronger inclination we should have towards performing the behaviour.[43] The following chart, explained with the example of behaviour towards recycling participation, explains the relationships in this theory:

[42] "Theory of Planned Behaviour." *Value Based Management Website*. Available from: http://www.valuebasedmanagement.net/methods_ajzen_theory_planned_behaviour.html. (accessed on November 15, 2004).

[43] Ajzen, Icek. Behavioural Interventions Based on the Theory of Planned Behaviour. http://aee6300.ifas.ufl.edu/Ajzen.pdf. 1991.

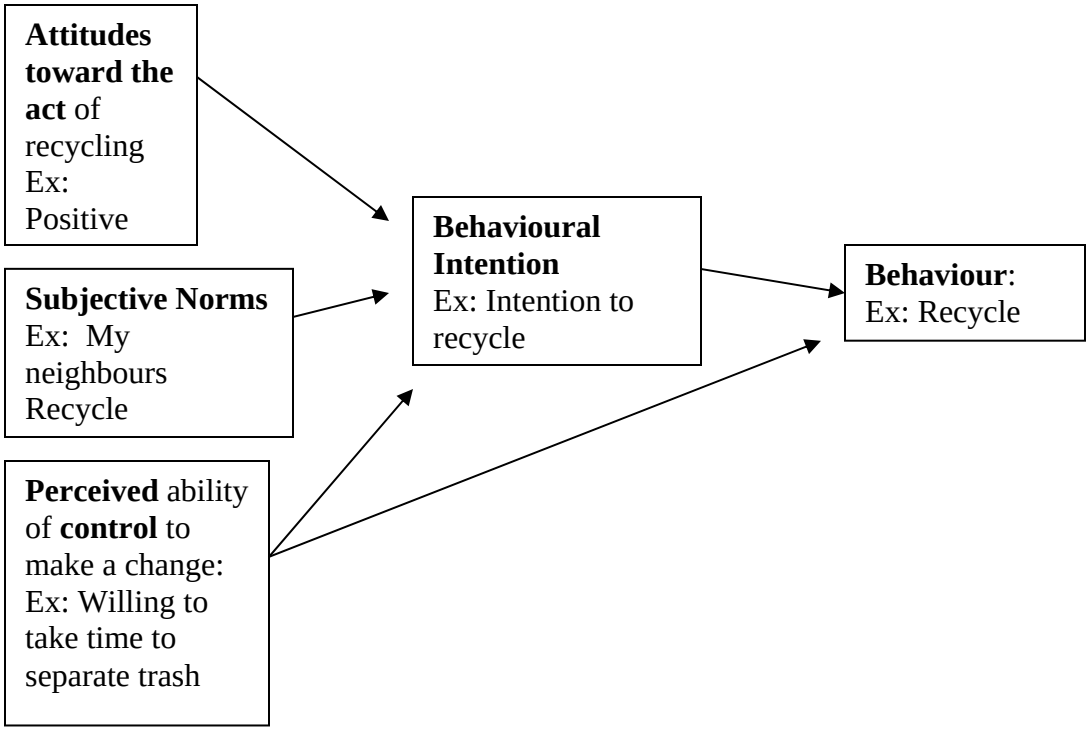


Fig.1 Explanation of the Theory of Planned Behaviour[44]

Applying this theory to the question of participation in Philadelphia's recycling program, we will have a better understanding of the theory if we look at it from the position of an individual. In the hypothetical example above, the city resident has a positive outlook toward the act of recycling itself (Attitudes toward the Act). This person sees the benefits of recycling and, despite any inconveniences that recycling may cause, the Planned Behaviour Theory suggests they would still recycle because their attitude towards recycling is positive. A nationwide public opinion poll by Maritz AmeriPoll[45] explained why

[44] Ibid.
[45] McCornack, Penny. "The Psychology of Recycling." The McGraw-Hill Recycling Handbook. Ed: Herbert F. Lund. New York: McGraw-Hill, 2001. (9.3)

certain people do not recycle. Among other contributing factors, the majority of those surveyed said that recycling took too much time.[46] The Planned Behaviour Theory suggests that this factor is one of perceived ability for control. If person X perceives that the action of separating recyclable items to be too time consuming or taxing, they will not likely take the time or effort to recycle. Theoretically, in a city that has uniform recycling services and pickup, it should take each person (or household) the same amount of time to separate their waste into recycling and trash containers for waste pickup. Why then, do some find the thought of separation too time consuming and difficult while others do not? The Planned Behaviour Theory suggests that motivation is the key to explaining the difference. Motivation provides us with an incentive and it calls to move toward action. Surveys from the previously mentioned poll suggested that recyclers experienced the same inconveniences that non-recyclers view as deterrents, yet they recycle anyway.[47] If it is motivation and an affirmative attitude toward recycling that motivates a human to act, one may suggest that if residents have not had any previously positive experiences recycling, they would not feel compelled to recycle. For example, suppose residents were ignorant of the positive results that transpire from recycling. The city of Philadelphia has facts on the recycling website which explain the positive effects of recycling including energy and resource conservation. If city residents could understand the power that they had, even as individuals, perhaps their motivations would change and in turn, their behaviours also. The McGraw-Hill Handbook on

---

[46] This issue will is discussed in the section titled "Single-stream Recycling"
[47] McCornack, Penny. "The Psychology of Recycling." The McGraw-Hill Recycling Handbook. Ed: Herbert F. Lund. New York: McGraw-Hill, 2001. (9.6)

Recycling also concludes that recycling is determined by individual motivations. In response to a claim that if recycling was easier, more people would participate, the handbook noted that:

"What does this information reveal? That recycling needs to be more convenient and cleaner? That curb-side needs to be easier and more widely available? That citizens need to be taught how to recycle? The answer to these questions may be 'yes' however, a more important question involves examining what might motivate the public to relinquish these considerations which are used as reasons for not recycling" [48]

While external factors have an influence on behaviour, it is ultimately each individual's motivation and intention about recycling that will determine their behaviour. Certainly, if regulation is the external factor which promotes the individual to recycle, their motivation may be different from the individual who is not required by authority to recycle but who recycles for out of their own conclusion that it is the best choice available.

Determinism and Environmental Psychology

With origins dating back to the times of Thomas Hobbes, the philosophy of Determinism asserts that all of man's choices are determined by pre-existing circumstances. Occasionally, this theory is associated with a denial of the ability for free will which depends on the theorists understanding of free will. Some feel that it refers to the metaphysical truth of independent agency, whereas others simply define it as the feeling of agency that humans experience when they act. Theoretically speaking however, determinism declares that every action is an "inevitable result of antecedent clauses."[49] Those who do not believe in free will

[48] Ibid. (9.4)
[49] Determinism: An Essay". Gill, Peter. *The Society of Natural Science Webpage*. Available from http://www.determinism.com/essay.shtml. (accessed on October 29, 2004).

see it as an allusion and that the outcomes of all future events have already been determined.

Environmental psychology studies the effects of the environment on human behavior. Based on its cohesive way of providing explanations for many different environmentally altering occurrences, the theory of environmental psychology is viewed as an essential theory for explanation of the human behavior. Environmental psychology describes the relationships between air pollution, urban poverty, urban understimulation, noise, density of population, landscape, and the effect that each has on human behavior.[50] For example, environmental psychologists have studied the rates of juvenile delinquency and vandalism in cities. While population density is obviously higher in the city than in the country or suburb, rates of delinquency in cities were still much higher after density had been accounted for. Environmental psychology has explained that there is a correlation between the monotonous repetition of urban scenery and violence rates.[51] Environmental psychology has shown that the delinquency rates are higher in cities because urban settings have the same patterns and visual stimuli on each street[52]. This can challenge the perception held by some that there are more stimuli in the city than in the country. The theory of environmental psychology explains that:

---

[50] Bell, Paul, Fisher, Jeffrey, and Loomis, Ross. Environmental Psychology. Philadelphia: W.B. Saunders Company, 1978

[51] Bell, Paul, Fisher, Jeffrey, and Loomis, Ross. Environmental Psychology. Philadelphia: W.B. Saunders Company, 1978.

[52] Ibid.

"fields, forests and mountains contain an unending variety of changing patterns of visual stimulation, but that urban areas contain the same patterns repeated on every street."[53]

The study of Environmental Psychology shows the direct correlation that our surrounding physical environment and stimuli have on our actions. "The City of Philadelphia is currently estimated to have over 30,000 vacant lots, many of which are overgrown, filled with trash and contribute to an appearance of decay and blight."[54] A local initiative called the Urban Tree Connection helps to reduce drug-related crime and violence by empowering local residents to get involved in the transformation of vacant lots into green spaces. As noted earlier, the stimuli in our physical environment in which we reside has a substantial impact on our behaviours and motivations.

A study by three professors at the University of Laval, Québec looked at many of the different determinants in recycling practice in Europe and found that the presence of recycling bins on city streets directly affected the waste diversion rates. Their study found that residents are unlikely to participate in recycling unless they have a recycling bin.

"Among the strongest evidence of the effects of external factors, [on recycling participation, researchers found] that possession of a bin had a significant effect on recycling behavior."[55]

Environmental Psychology would say that on streets where recycling participation is high, the presence of blue bins works as a tool for neighbours to

---

[53] Ibid.
[54] Urban Tree Connection. *About Us.* http://www.urbantreeconnection.org/ABOUTUS.html. Accessed on March 18, 2006.
[55] Guerin, Daniel, Crete, Jean, Mercier, Jean. A Multilevel Analysis of the Determinants of Recycling Behaviour in the European Countries. Quebec City: Academic Press http://archimede.bibl.ulaval.ca/di/files/90/2-9-90-20040428-1.pdf, 2001. p.198

remind each other of the pending recycling pickup. Likewise, without access to recycling bins, according to the determinism theory, residents will have no visual reminder to recycle and thus will not. Even though the blue bin itself is not the only way Philadelphia residents may recycle, (as long as recycling is in a separate container from the trash, the city will collect it) it is a symbol that Environmental Psychology suggests has the power to encourage and alter behavior.

Theory Summary

The two theories identified, determinism and Planned Behavior, take a philosophical/psychological approach to explain how recycling actions can be explained through the examination of behaviour. Both agree that motivation drives humans to behave, but see the sources of motivation to be different. Determinism suggests that our motives come from previous actions and influences that led to the current choice. A determinist may say that the momentum of previous choices and external factors lead humans to make current choices because of habitual experience and perceived outcomes. Some deterministic theorists would even suggest that the strength of previous choices and outside factors are so strong that 'free will' is not possible.

The Planned Behaviour theory does not give credence to many of the external environmental variables that determinism suggests. Instead, Planned Behaviour emphasizes the importance of the individual - their attitudes, beliefs of others and their perceived control which lead to their behaviours. Planned Behaviour would definitely support the notion of free will and propose that individuals are capable

of making unique choices based on their previous experiences. While they may disagree in the application of their theories, both determinism and the Planned Behaviour theory put great emphasis on human's attitudes and motivations and the role that the preceding actions and experiences have on current choice. When looking at the reasons why recycling participation is low in Philadelphia, Determinism and environmental psychology would assert that if the city Sanitation department was more efficient in supplying the residents with bins, the residents would respond by using them. The Theory of Planned Behaviour's explanation for differing waste diversion levels would say that Philadelphia's residents have had negative experiences with recycling. Whether the negative experience relates to the difficulty of bin acquisition, the limited materials acceptable in the recycling pickup, or to the inconvenient separation requirements, non-recyclers have concluded that the process of recycling is something that is not worth their time and effort.

Appendix E

Philadelphia's Recycling Timeline[56]

1987: Philadelphia City Council passes City Ordinance No. 1251A, enacting the first large-scale urban mandatory recycling program in the country.
1992: The Commonwealth of Pennsylvania was compelled to issue a Notice of Violation of Act 101 threatening a fine in excess of half a million dollars to force the City to expand its program beyond 1/3 of its residents.
1993: Contrary to provisions of 1251A, and the urging of the Streets Department, the Rendell Administration shifted decision-making authority for the Recycling program from the Recycling Coordinator to the Streets Commissioner.
1994: The Streets Department did not carry out a policy directive to develop a strategic plan to reach the 40 percent recycling goal by the year 2000.
1997: Residential recycling volumes dropped for a second year in a row to a rate of 6.5 percent: the equivalent of one Sunday Philadelphia Inquirer and two 16-ounce soda bottles per household each week.
1998: Al Dezzi, the Deputy Streets Commissioner for Recycling, resigned in January. Most of the senior recycling staff resigned or transferred to other positions. Replaced by internal transfer with staff of lesser experience, professional recycling job titles were not refilled. The position of Deputy Streets Commissioner for Recycling was reduced to a lower level, responsible to the Deputy Streets Commissioner for Sanitation.
1999: As the result of outside pressure from recycling efforts, the City begins a return to weekly collection on a trial basis in two pilot areas for one year.
2000: Philadelphia Recycling Office hires David Robinson as Recycling Coordinator.
2001: The City begins "Same Day - Same Way" pilot program in August.
2004: An incentive based recycling program led by RecycleBank is introduced in West Oak Lane and Chestnut Hill neighborhoods as an attempt to increase diversion rates.
2005: Recycling Coordinator David Robinson indicted on federal corruption charges.
February 2006: With the recycling diversion rate at a low 5.5%, Joan Hicken from Glendale Arizona hired as Deputy Director of Recycling.

[56] Some points accessed from the Recycling Alliance of Philadelphia and the Clean Air Alliance. *Recycling in Philadelphia*. http://www.cleanair.org/recyclingalliance/rec_phila.html#4. Accessed on March 20, 2006.

Appendix F
Waste News Report of City Recycling Programs[57]

PHILADELPHIA

Population:	1,517,550
Recycling rate:	37.5%
Calculated for year ending:	December 2004
Rate includes:	
Residential	✓
Commercial	✓
Other	
Rates by category:	
Residential	5.5%
Commercial	35.9%
Materials included: *(See key below)*	
Paper	NP, OCC, MG, MP, TB, OP
Metal	ALC, TC, APP
Plastic	PET, HDPE, BVC
Glass	GCON
Bulk	TEX, WOOD, FOOD, CND
Automotive	ABAT, TIRE, OIL
Hazardous	HH, ESRP, FLP
Organic	YARD
Other	
Total tonnage collected:	1,143,807
By city	50,492
By contracted haulers	1,093,315
Tonnage collected per material:	
Paper	133,291
Metal	329,055
Glass	16
Plastic	518
Yard trimmings	19,574
Other	661,351
Collection methods:	
Curbside	Yes
Frequency	Weekly/biweekly
Number of households	530,000
Is program mandatory?	Yes
How are materials collected?	Source-separated

[57] Truini, Joe. Waste News. *Municipal Recycling Survey*. 03/13/2006. Vol. 11 Issue 22. p12, 8p

Program operated by:	City crews
Dropoff	Yes
Number of sites	5
Program operated by:	City crews
Multifamily dwelling	Yes
Program operated by:	City crews, private haulers
Other	Apartment buildings with 5 or fewer units are collected by city crews. All others have private collecting.
Commercial recycling program offered:	Commercial establishments are responsible for compliance. City officers inspect.
Recycling goals:	
Mandated goal	35% - 40%
Non-mandated goal	N.A.
Goals met	Yes
Financial information:	
Annual revenue from the sale of recyclables	$1,244,329
Recycling budget	$10,000,000
Overall solid waste budget	$88,765,000
How are residents charged for recycling?	Included in property taxes
Recycling director:	Carlton Williams
Title	Deputy Streets Commissioner, Sanitation
Telephone number	(215) 686-5504
Fax number	(215) 686-5455
Web site	www.recyclingpays.phila.gov

LOS ANGELES

Population:	3,819,951
Recycling rate:	62.0%
Calculated for year ending:	June 2005
Rate includes:	
Residential	✓
Commercial	✓
Other	✓
Rates by category:	
Residential	45.0%
Commercial	77.0%
Materials included: *(See key below)*	
Paper	NP, OCC, MG, TB, MP, OP
Metal	ALC, TC, APP
Plastic	PET, HDPE, PB, BVC
Glass	GCON
Bulk	WOOD, CND
Automotive	AUTO, ABAT, OIL
Hazardous	HHW, ESRP, FLP
Organic	YARD
Other	
Total tonnage collected:	5,760,000
By city	1,355,326
By contracted haulers	4,404,674
Tonnage collected per material:	
Paper	810,599
Metal	730,094
Glass	162,425
Plastic	15,991
Yard trimmings	897,317
Other	3,143,574
Collection methods:	
Curbside	Yes
Frequency	Weekly
Number of households	745,000
Is program mandatory?	No
How are materials collected?	Source-separated
Program operated by:	City crews
Dropoff	Yes
Number of sites	6
Program operated by:	City crews
Multifamily dwelling	Yes

Program operated by:	City crews, private haulers
Other	None
Commercial recycling program offered:	N.A.
Recycling goals:	
Mandated goal	No
Non-mandated goal	70% by 2020
Goals met	No
Financial information:	
Annual revenue from the sale of recyclables	$2,900,000
Recycling budget	$39,075,021
Overall solid waste budget	$95,304,931
How are residents charged for recycling	There is no charge
Recycling director:	Alex Helou
Title	Division Manager
Telephone number	(213) 485-3637
Fax number	(213) 485-2961
Web site	www.lacity.org

CHICAGO

Population:	2,896,016
Recycling rate:	52.0%
Calculated for year ending:	June 2005
Rate includes:	
Residential	✓
Commercial	
Other	
Rates by category:	
Residential	14.0%
Commercial	57.0%
Materials included: *(See key below)*	
Paper	NP, OCC, MG, TB, MP, OP
Metal	ALC, TC
Plastic	PET, HDPE
Glass	GCON
Bulk	WOOD
Automotive	OIL
Hazardous	FLP
Organic	YARD
Other	
Total tonnage collected:	5,402,907
By city	160,413
By contracted haulers	5,242,494
Tonnage collected per material:	
Paper	534,424
Metal	2,734,547
Glass	78,049
Plastic	16,789
Yard trimmings	210,964
Other	1,669,234
Collection methods:	
Curbside	Yes
Frequency	Weekly
Number of households	660,000
Is program mandatory?	No
How are materials collected?	Blue bags
Program operated by:	City crews
Dropoff	No
Number of sites	
Program operated by:	
Multifamily dwelling	No
Program operated by:	
Other	Recyclables placed in bags; collected with trash

Commercial recycling program offered:	N.A.
Recycling goals:	
Mandated goal	25%
Non-mandated goal	N.A.
Goals met	N.A.
Financial information:	
Annual revenue from the sale of recyclables	None
Recycling budget	$14,500,000
Overall solid waste budget	$160,000,000
How are residents charged for recycling?	Included in taxes
Recycling director:	Chris Sauve
Title	Recycling Coordinator
Telephone number	(312) 744-4616
Fax number	(312) 744-7915
Web site	www.cityofchicago.org

BALTIMORE

Population:	628,670
Recycling rate:	27%
Calculated for year ending:	June 2005
Rate includes:	
Residential	✓
Commercial	✓
Other	
Rates by category:	
Residential	27.0%
Commercial	N.A.
Materials included: *(See key below)*	
Paper	NP, OCC, MG, TB, MP, OP
Metal	ALC, TC, APP
Plastic	PET, HDPE
Glass	GCON
Bulk	WOOD
Automotive	
Hazardous	
Organic	YARD
Other	
Total tonnage collected:	265,320
By city	95,031
By contracted haulers	171,099
Tonnage collected per material:	
Paper	53,727
Metal	74,372
Glass	409
Plastic	470
Yard trimmings	30,311
Other	106,839
Collection methods:	
Curbside	Yes
Frequency	Weekly
Number of households	195,000
Is program mandatory?	No
How are materials collected?	Source-separated
Program operated by:	City crews
Dropoff	Yes
Number of sites	5
Program operated by:	City crews
Multifamily dwelling	Yes
Program operated by:	Private haulers

Other	None
Commercial recycling program offered:	N.A.
Recycling goals:	
Mandated goal	No
Non-mandated goal	20% annually
Goals met	Yes
Financial information:	
Annual revenue from the sale of recyclables	$275,000
Recycling budget	$870,000
Overall solid waste budget	$70,000,000
How are residents charged for recycling?	Included in property taxes
Recycling director:	Joseph Kolodziejski
Title	Head, Bureau of Solid Waste
Telephone number	(410) 396-5134
Fax number	(410) 545-6117
Web site	www.baltimorecity.gov/government/dpw/recycle.html

Materials Key:
NP-newspaper; OCC-cardboard, corrugated containers; MG-magazines; TB-telephone books; MP-mixed paper; OP-office paper; ALC-aluminum cans; TC-tin cans; APP-appliances; PET-PET plastic; HDPE-HDPE plastic; PB-plastic bags; BVC-beverage cartons, drink boxes; GCON-glass containers; TEX-textiles; WOOD-wood waste; CND-construction debris; FRN-furniture; AUTO-automobiles; ABAT-automobile batteries; TIRE-tires; OIL-oil, oil filters, grease; FLP-fluorescent lamps; HH-household hazardous waste; ESRP-electronic scrap; FOOD-food waste; YARD-yard trimmings

Acknowledgements

Thank you to the individuals who through support, encouragement and mentoring, each helped to create this project:

Dr. B. Riebling
Professor S. Laskowski
Mr. Bob Milligan
Mr. Sean Davies
Mr. Ron Gonen,
Mr. Patrick Fitzgerald,
Mr. Maurice Sampson.
Ms. Marilyn Gibbins
Mrs. B.F. Gibbins