Municipal Solid Waste Reclamation Trends: A Local and National Perspective

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BLUEGREEN ALLIANCE

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Executive Summary

With an emphasis on greening our society, there is little doubt that the growth of the waste reclamation industry will be a significant component of moving toward a sustainable future. The waste reclamation industry already accounts for employing 1.1 million people nationally and generating $236 billion in revenues annually. In Minnesota, there are nearly 28,600 jobs in waste reclamation paying an estimated $1.19 billion in wages. There are a number of trends, both nationally and locally, that are driving the waste reclamation industry and that will almost certainly continue creating jobs and generating revenues around the country and here in Minnesota.

In Minnesota, adjusting for population growth, municipal solid waste (MSW) generation has been relatively stable since 2000. However, recycling rates have also hit a plateau (approximately 49percent or 41percent if you don't count the 3percent source reduction credit and the 5percent yard waste composting credit} and in some cases have decreased. New recycling goals established by the state call for a 50percent recycling goal by 2011 increasing to 60percent by 2025, and a 10percent composting goal by 2012 increasing to 15percent by 2025. As the Minneapolis/St. Paul Metropolitan Area (Metro Area) forges ahead to meet these goals and increase recovery and recycling rates, it has become one of the trend setters in this regard.

The existing solid waste and recycling infrastructure serving the Metro Area is quite comprehensive in its nature and involves a combination of public sector, private sector and public/private partnership initiatives. In the Metro Area, the Solid Waste Management Coordinating Board (SWMCB), whose membership includes six of the seven Metro Counties, establishes much of the overall solid waste management policy for the area but still provides a considerable amount of autonomy to the counties themselves for developing and implementing programs.

The national and local recycling trends can be categorized into five broad groups:

- Improving residential curbside collection efficiency;
- Increasing the amount of targeted materials collected;
- Stabilizing and growing recyclable commodity markets,
- Digging deeper into waste stream for diversion by targeting organics recovery/composting; and
- Implementing product stewardship programs for certain waste streams generated by consumers. The product stewardship programs getting the most attention are for:
    - Electronics (e-waste);
    - Paint;
    - Beverage container deposit programs; and
    - Pharmaceuticals.

Minnesota is actively engaged in all these trends and is considered a leader when it comes to diverting organics from the waste stream for composting, e-waste product stewardship initiatives, and paint product stewardship initiatives. These trends will continue to develop nationally as well as in Minnesota and should pose further economic opportunities for job creation revenue generation. Those trends that are the most likely to have the biggest impact on the Minnesota economy include the creation and growth of new recycling markets, the growing organics recovery and composting industry, and product stewardship programs developing around e-waste, paint, and pharmaceuticals.

I. INTRODUCTION

The U.S. recycling industry has become a significant contributor to our nation's economy responsible for employing over 1.1 million people and generating approximately $236 billion in revenues annually. This is also true of Minnesota. According to a study prepared by the Minnesota Office of Environmental Assistance (now the Minnesota Pollution Control Agency)[1], in 2000 the recycling industry accounted for an estimated 28,600 direct, indirect and induced jobs paying an estimated $1.19 billion in wages.

With an emphasis on greening our society, there is little doubt that the growth of the waste reclamation industry will be a significant component of moving toward a sustainable future. This report, prepared for the Blue Green Alliance in support of a Twin Cities-based green manufacturing initiative, summarizes the municipal solid waste and recycling system serving the Minneapolis/St. Paul Metropolitan Area and discusses the trends, both locally and nationally, that are driving the waste reclamation industry. The remainder of this section addresses municipal solid waste (MSW) generation and composition in the Twin Cities metro area.

A. MUNICIPAL SOLID WASTE GENERATION

The first order of business is to define the term MSW or what's referred to by Minnesota statute as mixed municipal solid waste (MMSW). Minnesota Statute 115A.03, Subd. 21 defines mixed municipal solid waste as:

> "…garbage, refuse, and other solid waste from residential, commercial, industrial, and community activities that the generator of the waste aggregates for collection….mixed municipal solid waste does not include auto hulks, street sweepings, ash, construction debris, mining waste, sludges, tree and agricultural wastes, tires, lead acid batteries, motor and vehicle fluids and filters, and other materials collected, processed and disposed of as separate waste streams."

According to the 2007 Solid Waste Policy Report[2], a total of 6,100,748 tons of MSW was generated in Minnesota in 2006. This is a slight increase over 2005, and adjusted for an increase in population represents a per capita generation rate of 1.166 tons annually. MSW generation has increased every year since 1991, although since 2002 it has been increasing at a slower rate.

Here in the Minneapolis/St. Paul Metropolitan Area (Metro Area), the Solid Waste Management Coordinating Board (SWMCB) loosely oversees the regional solid waste management system. The SWMCB is a joint powers board whose members include six of the seven metro area counties – Anoka, Carver, Dakota, Hennepin, Ramsey and Washington. SWMCB is discussed further in the Section II, which provides an overview of the existing Metro Area solid waste management system.

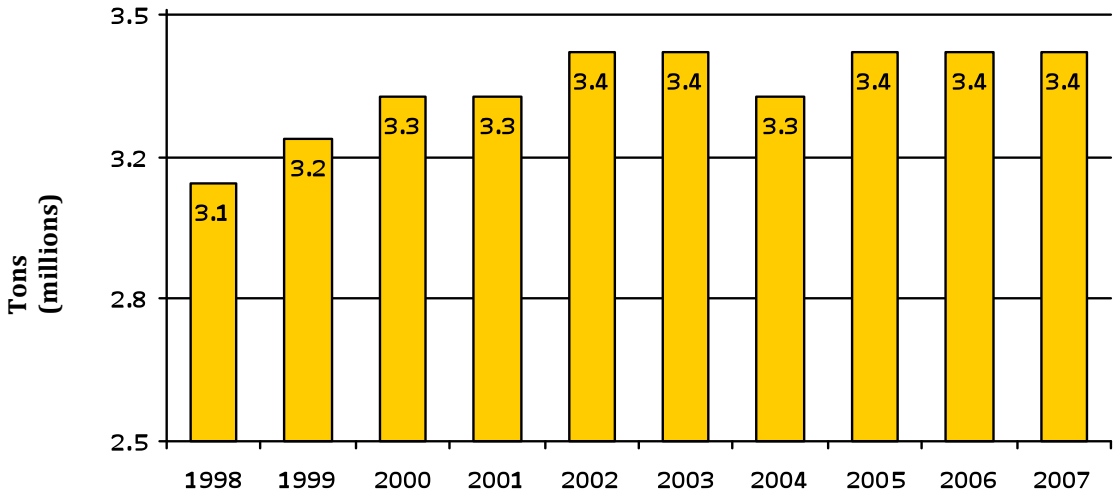
In 2004, the SWMCB updated the regional solid waste master plan[3]. The master plan sets a strong regional approach to solid waste planning. The six SWMCB member counties jointly prepared the plan though each of the counties developed their supplemental portion of the plan addressing individual county issues. The intent of this regional approach is to work toward a common vision and common goals, while recognizing the diversity of the counties. **Appendix A** presents the SWMCB's vision and goals for the Metro Area's solid waste management system as well as a listing of the regional outcomes the SWMCB is focusing on to move the region towards achieving its vision and goals.

[1] Minnesota's Recycling Industries: Economic Activity Summary, Minnesota Office of Environmental Assistance, 2001.
[2] 2007 Solid Waste Policy Report, Minnesota Pollution Control Agency, February, 2008.
[3] Regional Solid Waste Master Plan: 2005 – 2024, Solid Waste Management Coordinating Board, September, 2004.

Each year, the SWMCB prepares an annual results report, describing the progress made in achieving the regional goals (outcomes) set by the SWMCB. As the 2008 report is just now being compiled, the most recent version is the 2007 report[4].

Since 2000, MSW generation within the region has been relatively stable, fluctuating between 3.3 and 3.4 million tons (see Figure 1.1). Factoring in population growth, perhaps a more accurate figure of waste generation, growth of the waste stream has been even more static with fluctuations of per capita generation within a range of 1.25 to 1.30 tons/capita/year.

Figure 1.1
Projected Metropolitan Area Waste Growth



B. MUNICIPAL SOLID WASTE COMPOSITION

In 1999, the SWMCB, in partnership with the Minnesota Pollution Control Agency (MPCA), conducted a waste composition study to analyze the character of MSW deposited at landfills and resource recovery facilities in the region. Though this study was conducted ten years ago, it is the most recent data available on the regional composition of MSW.

The study provides information not only on the composition of the waste stream but also gives insights into what recyclable materials were still in the waste stream that could be targeted for recovery in future recycling initiatives. The composition study targeted loads from both the residential sector and the commercial/industrial sector to determine what differences there may be in the waste streams coming from households versus businesses. Though the waste stream was sorted into 59 different categories, for ease of presentation Table 1.1 shows the results of the waste sorts consolidated into eight broader categories represented as a percentage of the total MSW waste stream.

As presented in Table 1.1, the two largest components of MSW going to disposal facilities are paper and organics (34.2percent and 27.3percent, respectively). Not only is this the case for the consolidated waste streams but also for the individual residential and commercial/industrial waste streams.

[4] Solid Waste Management Coordinating Board Annual Results Report: 2007, Solid Waste Management Coordinating Board, May, 2008.

Table 1.1
Composition Break Out of Municipal Solid Waste
Generated in the Minneapolis/St. Paul Metropolitan Area

Material Category	Residential Waste Stream	Commercial/Industrial Waste Stream	Consolidated Waste Streams
Paper	31.8percent	35.1percent	34.2percent
Plastics	9.5percent	12.3percent	11.0percent
Metals	4.0percent	4.3percent	4.4percent
Glass	2.5percent	2.7percent	2.7percent
Organics	26.4percent	29.5percent	27.3percent
Problem Materials[1]	2.4percent	1.7percent	1.8percent
Household Hazardous Waste[2]	0.4percent	0.1percent	0.3percent
Other[3]	23.0percent	14.3percent	18.4percent
Total	**100.0percent**	**100.0percent**	**100.0percent**

[1] Problem Materials include batteries, televisions, computers and other e-waste.
[2] Household Hazardous Waste (HHW) includes paints, pesticides, cleaners, solvents, automotive fluids, etc.
[3] The Other category includes carpet, textiles, rubber, household bulky items, C&D waste, etc.

A further breakout of the consolidated paper category (34.2percent) yields the following results:

- Newspaper 4.1percent
- High Grade Office Paper 3.0percent
- Magazines/Catalogs 2.4percent
- Boxboard 2.5percent
- Uncoated OCC (old corrugated containers) 6.8percent
- Other Mixed Recyclable Paper 6.5percent
- Coated OCC 0.1percent
- Mixed Paper – Non-recyclable 8.3percent
- Uncoated OCC – Non-recyclable 0.5percent

Based on this breakout, most of the paper still in the waste stream (25percent) is recyclable (27percent if just looking at the commercial/industrial waste stream).

Looking at a similar breakout for the consolidated organics category yields the following:

- Food Waste 11.0percent
- Yard Waste (including woody materials) 2.9percent
- Wood Pallets 3.6percent
- Untreated Wood 2.3percent
- Treated Wood 3.8percent
- Diapers 1.9percent
- Other Organic Materials 1.7percent

Noticeable right away is the 11percent food waste component of the waste stream (11.5percent and 10.8percent for the residential and commercial/industrial waste streams, respectively). Combined with the 8.8percent non-recyclable paper (mixed paper and uncoated OCC) in the waste stream, approximately 20percent of the waste stream going to disposal has the potential for diversion to composting facilities or to anaerobic digesters for energy production and then composting. Including the yard waste left in the waste stream this increases to almost 22percent.

The potential for further recovery of recyclable paper, organics (including non-recyclable paper), as well as some fraction of the plastics category, is discussed later in the industry trends section of this report.

II. DESCRIPTION OF THE EXISTING MINNEAPOLIS/ST. PAUL METROPOLITAN AREA SOLID WASTE MANAGEMENT SYSTEM

A. OVERVIEW

Planning for the management of solid waste in Minnesota is primarily a county responsibility though counties and/or municipalities can form solid waste management districts through joint powers agreements to take on this responsibility. Counties and solid waste districts are required to prepare and update solid waste management plans. Plans must be approved by the MPCA and must include waste reduction and recycling provisions, as well as provisions to minimize the amount of waste that is disposed in landfills. For guidance, the state has created a preferred hierarchy for how solid waste is to be managed. Starting with the highest preference this hierarchy is:

1. Waste reduction and reuse;
2. Waste recycling;
3. Composting of yard waste and food waste;
4. Resource recovery through mixed municipal solid waste composting or incineration;
5. Land disposal with methane capture and recovery as an energy source; and
6. Land disposal with methane capture but without recovery as an energy source.

By state statute, Minnesota's recycling goal for the Metro Area is 50percent by January 31, 1996. In 2007, the region posted a recycling rate of 49.1percent (includes a 3percent source reduction credit and a 5percent yard waste composting credit). As we move into 2009, the state is in the process of revising its recycling goals based on the recommendations of the Minnesota Climate Change Advisory Group (MCCAG) convened last year. This group's recommended recycling and composting goals are:

- Recycling (without the 5percent composting credit) 50percent by 2011; 60percent by 2025
- Composting (with the 5percent composting credit) 10percent by 2012; 15percent by 2025

In the Metro Area, all seven counties have their own solid waste management programs. However, as noted previously, six of the seven metro counties (Scott County chose not to participate) have entered into a joint powers agreement and established the Solid Waste Management Coordinating Board (SWMCB). The mission of the SWMCB is to increase the efficiency and environmental effectiveness of the region's solid waste management system.

The collection of residential solid waste and recyclables within the Metro Area is provided by the cities and private waste collection industry. Collection options fall into one of three categories or a combination of these categories:

- Municipal collection with city trucks and crews.
- Organized collection where the city contracts with one or more private collection companies.
- Open collection where the city licenses haulers and allows them to collect waste within the city.

As summarized in Table 2.1, residents in 38 of the 167 communities in the Metro Area are provided waste collection services through city-wide organized collection. These communities represent approximately 30percent of the households in the region though most multi-family residents are excluded from these services. Typically, multi-family residences above a certain size (2 to 6 unit buildings depending on the municipality) are considered commercial properties. Two other communities (Farmington and Hopkins) provide municipal solid waste collection service using city trucks and crews.

The City of Minneapolis uses a hybrid system of municipal collection and organized collection of solid waste and recycling. Municipal crews service half of the City while the other half of the City is divided

up into smaller collection zones and is serviced by a consortium of haulers (Minneapolis Refuse, Inc.) under a city contract.

The remainder of the municipalities within the Metro Area license haulers to operate in their jurisdictions but allow haulers to contract directly with homeowners on a free market, competitive basis. This type of service is called subscription.

Table 2.1
Type of Residential Waste/Recyclables Collection Service
In Minneapolis/St. Paul Metro Area Communities

Residential Collection Service Model	Municipal Solid Waste Collection		Recyclables Collection	
	No. of Cities	percent of Cities	No. of Cities	percent of Cities
Organized	38	22.8percent	93	55.7percent
Municipal	2	1.2percent	0	----
Organized/Municipal	1	0.6percent	1	0.6percent
Subscription	126	75.4percent	73	43.7percent
Total	**167**	**100.0percent**	**167**	**100.0percent**

Table 2.1 also summarizes the existing collection system for recyclables in the Metro Area. Residents in 93 of the 167 communities are provided recyclables collection service through city-wide organized collection. This is approximately 67percent of the households in the region. Another 73 municipalities allow the licensed haulers to contract directly with homeowners. The City of Minneapolis uses the same hybrid model for collecting recyclables as they do for solid waste.

Almost all of the waste and recyclables collection services in the commercial/industrial sector are provided on a subscription basis and are negotiated between the business and their service provider.

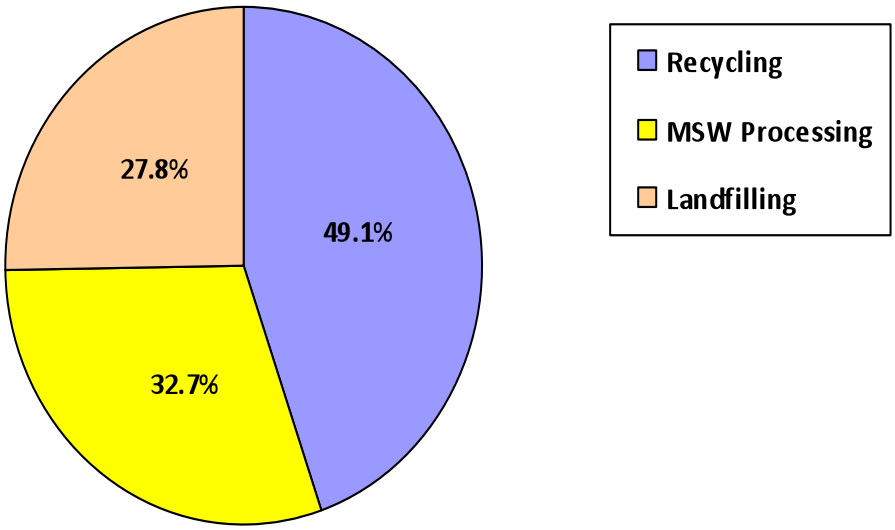
In 2007, the Metro Area managed approximately 3.4 million tons of MSW. In comparing the solid waste management results between 2006 and 2007, the recycling rate for the region nudged up from 48.2percent to 49.1percent. Processing of MSW also showed a tick upwards going from 31.7percent to 32.7percent. Landfilling of MSW went down to 27.8percent as compared to the 2006 number of 30.3percent. Figure 2.1 is a graphical representation of the 2007 waste management methods in the Metro Area. A description of the current methods for managing MSW in the region is provided below.

B. Waste Reduction & Recycling

Waste reduction is typically measured by the change in tons of waste generated per capita, comparing growth of the solid waste stream to regional population growth. As noted in the last section, the amount of waste generated per capita has changed negligibly since 1998. The reasons for this may signal the achievement of waste reduction initiatives promoted by the state or the SWMCB. However, a more likely explanation is that the continued slow economy of 2001, 2002, and 2003 had an impact on waste generation. Light-weighting of product packaging (reducing the overall weight of product packaging through using less packaging for some consumer items) was also a contributing factor.

In 2007, the Metro Area recycled 1.4 million tons of materials from the MSW stream. As noted previously, this equates to a 49.1percent recycling rate including the source reduction credits and the yard waste composting credits. Table 2.2 shows the Metro Area recycling rate since 1998. Since 2001, the recycling rate has grown from 46.2percent to its current level.

Figure 2.1
2007 MSW Management Methods
Minneapolis/St. Paul Metropolitan Area



The recycling infrastructure that has developed within the metro area is quite extensive and virtually every community is served with both residential and commercial/industrial recycling services. The success of the regional recycling system is not only a result of county and city efforts but of the significant contribution of the private sector. The private sector has been at the forefront of advancing recycling through financial investments, market development, and collection/processing of recyclables.

Table 2.2
Percent of MSW Recycled In the
Minneapolis/St. Paul Metropolitan Area (With Credits)
1998 – 2007

Year	Total Tons	Percent
2007	1,393,944	49.1percent
2006	1,359,499	48.2percent
2005	1,324,809	47.7percent
2004	1,336,601	47.9percent
2003	1,293,125	46.4percent
2002	1,296,903	46.3percent
2001	1,268,321	46.2percent
2000	1,327,726	48.3percent
1999	1,268,614	47.8percent
1998	1,231,525	47.8percent

Recyclables that are collected are taken either directly to a recycling market, a recycling broker, or to a materials recovery facility (MRF) where they are processed prior to delivery to a market. There are currently seven MRFs in the metro area where recyclable materials are delivered. Six are commercial

facilities and one (University of Minnesota) is an in-house facility. Information on these facilities, including ownership and the type of collection method their designed for, are shown in Table 2.3.

**Table 2.3
Material Recovery Facilities Serving the
Minneapolis/St. Paul Metropolitan Area**

MRF Ownership	Location	Processing Type	
		Single-Stream	Dual-Stream
Allied Waste Services	Minneapolis	✓	✓
Allied Waste Services	Inver Grove Heights	✓	✓
Eureka Recycling	Minneapolis		✓
Randy's Environmental Services	Delano		✓
Tennis Sanitation	St. Paul Park	✓	
University of Minnesota	Minneapolis		✓
Waste Management	Minneapolis	✓	✓

The processing type refers to the recyclables collection method. In dual-stream systems materials are collected in two separate streams – papers and containers. At the MRF, these materials are processed separately with papers going through a dedicated paper processing line and containers going through their own processing line. Single-stream collection refers to a one-sort system where all the recyclables are collected in a co-mingled stream (paper and containers together) and go through one processing line at the MRF where the materials are mechanically separated into their individual components. The Allied Waste Services and Waste Management facilities are designed for single-stream processing (their preferred approach) but can process separate streams if needed. Eureka Recycling, Randy's Environmental Services, and the University of Minnesota facilities are all designed for dual-stream recycling only. Tennis Sanitation's facility has been redesigned in the last several years to process single-stream recyclables only. Differences between single-stream and dual-stream recycling will be discussed in more detail under the industry trends section.

C. Organics Management

Prior to 1990, the largest fraction of organic waste going into landfills serving the Twin Cities Metro Area was yard waste. That changed in 1990 when yard waste generated in the metro area was banned from landfills and resource recovery facilities. Within a very short period of time a number of yard waste composting sites sprung up in the Metro Area. Some of those sites have since been closed but there are still at least a dozen sites serving the region.

The composting of source-separated organics (SSO) is still in its infancy in the Metro Area and is poised for growth as a significant component of the regional solid waste management and recycling system. Currently there are two facilities allowed to accept SSO for composting in the Metro Area – Resource Recovery Technologies' (RRT) facility in Empire Township (Dakota County) and RW Farms' facility at the Minnesota Landscape Arboretum in Carver County. At this time, there is no actual state permit classification for SSO composting facilities. The RRT facility obtained a permit for composting MSW (although at this time they're limited to yard waste and SSO) and the RW Farms facility is allowed to operate under the MPCA Demonstration and Research program to provide data on the environmental impacts of co-composting yard waste and SSO.

A this time there are a handful of municipalities in Hennepin County and Carver County that have established SSO collection and composting programs including Chaska, Chanhassen, Minnetonka, Wayzata, Orono, Medina and a pilot neighborhood program in the City of Minneapolis (Linden Hills neighborhood). On the commercial/industrial side of the equation there are close to 60 schools, mostly in Hennepin County, and a dozen restaurants/company cafeterias that are also participating in the composting program.

D. Processing and Energy Recovery

There are three MSW processing facilities that take in the majority of MSW generated in the Minneapolis/St. Paul Metropolitan Area – HERC, RRT-Newport and RRT-Elk River. In 2007, these facilities processed a total of 1,110,579 tons of MSW or approximately 52percent of the MSW available for processing. Table 2.4 provides summary information on these three facilities.

The Hennepin Energy Resources Corporation (HERC) is a mass burn waste-to-energy facility located in downtown Minneapolis. The facility is owned by Hennepin County and operated by Covanta Energy. Mass burn technology involves incinerating the MSW with only large bulky items and other non-processibles removed prior to incineration. A backend ferrous recovery system is able to recover most of the steel and iron coming through the system for recycling. Mass burn facilities use the heat of the incineration process to generate hot water and/or steam which can either be used for direct heating applications – district heating for example – or run through a turbine to generate electricity.

Resource Recovery Technologies (RRT) operates two refuse derived fuel (RDF) processing facilities located in or just outside of the metro area – Newport and Elk River. MSW delivered to these two RDF facilities goes through a mechanical process which separates the material into three separate waste streams – RDF, ferrous metal for recycling, and heavy residue for disposal. The resulting RDF is a fluffy material comprised primarily of paper, plastic and wood. The RDF is sold to both Great River Energy and Xcel Energy to be used as boiler fuel in several of their power plants.

Table 2.4
MSW Processing Facilities in the
Minneapolis/St. Paul Metropolitan Area

Statistics	HERC	RRT – Newport	RRT – Elk River
Type of Technology	Mass Burn Combustion	RDF Processing	RDF Processing
Permitted Capacity	365,000 tons/yr.	500,000 tons/yr.	468,500 tons/yr.
2007 MSW Quantities Delivered for Processing	365,267 tons	386,736 tons	327,198
Recyclables Recovered	Ferrous Metal	Ferrous Metal	Ferrous Metal
Primary Counties Served	Hennepin	Washington, Ramsey	Hennepin, Anoka, Benton, Stearns, Sherburne
Energy Markets	Xcel Energy	Xcel Energy	Great River Energy Xcel Energy
Type of Energy	Electricity	Boiler fuel for Red Wing & Mankato Power Plants	Boiler fuel for the Elk River power plant (GRE) and for the Wilmarth power plant (Xcel)

E. MUNICIPAL SOLID WASTE LANDFILLS

Prior to the construction of the MSW processing facilities in the late 1980's, MSW generated in the Metro Area was delivered to a number of regional landfills including some that were out-of-state. When the processing facilities became operational, several of the metro counties passed designation ordinances that allowed them to control were the MSW generated within that county was delivered. Hence, they could "designate" that it be delivered to a specific processing facility. In 1992, a lawsuit in the State of New York that went all the way up to the U.S. Supreme Court (C&A Carbone vs. Town of Clarkston, New York) prohibited such ordinances on the grounds that they violated interstate commerce laws. As a result, the metro area counties were forced to negotiate contracts with the haulers in order to obtain the MSW needed for operating the processing facilities.

Though much of the MSW still goes to these processing facilities, there are significant quantities of MSW and various industrial waste streams that are being landfilled within the region. Table 2.5 lists the landfills that are currently taking MSW and industrial wastes generated in the Metro Area. All these landfills are privately owned.

Table 2.5
Landfills Accepting Waste From the
Minneapolis/St. Paul Metropolitan Area

Landfill	Owner	Location
Pine Bend Landfill	Allied Waste Services	Inver Grove Heights, MN
Burnsville Landfill	Waste Management	Burnsville, MN
Elk River Landfill	Waste Management	Elk River, MN
Spruce Ridge Landfill	Waste Management	Glencoe, MN
Sarona Landfill	Allied Waste Services	Sarona, WI
Seven Mile Creek Landfill	Veolia Environmental Services	Eau Claire, WI
Sanitary Northwoods Landfill	Northwoods Refuse	Cameron, WI
Central Disposal Landfill	Waste Management	Lake Mills, IA

The total amount of regional MSW landfilled in 2007 was 943,137 tons. All landfills that serve the Metro Area are required by Federal Regulation (Subtitle D of the 1976 Resource Conservation and Recovery Act) to capture and destroy methane given off by the landfills. Some of these landfills are collecting methane for energy use.

III. NATIONAL AND LOCAL WASTE RECLAMATION INDUSTRY TRENDS

The waste reclamation industry will play a significant role in the green economy. As noted in the introduction, it already employs over 1 million people and generates in excess of $230 billion nationally on an annual basis. Energy prices, commodity price inflation and scarcity, and global environmental concerns, including global warming, has drawn greater attention to the industry.

The energy savings that can be realized through recycling of old materials into new products can be significant. For example:

- Manufacturing aluminum sheeting from recycled aluminum requires 96percent less energy than making the sheeting from virgin bauxite. One ton of recycled aluminum saves the equivalent of14,000 kilowatt-hour of energy, 40 barrels of oil, or 238 million BTU's of fossil fuel energy.
- An approximate 88percent energy savings is achieved through producing plastic from plastic as opposed to plastic from oil and gas. One ton of recycled plastic saves the equivalent of 5,774 kilowatt-hour of energy, 16.3 barrels of oil, or 98 million BTU's of fossil fuel energy.
- Steel recycling results in a 74percent savings in energy, with one ton of recycled steel saving the equivalent of 642 kilowatt-hour of energy, 1.8 barrels of oil or 10.9 million BTU's of fossil fuel energy.
- Manufacturing new paper from recycled paper results in a 40 – 60percent energy savings. One ton of recycled office paper saves the equivalent of 4,100 kilowatt-hour of energy, 9 barrels of oil, or 54 million BTU's of fossil fuel energy.

Considering that much of the energy used to manufacture new products ultimately comes from burning fossil fuels, the reduction in GHG emissions related to recycling can be significant. Add to this that the diversion of organic materials from landfills (e.g., food waste, yard waste, non-recyclable paper waste, etc.) can significantly reduce landfill gas emissions most of which are methane. Methane, a potent GHG, is considered to be 25 times more potent than carbon dioxide as a global warming gas.

With this new environmental awareness of the role that waste reclamation plays in energy and resource conservation and in reducing GHG emissions, the industry is trending toward recycling and composting of more materials from the waste stream. This section addresses some of those trends from both a national and regional perspective.

A. TRENDS IN RECYCLING

1. Residential Curbside Collection Efficiency Trends

There are generally three types of residential curbside collection methods being used today – multi-stream collection (curbside source-separation), dual-stream (2-sort) collection, and single-stream (1-sort) collection. The advantages and disadvantages of these methods are discussed below.

Multi-stream collection typically involves the homeowner either putting the various materials (metal, plastics, glass, newspaper, cardboard, etc.) out at the curb already separated or at least in such a manner that the collector can easily separate it and place these items in separate truck compartments. Multi-stream collection was widely used in the 70's and 80's when the modern-day recycling industry was in its infancy. It is still used in some small towns and cities throughout the country but is not seen in larger, urbanized communities. Minneapolis is one of the few major U.S. cities still employing this method of collection.

The primary benefit of this collection method is that with materials kept separate the need for sorting materials at a processing facility is reduced and a "cleaner" commodity is produced for sale to markets since there is little chance for cross-contamination with other materials. There are, however, a number of disadvantages to this collection method including:

- Putting more responsibility on the resident for separating materials (an inconvenience), which can lead to lower participation in the recycling program;
- The need for multi-compartment trucks, which may cost more and diminish the ability to add different types of materials to the recycling program;
- Collection vehicles leaving the route prior to finishing collection due to one commodity compartment being filled before the others. This also results in more "hauling of air" and increased fuel costs; and
- Increased collection costs associated with increased labor requirements, worker compensation costs, and time for collection.

The next stage in the evolution of recycling collection was dual-stream collection. This method is sometimes called two-sort or commingled recycling, and requires participants to separate their recyclables in to just two streams – fibers (all paper) and containers (glass, tin, aluminum, plastic). At this time, dual-stream collection is the most common collection method in practice. Its primary advantages over multi-sort collection include:

- Making participation more convenient for residents as they sort materials into just two categories;
- Allowing for the collection of additional materials such as plastic containers and different grades of paper; and
- Requiring a two-compartment truck versus a multi-compartment truck which saves time and money on the collection route.

Dual-stream recycling requires more separation and preparation of materials at a material recovery facility (MRF). Dual-stream MRFs generally use a combination of manual and mechanical separation techniques to get the materials separated. There is also greater opportunity for cross-contamination of products making it crucial that materials are processed to minimize contaminants in the final commodities.

In the mid-1990s, a new collection method was introduced – single-stream or one-sort collection. Waste Management, Inc. (WM) is often credited with pioneering this collection method. In a single-stream program all the materials (paper and containers) are placed in one recycling cart for collection. A number of benefits can result from this collection method including:

- Increased convenience for the participant (if it's recyclable it goes in one cart, if not it goes into the trash), which often results in greater amounts of materials collected at the curb;
- Allowing for the collection, even more so than dual-stream collection, of different types of materials;
- The ability to automate or semi-automate the collection process so only one person (the driver) can service the route; and
- Reduces time on the collection route saving labor and fuel costs, as well as potentially reducing workers compensation costs.

Single-stream recycling, however, is not necessarily the panacea for increasing the collection and recycling of materials in the waste stream. A variety of issues have emerged over the last 10 or 12 years with regard to single-stream recycling including:

- Larger quantities of contaminants in the recycled commodities resulting in the down-grading or rejection of materials, and increased disposal of some commodities at the market level. This is especially the case with recycled paper commodities, which can be heavily laced with shards of glass, plastic bags/containers, and metal containers/scrap;
- Increased levels of processing residuals at the MRF requiring disposal due to the compaction of materials on the collection route and the tipping of the materials on the receiving floor of the MRF. Glass has a tendency to break in the collection and tipping process, increasing the likelihood of contamination of other materials;
- Increased levels of non-recyclable materials requiring disposal. As with single-stream cart systems, it's difficult to see non-recyclable materials or trash in the recycling cart until it is dumped or delivered to the MRF;
- Loss of some recyclable materials due to the collection and processing methods used. Glass, as an example, is often color-mixed and crushed making it very difficult or impossible to recover for many recycled glass markets; and
- Higher processing costs due to the sophisticated processing equipment required to separate out the materials once collected and tipped at the MRF. Manual sorting at single-stream MRFs is usually minimized and some materials are unrecoverable even with manual sorting.

A number of commodity markets, especially paper, prefer getting their materials from multi-stream or dual-stream programs citing much cleaner and usable materials coming from these types of programs. It should be noted that single-stream collection/processing can produce marketable materials for recycling markets but, generally speaking the quality is lower than recyclables coming from multi-stream and dual-stream facilities. In fact, as market demand has slumped in the current economic climate (to be discussed later), some buyers of recycled commodities are either paying a lesser amount for materials coming from single-stream facilities or not accepting materials at all coming from such MRFs.

The Trends

It should come as no surprise that the recycling community is split on what collection and processing method – dual-stream or single-stream – is the best. Both systems have their benefits and drawbacks.

Despite the concerns and problems that have sprung up around single-stream recycling, this method of collection and processing has strong momentum. By March of 2002, there were 88 MRFs handling single-stream recycling – 41 in the West, 32 in the South, 13 in the Midwest and 2 in the Northeast.[5] By the beginning of 2007, an estimated 100city and regional single-stream programs were in operation in 22 states serving about 22 million people.[6]

Single-stream recycling has been embraced by municipal governments for increasing recycling (at least increasing the amounts of materials set-out for collection) and by the general public for its ease and convenience. The two largest national solid waste management firms – Waste Management and Allied Waste Services – promote this collection method as it lowers their collection costs and risks. Some smaller haulers have been forced to move in this direction because of competitive pressures. Commodity markets, as a general rule, are not as receptive to this method due to the feedstock quality, operational problems and increased disposal costs on their end.

Here in the Twin Cities, dominated by the two largest national firms, the growth of single-stream continues. What holds that growth in check to some extent are municipal leaders who recognize some

[5] Single Stream: An Investigation into the Interaction Between Single Stream Recycling Collection Systems and Recycled Paper Manufacturing, Conservatree, March, 2003.
[6] Single Stream Recycling, University of Wisconsin, Solid & Hazardous Waste Education Center, February, 2007.

of the problems with single-stream recycling and two regional companies – Eureka Recycling and Randy's Environmental Services – who own dual-stream MRFs and continue to promote that collection method.

2. Increasing the Amount of Targeted Materials Collected

Regardless of the collection method, a number of waste audits on both residential and commercial waste streams show a significant amount of targeted recyclables still in the trash. As discussed in the Introduction, over a third of MSW generated in the Metro Area is paper and most of this (25percent) could have been recycled.

Though much of the plastic found in the waste stream is currently not recyclable, there is a significant amount that is. Nationwide, the 2007 recycling rate for plastic beverage bottles (made from Polyethylene Terephthalate or PET) was 24.6percent[7]. Aluminum cans, on the other hand, fared much better with a 2007 recycling rate of 53.8percent.[8]

Based on these numbers, however, this still leaves approximately 75percent and 46percent of these containers, respectively, in the solid waste stream. Considering the 88percent energy savings associated with recycling plastics and the 96percent energy savings associated with recycling aluminum, the trashing of these materials is much more than just throwing out an aluminum beer can or an empty bottled water container. As recycling programs have matured in a number of communities, especially here in Minnesota, various methods for increasing participation levels and capturing more of the targeted materials have been implemented or are being considered. These methods and trends are discussed below.

Increasing Recycling In the Residential Sector

Recycling program education and outreach efforts are crucial for getting a residential recycling program started AND for maintaining or growing the program over time. Research has shown that without the continuing outreach and promotion to residents, recycling programs can stagnate and lead to reduced participation or an increase in non-recyclable items in the recycling bin (just because something is made of plastic doesn't mean it's recyclable). In Minnesota, community-based education efforts have been the primary vehicle for many community programs. Recently, however, a number of other mass media campaigns have been undertaken to promote recycling on a regional or state-wide basis. One example includes the SWMCB's "Rethink Recycling" website providing information, guidance and other resources to Metro Area residents and businesses. Another example is the "Recycle MORE Minnesota" campaign. This campaign is a joint effort of the MPCA and the Recycling Association of Minnesota (RAM) to help increase recycling throughout the state.

Pay-as-you-throw (PAYT) pricing for solid waste management services (sometimes referred to as unit pricing, volume-based pricing, or variable-rate pricing) is another method employed to increase recycling in the residential sector. With PAYT, residents are charged for the collection of solid waste based on the amount they throw away creating a direct incentive to recycle more and generate less waste.

Traditionally, residents pay for solid waste collection service through property taxes or a fixed fee regardless of how much – or how little – trash they generate. Under PAYT programs, households pay a variable rate depending on the amount of service they use. For example, a hauler or a community may

[7] 2007 Report On Post Consumer PET Container Recycling Activity, National Association for PET Container Resources and The Association of Post Consumer Plastic Recyclers, December, 2008.
[8] "U.S. Aluminum Can Recycling Grows In 2007", The Aluminum Association, July 21, 2008.

offer their customer/resident a choice in solid waste service levels – 36-gallon cart service, 65-gallon cart service or 90-gallon cart service – along with recycling service. The higher the service level, the more that customer or resident is going to pay for the service. If they choose to reduce their service from a 65-gallon level to a 36-gallon level while increasing the amount of recyclables they divert from their garbage, they will pay a lower price for the overall solid waste and recycling service. The vast majority of residents in the Metro Area are served by PAYT programs. Though this approach is quite common in the residential sector, it's not as widespread in the commercial sector.

One of the larger trends developing both nationally and regionally for increasing participation in residential recycling programs is offering reward programs to residents and/or neighborhoods for recycling more and wasting less. These programs are similar to credit card reward programs where you earn points that can be used for purchasing consumer goods. The difference here is that the more you recycle the more points you earn, which can then be redeemed at local and national retail partners.

The premier company who started it all is RecycleBank, LLC. Starting in Philadelphia in 2005, they have met with phenomenal success and are now partnering with haulers, communities and businesses in 18 states. RecycleBank's co-founder and CEO, Ron Gonen, expects to be operating in 25 states by the end of 2009 and 33 states by the end of 2010.[9] The program itself is quite simple.

Using an on-board scale and RFID chip and scanner, the amount of materials set out for recycling by each homeowner is weighed and recorded. The recorded weight is converted into RecycleBank Rewards Points which accumulate in an account setup for each participating resident. When the points reach a certain dollar value, they can be redeemed, much like a gift card, at a variety of businesses around the community. RecycleBank retail partners number over 400 nationwide and include such companies as Target, Cub, CVS Pharmacy, Subway, Bed Bath & Beyond, Dunkin' Donuts, IKEA, and Whole Foods. RecycleBank is also running a pilot apartment collection program at one location in New York and another in Wilmington, Delaware. They're goal is to begin rolling this program out once they've perfected this multi-family housing recycling approach.

Last year, Allied Waste Services (AWS) and RecycleBank announced a strategic partnership to launch a nationwide recycling rewards program. Late last year the program was launched in Minnesota with both the City of Maple Grove and AWS' customers in Eden Prairie being the first ones offered this rewards program.

The RecycleBank program has the potential for increasing participation rates in residential curbside programs as people are provided with a participation incentive with monetary value. This type of program also has the potential for bringing many non-recyclers into the recycling fold. One crucial element in the expansion of the RecycleBank program or similar reward programs will be how to make it work for different recycling collection methods. The logistics of the program are currently designed to complement single-stream recycling programs. Adapting this type of rewards program to a dual-stream collection scenario can likely be accomplished but may pose some technical and logistical challenges.

Increasing Recycling In the Commercial Sector

Increasing recycling in the commercial business sector typically involves different methods than in the residential sector. Recycling education campaigns targeting employees are typically not seen in the business sector. PAYT programs are generally not promoted by the private waste services industry unless the business is pushing for them. The RecycleBank model would also be difficult to adapt to a business setting. Increasing waste reduction and recycling in the commercial sector is often driven by regulatory requirements or the desire to reduce operating costs.

[9] "Fast Growing RecycleBank Not Seeking Bailout", Waste & Recycling News, March 30, 2009.

An example of regulatory requirements would be municipal or county ordinances that mandate businesses have recycling programs for their employees and/or customers. In Minnesota, there are a handful of municipalities or counties that have such requirements. Two examples in the Metro Area are Ramsey County and the City of Bloomington.

Ramsey County's business recycling requirements are found in their Food Protection Ordinance and are only applicable to food establishments licensed in Ramsey County. The ordinance requires such establishments to setup recycling programs for four materials – newspaper, cardboard, glass food and beverage containers, and metal food and beverage containers. It is unclear if this particular ordinance provision is actually enforced. The City of Bloomington mandates the separation and collection of recyclable materials by commercial businesses. The City Code does not specify what types of materials need to be separated for recycling. The City Code also lays out a process for enforcing this requirement, which includes a written warning, a monetary penalty or fine, and an appeal process. However, the City is no longer enforcing this particular ordinance due, in part, to a lack of staff as well as other competing law enforcement priorities.

It is unlikely that any new municipal or county ordinances in Minnesota (especially in the Metro Area) will be written and enacted. The lack of government resources that can be devoted to enforcing such ordinances, as well as the larger service priorities facing public entities (e.g., law enforcement, fire protection, human services, transportation infrastructure, etc.), will dictate other measures for increasing recycling in the commercial sector.

Perhaps the most effective way to increase recycling in the commercial sector is by focusing on the potential to reduce costs. This can be difficult for a variety of reasons among them the fact that in many situations the cost of solid waste management is a relatively small cost when compared to other aspects of the business. One stimulus that both the state and several metro counties have used to encourage a more active approach to recycling in the business community is through the use of taxes and fees. Table 3.1 lists the various taxes and fees levied on solid waste management services in the Metro Area.

Table 3.1
Metro Area Solid Waste Management Taxes and Fees

Entity	Name of Fee	Amount Charged On Collection Billings
State of Minnesota	Solid Waste Management Tax	9.75percent on MSW residential billings 17percent on MSW commercial billings
Hennepin County	Solid Waste Management Fee	9percent on MSW residential billings 14.5percent on MSW commercial billings
Washington County	County Environmental Charge	39.5percent on MSW residential and commercial billings
Ramsey County	County Environmental Charge	28percent on MSW residential billings 53percent on MSW commercial billings

What's perhaps most striking of these fees is that between the Minnesota Solid Waste Management Tax and the other County fees, businesses in Hennepin. Washington and Ramsey counties are paying

31.5percent, 56percent, and 70percent in additional fees, respectively, for managing the solid waste they generate. The materials collected in recycling programs are exempt from all of these fees.

It is believed that these taxes and fees have increased recycling levels in the commercial sector but since there is currently no way to effectively measure recycling in this sector, the impact of these fees on increasing recycling cannot be accurately determined. Anecdotal evidence suggests that they have helped increase recycling in the commercial sector but that there are still a lot of businesses (small to medium size, in particular) that have yet to get serious about recycling. This brings us to another method for increasing recycling in the commercial sector, especially in manufacturing and institutional (schools, colleges, hospitals) settings. It is a method of contracting for waste services referred to as Resource Management contracting.

Resource Management (RM) is a performance-based contracting strategy, which taps into the expertise of external contractors to bolster waste reduction and recycling through value-added services, such as improved reporting, dedicated customer service, data analysis, and continuous-improvement. The key to success in RM contracting is changing the compensation structure to provide incentives for contractors and reward them for achieving mutually determined goals – shifting the contractors' profitability model from "haul/dispose more volume" to "minimize waste and recycle more materials".

RM contracting is based on three premises:

- Significant cost-effective opportunities to reduce waste, boost recycling, and otherwise optimize services exist;
- Contractors will pursue them when offered proper financial incentives; and
- Financial incentives to contractors are supported by the savings generated through cost-efficiency improvements to a customer's current solid waste/recycling system.

Some examples of businesses and institutions that have successfully implemented RM contracts are listed in Table 3.2. There may be others but these entities are the ones that typically show up as case studies for this method of contracting.

Table 3.2
Entities with Existing RM Contracts

Name of Entity	Location	Type of Institution or Business
West Des Moines Community School	West Des Moines, IA (Multiple Buildings)	Public School District
Bridgewater State College	Bridgewater, MA (Multiple Buildings)	College
Lemuel Shattuck Hospital	Jamaica Plains, MA	Hospital
One Beacon Street	Boston, MA	Commercial Office Building
Raytheon Corporation	Andover, MA	Manufacturer
GM Orion Assembly Plant	Orion Lake, MI	Manufacturer
Dakota County	Hastings, MN (Multiple Buildings)	County Government
Rosemount/Apple Valley/Eagan School District (ISD 196)	Rosemount, MN (Multiple Buildings)	Public School District
Macalaster College	St. Paul, MN (Multiple Buildings)	College
Mahtomedi School District (ISD 832)	Mahtomedi, MN (Multiple Buildings)	Public School District

Recently, the Minneapolis Public School District issued an RFP for Resource Management program services (proposals were due on April 2). If the school district enters into a RM contract for the next school year, it will be the largest public school district to-date that has done so.

As can be seen from Table 3.2, RM contracting is typically found at entities that have multiple sites within a specific geographical area (e.g. colleges, schools, counties) where it may be easier to find ways to reduce solid waste generation and achieve cost-savings. Hospitals and manufacturing facilities are also ideal locations for implementing a RM program because of the ability to bundle different type of waste services together under one umbrella and manage the entire waste stream under one contract. As an example, hospitals can improve waste service efficiencies by hiring an RM contractor that will not only be responsible for reducing waste generation and increasing recycling throughout the hospital complex, but may also be able to provide (through sub-contractors) more efficient management of medical waste, hazardous waste, and pharmaceutical waste.

The MPCA is promoting more extensive use of RM contracting and has developed, with the assistance of Tim Goodman & Associates, generic templates for an RM RFP and contract. They've also recently started providing grants to public entities (school districts, municipalities, counties) that wish to implement RM programs.

The Trends

For increasing the amount of targeted materials collected in the residential sector, there is a strong trend toward PAYT collection programs for solid waste collection services. Whether one's solid waste and recycling services are provided through a citywide contract or through a single customer contract, the option to request a lower level of solid waste services and save money is attractive to many households. For singles, childless couples and empty nesters, a large volume container for trash is just not needed. Even for families with children or extended families living under one roof, the ability to recycle more, as a way to reduce the volume of their trash container and save money in the process, can help stretch the household budget.

Offering a recycling rewards program such as RecycleBank is also a trend that will likely continue. Though the mindset that recyclables have great value and residents shouldn't have to pay for this service is largely gone, providing a financial incentive in the way of rewards for recycling appears to be a big stimulus in getting people to recycle more at home. With Allied Waste Services now in partnership with RecycleBank, expect to see this type of approach to increasing recycling program participation rates continue to grow. Additionally, with Allied Waste Services having an exclusive agreement with RecycleBank in some marketplaces, I would anticipate that copycat programs will likely emerge over the next several years.

For increasing the amount of targeted materials collected in the business sector, it is unlikely that public entities in the Metro Area will continue increasing solid waste management taxes and fees on materials going to landfills and incinerators. Though such fees have been relatively successful in stimulating more recycling in the commercial sector, both the public, as well as private industry, have grown weary of such taxes/fees and any proposed increase would likely spur significant opposition. Though disposal bans on recyclable materials still found in the waste stream may have some backers, it is unlikely such actions would find much political support at this time.

The likely trends to watch for stimulating more recycling in the business sector are those things that will focus on how it can help improve the bottom line of businesses entities. PAYT collection services and RM contracting are expected to grow in prominence around the country as well as here in Minnesota. Educational and technical outreach to the business community will also likely grow in importance as

businesses search for ways to reduce their bottom-lines as well as increasing their appeal to the growing number of customers (the general public and other businesses) who are looking for "greener" companies to do business with.

3. Stabilizing and Growing the Recyclable Commodities Markets

To most people, curbside collection of recyclables is synonymous with recycling. In reality, though collection and processing of materials are important components of the recycling process, materials are not recycled until they've been converted into a new product and placed on the market for consumers. This is an important distinction and needs to be pointed out since without the actual markets/manufacturing processes for recyclable materials there is no recycling.

As was noted previously, some materials have a relatively high recovery rate such as aluminum at approximately 54percent. In 2008, paper recovery rates climbed higher from 56percent to 57.4percent.[10] Other materials, however, have significantly lower recovery rates. The PET plastic beverage bottles cited earlier (24.6percent) and glass food and beverage containers (28.1percent)[11] are examples of materials in this category.

For the last 25 years or so, one thing held true about markets for recyclables – they fluctuated between a low market value and a high market value. This band of fluctuation, however, was relatively narrow and had little effect on recycling, in part due to the fact that the U.S. recycling industry was still in the early stages of growth. Between 2005 and 2008, there was an explosion in the markets for most recyclables. The U.S. economy was booming and so were several of the Asian economies, in particular China. During the 2005 to 2008 boom years, China grew a strong appetite for American scrap iron, paper and plastics.

As an example during this period, China represented the single biggest import market for American scrap metal accounting for 20percent of the market. Other Asian countries also importing American scrap iron were South Korea (8percent), Taiwan (8percent), and Hong Kong, India, Philippines, and Vietnam accounting for another 20percent of the market.[12] China was also a large importer of US scrap paper, which at one time was the single largest commodity imported to China from the U.S. Because of this huge foreign demand, as well as growth in the U.S. economy, market prices for most recyclables escalated rapidly as can be seen in Table 3.3.

Table 3.3
Growth in the Scrap Commodities Markets Between 2005 and 2008[13]

Commodity	2005 ($/ton)	2008 ($/ton)
Steel Scrap	$150	$245
Aluminum Scrap	$900	$1,200
Office Paper	$100	$240
Cardboard	$75	$145
Newsprint	$60	$100
PET Plastics	$280	$780

Another ramification, however, in this run-up on demand was the inability of many U.S. commodity markets (especially paper and steel) to compete with the huge demand and willing buyers in foreign

[10] "US Paper Recovery Rate Grew Slightly in 2008", Paper Age, April 6, 2009.
[11] "Glass Container Industry Sets Recycling Goal", Container Recycling Institute, December 14, 2008.
[12] Iron and Steel Statistics Bureau, 2007.
[13] Secondary Markets Pricing, Waste News, April, 2008.

markets. As a result, this same period of time saw the shrinking and consolidation of a number of players in both the paper industry and the steel industry.

This demand and the prices buyers were willing to pay started declining rapidly in mid-2008 when the U.S. and much of the rest of the world slid into an economic global recession. As consumer demand and infrastructure development dropped and the global banking industry went into a free-fall, demand for recyclable commodities, and the prices paid for these commodities, tumbled. Typical prices for various commodities are currently at the following levels:

- Scrap Steel - $66/ton
- Aluminum - $400/ton
- Cardboard - $30/ton
- Newsprint - $26/ton
- PET Plastic - $176/ton

Fortunately, Minnesota recyclers have generally used domestic markets for their recyclable commodities outlets. Most of these markets, especially for paper (all grades) and plastics, are regionally located in Minnesota, Wisconsin and Iowa. This has buffered us from the worst of the commodity markets price drop. As a result, though market prices are lower than they have been for many years we are still able to move much of the recyclables collected in residential and commercial recycling programs.

With this as the backdrop, there is still optimism for the recycled commodities markets. Several things are driving the optimism. As the U.S. and other countries come out of the global recession, it is expected that the demand for recycled metals and cardboard will rebound. This is due in part to the expectation that consumers here and abroad will once again start spending money, which will increase the demand for a number of consumer items especially durable goods such as appliances, autos and electronics. These products will require metals and plastics in their manufacturing and cardboard in their packaging. Many of these items will contain recycled content to one degree or another.

Another predicted driver of recycled commodities markets includes renewed efforts to repair, replace or construct new infrastructure. One recent article on the future of markets states:[14]

> "As is often the case, one market declines as another rises. The aforementioned Chinese intend to focus economic efforts on internal infrastructure projects. America, as evidenced by the catastrophic bridge collapse in Minnesota last year, is also in bad need of an infrastructure overhaul. Both efforts will consume massive quantities of recycled material, not necessarily the same material processed by Chinese consumer industries. Steel, crushed concrete, copper wiring and plastic piping will be in big demand once these programs get rolling. All of these can be provided in bulk by scrap traders. As both economies turn inward, different opportunities for scrap traders will present themselves and local markets for recyclables will assume new importance…."

In addition to these market drivers, as we come out of the current recession, the push to convert the U.S. economy to a more environmentally sustainable one will continue. New infrastructure and "greener" technologies for powering our country (wind turbines and the smart grid), revamping our transportation system (lighter cars, hybrid vehicles and mass transit), and constructing our buildings (LEEDs certified construction activities including the use of building materials with recycled content) will not only boost existing materials markets but will create new markets and new products.

[14] "Of Markets and Futures, MSW Management, Daniel P. Duffy, April, 2009.

One lesson learned from the last five years is that a healthy recycled commodities market will require less dependence on distant markets and the development of more local or regional markets. This report started off by discussing the growth in the U.S. recycling industry and specifically the growth in the Minnesota recycling industry. A major component in future growth of the Minnesota recycling industry is the creation and growth of local and regional recycling markets.

The MPCA has a Recycling Market Development Program, which has helped Minnesota businesses create recycling manufacturing jobs and recycled-content products for over 15 years. Using various recycled materials as feedstock (paper, plastics, glass, metal) many of these businesses have prospered and grown developing new products and finding new market niches for their products. According to the MPCA's website, Minnesota's recycling manufacturing industry is recognized as a national leader. In 2003, the industry supported more than 9,000 jobs and added $2.98 billion to the state's economy. While many sectors of the state lost jobs from 2001 to 2003, the recycling sector showed a 3-4 percent gain in employment.

This is a trend that bodes well not only for the State of Minnesota but for the Metro Area in particular. With the assistance from state and local governments, new businesses that utilize recyclable materials in their production processes and convert those materials into new "green" products for the industrial, commercial and consumer marketplace will strengthen the regional recycling industry, and create and attract new jobs and markets to the state.

The Trends

The impact of the global economic recession has good news and bad news for the recycling industry. The good news is that recycling and the use of recycled materials in manufacturing has come of age and is now considered a significant component of the U.S. and global economies. It has now gained legitimacy. The bad news is that, like other sectors and commodities in the economy, it can be impacted by recessionary trends.

The last ten years or so has seen major growth in recyclable commodities markets and the last several years has seen the value of those commodities skyrocket. This demand and increased value is due in part to the continued development of the U.S. and foreign economies and the move to more sustainable way of life.

Though prices may not reach the heights they did back in 2007/2008, once we come out of the global economic recession, the demand and use of recycled materials will likely continue to escalate. The environmental qualities associated with recycled commodities – less energy and resource use – will push the recycling industry.

The other notable trend we will likely see as part of the growing markets for recyclable commodities is the creation of more diverse and more localized markets for these materials. Though importing recyclables to other nations will likely be a component of the nationwide recycling infrastructure, there will be much more interest in diversifying. This will almost certainly lead to market growth and job growth in Minnesota and the Twin Cities Metro Area.

4. Source-Separated Organics Management

Simply put organic waste is waste material of animal or plant origin. Among other things, this would include yard waste, wood waste, food waste and paper waste. Disposable diapers are sometimes thrown into this category but because of the plastic liner they are not truly an organic waste. Based on this definition, and based on the characterization of waste discussed in Section I, over 60percent of the

materials in Minnesota's MSW stream is organic (34.2percent paper and 27.3percent other organics). Setting aside recyclable paper and hard to compost organics (e.g. wood and diapers) this leaves approximately 20percent of the waste stream (primarily food waste and non-recyclable paper waste) potentially available for composting.

Diverting organics from disposal options to composting facilities is the new frontier for MSW management. Within the U.S., several states are out in front on this issue including California, Minnesota and Washington. A second tier of states are also focusing on this issue and are fast joining the ranks of these three, including Colorado, Oregon, and New York Regionally, interest is also growing in Iowa and Wisconsin. Three of the larger metro areas in North America that have successfully launched residential organics collection and composting programs are San Francisco, Seattle and Toronto. These communities, along with Portland, have also launched successful commercial organics collection programs.

Composting just the organic fraction of the waste stream is much different than composting raw MSW, which was popular for a period of time in the 80's and 90's. In this latter case, the composting of ordinary trash posed a number of problems – primarily odor and low-quality contaminated compost. Having residents, institutions and businesses separate the organic portion of their waste stream for collection and processing (hence the term source-separated organics or SSO) resolved many of the issues associated with MSW composting.

In Minnesota, there are four facilities that are permitted to accept and compost SSO. These include Swift County Composting Facility (Benson), Western Lake Superior Sanitary District (Duluth), CreekSide Soils (Hutchinson), and Resource Recovery Technologies or RRT (Empire Township). A fifth facility (RW Farms) located at the University of Minnesota Landscape Arboretum is currently operating under the MPCA's Demonstration and Research Project program and is likely to be permitted within the next several years.

Minnesota communities which offer residential SSO collection programs include Chanhassen, Chaska, Hutchinson, Medina, Minnetonka, Orono and Wayzata. Neighborhood pilot programs can be found in Edina and Minneapolis, and a residential SSO collection program proposed by Eureka Recycling is to be implemented in St. Paul within the next year or two. A number of other Metro Area communities have expressed interest in launching such programs though no immediate plans are in place. As for the Metro Area commercial/institutional sector, a diverse range of businesses and institutions (IKEA, Best Buy, convention centers, University of Minnesota, public schools, private schools, and neighborhood restaurants, bakeries and grocery stores) are all participating in SSO collection and composting programs.

Though there is much interest and support for SSO composting within (and outside of) the Metro Area, there are three primary issues, all intertwined with each other, which are currently preventing the widespread adoption of residential and commercial SSO programs:

- State rules and regulations;
- SSO composting infrastructure; and
- Collection issues.

Under current rules and regulations there are only two types of composting facilities – yard waste and MSW. SSO is not allowed to be composted at a yard waste composting site (the RW Farms facility is the exception), but the permitting and regulatory requirements for an MSW composting facility are far too burdensome, onerous and expensive for a SSO composting facility. Technically, the four facilities currently permitted to compost SSO are operating under an MSW composting facility permit.

Discussions have begun regarding revising the rules and regulations and is getting widespread support from state and local regulatory agencies as well as from a number of private sector players in this field. In fact, in the last legislative session some changes to definitions have already been made to make the transition to SSO programs easier.

Tied closely to this issue is that of the SSO composting infrastructure, particularly as it applies to the Metro Area. The composting facilities serving the Twin Cities (RRT and RW Farms) are located at the southern edge and the southeastern edge of the Metro Area, respectively. RW Farms is currently not a fully-permitted facility and has limited capacity. RRT also has some constraints as to how much they can accept and as they are operating under an MSW composting facility permit, their costs and tipping fees are much more comparable to a landfill or waste-to-energy facility making them non-competitive as a SSO composting option. Once the regulatory requirements and rule changes have been made to recognize SSO composting as a separate category different than MSW composting, it is anticipated that the infrastructure (e.g. SSO composting facilities) will begin to be developed in other parts of the Metro Area.

Collection of SSO, whether on the residential side or the commercial side, is also lagging due, in part, to the uncertainty of rules and regulations and lack of processing infrastructure. Having the ability to collect residentially-generated SSO with yard waste and take it to a SSO composting facility can reduce the collection cost significantly. Under current state rules, this is not allowed unless the material is going to an MSW composting facility. As route densities increase and collection costs decrease, haulers will be more willing to offer this service to their customers and cities, as well as homeowners, will be more apt to request these services from haulers. At this time, there is only one hauler that is aggressively selling this service to their residential and commercial customers (Randy's Environmental Services) and two haulers that are reluctantly offering this service to their commercial customers but only if requested (Waste Management and Allied Waste Services).

The Trends

So where does this leave the issue of source-separated composting? Nationally, the belief that source-separated organics composting is the next wave of waste diversion is widely held by those in the solid waste industry. In addition to the states already listed, other states having at least one operating SSO composting facility include Georgia, Maine, Massachusetts, New Hampshire, North Carolina, Ohio and Tennessee. SSO composting has also taken off in Canada (Ontario and Nova Scotia, in particular) and has been well established in Europe for well over two decades.

One reason for the intense interest in diversion of organics from the waste stream is its potential for not only providing beneficial effects associated with composting but also its potential impact on reducing greenhouse gas (GHG) emissions by removing a major source of methane generation from landfills (organics). Even with the capture of landfill methane as an energy source, fugitive emissions from such facilities can still release significant quantities of methane into the atmosphere.

In Minnesota, both the MPCA and the SWMCB have included SSO composting in policy reports and in the regional master plan as a way to attain ever increasing diversion goals. The report coming out of Governor Pawlenty's Minnesota Climate Change Advisory Group (MCCAG) last year specifically mentions composting as a tool for reducing Minnesota's Greenhouse Gas Emissions. The Integrated Solid Waste Management Stakeholders' Process (ISWMSP) is a group formed last year to develop implementation strategies around the recommended waste management policies coming from the MCCAG process. The ISWMSP group will be wrapping up much of their work by June. It's anticipated that SSO composting, and how best to implement these programs, will be high on the priority list for further state and regional action.

As for actual programs, Hennepin County continues to make SSO composting a large priority focusing on helping public entities (primarily schools and municipalities) develop and implement SSO programs. County grants are available to these public entities for starting programs. These programs have been so well accepted that private schools and businesses are contacting the County for technical assistance in setting up similar programs even if they don't qualify for grant funds. Though the County has worked with a few commercial businesses on SSO composting projects, it's Randy's Environmental Services (a Delano-based waste hauler) that has aggressively been marketing SSO collection and composting services to their clientele. These services have rapidly been incorporated into their core business.

Carver County, as well, has made SSO collection (co-collected with yard waste) a priority in their solid waste management system, and working with RW Farms and Waste Management has developed an impressive SSO composting program in less than two years. The program has been so successful that RW Farms is looking to establish a second SSO composting facility within the next couple of years.

Gauging by the level of interest from state regulators, state and county policymakers, several hauling companies, the general business community, and the general public, SSO collection and composting is expected to rapidly grow in the Metro Area in much the same way as recycling did in the 90's.

B. PRODUCT STEWARDSHIP

According to the Product Stewardship Institute (PSI), product stewardship is a principle that directs all participants involved in the life-cycle of a product to take shared responsibility for the impacts to human health and the natural environment that result from the production, use, and end-of-life management of the product. The greater the ability of a party to influence the life-cycle impacts of a product, the greater the degree of that party's responsibility. Typical stakeholders in a product stewardship initiative include manufacturers, retailers, consumers, and government officials.

The objective of product stewardship is to encourage manufacturers to redesign products with fewer toxics, and to make them more durable, reusable, and recyclable and with recycled materials. This is sometimes referred to as "Design for Environment" or DfE. The challenge of product stewardship is to move beyond disposal toward the concepts of zero waste and sustainable production.

A number of products have been the focus of product stewardship initiatives over the years. This list includes items such as fluorescent lighting, products containing mercury, tires, lead acid batteries, rechargeable batteries, and household batteries. Working with some combination of manufacturers, retailers, government agencies (primarily state and local), and consumers, many states have programs for the take-backtake-back and recycling of these materials.

Many of Minnesota's product stewardship initiatives have been in place for a number of years and are pretty well established. Examples of products covered under these initiatives include mercury containing products (including fluorescent lamps), batteries (all types), and tires. Because these programs have been widely adopted throughout the state, especially in the Metro Area, they are excluded from the trends discussion provided below.

More recently, however, four other product types have been garnering attention in product stewardship efforts both nationally and here in Minnesota – electronics, paint, container deposit programs, and pharmaceuticals. These are briefly discussed below.

1. Electronics Stewardship Initiatives

Used electronics are the most rapidly growing waste problem in the world due to their quantity, rapid obsolescence, and toxicity. Electronics include such devices as computers, TVs, VCRs, DVD players, camcorders, stereo systems, and cell phones. To put this problem into perspective, the Computer TakeBack Campaign published a fact sheet in 2007 with some startling statistics.[15] According to the Computer TakeBack Campaign:

- Worldwide, 400 million units of e-waste are scrapped each year.
- In 2003, it was estimated that nearly 133,000 computers were discarded each day in the U.S.
- The USEPA estimates that approximately 57 million televisions and computers are sold annually to households and businesses.
- The USEPA also estimates that nearly 130 million cell phones are retired each year.
- In 2005, we generated approximately 2.6 million tons of e-waste in the U.S. According to the USEPA, only 12.6percent of this amount was recycled.

There have been calls for some time to have the Federal government to pass e-waste management legislation setting a nationwide producer responsibility law. Thus far this hasn't happened. As a result, a number of states have passed such laws and implemented programs on the state level. So far, 18 states plus the City of New York have passed legislation mandating statewide e-waste recycling. Table 3.4 is a listing of these states.

Table 3.4
States and Cities with Producer Responsibility Laws

States/Cities	When Signed Into Law	Program Approach
California	9/03	ARF
Connecticut	7/07	EPR
Hawaii	7/08	EPR
Illinois	9/08	EPR
Maine	2004	EPR
Maryland	2005	EPR
Michigan	12/08	EPR
Minnesota	5/07	EPR
Missouri	6/08	EPR
New Jersey	1/08	EPR
New York City	4/08	EPR
North Carolina	8/07	EPR
Oklahoma	5/08	EPR
Oregon	6/07	EPR
Rhode Island	6/07	EPR
Texas	6/07	EPR
Virginia	3/08	EPR
Washington	3/06	EPR
West Virginal	4/08	EPR

As can be seen in Table 3.4, California was the first state to pass e-waste legislation followed by Maine, Maryland and Washington. The remaining 14 public entities on the list all passed their e-waste laws in 2007 and 2008.

[15] Facts and Figures on E-Waste and Recycling, Computer TakeBack Campaign, March, 2007.

The table also points out that with the exception of California, who implemented an Advanced Recycling Fee (ARF), all the other states have implemented Extended Producer Responsibility (EPR) programs. The difference between the two approaches is that under an ARF system, the consumer of the electronic product pays a fee up front for the end-of-life management of the product. That fee then goes to local, regional or state governments to setup takeback and recycling programs for these items.

Under the EPR approach, electronics manufacturers, and sometimes retailers, are responsible for taking their products back for end-of-life management. EPR is thought to be a better approach from an environmental management perspective as it requires the manufacturer to shoulder some of the responsibility and encourages manufacturers to adopt cleaner methods and less toxic materials in their manufacturing process and to design their products to be easier to dismantle and recycle.

In addition to the 18 public entities listed in Table 3.4, 15 states are introducing e-waste legislation this year. These states include Arizona, Colorado, Georgia, Indiana, Iowa, Kentucky, Massachusetts, Nebraska, New Hampshire, New York, Pennsylvania, South Carolina, Utah, Vermont and Wisconsin.

The Minnesota Electronics Recycling Act of 2007 was signed into law on May 8th of that year. Its intent is to facilitate the collection and recycling of video display devices (VDDs) from households in Minnesota. Regulated VDDs include all televisions, laptops, and computer monitors with displays larger than 9 inches, measured diagonally. At this time, cell phones are exempt. Requirements of the Act include:

- Manufacturers of VDDs must annually register and pay a fee to the state as well as collect and recycle VDDs from households/consumers in Minnesota.
- Manufacturers must meet annual targets for collection and recycling of covered electronic products based on their sales of VDDs to households/consumers in Minnesota. The VDDs they collect don't need to be just their particular brand as long as they meet their overall annual target.
- Manufacturers must collect and recycle, or arrange for the collection and recycling, of the VDD's they're responsible for.
- At the end of each program year, manufacturers file a report detailing the results of their collections for the year.
- Retailers are required to provide manufacturers with sales data for their respective brands as well as provide consumers with information regarding collection opportunities in Minnesota.

During the first program year (July 1, 2007 thru June 30, 2008), registered recyclers and collectors reported managing approximately 33 million pounds (17,000 tons) of covered electronic devices from Minnesota households.

According to at least one Minnesota legislator, Minnesota's e-waste program has been very successful. Representative Paul Gardner's website reports that not only is the e-waste law working, it's already creating jobs in the e-waste recycling industry. According to Representative Gardner:[16]

"One of the bright spots for employment in Minnesota has been the recycling of electronic waste. Because of the law we passed in 2007, consumers have been able to get rid of their old TVs, computers, etc.--usually without a fee--and have them recycled properly. Under the law, electronics manufacturers pay recyclers to have the material recycled, and in the first year, 33 million pounds (that's million) have been recycled. That exceeds the projected volume by 10 million pounds. We may be tweaking the law in the coming weeks to improve some technical details."

[16] Week of February 15, 2009 Review, Representative Gardner's Website (blog), February 20, 2009.

The Trends

With 17 states and one city having already passed laws and implemented programs, and another 15 states taking up this issue in their legislative sessions this year, there is no doubt that nationwide this trend will continue. Here in Minnesota, with the first year of program operation recovering over 50percent more than what was expected, it is anticipated that the e-waste management program will continue to be refined and new electronic products will be added to the program as more experience becomes available. Cell phones, as an example, are currently recycled via a voluntary process in Minnesota, but may get a second look as a product that gets covered in the e-waste program. As more of us race out to get the newest electronic gadgets, whether it's an iPod, iPhone or portable GPS system, it is likely that in the future these products will be eyed for inclusion in a product take-backtake-backtake-back program. In fact, the State has prepared a Product Stewardship Recommendations Report (discussed more at the end of this section) that sets up a comprehensive framework for product stewardship.

2. Paint Stewardship Initiatives

In December 2003, PSI facilitated a national dialogue aimed at reducing the generation of leftover paint, while increasing the reuse and recycling opportunities. This led to the development of the Paint Product Stewardship Initiative (PPSI), a coalition of paint manufacturers, government agencies, paint recyclers, painting contractors, and other participants. According to PPSI:

- Over 632 million gallons of paint are sold each year in the U.S.
- 10percent of paint sold has to be managed through special collection programs as leftover/surplus paint.
- Consumers have leftover paint because it is cheaper to purchase in larger quantities, can be saved for touch ups, and they would rather have more paint needed for a project than not enough.
- Paint is collected in high volumes (representing up to 60percent of all household hazardous waste), and this volume is expected to increase.
- The cost to manage leftover paint, from collection through recycling or disposal, averages roughly $8 per gallon – about $500 million per year in the U.S.
- In household hazardous waste management programs, it represents the largest cost for local governments to collect and manage.

The National Paint and Coatings Association (NPCA), which represents over 350 manufacturers of paints, coatings, adhesives, sealants, and caulks, as well as product distributors and materials suppliers to the industry, joined PPSI in 2002. Though NPCA has been working with individual states on the issue of leftover paint management for decades, the group felt that what was needed was a coordinated approach versus a state-to-state approach for managing leftover paint. They also felt that by joining PPSI, they could provide better information to state and local governments as well as gaining better information from non-industry stakeholders.

PPSI is in the process of developing a new nationally-coordinated system for the management of leftover architectural (house) paint. In 2007, Minnesota was selected for rolling-out a statewide demonstration project. The goal of the demonstration project is to work through critical issues and gather information that will be needed for developing a functional, fully funded, environmentally sound, and cost-effective national scope leftover paint management system. Originally, the Minnesota statewide demonstration project was to roll-out in 2008. Before it could move forward, however, industry-sponsored legislation was needed to address a number of issues including anti-trust

implications for the financing system and to ensure a level playing field. A bill was introduced in 2008 and passed both houses but Governor Pawlenty vetoed it.
The bill has been reintroduced in the current 2009 session (SF 477 and HF 569). SF 477 allows paint manufacturers to pilot an environmentally sound and cost-effective program for the takeback of paint. The bill also addresses such things as specifying certain pilot program components, imposing a uniform consumer paint stewardship assessment, requiring a report to the legislature by a certain date, and authorizes certain anti-competitive conduct. As of April 25th, SF 477 had been passed by the Senate and referred on to the house for the first reading and a comparison to the House's companion bill HF 569. This latter bill has gone through its second reading and has been sent to the Chief Clerk for comparison with SF 477.

As for the Minnesota Demonstration Project itself, it's currently under development with input from a national multi-stakeholders group. At this time, it is envisioned that paint manufacturers will front costs of running the statewide program with these manufacturers passing on the costs (estimated to be $0.25 to $0.50 per gallon of new paint sold) on to consumers. Leftover latex paint is to be recycled to the extent feasible and the USEPA is to conduct an evaluation of the demonstration project.

If the legislation itself either fails or is vetoed by the Governor, the PPSI is preparing to work with Oregon for implementing the demonstration project. As a result, paint stewardship legislation is also under review by the Oregon legislature.

After roll-out, evaluation and tweaking of the Minnesota Demonstration Project, the program is to be rolled-out in a phased-in approach starting with Oregon, Washington, and Vermont, moving on to California, and then to Iowa, Florida, North Carolina and Illinois.

The Trends

The cost of managing waste paint through local government household hazardous waste programs is a burden for many communities and county governments. A national (preferably) or regional program with involvement of the paint industry is essential for bringing costs down for the recycling and disposal of this material. With the support of over 200 participants, including paint manufacturers, painting contractors, paint recyclers and government agencies, the growth of this initiative is almost certain to continue.

Though the PPSI is behind schedule on their original timeline for development of a Minnesota demonstration project and roll-out in other states, PPSI and its partners here in Minnesota, primarily from the Metro Area, are moving forward.

Product stewardship programs for paint will grow nationwide and Minnesota (primarily the Metro Area) will continue to be a key player and leader in this arena.

3. Beverage Container Deposit Initiatives

Container deposit programs (bottle bills) are not typically thought of as product stewardship programs. They do, however, fit the definition as they involve a wide range of stakeholders – government agencies, bottling companies, distributors, retailers and consumers.

Container deposit programs require that a deposit on carbonated soft-drinks, water or alcoholic beverage containers be collected when the beverage is sold. When the container is returned to an authorized redemption center, or the original retailer in some jurisdictions, the deposit is partially or completely refunded to the consumer.

Governments typically pass container deposit legislation to encourage recycling and complement existing curbside recycling programs or to specifically reduce beverage container litter along highways, in lakes and rivers, and on other public or private properties. Deposits that are not redeemed are often used by the governmental entity involved to fund environmental programs; sometimes they are used to cover the costs of processing returned containers.

Currently, there are 11 states that have enacted container deposit legislation and programs. These are summarized in Table 3.6. In addition to these states, seven others are currently considering container deposit legislation – Florida, Maryland, New Hampshire, New Jersey, New Mexico, Tennessee, and West Virginia.

Table 3.6
Current States with Container Deposit Laws

State	When Enacted	When Implemented	Beverages Covered	Containers Covered	Deposit Amount
California	9/86	9/87	Beer, malt, wine, distilled spirits, coolers, all non-alcoholic beverages.	Aluminum, glass, plastic, and bi-metal.	≥ 24 oz. - 10¢ < 24 oz. - 5¢
Connecticut	4/78	1/80	Beer, malt, carbonated soft-drinks, carbonated water.	Aluminum, glass, plastic, and bi-metal.	5¢
Delaware	6/82	1/83	Beer, malt, ale, soft drinks, mineral water, soda water.	All beverage containers (except alum.) under 2 qts.	5¢
Hawaii	6/02	1/05	Beer, carbonated soft drinks, tea & coffee, water. Excludes wine and liquor.	All metal, glass, plastic containers ≤ 64 oz.	5¢
Iowa	4/78	6/79	Beer, carbonated soft drinks, mineral water, wine coolers, wine, liquor.	All metal, glass, plastic containers.	5¢
Massachusetts	6/81	1/83	Beer, malt, carbonated soft drinks, mineral water.	All metal, glass, plastic containers.	5¢
Maine	1/76	6/78	All beverages except dairy products & unprocessed cider.	All metal, glass, plastic containers ≤ 4 liters.	Wine/Liquor - 15¢. All others - 5¢
Michigan	11/76	12/78	Beer, soft drinks, carbonated & mineral water, wine coolers, canned cocktails.	All beverage containers < 2 qts. Excludes alum., paper, plastic under 1 gal.	5¢
New York	6/82	7/83	Beer, malt, carbonated soft drinks & mineral water, wine coolers.	All metal, glass, paper, plastic containers < I gal.	5¢
Oregon	7/71	1/72	Beer, malt, carbonated soft drinks, bottled water.	All metal, glass, plastic bottles, cans and jars.	Standard Refillable -- 2¢ All others -- 5¢
Vermont	4/72	7/73	Beer, malt, carbonated soft drinks, mixed wine drinks, liquor.	All metal, glass, plastic bottles, cans, cartons, and jars.	

Though not listed in Table 3.6, there has been some activity last year and this year related to beverage container recovery and deposit legislation in Minnesota and Wisconsin. In August 2008, the MPCA, in collaboration with the Wisconsin Department of Natural Resources (WDNR), began to pursue a voluntary product stewardship agreement with the beverage industry to fulfill the objectives of the 2007 Minnesota Solid Waste Policy Report, which recommended a goal to recycle 80percent of beverage containers by January 1, 2012. Based on the policy report, if progress is not satisfactory toward the 80percent goal, the MPCA will recommend stronger action be taken, and consider the following options:

- A producer responsibility program for the collection and recycling of beverage containers. Such a program would place the financial and programmatic responsibility on beverage producers to attain the 80percent recycling rate.
- A traditional container deposit program.
- A disposal ban on beverage containers that bears in mind the need for enforceability and fairness.

The MPCA and WDNR convened four stakeholder meetings between September 2008 and January 2009 to offer stakeholders an opportunity to identify and develop potential strategies to increase the recycling rate of beverage containers, excluding passage and implementation of a container deposit law. The stakeholders invited include representatives of the beverage manufacturing industry, retailers, local government, and others with an interest in beverage container recycling.

A number of strategies were discussed centering around four areas – residential curbside, multi-family, commercial/retail, and specialty (schools, parks and events). The draft report[17] coming out of this initiative came to the following conclusions:

- In order to achieve the 80percent goal identified in the policy report, the collection rate of these containers would need to triple;
- Many of the strategies identified by the stakeholders would require legislative action and expanded financial input from local government, Minnesota and Wisconsin state governments, and the business community;
- Due to the complexity and cost of these strategies, along with the need for substantive stakeholder commitments, MPCA staff contends that the state is unlikely to achieve the 80percent goal; and
- Although the stakeholder meetings were informative, offered an opportunity for discussion, and demonstrated the interest in addressing the issue, a clear path with specific commitments has not been developed.

At about the same time as this draft report was prepared; Rep. Melissa Hortman introduced HF 1128 on the floor of the Minnesota House. The bill's intent is to require a recyclable refund value on recyclable beverage containers, provide for refunds for containers returned, having unclaimed recycling refunds payment be appropriated accordingly. The bill was introduced and first read on February 26, 2009 and referred to the Environmental Oversight and Policy Committee.

A companion bill was introduced by Sen. Katie Sieben (SF 1549) on the floor of the Minnesota Senate. This bill required:

- A recycling refund value to be placed on recyclable beverage containers;
- Regulating the refunding procedure;

[17] Summary of the Beverage Container Stewardship Initiative for Minnesota and Wisconsin (Draft), MPCA, March 2009.

- Defining certain terms;
- Specifying certain beverage container labeling requirements;
- Providing for refunds for containers returned;
- Authorizing the establishment of redemption centers;
- Specifying certain distributor or manufacture reporting requirements;
- Requiring payment of unclaimed recycling refunds;
- Providing enforcement by the Department of Revenue;
- Creating an unclaimed recycling refunds account in the environmental fund;
- Appropriating money to the Commissioner for the environmental fund and for counties for solid waste management purposes; and
- Authorizing rulemaking.

The Senate bill was introduced and first read on March 16, 2009 and referred to the Environment and Natural Resources Committee. At this time, neither bill has made its way out of committee.

The Trends

With the alarming amount of plastic beverage containers and aluminum cans still being found in the solid waste stream, the call for container deposit legislation (both at the national and state level) has been eagerly renewed by many in the environmental industry. Beverage container capture and recovery rates in bottle bill states averages 78percent as opposed to 23percent in non-bottle bill states. Couple this with the Glass Packaging Institute's recent announcement that they've set a goal of using 50percent recycled glass in the container manufacturing process by 2013, and the Aluminum Association's recently announced 75percent recycling goal by 2015, and you can see why there is a renewed interest in container deposit legislation.

Last year and this year, a number of states having container deposit legislation amended their laws to include bottled water containers, as this is one of the fastest growing plastic items in the waste stream. As noted previously, seven states that currently don't have container deposit legislation are considering them in this year's legislative sessions.

Also noted previously are the recent discussions between the States of Minnesota and Wisconsin and other stakeholders about increasing the recycling rate for beverage containers to 80percent, and the current bills in both the Minnesota House and Senate related to container deposit legislation.

Having said this, the bottling industry is not supportive of this type of legislation, both nationally and in Minnesota, and to date have successfully lobbied against such legislation. Nonetheless, the trend will continue nationwide calling for a national bottle bill as well as state-level bottle bills. Regardless, if such activities succeed, there is a growing trend toward increased capture and recovery of beverage containers and a pretty clear sign that this will be the focus of state and local governments, including those in Minnesota.

4. Pharmaceuticals Stewardship Initiatives

Pharmaceutical waste management is emerging as a prominent public health issue as Americans use and dispose of more prescription medications and trace levels of pharmaceuticals end up in the water supply. A recent five-month investigation by the Associated Press[18] revealed that pharmaceuticals are present in the drinking water of 24 major metropolitan areas nationwide. Few water treatment facilities

[18] "AP Probe Finds Drugs In Drinking Water", San Francisco Chronicle, Jeff Donn, Martha Mendoza, Justin Prichard, March 10, 2008.

currently test for pharmaceutical contamination and almost none have the technology necessary to remove it. Disposing of these materials in the trash also poses human health and environmental problems, making that undesirable as well.

These pharmaceuticals come from a number of sources such as drug manufacturers, hospitals and pharmacies. If not already in place, regulatory requirements for the health industry (drug manufacturers, health care institutions and pharmacies) are quickly being put into place to deal with those sources of pharmaceuticals. However, in the U.S. there are currently no regulations or programs governing the proper disposal of medication and other prescription drugs coming from households and other institutions such as nursing homes, both of which are believed to be significant contributors to this problem.

Over the past two years, PSI has received funding from multiple state and local agencies to develop product stewardship approaches for the collection and management of unwanted/waste pharmaceuticals. The primary goals of this project include:

- Evaluating the need for a nationally coordinated system for the management of these materials that allows for multiple solutions that reflect local/regional differences; and
- Increasing the safe, legal and environmentally protective collection and disposal of unwanted/waste pharmaceuticals through the development of best management practices.

PSI is currently having a dialogue with a diverse group of key stakeholders to obtain their involvement and input into this process. This is being done through a series of four meetings in different parts of the country, with the first two meetings already held (June 19/20, 2008 – Sacramento, CA and December 2/3, 2008 – Washington D.C.). The last two meeting have not yet been scheduled. In between the meetings are a series of conference calls. The main goals of the PSI multi-stakeholder dialogue are to increase awareness and to create a national, sustainable system for the end-of-life management of unwanted/waste pharmaceuticals.

On March 18, 2009, PSI became a listed supporting organization for HR 1191. HR 1191, the Safe Drug Disposal Act of 2009, is sponsored by Rep. Jay Inslee (D-WA) and is a bill to amend the Controlled Substances Act to provide for disposal of controlled substances by ultimate users and care takers through State takeback disposal programs, to amend the Federal Food, Drug, and Cosmetic Act to prohibit recommendations on drug labels for disposal by flushing, and for other purposes. This bill was referred to the Subcommittee on Commercial and Administrative Law for legal review.

At the state level, none have product stewardship take-back programs for pharmaceuticals. However, at least three states – Maine, Oregon and Minnesota – are introducing pieces of legislation addressing this issue in their current sessions. Maine's LD 821 would require pharmaceutical producers to plan and finance a cost-effective medication return program for Mane. Oregon's SB 598 would require drug manufacturers and distributors that serve Oregon to plan, implement, and pay for a convenient way for Oregonians to dispose of unwanted and unused medicines in an environmentally safe manner.

SF 1568, the Minnesota Safe Drug Disposal Act of 2009, was introduced on the Minnesota Senate floor on March 16nd. The bill does the following:

- Provides for a product stewardship program under the MPCA requiring drug producers and wholesalers to participate in a collection and disposal program for unwanted pharmaceutical wastes;
- Specifies requirements, costs payment, product stewardship plan content, and an agency review and approval process;

- Requires unwanted products to be disposed in appropriate waste disposal facilities as well as setting up a permitting process for alternative disposal technologies;
- Authorizes fees and providing for enforcement and penalties; and
- Requires product stewardship program promotion, outreach and reporting.

The bill has been referred to the Environment and Natural Resources Committee.

A companion bill, HF 1217, has similar features and requirements. HF 1217 was introduced on the Minnesota House floor on March 2nd and was referred to the Environment Policy and Oversight Committee.

The Trends

Like paint, managing pharmaceuticals through take-back programs is a relatively new concept but one that is likely to be of increasing importance and focus in the future. Though there has been little to no experience with these kinds of programs in the U.S., over the last 10 years pharmaceutical take-back programs have been implemented in several foreign countries and five Canadian Provinces.[19] Though it is unclear exactly how much support is coming from the major drug companies for these take-back programs, the issue has gotten the attention of those in the drug industry as well as Federal, state and local public officials and agencies. As policies and legislation around pharmaceutical take-back programs gain more momentum, it appears that Minnesota, and the Metro Area specifically, will be at the forefront of this issue.

5. MPCA Product Stewardship Recommendations Report

During the 2008 legislative session, HF 1812 was passed. This bill required the MPCA to develop recommendations for establishing a comprehensive product stewardship approach for reducing environmental and health risks posed by the use or disposal of products. HF 1812 directed the MPCA to submit these recommendations to the chairs and ranking minority members of the senate and house committees with jurisdiction over environmental policy and environmental finance by January 15, 2009. More specifically, the recommendations were to address at a minimum:

- A set of criteria to be used to evaluate products proposed for product stewardship solutions;
- A process for designating products for product stewardship solutions and the role the Legislature would play in the process;
- Typical components of product stewardship plans;
- Options to facilitate the creation of industry-managed stewardship management organizations;
- Methods to identify/monitor progress toward stewardship performance goals for specific products; and
- Strategies to implement the use of standards, certifications, and eco-labels to promote environmentally preferable products.

During the preparation of the report, the MPCA met with several stakeholder groups and hosted two public meetings. The MPCA also researched other product stewardship programs in North America in order to identify opportunities for promoting consistency between existing and proposed programs in other jurisdictions. As part of this research, extensive dialogue was conducted with state environmental agencies in California, Oregon and Washington regarding the policy approach and components of their developed and developing frameworks. Similar discussions were also held with the Canadian provinces of British Columbia, Manitoba and Ontario.

[19] Pharmaceutical take-back programs have been implemented in Australia, Portugal, Spain, and in the Canadian Provinces of Alberta, British Columbia, Manitoba, Nova Scotia, and Ontario.

Based on feedback from stakeholder groups and the general public, as well as from the research and dialogues with other jurisdictions, the MPCA came up with recommendations for each of the bulleted items above. The Product Stewardship Recommendations Report is posted on the MPCA's website and can be downloaded at http://www.pca.state.mn.us/oea/stewardship/study.cfm

IV. AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009: STIMULATING THE INDUSTRY

In February of this year, the U.S. Congress passed and President Obama signed a $787 billion economic stimulus bill aptly named the American Recovery and Investment Act of 2009. The stimulus package contains a significant amount of money (nearly $60 billion) for greening the U.S. economy. A recent article, in Resource Recycling magazine, discusses how the stimulus package will impact the recycling industry.

The article[20] cites seven ways the stimulus package affects, or could affect, recycling around the country. Based on the author's (Henry Leineweber) review of the stimulus package, he identifies seven areas where the recycling industry may stand to benefit from the package. Some of these areas include:

1) As many as 25 shovel-ready recycling projects could receive direct support from the stimulus.

Earlier this year, 25 ready-to-go recycling proposals were identified as strong candidates for funding from stimulus package funding. These projects, from 17 different states, run the gamut of recycling and composting related initiatives including such things as construction or modification of recycling facilities (6 projects), construction of an anaerobic digester for processing organics for energy recovery/composting, recycling program expansions or enhancements (5 projects), glass recycling capital investment, and source-separated organics composting (2 projects). Several of these projects are expected to create several hundred jobs each.

Even if some of these projects don't receive funding, other projects with no direct connections to recycling are poised to benefit the industry. As an example, the stimulus package includes $11 billion for rebuilding the nation's energy grid. Such an undertaking would almost certainly consume large amounts of recycled steel, copper, aluminum and other metals.

2) Buying recycling and composting equipment will be easier.

The legislation allows for bonus depreciation toward the purchase of new equipment and plants by doubling the amount small businesses can write off on these investments. Technically an extension of the Recycling Investment Saves Energy Act, a provision added to the $700 billion Federal financial bailout plan passed last year under former President Bush, the law allows businesses to deduct up to 50percent of the cost of applicable assets, with a depreciable lifespan of less than 20 years. The provisions of this bill also allow businesses to expend up to $250,000 of applicable capital acquisitions through 2010, if the overall expenditure is less than $800,000.

3) Demand for recycled products from the transportation sector will increase.

[20] "Repairing Recycling: Seven Ways the Stimulus Package Affects You", Henry Leineweber, Resource Recycling, March, 2009.

Nearly $48 billion will be spent on transportation including intercity rail, mass transit and light rail, and highway and bridge infrastructure. Between 10,000 and 30,000 tons of steel will be used in each new bridge, according to some analysts. Repairing an existing bridge consumes an average of between 5,000 and 10, 000 tons of steel. Much of this steel is likely to be recycled.

New road and building construction is also likely to boost demand for geosynthetic barrier materials (some made from recycled plastics), road-base materials (made from recycled concrete and glass), steel (recycled) and landscaping materials (compost).

Additionally, the National Recycling Coalition (NRC) estimates that over $300 million will be needed to overhaul the nation's recycling infrastructure including modernizing facilities, constructing new plants, purchasing new equipment, and expanding processing capacity. NRC feels that this sum is well within the limit for energy efficiency and recycling grant funding set aside in the bill, although such projects will have to compete against other energy efficiency-related proposals.

Finally, based on Mr. Leineweber's analysis, he predicts certain sub-sectors within the recycling industry will be the big winners under the American Recovery and Reinvestment Act of 2009. These sub-sectors include:

- Recycled steel producers;
- Recycled copper and aluminum producers;
- Mixed plastic processors, such as producers of composite lumber, plastic railroad ties, and composite concrete[21]; and
- Equipment manufacturers, as many companies and public entities in the waste and recycling industry will modernize facilities, install new energy efficient technologies, purchase new collection vehicles and containers, and upgrade existing processing capacity.

V. CONCLUSIONS

Recycling has become a mainstream issue nationally as well as here in Minnesota. It has also seen a renaissance of sorts over the last ten years as its importance to reducing greenhouse gas (GHG) emissions and sustainability has been recognized. According to the USEPA, achieving the national recycling rate of 35percent would reduce GHG emissions by the equivalent of 48 million tons of carbon. This is the equivalent of taking 36 million automobiles of the road.

Within the last 10 years, a number of trends in waste reclamation have developed or are developing. Minnesota has been at the forefront of most of these trends, and nationally is seen as one of the leading states, along with California, Oregon and Washington, in developing and adopting new approaches and new concepts to waste reclamation. The National trends discussed in this report and how are affecting Minnesota are noted below:

• Achieving Residential Curbside Efficiency

Single-stream collection of residential recyclables is growing nationwide and here in Minnesota. This method of collection has met with a lot of controversy as for all the benefits it offers – ease of use, increased household participation, and the potential for collection cost savings – there are some significant issues with materials quality and marketability. Nonetheless, it is anticipated that single-

[21] It should be noted that Minnesota is home to several recycled plastics processors/manufacturers of composite lumber and other construction materials.

stream collection will continue growing both nationally, as well as in Minnesota albeit at a slower rate. This growth is especially true in urban areas.

- **Increasing the Amount of Targeted Materials Collected**

For increasing the amount of targeted materials collected in the residential sector, there is a strong trend toward Pay-As-You-Throw (PAYT) collection programs where the generator is charged based on how much is put in the garbage – the more garbage, the more you pay. Coupling this with residential recycling participation rewards programs (e.g., RecycleBank) is having a positive impact on increasing residential recycling rates and it's anticipated that more programs along this line will trend the residential recycling rate upward. Though most communities in the Metro Area are already using PAYT programs, the RecycleBank concept is growing and will continue to do so in the Metro Area.

As for the commercial sector, between solid waste management fees/taxes and the desire by businesses to reduce their overall operating costs, much recycling is already being done. However, there is a lot of room for growth in the recycling programs serving this sector. Concepts such Resource Management contracting, as well as local governments focusing more of their attention on the business sector, will continue to grow business recycling programs in this marketplace. Adding the greater awareness on the part that recycling plays in reducing costs and helping businesses maintain or grow their customer base through "green" marketing campaigns, the trend toward more business recycling programs will continue to grow in the Metro Area.

- **Stabilizing and Growing the Recyclable Commodities Markets**

Between 2005 and 2008, there was huge growth in the recyclable commodities markets in part due to economic activity here and around the world, especially in the Asian markets. Prices for recyclable commodities reached levels never before seen. However, when the world economy collapsed in the fall of 2008, so did these markets. One of the hard, but necessary, lessons we learned from this is not to rely so heavily on foreign markets for the purchase of our recyclable commodities.

As we begin coming out of this recession, there will be a lot more emphasis on boosting our local and regional markets to avoid such a high dependence on foreign markets for our recyclables. The driver behind growing domestic markets will be the emergence of the green economy over the next 10 to 20 years. As part of the move toward more energy conservation, renewable energy, and GHG emission reduction initiatives, the role of the recycling industry will become more prominent in our economy. The energy savings, GHG emission reductions potential, and the use of recycled materials in green buildings will stimulate domestic recycling markets including those in Minnesota. The MPCA has been taking an active role in assisting and promoting new recycling markets and businesses in the state and this trend is likely to continue.

- **Diverting Organics from the Waste Stream**

As we strive as a nation to increase recycling rates, digging deeper into the waste stream for diversion will be necessary. What has been attracting quite a bit of attention over the last 10 years has been the potential for diverting organics away from disposal and toward composting. California, Minnesota and Washington are the leaders in this area. With the Metro Area MSW stream containing nearly 20percent of available materials for composting, the state and the SWMCB has been focusing on this issue for the last seven years. To date, the state, local governments, and private industry have put a substantial amount of money and effort into developing source-separated organics composting programs and facilities. However, we have just scratched the surface of organics diversion and developing the rules/regulations, collection and processing infrastructure and markets for the finished project has

become a high priority for the state and metro counties. Growing these programs and infrastructure will continue as a trend for Minnesota for years to come.

- **Managing the Electronics Waste Stream**

With 17 states (including Minnesota) and one city having already implemented product stewardship programs for electronic waste (e-waste), and another 15 states taking up this issue in their current legislative sessions, there is no doubt that nationwide this trend will continue. Minnesota's e-waste stewardship program has been in operation for less than two years and has met with phenomenal success. The program, however, has a long way to go with regard to expanding the program to all types of e-waste, recovering the e-waste that's out there and assisting the private e-waste collection and processing infrastructure that is developing around this issue. The growth of this industry and public/private partnership programs will continue here and elsewhere throughout the nation.

- **Waste/Unwanted Paint Stewardship Initiatives**

The Paint Product Stewardship Initiative (PPSI) grew out of a partnership between the Product Stewardship Initiative, state and local governments, paint manufacturers and paint contractors. The need for a national recovery program for waste/unwanted paint, primarily from household consumers, was recognized by this group. Coming together they have developed a framework and timetable for rolling out a national paint stewardship program.

Minnesota was chosen as the location for a demonstration project that once implemented and refined would serve as the model for others to follow. This initiative is just getting started with Minnesota demonstration project being kicked-off later this year or early next. The PPSI is strongly committed to this effort as are a number of states (including Minnesota) and state legislators. With the strong support of paint manufacturers and others in the paint industry, as well as that of Federal, state and local governments, the trend toward paint product stewardship is sure to continue. Minnesota and the Metro Area, in particular, will continue to be a key player and leader in this arena.

- **Beverage Container Deposit Initiatives**

After a number of years of no activity, a number of states are revisiting the idea of container deposit programs (Bottle Bills). Much of this impetus comes from the alarming amount of plastic and aluminum beverage containers still seen in the waste stream. Currently, eleven states have implemented container deposit programs and at least seven others are considering passing container deposit laws.

There has been a renewed interest and focus on this issue in Minnesota. Formal discussions with various stakeholder groups regarding how to get beverage containers out of the waste stream were undertaken last year and this year led by the MPCA. Two bills, one from the Minnesota House and one from the Minnesota Senate, establishing a container deposit program were introduced in the current legislative session. It is unlikely, however, that these bills will muster the support to pass. The beverage industry and retailer groups have an effective lobby and have handily blocked previous legislation introduced in the Minnesota legislature.

Nonetheless, the issue of beverage containers in the waste stream is a hot national and state issue and it is likely that continued focus will be on programs for diverting these materials away from disposal. How that plays out in Minnesota is still left to be seen.

- **Waste/Unwanted Pharmaceuticals Stewardship Initiatives**

Recently, waste/unwanted consumer pharmaceuticals have come under closer scrutiny for inclusion in product stewardship programs. With trace levels of prescription drugs and other pharmaceuticals being

found in water supplies and causing biological disruption to aquatic ecosystems, this emerging issue is rapidly getting the attention of Federal, state and local regulators. Though disposal of some of the waste/unwanted pharmaceuticals coming from drug manufacturers, pharmacies and hospitals are regulated, others aren't. As for waste/unwanted pharmaceuticals coming from households and other institutions such as nursing homes, there is a significant lack of regulatory programs in the U.S.

Nationally, a House bill (HR 1191) was recently introduced in Congress to set up a framework for a national take-back program for waste/unwanted household pharmaceuticals. In addition, three states – Maine, Minnesota and Oregon – have introduced similar legislation at the state level. It is anticipated that this issue will grow in importance and both at a national and state-level legislation and regulatory programs will be implemented. Within the Minnesota solid waste management industry this issue is gaining momentum and programs for the collection and proper management of household waste/unwanted pharmaceuticals will take on greater importance in the years ahead

In conclusion, Minnesota is actively engaged in all these trends and is considered a leader when it comes to diverting organics from the waste stream for composting, e-waste product stewardship initiatives, and paint product stewardship initiatives. These trends will continue to develop nationally, as well as in Minnesota, and should pose further economic opportunities for job creation revenue generation. Those trends that are the most likely to have the biggest impact on the Minnesota economy include the creation and growth of new recycling markets, the growing organics recovery and composting industry, and product stewardship programs developing around e-waste, paint, and pharmaceuticals.

ATTACHMENT A

2005 – 2024 REGIONAL SOLID WASTE MASTER PLAN VISION, GOALS AND OUTCOMES

A. Regional Solid Waste Management System Vision

A sustainable community seeks a better quality of life for current and future residents by maintaining nature's ability to function over time. It minimizes waste, prevents pollution, promotes efficiency, and develops resources to revitalize local economies. The waste management system is a component of the infrastructure of a sustainable community. Therefore, solid waste will be managed by technologies and methods that support sustainable communities and environments. The solid waste hierarchy, with its associated goal of protecting the state's air, land, water, and other natural resources and the public health, is central to attaining the objectives of sustainability and solid waste management.

B. Regional Solid Waste Management System Goals

Goal 1: To manage waste in a manner that will protect the environment and public health, and that will conserve natural resources.

Goal 2: To manage waste in an integrated waste management system in accordance with the hierarchy in order to minimize landfilling, with an increased focus on maximizing reduction of toxicity and volume of waste, reuse, recycling, and source-separated organics waste management.

Goal 3: To manage waste in a cost-effective manner that maximizes environmental benefits and minimizes long-term financial liability for citizens, businesses and taxpayers.

Goal 4: To cause generators to take responsibility for the environmentally sound management of their waste and to allocate solid waste management system costs equitably among those who use or benefit from the system.

C. Regional Solid Waste Management System Outcomes

Toxicity Reduction

Regional Outcome #1: By 2010, the toxic/hazardous character of MSW will be reduced.

Regional Outcome #2: By 2010, households will use fewer products containing toxic/hazardous components, reduce the amount of the product used, and properly manage household hazardous waste and problem materials.

Regional Outcome #3: By 2010, business and industry will use fewer products containing toxics/hazardous components, reduce the amount of product used, and properly manage problem materials and hazardous materials.

Regional Outcome #4: By 2010, manufacturers and retailers will demonstrate greater responsibility for reducing the amount of toxic/hazardous components of consumer products and for properly managing these products when they become waste.

Regional Outcome #5: By 2010, public entities will use products that do not contain toxic/hazardous materials where cost-effective alternatives exist. Where cost-effective alternatives do not exist, public

entities will seek opportunities to use products that contain reprocessed/recycled hazardous and special wastes.

Waste Reduction, Reuse and Recycling

Regional Outcome #1: By 2010, the region will recycle at least 50percent of the MSW stream (including 3percent source reduction credit and 5percent yard waste credit) and work to slow the growth of the MSW stream.

Regional Outcome #2: By 2010, manufacturers and retailers will demonstrate greater responsibility for reducing the amount of waste generated from the transport, purchase and use of consumer products and increasing the recyclability of consumer products.

Regional Outcome #3: By 2010, the percentage of waste recycled by public entities will increase.

Regional Outcome #4: By 2010, the quality and usability of waste generation and management data, and the efficiency with which such data is collected, will improve.

Regional Outcome #5: By 2010, the collection and separate management of food waste and other organic waste will increase.

Processing

Regional Outcome #1: The region will maximize the use and capacity of waste-to-energy facilities to process waste in an environmentally sound and cost-effective manner.

Regional Outcome #2: By 2007, the cost and public subsidies of processing will be reduced.

Regional Outcome #3: Processing capacity serving the region will be expanded by existing and new technologies.

Regional Outcome #4: Public institutions and food production and service industries will manage food waste and other organic materials separately at the highest feasible level of the waste management hierarchy.

Landfilling

Regional Outcome #1: Through the year 2025, landfills will be designed, operated and managed to protect the environment and public health.

Regional Outcome #2: Through the year 2025, landfill disposal capacity for MSW that cannot be reduced, recycled, or processed will be available.

Regional Outcome #3: By 2010, the region and the State will determine environmental impacts and costs of MSW landfilling and fully account for mitigating impacts.

Regional Outcome #4: By 2010, households, businesses and public entities will make responsible waste management choices about landfilling.

Non-MSW Management

Regional Outcome #1: By 2010, the region will see an increase in the reduction, reuse, recycling and processing of non-MSW.

Regional Outcome #2: By 2010, the region will improve the quality, usefulness and collection efficiency of non-MSW generation and management data.

Regional Outcome #3: By 2010, public entities in the SWMCB region will incorporate sustainable building design principles, including the consideration of long-term building operation and replacement costs, for the construction and remodeling of government buildings.

Regional Outcome #4: By 2010, manufacturers and retailers will demonstrate greater responsibility for reducing the amount of toxic/hazardous components of building products, and for properly managing the products when they become waste.