



# Waste and Recycling in Illinois

Illinois communities cope with waste in different ways

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By Don Fullerton and Sarah Miller

## Introduction

Illinois households, businesses, and institutions generated 18.9 million tons of garbage in 2007, at a per capita rate 19 percent higher than the national average. The majority of that waste was deposited in landfills, which in Illinois generate the equivalent of 440,000 cars' output of greenhouse gases per year.<sup>1</sup> Local government policymakers can reduce municipal solid waste generation and landfill costs through policies that improve household incentives to reduce generation of waste and encourage recycling and conservation behavior. In this article, we examine municipal waste and recycling in Illinois, provide an overview of state-level mandates concerning municipal waste, and compare and evaluate garbage and recycling policies enacted by different local governments.

Municipal solid waste is defined by the Illinois Environmental Protection Act as "garbage, general household, institutional and commercial waste, landscape waste and construction or demolition debris." Municipal solid waste excludes special waste categories such as potentially infectious medical waste, liquid or semi-solid industry waste, and non-household hazardous wastes that are regulated as pollutants by the Illinois Environmental Protection Agency.<sup>2</sup>

The Illinois per capita waste generation rate was significantly higher than the national average rate in 2007. When similar definitions of waste are used – national averages excluded construction and demolition waste, hazardous household waste, flat glass, and some other categories – the average Illinois resident produces an estimated 2,088 pounds of garbage per year,

whereas the average American produces 1,751 pounds of garbage per year.<sup>3</sup>

One potential explanation for this difference is that Illinois is wealthy compared to the nation as a whole. According to the 2007 American Community Survey,<sup>4</sup> the median income per household in Illinois is \$54,124, as compared to the national median household income of \$41,994. Wealthier citizens consume more and thus tend to produce more trash. Wealthy states have more business activity, increasing the industrial, commercial, and institutional portion of solid waste in landfills.

Additionally, Illinois is relatively urban, with 87.1 percent of its citizens living in cities, as compared to 83.5 percent nationwide.<sup>5</sup> Urban areas have higher degrees of commercial activity and produce on average 25 percent more trash per capita than rural areas. The City of Chicago accounts for approximately 70 percent of all waste generated in the state and 61.9 percent of the population. The Chicago region also has the highest per capita waste production in the state, 8.3 pounds per person per day.<sup>6</sup> Figure 1 (on page 72) shows a map of annual per capita municipal solid waste generation by each of the seven Illinois Environmental Protection Agency (EPA) regions, with darker colors indicating higher annual per capita waste production.

Most garbage produced in Illinois ultimately ends up in a landfill. More than 60 percent of all municipal solid wastes in the state went to landfills in 2007, according to the Illinois EPA. Incineration has not been a disposal option in Illinois since 2000 (before 2000, incineration accounted for less than 2 percent of total waste disposal). However, the percentage of waste that is recycled or composted has been growing

<sup>1</sup> *Illinois Commodity/Waste Generation and Characterization Study*. Commissioned by the Illinois Department of Commerce and Economic Opportunity. Contracted by the Illinois Recycling Association. 2009.

<sup>2</sup> <http://www.epa.state.il.us/land/> for more information on hazardous waste definitions.

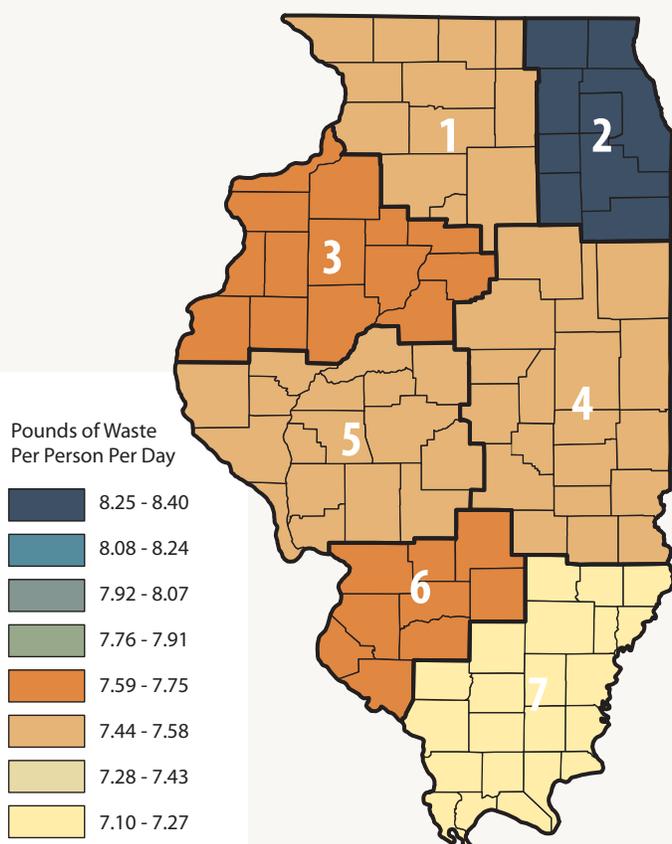
<sup>3</sup> *Illinois Commodity/Waste Generation and Characterization Study*. Commissioned by the Illinois Department of Commerce and Economic Opportunity. Contracted by the Illinois Recycling Association. 2009.

<sup>4</sup> Available at: <http://www.census.gov/prod/2008pubs/acs-09.pdf>

<sup>5</sup> *State Fact Sheets: Illinois*. United States Department of Agriculture Economic Research Service. Retrieved from <http://www.ers.usda.gov/statefacts/IL.HTM>. 2009.

<sup>6</sup> *Illinois Commodity/Waste Generation and Characterization Study*. Commissioned by the Illinois Department of Commerce and Economic Opportunity. Contracted by the Illinois Recycling Association. 2009.

Figure 1  
Per Capita Waste Produced by EPA Region



Source: Illinois Commodity/Waste Generation and Characterization Study, Department of Commerce and Economic Opportunity

Table 1  
Who Fills the Landfills?

Sources of Waste in Landfills

Industrial, Commercial and Institutional	36.5%
Residential Garbage	34.6%
Construction and Demolition	8.3%
Out of State	4.3%
Other	16.3%

Source: Illinois Commodity/Waste Generation and Characterization Study Department of Commerce and Economic Opportunity

wastes (See Figure 3). The large amount of potentially recyclable waste in landfills, particularly paper and plastic waste, suggests foregone opportunities for waste recovery and recycling. Indeed, the ICWGC study estimates that the market value of the stock of materials currently in landfills in Illinois, if they could be recovered, would be about \$600 million.

Industrial, commercial, and institutional waste accounts for 36.5 percent of waste in Illinois landfills, residential garbage accounts for 34.6 percent, construction and demolition accounts for 8.3 percent, out-of-state waste deposited accounts for 4.3 percent, and the ubiquitous “other” category accounts for the remaining 16.3 percent (See Table 1).

Although the number of landfills in Illinois has decreased over the last 10 years, total capacity has increased as existing landfills have expanded. The IEPA estimates that landfills in Illinois still have 988.6 million gate cubic yards of available capacity, enough space to last Illinois residents for about 19 years.<sup>7</sup>

Recycling

The Illinois EPA, in their 2007 Nonhazardous Solid Waste Management and Landfill Capacity Report, estimated that 35.3 percent of municipal solid waste

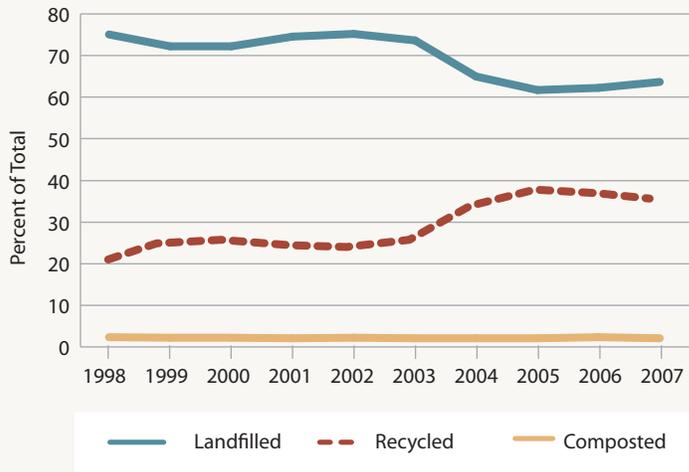
over time. In 1998, only 21.5 percent of waste in Illinois was recycled. By 2005, that number grew to more than 37 percent (See Figure 2).

Landfills

According to the Illinois Commodity / Waste Generation and Characterization (ICWGC) study, landfills in Illinois are composed primarily of construction and demolition materials, paper, organics, and plastics. These categories account for about 82 percent of all landfill space by weight. The remaining space is taken by glass, beverage containers, inorganic material, textiles, metals, and household hazardous

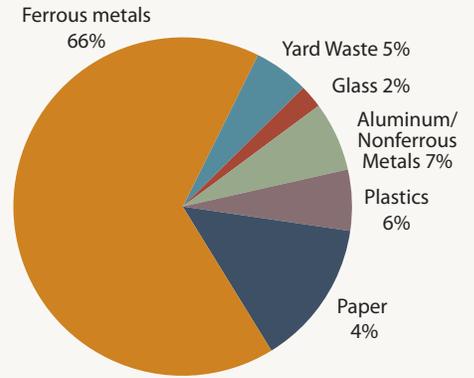
<sup>7</sup> Nonhazardous Solid Waste Management and Landfill Capacity. Illinois Environmental Protection Agency. 1998-2007.

**Figure 2**  
**Waste Disposal in Illinois**



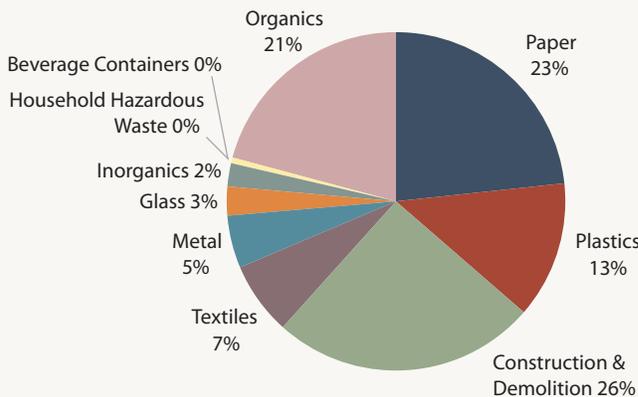
Source: Illinois Environmental Protection Agency, Nonhazardous Solid Waste Management and Landfill Capacity Reports: 1998-2007

**Figure 4**  
**Materials Recycled in Illinois by Weight**



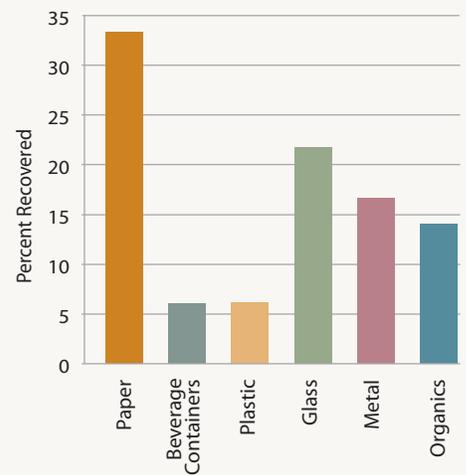
Source: Illinois Recycling Economic Information Study, Illinois Department of Commerce and Community Affairs

**Figure 3**  
**Composition of Landfilled Waste**



Source: Illinois Commodity /Waste Generation and Characterization Study, Department of Commerce and Economic Opportunity

**Figure 5**  
**Percent Recovered**



Source: Illinois Commodity /Waste Generation and Characterization Study, Department of Commerce and Economic Opportunity

is recycled and 1.5 percent composted, for a total diversion rate of 36.8 percent. Figure 4 displays the composition of recovered materials by weight. Ferrous metals, such as steel, comprise the majority of all recycled materials in Illinois. Although these heavy, iron-based metals are the bulk of recycled goods by weight, lighter but

more expensive materials such as aluminum and plastics are more valuable per pound and are an important revenue source for recycling processing plants.

Figure 5 displays the recovery rates for commonly recycled materials. Paper and glass both have high recovery rates:



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33.3 percent and 21.7 percent, respectively. Metal is recovered at a rate of 16.6 percent, and organics – such as yard waste – are recovered at a rate of 14 percent. Less than 10 percent of beverage container and plastic materials were recovered. High recovery rates do not necessarily imply that a material is being disposed of in the most efficient manner, and these statistics should be taken in the context of total waste production in the state. For example, even though paper is recycled at a high rate, paper waste still accounts for a significant portion of landfill space, suggesting that paper recycling still has ample room for improvement and that paper recycling programs have the potential to relieve landfills of almost one quarter of their waste.

In addition to returning a large portion of the Illinois waste back into the mainstream economy, the recycling industry creates a significant number of jobs in the Illinois economy. A study commissioned in 2002 by the Illinois Department of Commerce and Economic Opportunity found that more than 56,000 people in Illinois were employed by the recycling industry, with a payroll of \$1.7 billion. The same report estimates that approximately 1.9 percent of Illinois' gross state product is attributable to the recycling industry.

#### **Current State-Level Waste Management Policy**

Two major Illinois laws comprise modern state-level waste management and recycling legislation: the Solid Waste Management Act (1986) and the Solid Waste Planning and Recycling Act (1988).

The Solid Waste Management Act (SWMA) is directed at state agencies and employees. This legislation dictated that state agencies recycle at least 25 percent of their office wastepaper, newsprint, and corrugated containers by 1995 and at least 50 percent of these materials by 2000. The law

put similar goals in place for the purchase of recycled paper products. This law directs the Department of Central Management Services (CMS) to implement these state recycling efforts. The CMS fulfills this commitment through I-CYCLE, a program that coordinates with local recycling companies to enable recycling at more than 250 state offices. In 2007, the program diverted more than 2,200 tons of recyclables that might otherwise have been sent to landfills. Universities were also directed to implement recycling and composting programs, with the goal of diverting 40 percent of their solid waste from landfills by the year 2000.

In 1988, the state legislature passed the Solid Waste Planning and Recycling Act, or SWPRA, which expanded the mandate of solid waste reduction from government facilities and universities to the state as a whole. The SWPRA requires that each county and the City of Chicago create a waste management plan that includes a significant emphasis on recycling and landfill alternatives such as composting, with the goal of developing a local policy capable of managing that county's projected waste over a 20-year time horizon. Specifically, the SWPRA requires that all agents implement a recycling program that would divert at least 25 percent of municipal waste from landfills. The Illinois Environmental Protection Agency (IEPA) ensures compliance with this law by reviewing each local government's waste-management plan every five years. An important aspect of the SWPRA is that it designates local governments as bearing the ultimate responsibility for waste management in the state of Illinois.

In addition to these two waste-management laws, the state also bans hazardous waste, such as batteries, appliances, and motor oil, from landfills. The IEPA is responsible for regulating the safe disposal of these materials. In 2008, the Electronic Products Recycling and Reuse Act, com-

monly called the E-Waste Act, was signed into law. This law prohibits the disposal of certain electronic devices in landfills and requires that manufacturers of electronic equipment provide recycling and disposal options for consumers. The purpose of this bill is twofold: first, the law prevents hazardous materials commonly found in electronic devices (e.g., lead, mercury, and cadmium) from contaminating the environment; second, by making companies responsible for the recycling of their products after use, the law promotes more environmentally responsible design decisions by manufacturers. Under this law, manufacturers must accept their used electronics equipment back directly, or contract with a recycling company to accept their used product. Retailers are required to provide information about the recycling locations to consumers upon sale of the product. Because the manufacturers must ultimately pay for the disposal or recycling of their goods, companies may find it more cost effective to use easy-to-recycle material or a less bulky design in the manufacturing process.

### Proposed State-Level Waste Management Policy

Environmentalists and policymakers continue to debate whether these state-level mandates do enough to divert municipal waste from landfills and enough to encourage recycling behavior. Some recycling advocates have proposed more aggressive legislation. In 2005, then-Lieutenant Governor Pat Quinn called on the Illinois legislature to pass a “bottle bill,” a law that would require consumers to pay a 5-cent deposit on all beverage containers made of glass, plastic, aluminum, or other metal. The consumers would receive their deposit back upon return of the used containers to be recycled at the place of purchase.

Advocates point out that similar laws in other states have substantially raised recycling rates by providing a stronger finan-

cial incentive to recycle. The 11 other states that have enacted bottle bills recycle between 70 and 80 percent of beverage containers, as compared to the national average of 45.5 percent.<sup>8</sup> Furthermore, by increasing the value of used containers, bottle bills reduce the incentive to litter, thus decreasing the cost to the state of maintaining clean public areas.

Detractors cite the inefficiencies that a bottle bill would create. The cost to consumers of returning the beverage containers includes both transportation costs and time and these costs are not zero. Thus, the bill introduces marketplace distortions in the beverage industry in the same way as would a tax. Inducing consumers to return the bottles themselves does not allow the government to take advantage of the economies of scale available through centralized collection. One recycling truck going from house to house can collect items more efficiently than thousands of consumers, each using their own car to return their beverage containers to stores. Beverage containers are composed of high revenue-generating materials such as aluminum, glass, and plastic. Critics fear that a bottle bill would increase the cost of curbside recycling programs by removing these high-value materials from that recycling stream and perhaps causing recycling companies to charge a higher price to households in order to recover this lost revenue. In a paper prepared for the Illinois Recycling Association’s 2004 conference, the Solid Waste Agency of Northern Cook County estimated that a bottle bill would cost 3.6 times more than a curbside recycling program cost, and that removing aluminum alone from the revenue stream would result in a 20 percent increase in the cost to households of curbside recycling programs.<sup>9</sup>

From an economic perspective, the goals of the bottle bill could be achieved more efficiently by subsidizing recycling through the recycling processors, rather than



<sup>8</sup> *Bottle Bill Overview*. Chicago Recycling Coalition. Retrieved from: [http://www.chicagorecycling.org/index.php?option=com\\_content&task=view&id=52&Itemid=76](http://www.chicagorecycling.org/index.php?option=com_content&task=view&id=52&Itemid=76). 2009.

<sup>9</sup> Schilling, S. *Why a Bottle Bill is Bad for Illinois*. Solid Waste Agency of Northern Cook County. Prepared for the Illinois Recycling Association 2004 Conference and Trade Show, 2004.



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through each household. Instead of charging a few cents per beverage container to each consumer, an advanced disposal charge could reflect the true cost of disposal that the state bears for that item, and it could be levied on all goods. Recycling might then be subsidized through the recycling industry. The state could grant recycling centers a certain amount of money per ton of material recycled, based on the cost of putting that material in the landfill. Such a subsidy would provide incentives to the recycling center to collect the materials more aggressively, perhaps by paying households to recycle or by making recycling easier for households, effectively decreasing household recycling costs. Thus, a more centralized version of the bottle bill would avoid inefficiencies inherent in requiring each household to bear the cost of delivering recyclables themselves, while still providing the incentives to recycle.

#### **Local Government Waste Removal Policy**

Although the state imposes some mandates concerning recycling, the actual business of managing the solid waste stream falls on the shoulders of local and municipal government. Local governments in Illinois handle waste removal, and their policies range from allowing free garbage pickup and landfill dumping to charging a price-per-bag for private garbage removal. Many municipalities do not provide waste removal directly but allow several companies to compete in a garbage removal service market.

Some counties provide “free” garbage pickup, financed with property taxes. This type of policy means that consumers perceive the cost of an additional bag of garbage to be zero, although the actual social cost is positive: the garbage must be picked up and delivered to the landfill, and it takes up space in the landfill that cannot be used for future municipal waste. Each additional bag of garbage may also

add to social costs such as: noise and odor from the garbage trucks, methane from the landfill, and decommissioning costs upon closing the landfill. Because households are not charged per pound of garbage they produce, they have no incentive to limit their waste. In these cases, households inefficiently generate more waste than if they were forced to bear the true social cost of each bag or can of garbage.

Per-unit pricing or a “pay-as-you-throw” policy could induce the consumer to take into account the full social cost by charging a price based on the amount of trash generated. If the disposal of an additional bag of garbage is appropriately priced, and if other illegal disposal options are unavailable, unit pricing can encourage households to generate only as much garbage as they are willing to pay for disposal. One example of a local government in Illinois that uses a “pay as you throw” policy to manage waste removal is the city of Aurora. The waste program in Aurora requires that any 32-gallon garbage can or bag set out for collection must be tagged with a waste sticker. Each sticker cost \$2.35, and residents can purchase stickers from local grocery and hardware stores as well as from City Hall and the garbage removal company directly. Similar sticker programs are in place in Downers Grove, Geneva, Elmhurst, Swansea, and other towns.

Some garbage collectors offer subscription programs that on the surface may resemble per-bag pricing. In these programs, a household pays a monthly fee that depends on the number of garbage cans they plan to use each week. Households are paying a larger amount for more garbage removal, however, because the set monthly fee is the same whether a can is empty, half full, or completely packed with trash. Such subscription programs, while they may offset the cost of garbage removal for the city, do not strongly encourage households to reduce their waste.

In Iowa, for example, some actual subscription programs are employed in the towns of Cedar Rapids, Davenport, and Coralville. These policies fall somewhere between pure per-unit pricing and flat rate pricing. In these programs, residents pay a monthly rate based on whether they want weekly pickup of a can that is 35, 65, or 95 gallons. Additional trash disposal is priced per-unit, with stickers sold for 35 gallon bags. In Indiana, the city of Bloomington differentially prices trash, yard waste, and recycling. Per-unit trash disposal costs \$2 per bag, whereas yard waste disposal costs \$1 per bag, and recycling is free. The different charges of disposal reflect the different social costs: compared to yard waste, municipal solid waste is more likely to impose negative effects on others through landfill leakage or toxic gas release. Recycling is subsidized to encourage waste disposal that does not have such harmful impact on other community members.

Fullerton and Kinnaman, in a study undertaken upon the introduction of a “pay as you throw” policy to Charlottesville, Virginia, find that the introduction of an 80-cent-per-bag fee decreased the average weight of a household’s curbside garbage from 10.9 pounds to 9.37 pounds per week, a reduction of about 14 percent.<sup>10</sup> The weight of recycling also increased from 3.69 to 4.27 pounds per week per household, or 16 percent, indicating that households redirected some of their curbside trash to the recycling bin. The authors note that this 14 percent reduction in the weight of garbage may not capture the true decrease in waste production, because the introduction of the policy may have encouraged some households to dispose of their garbage illegally.

Although per-unit garbage pricing helps make consumers take into account the social cost of their waste production, this policy also increases the incentive for illegal waste disposal. Rather than pay for stickers each week, some households may find inexpensive but environmentally hazardous

ways of disposing of waste such as burning garbage or dumping it in empty lots. Per-unit garbage pricing may also increase littering. This type of illegal disposal could harm the environment more than the reduced landfill use helps it, resulting in a net decrease in environmental quality.

In another study, Fullerton and Kinnaman analyze the economic theory of household response to the introduction of a per-bag waste disposal program.<sup>11</sup> They point out that when households are able to dispose of their garbage improperly, charging for waste removal may encourage illegal burning or dumping. In their conclusion, the authors suggest that in areas where dumping or burning is less costly, per-unit pricing is more likely to result in illegal disposal. Urban areas where empty lots are common may provide venues where illegal dumping has low cost. Relatively unpopulated rural areas also provide ample opportunity for garbage dumping or burning. Per-unit pricing is less problematic in suburban settings or small towns, where the costs of dumping and burning are higher. Communities must be able to balance the costs of litter and illegal disposal against the benefits of less garbage and more recycling, in order for the “pay as you throw” system to improve environmental quality.

### Local Government Recycling Policy

The Solid Waste Planning and Recycling Act of 1988 created a hierarchy of the five waste disposal options for counties: the highest priority is reduction of volume at the source, followed by recycling and reuse, combustion with energy recovery, combustion for volume reduction, and landfill. As mentioned above, Illinois uses no incineration (either for energy recovery or for volume reduction). This section deals with the extent that Illinois is focused on the second waste disposal priority (recycling and reuse), and on what policies can promote recycling.



<sup>10</sup> Don Fullerton and Thomas C. Kinnaman. “Household Responses to Pricing Garbage by the Bag” *The American Economic Review* 86.4 (1996): 971-984.

<sup>11</sup> Don Fullerton and Thomas C. Kinnaman. “Garbage, Recycling, and Illicit Burning or Dumping” *Journal of Environmental Economics and Management* 29 (1995): 78-91.



<sup>12</sup> *State of Illinois Recycling and Recycled Paper Procurement Update*. Illinois Department of Central Management Services. 2007.

<sup>13</sup> *Statement on Current Recycling Markets*. Illinois Recycling Association. Retrieved from: <http://www.illinoisrecycles.org/1208statement.html>. 2008.

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Although the state government provides some funding for recycling in the form of grant programs like the Department of Commerce and Economic Opportunity's Recycling Expansion and Modernization Program, recycling policy is handled almost exclusively at the local level. Each county has an assigned recycling coordinator who ensures that recycling options are available for the community. Although most communities have drop-off recycling centers, that option is relatively inefficient. Economies of scale can be achieved by having a central organization provide curbside recycling, although in rural communities and other places with low recycling participation rates the administrative cost of curbside recycling may be prohibitive. Long distances between the homes of participating households can result in a high collection cost per-pound.

Some communities offer curbside recycling, either free or for a flat monthly fee. The City of Chicago is expanding its 19th Ward "Blue Cart" program citywide by 2011. The city will place blue carts behind every single-family home and apartment complex and these carts will be collected weekly. Households use the blue cart to deposit their cardboard, paper, glass, aluminum cans, and recyclable plastic. The carts are emptied into a truck to be delivered to a sorting center to be recycled (yard waste is put in paper or plastic bags beside the blue cart to be recycled separately).

This is called "single stream" recycling. Households put different recyclable items into one bin that is collected weekly or biweekly. Sorting materials at a recycling facility is more efficient than requiring households to sort products themselves, as centralized facilities can exploit economies of scale, and it is less expensive to collect unsorted recycling than sorted recycling. Household-sorted recyclables must be re-sorted anyway, as households may make mistakes in the sorting process.

Unsurprisingly as well, households that are required to sort are less likely to recycle at all. However, single-stream programs have more contamination, where recyclables become unusable because they are mixed with other waste. For example, if a household does not clean food waste from glass beverage containers before recycling, the glass could break and allow the food waste to contaminate paper products.

Some local governments have implemented mandatory recycling programs. Kane County, for example, requires all businesses to divert their two biggest recyclable materials from their waste stream, with a fine of \$25 to \$100 per day for violation.

### Recycling and the Recession

Although recent years have seen a surge of interest in green living and environmental quality, the recycling industry has not been immune to the current economic downturn. The overall decline in consumer demand has taken with it the demand for recycled goods, and consumers who at one time would have been happy to pay extra for "green" products are becoming more frugal. State-mandated programs, such as the I-CYCLE program, often operate at a loss.<sup>12</sup> When the market for recycled products dries up, the private production of recycled goods also declines, even if households continue to provide the materials to recycle. The Illinois Recycling Association stated that "if demand continues to lag, some processors or haulers may be forced to landfill materials as quality or recovery capacity result in inability to find end markets."<sup>13</sup> A major concern of the Illinois Recycling Association is that the public will "lose faith in recycling if they discover instances in which recycling is not occurring," and persist in not recycling even when the market for recyclable goods rebounds.

Volatile commodity prices make it difficult for recycling companies to plan ahead, and

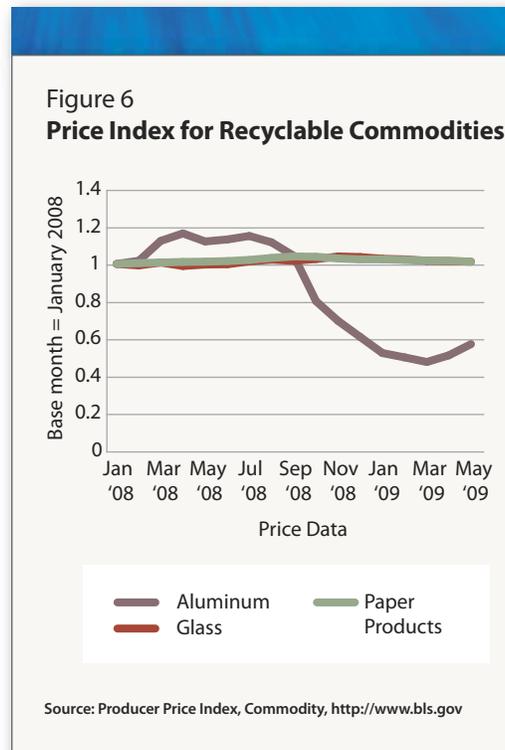
unexpected downturns in commodity prices may leave companies without the liquidity they need to finance day-to-day operations. The price of commodities generated by recycling can vary widely over time. According to the Producer Price Index, the market price of aluminum, a key moneymaker for the recycling industry, has declined severely during the recession. The prices of glass and paper products have also fallen since November 2008, albeit less severely, as seen in Figure 6.

Recycling companies may be unwilling or unable to take on the risk that volatile commodity prices pose. Local governments that want to provide recycling options for their community can help these companies by absorbing some of the risk, for example by providing a price floor for commodities. In Seattle, Washington, if the published price of recycled materials falls below a certain level, the city compensates the recycling plant to make up for the lost revenue. However, if the price rises above a certain ceiling, profits are shared with the city (and used to finance the price floor during more difficult times).<sup>14</sup>

Market prices alone may not provide sufficient incentive to recycle, because they don't account for the social costs of improper waste disposal. Since it is costly to put recyclable items in a landfill, the state could subsidize the recycling of these goods and still decrease its total disposal costs. A subsidy may make it profitable for companies to take in recyclable materials, even if the market price of the good is less than the cost of processing. This policy can improve social welfare as long as the per-unit subsidy represents the per-unit benefits of recycling not captured by the market price, such as improved environmental quality and foregone landfill costs.

### Conclusion

Solid waste managers in Illinois receive some state aid and are subject to some



state mandates, but the actual collection of recycling and disposal of waste in landfills are primarily under the control of local administrators. Those local governments can take advantage of a variety of policy instruments to decrease their local generation of municipal solid waste. Many provide free curbside collection of recycling, and some have instituted a price per bag of garbage. As described in this report, the most effective of these policies are the ones that induce households and businesses to consider all of the social costs of waste production, costs on others as well as on themselves.

The price per bag of garbage can work to induce households to face the true social costs of collection and disposal, and such programs may work well in suburban areas or moderate-sized towns. In the city or in rural areas, however, a price per bag might result in more illegal disposal.

Effective policies also need to balance enforcement and administration costs with the benefits of increased environmental quality. A "bottle bill" might provide the right incentives to recycle glass and plastic



<sup>14</sup> Source: *Wastes - Resource Conservation - Tools for Local Government Recycling Programs*. U.S. Environmental Protection Agency. Retrieved from: <http://www.epa.gov/waste/conservation/localgov/economics/process-ing.htm>.

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beverage containers, but it might be very costly if it makes individual consumers transport and return individual bottles. A simpler alternative might just impose “advanced disposal fees” on the purchase of all materials that can be recycled, and use those funds to subsidize recycling centers per ton of those materials recycled. Those recycling centers could then coordinate the collection of materials in bulk, collecting them from households and transporting them efficiently.