

**MOVING MUNICIPAL SOLID WASTE
PLANNING TO THE NEXT LEVEL: THE
ROLE OF USER-PAY AS A MUNICIPAL
SOLID WASTE MANAGEMENT TOOL**

BY

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Submitted to the Faculty of Graduate Studies
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ABSTRACT

“The current debate over user-pay garbage basically involves a conflict between two equally valid principles. One principle is paying for municipal services on the basis of ability to pay and the other is reducing environmental damage by requiring those responsible to pay for its cost.”

Letter to the Editor, *Kanata Courier-Standard*, May 1994.

Canadians generate enormous quantities of residential solid waste which, for most Canadians, starts with the filling of a garbage bag, and ends at the curb on collection day. As environmental standards for landfills tighten and solid waste management costs continue to climb, planners are having to take a closer look at what type of solid waste management system they have in place. The ultimate solution to the solid waste problem is the reduction in the amount of waste that is generated. However, there are countless arguments on how to achieve this goal. One tool advocated in this practicum, among many possible tools, to help reduce solid waste generation uses behavioural interventions including economic incentives to encourage residents to reduce their household wasteload.

This practicum examines why municipalities are having to explore alternative forms of funding mechanisms, environmental/conservation behavioural strategies, how traditional property tax financed and user-pay solid waste systems generally work, and provides a case study analysis of the potential impact of price preference on user-pay solid waste systems. The main focus is an investigation of critical cost variables for the City of Portage la Prairie’s partial user-pay solid waste management system and how residential price preference plays a role in addressing those critical cost variables. Portage la Prairie

adopted a partial user-pay program in 1995 in order to address the rising costs of solid waste management for the City. The establishment of stringent waste reduction targets and the tightening of Provincial environmental standards have contributed to the rising cost of providing solid waste services in Manitoba.

Intended for students, solid waste planners and administrators, the results of this study confirm that the critical cost variables identified appear to be consistent for many communities. Price preference potentially appears to play a pivotal financial role in any user-pay program which may help municipal funding of waste reduction programs and help meet strict waste reduction targets.

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1. INTRODUCTION: SOLID WASTE MANAGEMENT AT THE MUNICIPAL LEVEL

1.1 PROVISION OF MUNICIPAL SERVICES VIA THE MUNICIPAL ACT

The first step in this research is to provide sufficient context for considering a municipal servicing concept that is relatively new, such as incentive-based fee systems for solid waste services in municipalities, it is important to lay a foundation of basic information. How is it that municipalities provide services to their residents? Which services shall be provided? The answers to these questions fall directly from specific pieces of provincial and municipal legislation. The following chapter will introduce solid waste management at the municipal level and outline the most recent developments affecting municipal solid waste service delivery.

The Province of Manitoba's Municipal Act, most recently amended in 1996, is the Provincial legislation that outlines specific functions of local or municipal government outside of the City of Winnipeg. The Act legislates that municipalities may provide services to their residents if the services are approved through by-law. For example, under Division 4, section 311 of the Manitoba Municipal Act:

if approved by by-law, a municipality may undertake, as local improvement for the benefit of all or part of the municipality, the acquisition, development, upgrading or replacement of one or more of the following: sewage collection and treatment facilities; water supply, treatment and distribution facilities; waste management facilities; highways; drainage systems; or any other project the cost of which includes a capital component (Province of Manitoba Municipal Act, 1996).

More specifically dealing with solid waste management, the Act delineates that municipalities may provide solid waste services. It states that, “if approved by by-law, [the municipality] may provide...the collection and transportation of waste and recyclable materials” (Province of Manitoba Municipal Act, 1996, Division 4, section 312).

Together sections 311 and 312 provide local governments the authority to operate local waste management facilities (landfills and other facilities) and solid waste and recyclable material collection systems. Individually, each municipality decides which services it shall provide and how it shall best provide those services. Municipal solid waste services, and any other services, are usually provided based upon the requirements of the community and the local resources available.

1.2 MUNICIPAL SOLID WASTE MANAGEMENT POLICY

The development of environmental and solid waste management policy at the municipal level is just one of the pieces in the legislative waste management framework. While the Province of Manitoba’s Municipal Act authorizes municipalities to generally provide solid waste management facilities and collection systems, it is the responsibility of individual municipalities to define specific solid waste management services and programs for their jurisdiction. As previously mentioned, the legislative vehicle for municipalities to enact local solid waste management authority is through the passing of a by-law dealing specifically with such matters.

The Manitoba Association of Urban Municipalities Waste Management Task Force has adopted goals for municipal solid waste management programs. These goals are provided

to municipalities to help develop the best possible local solid waste management policy possible. The goals include:

- to ensure that solid waste is managed so that the environment and human health are protected;
- to ensure a 50% reduction of solid wastes from the waste stream;
- to ensure that waste disposal grounds are sited and operated so that the environment is protected; and
- to ensure effective communication among stakeholders (Manitoba Clean Environment Commission, 1995, p. 7).

1.3 RECENT DEVELOPMENTS AFFECTING MUNICIPAL SERVICE DELIVERY

Solid waste management has only recently, over the past decade and a half, become a source of contention with just about everyone. Prior to the 1980s the idea of solid waste management in urban centres was that the resident simply filled a green garbage bag with household materials that were deemed useless and placed it at the curb on the appropriate pick-up day. From there the bag of waste was removed by a city collection crew and was gone forever. The tradition of collect-transport-dispose was the only model or policy for municipalities to deal with solid waste.

Throughout the 1980s it was evident that this old way of dealing with garbage was inadequate. According to John Sinclair, a Manitoba-based academic and solid waste expert, “conflicts between proponents and opponents of the old ways of waste management became major issues in local and provincial politics, and increasingly important matters of national and international concern” (Sinclair, 1993, p.1). Waste management problems and proposals spurred increased public interest which led to greater

press coverage, which, in turn, created agony for local and provincial government officials. By the end of the decade, it was evident that a new era had begun for waste management (Sinclair, 1993).

As the millennium approaches, a host of new solid waste management initiatives in various parts of the country have been initiated with the goal of significantly reducing the amount of waste that is sent to landfill. Each of the programs, whether implemented in small or large communities, has had as one of its prime objectives the significant reduction in the amount of solid waste that is sent to landfill. There are three factors that have had a very important influence on the provision of municipal solid waste services in Manitoba, and all three are functionally interconnected: the first is the establishment of environmental policy targets for waste reduction; second, the establishment of Provincial waste management legislation; and third, financial constraints and tightening of solid waste environmental requirements and responsibilities for municipalities. The following will provide detailed information on each of the above factors which will help clarify some of the most important developments affecting municipal solid waste services in Manitoba.

1.3.1 ENVIRONMENTAL POLICY TARGETS

As previously mentioned, the prime objective of the new age of municipal solid waste management is to significantly reduce the amount of solid waste that is sent to landfill. Planning activities, attempting to address an issue, be it social, political, economic or environmental, can identify an objective or a number of objectives which should be clearly mandated. If the general objective of reducing solid waste sent to landfill is agreed upon,

the specific target of reducing the amount by a given percentage would be the next logical step.

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national and international concern. It is comprised of environmental ministers from the federal, provincial and territorial governments. According to CCME information, CCME members “propose nationally-consistent environmental guidelines, criteria and objectives so as to achieve a high level of environmental quality across the country” (CCME, 1998). The establishment of the specific target of reducing solid waste sent to landfill by 50% based upon 1988 (or in some provinces 1989) levels by the year 2000 has been determined by CCME as *the* target for solid waste reductions. This target is one that provinces, territories and municipalities should strive to achieve as a minimum reduction objective. CCME’s target, although meaningful, remains only a suggestion for communities because CCME has no authority to implement or enforce its legislation.

In order to set the goal high, provinces, including Manitoba and various municipalities, including the City of Portage la Prairie and Winnipeg, Manitoba, adopted this arbitrary number of reducing the amount of waste sent to landfill by 50% by the year 2000 based upon 1988 levels.

1.3.2 THE ESTABLISHMENT OF PROVINCIAL WASTE MANAGEMENT LEGISLATION

Waste management is the responsibility of municipal governments, but environmental regulations and monitoring of practices and sites are provincial responsibilities. Within the

province of Manitoba, solid waste is regulated by the Province through a combination of pieces of legislation which are interconnected. Manitoba's Environment Act is generally considered a part of the environmental legislative puzzle with the purpose being to guarantee that there is a proper management system in place to ensure a high environmental quality for the entire province (Manitoba Environment Act, 1987).

In addition to Manitoba's Environment Act, the Province adopted what has been called the Waste Reduction and Prevention Act (WRAP) in 1990. The WRAP legislation was one of the first of its kind in Canada and has been considered a model piece of legislation for other provinces and communities to follow. The purpose of the WRAP is generally to "reduce and prevent the production and disposal of waste in the province consistent with the principles of sustainable development" (Manitoba WRAP Act, 1990, p.1). Manitoba's WRAP Act is unique in that it is one of the first pieces of legislation that endorses the waste stewardship approach to solid waste management. Waste stewardship is the concept of having the manufacturers and distributors of products share some of the responsibility and cost of disposing material they have produced for consumption. Therefore, levies for certain containers and/or materials are imposed at the point-of-purchase to cover the cost of disposal or recycling. The levy revenue from distributors is then remitted to the Manitoba Product Stewardship Corporation (MPSC) which oversees the distribution of funds to municipalities for recycling initiatives (MPSC, 1998). The Province's WRAP legislation, combined with the adoption of the 50% reduction target by year 2000, provides a legislative framework for the reduction and prevention of solid waste in Manitoba.

In addition to the reduction and prevention side of waste management legislation, in 1991 the Province of Manitoba enacted the Waste Disposal Grounds Regulation (WDGR) due to growing concern about the environmental impact of waste disposal practices. Prior to the Waste Disposal Grounds Regulation, the regulations regarding the environmental impact of landfills in Manitoba were much more relaxed. The WDGR tightened the environmental regulations on landfills and had a major impact on Manitoba's system of many small, locally-based, environmentally-unsound landfills. A total of 44 landfills, as of June 1998, have been decommissioned as a result of the WDGR (Ferguson, 1998).

Many municipalities in Manitoba are facing the closure of one or more of their local landfill sites in the near future. This has caused some local governments, according to the Clean Environment Commission, to "explore alternative waste disposal options including upgrading and/or consolidating existing sites, or forging partnerships with neighbouring municipalities to develop regional sites" (Clean Environment Commission, 1995, p. 4). To authorize municipalities the power to develop landfilling options on a regional scale, the Province of Manitoba enacted the Regional Waste Management Authorities Act in 1993 (Ferguson, 1998). Under this Act, municipalities may see increased costs for transporting their residential solid waste to a regional facility due to regional landfills being located at greater distances from some municipalities formally using local sites.

1.3.3 REDUCED FEDERAL TRANSFER PAYMENTS AND TIGHTENING ENVIRONMENTAL STANDARDS

Governments at all levels across Canada have reduced expenditures for services and programs in response to the high levels of debt accumulated over previous years. Federal

transfers to the Province of Manitoba, considered vital for financing many government services at the provincial and municipal level, have been reduced by over 13% (in total dollars) during the past 3 fiscal years. This equates to a drop in the federal transfer payment to the Province of 5.4% of total budgetary revenue between the fiscal years of 1995/1996 to 1997/1998. Table 1 illustrates the decline in transfer payments to the Province of Manitoba over the past three fiscal years.

Table 1. Federal Transfer Payments for the Province of Manitoba

<u>Fiscal Year</u>	<u>Federal Transfer Payment (in Thousands of Dollars)</u>	<u>Transfer Payment as % of Total Budgetary Revenue</u>
1995/1996	1,789,113.7	34.1
1996/1997	1,690,711.3	31.8
1997/1998	1,555,112.9	28.7

Source: Manitoba Budget Addresses 1995-1998, Manitoba Department of Finance.

The impact of the reductions in federal transfers to Manitoba on municipal waste management systems is difficult to assess. According to Kelly Braden, Director of Operations for the City of Portage la Prairie, the impact of reductions in transfer payments coupled with reduced Provincial funding to municipalities, has been negligible specifically in the area of municipal solid waste services. However, the Federation of Canadian Municipalities cites the reduction of transfer payments as one of the forces that have prompted municipal governments to “re-think how they calculate and finance the costs of managing wastes generated by households in their community” (Federation of Canadian Municipalities, 1996, p.2). Therefore, it is interesting to note that although the decrease

in transfer payments may not have a direct impact on municipal solid waste services in Portage la Prairie, it remains likely that policy options have been constrained.

1.4 TIGHTENING ENVIRONMENTAL RESPONSIBILITIES: THE IMPACT OF REGIONALIZATION OF LANDFILLS

A factor having had a dramatic impact on the expenditures for solid waste services in Portage la Prairie, has been the tightening of environmental standards and responsibility based upon Provincial environmental policy directed at the municipal level (Braden, 1998).

In order to assess the impact of a municipality shifting its disposal site to one based upon a regional scale, it is important to understand the cost factors involved in solid waste disposal. Traditionally, the collection of solid waste has been the largest cost component of most solid waste systems. However, with the implementation of new and tougher regulations, disposal costs have risen significantly (Minnesota Pollution Control Agency, 1992, Bertollo, 1993). Some of the factors that must be included in disposal costs are new site acquisitions, annual preparation costs, permitting, annual operating costs and close-out costs (Saskatchewan Environment and Public Safety, 1990). Additionally, there are other expenses associated with solid waste disposal grounds: transportation costs, depreciation costs of equipment, long-term maintenance costs of landfill, long-term liability costs, opportunity costs, social costs, and environmental costs (OMOE, 1992).

While disposal costs would no doubt increase in a regionally-based waste management system in Manitoba due to increased hauling distance, collection costs would still be a large cost component. In a recent presentation on the regionalization of landfills by Jim Ferguson of Manitoba's Department of Environment, he confirmed that although

transportation costs would likely increase for municipalities forced to use regional sites, it is an incentive for municipalities to reduce the amount of waste that is transported to landfill (Ferguson, 1998).

Although the solid waste transportation expenses for every municipality using a regional landfill operation would obviously be different, the regionalization of landfills in Manitoba is a contributing factor to increasing costs for municipalities.

1.4.1 PROPOSED REGIONAL WASTE MANAGEMENT SYSTEMS IN MANITOBA

Due to the fact that many local landfill sites are being closed, or will be closing in the near future, seven separate regional landfill studies have been completed in Manitoba. The areas that have completed studies include: the Interlake; Stanley-Winkler-Morden; Virden; Carberry-Neepawa; Gladstone-Normac; Eastman; and the Southwestern Manitoba. As an example of the potential impact of a regionalized solid waste management system, the Interlake region's study found dramatic increases in costs under a proposed regional system (Rural Development Institute, 1994). In a comparison of costs between three waste management options including: transporting solid waste to Browning Ferris Industry's mega landfill; upgrading the existing site; and developing a regional system, the regionalized system, although arguably the best option, is very costly. Cost estimates for the regional system assess the development and first year of operation costs to be \$1,352,885 (Rural Development Institute, 1994) compared to the current level of combined costs for jurisdictions within the Interlake region, based on the most recent 1992 figures, at \$221,561

The economic impact of the establishment of the WDGR with the corresponding decommissioning of 44 landfill sites in the province has the potential to increase the costs associated with solid waste disposal for municipalities. If the findings from the Rural Development Institute regarding the Interlake region are any indication of other regions, the regionalization of landfill operations will increase solid waste costs across the board. However, it must be stated that environmental impact of the decommissioning of smaller local landfills can only be good news for the areas immediately surrounding the landfills and therefore a positive impact on the community as a whole.

The preceding has introduced solid waste service policy and some of the most recent developments in municipal solid waste service delivery. The purpose of the remainder of this practicum will be to introduce and evaluate environmental/conservation behaviour modification techniques, analyze current municipal solid waste management mechanisms, provide a case study of the City of Portage la Prairie's user-pay system and conclude with some observations and suggestions for further research.

1.5 LIMITATIONS AND ASSUMPTIONS OF STUDY

In order to keep this study to a workable scale a number of limitations and assumptions dealing with the case study of Portage la Prairie had to be instituted. Results of the case study of Portage la Prairie were based upon the responses from residents via a survey questionnaire. Possible solid waste reduction rates within scenarios 2 - 4 are strictly generalized figures and were provided by research compiled by Resource Conservation Manitoba. Additionally, price-preference was defined as a waste collection tag or bag-tag price threshold by which residents would significantly

change their disposal habits under Portage la Prairie's current partial user-pay solid waste system, or within a possible full user-pay type scenario. Assumptions on the case study scenarios were made based upon the potential impact of a change in price for waste collection tags - nothing else. The potential increase in waste collection tag price and a change in the solid waste management system (full or partial user-pay) can alter variables throughout the entire model. An increase in the price for waste collection tags may persuade some residents to reduce their waste load, which may increase recyclable material collected and processed, which may alter Manitoba Product Stewardship Corporation support payments, which, in turn, may reduce collection costs, which may reduce disposal costs, etc. These are all important factors or variables but creating a model using these possible scenario inputs is beyond the scale of the study. Therefore, the assumption is made that under a partial user-pay system the number of tags sold would remain relatively constant given a slight price increase in tags. Additionally, the assumption is made that under a full user-pay system the average household would dispose of a given amount (a conservative estimate of 1.5 bags) of solid waste per week

2. ENVIRONMENTAL AND CONSERVATION BEHAVIOUR

TECHNIQUES: TOOLS FOR CHANGE

2.1 THE SOLID WASTE PROBLEM

In recent years, environmental and waste management issues have become a key concern for government, the private sector, unions and the general public. In the past solid waste, and solid waste management issues, were not considered of great importance because there was very little political, economic or environmental opposition to solid waste planning and management methodologies of the time.

Today, the increasing amount of municipal solid waste generated has put increased pressure on governments at all levels to address the solid waste problem. The problem is such that municipalities have the responsibility of disposing of an increasing amount of solid waste, and this task is becoming increasingly difficult, both financially and politically (Hamburg *et al*, 1997). Additionally, as provincial governments are tightening the environmental regulations on local landfills, municipalities have had to decommission local landfills and, in some cases, regionalize disposal operations.

Several highly publicized solid waste incidents and/or proposals (New York garbage barge, and the Kirkland Lake rail/mine dump) have raised the public consciousness regarding effective solid waste reduction, and safe disposal methods. Incidents such as these are, at the very least, dramatic examples of how solid waste could potentially be handled. However good or bad as the incidents may be, publicized solid waste management and planning issues are something that a growing number of people want to

know more about, simply because they want to understand the impact that solid waste issues have on their communities.

Policies designed to address the solid waste dilemma can be divided into three categories. The first category, disposal, includes decisions on how and where to construct disposal facilities (landfills, Energy-From-Waste facilities (EFW), etc.). Solid waste managers and planners recommend sites and processes based upon economic feasibility, geologic suitability, and political willingness. The second category of policies, source reduction, attempts to decrease the amount of solid waste generated. Programs within this category include package stewardship and switching to reusable as opposed to disposable materials. The third category is materials diversion, which redirects material away from landfill. Activities include recycling, composting, market creation, storage and processing, or transport of waste to other communities (Miranda *et al*, 1994). Diverting material away from landfill saves municipalities money in tipping fees; natural resources are saved and pollution is reduced when recycled material is used in production instead of virgin materials (Carless, 1992). It is with the materials diversion category that solid waste managers and planners have primarily focused efforts on reducing the generation of solid waste. One area which has shown increasing importance in municipal solid waste management is the role of an individual's waste generation and disposal behaviour (environmental or conservation behaviour). More and more solid waste administrators are recognizing that personal environmental and conservation behaviour has a large impact on the success of solid waste policies and, eventually, programs. For this reason this chapter will focus on behaviour modification strategies.

2.2 THE ROLE OF BEHAVIOUR MODIFICATION

In order for society to reduce the amount of solid waste it generates and disposes, society must change its conservation behaviour. Conservation and environmental behaviour not only must change, it is even more of a challenge, that it must stay changed (De Young, 1993). One of the biggest roles that conservation behaviour researchers can contribute to municipal solid waste management is, according to De Young, “to develop techniques that help change and maintain individual behaviour while minimizing the need for repeated intervention” (De Young, 1993, p. 486).

Currently, municipal solid waste administrators have relied upon residents to voluntarily recycle and/or reduce the amount of solid waste that is generated or disposed in local landfill. With the lofty government targets for solid waste reduction and strict provincial environmental landfill guidelines, municipalities have not been reaching their anticipated reduction targets based entirely on the voluntary recycling of residential materials (Hamburg, 1997). Behaviour modification mechanisms are initiated in some programs in order to increase solid waste diversion/reduction rates. This literature review will discuss three aspects of this issue: (a) behaviour modification techniques; (b) an evaluation of behaviour modification techniques; and (c) the role of demographics as determinants of participation in environmental behaviour.

2.3 ENVIRONMENTAL AND CONSERVATION BEHAVIOUR: TECHNIQUES FOR CHANGE

The techniques for changing environmental and conservation behaviour have been categorized and subdivided into many divisions. One of the earliest organized systems for

outlining these techniques is Cook and Berrenberg's seven-category framework. The authors organize behaviour intervention techniques into the categories of persuasive communications, evoking attitude-consistent behaviour, material incentives and disincentives, social incentives and disincentives, modeling of behaviour, facilitating of implementation of behaviour change and providing information on the effectiveness of change (Cook and Berrenberg, 1981). Probably the most dominant perspective on behaviour change came about in 1953 with Skinner employing his "Skinner Box". Skinner laid the groundwork for studying behaviour of mice using behaviour modification interventions (Skinner, 1953). Through the study of behaviour modification in mice, later studies of behaviour modification strategies focused on human investigations. In 1989, Geller categorized behaviour modification techniques as either antecedent (interventions that occur before the target behaviour), or consequence (interventions that occur after the target behaviour) (Geller, 1989).

It is important to understand that even though behaviour modification techniques and interventions have been divided and subdivided based upon specific principles, three main categories of interventions and influences are common. First, Geller's categorization of interventions as antecedent, and secondly, consequential is a very good reference point for studying the basic framework of behaviour modification techniques. A third intervention, which may be labeled social influences, is an intervention technique that is becoming quite common. Each will be considered in turn.

2.3.1 ANTECEDENT INTERVENTIONS

Antecedent interventions are strategies initiated prior to target behaviour. In other words, antecedent strategies are a form of intervention which are directed at promoting, prompting, reinforcing or reminding why a specific type of behaviour is important. In a review of behavioural programs which were focused on increasing recycling rates, Porter *et al* indicate that antecedent interventions have been used to successfully increase recycling rates. For example, they discuss various antecedent interventions which have been used including: written and oral prompts; commitment strategies; environmental alterations; goal setting; and a combination of prompts and environmental alterations (Porter *et al*, 1995).

PROMPTS

Prompting strategies are written or verbal communications targeted at individuals to encourage a desired behaviour. Written prompts are quite common and consist of brochures, notices, stickers, flyers or advertisements that may advocate recycling and/or explain where a local recycling depot is located for material drop-off. Verbal prompts offer the same encouragement however they are delivered via personal contact through telephone conversations or face-to-face meetings. Additionally, prompts may be provided via radio or television advertisements.

COMMITMENT

Commitment interventions typically ask individuals or participants to make a public commitment to participating in a particular cause. Usually the commitment can take the form of either a verbal statement or a written commitment strategy. It is not uncommon

for participants who pledge to commit to a type of pro-environmental behaviour (recycling for example) to have their names published in a local paper or advertisement to publicly show their commitment. The motivating factor behind the commitment strategy is that assumption that making a public commitment, as Wang and Katzev state, "...brings into play consequences mediated by the committed individual's peer group" (Wang and Katzev, 1990,). This type of antecedent intervention may seem different from a consequential intervention, in that the focus of the commitment strategy is primarily on pledging prior to the behaviour activity desired, rather than focusing on the possible consequences.

ENVIRONMENTAL ALTERATION

Environmental alteration techniques are used to make the desired behaviour as easy as possible for individuals to participate in a desired activity. By altering the environment, pro-environmental activities are more convenient and easier to perform. For example, adding more recycling receptacles in a particular area, providing containers for individuals to recycle at home, implementing a commingled recycling system instead of source separation, and changing the day of recyclable material pick-up to coincide with solid waste pick-up are examples of interventions which may make recycling easier for households (Porter *et al*, 1995).

GOAL SETTING

The establishment of goals has been one antecedent behaviour intervention that has been used quite extensively. The basis for the goal setting is such that participants have the opportunity to observe the impact that they, or their peer group, may be having on

reaching the determined goal. For example, charities and school fund-raising drives often use the goal setting approach in order to encourage a particular type of behaviour (soliciting donations). Typically, organizers post the predetermined goal or objective and also indicate where the current levels are as compared to the goal (for example, the United Way often uses a large thermometer to indicate their fund-raising objective with the thermometer body itself gradually filled-in to indicate current funds raised.)

2.3.2 CONSEQUENTIAL INTERVENTIONS

Consequential interventions to alter behaviour are strategies that are implemented after a specific target behaviour. Consequential strategies, or coercive motivational techniques (De Young, 1993), can be employed as the counterpart to antecedent techniques - motivational reinforcement applied after a behaviour has been initiated. Consequences that have been used to increase recycling include feedback, rewards and penalties. The use of consequences may conjure images of using punishment. People are known to rapidly alter their behaviour while under duress. However, consequential intervention is not synonymous with punishment. There are techniques that can coerce without the use of punishment. These types of consequential motivational strategies include the use of monetary disincentives (i.e. consumption-based taxes and user-fees), and the use of physical barriers to nonconserving behaviour (i.e. high occupancy vehicle lanes on commuter routes) (De Young, 1993).

REWARDS

Rewards have been one of the most predominant forms of consequential behaviour techniques used by agents interested in encouraging proenvironmental behaviour.

Rewarding conservation behaviour with prizes or money has been an important part of early reuse and recycling programs.

PENALTIES

One of the most controversial yet popular behavioural modification techniques is the use of penalties for not participating in a targeted behaviour - such as recycling. User fees in certain incidences or programs can be labeled as a penalty for not reducing a household waste load effectively. If a household chooses not to reduce its wasteload, under particular user-pay programs, it therefore must pay a financial penalty in the form of a fee for collection and disposal of the additional solid waste.

Some municipalities have embraced consequential behaviour intervention techniques in their solid waste by-laws to the point of banning certain materials from landfill and enforcing mandatory recycling. Residents who do not comply with the municipal ordinance may have to pay fines for disposing of illegal materials.

2.3.3 SOCIAL INFLUENCES

Social influences are another broadly defined set of behavioural interventions which can be an effective motivating influence on behaviour. Feedback is one commonly used technique:

FEEDBACK

The provision of feedback regarding the behaviour of groups or individuals behaviour is a commonly used technique for increasing conservation behaviour. For example, the Manitoba Product Stewardship Corporation used an advertisement that stated recycling

increased by 75% over the previous year. Performance feedback can be a significant influence which makes use of social rather than monetary incentives (DeLeon and Fuqua, 1995).

Vining and Ebreo state that social influences are a distinct cause for initiating proenvironmental behaviour (recycling in particular). They define social influences and the motivation itself for recycling as “concern for neighbour’s or family’s perceptions or as the presence of lack of social support among members of one’s household or community for conservation behaviors” (Vining and Ebreo, 1990, p.58).

A similar planning paradigm can be easily noticed in the “keeping up with the Jones” phenomena in which neighbours in a residential area feel compelled to upgrade their residences for fear of social pressure. The same can be stated for proenvironmental or conservation behaviour intervention techniques. In a study conducted in 1988, the authors found that social pressure (in the form of modeling of conservation behaviour by one’s peers) was reported to be an important motivation for recycling (Vining and Ebreo, 1988).

2.4 EVALUATION OF BEHAVIOUR MODIFICATION TECHNIQUES

Due to the large number of individual behaviour modification techniques, it is imperative for solid waste administrators to understand the framework of each, and facilitate informed decisions about suitability. Therefore, it is important to evaluate each behaviour modification technique to understand its potential effectiveness based upon previous trials. Cone and Hayes have identified that behaviour intervention assessments must take into account the diversity of issues when analyzing the validity of these techniques. They state

that assessments should be based upon generalizability to other environmental problems, settings and contexts (Cone and Hayes, 1980).

De Young incorporates many of Cone and Hayes' ideas into his own evaluation framework for behavioural interventions. De Young bases his evaluation on reliability, speed of change, particularism (can the technique be used universally?), generality (does the behaviour "spill over" into other conservation behaviours?), and durability (De Young, 1993). The remainder of this chapter is directed to an evaluation of environmental/conservation behavioural interventions which are commonly used.

2.4.1 PROMPTS

Prompts are considered unreliable and generally untrustworthy. Furthermore, prompts are not universal. Prompts come in a variety of styles, placements, formats and are all worded differently. They are considered effective at soliciting immediate behaviour responses.

Additionally, prompts usually do not promote desirable side-effect pro-environmental behaviours, and whatever behaviour comes about as a result of the prompt is non-durable.

The behaviour that is a result of a prompt is considered non-durable because prompts lose their novelty as time goes on, and experimental studies show that once a prompt is removed, behaviour generally returns to pre-prompt forms (De Young, 1993).

2.4.2 COMMITMENT

Commitment intervention techniques appear to have a mixed review. Katzev reports that commitment alone is able to elicit a larger percentage of participant behaviour change than offering material incentives (Katzev, 1986). Additionally, commitment seems to offer a

more durable behaviour change than other techniques. Stern and Aronson (1984) indicate that participants who pledge to commit to pro-environmental behaviour usually end up extending this behaviour beyond the period of study.

However, De Leon and Fuqua (1995, p. 244) have found that commitment-only strategies may not be as reliable as previously thought. In a study they completed in 1995, the authors conclude that, “the commitment-only group displayed virtually no change...” referring to paper recycling rates at the conclusion of their experiment, compared to other behaviour techniques.

2.4.3 ENVIRONMENTAL ALTERATION

Manipulation or alteration of the environment can increase pro-environmental behaviour. In a review of behavioural studies, Porter *et al* (1995) indicate that making recycling activities more convenient and easier to perform increases recycling activities. Humphrey, Bord, Hammond and Mann found that office employees recycled more paper when given personal paper recycling receptacles over a ten week period. Employees who were asked to use a centralized paper recycling receptacle recycled 9% less paper over the same period (Humphrey *et al*, 1977).

Providing additional garbage and/or recycling receptacles has shown to increase the amount of recycling and/or reduce the amount of littering. It could be expected that these behaviours have the possibility of being very durable as the intervention technique remains in place for long periods of time. One significant drawback to some environmental alteration strategies is that they may tend to have high initiation costs associated with

them. However, environmental alterations may also be expected to have rapid behavioural responses and to be quite reliable.

2.4.4 GOAL SETTING

The establishment of goals is a promising technique which can be used to increase recycling levels. In an experiment with school children, Hamad *et al* (1980), found positive effects with goal setting on newspaper recycling. A goal of 20,000 pounds of newspaper to be recycled in three weeks was established by the school principal. Results from the experiment showed that goal setting led to the highest amounts of recycled paper as compared to two other groups which used consequential strategies (feedback and reward). One of the major drawbacks of goal setting is that it is extremely undurable. Once the goal has been removed, recycling behaviour declines. The speed of change for goal setting seems to be rapid, however studies have yet to determine if goal setting rates high in particularism and generality.

2.4.5 REWARDS

Material incentives are able to modify conservation behaviour in a rapid fashion. The magnitude of the change is usually correlated to the magnitude of the reward (Birch and Veroff, 1966). Rewards also have universal acceptance by virtue of having a nonparticularistic character (Foa, 1971). Durability is a problem with material incentives in a similar fashion to goal setting. Behaviour is quick to change with the offer of rewards, however as soon as the reward system is terminated, behaviour quickly reverts back to normal. Generality is considered to be potentially a large problem with reward-based techniques. Lepper and Greene argue that participants who previously undertook

proenvironmental behaviour prior to the implementation of rewards may focus primarily on the reward, instead of the motivations behind the conservation behaviour itself.

Therefore, the potential exists for conservation behaviour to be limited to activities that only have rewards and restrictive to those activities which do not (Lepper and Greene, 1978).

2.4.6 SOCIAL PRESSURE AND MATERIAL DISINCENTIVES

Techniques that employ coercive motivational techniques such as social pressure and material disincentives are quick and reliable behavioural change strategies. Penalties such as bottle deposits and user-fees for solid waste services are extremely effective in producing positive proenvironmental results. For example, Levitt and Leventhal reported that in New York State, the introduction of a deposit/return system reduced the incidence of returnable containers in solid waste samples by 26%. Purchasers of selected beverage containers paid a deposit on the container at the time of purchase. Consumers then received a deposit refund only if the container was returned. If the consumer chose not to return the container, they were penalized by higher costs (Levitt and Leventhal, 1986).

Due to the largely voluntary nature of recycling programs in Canada, the penalty system of behaviour modification is one that is rapidly becoming favourable with solid waste administrators. It is growing because the material disincentive strategy works. For example, in Sydney Township (1993-1994), Ontario, one of the first communities in Canada to undertake a user-fee based solid waste system, the recycling rate increased by 26% and the amount of solid waste sent to landfill decreased by 46% after user fees were introduced (Solid Waste Magazine, 1996).

The same results are echoed in a study of recycling behaviour in Brandon, Manitoba. The recycling system in Brandon, although very new, relies strictly on a voluntary effort from households to recycle materials. The authors state the system has had very limited success in reducing the large volume of solid waste because, "there is currently very little incentive - apart from personal satisfaction - for residents to participate" (Hamburg *et al*, 1997, p.150). This would suggest that there could be room to introduce a form of user-pay program which has shown to reduce residential solid waste disposal dramatically.

Material disincentive programs do have drawbacks, the most significant of which can be the fear of illegal dumping and, as De Young puts it, "creative misbehaviour". One of the first assumptions when a proposed user-pay program is put forth, is the idea that illegal dumping will be a problem. Studies indicate that although the fear of illegal dumping is usually the greatest fear among residents involved in the user-pay debate, the fear is, for the most part, unsubstantiated (Gale, 1996; Becker and Browning, 1991; Recycling Council of Ontario, 1994). There have been no conclusive studies to substantiate this fear, however it still remains a major stumbling block for user-pay advocates (Recycling Council of Ontario, 1994 .

2.5 THE ROLE OF PEOPLE: DEMOGRAPHICS AND DETERMINANTS OF PARTICIPATORY BEHAVIOUR

Environmental behavioural techniques or strategies differ in terms of their source of initiation. One of the most interesting features of behavioural techniques is the distinction between the source of motivation - either self-motivated or initiated by outside influences. Techniques such as prompts, material rewards, social pressure and support all involve

information and motivation that is provided externally. De Young states, “the source of the motivation is initiated by some outside entity or by some aspect of the behaviour setting...these interventions are generally experienced as being tangible and concrete in nature” (De Young, 1993). In contrast, self-monitored feedback, commitment and intrinsic satisfaction involve motivations derived from direct experience and are considered less quantifiable and intangible in nature (De Young, 1993).

Demographics plays a controversial role in determining who is more than likely to be involved in conservation behaviour. With the popularity of Foot’s book *Boom, Bust and Echo*, a forecasting tool of choice for many planners, visionaries and academics has been demographics. However, as important as demographics may be for identifying and directing public policy, there has been no clear convincing evidence that demographics plays a defining role in any particular direction for environmental behaviour studies.

Weigel reported that recycling participation was related to liberal social, economic and religious philosophies; higher education; and higher occupational status (Weigel, 1977).

Additionally, Van Liere and Dunlap found that young, well-educated people with high incomes are more concerned with the environment (Van Liere and Dunlap, 1980).

Conversely, Vining and Ebreo indicate in a study comparing recyclers and non-recyclers, “there were only weak differences in the demographic characteristics of recyclers and non-recyclers. Recyclers and non-recyclers were similar in terms of occupation, most categories of income, and size and composition of household” (Vining and Ebreo, 1990, p.71). Similar to Vining and Ebreo, Oskamp et al have suggested weak links between demographic variables and recycling behaviour (Oskamp *et al*, 1991).

One important demographic factor that seems to have validity has been presented by Berger. She reports that demographics play an important role, “as antecedents to facilitating factors” (Berger, 1997, p.516). She goes on to state that, “the size of residence area, type of dwelling, education, and income are very important determinants of access to recycling facilities” (Berger, 1997, p. 519). This determination would seem to be fitting based upon that most recycling programs are focused on single family homes which are usually owned/occupied by higher educated, moderate to high income individuals.

2.6 CONCLUSION

The behavioural intervention approach has produced results that show how strategies involving prompts, environmental alteration, commitment and goal setting as antecedent interventions; rewards and penalties as consequential; and social influences or social pressure interventions may influence proenvironmental behaviour. Due to the increasing amount of solid waste that municipalities must deal with, municipal solid waste administrators must include behaviour modification as another tool in their toolbox to address the situation. With rising political and economic pressure to reduce the waste-load, and working within a municipal solid waste reduction system that is voluntary, planners must investigate moving solid waste reduction to the next level.

The remainder of this practicum will focus on how the concept of the user-pay penalty-based solid waste management system can play a significant role in moving solid waste reduction to the next level. Subsequent studies should examine how such a system could be articulated in relation to other strategies.

3. CURRENT MECHANISMS MUNICIPALITIES ARE USING TO MANAGE SOLID WASTE

Many human activities give rise to residual materials which are not of immediate use where they are generated. These residuals may be recycled, reclaimed or reused; otherwise they constitute solid waste which will ultimately be released into the environment. The biosphere has the capacity to transform many wastes over time, either to harmless products or into nutrients which can be used again. However, the natural capacity of the environment can be easily exceeded if wastes are not controlled. Therefore, careful planning, control and management are required.

As a nation, Canada is one of the most prolific generators of solid waste in the world. The average Canadian generates an estimated 1.7 kilograms of solid waste per day. The United States and Australia follow close with generation rates of 1.6 kilograms per person/per day. In comparison, Sweden produces a minuscule .8 kilograms per person/per day (OMOE, 1990).

Increasingly, municipal waste management systems across Canada are having difficulties meeting demand for disposal of solid waste. Therefore new approaches are needed to solve these waste problems.

The newest solid waste management approach which many municipalities have introduced or are considering introducing, is what has been called an "incentive-based fee system" (Skumatz, 1995). This type of system has many different names or titles associated with it - user-pay, user-fee, unit pricing, pay-as-you-throw, effluent fee (Downing, 1984 p. 173),

pay-as-you-waste, tag-a-bag, variable rates (each one may be used interchangeably throughout this practicum), the list goes on and on. However, the basic premise is the same - a city, town or municipality charging its customers (residents) based upon the amount (either by volume or weight) of solid waste they generate.

Most municipal services are provided on a merit based system - that is services are provided to residents based upon their merit or social worth within the community. These services are generally paid for via a resident's property tax bill based upon a predetermined rate. This form of municipal service funding has many positive and negative social, economic and environmental impacts.

Currently, many municipalities are exploring the idea of service funding via a market based model. This model suggests that some municipal services could be provided using a market-based costing structure. Therefore, services, such as solid waste and recyclable material collection, etc., could be provided via a user-pay, or incentive-based, model.

User-pay puts the cost of solid waste services directly to the resident and provides a direct economic incentive to reduce the amount of waste material disposed. The more the residents reduce their household waste load, the less, if any, they resident pay toward solid waste services.

This type of service delivery has been used for many years with such services or utilities as municipal water services, hydro electricity, and others. However, with the establishment of waste reduction targets and the corresponding tightening of provincial environmental legislation, more and more municipalities are exploring new and different options for

financing their programs, such as solid waste services, for example. The incentive-based fee system is one such tool which may be used to address the high cost of delivering municipal solid waste services. Chapter three will examine the current range of municipal solid waste mechanisms and funding strategies that are currently being used and introduce and provide some detail on the user-pay concept.

3.1 RANGE OF CURRENT SOLID WASTE PRACTICES

Solid waste management services vary widely from province to province and municipality to municipality. Generally, the approach to solid waste services for any given community depends on a multitude of variables including population, population density, proximity to disposal and/or material processing facilities, the amount of waste generated and the availability of resources (Federation of Canadian Municipalities, 1996). In order to provide a broad perspective on solid waste management services, the following will provide information on the basic types of waste management services offered and the funding mechanisms used to finance those services.

3.2 TYPES OF WASTE MANAGEMENT SERVICE

Residential waste management may consist of any combination of the following:

- collection of garbage, recyclables, organics collection, bulky waste, household hazardous waste;
- processing of recyclables;
- composting of collected organic materials;
- disposal of solid waste at a transfer station, energy-from-waste facility or landfill;
- public education and information.

As stated previously regarding the regionalization of landfills, collection is usually the most expensive component in the delivery of residential solid waste services. Often the collection component is upwards of 70% of the entire solid waste service budget (Resource Integration Systems, 1996). Therefore the need to make collection as efficient as possible is very important. Routes and pick-ups are carefully planned to maximize productivity and avoid downtime as much as possible.

Municipalities or firms that deal with the collection of solid waste require a large capital investment in infrastructure such as trucks and lifting equipment. In some regions, the collection equipment of choice is the standard garbage truck usually operated by 2 to 3 workers. The vehicle is driven by one worker while the others collect and deposit the material in the back of truck. One of the emerging trends in solid waste management is co-collection. Co-collection refers to the ability of a specialized truck to collect more than one material at a time. For example, co-collection presents itself well with the ability to collect both wet and dry materials at the same time. The technologies for co-collection are improving and the potential exists for significant net environmental benefits, cost savings and system efficiencies (Resource Integration Systems, 1996)

If communities do not provide collection services, self-hauling of solid waste is required which is very common in rural Manitoba. Self-hauling is where the resident takes their household waste and recycling materials to a local landfill, transfer station or recycling depot for disposal. Some municipalities provide “free” drop-off of materials (usually funded by property taxes), while others have initiated a tipping fee or user-fee for solid

waste. The advantage of using a self-haul system is that public sector collection costs are nil.

Waste management services fall into one of four types:

- 1) municipal
- 2) contract
- 3) franchises
- 4) licensed service

Each of these services has been used to some extent in urban and rural areas throughout North America. However, before any explanation of each of the services is given, it is important to understand the different types of residential waste management service systems.

3.2.1 MUNICIPAL SYSTEMS

In a municipally operated solid waste management system, the municipality or local government has its own fleet of collection vehicles and operators. Some operate disposal sites as well. The cost of the entire operation is usually funded primarily through property taxes. For example, in the City of Toronto, municipal staff collect garbage, recyclables, leaf and yard waste and bulky goods.

3.2.2 CONTRACTED SYSTEMS

For other cities, like the City of Mississauga, contract their solid waste collection and disposal to private hauling firms since the early 1970's (Resource Integration Systems, 1996). The main reason for moving away from municipally operated systems and opting

for the contracted system is that municipalities save themselves a headache running a fleet of collection vehicles and/or operating a disposal site.

While some communities have previously operated their own municipally run solid waste management system, they have found areas in which they have contracted out some of the operations. In most cases where a hybrid system is used, the municipality will collect solid waste while a contracted firm will collect and/or process recyclable materials.

3.2.3 FRANCHISE SYSTEMS

The City of Fremont, California has an exclusive franchise with Browning-Ferris Industries (BFI) to provide all its solid waste management services. The services are mandatory for its residents who may choose from a predetermined level of service (i.e. a 32 gallon refuse container per week) at a corresponding price. Recycling and yard waste pick-up are included in the fee and all three materials are picked-up on the same day. The franchise system is based upon creating efficiencies from one service provider serving households with one vehicle.

The unique approach to franchising is that a city can be divided into zones with haulers offering different services catering to each individual zone. The level of service and price depends on how the franchises are managed. This eliminates the city from having any involvement with the solid waste management system, except for minor administration (Resource Integration Systems, 1996).

3.2.4 LICENSE SYSTEM

The City of St. Paul, Minnesota licenses 28 solid waste haulers to serve 115,000 households. Each hauler has significant market share, however, no one hauler has more than 10% of the market.

Licensing of haulers is similar to the franchise system, however, the municipality usually has more control over solid waste management. If the municipality chooses to manage under a license system, they can stipulate the collection of recyclables and waste on a standard collection period (hauler must collect on Wednesdays in Zone "A"). Without municipal management, a licensing system can be collection chaos. Different haulers therefore collect waste and/or recyclable materials on the same days in the same neighbourhood creating traffic problems, wear and tear on streets and atmospheric pollution with little accountability to the residents.

3.3 WASTE MANAGEMENT INSTRUMENTS DIRECTED AT PRODUCERS: WASTE STEWARDSHIP

As municipalities strive to achieve the 50% waste reduction target, waste diversion and reduction initiatives have been established to help residents divert material away from local landfill. By far one of the most dominant symbols of this movement is the 'blue box' recycling program. However, estimates have shown that these types of recycling programs have reduced waste by only seven to nine percent of the total waste stream (Fenton, 1993).

Robert Fenton says that another instrument has evolved to deal with the burden on publicly financed waste management programs: waste stewardship. The concept of waste stewardship, Fenton says:

“is based on the assumption that high levels of waste result from the traditional separation between the decision to create trash and the responsibility to dispose of it. On the one hand, private companies and individuals have been making decisions about producing, distributing, and consuming products with little regard for the waste-creating consequences. On the other hand, governments have traditionally assumed responsibility for dealing with whatever resulted from private decisions” (Fenton, 1993, p.26).

The idea of waste stewardship essentially states that the manufacturers have to bear some of the responsibility for the life-cycle of the products they manufacture - a life-cycle that begins from cradle, the design and assembly of the product, to grave, disassembly, re-use, recycling and/or eventual landfill. Two of the current challenges for solid waste management planners deal with the waste stewardship. First, how should provincial and federal officials design, implement and enforce the idea of waste stewardship on a provincial or national scale? Second, How will municipal solid waste management plans incorporate these policies (Fenton, 1993)?

3.4 SELECTING A WASTE MANAGEMENT MECHANISM

The most important factors that have to be considered in selecting among solid waste management system options are (in no particular order): cost effectiveness; waste minimization; and potential for material recovery.

The Manitoba Product Stewardship Program (MPSP), Manitoba's waste reduction and prevention program created under the WRAP legislation, and the Manitoba Product Stewardship Corporation (MPSC), the body created to implement the MPSP, exemplify the goals of cost effectiveness; waste minimization; and material recovery needed for a successful waste management system. The objectives of the MPSC, which only handles a small portion of the waste stream, are to:

- establish and administer a waste reduction and prevention program for designated materials for Manitoba consistent with the principles of sustainable development;
- provide for the effective, efficient and economical waste management of designated materials; and
- administer the Multi-Material WRAP fund.

In order to create a successful waste management system, a municipality must reduce the amount of material sent to landfill, maximize the amount of material recovered or diverted away from landfill, and complete those two tasks in the most economically efficient way possible. MPSC objectives are clearly rooted in these three factors which, therefore, greatly influence and impact all municipal solid waste management systems in Manitoba (Manitoba Product Stewardship Corporation, 1997).

3.5 FUNDING MECHANISMS

The funding mechanisms in place in many municipalities are such that local governments are having a difficult time covering costs, meeting tougher environmental regulations and the expectations of local residents. In order to meet these constraints, municipalities are forced to examine their funding mechanisms for solid waste management. Some of the

most common solid waste management funding mechanisms include (Federation of Canadian Municipalities, 1996):

- **property tax financed systems:** solid waste costs are identified and incorporated into municipal budgets which are used as a basis for property tax assessments;
- **tipping fees:** funds charged to haulers to dump non-residential or waste from other communities in a municipal landfill ;
- **generator/service provider surcharges:** charges imposed on industrial, commercial and institutional (IC&I) waste generators to increase municipal revenue or exercise economic and waste flow control;
- **waste management utility fees:** fees (usually a uniform monthly charge) collected from residents who subscribe to a determined level of solid waste service;
- **user-fees:** fees collected from residents based either upon each unit of waste collected (full user-pay), or upon each unit of waste disposed over and above the predetermined service level (partial user-pay). Partial user-pay systems are supplementarily funded usually through property taxes or utility fees.

3.6 COMPARISON OF DIFFERENT APPROACHES TO MUNICIPAL SOLID WASTE MANAGEMENT AND FUNDING

The most common approach to managing solid waste in Canada has been a solid waste management system funded on property taxes. The property tax financed model funded solid waste services based upon the ability of the homeowner to pay. The newest approach to managing solid waste in Canadian municipalities is the user-pay approach.

This penalty-based behaviour modification model is based upon making those responsible for generating solid waste responsible for funding the system. The proceeding will detail both of these approaches and give reasons why the user-pay approach makes sense.

3.7 WHAT IS USER-PAY?

Currently, financing for garbage collection and disposal typically comes from residents' property taxes. Since the homeowner is not charged directly for the collection and disposal of the solid waste, the true or actual cost of the service is hidden. A user-pay concept of solid waste management, or any other municipal service for that matter, takes a different approach.

User-pay is a system that charges for solid waste services based upon the amount of solid waste disposed by each household. Those households that dispose of more garbage pay more than those who put out a little. In concert with all user-pay systems, is a combination of different types of waste reduction or diversion techniques that help reduce the amount of solid waste disposed. In order for a user-pay system to be successful, waste reduction or diversion options must be clearly in place prior to implementation. These reduction or diversion initiatives may take the form of recycling programs (blue or green box systems, or centralized recycling depots), composting programs (either home or centralized), and household hazardous waste disposal sites.

3.8 ECONOMIC RATIONALE BEHIND USER-PAY

The economic rationale for implementing user fees for waste disposal is rooted in efficiency and equity. From an economic perspective, regulatory instruments and performance standards are more inefficient than charges and economic instruments (Lindeneg, 1992). Economic and resource efficiency is a worthy goal because it ensures

that society avoids unnecessary expenditures and receives the greatest possible benefits from its scarce environmental and economic resources (Fortin and Mitchell, 1990).

The market is the primary resource allocation mechanism. Pricing, in theory, “allows bidding for scarce goods and services and factors of production, thereby ensuring that goods and services are allocated to the highest valued uses, and that factors of production are allocated to that use where they bring the largest return” (Millerd, 1984, p.8).

However, it is on the demand side of public service allocation that pricing performs its most useful function. Pricing is a tool which allows service managers to manage demand. Managing demand in the public sector is a necessity because the scarcity of economic resources prevents the satisfaction of all needs and the provision of unlimited service (Millerd, 1984). By following the economic rule for optimal allocation of resources - price equals all the costs of providing the service - the constant pressure to increase expenditures and expand public services can be alleviated when the real costs are made apparent to consumers (Bird, 1976). User charges or pricing for public services promotes efficiency because they provide direct incentives for users to change their behaviour and economize on the consumption of scarce resources (Kemper and Quigley, 1976). In the realm of waste collection and disposal “residents having to pay higher costs for disposing of waste will attempt to reduce the amount of garbage they generate” (Blume, 1991, p.3).

Theoretically, charging fees for waste disposal results in a more equitable response to waste management problems. In the case of user charges for waste and pollution taxes/levies in general, the cost of pollution is directly imposed on those who cause it.

With waste disposal charges, the total cost of disposal is allocated fairly as each household pays for collection and disposal of its own waste.

However, there are compelling arguments used to reject the equity theory of user charges.

The chief argument is that user charges penalize large families and those with the least ability to pay by charging them for a basic and essential public service. Additionally, regressivity is argued on the basis that everyone pays the same rate regardless of income.

However, a University of Chicago study showed that waste generation is positively related to income. An income elasticity of .53 was determined whereby a 10 percent increase in real income results in a 5 percent increase in garbage disposal (Albrecht, 1976).

Another economic advantage of implementing user charges is quite simply that governments have an efficient means of covering the costs of the service. The costs of financing the system are imposed on the beneficiaries. Any additional costs imposed such as excessive demand are covered by the users. Therefore, governments do not have to rely on financing services by continually raising taxes or using other public revenues which ultimately reduces funds available for other services. This is important due to many Manitoba municipalities (i.e. the City of Portage la Prairie) experiencing rising waste management costs which consume larger portions of public revenues (City of Portage la Prairie, 1998).

3.9 FACTORS TO CONSIDER IN FUNDING WASTE MANAGEMENT SERVICES

In order to answer the question of why user fees, it is important to take a look at what type of solid waste management system or municipal funding strategy is typically in place prior to deciding to implement any type of user-pay system.

3.10 WASTE MANAGEMENT SERVICES FUNDED THROUGH PROPERTY TAX REVENUES

The most predominant practice for funding residential municipal solid waste services is through property taxes. Those costs that have been identified are incorporated into municipal budgets which in turn provide the basis for municipal property assessments. There are advantages and disadvantages to this type of strategy. The advantages to this type of system are as follows:

- Waste management is recognized as an essential or merited service to which all should contribute
- Predictable, secure revenue stream
- Very low administrative requirements
- Partially ties waste management costs to ability to pay (Federation of Canadian Municipalities, 1996).

Based upon the above points, waste management services, or any other municipal services, funded through property taxes have maintained this safe, predictable, merit-based funding strategy for decades.

However, there can be a number of important disadvantages based upon this funding strategy. They include:

- Current costs probably not determined through full-cost accounting methodology
- Strong resistance to property tax increases
- No relation between mill rate and amount of waste generated
- No direct incentive for individual households to reduce waste disposal (Federation of Canadian Municipalities, 1996).

In addition to the stated disadvantages, this funding strategy may be deemed inequitable if municipal waste management costs are incorporated into mill rates established for industrial, commercial and institutional (IC&I) generators which do not receive municipal waste services (Federation of Canadian Municipalities, 1996).

3.11 WASTE MANAGEMENT SERVICES FUNDED THROUGH USER-FEES

User-pay is a very persuasive means of convincing residents to reduce the amount of garbage they produce. Communities which have implemented user-pay programs have experienced dramatic increases in the amount of material recycled, typically 15% - 50% depending on the type of system implemented. For example, in 1993-1994, in Sydney Township, Ontario, the recycling rate increased by 26% and the amount of waste sent to landfill decreased by 46% after a partial user-pay program was introduced (Solid Waste Magazine, 1996).

User-pay programs in Canada range from full user-pay programs in which all bags of solid waste disposed are paid directly by the disposing household, to partial user-pay programs that allow households as many as four bags per week. Glenn Munroe of Halifax, Nova Scotia, is a consultant with the LURA Group and is considered one of the leading experts

on the use of variable rates as a tool for municipal solid waste management in Canada. Mr. Munroe has completed numerous studies on user-pay systems and his most recent work has involved the completion of a survey of municipalities across Canada who are using user-pay in their community (the first such national study on the subject). Among his findings were that there were a total of 144 communities across Canada that were currently using a user-pay program for solid waste services. This figure is the closest figure that is presently used (Munroe, 1998) to accurately determine the number of user-pay programs in the country.

Outside of Ontario there has been a shift towards the regionalization or the establishment of distinct nodes of user-pay programs within other provinces. Currently, Ontario has by far the largest number of incentive-based fee systems in Canada with 84. This may be attributed to Ontario being the first province to legislate or grant the municipalities the power to impose fees for solid waste services. British Columbia has the second largest total of communities adopting variable rate systems with 47. Combined, the prairie provinces of Alberta, Saskatchewan and Manitoba have a grand total of 13 user-pay initiatives under way. The Maritimes and Quebec currently have no user-pay programs initiated, however, it won't be long before variable rate programs are initiated in those areas (Federation of Canadian Municipalities, 1996). Table 2 provides a breakdown of user-pay programs across Canada.

Although British Columbia, Ontario and the prairie provinces hold all of the user-pay solid waste programs, the British Columbian examples differ greatly from their counterparts in other provinces.

Table 2. Number of User-Pay Municipal Solid Waste Management Systems in Canada by Province 1998.

<u>B.C.</u>	<u>Alberta</u>	<u>Sask.</u>	<u>Manitoba</u>	<u>Ontario</u>	<u>P.O./Maritimes</u>	<u>Total</u>
47	5	4	4	84	0	144

Source: Munroe, 1998.

The examples of user-pay in British Columbia, as a general rule, tend to be initiated in communities with a population over 50,000. This is in sharp contrast to Ontario and the prairie provinces where user-pay would generally be found in municipalities of 10,000 or less (Munroe, 1998).

The user-pay experience in the United States is much more extensive in terms of number of programs initiated as well as the size communities in which the programs have been adopted. According to Lisa Skumatz, a leading American expert on user-pay solid waste management, in 1993 the number of communities in the United States with variable rate systems was over 1,000, up from a few hundred just a few years earlier (Skumatz, 1993). Additionally, not only has the American experience with user-pay been adopted by small to medium-sized communities, it has also been adopted by some of the larger cities. Seattle, Washington (population 532,000) has had a user-pay program in place for many years and has become a model for larger cities interested in adopting variable rates (City of Seattle, 1998).

3.11.1 ADVANTAGES FOR USER-PAY SOLID WASTE MANAGEMENT PROGRAMS

Throughout North America, experience has demonstrated that there are some very important benefits to be gained from adopting user-pay programs. These benefits include

(Federation of Canadian Municipalities, 1996, p. 10; Resource Conservation Manitoba, 1997, p. 10):

- *Significant increases in the diversion of materials to recycling and composting programs* - Communities that have implemented user-pay programs report increases in recycling and composting rates. The former Sydney Township in Ontario now the City of Quinte West, for example, increased its recycling rate by 26% in 1993/94 (the year a user-pay system was implemented).
- *Significant reductions in waste disposal* - Communities report reductions in the amount of solid waste disposed after a user-pay system has been adopted. Again in the former Sydney Township, the amount of solid waste disposed was reduced by 46% after user-pay was initiated.
- *Better understanding of waste management costs* - A better understanding of costs helps communities identify opportunities for greater efficiency.
- *The costs of waste management can be removed from property tax bills* - This makes the cost of solid waste services visible to households and forms a direct linkage for these charges to the actual costs incurred for providing these services.
- *There is a more equitable distribution of the costs of providing waste management services* - Households are charged directly for the services provided and in proportion to the amount of waste they generate. Waste management charges can be removed from the tax bills of waste generators who may not receive these services from the municipality (i.e. Industrial, commercial and institutional and/or multi-unit residential dwellings whose tax bills often include the cost of waste management services they do not receive).

Through extensive pre-implementation planning and price structuring, user-pay programs can provide a long term funding solution for recycling and composting programs. This may be done by incorporating the cost of waste diversion programs into the fees charged for waste collection and disposal.

3.11.2 WHY ISN'T EVERYONE IMPLEMENTING A USER-PAY PROGRAM? - THE DISADVANTAGES

With any new innovative public program, there have been problems in gaining public understanding and acceptance of the concept for user-fees for solid waste services. As with most planning initiatives, legitimate public concerns regarding the initiative, whether they be over user-fees for solid waste services or any other program, must be completely addressed before acceptance can be achieved. Municipal experience, and the author's own experience in addressing user-pay through work completed in the Township of Humphrey, Ontario (Mochrie, 1996), shows consistency in the issues that the public may have with the user-pay concept. The following issues are quite common and must be addressed before proceeding with the implementation of a user-pay system (Resource Conservation Manitoba, 1997):

- *Public Resistance* - Most members of the public resist the imposition of user-fees for a number of reasons. First, they feel that solid waste removal is one of the services that they actually *see* for the property taxes they pay (along with street repair and/or snow removal, etc.). Therefore, they are furious when they hear that they will be paying *again* for this service, which was initially funded through their taxes. The public outcry is usually one of no way will I pay another charge for garbage removal in addition to my property taxes. I pay enough as it is! In most cases, property taxes are reduced in proportion to the approximate amount of the cost of the solid waste collection calculated generally for each household. For example, in the City of Portage la Prairie, property taxes for residential households were reduced approximately 3% with the introduction of their partial user-pay solid waste management system (City of Portage la Prairie, 1995). Other municipalities may choose not to reduce residential property taxes in a similar fashion, the results of which can be dangerous politically for local politicians.

- *Political Resistance* - Politicians are weary of even mentioning the concept of user-pay fearing harsh criticism from constituents who already feel over-taxed.
- *Public Resistance to change (the Psychology of Change)* - Sometimes the public resists change for reasons which may only be described as anti-change or pro-status quo.
- *Social Inequities* - The idea of “fairness” for the elderly, low income families, large families, etc. is a key indicator of support or opposition for user-pay (Kelman, 1981, p. 84).
- *Illegal Dumping* - Fears of illegal dumping of solid waste in remote areas or in commercial dumpsters usually becomes a contentious issue. However, most case studies have indicated that illegal dumping, although a serious concern for residents prior to implementation, became a non-issue soon after a user-pay system is in place (Gale, 1996). For example, in a survey of ten Illinois communities with user-pay, illegal dumping was not found to be a major problem nor a major impediment to a volume-based user-pay system (Becker and Browning, 1991). Lisa Skumatz indicates that the issue of illegal dumping exists before user-pay systems are in place, as well as after and the composition of most illegally dumped waste is not household waste (Recycling Council of Ontario, 1994). However, it should be noted that it is extremely difficult to substantiate, quantifiably or qualitatively, any amount of illegally discarded solid waste that is a direct result of the imposition of user-fees.
- *Multi-Family Dwellings* - One of the most significant problems to date involving implementing user-pay systems in larger urban centres revolves around the question of how to tackle problems associated with multi-unit dwellings. Multi-unit dwellings present a problem because most buildings of this type use communal bins to collect household waste. How could you enforce a user-pay system under a communal collection system? Some municipalities quantify the amount of waste discarded in the communal bin and therefore charge the building owner based upon those figures. It is then up to the building owner to provide 3R’s services to their tenants.

Geoff Rathbone, Vice President Market and Technical Development with the Corporations Supporting Recycling (formerly the Ontario Multi-Material Recycling Institute), has worked to develop technology to address this problem. Although in the infant stages of development, the system uses an electronic keypad stationed on each floor of an apartment complex beside the regular garbage disposal chute. The apartment resident simply selects the appropriately marked key from the keypad which indicates the material to be discarded (usually fibres, containers or garbage). A valve at the base of the chute directs the material into the appropriate receptacle for recycling or disposal. Although this system is first being developed to introduce recycling to multi-unit dwellings, it could eventually be refined to the point of accepting waste and recyclables on a user-fee basis. Mr. Rathbone, indicates that the notion of a debit or smart-card system could be easily adapted into the system which would automatically debit a pre-authorized account for any fees incurred (Rathbone, 1998).

- *Increase in Administration Cost* - User-pay can increase the amount of administrative responsibilities for the municipality with the potential increases coming in the form of increased staffing, billing and operational costs. The amount of administration required depends on the type of system implemented. However, higher administrative costs are more than offset by lower overall waste management costs.

In summary it is not perfect and it is not meant to be a stand alone strategy, but there can be some exceptional benefits in adopting user-pay as a waste management strategy. As many Canadian municipalities are noticing, user-pay coupled with other behaviour modification strategies, can be an effective environmental and economic waste management instrument.

3.12 WHAT PRICE IS THE MOST APPROPRIATE PRICE?

To simply decide to implement a user-pay waste management system is only a small portion of what can make up a combination of components that together can form a

successful user-pay system. Bird and Tsiopoulos (1997) agree that governments at all levels are being forced by budgetary pressures to turn increasingly to user-charges to finance their activities. However, they add that all too often governments fail to appropriately design and implement user charges which can defeat the positive effects of any user charge policy. Similar to what Fortin and Mitchell (1990) have stated, Bird and Tsiopoulos base their convictions on efficiency.

“The main economic reason of levying user charges on the direct recipients (whether individuals or businesses) of benefits from particular public services is to make government’s use of resources more efficient. The goal of maximizing the efficiency with which governments use scarce public resources is not the whim of an ideologically driven economist. It is simply common sense: surely, any society should use its scarce public resources in a manner that will provide its people with as large a bundle as possible of services that they want, and that is all that is meant by efficient resource use. Efficiency in this sense is an especially important objective in times of budgetary stringency” (Bird and Tsiopoulos, 1997, p. 29).

In the current fiscal environment in which governments are looking for funds wherever they can find them, it has become important to ensure that the *right* prices are being charged for the *right* services. Fair enough. However, how do you establish a price in a market dominated in some municipalities by a public monopoly? This is not an easy question to answer. First off, the costs of many public sector activities are very difficult to define properly. This is true for most public sector activities, however, solid waste management costs are among the easiest to define compared to other public expenditures. Second, even when it is possible to define the costs, it is often difficult or impossible to estimate them in the quantitative terms needed to determine appropriate user charges

(Bos, 1985). Therefore, Bird and Tsiopoulos suggest that the determination of user charges should take into account the cost of changing public prices once they have been set. The prices set by any public agency will be the outcome of a political and administrative process rather than a pure “market” or economic process. User fees are therefore a political institution, and like most political institutions they are very hard to change. It is most important, therefore, to set the initial user-fee price as closely as possible to the most economically efficient price. Additionally, since user-fees are inherently political, the importance of instituting a public consultation process with the public is critical (Bird and Tsiopoulos, 1997, p. 84).

4. CASE STUDY: CITY OF PORTAGE LA PRAIRIE'S USER-PAY EXPERIENCE

The purpose of the case study is to identify the critical variables affecting solid waste management costs in Portage la Prairie, and how user price-preference may play a role in addressing those critical cost variables. One assumption that should be noted is the primarily economic focus of the case study. Environmental and/or conservation behavior sensitivity to different price preferences have been purposely not addressed due to the size and scope of this study. However, general guidelines for possible expected solid waste diversion rates will be provided within the chapter.

Portage la Prairie is the third largest urban centre in Manitoba with a population of over 13,000 people. Located approximately 100km west of the city of Winnipeg, the city of Portage la Prairie adopted a partial user-pay system in 1995 - the first such program for an urban centre of its size in the province of Manitoba. Residents of the city were involved in various public consultation sessions in which the partial user-pay program was the solid waste management system determined as most suitable.

The City of Portage la Prairie incorporates a partial user-pay program in which residents are permitted to dispose of two bags of waste without additional fees. The cost of collecting and disposing these two bags is paid for via residential property taxes. If the household has more than two bags, it may purchase an appropriate bag tag sold at local stores and at City Hall, for an additional charge (\$0.75). The tags are then affixed to the extra bags and taken to the curb on collection day. Tags are sold to area retailers at \$0.65

which are then sold to residents for \$0.75 providing retailers with a \$0.10 profit per tag sold. Recyclable material is not charged any extra fees as an effort to encourage residents to recycle as much material as possible.

The City of Portage la Prairie operates one landfill located approximately 30 kilometers northeast of the city in the Rural Municipality (RM) of Portage la Prairie. In addition to serving the City of Portage la Prairie, the landfill also serves the disposal needs of many of the RM's in the Portage area and is a typical example of the regionalization of landfills that has also happened in many other areas of the province of Manitoba, and western Canada. Prior to the opening of the regional landfill the City of Portage la Prairie and the other RM's were responsible for operating their own disposal sites.

As mentioned previously, it is important for any successful user-pay program to have a waste reduction program in place during, but most importantly, established prior to implementing the user-pay program. The City of Portage la Prairie has in place a number of waste reduction initiatives including a green box recycling program, recyclable depot drop-off centres, Christmas tree wood chipping program, centralized composting facility and residential backyard composting program.

Prior to the establishment of the user-pay system in 1995, the City of Portage la Prairie financed its solid waste management system exclusively through a property tax funding model. The impetus to rethink the way that solid waste was managed in Portage la Prairie came about primarily due to the establishment of increased environmental standards set by the Provincial government (Braden, 1998).

4.1 PORTAGE LA PRAIRIE'S SOLID WASTE COST STRUCTURE

Virtually all Canadian municipalities incur costs in providing waste management services to their residents. The Federation of Canadian Municipalities (FCM) suggests that it typically costs \$100 to \$150 per year to provide a single-family household with collection of garbage, recyclables and organic materials (Federation of Canadian Municipalities, 1996). Table 3 shows the typical costs associated with the management of different materials with the waste stream according to the FCM. Additionally, corresponding solid waste management costs are provided for the City of Portage la Prairie as a comparison.

Table 3. Typical Municipal Residential Solid Waste Management Costs

Cost Component	Cost Range (\$ per tonne*)	Typical Cost (\$ per tonne*)	City of Portage la Prairie Cost (\$ per tonne**)
Garbage Collection	\$30-70	\$40	\$55
Transfer (Solid Waste)	\$0-\$20		
Disposal (Solid Waste)	\$0-\$100	\$30-\$50	\$48
Recyclables Collection/Processing	Up to \$150		\$123***
Recyclables Revenues	\$50-150		
Net Cost of Recycling	\$0-\$100		
Leaf/Yard Waste Collection	\$50-\$80		
Leaf/Yard Waste Composting	\$30-\$50		
Backyard Composting	\$65		

*Source: Federation of Canadian Municipalities, 1996.

**Source: City of Portage la Prairie Waste Matters Program and Operations Department Revenue/Expenditures Data 1997.

***Value does not include MPSC support payments.

The present study is being used to analyze the costing structure with respect to the most critical variables associated with the operation of a municipal solid waste management system - the system in place in Portage la Prairie, Manitoba. In concert with the critical variable structure will be the methodology and results of a survey presented to and

completed by residents of Portage la Prairie regarding their preference to solid waste pricing within a user-pay system. The influence of examining user price-preference is that the revenues collected from a user-pay system are an integral component of a solid waste management systems revenue base and therefore should not be overlooked. Many municipalities are considering, or have already moved to, the notion of providing solid waste services based upon a utility model (i.e. similar to that of municipal water services for example). Therefore, the price component of the user-pay tool, is crucial to the success of a user-pay system and hence worthy of a case study such as this.

Under the City's current solid waste and recyclable materials contract, which is due to expire in 1998, solid waste and recyclable material collection is contracted to private collection firms. Laidlaw is contracted to handle the residential solid waste, while Browning-Ferris Industries (BFI) is contracted to handle the recyclables. Solid waste is transported to the landfill site north of the city in the RM of Portage la Prairie, while recyclable material is processed at the Portage and District Recycling centre in the city. Due to the structure of the contract, all revenues from the sale of the processed recyclable material are remitted to BFI. Additionally, there are no fees charged for the processing of recyclable materials for the term of the contract.

From the City of Portage la Prairie's Operations Department Statement of Revenue and Expenditure (see Table 4), the critical cost variables for solid waste costing are solid waste collection (garbage contract), operation of the disposal site (landfill contract), and expenditure obligations negotiated under the contract (i.e. recyclable material collection). Kelly Braden, City of Portage la Prairie Operations Manager, anticipates that under the

tentative new contract that is already under negotiation, recyclable material collection, which has been previously provided for zero cost, will have an approximate cost of \$30,000 annually. However, the additional expenditures under the new contract could potentially add a significant cost to solid waste services in Portage la Prairie (Braden, 1998).

Table 4. City of Portage la Prairie Operations Department Statement of Revenue and Expenditure

Revenue	Actual for the 12 Months Ended Dec.31, 1997 (\$)	Budgeted for the 12 Months Ended Dec.31, 1998 (\$)
Garbage Fees	112,449	102,000
Waste Collection Tags	10,977	12,000
MPSC Grants	51,458	50,000
Used Tire Man. Program	1,648	4,000
Apartment Collection Fees	10,253	7,000
Total Revenues	186,784	175,000
Expenditures		
Garbage Contract	144,477	154,000
Recycling - Processing	0	30,000
Recycling - Collection	43,523	48,600
Composting	6,650	13,200
Promotion/Education	5,036	3,500
Salaries	2,686	3,300
Salaries - Temporary	322	1,600
Landfill Contract	127,933	128,000
RM Tipping Fee Rebate	14,000	14,000
Pool Truck Rental	1,672	1,100
Forestry - Burnsite	0	20,000
Tire Disposal	0	2,000
Materials - Nuisance Grounds	6,027	9,200
Total Expenditures	352,326	428,500
Subtotal	(165,542)	(253,500)

Source: City of Portage la Prairie, 1998.

4.2 USER PRICE-PREFERENCE FOR SOLID WASTE SERVICES

The remainder of this chapter will deal with the issue of residential price-preference for solid waste services. Background information will be provided regarding the willingness-to-pay for environmental quality, site selection criteria as well as the survey methodology used and survey results. For the purpose of this chapter, price-preference will be defined as a waste collection tag or bag-tag price threshold by which residents would significantly change their disposal habits under Portage la Prairie's current partial user-pay solid waste system, or within a possible full user-pay type scenario.

4.3 WILLINGNESS-TO-PAY FOR ENVIRONMENTAL QUALITY

The willingness-to-pay for environmental quality is derived from an analysis of how many dollars one is willing to pay for an improvement in environmental quality. By asking the willingness to pay for varying levels of environmental quality, one can establish the relationship between the environmental quality wanted and the individual's willingness to pay (Siebert, 1987). Willingness to pay for environmental quality has direct parallels to willingness to pay for user-pay solid waste services, as both deal with similar multiple factors affecting the relationship between an individual's willingness to pay and the effectiveness of an environmental service, like user-pay solid waste services. Seibert explains that the willingness to pay depends on a set of factors such as, "[an individual's] attitude towards society, the level of applicable information available, spatial extent of the public good, frequency of use, and income" (Seibert, 1987, p. 71). Siebert argues that the example of the level of information about the effects of environmental information plays an essential role and therefore, "an individual who is better informed about environmental

damages...has a higher willingness to pay” (ibid). This theory has important implications for solid waste planning in that any planning process must involve the residents affected by any proposed plan in order for that plan to have a greater chance of being successful.

The willingness to pay also depends on the type of use and the intensity of needs. People living within close proximity of a large landfill might be willing to pay more than most people for the diversion and/or reduction in the amount of solid waste material directed to that landfill. One of the most significant factors which influences the willingness to pay for environmental quality and thus solid waste services, is the method by which the environmental supply is financed. This could consider for example, whether the environmental policy, program or service is financed by way of general tax revenue or according to the individual’s willingness-to-pay statement.

4.4 SITE SELECTION

For the purposes of this study, it was important to select an urban centre that reflected the objective of the project. Since the objective of the study was to establish the critical municipal solid waste management system cost components and how user price-preference may play a role in addressing those critical cost variables, there were three site selection criteria: it should be a place that had adopted a user-pay program; second, this program should have been in place for a period of time; and third, it should be a small to medium-sized urban area. The city of Portage la Prairie, Manitoba fulfills all three criteria.

Selecting a small-to-medium sized urban centre was considered an important criterion because majority of user-pay solid waste programs are implemented in similarly sized

urban areas, therefore corresponding information was *easier* to find. From a Canadian perspective, there have been no user-pay systems initiated in any large metropolitan cities, similarly the United States has only one large urban centre, Seattle, Washington, with user-pay. Many large cities are contemplating user-pay, however there are many barriers at this time, including the problem of implementation with multi-family dwellings, communal bins, etc. This type of study conducted on a larger urban setting could be considered a possible avenue for a future thesis or practicum project.

4.5 METHODOLOGY OF SURVEY FOR PORTAGE LA PRAIRIE RESIDENTS

In order to gather information on residential perspectives on price sensitivity and solid waste services within the city of Portage la Prairie, 400 surveys were randomly distributed in December, 1997 to single-family households. The objective of the survey (Appendix 1) was to provide a method of collecting data in a purely random fashion regarding consumer choice in municipal planning, focusing specifically on the City of Portage la Prairie's user-pay solid waste management system. The survey package was composed of a brief, one page introductory statement outlining the objectives of the study, as well as a contact name and phone number for further questions; three page survey; and a stamped, self-addressed envelope for returning the surveys once completed by the resident. Delivery of the survey packages was via Canada Post regular class mail service.

In order to achieve random distribution of survey packages to single family residences, distribution was based upon postal codes found within the 12 polling districts in the city. Within each polling district, using the most recent electors roll available (1995) , 33 addresses from single family households were randomly chosen which brought the total

number of individual survey destinations to 396. The remaining 4 households were chosen at random from the 12 polling districts. Once the addresses had been registered, postal codes were referenced via Manitoba Telecom Service's (MTS) South Central 1996 White and Yellow Pages Directory.

The data collected was based upon a series of open and closed-ended survey questions. Data collected ranged from establishing basic disposal and recycling patterns to collecting price preferences and opinions on the basic foundations of the user-pay concept. Demographic information collected was limited to household size due to the survey size and scope of the study. Basic demographic information correlated to solid waste strategies has been provided in 2.5.

The survey was designed by the author under the supervision of this study's advisor and reviewed by the University of Manitoba, Faculty of Architecture's Ethics Committee.

4.6 RESULTS OF SURVEY

Of the 400 randomly mailed-out surveys, 40 were returned due to a change in the resident's address, the resident has moved or other miscellaneous event. Therefore, of the remaining 360 surveys, 110 were completed by the residents and returned for analysis (a 31% return rate). Only results dealing with price-preference will be provided in the text of this chapter. For a summary of results from the entire survey, please see Appendix 2.

4.6.1 PRICE PREFERENCE: PARTIAL USER-PAY SCENARIO

In order to obtain data pertaining to residential price preference with a partial user-pay system, a simple scenario was created. The objective of the scenario was to provide

respondents the opportunity to respond based upon the criteria posed within the scenario itself. The scenario read as follows:

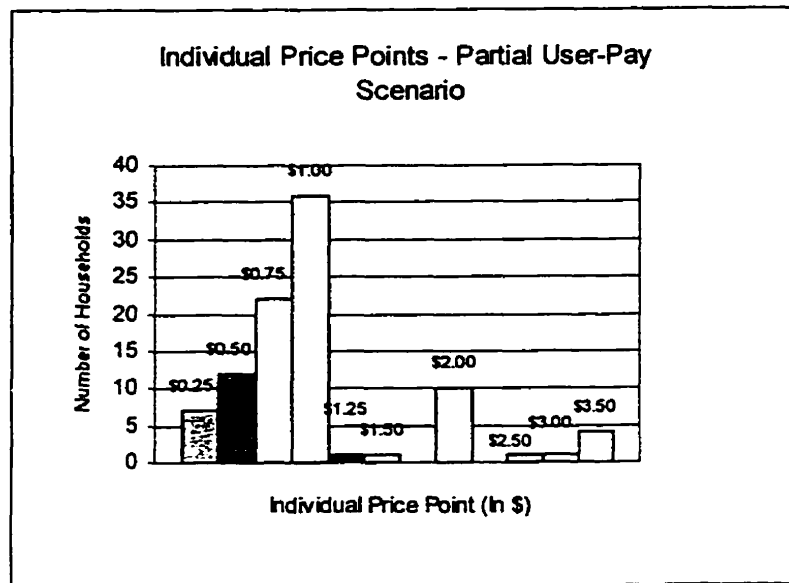
Assume you are a resident within a city which provides garbage pickup based upon a partial user-pay system. In this system each household may dispose of *two* bags of waste per week and as many recyclable materials in a green box without a user-fee. However, to dispose of any additional bags a fee will be charged. At what price point (per bag) would you drastically change your waste disposal habits? Circle your answer.

\$0.25 \$0.50 \$0.75 \$1.00 \$1.25 \$1.50 \$1.75
\$2.00 \$2.25 \$2.50 \$3.00 \$3.50

This type of solid waste management scenario is exactly what the City of Portage la Prairie has in place for its residents. Interestingly enough, of the 95 who answered the question, 38% (36 households) of respondents indicated that they would be willing to pay \$1.00 per bag of solid waste disposed over and above the two bag limit in place. This is in contrast to the \$0.75 residents currently pay for additional bags of solid waste. Figure 1 provides a breakdown of respondents price-preference under a partial user-pay scenario.

From the survey, 23% (22 households) of respondents indicated that they were willing to pay the current rate of \$0.75. However, when the price points are grouped together and analyzed an interesting result was discovered. When responses from people who indicated that their optimum price point was at the current price (\$0.75) or below were grouped, 43% were in this group. This is almost identical to the respondents who indicated that a price prices between \$1.00 and \$1.50 would be optimum at 40%.

Figure 1. Individual Price Points for a Potential Partial User-Pay System



Interestingly, 11% of respondents indicated that they would be willing to pay \$2.00 per bag - the fourth highest rated price point of the twelve price points to select from and over twice the current rate.

4.6.2 PRICE PREFERENCE: FULL USER-PAY SCENARIO

In a similar fashion to the partial user-pay scenario, residents were asked to provide a price point that they were willing to pay under a full user-pay waste management system. Figure 2 presents a summary of the data collected from 87 respondents to the full user-pay scenario. There was a similar response to the price points presented in the full user-pay scenario as compared to the partial user-pay, however with one major difference. In the full user-pay scenario, by far the most heavily favoured price point was the \$1.00 point with 29% (25 households) of respondents choosing that price. However, the second most preferred price was \$0.25 (21%), followed closely by \$0.50 (18%) and 16% indicating

\$0.75 as the optimum price. Over half (55%) of the respondents selected price points that were under \$1.00 per bag.

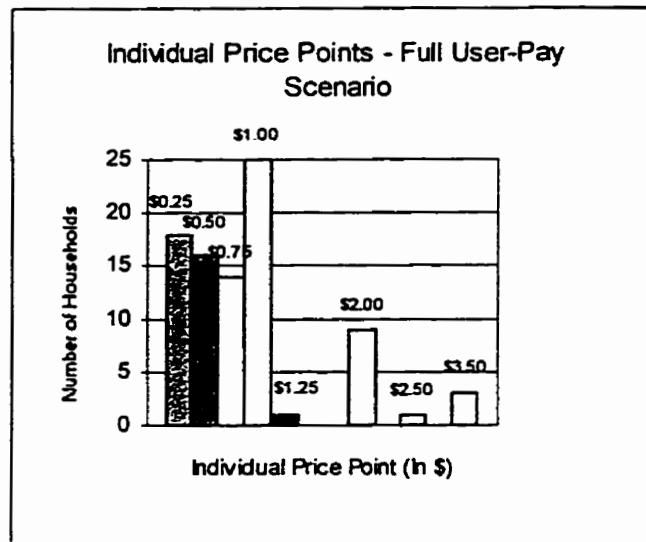
4.7 POTENTIAL IMPACT OF SURVEY RESULTS

From the price preference information provided by residents responding to the survey, a basic model was created comparing potential price point data and Portage la Prairie's solid waste system financial data based upon 1997 figures. The purpose of the model was to determine the potential economic impact on the City's solid waste balance sheet as a result of residential price preference.

Assumptions were made based upon the potential impact of a change in price for waste collection tags - nothing else. The potential increase in waste collection tag price and a change in the solid waste management system (full or partial user-pay) can alter variables throughout the entire model. An increase in the price for waste collection tags may persuade some residents to reduce their waste load, which may increase recyclable material collected and processed, which may alter Manitoba Product Stewardship Corporation support payments, which, in turn, may reduce collection costs, which may reduce disposal costs, etc. The assumption is made that under a partial user-pay system the number of tags sold would remain relatively constant given a slight price increase in tags. Additionally, the assumption is made that under a full user-pay system the average household would dispose of a given amount (a conservative estimate of 1.5 bags) of solid waste per week (see Scenario 3 for more details on full user-pay assumptions). The model depicted four scenarios as a result of the information provided via the survey. The first scenario was one created

on the actual financial information and solid waste service components for the City's solid waste system for 1997 - the purpose being that the base scenario is a benchmark by which the other three scenarios might be compared. The second scenario was based upon a partial user-pay system by which additional bags of solid waste are charged \$1.00. The third scenario was based upon a full user-pay system with a \$0.50 charge per bag, and finally, the fourth scenario was based

Figure 2. Individual Price Points for a Potential Full User-Pay System

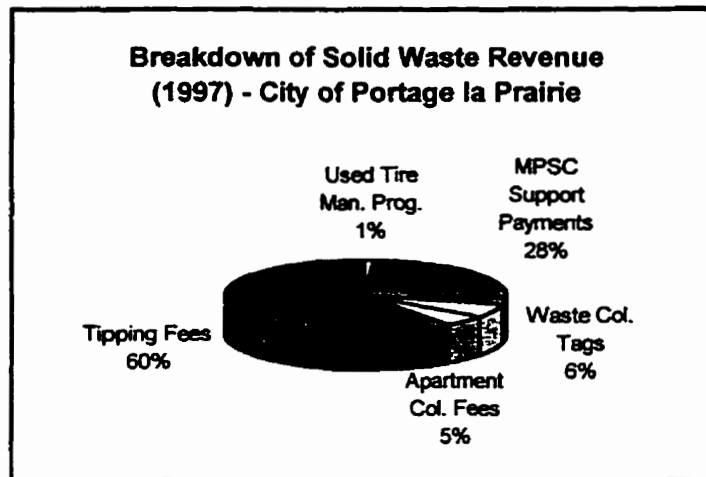


upon a full user-pay system with a \$1.00 charge per bag. The following will expand briefly on the impact of price preference on each scenario.

4.7.1 SCENARIO 1: BASE SCENARIO

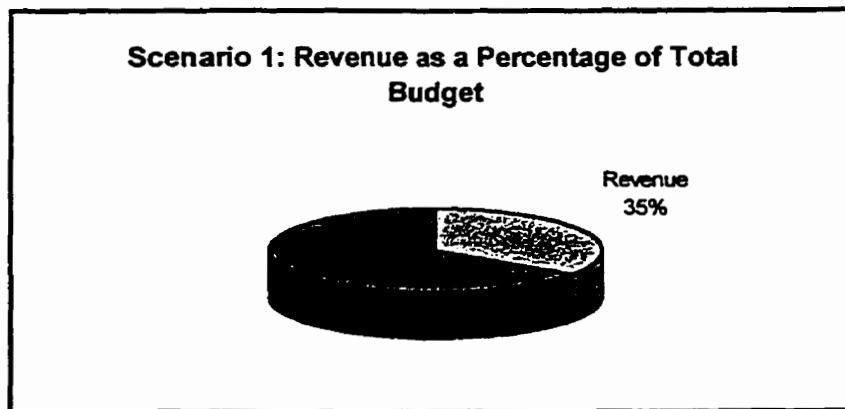
Under the current funding mechanisms, Portage la Prairie's solid waste service revenues come chiefly from tipping fees and MPSC support payments. Only 6% of revenues are provided by waste collection tags (bag tags). Figure 3 provides graphic representation of solid waste revenues in Portage la Prairie in 1997.

Figure 3. Breakdown of Solid Waste Revenue



Under the partial user-pay model charging a net charge of \$0.65 (sold by retailers for \$0.75) per waste collection tag, and a total of 16,888 (Braden, 1998) tags sold, there was a total net shortfall of \$165,541 by comparing expenses to revenues for the entire solid waste system in 1997. Figure 4 presents the proportion of total budget that would be covered by these revenues.

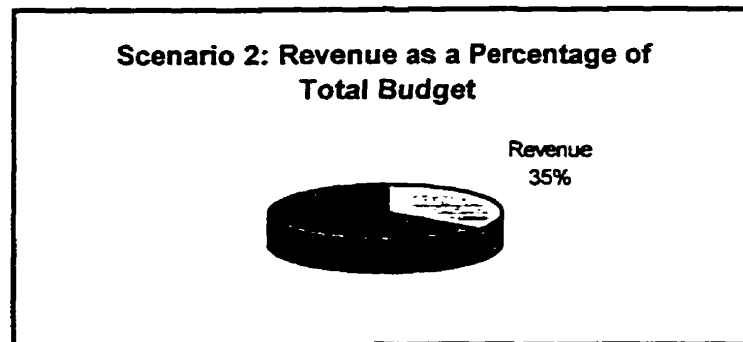
Figure 4. Revenue as a Percentage of the Solid Waste Service Budget: Scenario 1



4.7.2 SCENARIO 2: PARTIAL USER-PAY \$1.00 PRICE POINT

Using the base scenario as a comparison and using the value of 16,888 tags sold, a partial user-pay system using the \$1.00 price point would increase revenue by approximately \$5911.00. Keeping the same values for system expenses and revenues, except for the price of the waste collection tags, the data shows a slight increase in revenue. This is assuming that the same amount of tags were sold as compared to the base scenario at \$0.65 per tag. The figure of 16,888 tags might be artificially high when using as a comparison for a user-pay system with a \$1.00 charge due to the fact that residents may change their disposal habits enough to reduce the need for tags slightly. However, the scenarios are based upon the data provided by residents as to their optimum price points. Figure 5 indicates the percentage of revenue for Scenario 2.

Figure 5. Revenue as a Percentage of the Solid Waste Service Budget: Scenario 2



Within the parameters provided in Scenario 2 it could be estimated that residential solid waste disposal behaviour may shift which could result in solid waste disposal being reduced by 15% to 20% (Resource Conservation Manitoba, 1997).

4.7.3 SCENARIO 3: FULL USER-PAY AT \$0.50 PRICE POINT

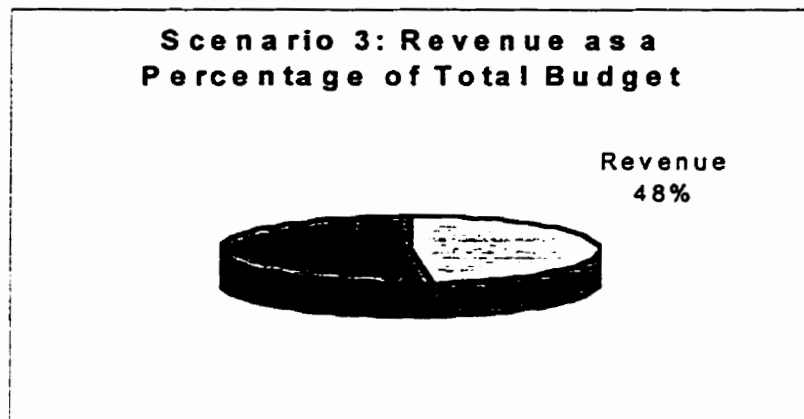
Since a full user-pay system is not the current system implemented in Portage la Prairie, a number of assumptions had to be established. First, the number of potential waste collection tags had to be established. It was assumed that since revenues from waste collection tags were obtained from single and two-family (semi-detached) homes, the number of collection tags potentially sold would be in relation to the number of households found within those housing options. Therefore, according to Statistics Canada 1991 data, there were 3635 single family homes and 115 semi-detached dwellings in Portage la Prairie in 1991 (the most recent data available). Therefore, a total of 3865 single family units (3635 single family homes plus 115 semi-detached dwellings with two units in each dwelling equals 3865 units) would be potentially purchasing tags.

With respect to the number of bags disposed per household, a number of 1.5 bags of solid waste disposed per week was calculated using the data collected from the survey (see Appendix 2) and was considered a very conservative estimate of weekly residential solid waste disposal activity. Frequency of pick-up was calculated using the City of Portage la Prairie's Solid Waste By-Law which states, "...all dwelling units shall receive collection fifty times per year" (City of Portage la Prairie, 1998). Therefore, within this scenario, an approximate total of 289,875 tags could be sold.

Potentially, under a full user-pay system charging \$0.50 per bag, total solid waste management system expenditures would exceed revenues by \$22,955.50. This is a marked decrease in total system deficit as compared to both Scenario 1 (deficit of

\$165,541) and 2 (deficit of \$159,630). The percentage of revenue for Scenario 3 is summarized in Figure 6.

Figure 6. Revenue as a Percentage of the Solid Waste Service Budget: Scenario 3

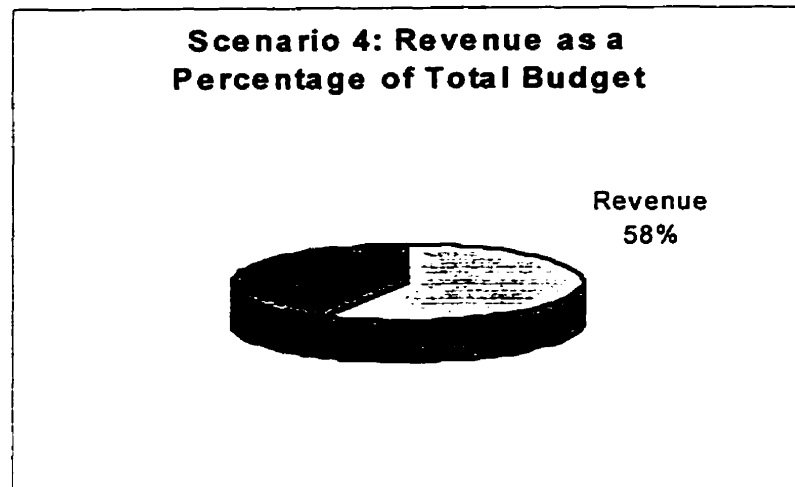


Within the parameters provided in Scenario 3 it could be estimated that residential solid waste disposal behaviour may shift which could result in solid waste disposal being reduced by 30 to 40% (Resource Conservation Manitoba, 1997).

4.7.4 SCENARIO 4: FULL USER-PAY AT \$1.00 PRICE POINT

The potential revenue increase in establishing a full user-pay system and charging \$1.00 per waste collection tag would be substantial. Scenario 4's depiction of this type of system is the only one in which revenues exceed expenditures and could be considered the only self-sufficient system (sufficient based upon its non-reliance on property taxes for financing). Based upon the assumptions already stated, Scenario 4 would have revenues exceeding expenditures (in other words a surplus) by \$130,607. Figure 7 represents the percentage of revenue for Scenario 4.

Figure 7. Revenue as a Percentage of the Solid Waste Service Budget: Scenario 4

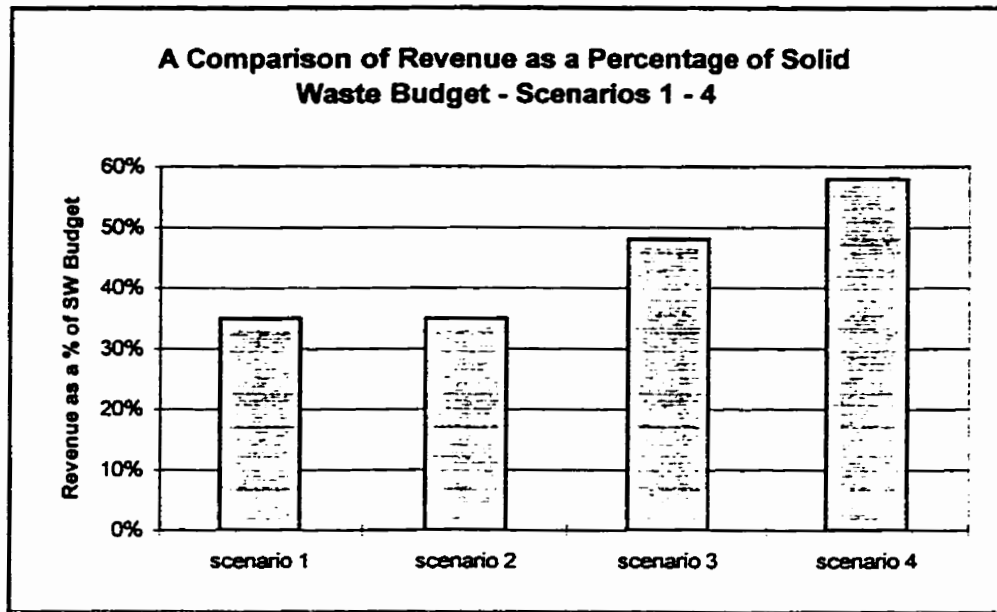


From the information provided in Scenario 4, additional revenues collected via user fees may be directed to a number of waste management options. One option may include funding supplementary environmental and conservation behaviour strategies which may complement the user-pay system. Additionally, it could be estimated that residential solid waste disposal behaviour may shift which could result in solid waste disposal being reduced by 30 to 40% (Resource Conservation Manitoba, 1997)

4.8 CHAPTER SUMMARY

Chapter four has provided an outline for a survey conducted on price preference for a random sampling of households in Portage la Prairie. From the user-pay price information provided in the survey responses, user-pay funding scenarios were developed with varying degrees of revenue derived from user-fees. Figure 8 provides a comparison of the Scenarios with respect to the proportion of revenue as a percentage of the potential solid waste budget.

Figure 8. A Comparison of Revenue as a Percentage of Solid Waste Budget



5. CONCLUSION: IMPLICATIONS OF PORTAGE LA PRAIRIE'S USER-PAY EXPERIENCE FOR MUNICIPALITIES OF SIMILAR SIZE

The user-pay concept is a penalty behavioural strategy that has been demonstrated to be an effective and efficient tool to reduce residential solid waste disposal. A well planned user-pay strategy in concert with a potent pre-implementation planning and communications framework can be an powerful incentive for some communities to reduce residential waste generation. Municipal solid waste planners and administrators must access all tools in their collective tool boxes in order to meet stringent provincial environmental standards for solid waste reduction. The user-pay concept and environmental and conservation behavioural intervention mechanisms offer a number of effective, proven tools which may help the cause.

What does all this mean for Portage la Prairie? The research and case study show that the City is more than on track with its solid waste management policy. From an economic standpoint, the user-pay program is a step in the right direction in terms of moving from a system funded by those with the ability to pay, to a system financed by those who are responsible to pay for incurring the costs. Although the current system is by no means economically self-supporting, it is one that offers considerable potential for economic sustainability. Movement from a solid waste management system financed by property taxes to one partially funded by user-fees is one incremental step along an evolving servicing pathway. The establishment of a hybrid system combining user-fees with waste management utility fees could be one way of moving toward a more economically

sustainable system. However, it is of great importance that any solid waste management system be developed using planning initiatives which encompass and reflect the community at large. No solid waste planning programs should be developed in a vacuum, for this will only create headaches for everyone involved.

How do these findings compare to other communities? Since Portage la Prairie is the only community of its size with a user-pay system in place, it is difficult to evaluate precisely how economically sustainable the program is. However, one important finding that has been determined is that the critical costing variables (solid waste collection cost, disposal site operation cost and contractual obligation costs) are variables which seem to be common to other communities, based upon the literature and through interviews (Borsa, 1998).

The purpose of this case study was to identify the critical variables affecting solid waste management costs in Portage la Prairie, and how user price-preference might have played a role in addressing those critical cost variables. Too often, user-pay programs are planned with too little thought devoted to the price of waste collection tags, waste management utility fees or other price markers depending on the system of choice. It is hoped that the case study will provide insight for solid waste planners, administrators, politicians and residents interested in user-pay with a foundation for the importance in establishing the *right* price.

5.1 SUGGESTIONS FOR FURTHER RESEARCH

User-pay solid waste is an area where information is sparse - however this is changing.

There are many relevant research opportunities for individuals interested in an study that is, for the most part an undiscovered specialty. The user-pay solid waste subject is one that is growing - tremendously. More information is required on the long term economic implications of user-pay solid waste programs. Does this type of funding mechanism lead to similar initiatives in other municipal services? How does a user fee on recyclable material in addition to one on solid waste impact diversion or reduction rates?

Currently, one of the most difficult problems for solid waste planners regarding user-pay is how to develop a user-pay solid waste management system for a large metropolitan city. There are many barriers that must be overcome in order to even consider implementing a user-pay program in an urban centre with a population of 200,000 or more. With the exception of the Seattle example, research in this area appears to be non-existent.

Specific areas of research which may be useful to conduct within the Portage la Prairie context might include an evaluation exercise to determine the environmental impact of the user fee system. Evaluation is a very important component of any planning project because evaluation provides crucial feedback and therefore highlights areas to further focus efforts. Which parts of the waste stream are most impacted by user-pay? What are the largest components of the residential waste stream in Portage la Prairie and how can a future waste management system address those components? What tools can be used to divert more material from landfill? The former Township of Sydney in Ontario has identified that an evaluation exercise to identify the economic and environmental state of

their user-pay system to be an important future exercise. Any evaluation completed will be the first comprehensive evaluation of their solid waste system since 1994.

Portage la Prairie's experience with their user-pay system has, if nothing else, provided the impetus for other communities in Manitoba to rethink how they plan and manage solid waste. The City should be considered a progressive example of a community willing to address solid waste environmental issues using a program whose time has come of age.

APPENDIX 1. SURVEY



The City of Portage la Prairie

97 Saskatchewan Avenue E., Portage la Prairie, MB R1N 0L8

January 12, 1998

Dear Resident:

The City of Portage la Prairie strives to provide it's residents with the best solid waste collection services possible. We feel, and you have told us, that the provision of an environmentally responsible, economically viable, and above all, easy to use system is important to Portage la Prairie residents. Thanks to your effort we have reduced the amount of solid waste sent to landfill by 12% since August 1, 1995.

However, we are always interested in seeking your input so as to improve our services. The University of Manitoba is currently undertaking a study on municipal service provision focusing directly on solid waste services. The University is interested in gathering information from residents on how solid waste services might best be provided. The information received will be useful in discovering new directions for solid waste services in the city.

Please take a few minutes and carefully fill-out the attached questionnaire. Once completed, simply place it in the stamped return envelope and mail it back to us. It is as simple as that! The information you provide will be considered **STRICTLY CONFIDENTIAL** and will be treated with the highest discretion.

We welcome any questions or comments regarding this study. Please feel free to call Darren Mochrie at the University of Manitoba at (204) 943-8377 between 9am to 9pm. If you would like to view a copy of the completed study, it will be available at the City of Portage la Prairie's Operations Department, located at 495-11th Street N.W., upon publication. The expected publication date will be late February or early March, 1998.

We sincerely thank you for your efforts!

Kelly N. Braden P. Eng.
Director of Operations
City of Portage la Prairie

Darren Mochrie
Graduate City Planning Student
University of Manitoba

Consumer Choice in Municipal Planning - Portage La Prairie Residential Solid Waste Questionnaire

Please Note: *The following information is considered strictly confidential and will be treated as such. No persons, other than the surveyor, will have access to information contained within any completed and returned surveys.*

Logistical Information:

Number of Members in Household:

Current Street Address and Postal Code:

.....

Survey Questions:

1) On average, how many bags of garbage does your household dispose of each week?
(Circle one) 1 2 3 4 or more

2) Does your household currently use a green box to recycle suitable materials?
Yes No Sometimes

3) Circle the following response that best reflects your views regarding household solid waste services within Portage La Prairie: "I feel that my household garbage pickup and disposal..."

A) Should be provided by the City as a service and billed accordingly on my property tax bill.

B) Should be provided by the City as a service in which each household is charged directly based on the number of bags disposed each week.

C) Should be provided by the City as a service in which each household is permitted to dispose of one or two bags each week paid through municipal property taxes. Any additional bags should be subject to a user-fee.

D) Should be my choice as to hire my own private contractor to pickup my solid waste to suite my household's individual needs.

E) Other (Explain)
.....
.....
.....

4A) Do you feel the current property tax financed pick up limit of two bags of garbage per week is fair? YES NO (if not, why? Answer in space provided below.
Move to question 4B)

.....
.....
.....
.....

4B) (Answer only if you answered "No" in 4A.) Circle the limit which most closely represents the bag limit that you would like to see:

0 bags 1 bag 2 bags 3 bags 4+ bags no limit

5) Certain utilities and some municipal services are provided on the basis that each user or household is billed according to the amount of that utility or service used. You are billed for the specific amount of water used by your household, for example. Circle the utility(ies) or service(s) that you feel should be financed according to the specific amount used by an individual or household: Hydro Electricity Natural Gas

Water Garbage Pickup Municipal Sporting Facilities Libraries
Sewage Services Telephone

Other (specify).....

6) Assume you are a resident within a city which provides garbage pickup based upon a partial user-pay system. In this system each household may dispose of *two* bags of waste per week and as many recyclable materials in a green box without a user-fee. However, to dispose of any additional bags a fee will be charged. At what price point (per bag) would you drastically change your waste disposal habits? Circle your answer.

\$0.25 \$0.50 \$0.75 \$1.00 \$1.25 \$1.50 \$1.75
\$2.00 \$2.25 \$2.50 \$3.00 \$3.50

7) Assume you are a resident within a city which provides garbage pickup based upon a full user-pay system. In this system each household must pay a fee for *every* bag of waste put at the curb. Recyclable material may be disposed of without user-fees. At what price point (per bag) would you drastically change your waste disposal habits? Circle your answer.

\$0.25 \$0.50 \$0.75 \$1.00 \$1.25 \$1.50 \$1.75
\$2.00 \$2.25 \$2.50 \$3.00 \$3.50

8A) Is recycling a program that you support and are willing to pay through taxes to support it?

Yes (If yes, please answer 8B) No

8B) To what level would you be willing to pay for the collection of recyclable material? (Currently, Portage la Prairie residents pay \$0.46 per week through property taxes for collection of recyclables and solid waste.)

\$0.10 \$0.30 \$0.50 \$0.70 \$0.90 \$1.00+
\$0.20 \$0.40 \$0.60 \$0.80 \$1.00

Other (Specify)

9) The City of Portage la Prairie provides bulky item collection (up to 100 pounds) for \$0.75 per pick up. Please indicate below how you believe this service should be financed:

- A) Partial user-pay system (Both the City and residents share collection costs.)
 - B) Full user-pay system (The resident, or user, pays a fee to have bulky items collected.)
 - C) No user-pay system (Bulky items collected and financed via property taxes.)
 - D) Current system of \$0.75 per article.
 - E) Other system (please specify
-

Additional Comments?

APPENDIX 2. SUMMARY OF SURVEY RESULTS

Composite Sketch of a Typical Portage la Prairie Household's Solid

Waste Disposal Habits and Attitudes

- Household Size: 2.3 people
- Disposal Quantity (per household): 1.5 bags per week
- Recycling Habits: Uses green recycle box
- Agrees with and/or prefers the partial user-pay concept
- Agrees that the current property tax financed pick up of 2 bags of solid waste per week is fair.
- Under a partial user-pay system, which is currently in place, majority of residents would agree to a \$1.00 charge for each bag above the 2 bag limit (currently paying \$.75 per additional bag).
- Under a full user-pay system majority of residents would agree to a \$1.00 charge for each bag of solid waste placed at the curb of each household.
- Most residents agree that recycling is a program worth supporting and financing through taxes (majority of whom are willing to pay \$.50 per week.)
- Believe that bulky item collection should remain the same at \$.75 per item.

Household Size Vs. Solid Waste Disposal Quantity

Household Size	Typical # of Bags Disposed
5	Between 1 to 3 bags
4	2
3	2
2	1
1	1

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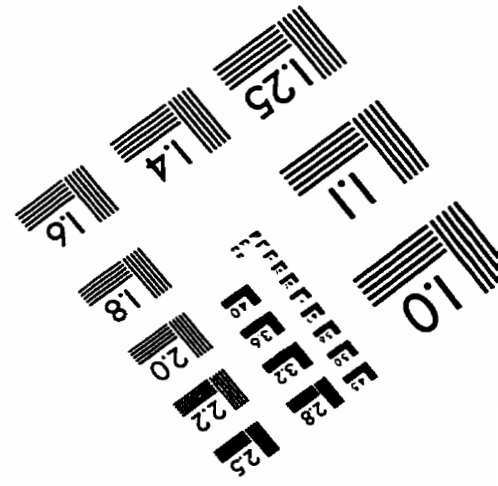
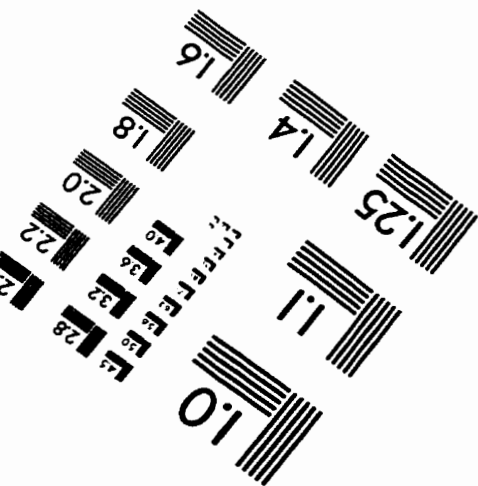
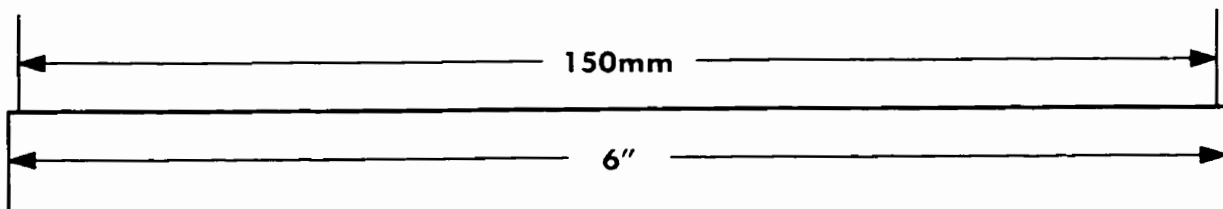
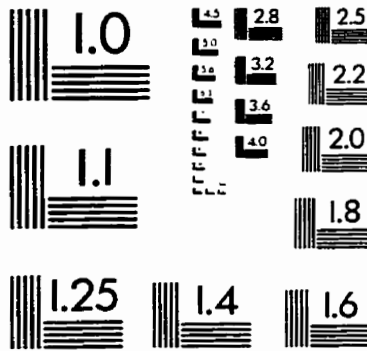
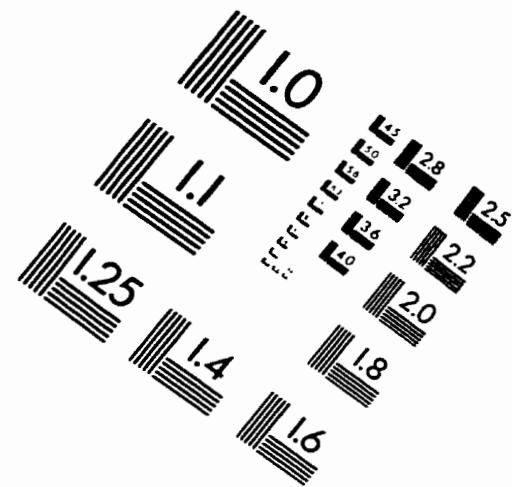
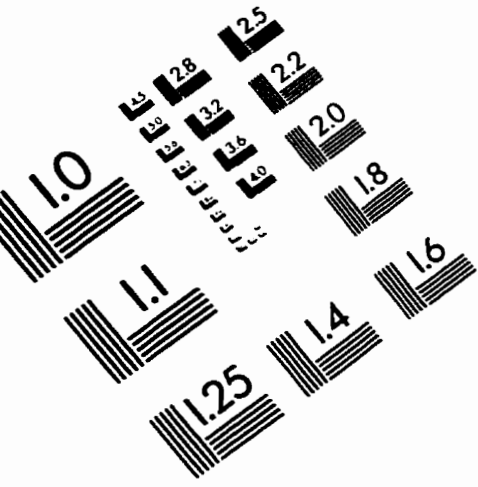
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IMAGE EVALUATION TEST TARGET (QA-3)



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