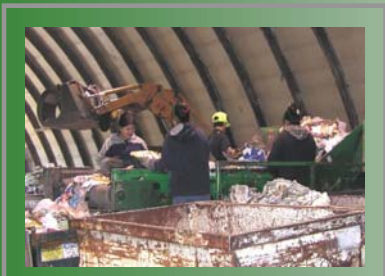


# City of Urbana 2005 Recycling Report



Celebrating  
**20** Years  
**U·CYCLE**  
Urbana's Recycling Program  
Since 1986

Multifamily Recycling Program  
**U·CYCLE**  
City of Urbana

July 2006

## **Introduction**

This report provides a review of recycling activities that are conducted directly by the City, the U•CYCLE programs, and other recycling efforts within the City. The City has strongly supported recycling as a critical component of solid waste management activities. The 20<sup>th</sup> anniversary of the residential U•CYCLE program will be observed September 22, 2006.

This report will discuss commodity/waste generation rates in aggregate and by generation categories as well as diversion rates from two views – by recovery methods, recycling and composting; and by generation category – residential, commercial, and construction and demolition.

## **Definitions**

Unfortunately, there are a number of key terms that have different meanings to different groups or are simply used incorrectly. This often leads to confusion and underscores the need to standardize solid waste terms nationally. Listed below are several key terms that are used in this report and have the definitions ascribed accordingly, unless otherwise noted in the report:

**Capture rate** – “The quantity of a specific commodity (e.g. aluminum cans) recycled divided by the gross quantity of that specific material generated.”

**Composting** – “The controlled, biological decomposition of discarded organic materials into a humus product that may be used as a soil amendment or mulch.”

**Construction and Demolition Debris (C&D)** – “Non-hazardous, uncontaminated materials resulting from the construction, remodeling, repair and demolition of utilities, structures, and roads...”

**Commodity** – “A tangible good or product that is bought or sold on a commodity exchange, subject to supply and demand influences.”

**Discard(s)** – “To relinquish materials, products, or packages no longer useful to the generator.”

**Disposal** – “The placement of waste materials in a landfill, incinerator, or other repository intended for the permanent containment (or destruction) of waste. [Reuse, recycling and composting are not considered disposal.]

**Diversion Rate** – “The net weight of commodities recovered divided by the sum of commodities and waste generated.”

**Generation** – “Refers to the weight of commodities and waste as they enter the management system before recycling, combustion, or landfilling occurs.”

**Participation rate** – “The number of households, tracked by individual location, setting recyclables out, usually for a one month period, for collection divided by the potential number of households served.” [This rate is often confused with setout rate, but is rarely used due to the effort to monitor each individual household.]

**Recyclables** – “Discarded materials that can be collected, sorted, processed, and then used as raw materials in the production of new products.”

Recycling – “Any process by which materials that would otherwise be disposed of or discarded are collected, separated, or processed and returned to the economic mainstream in the form of raw materials or products.”

Recovery – “The diversion of materials from disposal for the purpose of recycling or composting.” [Excludes reuse and source reduction activities such as backyard composting or repair of pallets, etc.]

Recovery rate – “The quantity of material recovered divided by the aggregate referenced commodity or generating sector.” [If only recycling strategies are used, then the terminology is recycling rate.]

Reuse – “The recovery or reapplication of a package or used product in a manner that retains its original form or identity.” [Unlike recycling, reuse does not involve processes that significantly alter the original condition of the package or product.]

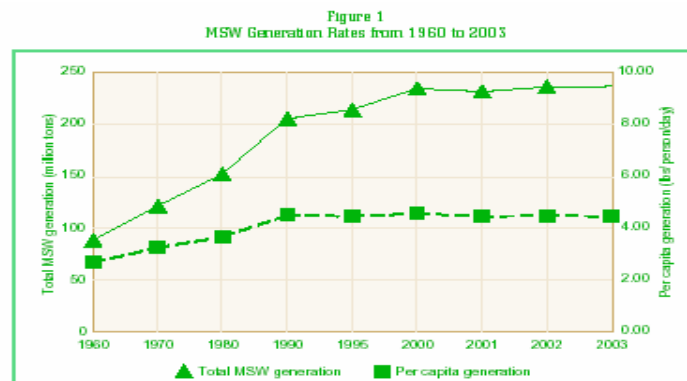
Source reduction – “The design, manufacture, purchase, or use of materials, such as products or packaging, to reduce the amount or toxicity of materials before they enter the management system.” [Intended to reduce pollution and conserve resources, e.g. reusing pallets or “light weighting” - making a thinner aluminum can cover. Also referred to as waste prevention.]

Waste – “Discarded materials that are landfilled or incinerated, rather than reused, recycled or composted.”

Waste reduction – “Decreasing the quantity of materials that are landfilled or incinerated.” [This may be a combined result of source reduction, reuse, composting and recycling practices.]

## **Commodity/Waste Generation**

In order to calculate various diversion or recovery rates the aggregate generation rate of the commodity/waste stream must be established. The basic unit used in deriving generation rates is pounds per capita per day (PCD). There are several different information sources – local, state or national data, and methodologies that can be used for this estimation. The most accurate method would be to use recent local data. While, the last local data was gathered in 1988 and used in the 1990 Champaign County Solid Waste Management Plan (CCSWMP), it still remains a viable data source with adjustments. According to USEPA, the generation rate for Municipal Solid Waste (MSW) has “remained relatively constant since 1990 at 4.5 PCD”. In fact, from 1996 to 2003 the generation rate decreased 0.117% per year due light-weighting of products.



There are several caveats to note for generation rates. First, USEPA data for MSW only includes residential and commercial categories and does not include C&D waste. However, the commercial category does include institutional and industrial sources but only packaging, cafeteria and administratively generated wastes – not manufacturing or process wastes.

Second, the term “solid waste“ is much broader and includes residential, commercial, industrial – including manufacturing or process wastes, C&D, and non-liquid/non-hazardous special wastes.

Third, the State of Illinois definition of “municipal waste” includes C&D and is defined as: “garbage, general household and commercial waste, industrial lunchroom and office waste, landscape waste, and C&D” (415 ILCS 5/3.21). Illinois’ definition does include institutional waste under the category of commercial, but like USEPA does not include industrial process and manufacturing waste or special waste. The 25% recycling goal established by Illinois uses this definition and therefore the aggregate generation rate in this report will also.

The CCSWMP provided generation data for “total solid waste” which is distinguished from “municipal solid waste” as discussed above. The PCD values presented in that report are as follows:

### CCSWMP 1990 Data

Waste Category	PCD
Residential/Commercial	3.43
Industrial	0.41
C&D	1.84
<b>Total</b>	<b>5.68</b>

There are several adjustments to be made to the values above. The industrial category PCD value of 0.41 is revised down to 0.06 PCD to reflect only industrial lunchroom and office waste and not industrial manufacturing process waste. This value is added to the commercial sector and was derived by this formula:

$$\frac{(\text{est. generation for lunchroom/office waste})(\text{persons employed in Urbana in manufacturing}^1)(365 \text{ days})}{2000 \text{ pounds}}$$

$$(1.56)(1550)(365)/2000\# = 441 \text{ Tons per year or } 0.06 \text{ PCD}$$

<sup>1</sup>2002 US Economic Census data

The CCSWMP did not differentiate residential from commercial waste, but that category can be separated using the most recent USEPA data, found in their 1998 report. Residential wastes are defined as originating from both single family and multifamily residences. Commercial wastes are defined as originating from retail and wholesale establishments, hotels, office buildings, hospitals, schools and other institutions and similar sources. USEPA determined a range for the residential portion at 55-65% and the commercial portion at 35-45%. It is assumed that Urbana would fall in this range

and this report allocates the residential sector at 60% and the commercial sector at 40%. Given these adjustments then the following chart establishes the generation rates used in this report:

### Urbana 2005 Municipal Commodity/Waste Generation

Category	PCD	Percent	Tons/Yr.	Tons/Day
Residential	2.058	38.6	14,715	40.3
Commercial	1.432	26.9	10,239	28.1
C&D	1.84	34.5	13,156	36.1
<b>Total</b>	<b>5.33</b>	<b>100</b>	<b>38,109</b>	<b>104.4</b>

### Comparison of Urbana, Illinois and the Nation

Locale	PCD	MSW Generation (Tons)
Nation	4.5	236 Million <sup>1</sup>
Illinois	7.0	23.6 Million <sup>2</sup>
Urbana	5.33	38,109

<sup>1</sup> Municipal Solid Waste Generation, Recycling, and Disposal in US, USEPA 2003.

<sup>2</sup> 17<sup>th</sup> Annual Non-hazardous Solid Waste Management and Landfill Capacity Report, IEPA.

Finally, one last distinction can be made for the residential category for diversion calculations. The U•CYCLE residential program serves single family through 4plex, and the multifamily program serves five or more dwellings. Since the U•CYCLE programs do not serve the University of Illinois populations that reside in their dormitories, we can also segregate that population. This is accomplished using US census data estimates for 2004 and University information.

### Urbana 2005 Residential Commodity/Waste Generation Detail

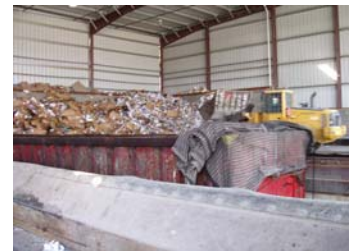
Sector	Population	Percent	Tons/yr.
Single family – 4plex	18,098	46.2	6798
5 or more units	15,492	39.5	5812
U of I	5588	14.3	2104
<b>Total</b>	<b>39,178<sup>1</sup></b>	<b>100</b>	<b>14,715</b>

<sup>1</sup>US Census estimate for 2004

## Recovery Data

The data presented here comes from a number of different sources – internal City data, private sector recyclers and haulers, a University of Illinois FY04 report, and other sources. Some information is estimated, and other is substantiated by weight data. However, it represents the best data available to represent calendar year 2005.

Sector	Location/Program	Tons
Residential	<b>Recycling</b>	
	Residential U•CYCLE	1751
	Multifamily U•CYCLE	708
	University of Illinois (allocated 50% to Urbana)	557
	Community Development Neighborhood Cleanups	24
	<b>Subtotal</b>	<b>3040</b>
	<b>Composting</b>	
	Spring & Fall leaf/Holiday tree collection	463
	University of Illinois (allocated 50% to Urbana)	450
	Private haulers (Landscape Recycling Center)	1260
	<b>Subtotal</b>	<b>2173</b>
	<b>Residential Total Recovery</b>	<b>5213</b>
	Commercial	<b>Recycling</b>
City Facilities:		
Public Works Fleet		5.8
Public Works Operations		1.8
Public Works Building		12.4
City Building		10.6
Civic Center		4.8
Fire Substations		2.9
Library		5.1
Private haulers		1547
University of Illinois (allocated 50% to Urbana)		557
Tire Collection Event		45
<b>Subtotal</b>		<b>2192</b>
<b>Composting</b>		
Public Works - Arbor	957	
Public Works - Operations	233	
University of Illinois (allocated 50% to Urbana)	450	
Private haulers (Landscape Recycling Center)	1260	
<b>Subtotal</b>	<b>2900</b>	
<b>Commercial Total Recovery</b>	<b>5092</b>	
C&D	<b>Recycling</b>	
	Public Works -Operations	1560
	University of Illinois	432
	<b>C&amp;D Total</b>	<b>1992</b>



The recovery data found on the previous page does not include all recovery efforts being conducted in the City. For example, some grocery and other retail outlets recycle corrugated cardboard that is collected by recyclers located outside of Urbana – Champaign. Therefore the quantity of recycled materials would be higher than shown. While recycling activities are also being conducted by the Urbana Park District, Urbana School District and Champaign County, no specific quantity information is available but these quantities should be included in data estimates supplied by local haulers.

### 2005 Commodity Recovery Summary

Category	Recycling (Tons)	Composting (Tons)	Total (Tons)
Residential	3040	2173	5213
Commercial	2192	2900	5092
C&D	1992	0	1992
<b>Total (Tons)</b>	<b>7224</b>	<b>5073</b>	<b>12,297</b>

Finally, in 2005 road maintenance/construction projects generated 8234 tons of milled asphalt or concrete pavement for recycling. However, reclaimed asphalt/concrete pavement is not considered by IEPA to fall under the definition of “municipal waste” as C&D, but rather is considered to be “clean construction or demolition debris” since it is source separated on-site and is not intended to be discarded. Therefore this quantity cannot be included in calculations for the overall diversion rate, but does reflect re-use efforts.

### Diversion Data

The first view of diversion rates will look at individual recovery methods – recycling and composting of commodities:

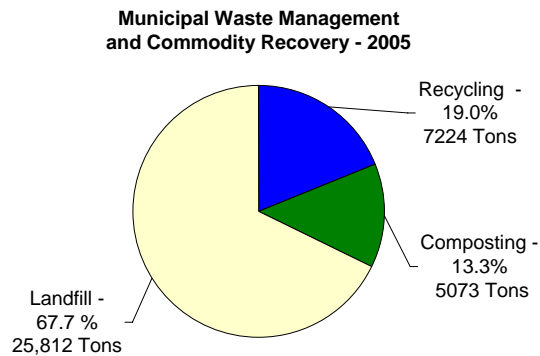
### Diversion Rates by Recovery Method

Recovery Method	Tons Recovered	Total Tons Generated	Diversion Rate
<b>Recycling</b>	7224	38,109	<b>19.0</b>
<b>Composting</b>	5073	38,109	<b>13.3</b>
<b>Total</b>	12,297	38,109	<b>32.3</b>

**The overall diversion rate for Urbana is 32.3%.** As mentioned earlier, this is a minimum value and is likely higher. But given this data, this means that 67.7% is landfilled. This is better the State value of 73.1% as reported in 2003 by IEPA. The diversion rate exceeds the State’s diversion goal of 25% and is just below USEPA’s 2008 goal of 35%.



Determination of the diversion rates for recycling and composting reveals the overall municipal waste management strategies for the recovery of commodities and management of wastes in Urbana:

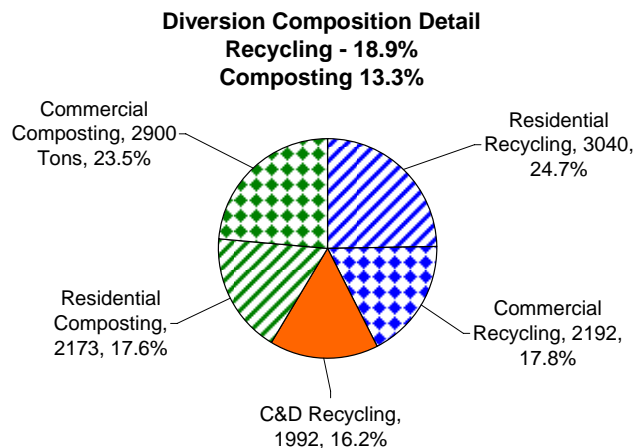


A further look at the overall diversion rate of 32.3%, by generation category - that includes both recycling and composting recovery, shows that the commercial category comprises nearly half of all recovery and is followed by residential and C&D categories.

### Diversion Rates by Generation Category

Category	Tons Recovered	Tons Generated	Diversion Rate
<b>Residential</b>	5123	14,715	<b>34.8</b>
<b>Commercial</b>	5092	10,239	<b>49.7</b>
<b>C&amp;D</b>	1992	13,156	<b>15.1</b>
<b>Total</b>	<b>12,297</b>	<b>38,109</b>	<b>32.3</b>

The diversion rate distinguished by category and recovery method is shown below:





## U•CYCLE Programs

The residential and multifamily programs combined recycled a total of 2459 tons. The following chart depicts the recycling rate for the residential housing sectors that they serve:

**U•CYCLE Programs 2005 Recycling Rate**

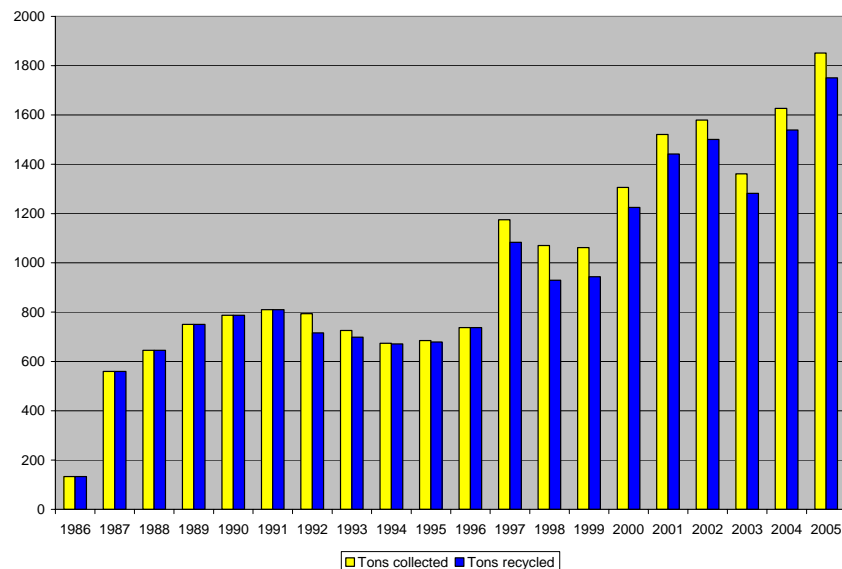
Sector	Tons Generated	Tons Recycled	Recycling Rate
Single family – 4plex	6798	1751	25.7%
5 or more units	5812	708	12.2%
<b>Total</b>	<b>12,610</b>	<b>2459</b>	<b>19.5%</b>

## Trends in U•CYCLE Programs

The residential U•CYCLE program was among the first curbside programs initiated in Illinois in 1986. It began collecting 3 basic commodities - newspaper, glass, and cans as did most programs at the time. The availability of new markets and processing capabilities, for the most part, drive the types of commodities that can be collected and recycled. Local demographics and economic times also play a significant role in the quantity of commodities actually collected. In 1996, additional materials - limited plastics, cardboard, magazines, and other papers were added to the list of acceptable materials for the program and they still continue today.

Given the longevity of the program, certain trends can be seen. The chart below reflects the quantity of materials collected and recovered from the residential program since 1986.

**Residential U•CYCLE Historical Quantities Collected/Recovered**



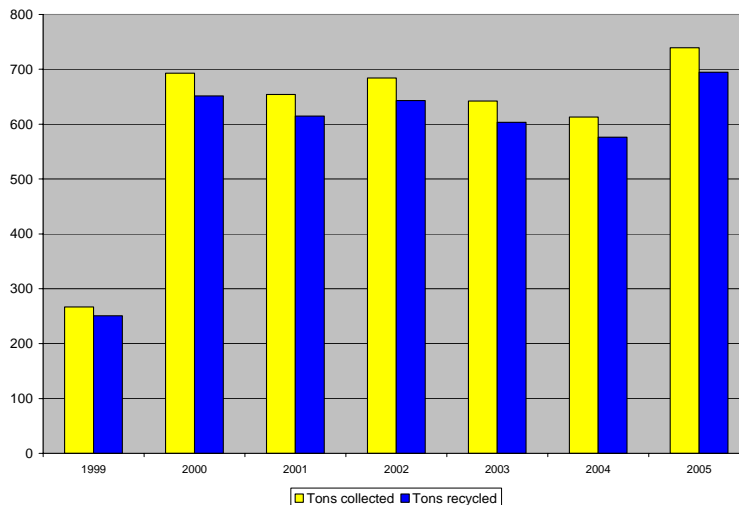
There are several points of interest derived from this chart. First there is a difference between the quantities collected and recovered before shipping to other facilities for further processing and used as feedstock for manufacturing. This is due to contamination and collection of unacceptable materials, not only in the residential program but also in the multifamily program, as shown below. Both programs experience a contamination rate typically ranging between 5 and 7 percent. This range is also seen in other curbside programs and is not unusual. Also seen in the chart, is the addition of expanded materials in 1996 and has had a significant impact over the last 10 years. Over the last twenty years 19,857 tons have been collected and 18,888 have been recycled. Over the last ten years, 13,291 tons have been collected and 12,436 recycled.

In 1998 and 1999 quantities collected saw a dip, but rebounded in 2000. In 2003 a dip was also observed. It was this information that led to the decision to make the 64 gallon U•CART available to households, upon request, in April 2004. The strategy was to increase household storage capacity and to increase convenience. This has been very successful with over 3028 U•CART's having been delivered to 37% of the residential households. Comparing FY0304 to 0405, quantities have increased 32% !

The average weight of an individual "setout" in 1996 was 15.7 pounds and has increased 58% to 27 pounds in 2005. The residential program currently is offered to over 8150 households with a population of approximately 18,100 persons. The setout rate for 2005 was 32.4%.

The multifamily U•CYCLE program began in 1999. The same commodities collected in the residential program can be collected in the multifamily program. It is offered to approximately 15,500 persons living in 8768 units.

### Multifamily U•CYCLE Historical Quantities Collected/Recovered



The quantities collected in the multifamily program have not been as large as in the residential program, at least on a per capita basis. In 2005, the residential program saw 204 pounds per capita collected versus 95 pounds in the multifamily program. However, there are many differences: the student population decreases during summer






months, owner occupied units tend to acquire more goods than do apartment units – even though USEPA makes no real distinction in PCD generation, transient nature of the student population, and the lack of space for storage of recycling containers, account for some of the differences.

A survey was sent out in 2005 to assess what obstacles or improvements could be made to improve participation. Providing indoor storage for recyclables as well as providing additional information of acceptable materials ranked high. In November 2005, indoor storage bags were distributed to all units. These storage bags are coined “U•BAGS” and have a capacity of 6 gallons, and are made with recycled polyethylene fabric, and a listing of acceptable materials are printed with on one side. These bags can fit under sinks or can hang in closet storage areas for temporary storage of recyclable materials.

Comparing the period of December through April of 2004 against 2005, the U•BAGS have contributed to a 15% increase in commodities collected ! Additional advertising targeted at student populations has also occurred and 2005 saw an increase of 20% over the quantity collected in 2004. These and other efforts will continue and the increasing trend is expected to continue.

### **Benefits of Recycling**

There are many benefits to recycling, and most benefits are mentioned generically such as conserving natural resources, saving energy, creating jobs, contributing to the overall economic base, etc. Recycling was initially widely promoted for the environmental benefits and obviously still does makes significant impacts. But today, recycling is becoming more recognized for its economic benefits. It is possible to quantify these generic headings into specific benefits. A listing of some of the specific benefits is provided below:

-  Every ton of recycled paper saves approximately 4 barrels of oil, 4200 kilowatt hours of energy, and enough energy to heat and air-condition the average north American home for nearly 6 months !
-  For every 1000 tons of commodities recycled, 6 jobs are created. The U•CYCLE programs have created 14 jobs in the economy.
-  Reduction in greenhouse gas emissions was equivalent to removing 2980 passenger cars from the roads in Urbana.
-  Just the glass alone, recycled from the U•CYCLE programs, saved 5160 gallons of fuel oil.
-  The energy saved from the recovery of all commodities listed in this report could power 912 homes in Urbana for a year –that’s 14% of all single family homes.  
(US Census 2000 data reported 6487 single family homes)