C.D. Howe Institute
Commentary

www.cdhowe.org No. 213, July 2005 ISSN 0824-8001

The Urban Papers

Taking Out the Trash:

How To Allocate the Costs Fairly

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In this issue...

Over 200 communities in Canada and 6,000 in the United States now finance their waste management systems through variable fees charged directly to households, enabling consumers to see clearly what their garbage disposal costs are — and take measures to reduce them.

The Study in Brief

The cost of residential waste management service is currently buried — along with other services, such as police and ambulance operations — within most municipal property tax bills. While the cost is modest at about $150 to $250 per household per year, it is not visible to consumers and, as a result, they lack a cost incentive to reduce the amount of waste they generate.

Partial- and full-unit pricing mechanisms for residential waste management send a message to consumers that a reasonable, but not infinite, amount of service will be provided for a set fee, or on a user-pay basis. Experience shows that when partial- or full-unit pricing mechanisms are introduced, the amount of disposed residential waste declines by 8 percent-to-38 percent, and the amount recycled increases by as much as 6 percent in mature systems to 40 percent in newer recycling programs. In locations where recycling is cheaper than garbage disposal, this change in household behaviour leads to a more efficient, cheaper, waste management system.

Over 200 communities in Canada and 6,000 in the United States now finance their waste management systems through fees charged directly to householders, requiring consumers to pay the full cost of their waste management services and enabling them to see exactly what the service costs. Where residential waste management service is delivered through a separate cost centre or utility, full-cost accounting identifies and recovers the entire expense of the service. This approach is fairer than the current system in place in most Canadian communities, where everyone pays based on their property taxes.

Municipalities throughout Canada should introduce partial- and full-unit pricing for the financing of residential solid waste management services. This will reduce the amount of residential garbage that has to be disposed of, while encouraging the development of more efficient system for doing so. Meanwhile, provincial and territorial governments should consider encouraging user-pay mechanisms by making them a requirement for financial support.

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$12.00; ISBN 0-88806-660-0
ISSN 0824-8001 (print); ISSN 1703-0765 (online)

Canadians are very dependent on landfill as a waste management option; we currently landfill 79 percent of the waste we produce, compared to an average of 58 percent for other OECD countries (OECD 2004). Waste disposal is excessive — or a sign of inefficiency in our economy — when households send materials to landfills that could be better used as feedstocks for industrial and other processes. The potential net lifecycle effects of recycling waste materials such as metals and papers, rather than disposing of them, are enormous. But Canadian consumers receive few price signals to indicate that they should manage their wastes in a more resource-efficient manner and, as a result, waste disposal rates are as high. Pricing signals could lead to better choices and improved economic efficiency, while reducing the environmental pressure that landfill creates.

User fees for waste management make the costs of those services transparent to householders. If the fee structure is designed correctly, it encourages consumers to reuse, recycle, compost and decrease their dependence on landfill as a waste management option. Meanwhile, landfills are difficult to establish in Canada and greater reliance on that system may be unwise in future. The waste management system should also be self-financing through a fee structure that makes the costs transparent to the consumer and sends the correct signals to alter consumer behaviour. The financing of waste management services has been buried in the property tax system in the past; governments should change this practice to make the costs transparent to the consumer.

Background and Overview

In Canada, most households receive some level of solid waste-management collection service, such as garbage, recyclables and garden waste pickups, typically delivered by the local municipality. The collection service is provided using either municipal staff or by contract with private-sector waste management companies. The level of service varies by municipality, depending on local circumstances; small and rural communities often provide drop-off collection service, while large urban communities offer curbside collection. Residential waste management services typically cost between $150 and $250 per household a year in Canada. This amount is considerably less than costs for similar service in the U.S., and is modest compared to the average $300 a year for a basic phone service and $600 per year for cable television (currency figures are in Canadian dollars unless otherwise noted).

Property taxes have traditionally financed residential waste management costs in Canada. Financing residential waste management services from property tax revenue leads to inequities and cross subsidization because commercial and industrial property owners typically do not receive waste collection service. Ideally, the financing of residential waste management services should be separated from property taxes; households should pay for the services directly so that consumers see the exact costs. Under the current property tax arrangement, the costs of waste management, which are low, are buried along with the costs of other services, such as police and ambulance services.

Table 1: *Waste Generation, Diversion and Disposal by Source, Canada, 2002*

	Residential Waste	IC&I Waste	C&D Waste	Total
		Millions of Tonnes		
Total Waste Generation	12.0	15.0	3.4	30.4
Total Waste Diverted	2.6	3.5	0.5	6.6
Total Waste Disposed	9.5	11.5	3.8	23.8
Diversion Rate	21%	23%	16%	22%

Source: Statistics Canada (2002).

About 21 percent of residential waste is recycled in Canada (Table 1). The remaining 79 percent is disposed, mostly through landfill and a small amount through incineration. Recycling and composting are voluntary activities in most Canadian municipalities, and a large amount of material which could be recycled or composted is actually disposed because of poor participation in waste diversion programs and less than optimal capture of recyclable and compostable materials. In the future, increasing recycling and composting are essential to establishing sustainable waste management systems in Canada and to reducing our reliance on expensive and relatively scarce landfills.

Partial- and full-unit pricing mechanisms for residential waste management send a message to consumers that a reasonable, though not infinite, amount of service will be provided for a set fee, or on a user-pay basis. Where participation in recycling is a voluntary activity, experience has shown that economic instruments, such as partial- and full-unit pricing for garbage pick-up, provide additional encouragement to recycle and compost more material. Experience has also shown that when partial- or full-unit pricing mechanisms are introduced into municipalities, the amount of residential waste to be disposed falls by anywhere from 8 percent to 38 percent, and the amount recycled increases by anywhere from 6 percent in mature systems to as much as 40 percent in newer programs. For materials such as paper, metals and certain plastics, recycling is cheaper than garbage disposal in some locations, therefore this change in behaviour by households leads to a more efficient, cheaper waste management system. It also preserves landfill capacity.

Partial- and full-unit pricing mechanisms for residential garbage disposal have proven successful instruments to encourage waste reduction. This is consistent with sustainable development principles; materials are incorporated into manufacturing industries across Canada, reducing the need to extract raw materials from the environment and also lowering reliance on imported recyclables from other countries. Operation of waste management as a separate utility leads to full-cost accounting to identify total costs of waste management, which can then be charged back to the consumer, the residential taxpayer.

Using an approach where costs are charged in proportion to the amount of service used is fairer than the current system, where the cost is not linked to the service used. Households that put out 10 bags of garbage each week pay the same as households that put out one bag of garbage and use the system much less. Where municipalities have moved to a unit-pricing mechanism for residential

solid waste management, concerns regarding illegal dumping have been managed through diligent enforcement of anti-dumping by-laws.

Municipalities should consider the introduction of partial- and full-unit pricing mechanisms to pay for residential solid-waste management, along with the creation of a separate utility for managing residential solid waste, to reduce the amount of residential waste disposed and to encourage the development of more efficient residential waste management systems in Canada. Provincial and territorial governments should encourage municipalities to adopt user-pay mechanisms, perhaps through regulation or as a condition for provincial financial support.

Size Matters

In 2002, Canada produced over 30 million metric tonnes of solid non-hazardous waste, which includes that from residential, institutional, commercial and industrial (IC&I) and construction and demolition (C&D) sources. 24 million tonnes of waste were disposed in publicly and privately owned landfills and incinerators in Canada and the U.S. About 9.5 million tonnes were from residential sources, approximately 11.5 million tonnes were from IC&I sources and some 3.8 million tonnes were C&D materials. Each household in Canada produces slightly less than 1 tonne of waste per year; about a fifth is recycled.

Residential or household waste includes waste from single family, multi-family, high-rise and low-rise residences, waste managed through backyard composting and grass-cycling, material that is self-hauled to depots, transfer stations or landfills, and waste that is picked up for recycling or composting, or disposal in landfills or incinerators.

Municipalities employed more than 8,100 people in waste management service activities, and waste management businesses had more than 24,300 people on their payrolls across Canada in 2002, the latest year for which figures are available (Statistics Canada 2002).

Municipalities and other government bodies which provide waste management services spent $1.5 billion on waste management activities in 2002. About $800 million of this represented payments by municipalities or municipal organizations to contracted waste management firms.

Operating revenues of businesses in the waste management industry totalled $4.1 billion in 2002, while operating expenditures reached $3.4 billion. In addition, these companies invested $342 million in capital expenditures in Canada in 2002.

The Situation Now

In Canada, most households receive some level of solid waste management service, such as garbage, recyclables and garden waste pick-up, typically delivered by local municipalities, either using their own staffs (in about 30 percent of cases), or by contract with the private sector

Typically, larger urban municipalities provide weekly curbside pick-up of garbage. Curbside pick-up of recyclables (weekly, bi-weekly or monthly) is

provided in many Canadian urban settings. Where curbside pick-up of recyclables is not provided, drop-off recycling service is often available.

Leaf and yard waste (green waste) is picked up at curbside on a seasonal basis in many Canadian municipalities and, where services are not provided, drop-off locations are often available. Many municipalities also run backyard composting programs, encouraging residents to manage compostable materials on their own property. About 40 percent of the residential solid waste stream is compostable, making backyard composting an effective method of reducing system costs. Recently, a number of municipalities introduced curbside pick-up of kitchen organics, such as food waste, in an effort to reduce the amount of garbage being disposed in landfills.

Grass-cycling, or leaving grass on the lawn rather than putting it out for pick-up, and grass bans — not picking up grass waste at all — have also been introduced by some municipalities in the last few years. These programs reduce the amount of material transported and disposed by the municipality, thus cutting costs and reducing the amount of material managed by the municipality by up to 5 percent.

Current Financing Methods

Residential waste management costs are typically financed through property tax revenues, with small amounts coming from other sources. This approach is changing and numerous Canadian municipalities now finance their waste programs though a combination of tipping fees at transfer and disposal facilities, utility fees, partial- or full-unit pricing mechanisms, recycling revenues, eco-taxes, and fees obtained through product stewardship or extended producer-responsibility programs, grants and levies (RIS 2002).

Financing with property taxes: To finance waste management through property taxes is to take waste management as an essential municipal service to which all property owners should contribute. It provides a stable, secure revenue stream, with low administrative requirements and it partially ties the costs to an ability to pay. However, the costs are not transparent to the users and some people use the system more than others. There is no direct relationship between the mill rate and the amount of waste generated, and an inequitable situation arises where residential waste management costs are incorporated into the mill rates established for IC&I generators who do not receive municipal waste collection service.

Tipping fees at transfer and disposal facilities: Municipal governments may charge tipping fees for non-residential wastes, or for wastes from other communities, that are higher than the full costs incurred by these operations. The portion of the tipping fee which is above and beyond the cost of rendering the service provides additional funds to municipalities that are often used to finance other related or non-related municipal operations. For some municipal governments tipping fees at their landfills are a substantial source of revenue.

One of the drawbacks of depending on tipping fees is that municipal borders do not restrict the flow of waste. If tipping fees are too high, waste that is not

under the direct control of the municipality will be shipped and disposed of wherever it makes the most practical and economic sense. For example, the City of Toronto (formerly Metro Toronto) increased tipping fees at its facilities from $50 per tonne to $150 per tonne within a short period of time in the early 1990s, with the result that in excess of 90 percent of non-residential waste was shipped to cheaper U.S. disposal sites. Even when tipping fees were reduced again to $50 per tonne, a significant portion of this waste still went elsewhere, often under longer-term contracts. Toronto faced a significant revenue shortfall as a result.

Waste management utilities and utility fees: Provision and financing of waste management services can be structured as a utility, with a fee for service charged directly to households on a cost recovery basis (Kelleher and Robins 1997). While this usually takes the form of a uniform monthly or annual charge, it can also include a component that is charged on a variable-rate pricing system or user-pay basis. Waste management utilities are reasonably common in British Columbia and the U.S., but have not been implemented to any great extent in the rest of Canada. Utilities or utility fees for waste management provide a stable revenue source; the costs are clearer to residents and they force municipal governments to identify and account for all of their direct and indirect costs. Fees can be altered to finance changes to the system — as opposed to property tax financing, where waste management competes with other municipal services for scarce dollars — and the administration costs can be low if the fee collection is included with other municipal utility operations. If this approach is imposed on communities which have traditionally financed their waste management services through property taxes, the utility fee is generally seen as double taxation unless it is carefully explained and communicated to the public.

Full-unit pricing systems: In a full-unit pricing system for residential solid waste management, the fee imposed on each unit of waste collected is the sole source of revenue to finance the system. This type of financing structure can be set up as a utility if desired. Advantages of a full-unit pricing system include: It provides a strong incentive for waste reduction and diversion; waste management costs are transparent; households pay in proportion to the quantity of wastes generated, and it can provide a long-term solution for financing waste diversion programs. Limitations include: greater revenue uncertainty; it requires new administrative systems; significant time and effort is needed to build political will to proceed; it is not suitable to multi-family dwellings, and it is perceived as a burden to low-income residents or large families. One of the criticisms of this approach is the potential for increased waste burning or illegal dumping in smaller municipalities, though this can be limited by good enforcement mechanisms (Association of Municipal Recycling Corporations 1996).

Partial-unit pricing systems: In partial-unit pricing systems, waste management is financed through a combination of taxes, or flat utility fees, and household unit pricing charges. A common approach is to provide a basic collection service of a maximum of one or two bags — either through taxes or flat utility fees — with additional charges for every extra container. Partial unit-pricing systems can provide a transition to full-unit pricing. They establish a more predictable revenue base; they sensitize residents to current waste generation practices, and provide an increased incentive to reduce and divert waste. Because a certain fixed level of

service is maintained on the tax base, this approach maintains a basic municipal service concept, with charges applying only to excessive wastes. These systems require increased compliance monitoring and are not worthwhile unless a low bag limit is imposed.

Extended Producer Responsibility and Product Stewardship

Municipal powers to implement financing mechanisms for solid waste management are limited to applying fees only after products have already become wastes. Paying for waste management services solely through property taxes and tipping fees at disposal facilities will tend to keep these costs largely invisible to consumers.

Waste management policy experts argue that as consumers become aware of the costs of waste management and have an incentive to reduce them, they will send signals back to the producers and distributors of products through the marketplace to minimize the quantities of waste they will have to manage.

Economic instruments targeted at the producers and distributors of materials and products to reduce waste generation at source encompass an extremely broad range of policy instruments referred to as Green Product Taxes, Product Stewardship and Extended Producer Responsibility (OECD 2001). Implementation of such policies is beyond municipal jurisdiction in Canada and can only be implemented by the provincial or federal governments.

Proponents of these mechanisms, whether in association with, or as an alternative to, economic instruments imposed at the municipal level argue that:

- Priority should be given to economic instruments that directly encourage the prevention of waste upstream, rather than funding the management of wastes after they are produced;
- Economic instruments applied at the pre-consumer stage can produce faster, more significant changes in the product life cycle by sending signals back to producers to develop more efficient designs, and
- In an open economy, municipal fees cannot incorporate the full environmental and social costs associated with the wastes created.

Eco-Taxes

In the case of eco-taxes, or advance disposal fees, provincial governments use their taxing authority to impose fees on designated products. In Canada, this practice is usually restricted to beverage containers and to hard-to-manage products, such as tires, batteries and motor oil. The revenues raised may be used for:

- Programs to promote better management of the products on which the fee was imposed. These would include various provincial beverage container stewardship programs and tire tax programs;
- Unrelated environmental or social program costs (e.g. half-back deposit funds in New Brunswick and Nova Scotia, and the Saskatchewan

Association of Rehabilitation Centres (SARCAN) bottle return program, which employs disadvantaged workers), and
- General revenues (e.g. revenue from a $0.10 environmental levy on beer can sales goes to general revenues in Ontario).

In October, 2004, Alberta became the first province in Canada to implement an electronics stewardship program which is funded by an environmental levy placed on designated electronics. This levy ranges from $5.00 for a laptop computer to $45.00 for a 46-inch or larger television. In Alberta, there is also a $4.00 advance disposal surcharge on all new licensed highway vehicle tires. Tire vendors in Manitoba are required to collect and remit a tire levy of $2.80 for each new tire sold for highway vehicles. New Brunswick has implemented an environmental levy on all new tires sold in the province — $3.00 for a wheel rim size up to 17 inches and $9.00 for tires up to 24.5 inches.

In Saskatchewan, oil wholesalers pay the province an environmental handling charge that helps fund used oil collection and recycling programs in the province ($0.05 per litre of oil, $0.50 for oil filters under 20 cm, $1.00 for filters over 20 cm).

The province of British Columbia has introduced eco-fees on a number of materials which are considered hard to handle. These include paint, auto batteries, solvents, flammable liquids and pesticides.

Industry self-managed programs fall within two broad categories:

- Voluntary initiatives to manage specific products or waste segments. The largest such example in Canada is the National Packaging Protocol under which industry reduced the total quantity of packaging disposed in Canada by over 51 percent in 1996, compared to 1988. The Rechargeable Battery Recycling Corporation provides a number of locations where waste rechargeable batteries can be dropped off for proper management. The costs are covered by voluntary industry levies based on sales volumes; suppliers advertise their participation by way of a seal of approval on their products.
- Programs required by regulation, but managed entirely by industry. The Alberta Dairy Council requires members to contribute to a fund based on sales of two- and four-litre, high-density, polyethylene milk jugs. Money in the fund is used to provide top-up support payments to municipalities that recover and recycle milk containers and as support for milk jug recovery promotion efforts.

Industry Funding and Support Organizations

Industry funding and support organizations fall within three broad categories:

- Programs funded by contributions from industry sectors that provide financial, technical or promotional support to municipal waste management programs: Collecte sélective Québec has provided support to

the development of municipal recycling programs throughout the province.

- Quasi-private organizations, often effectively controlled by government, but funded by levies imposed on products. The Manitoba Product Stewardship Corporation raises funds from a $0.02 levy on beer and non-beer beverage containers sold in the province and uses the approximately $7.6 million to support the development of municipal recycling. The board of directors of the corporation includes representation from many stakeholders, including the provincial and municipal governments, as well as industry.
- Programs funded by mandatory and regulated fees imposed by provincial regulation, but collected and managed by industry associations. Stewardship Ontario collects fees from private sector companies that sell packaging and printed paper into the provincial market, and disperses the revenue to municipalities to support their recycling programs for packaging and printed paper — the Blue Box program. In 2004, almost $60 million was collected by Stewardship Ontario from packaging and printed-paper stewards and was distributed to municipalities based on the tonnage of material they recycled.

Unit-Pricing Mechanisms for Waste Disposal

In a unit-pricing program, waste generators pay for waste collection on the basis of the amount of waste they create. There are many variations that can be introduced into a unit-pricing program design.

In the United States, the Environmental Protection Agency (EPA) defines unit pricing mechanisms, also referred to as user-pay or pay-as-you-throw, (PAYT), as:

> [A]n economic incentive that encourages citizens to reduce waste. Unlike traditional municipal solid waste management systems, where residents pay for waste services through taxes or flat fees, under the PAYT systems, residents are charged for municipal solid waste services based on the amount of trash they discard. These programs represent a concrete step that local officials can take to make their municipal management efforts more economically and environmentally sustainable (EPA 1999).

Four states in the U.S. have legislation that mandates or promotes implementation of unit pricing for residential solid waste management — Minnesota, Iowa, Wisconsin and Washington. Another 12 states, including Massachusetts, Indiana and Rhode Island, provide direct financial incentives and grants to communities using or implementing unit pricing for residential solid waste management services. The EPA is also heavily involved in promoting unit pricing as an effective waste diversion tool through products such as the Pay-As-You-Throw Tool Kit and other educational materials and supports for local municipalities.

Since the early 1990s, the number of unit-pricing programs in both the U.S. and Canada has grown substantially (Table 2). The practice is much more

Table 2: *The Growth of Unit-Pricing Programs for Residential Solid Waste Management in Canada and the U.S.*

Time Period	Canada	United States
Late 1970s	No unit pricing in place.	Only a handful of unit pricing programs operated in some states, including California, Michigan, New York and Washington.
1980s	No unit pricing in place.	A few dozen programs implemented. Seattle introduces unit pricing in 1981, making it the first full unit-pricing program in a U.S. city.
Early 1990s	First unit-pricing programs established in 1991. By 1993, 35 programs in place. By 1996, there were about 120 programs in place, mainly in Ontario, but in small communities. Greater Vancouver Regional District commits to zero-based utility system by 2000.[a] Most Greater Vancouver municipalities have utilities and one- or two-bag limits, with unit pricing of extra containers or bags.	More than 1,000 PAYT programs are identified in the United States. About 1,800 programs have been adopted in more than 25 states. Legislation mandating or encouraging the adoption of unit-pricing programs introduced in 10 states. The City of San Jose, California, (pop. over 840,000) adopts unit-pricing, becoming the largest city in the U.S. to do so.
Late 1990s	Approximately 150 unit-based pricing programs in place — about 70 percent in Ontario, with the remainder in Western Canada. No large Ontario community has adopted unit pricing.	By the end of the 1990s, 58 communities with populations greater than 100,000 (representing 15 percent of the population living in large communities nationwide) had introduced unit pricing.
Early 2000-2004	About 200 unit-pricing programs in place. Large communities in Ontario begin to embrace unit pricing, including Town of Markham, Niagara Region and Region of Peel. Region of Peel (pop. 1 million) is largest Ontario municipality to adopt user-pay three-bag limit and $1.00 a bag after that. County of Oxford (pop. 100,000), largest county in Ontario, to go full user-pay — $1.00 a bag on all bags. Simcoe County (pop. 400,000) has a two-bag partial user-pay program at $2.00 a bag.	An estimated 6,000 unit-pricing programs exist.[b] Only four states do not have any unit-pricing programs.

Source: Kelleher and Dixie (2002); Kelleher, Robins and Hogan (1996, 1997).

[a]In the mid-1990's, all 22 municipalities in the Greater Vancouver Regional District (population 1.8 million) committed to establishing a zero-based utility system for residential solid waste management by 2000, which means no units of waste would be covered by municipal taxes and unit pricing would be designed and used to encourage increased waste diversion.

[b]EPA (2004).

widespread in the U.S., with over 6,000 user-pay programs in place in 2004, representing over 20 percent of the total population (EPA 2004), compared to about 200 user-pay programs in municipalities in Canada.

All provinces in Canada have some unit-pricing programs for residential waste, introduced either at the regional or municipal government level. The majority of the programs have been introduced in Ontario and British Columbia. A survey carried out in 2002 (RIS International 2002) indicated that many municipalities in British Columbia and a handful in Alberta, Manitoba and the Territories charge an annual flat fee directly to households for curbside waste collection and require residents to pay per bag for any additional waste over a set limit of about two bags per week. Almost 150 communities in Ontario have adopted full or partial user-pay systems where residents pay directly for every bag of garbage set out at the curb or for each bag of garbage over a set limit. There are also a few communities in Saskatchewan and the Atlantic provinces that have introduced user-pay systems for residential waste services.

Variable-Rate Pricing Mechanism Designs

This section briefly describes different variable-rate pricing systems for residential solid waste management. The designs have different effects on consumer behaviour and on the amount of waste disposed. This, in turn, affects overall residential waste management system costs. The different effects on waste diversion and disposal are noted where known. One of the key reasons for promoting this policy is to reduce the amount of waste which must be managed by the municipality, and thus lower the system costs. It is also a fairer way to distribute the costs of waste management and ensure that householders pay in proportion to the services they use.

The key differences among variable-rate pricing and unit-pricing mechanisms are:

Full-unit pricing: All residential garbage that is placed at the curb for collection must be paid for in advance, either by purchasing a tag and placing it on each bag, or by paying on a monthly basis for a selected size of container (Table 3).

Partial-unit pricing: A designated number of bags or cans of garbage can be placed at the curb without advance payment. If the householder exceeds the permitted number, then any additional bags or cans are paid for in advance by purchasing a tag and placing it on each additional container (Table 3).

Variable-rate pricing: Larger programs in the U.S. allow householders to rent different sizes of bins for weekly collection of their garbage. Some programs offer up to five different sizes of bins, while others offer two or three (Table 4). These programs succeed because householders ration their waste generation to fit the size of container they rent and they are motivated to rent the smallest container possible, ultimately leading to a more efficient and fairer system and lower overall system costs.

Within each of the designs, there are different approaches to actually delivering the waste management service and allocating service limitations or

Table 3: *Examples of Canadian and U.S. Tag and Sticker Programs for Residential Garbage Collection and Disposal*

Location	Program Features and Waste Reduction Impact
Aurora, Illinois (pop. 132,300) (Currency in U.S. dollars)	• Fee is set to reflect exact cost of program because surpluses are not permitted. • Program implemented in November 1991. Several options available to residents. • $14.00 a month for a 64-gallon container and $18.50 a month for a 96-gallon container. • Pre-printed packages of 13-gallon garbage stickers available ($22.00 for 20). • $2.17 stickers for 32-gallon garbage container. • Curbside recycling (no additional charge). • Yard waste collection $2.17 a bag; cannot exceed 30 gallons; (use a garbage sticker). • Solid waste management is entirely funded through the sticker fees. Financing in 1996: 73 percent curbside user fees and 27 percent residential taxes; in 1990, 100-percent residential taxes. • Some illegal dumping at first. • A 40-percent reduction in waste sent to landfill; 22 percent diverted through recycling.
City of Stratford, Ontario (pop. 29,300) (Canadian dollars)	• Residents can put their garbage out in bags, cans, or bundles; all garbage must be tagged (Tags cost $1.75 each). • Standard garbage bags need one tag; grocery bags, a half tag • Containers up to 128 litres need one tag; 129-to-140 litres, two tags, and 240-to-360 litres, three tags. • A 62-percent increase in recycling; reduction in residential garbage of 35 percent.
City of Barrie, Ontario (pop. 103,700) (Canadian dollars)	• Program implemented in May 1997. • Two-bag/can limit. • Tags for extra waste cost $1.00 each and can be purchased at retailers, City Hall and the landfill (approximately 80,000 tags are sold annually). • No curbside collection for bulky items and large appliances. • Yard waste collected every second week (no charge). • Residents can take four loads of waste to the landfill annually (no charge). • A 39-percent reduction in waste sent to landfill; 20-percent increase in recyclables diverted.

Source: Authors.

levying waste fees. This Commentary now describes some of these approaches, with examples of where they are practiced.

Marked Stickers and Tags For Residential Garbage Pick-Up

Adhesive stickers or tie-on tags can be sold to residents for use on their own garbage bags or containers. The stickers or tags are purchased from designated outlets, such as retail or city facilities. In some instances they are distributed to residents through the mail. Residents must place the stickers or tags in a prominent and visible location on the bag, or on top of the waste inside the container. Some form of volume restriction is generally used in association with stickers and tags; however, in some communities, residents can set out waste in any size of bag as long as the correct number of stickers is attached. Tags and

Table 4: *Examples of Standardized Container Programs for Residential Garbage Collection and Disposal*

Location	Program Features and Waste Reduction Impact
San Jose, California (pop. 840,000) (Currency figures in U.S. dollars)	• Program implemented in July 1993. • There are five monthly subscription rates available: 20-gallon container for $17.22 per month, a 32-gallon container for $18.30 a month (weekly collection), a 64-gallon one for $36.60, 96-gallon for $54.90. • Yard waste collection cart costs $2.50 a month. • A sticker for extra garbage (32 gallon garbage bag) costs $4.50. • Bulky items cost $23.00 for three. • No additional charge for curbside recycling and yard waste placed loose in the street. • Recycling rates tripled overnight. • Illegal dumping not a problem. • In 2000, San Jose claimed a 64-percent diversion rate.
City of St. Albert, Alberta (pop. 53,000) (Canadian dollars)	• Program implemented in 1996. • Four pre-set weekly volumes: one bag (15 kg) per two weeks for $5.10 a month (includes garbage collection, $1.45, and composting and recycling, $3.65). • One can or two bags per week for $9.55 a month; two cans or four bags per week for $15.45 a month, or three cans or six bags per week for $21.35 a month. • All subscriptions include composting and recycling. • Extra garbage $1.50 a bag; oversize bags (15-to-30 kg of waste) require two stickers. • Drop-off depot recycling; no additional charge. • For six months of the year, residents can rent an automated bin for $4.00 per month and receive bi-weekly curbside organics (food and garden waste) collection. • A 40-percent reduction in waste sent to landfill. • In the first year of the program, waste management was financed entirely by user fees and extra garbage tags and recycling revenues created a year-end surplus of $77,000.
City of Seattle, Washington (pop. 573,000) (U.S. dollars)	• Variable-rate subscription can system introduced in 1981. • Additional fee for backyard pick-up of 32-gallon containers or larger. • Tags for extra garbage are $5.50 each. • An optional user-pay system for leaf and yard waste collection was introduced in 1989. Leaf and yard waste collected at the curbside for $4.30 per month. • Residents may also choose to put out between four and six 32-gallon bags/cans depending on the time of year. The system was made fully self financing in 2002. • Bulky item pickups cost $20.00 per item; $25.00 for items containing Freon/CFCs. • Curbside recycling at no additional charge. • An illegal dumping ordinance was passed and enforcement staff hired. • Average number of cans of garbage per household went from 3.5 containers to 1.6. • A 44-percent diversion in 1998, compared to 28 percent in 1988. • In January 2005, a ban on recyclables in the garbage took effect.

Source: Authors.

stickers that fall off will quickly undermine public support for the program. This was a problem with early programs, particularly in cold climates, but was resolved by some product redesign.

Numerous communities across Canada and the U.S. have implemented tag and sticker programs for garbage collection (Tables 3 and 5). Large cities in the U.S. tend to use can subscription rather than tag/sticker programs; the largest communities currently using tags and stickers have populations of 200,000 or less. In Canada, larger communities moving to user pay all have tag/sticker systems. The Region of Peel, Ontario, with a population of almost 1 million, introduced a three-bag limit, with tags required for additional bags or containers of garbage in 2003. In Stratford, Ontario, residents pay $1.75 for each bag of garbage disposed. In Orillia, Ontario, each household gets 40 garbage tags per year, and can decide when to use them. This promotes a rationing mentality, and residents use their

Table 5: *Examples of Flat Fees Combined With Extra Charges per Bag for Residential Garbage Collection and Disposal*

Location	Program Features and Waste Reduction Impacts
City of Victoria, B.C., (pop. 74,000) and (Currency in Canadian dollars)	• Program implemented in January 1992. • There is a $150.00 annual flat fee for one bag per week of garbage. The rate is lower City of Whitehorse, for apartment dwellers — residents in large buildings pay $88.00 a year. • Additional bags/cans (up to 15 kg) cost $3.50 each. • Curbside recycling at no additional charge. • Garden waste drop-off costs $3.00 per car and $6.00 per pick-up.
Yukon Territory (pop. 19,000)	• There is a charge of $11.00 per month for garbage collection. • Garbage is collected every other week, with a four-bag limit. • Extra bags require tags costing $1.00 each. • In November 1999, the city started charging residents a fee at the landfill of $1.00 for eight bags or less to help cover the costs of operating the site. • New curbside organics program launched in May 2002.
City of Lansing, Michigan (pop. 130,000)	• Program implemented in 1975. • Mandatory flat fee of $52.50 per household per year for curbside recycling and $52.50 (U.S. dollars) per year for leaf and yard waste collection. • Green bags for garbage cost $1.80 each, or $9.00 for a package of five. • Residents can also choose to dispose of their waste in roll-out carts, ranging in price for a three-month rental period ($31.20 for a 21-gallon cart; $33.90 for a 32-gallon cart; $38.10 for a 65-gallon cart and $46.35 for a 96-gallon cart). • Bulk-waste stickers for large appliances and other large items cost $31.00. • City competes with private haulers for residential customers. The rate structure is designed to cover the program's costs because it operates as a utility.

Source: Authors.

tags prudently. The system allows residents to save tags when they are away and use them during Christmas or other holiday periods, for example.

Variable-Size Subscription Systems for Residential Garbage Pick-Up

In a variable-container subscription system, householders pay according to the size of garbage container they select. The monthly or annual subscription rate is paid to the municipality in advance for a selected size of container (Tables 4 and 6). Some communities, such as Seattle have responded to demands for even smaller containers and are offering a mini-can service of 30 litres.

All large U.S. communities with populations greater than 300,000 that have implemented unit- or variable-rate pricing systems have adopted variable container subscription systems. Only one municipality in Canada, St. Albert, Alberta, (pop. 53,000) has implemented a variable-container subscription program. The use of variable-container subscription systems is limited in Canada by the fact that collection of garbage in container systems is not as common as in the U.S.

These systems force consumers to make a decision on which volume of container meets their needs best: Residents see that larger containers hold more waste and cost more to manage. The systems also allow residents to change the size of container they use if they find that they need more or less capacity. Seattle provided a micro-can service following customer demand for a container that was smaller than the smallest offered when the program began.

Table 6: *Examples of Flat and Utility Fee Structures Used To Finance Residential Solid Waste Management Systems*

Location	Program Features and Waste Reduction Impacts
Edmonton (pop. 666,000) (Currency figures in Canadian dollars)	• Adopted a full utility model and flat fee in July 1995 to cover part of waste costs. • Single-family households are charged $13.25 each month for weekly garbage collection and disposal. • Weekly curbside blue bag recycling and 20 drop-off depots at no additional charge. • The 1999 financing: 43 percent utility fees; 46 percent tax base; 9 percent revenues, and 2 percent other. • Although the system charges directly for waste and covers part of the cost through this mechanism, there are no incentives to reduce waste.
Minneapolis (pop. 368,000) (U.S. dollars)	• Program implemented in 1995. • The primary source of funding is the Solid Waste Base Fee and Disposal Fees charged on the Public Works Utility Bill; the Solid Waste Base fee is $22.25 per unit per month; the Large Cart Disposal fee is $4.00 per cart per month, and the Small Cart Disposal fee is $2.00 per cart per month. • The State of Minnesota requires that all municipalities charge variable rates for garbage disposal. • The Recycling Credit for participating households is $7.00 per unit per month. • Residents are required to rent an additional cart if they frequently put out extra garbage. • Bi-weekly curbside recycling at no additional charge. • Seasonal weekly yard waste collection at no additional charge.
Los Angeles (pop. 3,823,000) (U.S. dollars)	• Program implemented in July 1996. • The basic level of service is funded through a Sanitation Equipment Charge of $11.00 per month for single family dwellings and $7.27 for apartments. • No charge for the first 60 gallons of garbage per residence per week; $5.00 per month for each 30 gallons of Extra Capacity garbage; $2.50 per month for each 30 gallons of Extra Capacity yard waste; the minimum service period is six months. • Intermittent Extra Capacity: Residents may purchase Extra Capacity tags for garbage or yard waste at a cost of $1.00 each (minimum purchase of five); tags are intended for occasional use only (25 per year is household limit). • Extra garbage or yard waste is charged on the water and power bills. • The collection cost per household is approximately $1.72 for recyclables, $3.24 for yard trimmings and $5.75 for refuse.

Source: Authors.

Standardized Marked Bag Systems for Residential Garbage Pickup

In some municipalities, standardized marked bags can be purchased at local retail stores and designated municipal outlets or the municipality distributes them to the householder. This system is relatively uncommon for residential waste, and is only used in a few locations because municipalities have found that metered stickers and tags are easier to manage. However, a standardized marked bag system was introduced for commercial waste in the City of Toronto (the yellow bag system) and for residential waste in Wellington County, Ontario, in 2002 (Table 7).

Weight-Based Systems for Residential Garbage Pickup

Under a weight-based system, the amount of garbage generated by each household is measured as it is collected and households are billed on the basis of the total weight collected (EPA 2001). This requires adapting collection vehicles with electronic equipment to weigh each bag or container of garbage and record

Table 7: *Descriptions of Selected Marked Bag Programs for Residential Garbage Collection and Disposal*

Location	Program Features and Waste Reduction Effects
City of Worchester, Massachusetts (pop. 170,000) (Currency in U.S. dollars)	• Program implemented in 1993. • Only one size of bag is available: the 30-gallon bag costs $1.00. • There is no bag limit. • Curbside recycling and leaf waste provided at no additional charge. • Other yard waste can be taken to a depot. • Bulky wastes collected at curbside with a fee of $5.00 charged per item. • Illegal dumping problem at first. • A 45-percent reduction in waste sent to landfill; 37 percent diverted to recycling.
County of Wellington, Ontario (pop. 187,300) (Canadian dollars)	• Program implemented January 1, 2002. • Special yellow bags for garbage are $1.75 for standard-sized bags and $1.00 for smaller bags. • The bags are available at retail and local government outlets throughout the County. • The County has also expanded its recycling service to collect more materials. • Tipping fees in the County were standardized in September 2001 ($1.00 per bag up to 10 bags and $60.00 per tonne after 10 bags.)
Toronto (pop. 2,400,000) (Canadian dollars)	• Yellow bag program implemented for commercial garbage in 2002; each garbage bag costs $3.10, which reflects the exact cost of collection, transfer and disposal. • Businesses can buy organics carts; collection is free. • Collection of recyclables is free. • Garbage from businesses has declined by 50 percent.

Source: Authors.

the address of the generator. Weight-based systems are more suited to containerized waste pickup, which is not common in Canada, but is gaining in popularity.

Curbside weight-based systems became popular in the mid-1990s, but have not become as widespread as expected. This type of system was pilot tested in Oak Bay, B.C., in 1993/1994, in Hampton, Virginia, in 1995, as well as in Durham, North Carolina, and Austin, Texas. In each case, full-scale implementation did not proceed due to administrative complexities, technological problems or costs.

However, in Ireland, where garbage tipping fees are above $200 a tonne, weight-based billing systems have been implemented as a way of demonstrating the need for increased fees to residents, and to show which proportion of the annual garbage bill is variable, depending on the amount of waste discarded.

Currently there are no residential curbside weight-based garbage collection systems in Canada, although many municipalities charge for drop-off of garbage at landfills, depots and transfer stations above a fixed limit in the 150 kg per household yearly range. While technically possible, there is no clear evidence of significant advantages of curbside weight-based systems over volume-based alternatives for Canadian municipalities. Until such advantages are clearly demonstrated it is likely that the increased level of complexity involved will prohibit wider application.

Moving From the Status Quo to a User-Pay System

There are a number of reasons why municipalities may consider moving away from property tax revenues to finance the residential waste management system. Benefits include waste reduction, leading ultimately to a more efficient, cheaper residential waste management system and reduced reliance on landfill. The following sections discuss some of the key considerations in moving towards a more equitable financing approach.

Advantages of User Fees and Per-Unit Charges for Residential Solid Waste Management

Experience in North America has demonstrated many advantages to financing waste management systems in ways that show the homeowner the cost of the service. These advantages are particularly apparent if some element of variable-rate pricing is included in the funding structure. Over the longer term, user fees and per-unit charges lead to a more efficient, fairly priced and funded residential solid waste management system. Key advantages of user fees and per-unit charges are:

- They lead to better understanding of waste management costs: The costs of the current system of residential waste management must be understood before moving to a new financing system. This step alone has helped communities to identify opportunities for increased efficiencies.
- The costs of waste management can be removed from property tax bills: This makes the costs of waste management visible to householders and directly links these charges to the actual costs incurred by the municipality for providing residential waste management service.
- There is a more equitable distribution of the costs of providing residential waste management services: Households are charged directly for the services they use and, in the case of variable-rate charges, in proportion to the amount of waste they generate. Waste management charges can be removed from the tax bills for industrial, commercial, institutional and multi-family buildings that do not receive any waste collection service.
- They can provide a long-term funding solution for recycling and composting: The costs of waste diversion programs can be incorporated into the fees charged for waste collection and disposal, or by implementing user charges for these services as well.
- They often result in significant increases in material recovered through recycling programs and a reduction in the waste disposed: Communities that have implemented variable-rate pricing programs report significant increases in recycling rates. A survey of programs in Canada and the U.S. found that the recycling rate increased from 6 percent for programs which already had high recovery rates toas much as 40 percent in some cases with the introduction of variable rate pricing (RIS 2001). This significantly reduces reliance on landfill.

- They lead to significant reductions in waste disposal: Communities report reductions in the amount of waste disposed of between 8 percent and 38 percent after a variable-rate pricing structure for garbage collection is implemented. Reduced reliance on landfill is critical as disposal facilities become more difficult to site.

Barriers to Changing the Current Waste Management Financing Structure

Like any innovation, gaining public support for utility fees and user fees for residential garbage collection is challenging. Initial public resistance to changes to any established public service is common. Legitimate public concerns over user fees for waste management must be fully addressed to gain public support and acceptance.

In some cases, municipal waste management staff members have spent significant time and resources laying the groundwork for establishing a utility or unit pricing system, only to have elected councils reject their proposal, often in the face of hostile public reaction. This has been the case particularly in larger municipalities where it is more of a challenge to explain the rationale for moving to a user-pay approach when numerous stakeholder groups with different interests are involved. Smaller communities are generally more cohesive and can come to this decision more quickly.

Municipal experience has shown that it is essential to address certain perceptions and concerns:

Double taxation: Initial citizen reaction is often that utility or user fees represent a new tax. The costs of providing residential waste management services have traditionally been incorporated into municipal property taxes. If utility or user fees are implemented and property taxes are not reduced, the issue of double taxation will be raised. Most communities, therefore, have chosen to partially offset utility or user fees by property tax reductions; others have made the case that user fees are necessary to prevent new tax increases.

IC&I subsidy: It is difficult to explain to residents that IC&I property taxpayers have been helping to pay for the cost of the residential waste management system, without getting waste collection service themselves in many cases. The move to a new, more transparent financing structure will result in householders paying the full cost of their residential waste collection service. This will be unpopular because in some cases the IC&I sector has cross-subsidized the cost of the residential waste management system, covering 50 percent or more of the residential waste management system costs. For this reason, the transition from one financing system to another may need to be phased in over a number of years. Alternatively, if mandated at the provincial level, it takes responsibility for making the decision away from local politicians.

Social inequities: Under current arrangements, the costs of waste management services are included in the mill rate and households pay the same regardless of

how much waste they generate or how much they divert to recycling and composting. With utility fees or user-pay, however, arguments will be advanced that lower-income or other disadvantaged groups may be disproportionately affected. Large families produce more waste than small families; however, this issue can be addressed through subsidy policies which are narrowly focused on this one issue. While most communities in Canada have taken the position that broad social equity issues cannot be adequately addressed through local waste management policies, many U.S. programs provide discounted or free bags or tags to families on social assistance. It is often difficult to manage this issue in rental properties, where renters do not directly pay the property tax.

Administrative burden: Utility fees and user-pay programs can increase administrative requirements for the municipality, with the potential for increased staffing, billing, and operational costs, depending on the system design. The additional burden on the municipality will vary significantly depending on the type of financing program adopted and any new costs must be carefully integrated into the fees charged. In most cases, communities experience some additional program start-up costs, such as hotline assistance for the first months of program implementation. These are more than offset by lower total municipal waste management system costs.

The need to build consensus: Some communities have reported that when first raised in public, the discussion of utility fees or user fees for garbage has generated more negative reaction in the media and among citizens than any other municipal issue. Others have found that given adequate time and information, with effective communications and the participation of key interest groups, consensus can be reached on the most appropriate approach for each community.

Illegal dumping/burning: For communities that opt for pay-as-you-throw bag/tag systems rather than flat monthly fees, the problem of illegal dumping or illegal burning of wastes to avoid user fees is always a concern. However, experience has shown that this issue can be managed through effective education, adequate enforcement measures and by providing outlets for recycling, composting and bulky waste collection.

The Objectives of the Financing Change

The benefits of adopting utility and other user fees for residential waste management services will vary by municipality. In areas where waste management costs still constitute a relatively small share of the total municipal budget, elected officials may not be prepared to ask voters to change existing practices. Other municipalities that face increased waste management costs and a fixed tax base want a more equitable funding formula.

Municipalities have adopted utility fees and user fees for waste management for different reasons:

- As an effective tool in reducing the quantities of waste requiring disposal.
- To provide more independence in the financing and management of the residential waste management system.

- To relieve pressure on municipal property taxes.
- To put a polluter-pays principle into practice at the local level, as one component of a broader policy to promote community sustainability.

The objectives to be met will generally have a major influence on the type of program selected. Deciding on the most appropriate approach must also follow from consideration of other community-specific concerns, such as:

- A staged transition from the current system to the new system.
- Minimizing capital costs to the municipality — for example, higher capital costs are involved if a container system is chosen.
- Permitting households to set out garbage in a variety of ways, including bags, cans and carts.
- Minimizing administrative requirements for the municipality.
- Providing for exemptions for designated groups.

Provincial or territorial legislation mandating independent financing of waste management through user fees and utility fees resolves a number of these issues.

Waste Reduction Effects of Unit-Pricing Mechanisms

One of the important objectives in any residential waste management system is to ensure economic efficiency. In some communities across Canada, the cost of recycling is less than the cost of garbage pick-up and disposal and there is a strong incentive to maximize the amount of material that is managed in that way. Backyard composting is a waste management technique that costs significantly less than garbage pick-up and disposal — typically $45.00 per tonne, compared to $100.00-to-$110.00 per tonne[1] for garbage pick-up and disposal and $70.00-to-$80.00 net for recycling. Therefore, any instrument which maximizes waste reduction behaviour of householders will ultimately lead to system cost savings for the municipality. After a certain point, voluntary recycling and backyard composting tend to level out, and the next quantum leap in behaviour requires a mechanism to change consumer behaviour. Unit pricing mechanisms have proven to be a very effective tool to change consumer and householder behaviour with respect to residential solid waste management (Table 8).

A comprehensive study conducted for the City of Toronto (RIS 2001) evaluated the long-term effects of unit pricing programs on 15 large- and medium-sized communities in Canada and the United States. The results showed that unit pricing resulted in a reduction in the amount of waste sent for disposal and an increase in recycling rates.

A study conducted by SERA (2002) concludes that unit-based pricing programs led to source reduction of 5 percent-to-7 percent, expressed as a percentage of residential solid waste generation. Source reduction is attributed to

1 Garbage pick-up is typically $40-to-$50 per tonne. The remaining garbage disposal cost depends on whether the waste is transferred, at a cost of $8-to-$15 per tonne depending on location, and the tipping fee that has to be paid at the landfill or incinerator — anywhere from a low of $20 per tonne to a high of $100 or more.

Table 8: *Effects of Bag Limits and Unit Pricing on Material Recycled and Waste Disposed in Six Canadian Municipalities*

	Change in Amount of Residential Waste Disposed	Change in Amount of Residential Waste Recycled	Base Year Before Bag Limits and Unit Pricing Introduced	Comparison Year After Bag Limits and/or Unit Pricing
	Percent	*Percent*		
Peterborough, Ontario	-21	+49	1993	2000
Markham, Ontario	-8	+6	1997	2000
Georgina, Ontario	-38	+46	1996	1999
Barrie, Ontario	-16	+22	1996	1999
Orillia, Ontario	-23	+31	1996	1999
St. Albert, Alberta	-38	+51	1995	2000
Peel, Ontario	-4	+12	2002	2003

Source: RIS (2001).

changes in behaviour, including buying items in bulk or with less packaging, reusing items, reducing junk mail and home composting. The advantage of source reduction to the municipality is that less waste needs to be managed, thus lowering overall system costs.

Conclusion

The current method of financing residential waste management systems by property tax revenues in place in many parts of Canada is unfair for a number of reasons. Where property taxes are paid by the IC&I sector, cross-subsidization of the residential waste management system takes place. Canadian municipalities should initiate a process to slowly move away from financing residential waste management systems from the property tax base, to a self-financed independent utility or cost centre for residential solid waste management. This will provide managers with some independence regarding changes to the residential waste management system, which will be more viable when they are not competing for scarce municipal budget dollars. This will also lead to design of a more equitable system where households pay for residential waste management on a full cost recovery basis and in proportion to how much they use the system.

One of the overwhelming features of unit-pricing mechanisms is the positive influence on the householder's waste diversion behaviour. The implementation of a unit-pricing program encourages residents to look at their waste generation habits, in order to reduce the amount disposed to a level that is economically advantageous to themselves. More importantly, this mechanism targets those residents who habitually set out large quantities of garbage and participate in waste diversion programs on a sporadic or minimal basis. Unit-pricing programs match the price residents pay to the level of garbage collection service provided.

Unit-pricing programs have a positive impact on residential waste generation and diversion activities, especially in the period immediately following their implementation. Residents respond to the direct financial cost associated with waste disposal and attempt to minimize the cost by switching to diversion

activities, such as recycling and composting, to reduce the amount and the cost of disposed wastes.

Provincial and territorial governments should provide municipalities with incentives to introduce unit pricing mechanisms. Mandatory user pay and utility systems are in place in some U.S. states and throughout Europe. A mandatory requirement to implement user pay systems at the provincial and territorial levels across Canada would take the decision out of the local municipal political arena, where it may be harder to gain political support for important reforms.

Unit-pricing mechanisms for residential waste management should be considered by all municipalities in Canada and should be encouraged through incentives offered to municipalities by provincial and territorial levels of government, or through mandatory unit-pricing legislation. This policy would contribute to Canada's sustainable communities agenda by making waste management self financing and by promoting cost transparency to taxpayers.

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