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An Assessment of the U.S. EPA Voluntary Partnership Program: WASTEWISE

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by

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The Group Project is required of all students in the Masters of Environmental Science and Management (MESM) Program. It is a three-quarter activity in which small groups of students conduct focused, inter-disciplinary research on the scientific, management, and policy dimensions of a specific environmental issue. This Final Group Project Report is authored by MESM students and has been reviewed and approved by:

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ABSTRACT

An Assessment of the U.S. EPA Voluntary Partnership Program WasteWise

by
Alfred Andrade, Jr., Donna M. Cassano, Connie H. Liu, Anita Teo and Joseph B.Yahner

WasteWise is an US EPA voluntary program established in 1994 as a non-regulatory means to reduce municipal solid waste and prevent pollution. Membership in the program is free and the program is designed to create a flexible, cooperative partnership to provide its members with cost-effective solutions for waste reduction. The program targets large and small businesses, local and state governments, not-for-profit organizations, academic institutions, and trade organizations. The primary objective of our research is to determine the effectiveness of the EPA WasteWise program in promoting waste reduction, recycling, purchasing and manufacturing of recycled products, and ultimately preventing pollution by reducing green house gas emissions.

As a foundation for our research, we have provided an historical review of voluntary agreements and their value in motivating environmental changes. In addition, we have utilized analytical tools such as a questionnaire and case studies to generate original research and provide unique insight on the efficacy of the WasteWise program. One of our case studies involved recruiting the University of California, Santa Barbara into the program to evaluate any potential difficulties experienced by new members. Based on our analysis of the program we will provide recommendations on ways to overcome some of the program deficiencies identified during our research. In addition, we have provided a protocol or useful tool to facilitate partner reporting in the program. Finally, our research includes recommendations for improving incentives offered to WasteWise members to increase active participation.

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Acronyms

AS	Associated Students
ASRP	Associated Students Recycling Program
CIWM	California Integrated Waste Management Board
CEC	Community Environmental Council
CCAP	Climate Change Action Plan
CSI	Common Sense Initiative
EMS	Environmental Management System
ERG	Environmental Research Group
EO	Executive Order
EPA	Environmental Protection Agency
GEMI	Global Environmental Management Initiative
GLOB	Glass, Aluminum, Plastic
IPM	Integrated Pest Management
IWM	Integrated Waste Management
LMOP	Landfill Methane Outreach Program
LTA	Long Term Agreements
MACC	Make a Corporate Commitment Campaign
MOU	Memorandum of Understanding
MSO	Material Services Officers
MSW	Municipal Solid Waste
NEEAT	New England Environmental Assistance Team
NEPP	National Environmental Policy Plan
NGO	Non-Government Organization
NWWM	Non-WasteWise Member
OAR	Office of Air and Radiation
OPR	Office of Policy and Reinvention
OPPTS	Office of Pesticides, Pollution Prevention and Toxic Substances
OR	Office of Reinvention
PEPCO	Potomac Electric Power Company
PPA	Pollution Prevention Act
PPCC	Partnership Programs Coordinating Committee
SIC	Standard Industrial Classification
UCSB	University of California Santa Barbara
VA	Voluntary Agreement
VEA	Voluntary Environmental Agreements
WARM	Waste Reduction Model
WWM	WasteWise Member

EXECUTIVE SUMMARY

WasteWise is an Environmental Protection Agency voluntary program established in 1994 as a non-regulatory means to reduce municipal solid waste and prevent pollution. Membership in the program is free and the program is designed to create a flexible, cooperative partnership to provide its partners with cost-effective solutions for waste reduction. The program targets large and small businesses, local and state governments, not-for-profit organizations, academic institutions, and trade organizations. The primary objective of our research is to determine the effectiveness of the EPA WasteWise program in promoting waste reduction, recycling, purchasing and manufacturing of recycled products.

As a foundation for our research, we provide an historical review of voluntary agreements and their value in motivating environmental changes. Our review suggests that voluntary agreements can effectively complement existing regulatory programs, and, as in the case of WasteWise, achieve positive environmental results by addressing environmental problems where there are no regulations in place.

We conducted general case studies of partners to gain a detailed and unique perspective from program participants. Our primary case study involved recruiting the University of California, Santa Barbara into the WasteWise program to evaluate the process of joining the program. In addition, we obtained the partners perspective on the program by conducting a survey. The results indicate that partners have similar motivations for joining the program, primarily to improve community relations, to promote the organization's waste reduction goals, and to learn waste reduction techniques. In addition, partners indicate that the cost savings attributable to the program outweigh the costs.

Based on our research, we concluded that the WasteWise program could benefit organizations seeking to initiate or expand their waste reduction programs. Potential benefits to partners include technical advice, national exposure, and information exchange opportunities with other members, a structure for tracking waste reduction quantities, and external motivation for partners to maintain a waste reduction program. However, the program does have a number of deficiencies that should be addressed. These include a low reporting

rate by partners (less than 20% report results), free riders, a lack of resources designed to target specific types of partners, and difficulty fulfilling the initial baseline and goal setting requirements of the program.

Our recommendations include the following: increase efforts to assist non-reporting partners to participate and report, develop resources specific to industry sectors, such as the Education protocol, solicit external sources to provide on-site assistance to partners, and develop electronic database to improve localized support for partners.

1.0 INTRODUCTION

1.1 VOLUNTARY AGREEMENTS

A voluntary agreement is "an agreement between government and industry to facilitate voluntary action with a desirable social outcome, which is encouraged by the government, to be undertaken by the participant based on the participant's self-interest" (Storey et al., 1997). A voluntary approach to addressing environmental problems is increasingly being regarded as an instrument to complement the regulatory approach.

Historically, policymakers have relied on legislative and regulatory approaches to ensure adequate protection of environmental quality. The benefits of the regulatory approach are: visibility, credibility, accountability, compulsory application to all and elimination of the "free rider", greater likelihood of rigorous standards being developed, cost spreading, and the availability of a range of sanctions (Webb, 1996). However, while regulatory approaches have been effective in achieving results, they can be inefficient. Regulatory programs tend to be highly formal, expensive to operate, may foster adversarial relations between regulator and regulated, and they have limited scope in terms of what a legislator can regulate (Webb, 1996). In addition, regulations are often difficult to develop and amend because the rule making and amendment processes are both slow and expensive.

As a consequence of these limitations, significant attention has been given to voluntary agreements as a move away from the traditional command-and-control approach. The potential advantages of voluntary programs include flexibility; lower cost in rule making, implementation and operation; less time required to establish and amend rules and structures; the potential for positive use of peer pressure, and the responsibility of achieving goals is internalized by the participants. (Webb, 1996). On the other hand, voluntary programs potentially exhibit a number of common drawbacks, such as lower visibility, less credibility, difficulty in applying rules to free riders, less likelihood of rigorous standards being developed, uncertain public accountability, and limited enforcement actions (Webb, 1996). For voluntary programs to become as successful as regulatory programs, it is important for all the parties involved to have trust in working towards their mutually acceptable goals. Despite these limitations voluntary agreements have proliferated in

Europe and the United States. One such program is the United States Environmental Protection Agency's WasteWise program.

The WasteWise program, started in 1994, is a voluntary agreement designed to promote waste reduction in businesses and other organizations. The impetus for the program is the fact that municipal solid waste continues to increase as available landfill space continues to decrease. As such, innovative approaches for reducing solid waste generation are sorely needed. WasteWise is a flexible voluntary approach that encourages participants to design their own waste reduction and recycling programs. The program is unique in that it is the first voluntary program at the federal level, which is directed specifically at reducing municipal solid waste. In addition, there are currently no federal level regulatory approaches designed to reduce non-hazardous solid waste generation.

The WasteWise program is typified as a monitoring and reporting voluntary agreement. Its manner of target or goal setting for participants is a self-selected performance goal within an overall program goal. The agreement between the regulator and the participant is informal and there are no regulatory threats beyond state waste management legislation. For this type of voluntary agreement, monitoring procedures are a critical component. Its political acceptance depends on public confidence in its effectiveness. In order to determine its success and effectiveness, a detailed monitoring system is needed. Often monitoring and reporting requirements are considered to be one of the primary costs faced by the participants in voluntary agreements. Therefore, the criteria commonly used for evaluating the success of a voluntary program are its environmental and economic effectiveness.

With the rising use of voluntary agreements as a new policy instrument, it is necessary to improve their credibility and accountability. Some basic aspects are the setting of clear and quantifiable objectives, reliable monitoring results, periodic reporting, and the verification of results. This study is devoted to the analysis of WasteWise as a voluntary approach in promoting waste reductions.

1.2 OBJECTIVE AND SIGNIFICANCE OF RESEARCH

1.2.1 PROJECT OBJECTIVES

The primary objective of our research was "to determine the effectiveness of the voluntary program, WasteWise, in promoting

waste reduction through waste prevention, recycling, and, purchasing and manufacturing of recycled content products."

To accomplish our primary objective, we have completed the following specific research objectives:

- Identified the strengths and weaknesses of the WasteWise program in promoting municipal solid waste reduction.
- Discovered barriers faced by both the EPA and the partners of the program in attaining the full potential of WasteWise.
- Analyzed the effectiveness of using the voluntary approach to achieving a mutually beneficial goal between the US EPA and their partners.
- Assessed the cost-effectiveness of the program through a cost case study. This was a key issue, since costs of monitoring and reporting have been identified in most literature as the primary costs to participants in voluntary agreements.
- Designed a protocol aimed to ease the process of determining a baseline, which is necessary before setting waste reduction goals. The objective of producing the protocol arises mainly from the importance of having clearly established tracking and measuring procedures.

In addition, the study provides overall recommendations to increase active participation of WasteWise partners in waste reduction.

1.2.2 SIGNIFICANCE OF RESEARCH

The significance of our research lies in understanding the effectiveness of voluntary approaches to promote waste reduction. The WasteWise program is designed to initiate solid waste reduction at the source and to incorporate economic and environmental benefits derived from waste reduction and recycling. To determine the effectiveness of the program, it is necessary to understand the program's structure, implementation, and results. Currently, there is a lack of clear and established methodologies for evaluating the performances of voluntary agreements. With rising interest among policymakers to use voluntary agreements for achieving environmental results, there is a need for further development of criteria and methods for evaluating the performance of voluntary agreements. Our research will attempt to assess the WasteWise

program's achievements and specific advantages as well as to determine its drawbacks and difficulties in attaining its objectives.

In our research, we formulated a questionnaire to collect information from partners participating in the program. We also conducted various case studies to gain a detailed and unique perspective from program participants. In addition, we analyzed information from EPA to assess the current state and history of the program. These sources of information have guided us in our research.

In the following sections we provide background information on local and international voluntary agreements, and briefly discuss the current state of solid waste management in the United States. We then present our research methodology: various case studies (which serve to guide our larger survey of WasteWise partners), the results of our questionnaire, and data analysis to assess the overall effectiveness of the program. We then discuss our protocol, a tool we developed to improve participation in the program, and finally, we present conclusions and recommendations for improving the program.

2.0 BACKGROUND

This section will discuss the use of voluntary agreements internationally and in the United States. It will also examine the status of solid waste management in the United States and address federal, state and local roles involved in managing solid waste.

2.1 VOLUNTARY AGREEMENTS

2.1.1 INTERNATIONAL ENVIRONMENTAL AGREEMENTS

Voluntary Environmental Agreements are not specific to the United States. Other developed countries have also started their own programs. The Environmental Commissioner (EC) Ritt Bjerregaard stated that "industry is not only a significant part of environmental problems, but also part of their solution". The EC considers environmental agreements as a proactive approach towards environmental legislation. However, European nations have encountered free rider problems. In order to alleviate some of these problems, specific objectives are important conditions. Most environmental agreements in the European Union (EU) have dealt with energy efficiency and the reduction of CO_2 emissions, but there have been agreements made in regards to land use which deal with waste disposal.

All EU countries, except Greece, are using Voluntary Environmental Agreements (VEAs) (Webb, 1996). The Netherlands currently has the most EAs with over 100 in place. Together with Germany, the two countries account for approximately two thirds of the total existing EAs in the EU. Some smaller countries, such as Austria, Belgium, Denmark and Sweden have higher number of EAs than in larger countries such as France, Italy and the UK (AKF). Some reports have indicated that EAs are used more often in countries where environmental policies are more established. These countries often have a tradition of decentralization, consensus building and negotiation in decision-making processes. Other non-European Union countries, such as the USA, Japan, Canada and New Zealand, have also used EAs in their environmental policy.

Most of the VAs enacted by the EU have focused on energy savings and reduced CO_2 emissions (Chemistry and Industry News). To date, there has been no extensive study to quantify the effects of the

agreements in terms of energy savings, reduced CO_2 emissions, efficiency, etc. Due to this uncertainty, research institutes from five member states have come together to study VAs in member countries, to discuss the lessons learned from them and to give recommendations on the possible role of VAs in energy policy at the member state and EU level (AKF). There have been some theoretical and empirical studies completed, however these focused on the negotiation process and its formal outcome. There is also a new program, Voluntary Agreements Implementation and Efficiency (VAIE), created to discover the effects of implementation and the effects on understanding the entire process from completion of the VA to implementation and final outcome (AKF). This project has four focuses. First, to improve the understanding and functioning of VAs. Second, to discover the efficiency of VAs in meeting environmental targets. Third, using a task force to identify VA best practices, and finally issue recommendations on improving its incorporation with policies to encourage energy efficiency and CO_2 reductions. This project was proposed in May 1998 and is projected to conclude in two years.

The following problems were encountered when assessing the effectiveness of EAs (Environmental Agreements) in the EU countries:

- Determining a quantitative baseline (i.e., condition without the agreement) against which to assess effectiveness of the agreement
- Gathering quantitative data on the status prior to the agreement
- Tracking quantitative data after implementation of the agreement

Without these quantitative values, it is difficult to determine if environmental improvements are conclusively attributed to the EAs. The variations that arise between EAs in each country in terms of their objectives and approaches, as well as differences in cultural, political, œconomic and environmental contexts in which they are negotiated, established and implemented also makes it difficult to generalize on the effectiveness of EAs.

2.2 U.S. EPA VOLUNTARY / PARTNERSHIP PROGRAMS

US EPA voluntary agreements suffer from the same difficulties as international EAs when it comes to evaluating them. Although the US EPA programs have some common characteristics, they are also very unique which will be discussed in this section.

2.2.1 Partners for the Environment

Partners for the Environment is an array of voluntary partnership programs formed by the US EPA at both the Headquarters and Regional levels with businesses and organizations committed to achieving cost-effective environmental quality through voluntary goal setting and commitments to report results. A general definition for an US EPA partnership program is

> "a program that involves voluntary cooperation with an outside entity, such as other governmental agencies, business and industry, environmental and public interest groups, and communities and private citizens to improve environmental performance."
> (Lexington Group, 1999)

Through these partnerships, the EPA has shifted its emphasis from cleaning up pollution to preventing it, from strict command and control to increased voluntary compliance. Partnership programs have not supplanted the regulatory programs but have been designed to complement them.

Brief History

US EPA Voluntary programs were conceived and managed at the US EPA Headquarters in the early 1990's as the mantra to re-invent government was popularized. It became a political platform as traditional forms of command-and-control regulation were not achieving adequate, cost-effective or timely results. Voluntary programs began to proliferate at both the EPA's Headquarters and Regional levels in the early 1990's. These programs are within the Office of Policy and Reinvention (OPR), under the Office of the Administrator. For the past ten years, partnership programs have expanded to more than fifty-four programs managed by Headquarters and by U.S. EPA's ten Regional Offices nationwide. Appendix A contains a list of these programs.

At the national level, the first major US EPA initiative for reducing pollution was the 33/50 program that started in 1991 and ended in 1995. It followed closely after the Pollution Prevention Act of 1990. The 33/50 program challenged industry partners to reduce their emission of selected toxic chemicals by 33 and 50 percent over a seven-year period (EPA/100-B-97-003, 1998). The Green Lights Program also started in 1991, and provided technical assistance to businesses and organizations that were interested in using energy more efficiently. This program successfully partnered with Energy Star Buildings in 1995; together their goal was to reduce emissions of greenhouse gasses associated with energy use by improving the energy efficiency of commercial and industrial buildings (Cadmus Group, 1999).

At the regional level, voluntary programs were blossoming as well. Regional programs are more focused on specific local concerns, such as the Chesapeake Bay Program, which addresses pollution inherent in the region.

Since the US EPA voluntary programs began, they have achieved impressive results. Table 2.1 illustrates the environmental benefits and cost savings achieved in 1998 by eight of the existing fifty-four programs. These partners realized substantial cost savings along with the environmental benefits such as diversion of waste from the landfill, reduced CO_2 emissions due to their waste prevention efforts and water and energy were conserved.

Table 2.1: Sample of Partnership Program Accomplishments

Partnership Program Accomplishments	1998	2000 (Projected)
Number of Partners	7,302	13,055
Money Saved (billions of dollars)	3.3	4.6
CO_2 Emissions Reduced (million metric tons)	80	210
Waste Prevented (million tons)	7.8	8.3
Water Saved (billion gallons)	1.8	2
Energy Saved (trillion BTU's)	510.8	755

(source: http://www.epa.gov/partners/partnerships)

Therefore, in addition to improving environmental quality, the US EPA has demonstrated that voluntary programs are also good for business. Table 2.1 shows that partners reported cost savings of 3.3 billion dollars and they are projected to save $4.6 billion annually by the year 2000.

2.2.2 General Goals of US EPA Voluntary/Partnership Programs

The Office of Pesticides, Pollution Prevention and Toxic Substances (OPPTS) and the Office of Air and Radiation (OAR) recognized the importance of providing proper incentives and information to industry partners willing to achieve environmental improvements. All along, partnership programs have been developed to promote elements of the EPA's mission to

> "protect human health and to safeguard the natural environment upon which life depends-and reflect public priorities as articulated by Congress in the form of statutory mandates." (EPA/190-R-97-002, 1997)

Some distinguishing features of the US EPA's partnership programs include:

- Non-regulatory
- Mutually beneficial to all parties
- Based on shared goals and joint responsibility
- Information sharing
- Non-prescriptive, tailored to meet the partner's needs

Voluntary programs have been created to address a variety of complex environmental issues and are often tailored to meet specific partner needs. Although US EPA voluntary programs are very unique due to the entrepreneurial spirit that they were developed under, they generally support one or more of the EPA's strategic goals. In 1997, as part of the US EPA Strategic Plan (EPA/190-R-97-002, 1997), they defined the following ten strategic long-term goals:

1. Clean Air – safe, healthy air to breathe and reduction of air pollution.

2. Clean and Safe Water – clean, safe drinking water, protection of rivers, lakes, wetlands, aquifers, watersheds and aquatic ecosystems.

3. Safe Food – decrease pesticide residues on food.

4. Pollution Prevention & Risk Reduction – cost effective elimination, reduction, or minimization of emissions and contamination through pollution prevention.

5. Improved Waste Management, Restoration of Contaminated Sites, Emergency Response – storage, treatment and disposal of waste in ways that prevent harm to people and the natural environment and restoration of previously contaminated sites.

6. Reduction of Global and Cross-Border Environmental Risk – provide leadership to reduce risks from climate change and the depletion of stratospheric ozone.

7. Expansion of American's Right to Know About the Environment – improve access to information about the status of the local environment and increase information exchange between government and citizens.

8. Sound Science, Improved Understanding of Environmental Risk, and Greater Innovation to Address Environmental Problems – development and application of best available science for addressing current and future environmental hazards.

9. A Credible Deterrent to Pollution and Greater Compliance with the Law – strive for full compliance with environmental laws.

10. Effective Management – evaluate infrastructure to increase effectiveness of internal management and fiscal accountability.

Voluntary programs have been developed to incorporate these goals. Appendix G3 lists the US EPA strategic goals and the voluntary programs that support each of the goals. Most of the pollution prevention programs have some component of waste management associated with their goals, but WasteWise is the only US EPA program that deals specifically with non-hazardous solid waste on a national level.

2.2.3 General Characteristics of US EPA Voluntary Programs

A review of current literature was performed to gain a better understanding of the general characteristics of US EPA voluntary programs and how partnership programs are managed and supported by the US EPA and viewed by partners. In 1999, the Cadmus Group and the Lexington Group researched these topics and completed two studies for the US EPA's OPR.

The Cadmus Group characterized the US EPA partnership programs by two factors: the way the program recruited members and the incentives to join. The Lexington Group looked at how partnership programs as a whole were organized and managed by the US EPA. This valuable information has been incorporated into this paper in the following sections.

Categories of Partner Recruitment

The Cadmus Group (1999) characterized partnership programs by looking at the types of partners that they seek to recruit. Partners that participate in the EPA's voluntary programs fall into two general categories:

- Classified by an industrial sector or sub-sector
- Grouped by a specific characteristic or a set of characteristics.

A sector refers to the specific activity that a partner engages in, such as, manufacturing, and sub-sector is a term used to reveal more detail about the sector such as, chemical manufacturing.

Recruitment of partners for voluntary programs that use a sector or sub-sector classification can take three forms:

- Partners are chosen from a single sector or sub-sector
- Partners are chosen from more than one sub-sector within a sector
- Partners are chosen from a set of sectors or sub-sectors.

The difference in the categories of partner recruiting is most easily illustrated by looking at specific examples.

Partner Recruitment by Sector and/or Sub-sector

Some programs work with partners in a single sector or sub-sector because the program itself is strongly focused on addressing a particular environmental problem faced by a certain type of industry. The best example of this is the 33/50 program, a pollution prevention program that sought to drastically reduce the amount of seventeen toxic chemicals discharged to the environment and/or sent to waste treatment facilities by the manufacturing sector. This program included all sub-sectors within the manufacturing sector.

Other programs recruit partners that have certain characteristics that can be found in a specific set of sectors or sub-sectors. An example of a program with this type of recruitment strategy is the WasteWise program. The WasteWise program includes most economic sectors such as manufacturing, state, local and tribal governments, universities, restaurants, hospitals, and small as well as large businesses. The strategic goal of this program is pollution prevention but it also promotes waste management and emergency response strategic goal.

Partner Recruitment by Specific Characteristics

Some partnership programs prefer to work with organizations that share a set of characteristics regardless of their sector or sub-sector classification. Examples of shared characteristics are listed below.

- Business owners/managers
- Community organizations interested in a similar environmental issue
- Waste generators grouped according to the type of waste generated (e.g. hazardous waste commercially generated and non-hazardous municipal waste)
- Companies with compliance programs
- Small businesses
- Regulated entities

Programs that use specific characteristics to recruit partners do not decide whether an organization is eligible based on its industrial classification but care more about the organizations shared characteristics. Region Five's Natural Landscaping program, a multi-media pollution prevention program that also promotes bio-diversity, is an example of partnership recruiting using shared characteristics.

This program solicits partners that are interested in environmentally friendly landscaping techniques, regardless of whether they are a large manufacturer, small retail business, a local government agency or a private citizen.

2.3 Characteristic Program Elements and Incentives

Program elements were defined in order to help characterize the basic program approaches implemented by the diversity of US EPA voluntary programs. The research by the Cadmus Group (1999), identified ten program elements which act as incentives for participation and fit into the following five major categories:

1) **Regulatory Flexibility**
   Flexibility to Achieve Superior Results
   Flexibility to Encourage Compliance

2) **Economics**
   Cost Savings
   Market Transformation

3) **Information**
   Outreach and Education
   Recognition and Awards

4) **Enhancement of Environmental Decision-making**
   Environmental Stewardship
   Capacity Building

5) **Innovation and Technology Exchange**
   Test/Validate New Technologies/Practices
   Promote Proven Technologies

As we have previously indicated, each program is relatively unique and the extent to which these elements are present in a program will vary. WasteWise primarily uses cost savings, information transfer, recognition and awards as incentives. In addition, the program administrators expect that new technologies and waste management practices will emerge that can be shared by partners and expand waste prevention successes on a larger scale. For example, if a clothing manufacturer successfully develops a process to incorporate scrap materials back into the manufacture of their product, this process decreases the amount of raw materials purchased and

prevents waste. This innovative approach may be applied to manufacturers of similar products.

2.4 The Evolving Role of US EPA Voluntary/Partnership Programs

Partnership programs are playing an increasingly important role in the EPA's ability to accomplish its goals. These VAs between government and industry are flexible enough to address complex environmental issues and changing circumstances where the "one size fits all" mentality of command and control alone cannot. "The partnership approach is a powerful mechanism for EPA to address the shifting structure of the economy and the changing context of environmental management, complementing but not replacing its regulatory programs." (Lexington Group, 1999).

Four trends have been documented that are closely related to the rapidly changing economy, where "increased productivity comes less from manufacturing advances and more from knowledge based services" (Lexington Group, 1999). As a result, the US EPA may increase the use of voluntary programs as a tool to protect the environment and human health. The Lexington Group categorized these trends as:

- The increasing importance of knowledge in industry
- The emergence of new environmental concerns, such as greenhouse gas emissions, urban sprawl and non-point source pollution
- An increased public awareness, through expanded access to environmental data through the internet and better networking capabilities between citizens and advocacy groups
- An increased need for non-regulatory, market-based approaches to improve corporate environmental performance that goes beyond mere compliance with regulation

Partnership programs that utilize these trends in their design create opportunities for both the needs of the US EPA and the needs of the partner to be advanced.

Agency View of Partnership Programs

According to the research by the Lexington Group (1999), there is lack of consensus within the US EPA concerning the role and value of partnership programs. Although senior management supports the partnership approach in public appearances, there is skepticism within the US EPA regarding the effectiveness of the voluntary approach. Skeptics consider voluntary programs a form of "corporate welfare" benefiting large companies that are only doing what is perceived to be in their best interests. Some view these programs as taking necessary resources away from the regulatory function of the US EPA. Partnership program managers also have difficulty getting qualified technical support from regional divisions. There is little or no interaction between partnership programs and other US EPA programs. This lack of integration and support can lead to inconsistent funding. If programs are inconsistently funded, their opportunity to be used as a tool to protect the environment is jeopardized. Inconsistent funding also demoralizes the staff and can lead to high turnover rates among the staff, which lowers the overall quality of a program.

Partners View of Partnership Programs

Results from a survey by the Lexington Group (1999), revealed that partners think that voluntary programs can affect the internal decision making process of an organization by shifting priorities and elevating environmental responsibility. Participating in a program makes it more likely that the problem will receive the attention and resources that it deserves. The partners also said that they found the technical assistance provided by the programs was helpful. The partners felt that the government was trying to build better relationships with organizations through the partnerships and the move to a less adversarial relationship was viewed positively. However, industry will not want to expend the effort to join if they have experienced the failure of a program due to inconsistent funding or for other reasons.

2.5 Solid Waste Management in the United States

This section discusses the evolution of solid waste management in the US. It introduces the concept of integrated waste management and important terminology. The status of municipal solid waste in the US and current trends in solid waste generation are explored along with federal, state and local government waste management

roles. This will help to explain the need for a federal program such as WasteWise to facilitate a national movement for improved waste reduction and diversion from landfills.

2.5.1 Growth of Solid Waste Legislation

The legislative landscape for solid waste management in the United States is in constant flux. State, federal and local government as well as businesses and individuals recognize the importance of avoiding a solid waste management crisis in the US but there is no blueprint for achieving efficient, cost-effective actions (Kreith, 1990). Success in diverting waste from landfills has been primarily due to state recycling programs implemented across the nation.

Solid waste management has become a very active topic for state legislators. In 1989, thirty-eight states and the District of Columbia passed 125 laws in an effort to reduce the amount of solid waste reaching landfills. Of these laws,

- 29% addressed general recycling-related issues
- 19 % concerned special wastes like used oil, automobile tires and car batteries
- 18% dealt with plastics and packaging
- 14% provided for comprehensive waste management programs
- 11% offered grants and financial aid for recycling programs
- 7% provided for procurement preferences designed to encourage the purchase of recycled content products
- 2% offered tax incentives for the purchase and operation of recycling vehicles
  (Kreith, 1990)

Recycling has been the most popular and least controversial approach to solid waste management. Several States (California, Iowa, Washington, Georgia, New Mexico, North Carolina and Wisconsin) had set ambitious waste diversion goals of 25% by 1995 and came close to accomplishing them or exceeding their goals by recycling alone. This trend has lead some states (California, Iowa and Wisconsin) to set waste diversion goals at 50% by the year 2000 (Kreith, 1990). Achieving this goal may not be accomplished by recycling alone. There is a growing consensus that the nation's solid waste management could not be handled in a disjointed fashion. By the end of 1990, twenty-seven states had passed comprehensive

waste management laws to address the problem from the perspective of the entire system.

2.5.2 Integrated Waste Management

The US EPA developed an integrated waste management hierarchy that is comprised of five main components:

- **Waste Reduction/Source Reduction**- modifying marketing, manufacturing, and social practices to reduce the amount of wastes generated and entering the waste stream.
- **Reuse and/or Recycling** – capturing materials from the waste stream and processing them through a market (e.g. aluminum, plastics) or by reusing them on-site as may be the case with composting.
- **Waste-to-Energy Combustion** – using high temperature combustion to reduce the volume of waste going to the landfill and producing energy in the process.
- **Incineration**- combustion process where wastes are burned to reduce their volume, no energy is derived from the process.
- **Landfilling** – disposal of solid waste that could not be recycled or reused and from combustion/incineration processes into environmentally safe landfills.

An integrated waste management approach is important because each element of a WasteWise partner's waste stream can be handled in the most effective, cost-efficient, safe and environmentally beneficial manner possible. Each of the integrated waste management components entails benefits and costs, which may make it more appropriate in some situations than others.

2.5.3 Municipal Solid Waste in the United States

This section briefly describes the state of municipal solid waste (MSW) in the United States. It examines the recent history of waste generation and waste management and looks ahead to 2010. Finally, federal, state and local roles in solid waste management are explained and the need for programs such as WasteWise will be clarified.

Types of Materials in MSW

Materials included in the MSW stream include paper, cardboard, yard trimmings, glass, metal plastic, wood, and food wastes. Except for food wastes and yard trimmings, each of these material categories is made up of many different products. There are three general categories of products in the waste stream:

- Durable goods (long lasting materials that have become obsolete, e.g. appliances)
- Non-durable goods (produced frequently and are short lived, e.g. newspapers)
- Containers and packaging

In general, each category contains every type of material with the exception of durable goods, which does not contain paper or cardboard and non-durable goods, which do not contain any wood or glass and only small amounts of metal.

Sources of Materials in MSW

Residential sources of waste (multi-family and single family) and commercial sources of waste (colleges, universities and industrial sites) comprise the MSW stream. It is estimated that residential sources are responsible for 55% to 65% of the total amount of MSW generated in the United States. Commercial sources are responsible for approximately 35% to 45% of the total waste generated in the US in 1995 (Franklin Associates, 1997).

Material Composition of MSW in the United States

MSW generation totaled 208 million tons in 1995, up 16% from the 180 million tons generated in 1988. Figure 2.1 provides a breakdown of the materials in the MSW stream generated by the US in 1995. This figure shows that paper and paperboard (cardboard) were the largest components of MSW at 39% followed by yard trimmings at 14%. Other materials refer to rubber, leather and textiles and are commonly referred to as non-recyclable refuse.

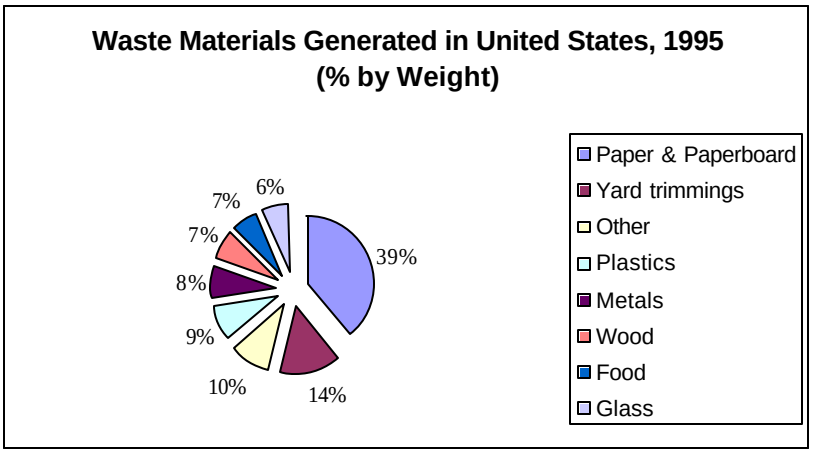

Figure 2.1 Waste Materials Generated in US by Weight, 1995
(Total Weight = 208.0 million tons)
Franklin Associates, 1997

A portion of each material type was recycled in 1995. Table 2.2 illustrates how much of each material type was recovered as a percent of the amount that was generated. Although paper and cardboard are generated as the largest component of US MSW, 40% is also recovered. The high ratio of materials recovered for materials such as paper and metals is due to the fact that strong markets exist for these materials. The percentage of materials recovered out of all waste generated was 27%.

	Weight Generated	Weight Recovered	Recovery as a Percent of Generation
Paper and paperboard	81.5	32.6	40.0%
Glass	12.8	3.1	24.5%
Metals			
Ferrous metals	11.6	4.2	36.5%
Aluminum	3.0	1.0	34.5%
Other nonferrous metals	1.3	0.9	69.4%
Total metals	15.8	6.2	38.9%
Plastics	19.0	1.0	5.2%
Rubber and Leather	6.0	0.5	8.9%
Textiles	7.4	0.9	12.2%
Wood	14.9	1.4	9.6%
Other materials	3.6	0.8	23.1%
Total Materials in Products	161.1	46.6	28.9%
Other Wastes			
Food Wastes	14.0	0.6	4.1%
Yard Trimmings	29.8	9.0	30.3%
Miscellaneous Inorganic Wastes	3.2	Neg.	Neg.
Total Other Wastes	46.9	9.6	20.4%
TOTAL MUNICIPAL SOLID WASTE	208.0	56.2	27.0%

Includes wastes from residential, commercial, and institutional sources.
Neg. = Less than 50,000 tons or 0.05 percent.

Table 2.2: Generation and Recovery of Materials in US MSW, 1995
Franklin Associates, 1997

Management of MSW in U.S.

Another measurement of the status of waste management in the US is viewing how integrated waste management is being applied. Figure 2.2 illustrates that 57% of the waste generated was land-filled, 27% of the waste was recovered for recycling and 16% was combusted in the United States in 1995 (Franklin Associates, 1997). These numbers show a significant improvement over the statistics for 1988. The amount of waste land-filled dropped by 16%, recycling increased by the numbers changed. 73% of the waste stream generated was land-filled, 13% was recovered for recycling and composting and about 14% was incinerated (Kreith, 1990). These numbers indicate waste in the U.S. is predominantly landfilled even though significant gains have been made in the recovery of materials for recycling. The greatest quantity of recovered materials comes from the commercial

sector (Franklin Associates, 1997). Old corrugated cardboard and office paper is widely collected from commercial establishments.

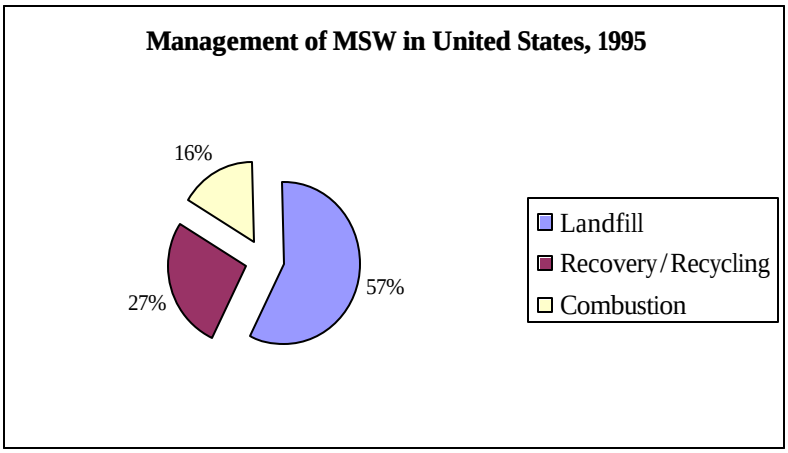

Figure 2.2 Management of MSW in United States, 1995
(Total Weight = 208.0 million tons)
Franklin Associates, 1997.

Trends in MSW Management

The generation of MSW has steadily increased over the last ten years. Through the mid-1980's, incineration declined and landfills became more difficult to site. Materials recovery rates grew slowly as MSW generation continued to rise. Recovery rates increased through the late 1980's and early 1990's, combustion remained constant and discards to landfill have steadily decreased. Although the number of landfills in the U.S. is declining, landfill capacity has remained somewhat constant. Thirty-seven states report having more than 10 years of landfill capacity left. (Franklin Associates, 1997). However, the tipping fees, or the amount paid per ton of wastes disposed of at landfills or incinerated has dramatically increased since the 1980's and will continue to increase as landfill restrictions increase and the capacity of the landfills dwindles (Kreith, 1990).

The generation of MSW is projected to increase by 1.1% between the year 1995 and 2000 and 1.3% per year between the year 2000 and 2010. This would mean that the total waste generated in 2010 would be approximately 262 million tons. With increased recovery rates and increasing "waste to energy" combustion rates, the percentage of the waste stream going to the landfill should decrease. It is expected that

landfill capacity will remain constant. Per capita waste generation increased from 2.7 pounds per person per day in 1960 to 4.3 pounds per person per day in 1995 (Franklin & Associates, 1997). The per capita waste generation is projected to increase to 4.4 pounds per day per person for the year 2000 and to 4.7 pounds per day per person by 2010 (Franklin Associates, 1997).

Government Roles and Solid Waste Management

In 1987, in a statement before the U.S. Senate Committee on the Environment and Public Works, the US EPA assistant administrator for Solid Waste and Emergency Response, J.W. Porter, summarized the principles guiding the federal policy in solid waste management. Porter announced that "federal initiatives will provide for an evolutionary change by voluntary actions." In 1988, the EPA published the Agenda for Action, which outlines the federal objectives for the management of municipal solid waste nationwide:

- Encourage participation in solving the waste problem through increased informational and educational efforts, technical assistance, and research.
- Set up state and local integrated waste management planning.
- Increase "source reduction" activities.
- Increase recycling.
- Improve waste combustion safety.
- Improve landfill safety.

Although the states have made tremendous progress enacting waste-reduction programs, federal legislation may still be needed to supplement state efforts and target areas in which the state programs have been ineffective. It is difficult to know exactly how much solid waste can be reduced and there is not one single approach that will work because regions differ in the types of wastes generated, in consumer habits, and in potential markets for recycled materials. Although States and localities are the best managers of their waste management needs, the nation could benefit from a policy of waste management that promotes a systems approach to finding solutions to solid waste management issues.

Federal Role

In order for waste prevention and recycling to become effective solid waste management tools, federal initiatives need to promote consistent market development for recyclable materials. Federal standards for the manufacture of products and packaging could lead to the production of less wasteful products (Andress, 1989.) In addition, federal support for research that encourages cooperation and technology exchange will help to avoid costly duplication of efforts and serve to spread information to all states, which have similar waste management concerns. Federal agencies could also help standardize elements in state waste reduction programs by specifying some basic characteristics. Although there is not a single solution that can be applied to all communities, businesses or institutions, the federal government can help more states reduce waste by setting minimum standards. (Andress, 1989). However, a program that may work well for one community or business—environmentally, economically and in terms of the quality of life—may not work well for another community or business.

Recognizing the importance of a flexible program, WasteWise allows each partner to design their own waste reduction, recycling and purchasing goals. The structure of a partner's participation depends on a range of independent variables. To deal effectively with the millions of tons of garbage that is generated we must consider a variety of different options when dealing with the waste. The WasteWise programs primary emphasis is on waste prevention because as we have seen, achieving future waste management goals cannot be achieved by recycling alone.

The WasteWise Program targets the reduction of MSW and promotes recycling and the purchase of recycled content materials. WasteWise is important because as our population has grown, so has the total amount of MSW that Americans generate in the course of a year as well as on a per capita basis. In fact, MSW volume has increased 250 percent since 1960—from 88 million tons to over 208 million tons in 1995. The next section describes the WasteWise program in detail. It summarizes how partners have been recruited to the program and at specific program elements such as partner responsibility and program incentives. It also briefly highlights the WasteWise program progress reported by the US EPA and the 1998 awards given by the US EPA to program partners.

3.0 THE WASTEWISE PROGRAM

The WasteWise program was created in 1994 in response to the Pollution Prevention Act (PPA) of 1990. WasteWise was an initiative in the President's Climate Change Action Plan (CCAP) because waste reduction activities reduce greenhouse gas emissions, which are associated with climate change. Waste reduction activities conserve raw materials and energy by preventing materials from ending up in landfills and incinerators. Preventing or diverting waste from the landfill by reuse and recycling activities effectively reduces the amount of greenhouse gases emitted.

WasteWise program is open to all sectors that are interested in waste prevention. There is no cost associated with joining the program. It is a flexible program that focuses on waste reduction activities. WasteWise allows its partners to design their own solid waste reduction programs, tailored to their needs. The program encourages its partners to reduce the amount of non-hazardous municipal solid waste that they generate by finding innovative methods, or using emerging technologies in the manufacturing and design process of materials.

The goal of the WasteWise program is to promote waste reduction through waste prevention, recycling, and buying recycled products.

3.1 Partner Recruitment

Initially, only Fortune 500 companies in the industrial and service sectors were recruited through a letter from the EPA Administrator inviting them to join the program. Currently, the recruitment of partners for the program is not limited to any particular sector or sub-sector, instead, the program has a broad reach and partners include state, local, and tribal governments, universities, retail stores, manufacturers, restaurants, hospitals, non-profit organizations and businesses, both small and large. WasteWise uses Trade Associations and existing partners, to promote the program to potential partners. The WasteWise Endorser program component is composed of 81 Trade Associations that believe in the WasteWise mission and encourage their members to join and promote the program.

The most effective method used by the WasteWise program for recruiting partners is through direct mailing. Other methods used include the WasteWise Website, HelpLine, trade associations,

networking between existing partners and potential partners and WasteWise program outreach efforts which include publications, conferences and forums.

Building on its success with its current partners, in 1999 WasteWise began targeting to increase the number of participants in the federal government sector. The main driving force behind this approach came from the recent proclamation of Executive Order (EO) 13101. EO 13101 compels federal agencies to improve their waste prevention, recycling, and procurement programs. The procurement includes products made with recovered materials and environmentally preferable products. Under this Executive Order, the agencies are required to set quantitative goals every five years (FY2000, 2005, 2010). All these fit well with the goals of the WasteWise program and therefore, offers a high potential for a successful collaboration between WasteWise and other federal sectors.

3.2 Program Elements

The WasteWise program elements include partner responsibilities such as registering, goal setting and reporting. Another element of the WasteWise program is incentives. Incentives act to encourage program participation and include cost savings, technical assistance, information exchange, and public recognition. These program elements are briefly explained below.

3.2.1 Partner Responsibility

Partner responsibility has three major components: registering, setting goals, and reporting results.

WasteWise Partnership Forms

Partners complete three forms as members of the WasteWise Program (Appendix D3, D4, D5):

- **Registration Form** indicates the partner's desire to participate in the WasteWise Program, identifies a point of contact and a description of the participating facilities.
- **Goal Identification Form** indicates the partner's specific goals. This form must be completed within 6 months after joining the program.

- **Annual Reporting Form** describes the partner's progress in achieving the stated goals.

Goal Setting

Partners join the program by registering and then they have six months to set their goals in three areas: waste prevention, recycling, and purchasing or manufacturing of recycled content products. They are required to list three waste prevention goals, one recycling collection goal and one purchasing or manufacturing of recycled content products goal. The partner commits to achieving these goals over a three-year time period. At the end of this period they become alumni partners in the program in which they continue their WasteWise goals but are not required to report their results to the US EPA.

Reporting

Once goals are approved, partners are expected to track and monitor their progress and are encouraged to report their results annually (March 1 of each year) to WasteWise administrators. The reporting form consists of the following sections that address goal setting, waste prevention progress, recycling collection, and purchasing or manufacturing of recycled content products.

3.2.2 Program Incentives

Cost Savings

Cost-savings are usually the main incentive for the firms to join the program. This incentive is marketed by the fact that by reducing municipal solid waste, disposal costs are reduced and by reducing the amount of materials purchased money can also be saved. Markets for high quality recyclable exist. Therefore, one possible benefit is that collecting and selling these marketable products in the waste stream could generate revenue.

Technical Assistance

The WasteWise program through the US EPA's contractor Environmental Research Group (ERG) offers technical assistance. ERG provides staff for the toll-free HelpLine and assigns representatives to work directly with partners. Partners are encouraged to call their assigned consultants if they need help in

developing and implementing their waste reduction activities, or if they need answers to general questions on solid waste reduction. The WasteWise website is also a place where partners can network and find out what other organizations similar to their own are doing with respect to solid waste management.

Public Recognition

Partners gain public recognition of their waste reduction effort through EPA publications, case studies, award ceremonies, and national and regional events. The EPA also provides its partners with a variety of waste reduction publications, WasteWise Updates and Bulletins, describing tips for waste reduction, as well as waste reduction guides and directories. An annual progress report is also given to inform partners of current events in WasteWise and to share any partner success stories on waste prevention.

The successful and innovative actions of a WasteWise partner are recognized through publicized case studies, which are included in program workshops, in WasteWise publications and in trade journals. EPA also highlights any outstanding achievements of its partners in awards ceremonies each year. Awards are given to partners based on their accomplishments in the tonnage of waste reduced, associated cost savings, and technological advances and innovation.

Partners also can meet with EPA officials to share their accomplishments by attending the national forum, which is a biennial gathering, held in Washington D.C, and includes prominent speakers. In addition, there are regional forums and partner network meetings held in cities across the country, such as Columbus, Boston, San Francisco and New York. Partners with good waste reduction efforts and new partners are all recognized at these events. These events provide partners with opportunities to network and share their waste reduction methods.

Waste Prevention and Greenhouse Gas Emissions

WasteWise uses WAste Reduction Model (WARM) that convert materials diverted from the landfill to an estimate of greenhouse gas emissions reductions. The WARM Model is a Microsoft Excel spreadsheet application created by the EPA to help solid waste planners and organizations track and voluntarily report greenhouse gas emission reductions from several waste management practices. Although WARM was developed for state and local solid waste

managers and other organizations interested in calculating greenhouse gas emissions associated with different waste management options, WasteWise partners can download the WARM model from the EPA's website.
(www.epa.gov/globalwarming/actions/waste/software.html)

3.3 Program Progress to Date

The year 1999 marked the fifth year of the EPA WasteWise program. Membership has consistently grown since the start of the program from about 375 members to more than 900 members today. During this time period, members have reduced the amount of municipal solid waste they generate by six-fold from 1.3 million tons in 1994 to 7.6 million tons in 1998. This waste reduction effort can be related to avoided greenhouse gas emissions of 1.2 million metric tons in 1994 to more than 7 million metric tons in 1998. Recycling collection has also risen consistently for this time period from 1 million tons in 1994 to more than 7 million tons in 1998. Partners are also making advances in the area of purchasing or manufacturing of recycled content products. Partners reported purchasing 458,000 tons of products containing recycled materials in 1998. (WasteWise Fifth-Year Progress Report, 1999)

Recent Awards

The WasteWise program recognized thirteen 'Partners of the Year' in ten different awards categories and twenty 'Program Champions'. 'Partners of the Year' are those partners who were judged to have accomplished and reported the most impressive waste reduction results during 1998. 'Program Champions' are those partners who made "noteworthy accomplishments" in the three goal areas of waste prevention recycling and purchasing or manufacturing of recycled content products in 1998. WasteWise recognized organizations according to their size and economic sector for both of these types of honorees. The categories include:

- Very Large Corporation (20,000+ employees)
- Large Corporation (1,000-19,000 employees)
- Mid-size Corporation (500-999 employees)
- Small Business (<500 employees)
- University/College, School/School District
- Local government

The 1999 award winners are listed in Appendix C

3.4 Preliminary Assessment of WasteWise

Two members from the research team interned at the EPA WasteWise Headquarters in Washington D.C. during summer 1999. During this time, data collection and analysis was performed on the overall history of the WasteWise program. The following analysis was based on data provided by the EPA.

HISTORY OF THE PARTNERS

While the number of partners in the WasteWise program has grown since the program started, the number of partners reporting their results has not. Only approximately 150 partners (~20%) report their results each year. In addition, the overall waste prevention figures are driven by less than 40 partners (~5%). Based on the information gathered from the Partners of the Year Awards winners and Top 10 Driver Reports, the majority of the companies that frequently reported are those who joined the WasteWise program when it first began. For some unknown reasons, the partners who joined after 1994 have not been active in reporting their results.

Figure 3.1 illustrates the membership growth for WasteWise from 1994-1998. Most of the increase from 1996-1997 comes from the Government sector. Although the Government sector contains the highest number of partners, WasteWise officials plan to continue its active campaign in targeting the Federal Government sector due to the recent proclamation of Executive Order (EO) 13101.

Figure 3.1. Membership Growth for WasteWise

WasteWise partners are divided into 53 different sectors. Figure 3.2 represents a range of partners in selected sectors. The total number of partners in each sector varies (Appendix B2). Some sectors are poorly represented, for example, Advertising/Marketing sector has only 1 partner. On average there are approximately 20 partners per sector.

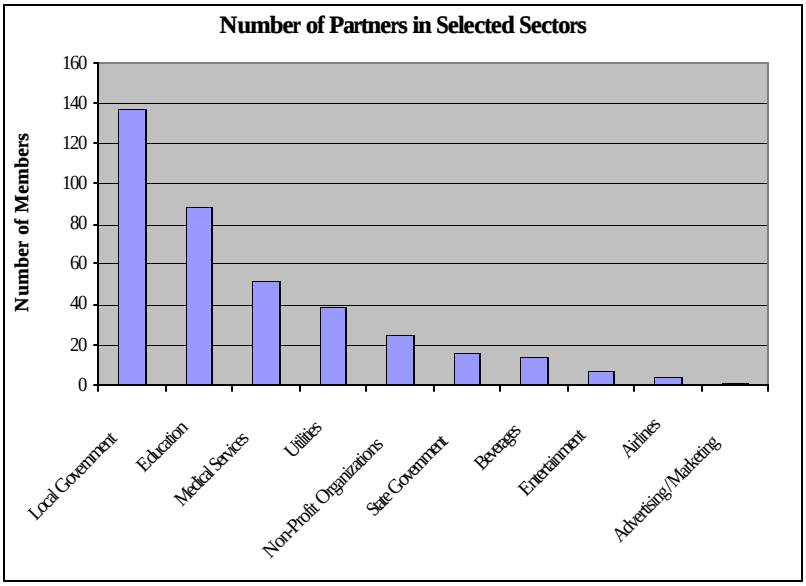

Figure 3.2. Number of Partners in Selected Sectors

Partner Reporting

According to the reporting history trend shown in Figure 3.3, most of the repeat drivers (partners who reported frequently with significant amount of waste reduction) are beginning to report lower waste prevention results. Since most of the drivers are partners who joined in 1994, it is not surprising that their waste prevention numbers are decreasing. Under recycling, while the amount recycled increased, the rate of increase was lower in 1998 than it was before. The current recycling activities and the numbers reported relied heavily on two companies: Louisiana Pacific and Anheuser Busch (approximately 72% of the recycling totals or 5.2 million tons).

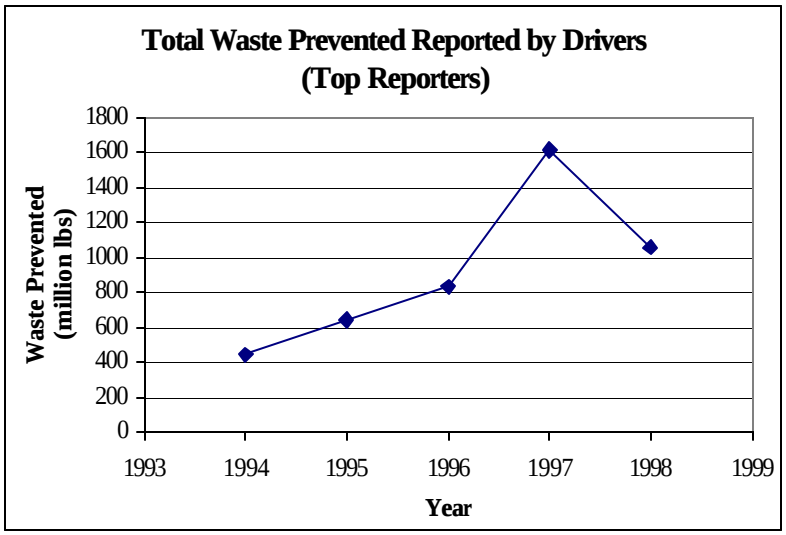

Figure 3.3. Partner Reporting History of Total Waste Prevented

From the information gathered, the active reporting partners can be categorized into a few distinct industrial sectors. As seen from Figure 3.4, most of the active reporting partners are from the following sectors:

- Soaps, Cosmetics & Hygiene (64% partners reporting)
- Mining & Crude Oil Production (60%)
- Toys & Sporting Goods (57%)
- Motor Vehicles & Parts (56%)

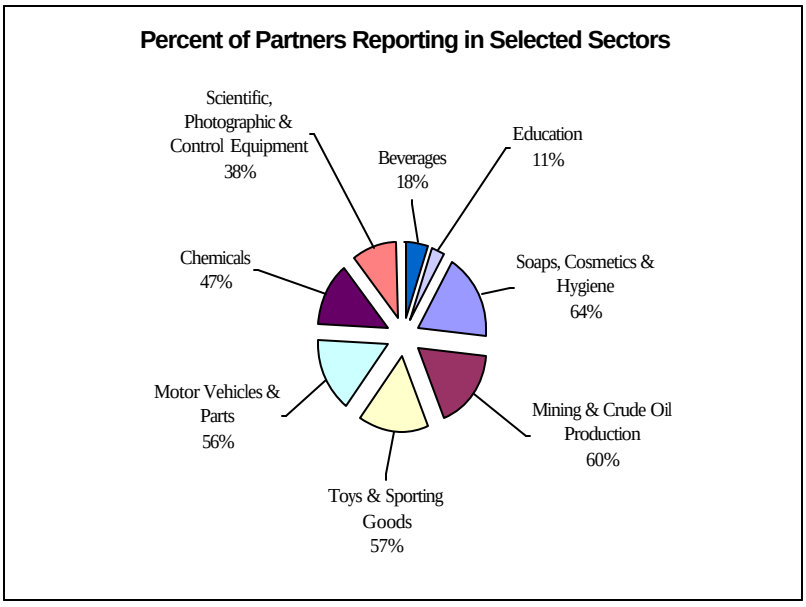

Figure 3.4 Percent of partners Reporting in Selected Sectors

On the other end, some sectors that have not reported at all include Tribal and State Governments, Transportation Equipment, and Construction & Engineering.

One possibility that some partners are not reporting actively may be due to the type of waste materials they generate. The materials types produced may affect the ease for reporting. Based on this hypothesis, the type of waste commonly reported by WasteWise partners was analyzed in order to identify any common trend.

The top materials conserved by WasteWise partners include corrugated, wood, and mixed organics. The materials recycled in highest amounts through the WasteWise program are corrugated containers and boxes, ferrous materials, and aluminum and other non-ferrous metals. The top materials focused for greenhouse gas emissions reductions include aluminum cans, office paper, newspaper, plastics (PET, LDPE, HDPE), steel cans and corrugated cardboard. Figure 3.5 shows the distribution of waste materials prevented from going to landfill through WasteWise partners' efforts.

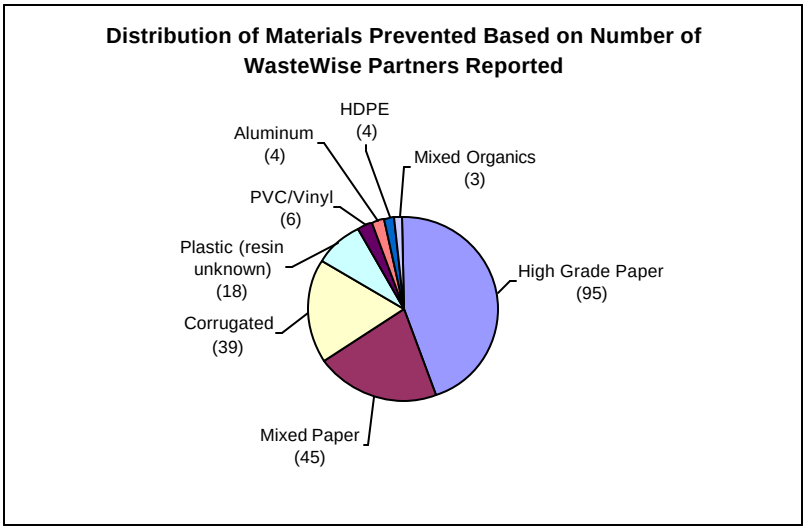

Figure 3.5. Distribution of Materials Prevented from landfill (based on number of WasteWise partners reported)

Based on the top 25 activities undertaken by members (Appendix B5), most of the current activities involved internal restructuring of the companies. For example, establishing employee education program/newsletter, starting a donation program, switching from disposable to reusable product, etc.

The top three activities carried out by WasteWise partners to helped reduce wastes from going to landfills (in terms of tons reduced) can be seen in Table 3.1.

Rank	Number of Reporters	Specific Activities	Total Tons Reduced
1	12	On-site composting	310,733
2	10	Use reusable/returnable packaging	68,962
3	27	Find a method to reuse/use old products	36,998
4	10	Reduce amount of solid waste disposal	22,816

Table 3.1 Top Four Activities Reported by WasteWise Partners (based on total tons of waste reduced)

Although these activities did not rank high (16th, 20th and 5th respectively) in terms of the number of partners reporting these activities, the total number of waste prevented was significant (416,000 tons). The total amount of waste prevented reported by one or two partners in a category usually dominated the total amount of waste prevented by that particular activity. Often, the total number of reporters for a category did not have a direct correlation to the total number of tons prevented. For example, although 27 partners find a method to reuse, the total tons reduced through the activity is only approximately 37,000 tons. Compared to 12 partners who carried out on-site composting and managed to prevent as much as 311,000 tons.

Reporting analysis showed that a few partners primarily led the waste prevention results. These partners are mostly from large size industrial sectors. For example, Anheuser Busch, a consistent reporting partner, was responsible for nearly 58% of the total waste prevention amount reported (315,000 tons). The overall waste prevention result is highly dependent on very few partners.

In addition to the data analysis above, more information was gained through a survey that was conducted by the EPA WasteWise program.

EPA Survey

A survey by the EPA was sent out to all partners in September 1999 and overall results are summarized in Appendix I. The primary purpose of the survey was to determine the member's overall satisfaction with the program. The survey focused on four areas of customer satisfaction:

- Satisfaction with overall Program and Staff
- Satisfaction with Program Components
- Satisfaction with the Partnership Approach
- Satisfaction with other components of the WasteWise Program

Although the results of this survey provide useful information about member satisfaction with the services provided by the WasteWise program, it did not directly address the overall performance of the program. Therefore, another survey was designed to collect data to assess the performance and effectiveness of the WasteWise program. The following section will discuss the results of that survey.

4.0 QUESTIONNAIRE

4.1 APPROACH AND METHODOLOGY

As discussed in the previous section, the US EPA WasteWise program recently conducted a customer service survey. Although the results of this survey provided useful information about member satisfaction with the services provided by the WasteWise program, it did not directly address the overall performance of the program. In addition, the survey did not address the various weaknesses of the program. Our survey was designed to address the following weaknesses: participants' difficulty completing the Annual Report form, participants' difficulty establishing a baseline for waste reduction, and the program's apparent lack of useful incentives for members. We developed questions that specifically addressed these areas of concern. A draft of the questionnaire was submitted to the WasteWise managers for recommendations. The suggestions from the US EPA, primarily recommendations for clarifying a number of questions, were included in the final version of the questionnaire (see Appendix D2 for complete questionnaire).

The final version of the questionnaire included the following four sections:

Partner Information – The section is designed to obtain background information about the members responding to the questionnaire. We feel that distinguishing member characteristics is important in our analysis of the survey results. By classifying members into specific categories (e.g. large vs. small members, reporting vs. non-reporting members) we can identify specific characteristics of each class. For example, do large and small companies have different motivations for joining the WasteWise program?

There is a broad spectrum of participants involved in the WasteWise program. For example, active participants in the program range from Hewlett Packard and Anheuser Busch to Sligo Adventist School and the city of Fairhope, Alabama. To determine the relative size of each organization, we asked participants to classify the number of employees in their organization into the following categories:

- 1 to 100 employees
- 100 to 1000 employees
- 1000 to 5000 employees
- Over 5000 employees

Additional questions were developed to further distinguish the characteristics of members and to understand their motives for joining the program. Our questions addressed the following topics:

- Participation in other EPA voluntary programs (e.g. Energy Star, Green Lights, Climate Wise)
- Environmental Management System in place (e.g. ISO 14001, in-house EMS)
- Reasons for joining WasteWise
- Cost saving and costs of participating in the program
- Support of program from within organization (e.g. CEO, upper management, individual employees)
- Amount of time spent implementing the program

Establishing Baseline and Setting Goals – This section of our questionnaire addressed some of the difficulties associated with establishing a baseline and setting goals. Discussions with WasteWise program managers and information obtained from the subsequent internship confirmed that these are significant obstacles for program participants. Questions from our survey targeted the following concerns:

- Usefulness of tools available to assist in establishing a baseline
- Amount of time needed to establish baseline and set goals
- Ease or difficulty of defining goals
- Progress towards achieving goals

Reporting – This section of our questionnaire addressed some of the potential difficulties associated with the reporting process. Currently only a small percentage of program participants report their waste reduction results to WasteWise. This lack of participation in the reporting process is a significant problem for the program. One of the primary indicators of the program's success is the total amount of waste reduced by the partners. Non-reporting partners do not provide waste reductions quantities to the program; therefore, the amount of solid waste reduced by WasteWise members may be

significantly underestimated. Questions from this section addressed the following concerns:

- Completion of the Annual Reporting Form
- Ease or difficulty of reporting process

Program Incentives – This section of our questionnaire addressed the usefulness of incentives offered by the program. Cost savings and learning waste reduction techniques are primary incentives for joining the WasteWise; however, in this section we focused on incentives specific to program. These incentives include the use of the WasteWise logo to advertise participation in the program and company or organization recognition from the National Awards Ceremony.

On December 10, 1999 the EPA WasteWise program provided us with a list of all 947 companies and organizations participating in the program. The list included 502 members with electronic mail addresses, while the remaining 445 members had only street addresses listed. Members with electronic mail addresses were sent email messages December 18, 1999, with the survey included as an attachment. Of the surveys sent by email, 53 were returned as having invalid addresses. Members without email addresses were sent hard copy versions via standard mail on January 10, 2000. In addition, the 53 partners with invalid email addresses were sent hardcopy versions of the survey. Of the surveys sent by standard mail, 15 were returned as having invalid mailing addresses. Not including the 15 partners with invalid addresses, 932 (98%) WasteWise members were sent the questionnaire. As of February 9, 2000, 106 (11.2%) members had returned completed surveys. The response rate is summarized in Table 4.1.

Method of Delivery	Number Sent*	Number Responding	Percent Responding
Email	449	50	11.10%
Standard Mail	483	55	11.40%
Totals	932	106	11.40%

Table 4.1 – Email and Standard Mail Response Rates for Questionnaire

* Does not include invalid addresses

Member's responses to each question were assigned a numeric value and entered into SPSS (a statistical analysis software) for analysis. Frequency charts, bar graphs, and pie graphs were generated to analyze the data. In addition, cross tabulations were run to determine how members with certain characteristics responded to questions.

4.2 QUESTIONNAIRE RESULTS

A total of 106 WasteWise partners completed and returned our questionnaire. The respondents represent 11.4% of partners surveyed and approximately the same percent of the total population of WasteWise members (~ 950 members). One completed survey was returned anonymously.

The locations of questionnaire respondents were categorized into four geographical regions: Northeast, Southeast, Midwest, and West. The West and Midwest regions had the highest frequency of members responding (28% of total responses), while the Northeast followed closely with 26% of total respondents. As seen in Figure 4.1, the distribution of respondents closely mirrored the distribution of all WasteWise members (based on 1997 EPA data) indicating a reasonably representative sample. The West region had a higher percent of survey respondents relative to the region's population of WasteWise members. This is primarily due to the high response rate from California WasteWise members (16% of total responses). The high response rate from California may result from the willingness of state organizations to participate in a survey conducted by The University of California.

Figure 4.1 presents a comparison of the regional distribution of total WasteWise members, the distribution of respondents, and the population distribution for each region. This comparison indicates that the Northeast region had a higher participation rate in the questionnaire relative to the region's population, while the Southeast region had a lower participation rate.

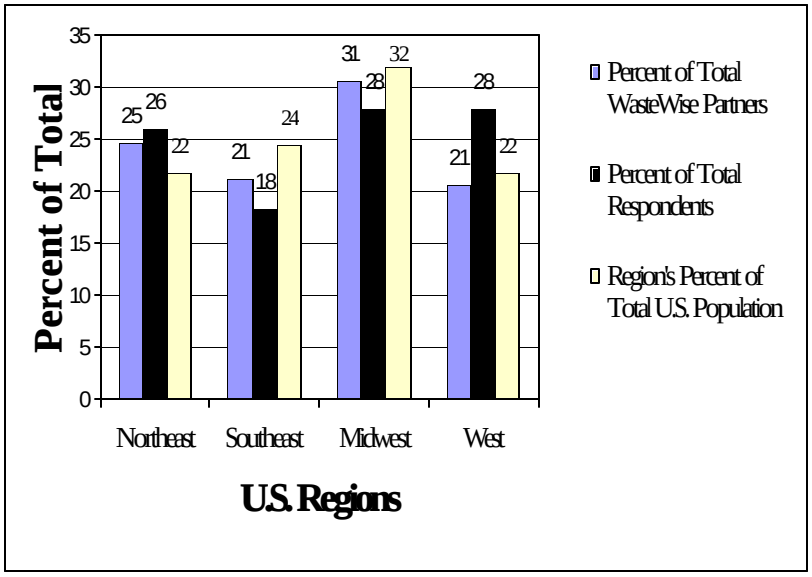

Figure 4.1. Distribution of Total WasteWise Partners, Respondents to Survey, and Percent of Total Population Each Region Represents

Figure 4.2 illustrates the size of WasteWise members (by number of employees) responding to the questionnaire and the size of organizations in the total population of the program. Other indicators of organization size, such as total revenue, were not considered because these metrics would not apply to over one-third of respondents that are in the not-for-profit sectors (e.g. education, government). The category with the highest number of respondents was the over 5000 employees grouping. Surprisingly this group makes up only 16% of all WasteWise members but accounted for 32% of the responses. The 100 to 1000 employees category represented 31% of total respondents. The less than 100 employee category represents 28% of all WasteWise members, but only accounted for 20% of questionnaire respondents. The comparison of response rates for partners indicates that smaller organizations tended to not respond to our survey. One possible explanation for the high response rate of large organizations is that many of the large partners have been in WasteWise since the program started in 1994. Consequently, they may be more active in the program and more willing to respond to a questionnaire about WasteWise.

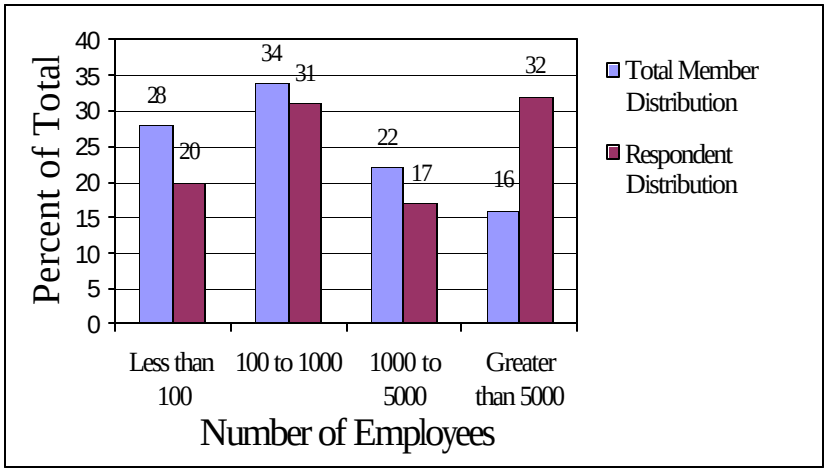

Figure 4.2 Respondent Profile - Size Comparison of Members Responding to Questionnaire and Total Population of WasteWise Members.

In addition to categorizing respondents by number of employees, we created a category for "For profit" and "Not-for-profit" organizations. "For profit" members include all of the business sectors such as chemical manufacturing and metal products, while "Not-for-profit" members include state and local government, tribal government, and the education sector. Although the EPA WasteWise program does not categorize members as being "For profit" or "Not-for-profit", we felt that using this grouping may help elucidate certain characteristics of each group. For example, do "For-profit" organizations perceive cost savings from waste reduction as more important than "Not-for Profit" organizations? Figure 4.3 compares the distribution of "For profit" and "Not-for-profit" WasteWise members responding to the questionnaire with the total distribution in the WasteWise program. The response rate for each group is identical to the distribution of members in the program.

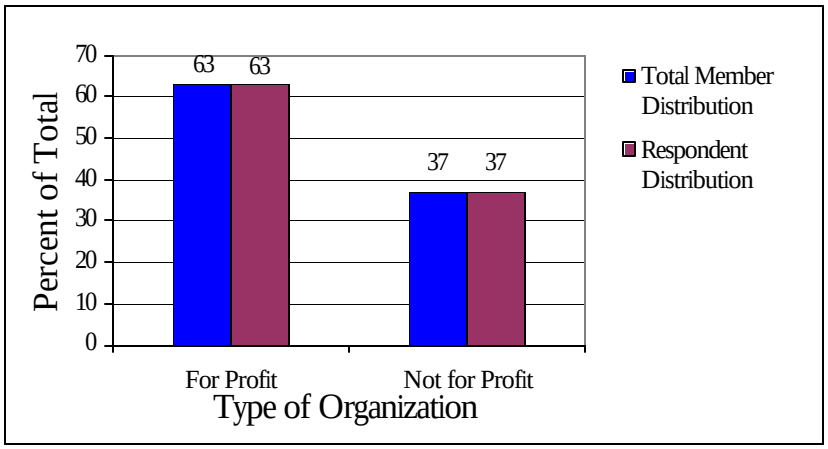

Figure 4.3 Respondent Profile – Comparison of the Type of Organization Responding to Questionnaire vs. Total Population of WasteWise Members.

With respect to having an Environmental Management System in place, 53% of respondents indicated that their organization had an EMS in place. In addition, 83% of organizations responding to the survey had an internal waste reduction program in place before joining WasteWise. The latter result suggests that the large majority of respondents (83%) did not join the program to obtain assistance in starting a waste reduction program. Rather, it suggests that they joined to improve their existing waste reduction program or to take advantage of other benefits of the program such as national recognition.

Respondents were also categorized by the year they joined the program. In Figure 4.4, the questionnaire respondents are compared to all WasteWise members based on the year in which they joined the program. As the figure illustrates, the number of partners responding (based on the year joined) was relatively representative of the total WasteWise population. The response rates for members joining in '94, '97, and '99 were slightly higher than the population of WasteWise members, while members joining in '95 and '96 responded at a lower rate. The large increase in members joining the program from 1996 to 1997 is a consequence of the large numbers of

state and local government organizations recruited into the program in 1997.

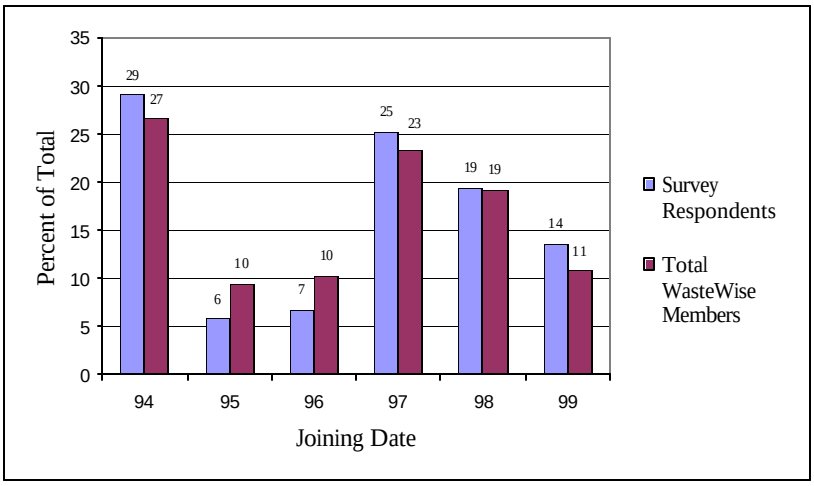

Figure 4.4 Respondent Profile – Comparison of the Year Joined by Total WasteWise Population vs. the Year Joined by Questionnaire Respondents

Incentives for Joining Program

According to the questionnaire responses, there are a number of incentives that motivate partners to join the program (see Table 4.2 for summary). Member responses indicate the following reasons as the primary incentives for joining:

- Improve Community Relations
- Promote Organization Waste Reduction Goals
- Learn Waste Reduction Techniques

One of the surprising results of this section is that respondents considered cost savings one of the least important reasons for joining the program. Cost savings is considered one of the primary selling points of the program, as illustrated by the dollar sign often inserted in the program name (i.e. WasteWi$e). This response may result from the fact that 83% of respondents indicated that their organization had a waste reduction program in place before they joining the program. Therefore, partners may realize the potential for saving money by reducing waste before they join WasteWise.

Incentive	Response Summary Very Important / Important	Somewhat Important
Not Important		
Improve Community Relations	83.50%	16.50%
Promote Org. Waste Reduction Goals	83.20%	16.80%
Learn Waste Reduction Techniques	81.40%	18.60%
Employee Environmental Interests	68.60%	31.40%
Cost Savings	65.30%	34.70%
Participation is Free	59.40%	40.60%
Promote Relations with EPA	53.90%	46.10%

Table 4.2 Reasons for Joining WasteWise Program

The questionnaire also asked members to rate the usefulness of incentives offered specifically by the WasteWise program. One of the primary incentives offered to participants of the program is to display the WasteWise logo on internal and external communications. For example, the logo can be displayed on brochures to "advertise" the organization's participation in the program or it can be used internally to mark waste receptacles. It should be noted that the WasteWise logo cannot be displayed on a participating organization's products or packaging. According to member responses, 55% had little or no use of the logo for internal display, while 66% had little or no use of the logo for external communication. These results suggest that the logo is of little use for the majority of WasteWise partners. Possible explanations include inadequate marketing of the logo or a lack of name recognition of the WasteWise program.

Costs and Cost Savings

Organizations were asked to approximate their costs and cost savings attributable to participation in the WasteWise Program. It should be noted that waste reduction activities associated with the WasteWise program often overlap with ongoing waste reduction activities at

member organizations; therefore, it is difficult, if not impossible, to attribute cost savings or costs specifically to participation in the program. For example, an organization that has been saving money by recycling may see an increase in recycling volume, and subsequent cost savings, after joining the program. However, it may be difficult to distinguish between cost savings realized by existing efforts to recycle and cost savings resulting from participation in the WasteWise Program. In addition, these results are limited by the fact that many of the participating organizations do not actually calculate cost saving or cost associated with their waste reduction programs. As a result, many of the responses are rough estimates and may not represent the actual costs or cost savings attributable to the WasteWise program. Despite these limitations, we wanted to determine an approximate value for how much money members are saving from the program and how much they are spending. The response summaries are provided in Figure 4.5 and 4.6.

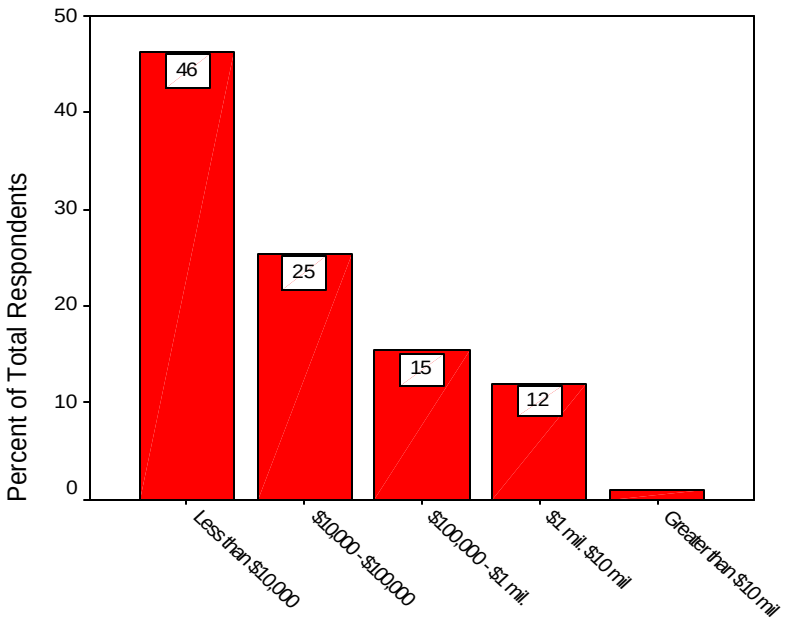

Figure 4.5 Approximate Cost Savings Attributable to Participation in WasteWise

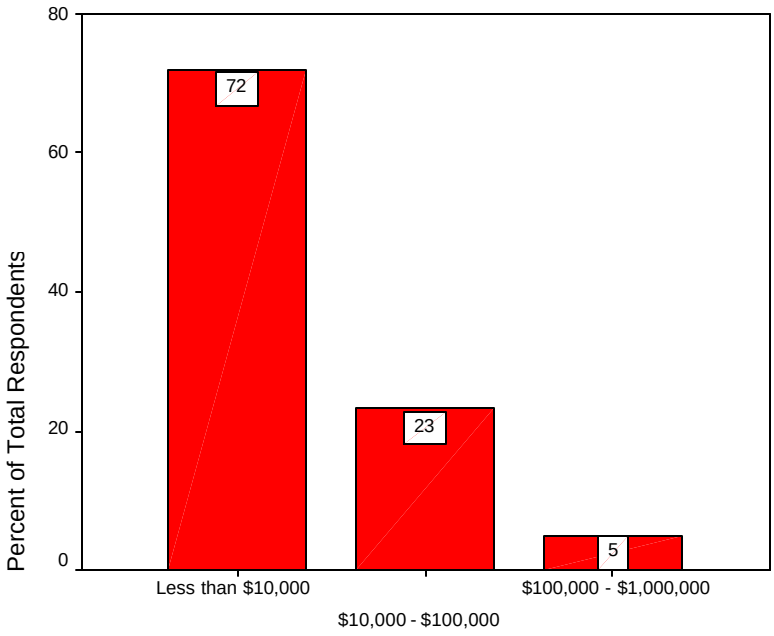

Figure 4.6 Approximate Operation and Maintenance Costs Attributable to Participation in WasteWise

According to the results from the returned surveys, 46% of respondents approximated their cost savings attributable to WasteWise to be $10,000 or less, while 72% indicated that their operation and maintenance costs attributable to the program are $10,000 or less. In addition, 29% of respondents indicate that their organization's approximate cost savings was greater than $100,000, while only 5% of respondents indicated that their organization's operation and maintenance costs were greater than $100,000. A cost savings of greater than $1 million was realized by 13% of respondents. Although these results do not provide any specific cost/cost savings ratio, the results strongly suggest that the savings attributable to the WasteWise program exceed the operation and maintenance costs of participation.

ESTABLISHING BASELINE AND SETTING GOALS

As discussed earlier, one of the difficulties facing members (especially new members) of the WasteWise program is the process of establishing a baseline and setting goals. This section of our questionnaire was developed to determine the usefulness of WasteWise "tools" designed to assist members in establishing a baseline and setting goals. The responses were assigned a number ranking from one to four in which a four represents a "Very Useful" resource and a one represents a resource that is "Not Useful". The mean of member responses is summarized in Figure 4.7. The member responses indicate that the WasteWise Toolkit is the most useful resource provided by the WasteWise program. The Toolkit is given to members upon joining the program and provides information on waste reduction methods, goal setting, and quantifying waste reduction efforts. According to the respondents, the Bulletin and Update are also useful resources for establishing a baseline and setting the WasteWise goals.

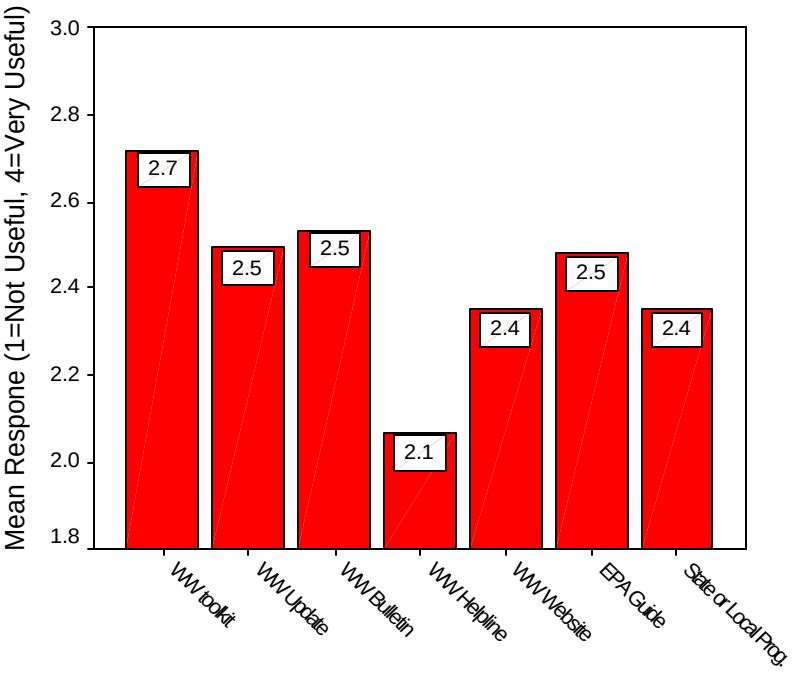

Figure 4.7 Usefulness of WasteWise Resources (1=Not Useful, 4=Very Useful)

Surprisingly, respondents identified the WasteWise HelpLine as the least useful resource. Consultants hired by the EPA WasteWise program staff the HelpLine. They provide members with personalized assistance pertaining to reporting, goal setting, and other waste reduction topics. For example, a member can call the HelpLine to ask advice about completing the reporting form or they can call to obtain information about local recycling facilities and waste management companies. The member responses suggest that the Toolkit, WW Update, and WW Bulletin are useful resources for establishing the baseline. However, the responses draw into question the usefulness of the WW HelpLine.

One of the primary responsibilities of participating in the WasteWise program is setting waste reduction goals. Goal setting for the WasteWise program is divided into three different tasks: waste prevention, recycling collection, and buying/manufacturing recycled. The purpose of this question was to identify which of these goals is the most difficult to achieve, and consequently, may require more assistance from the WasteWise program in achieving that particular goal.

We asked members to rank the three areas of goal setting from "Very Easy" to "Not Easy". Responses were assigned a number ranking from one to four in which a four represent a "Very Easy" goal setting task and a one represents a goal setting task that is "Not Easy". The mean of the responses is summarized in Figure 4.8. Recycling collection was rated as the easiest task, while buying/manufacturing recycled is the most difficult. Buying/manufacturing recycled is a difficult task for many members to achieve because it often requires purchasing recycled content products that can be more expensive than products without recycled content material. Buying recycled can be particularly difficult for larger organizations that do not have a centralized purchasing department.

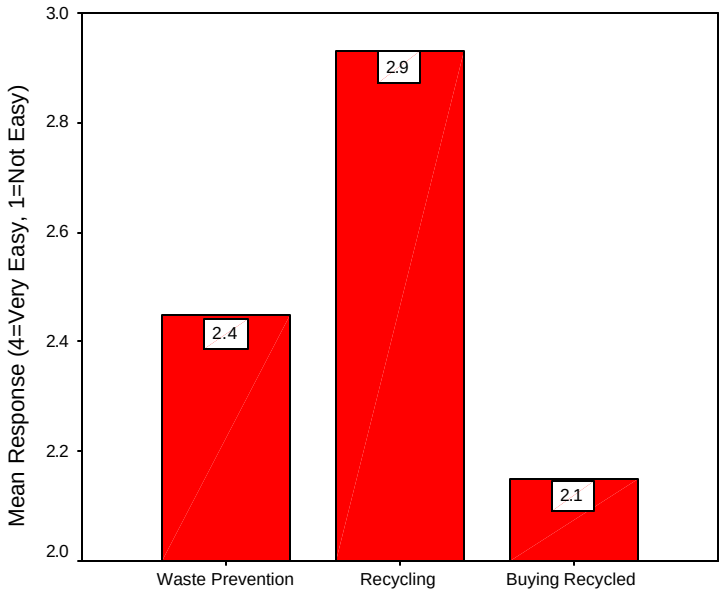

Figure 4.8 Ease of Setting Goals for WasteWise (4=Very easy, 1=Not Easy)

Reporting

In our initial analysis of WasteWise, the lack of partner reporting was identified as one of the problem areas of the program. Currently only 20% of WasteWise members report their waste reduction results to the program. We feel that this low reporting rate significantly underestimates the amount of waste reduction achieved by WasteWise members. To identify non-reporting partners responding to our questionnaire, we specifically asked respondents if they currently completed the reporting form. According to survey responses, 40 respondents (38%) currently do not complete the reporting form. Ten of those members not completing the reporting form joined the program in 1999. Comments by a number of these new members indicate that the primary reason they have not completed the reporting form is because they are new to the program.

According to non-reporting members, the primary deterrent to reporting is insufficient time (see Figure 4.9). This result is not surprising considering the many tasks for which environmental managers and recycling coordinators are responsible. Responses to this question also indicate that insufficient resources are a significant deterrent to reporting. These results suggest that the WasteWise program may need to improve the resources available to members completing the reporting form. In addition, non-reporting partners' apparent need for additional resources supports the need for the protocol (see Section 6), a tool designed to improve reporting and other aspects of waste reduction. Responses from non-reporting members suggest that the complexity of the reporting form was not a significant barrier to reporting relative to the other deterrents. This result contradicts our original assessment of the reporting process in which we felt that the form may be too complicated for many members to complete.

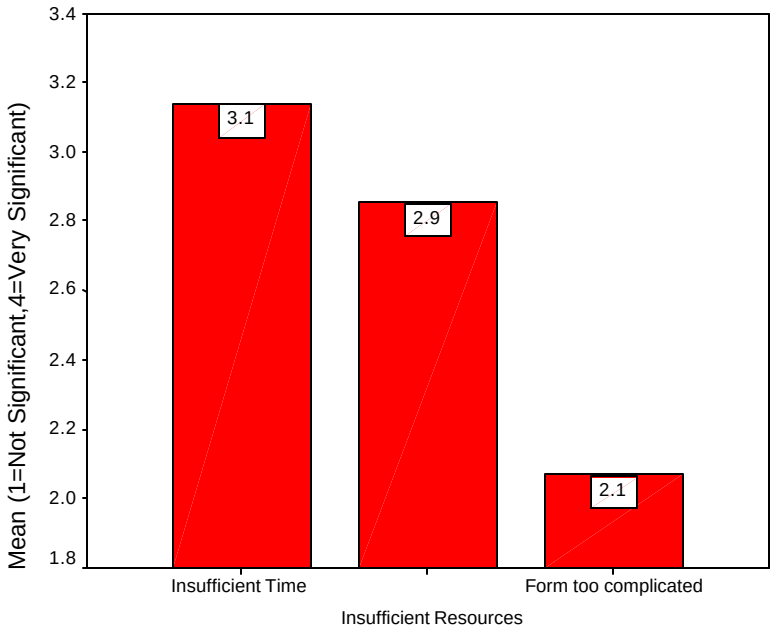

Figure 4.9 Mean Response for Deterrents to Reporting by Non-Reporting Partners (4=Very Significant, 1=Not Significant)

As mentioned above, insufficient time was the most significant barrier to reporting. In our questionnaire, respondents were asked to

estimate the amount of hours spent on various WasteWise activities. Figure 4.10 contains a summary of the results based on the size of the partner and the amount of hours spent on various WasteWise tasks each month. As expected, larger companies spent significantly more time performing the tasks required by the program. Tracking and measuring data/gathering info was the task requiring the largest input of time for all four organizational sizes. One weakness of this analysis is that it is certainly difficult for the respondent to delineate between the amount of time spent on the various WasteWise responsibilities and the amount of time spent on other tasks required by his or her job. Regardless, we feel that the information is useful in providing a general estimate of the time spent on WasteWise activities by each size group. The estimates provided by respondents to the questionnaire suggest that participation in the program can be a significant time investment, particularly for large organizations.

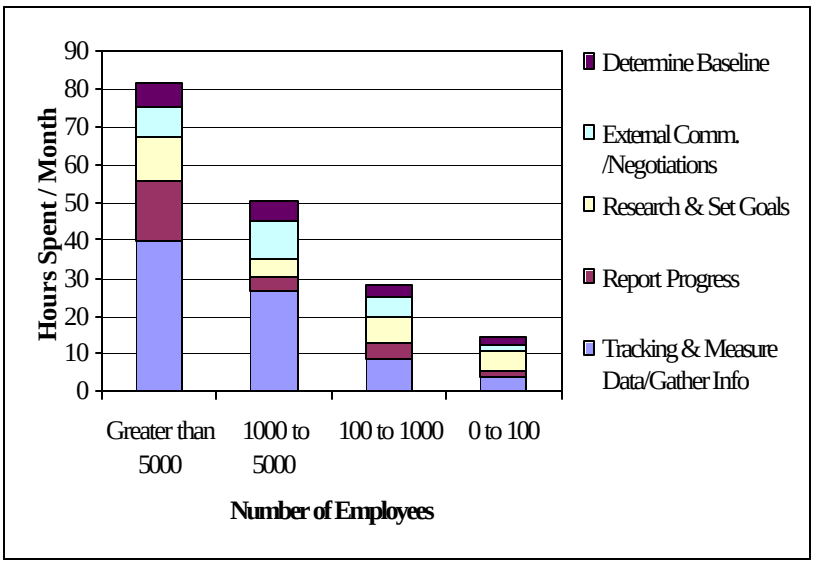

Figure 4.10 Amount of Time Spent on WasteWise Activities Based on Number of Employees in Organization

Figure 4.11 provides the average amount of time spent by all members on WasteWise tasks. As with the comparison based on partner size, the most time consuming task was measuring data and

gathering information. The survey also indicates that researching and setting goals was the second most time intensive task at eight hours per month on average. The UCSB case study and comments from WasteWise members lend support to the difficulties and time consuming nature of researching and setting goals.

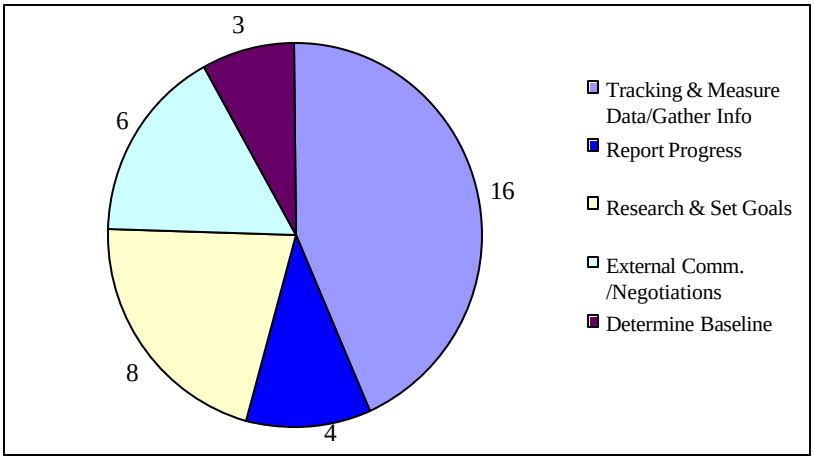

Figure 4.11 Average Number of Hours Spent Each Month on Various WasteWise Activities

For Profit vs. Not For Profit Members

As discussed earlier in this section, part of our analysis involves separating responses from "For-profit" and "Not-for-profit" members. We felt that this type of analysis would be useful because these two groups may have different motivations for joining WasteWise. For example, "Not-for-profit" partners may primarily join to learn waste reduction techniques, while "For-profit" organizations may join primarily to promote community relations. Understanding the motivating factors for these two groups may provide some insight into how to recruit new partners.

Figure 4.12 summarizes the results of our comparison between "For-profit" and "Not-for-profit" members and the reasons they gave for joining the program. The graph represents the mean value of responses by members in which a 4 represents a "very important" reason for joining and a 1 represents a "not important" reason for joining. The most notable characteristic of our results is that the reasons given for joining the program are relatively similar for each

group. Cost savings, community relations, promoting company waste reduction goals, and promoting relations with EPA all have a similar response mean for each group. These results suggest that "For profit" and "Not-for-profit" organizations have similar motivations for joining the program.

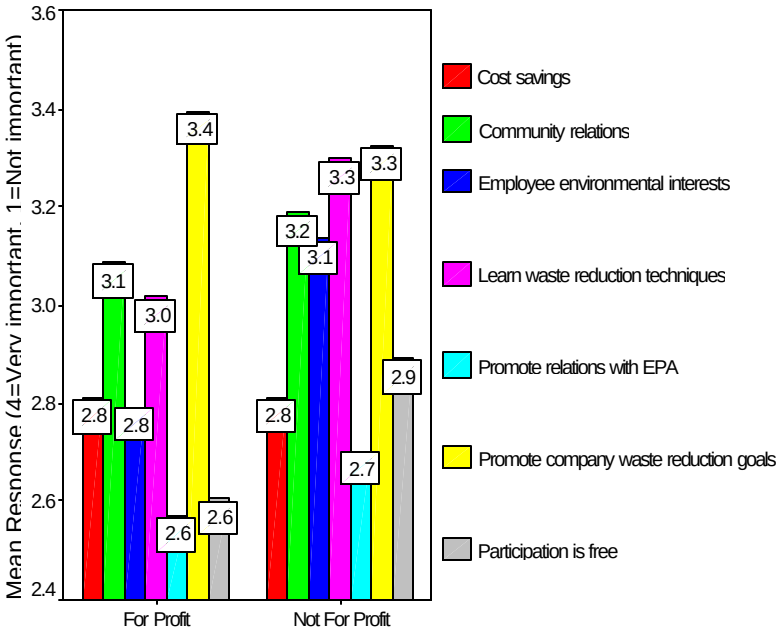

Figure 4.12 Reasons for Joining WasteWise – For Profit vs. Not-for-Profit comparison

The results illustrated some differences between responses from "For profit" and "Not-for-profit" respondents. Partner responses indicate that employee environmental interests were a slightly more important reason for joining for "Not-for-profit" organizations than for "For profit" organizations. In addition, learning waste reduction techniques was slightly more important for "Not-for-profit" members than for "For profit" members. A possible explanation for this result is the fact that 32% of respondents are large organizations (primarily "For profit" members) that may have had a waste reduction program in place before joining the program and, therefore, may not have as much of a need for learning waste reduction techniques.

Our analysis also looked at how "For profit" and "Not-for-profit" organizations rank WasteWise resources available to improve waste reduction. Onsite assistance by WasteWise representatives and

networking with partners from the same sector are resources currently offered by the program, but only on a limited level. Figure 4.13 shows the mean result of this analysis, in which a 4 represents a "very useful" resource and a 1 represents a "not useful" resource. The responses of the two groups suggest that onsite assistance by WasteWise representatives and networking with other partners would be more useful for "Not-for-profit" organizations than it would be for "For profit" organizations. "Not-for-profit" organizations may be more willing to have onsite visits because they are less concerned about the presence of EPA officials at their facilities and they may be less wary of networking opportunities because they are less concerned about revealing proprietary information. Perhaps the WasteWise program could increase efforts to extend these resources (i.e. networking opportunities and on-site visits) to large "Not-for-profit" partners such as universities or local governments.

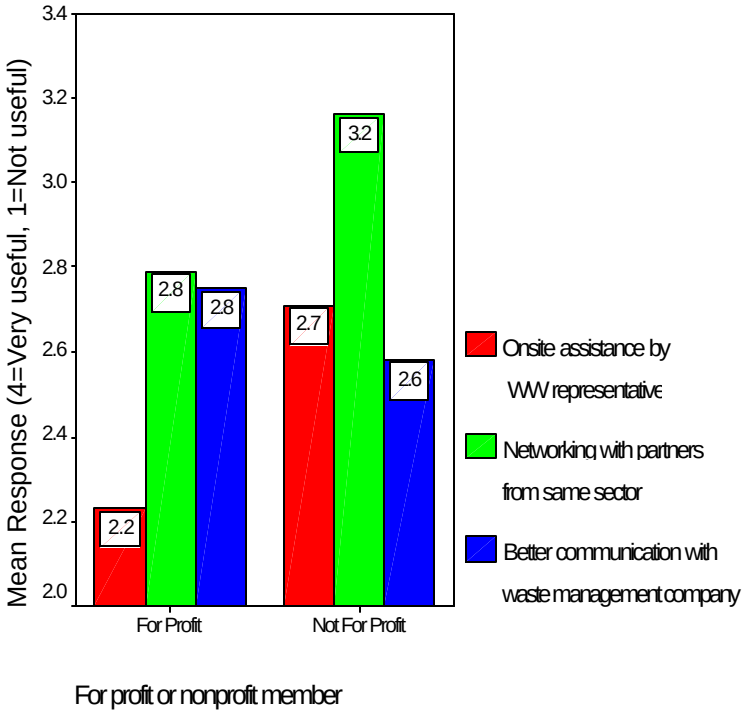

Figure 4.13 Resources for Improving Waste Reduction – For Profit vs. Not for Profit

Conclusions

According to our analysis of the characteristics of partners responding to our questionnaire, the respondents are relatively representative of the total population of program members. Therefore, we feel confident that the responses from members are representative of the total members in the WasteWise program. Responses from our questionnaire provide a number of significant results. First of all, the primary incentives for joining the program are to improve community relations, to promote the organizations waste reduction goals, and to learn waste reduction techniques. The results also suggest that partners' cost saving attributable to WasteWise are higher than the operation and maintenance cost of associated with the program.

In terms of fulfilling the primary responsibilities of the program, respondents indicated that buying recycled was the most difficult goal to achieve. In addition, the least useful resource available for establishing a baseline was the Helpline. This is surprising due to the fact that the Helpline is the primary form of personal contact between WasteWise contractors and members. With regards to reporting responsibilities, non-reporting respondents indicate that insufficient time was the primary deterrent to reporting. This result suggests that the reporting process should be streamlined to reduce the time spent on reporting.

Finally, our results indicate that the resources desired by members vary slightly based on the partner's classification as "For-profit" or "Not-for-profit". According to respondents, "Not-for-profit" members would find on-site assistance and networking with other partners more useful for improving waste reduction.

5.0 CASE STUDIES

The following case studies explore in-depth partners' assessments of the WasteWise program. These case studies focus on the following: progress of a WasteWise partner currently in the program, interview partners through on-site visits, process of recruiting a new WasteWise partner, and a cost study of partner participation in the WasteWise program.

5.1 WASTEWISE PARTNER: AMGEN

Amgen is a multinational biotechnology company employing over 5,000 staff worldwide. The firm is headquartered in Thousand Oaks, CA where approximately 3,500 employees work in over 38 buildings. In late 1994, Amgen approved a Corporate Waste Reduction Program to incorporate reuse, reduction, and recycling practices throughout the Thousand Oaks facility. Jaqueline Civet, Amgen's Corporate Recycling Coordinator, took the initiative to join WasteWise in 1994 to support their fledgling internal waste reduction program. Amgen's website reports that the internal program was established in response to "environmental concerns and decreasing landfill availability". Additional pressures were felt externally from Assembly Bill 939. The bill mandates California counties to reduce waste production levels by 25% by 1995 and 50% by the year 2000. The bill does not specifically mandate corporations to reduce waste; however, as an active member of the community Amgen believes they should do their part.

Since joining WasteWise, Amgen has saved approximately $450,000 annually from their waste reduction efforts. In addition, the company has received the WasteWise Ambassador Award, an awards program designed to acknowledge program partners that complete an annual report and show improvement in their waste reduction efforts. The following case study provides an annual summary of Amgen's waste reduction program and a brief cost analysis outlining some of the financial costs and benefits associated with their waste reduction program.

Annual Waste Reduction Progress

1994 Summary

In the first year of participation in WasteWise, Jacqueline Civet was required to set goals focusing on waste prevention, recycling collection and the purchasing of manufactured products. In 1994, Civet developed the following goals: to establish a solid waste measurement and reporting program, to promote in house materials exchange, and to establish a mug program with the cafeterias. Amgen improved their recycling program by purchasing a baler for cardboard and by recycling magazines and newspapers.

In addition, she persuaded the purchasing department to increase the purchase of construction material made from recycled content materials. Additional efforts to buy recycled included switching to recycled content bathroom paper and increasing the purchase of recycled content office paper to "include the majority of our paper" (roughly 75%). By implementing practices such as printing on double-sided paper and e-mail, disposal fees were reduced by approximately $80,000 from the previous year.

1995 Summary

In 1995, Amgen's goals included increasing overall recycling quantities and switching from single use insulated boxes to multi-use boxes in shipping products to customers. There was also a push to decrease the use of plastic bags in trash containers and decreasing paper use by increasing electronic communication and switching many forms to electronic format. Civet also increased the number of departments participating in the recycling program and formalized a pipette tip box-recycling program with manufacturers. In 1995, the company saved close to $300,000 in the reuse of equipment and furniture. Since the previous year, two buildings were demolished and the company was able to recycle 37% of the demolished materials saving the costs of purchasing virgin materials and the costs of disposing of the rubble. In addition, Amgen expanded their existing materials reuse/donation program, including donating used lab equipment to thirty schools. The company benefited by avoiding the costs associated with transporting the materials to landfills and by enhancing its relations with the local community.

1996 Summary

Creating a food donation program in which the company's cafeterias donated extra food to local food banks expanded the reuse/donation program. The multi-use box program from the previous year was expanded and initiated in-house. The recycling program was expanded to include computer software and hardware. In addition, jumbo rolls of toilet paper without paperboard cores were purchased to replace existing rolls.

In 1996, the company was undergoing heavy construction and demolition. Five buildings were demolished during this year and approximately 95 tons of material was recycled from these buildings. Also, 75 tons of wood was recycled outside of the demolition process. In addition, approximately 4,300 lbs. of chemicals were donated to schools valued at about $101,756. This donation also saved the company approximately $6,400 in disposal fees. Also overall disposal fees were down 17% from 1995 (based on per person/per year).

Waste reduction efforts in 1996 also focused on decreasing the amount of paper forms used by the various departments. Departments such as Human Resources, Library, and Graphics/Marketing converted from paper to electronic forms. The company also revamped some of its in house communication lines by sending messages by voice mail and posting only a couple of hardcopies in public areas. Previously, hardcopies were sent to all employees. Amgen has also increased it's purchasing and buying of recycled products by recharging its fax and printer cartridges rather than purchasing new ones.

Project Costs

Project costs of participation in the WasteWise program are the cost associated with initiating and implementing the program. Prior to joining WasteWise, Amgen had no formal recycling program in place; therefore, costs prior to the program were considered as zero. In addition, the program is free so there are no costs associated with joining the program. The flexible nature of the program also minimizes the costs of participation. WasteWise allows each participant to design their own waste reduction and recycling goals, thus minimizing the cost of modifying existing programs.

Although Amgen did not experience any initial costs when joining the program, there were costs incurred in the implementation of the program. The start up costs may vary from partner to partner depending on the depth of the program developed. For Amgen, initiating their waste reduction program cost $800 for the set up of recycling bins and approximately $60,000 for the creation of Civet's position. The operation and maintenance costs of the program primarily consist of Civet's salary and labor costs (estimated cost $182,000 for three years) associated with the internal collection of recyclables.

Benefits of WasteWise Partnership

Amgen's partnership with WasteWise yields a number of benefits for the company. The first benefit for the company was cost savings. We were unable to correlate Amgen's cost saving benefits directly with their participation in the WasteWise program since a waste reduction program was already in place before the partnership was established. As a result, Amgen would have seen cost savings without the partnership. With this caveat in mind, Amgen's waste reduction efforts have resulted in significant savings. Cost savings are realized primarily through reduced trash disposal fees and decreased purchasing through reduction and reuse programs.

Another potential benefit from the partnership was public recognition. Participation in the program allowed Amgen to use the WasteWise name on publications, websites, product labeling, etc. Additional public recognition could be realized through various awards programs presented by WasteWise. Despite the potential for public recognition, Amgen had not made significant efforts to publicize their partnership. The only mention of the company' s waste reduction program was an outdated page on their website.

A less tangible benefit is that the partnership may act as a "signaling device" to Amgen employees. According to Civet, there are a handful of employees who are active participants in Amgen's environmental practices. However many employees are "supportive in a removed way." This detached support indicates that many employees may have environmental concerns. Participation in the WasteWise program may provide a low cost opportunity for Amgen to demonstrate sets of values consistent with their employees environmental concerns. These shared values may improve job satisfaction and employee perception of the company.

In addition, implementing and attaining goals within the WasteWise program could make Amgen better poised to comply with any future waste reduction regulation. Establishing this voluntary link now with the EPA may facilitate negotiations between the two entities in the future.

Conclusion

WasteWise has given Amgen a tool to oversee its waste reduction operations and to make adjustments to streamline its waste generation. In doing so, the company has been able to save at approximately two million dollars in three years of participation in the program (based on 1994 to 1996 data). The waste reduction practices of Amgen have reduced the company's costs associated with the waste disposal. From a financial perspective these cost savings are somewhat insignificant relative to Amgen's total revenues (over $2.7 billion in 1998). Regardless, the waste reduction program provides a large financial return on small capital input. In addition, Amgen's various donation programs have provided the company with important community relations opportunities.

5.2 ON-SITE VISITS WITH PARTNERS

EPA started conducting on-site visits to a few partners in 1999 to gain a better understanding of the partner's assessment of the program. This approach was valuable for both EPA and its members to achieve better communication and to understand some of the program shortcomings.

Four on-site visits were conducted in 1999. These visits consist of one EPA WasteWise official, one to two ERG (Environmental Research Group) contractors, and the partner official(s) involved in WasteWise. This is a valuable approach for EPA to establish better communication with the partner, as well as to provide a better understanding of partner assessment of the program by asking questions and/or identifying concerns that the partner may experience. In addition, WasteWise program officials provided partners with valuable feedback concerning any technical assistance and/or other issues. In 1999, EPA began contacting select partners if they would like a visit. Since time and their approval is the only commitment that the partner has to submit, and EPA covers all other expenses, EPA contacts partners primarily based on the size of the organization as well as their interest.

Unfortunately, EPA is also limited in time, money, and resources making the selection process for on-site visits more difficult. This is one reason why EPA has invested their limited resources by contacting larger organizations, since they find that they may benefit the most with their assistance. These partners tend to have a multi-level organizational structure that has the advantage of having adequate resources for building and maintaining strong support for effectively handling waste reduction issues. The ability to increase on-site visits to all other partners will be a challenge for the future, unless there is a chance for further allocation to EPA.

The following summarize four on-site visits by WasteWise EPA officials, with special attention to partner assessment of the program:

Kaiser Permanente Oakland, CA (Headquarters) and VA facility, April 1999

Kaiser Permanente is a partner in the Medical Services Sector. Kaiser initiated a Waste Minimization Pilot program in a select number of Kaiser facilities in 1997 with the intention of implementing the program nationally to all of its facilities in 1999 and

2000. Interestingly, the National team at Kaiser developed its own version of the WasteWise ToolKit, called the *WasteWise Management Starter Kit* as well as drafted its own waste reduction plan to provide further guidance, successes and lessons learned to its facilities.

Kaiser's assessment for success in the WasteWise program include the following:

- In terms of the WasteWise program scope and measurement, one needs to have upper management support.
- It is important to work with suppliers to develop reductions in the packaging used to transport supplies, and develop contracts to work with waste haulers or recyclers.
- Since Kaiser is intending to implement the program nationally to all its facilities, they believe it is valuable to have on-site assessment and follow-up visits from an on-site leader/member of their headquarters, who initiated the WasteWise program to the facility.

Internal Revenue Service (IRS), New York, 1999

The IRS is a partner in the Federal Government Sector. The IRS also developed its own set of waste management guidelines to outline the purpose, background, and process for implementing a plan. This included developing its own "Waste Management Review Guide" for establishing a baseline but the IRS has requested that it needs help from WasteWise.

The IRS also believes that it is necessary to have an on-site leader to oversee the waste reduction efforts and to help teach others. The IRS is also interested in individual attention through WasteWise account representatives and the HelpLine.

The following on-site visits was attended by the research interns from our team and documents difficulties or successes that the partners may have encountered in the program:

Potomac Electric Power Company (PEPCO), Alexandria, VA July 1999

PEPCO is a partner in the Utility Sector. PEPCO is also considering future corporate restructuring or implementing the program to all its

facilities like Kaiser Permanente. However, for PEPCO this may be a problem, since they are experiencing hardships in the implementation of the WasteWise program in their first facility.

The most significant barrier they have experienced involves establishing a baseline and quantifying the results. They have not been able to report to WasteWise due to their difficulty in finding time to understand how to conduct a waste audit and identify materials for waste reduction. Initially, they wanted to reduce or recycle their fly ash but WasteWise does not recognize these materials or other hazardous materials as part of their program. In addition, PEPCO has difficulty to educate and cross-train employees concerning the responsibilities to recycle, and re-use materials, particularly oily rags. In the utility industry, they stated it is more expensive to wash oily rags than it is to purchase new ones. Thus, PEPCO is faced with limited areas for achieving WasteWise reduction activities. Although they are eager to contribute in their efforts, it seems that the materials that they want to reduce do not qualify as part of the WasteWise program.

City of Chicago, Chicago, IL, September 1999

The City of Chicago joined in September 1997 and is a partner in the Local Government Sector. At the time of the visit, they had not submitted any annual reports to WasteWise. The City of Chicago is a policy department that oversees other departments (ex., park district, sanitation, police, and fire); it can only provide recommendations to and influence other departments in the City.

In this case, the City of Chicago coordinator who initially joined WasteWise left the organization and now the duties have been given to a new official. This transition was a primary reason for not reporting. Nevertheless, the new coordinator was eager to learn about the benefits of the WasteWise program, in particular, the examples of what other cities and schools have contributed in the program. Unfortunately, EPA WasteWise officials had very little information to give them since the program has only been offered for government participation since 1997. There has not been a "leading" partner who has reported in their industry sector. EPA WasteWise officials mentioned the desire to look for a pioneer to lead the way for others to follow.

A second barrier that the partner expressed was the inability to establish a clear approach for managing and understanding the goals of the WasteWise program. The question of what they needed to do, and how to identify the scope of their own structure since they oversee many departments was addressed. Again, this relates to the beginning steps that a partner needs to perform once joining WasteWise.

ERG officials offered the following technical support and advice to the City of Chicago:

- Identify types of waste in the wastestream, time frame, range of approach, and gather current scale rates (ex., the number of containers to establish volume).
- Establish baseline. The partner knows how much the city is recycling (ordinance with haulers; every 6 months required to report to the city the amount hauled), thus the next step is to work with suppliers and purchasing department.

Conclusion

Overall, these on-site visits have illustrated that although these partners differ in industry sector and waste materials, they share a common need to achieve a better understanding of the WasteWise program. Partner assessment of the program are summarized as follows:

- Difficulty in establishing baseline and quantifying materials. This may include identifying types of waste in their facility wastestream, and the approach needed to conduct a waste assessment.
- Difficulty in cross-training and educating employees on waste prevention.
- Need to have follow-up visits or on-site assessment to further teach and instruct employees.
- Need for development of a specific protocol for particular industry sectors

5.3 NEW WASTEWISE PARTNER - UCSB

The University of California at Santa Barbara (UCSB) campus contains 72 buildings, which service about 3,119 academic staff, 5,715 non-academic staff and an undergraduate and graduate student body of 20,056. This campus population totaling 28,890 are the consumers of goods and the producers of solid waste (UCSB Office of Budget and Planning, 1999). UCSB began their waste management program in 1986 in conjunction with the Community Environmental Council (CEC) concentrating primarily on collection and recycling of high quality office paper. Today, the waste management program has become more diverse, including recycling of glass, plastic, aluminum, cardboard, newspaper, green waste, the reuse of office furniture and includes integrated pest management (IPM) to reduce the amount of harmful pesticides applied on campus.

UCSB has employed a teamwork approach to addressing their waste management needs, which they call the Recycling Network. This network is comprised of several UCSB entities which include Associated Students Recycling Program (ASRP), the University Center Operations, University Center Dining Services, Residence Halls, Physical Facilities and Central Stores. Other vital partners include the CEC, a representative from the County of Santa Barbara Department of Public Works, and UCSB's waste hauler, Marborg. All are represented at the UCSB Recycling Committee, the founder of which was Vice Chancellor David Sheldon. Most importantly, UCSB was able to enlist the support of the Chancellor of the University for their integrated approach to reducing the University's solid waste that was destined for the landfill. A detailed description of the components of UCSB's Recycling Network can be found in Appendix G1.

Outreach

Outreach and education is a very important component of a waste management system. ASRP has outreach coordinators that are responsible for waste management education on campus. The outreach coordinators are responsible for educating the incoming staff and students as well as keeping in touch with the more resident population at the university. These outreach coordinators administer the Green Awards Program to promote their waste management goals and to recognize departments and campus organizations that

strive to improve their waste prevention methods, increase their use of recycled content materials, such as paper, and participate in recycling collection. This program began in 1997 and acts as a form of internal recognition and stimulates competition among departments and other organizations such as the copy centers that produce quarterly readers for students and results in increased awareness that waste management is everyone's job.

Each year during fall quarter, ASRP outreach coordinators contact each of the 119 Material Services Officers (MSO) that are assigned to each department at UCSB as well as other organizations that directly support the university requesting their participation in the Green Awards recognition program. Interested parties complete a questionnaire sent to them by e-mail by mid-February. This form asks specific questions about their waste management practices. After the forms are completed and returned, the outreach coordinators visit each respondent, verify information on the form and identify exceptionally "green" candidates. Green Awards are given to recipients on Earth Day. The awards are publicized through e-mail and in campus publications such as the newspaper the Daily Nexus.

Approximately 29% of the UCSB departments contacted participate in the Green Awards program. The award winners for 1997, 1998 and 1999 were the Geography Department, the English Department, and the College of Creative Studies, respectively. The information gathered from the questionnaires is also used to focus outreach efforts. Innovative ideas are highlighted along with basic successes. Departments that participate in Green Awards benefit even if they do not win an award. There is almost always room for improvement in waste management practices and by having an outreach coordinator visit departments and make recommendations important improvements can be made.

The Influence of California Assembly Bills

The creation of Assembly Bill 939 and Assembly Bill 75 has influenced UCSB to lead the way for waste minimization.

AB 939

In 1989, the California Integrated Waste Management Board (CIWMB) was created with the enactment of AB 939, due to a national and state concern for overfilling landfills. AB 939 has

achieved significant progress in waste diversion, program implementation, solid waste planning, and protection of public health and safety and the environment from the operation of landfills and solid waste facilities.

The passage of AB 939 mandated that local jurisdictions in California set levels of waste diversion goals of 25% in 1995 and 50% in 2000, using 1990 baseline numbers. The act also created a framework for program planning and implementation and solid waste facility and landfill compliance standards. CIWMB uses financial, technical, and regulatory incentives when working with local governments and private businesses to assist in achieving substantial waste reduction. (21st CenturyPolicyProject, http://www.ciwmb.ca.gov/2000Plus/).

AB 75

AB 75 is a state mandated local program that requires each state agency and each large state facility to divert at least 25% of the solid waste that they generate from landfill disposal and combustion facilities by January 1, 2002, and at least 50% by January 1, 2004. The passage of AB 75 requires Universities in California comply with CIWMB to develop and adopt and integrated waste management plan. AB 75 would also require each state agency to submit an annual report to CIWMB regarding solid waste reduction.
(http:/www.leginfo.ca.gov/pub/bill/asm/ab_005-0100/ab_75_bill_2000209_status.html).

Status of California

According to California EPA, California has achieved its goals of diverting 25% of its waste stream from landfills in 1995, as mandated by AB939.
(http://www.calepa.ca.gov/publications/factsheets/1997/ab939.htm).

Trends of Solid Waste Management at UCSB

UCSB has a well-structured waste management system. In order to determine how it is working we looked at the available data from yearly statistics gathered by UCSB and waste stream audits that have been conducted. In this section data supplied by UCSB is analyzed and trends are examined.

UCSB Annual Statistics

UCSB has collected and recorded waste management data annually since 1993. The amount of waste generated, the types of materials collected from the waste stream for recycling and the amount being land-filled are included in Appendix G. Figure 5.1 shows the amount of waste generated by UCSB and the amount of waste recycled at UCSB. There is an upward trend for the tons of material generated and recycled at UCSB. The amount of waste generated has increased by 70 percent from 1993 to1998. UCSB has shown significant improvement in the tonnage recycled. UCSB increased the tonnage of recyclables by 943 percent. This large number reflects the effort that UCSB has made at increasing the amount of recyclables captured from the waste stream over the 1993-1998 time-period. Tonnage for recycling dropped from 1996-1997 and then rose steeply from 1997 to 1998 while waste generated remained about constant from 1996-1997 and then rose sharply after 1997. Recycling is market dependent and it may be that the market changed for a component of the waste stream that led to the steep drop. Waste generation could increase as the result of new construction or renovation of existing structures.

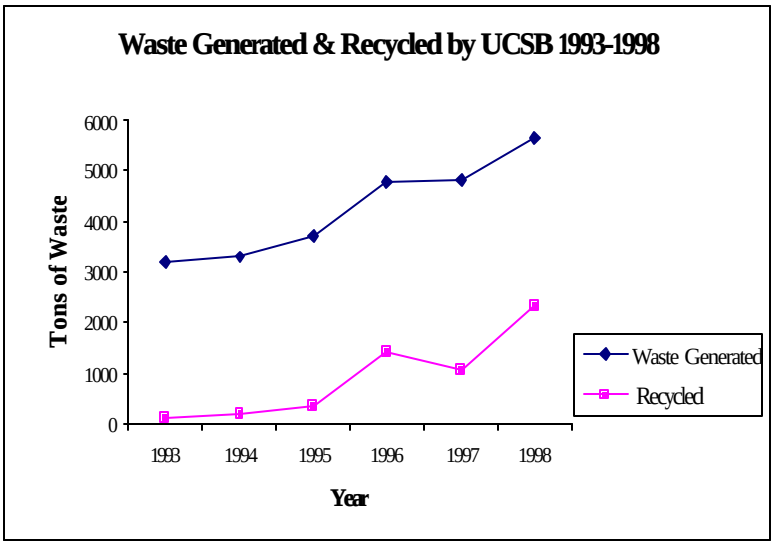

Figure 5.1 Waste Generated and Recycled by UCSB 1993-1998

Another important trend analyzed is the per capita waste generation at UCSB. Figure 5.2 illustrates the upward trend in per capita waste generation at UCSB.

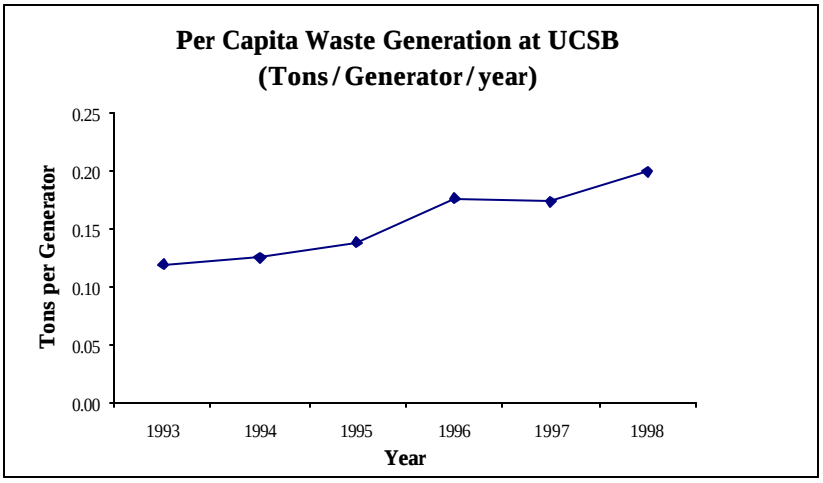

Figure 5.2 Per Capita Waste Generation at UCSB

Per capita waste generation has increased by 60% or an average of 10% per year for the 1993-1997 time period. However, there was only a 6.2% population growth for the university.

The histogram in Figure 5.3 shows the upward trend in the percentage of waste diverted from the landfill through recycling efforts. Although there have been significant increases in the percentage of materials that are being diverted from the waste stream through recycling the overall trend seen is toward increased per capita waste generation.

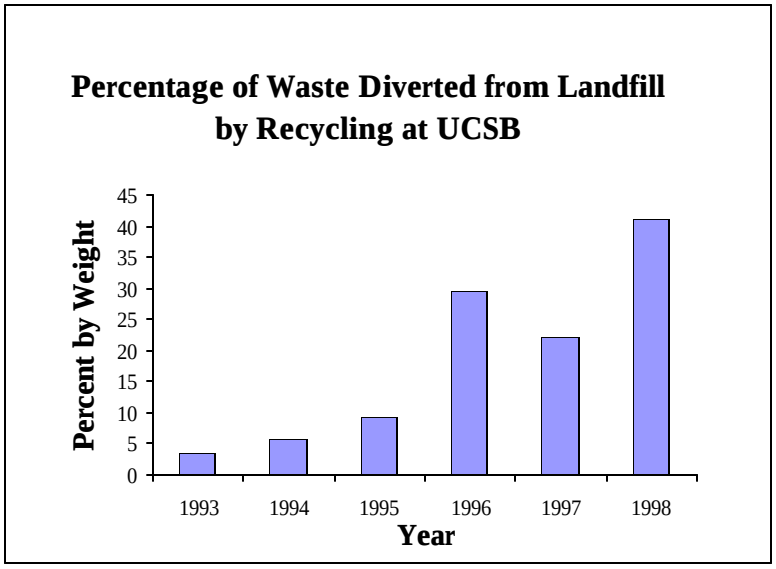

Figure 5.3 Percentage of Waste Diverted from Landfill by Recycling at UCSB

Waste Stream Audits

The Recycling Committee members at UCSB are eager to know how UCSB is doing with respect to their waste management efforts. They believe that the best way to evaluate progress is to conduct periodic waste stream audits. Waste audits can help improve waste management efforts by offering a view of the percentage of the wastes in dumpsters destined for the landfill can be recycled. UCSB has performed two waste stream audits, one in 1994 with the contractor J&S Salvage Incorporated and another in 1999 with CEC. This section presents the results from these two audits, compares the audits and examines the trends that were found.

UCSB's 1994 Waste Audit (J&S Salvage)

J & S Salvage collected twenty-one samples with an average weight of 185 pounds and a total weight of 3,879 pounds over a three-day time period from trash dumpsters that service eleven buildings on UCSB's campus. The buildings selected for the audit were the library, South Hall, Ellison, Engineering I, Engineering II, North Hall, Cheadle Hall, Chemistry, Bio Science, the Corp Yard, and Central Storage. UCSB selected these buildings because they represented a mix of administrative offices, departmental offices, classrooms, and

laboratories and because they have the highest volume of trash service. These buildings also contribute 53%, or 1,486 tons per year to UCSB's waste stream. J & S sorted the samples into 25 different waste types, which are listed in Appendix G4.

1994 Audit Results

J&S Salvage provided UCSB with aggregate data describing the materials in the waste stream as percentages of the total waste stream. The amount and type of waste produced by the individual buildings was not included in their report. Figure 5.4 depicts the percentage of materials found in the waste stream by weight.

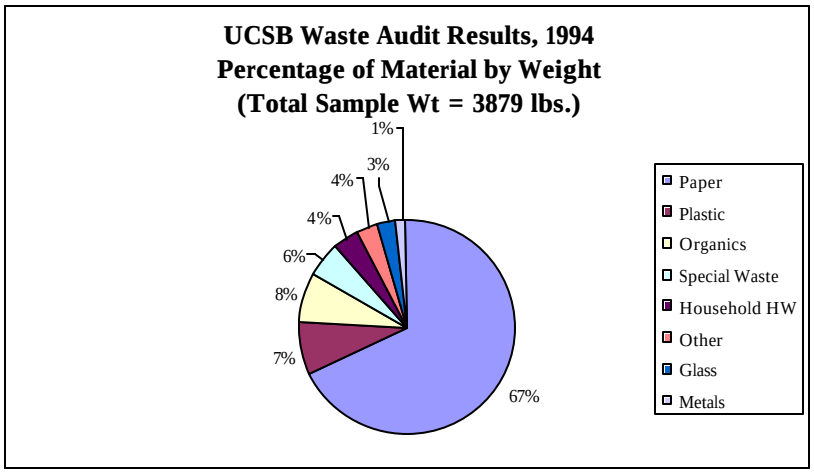

Figure 5.4 Percentage of Waste Material found in Waste Stream, (J&S Salvage Audit at UCSB, 1994)

The sampling indicated that paper was the largest contributor to UCSB's waste stream at 67% by weight. The next largest type of material by weight was plastic at 7%. This was followed by organics (food waste) at 7.5%, special waste (four video monitors) at 5.6%, household hazardous waste (batteries, copier machine toner cartridges, fluorescent light tubes and used air conditioner filters) at 3.7 %, other garbage at 3.6%, glass at 2.8%, and metals at 1.3%.

At the time of this audit, the term "Office Pack", which is a common way to refer to recyclable paper did not exist. Because this portion of

the waste stream is so large and diverse, the paper was sorted into categories, which can be seen in Figure 5.5.

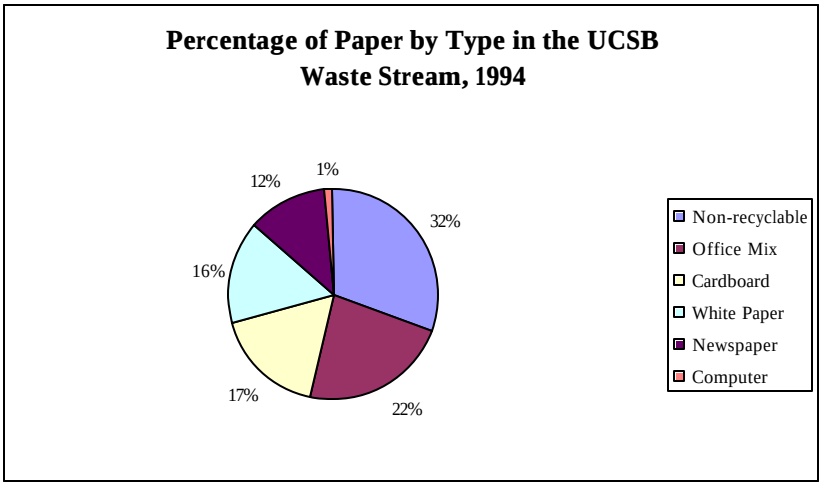

Figure 5.5 Percentage of Paper Type in UCSB Waste Stream

It can be seen from this figure that about 47% of UCSB's paper waste consisted of recyclable commodities. UCSB used the results of this audit to target the highly recyclable paper, such as cardboard, newspaper and white paper for recycling to reduce their waste disposal costs

UCSB's 1999 Waste Audit (CEC)

As stated earlier, UCSB is fortunate to have a strong relationship with the Community Environmental Council (CEC) who performed a waste stream audit for UCSB at no cost in March 1999. At the time of the audit, UCSB was recycling about 42% of its waste stream.

CEC collected six waste samples with an average weight of 214 pounds and a total weight of 1071 pounds from trash dumpsters that service five buildings on the UCSB campus. The buildings selected for the audit were: Engineering I, Phelps, Cheadle Hall, Girvetz and San Nicolas residence hall. These buildings were selected based on the amount of material they generate and because they represent a mix of administrative offices, departmental offices, classrooms, laboratories and food service. These buildings contribute an average of 358 tons per year to the UCSB waste stream.

1999 Audit Results

The data from the most recent waste audit performed by CEC in 1999 can be found in Appendix G5. This data was used to create the following pie charts to illustrate the current components of UCSB's waste stream. It is important to note that CEC used the term "trash" to describe the components found in the waste stream that are not recyclable.

Figure 5.6 indicates that the trash component was the largest component by weight in this waste stream audit at 36% by weight.

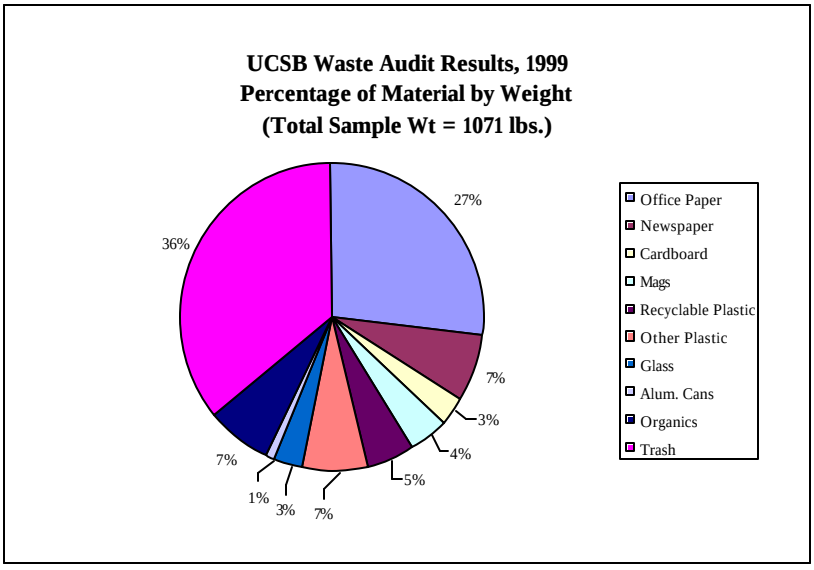

Figure 5.6 UCSB Waste Audit: Percentage of Material by Weight (CEC Audit, 1999).

It can also be seen that the sampling indicates that paper is the largest recyclable component of UCSB's waste stream at 37% by weight (includes office paper, newspaper and cardboard). Office paper, cardboard and newspaper are highly recyclable items. The largest amount of these items came from Phelps followed by Cheadle Hall. This information can be used by UCSB to increase the recycling of these items in these buildings. Plastics were the next highest category

of recyclable found in the waste stream audit at 14%. Followed by organics (food waste) at 7%, glass at 3% and aluminum at 1%.

Comparison of Waste Stream Audits

The audits shared two buildings in common (Engineering I and Cheadle Hall), however, the 1994 audit did not include data regarding amounts and types of materials generated by specific buildings. This information assists a manager designing waste prevention and recycling collection strategies in a more targeted way. For example, in the 1999 audit Phelps Hall had the highest amount of paper in its waste stream.

Trends

Paper was the highest percentage of material by weight for both audit years (67.5% 1994 and 41% for 1999). These percentages include all paper reported including non-recyclable paper that was categorized, such as magazines. However, the percentage of paper by weight decreased by 26% from 1994 to 1999. This indicates that collection efforts for paper have made a significant difference. The percentage of glass by weight remained about the same and newspaper was only slightly less (1.3%) in 1999. The percentage of plastics in the waste stream has increased by 4% since 1994. The 1994 waste audit did not use a trash (non-recyclable refuse) category but the CEC audit did. The trash category was the second highest category by weight at 36% after paper in the total sample in 1999.

Waste stream audits are an important planning tool for managing solid waste. They are also important for evaluating progress toward a goal. These audits have given UCSB feedback about what progress has been made and have pointed out areas for improvement necessary for meeting the demanding diversion goals mandated by legislation. This analysis shows that UCSB can probably increase the amount of paper captured from the waste stream thus increasing their recycling rates. However, it appears that growth in per capita waste generation needs to be stabilized. How to accomplish this is not clear. Increasing education and outreach targeted toward individuals may help.

Avoided Costs

By increasing recycling and diverting waste from the landfill, UCSB has avoided the cost of disposal. Avoided costs are linked

to the tipping fees that are paid to the landfill operators when waste is disposed. Tipping fees in 1994 for UCSB were $54 per ton. J&S Salvage estimated that UCSB could divert approximately 692 tons of paper per year based on the waste audit, avoiding $37,000 per year disposal fees from paper alone. Recycling markets also exist for cardboard, office mix, white paper, newspaper and computer paper and some organizations are paid for these commodities generating revenue.

UCSB Joins WasteWise

The WasteWise program expanded to include the education sector in 1997. Now, there are approximately 88 partners in the education sector, one of the largest sectors by membership. However, the education sector has the lowest reporting rate of all of the sectors. As part of our research, we wanted to evaluate the WasteWise program from a new member's perspective. UCSB was not a member of WasteWise when we began our research. We chose UCSB as our new member case study for the following reasons: UCSB had a waste management program in place and had been collecting data since 1993, what we learned from the case study could be applied to the education sector, we wanted to know what WasteWise could offer an institution with an existing and sophisticated system already in place and UCSB was geographically desirable and the willing to join.

Considering how sophisticated and well coordinated the waste management system is at UCSB the reader might be wondering: Why would UCSB join the WasteWise program? Mary Ann Hopkins, the Manager of Integrated Pest Management, Recycling and Refuse and the Chair of the Recycling Committee at UCSB, was interviewed as a prospective member of the WasteWise Program by our research team. Hopkins believes that even though solid waste management is a local issue best managed on a local level, that there is a need for a national movement to raise the level of awareness of the status of solid waste management in the United States. Although UCSB is diverting 42% of the waste generated from the landfill due to their waste management efforts, she is striving to do better. UCSB has been proactive in their waste reduction efforts, instituting their programs long before they were mandated to do so by the state. They did so because they are part of a community that cares about its environment and they wanted to set a good example. In addition, joining the WasteWise Program was viewed as an opportunity to

learn from others, to showcase some of the accomplishments of UCSB as well as serve as an opportunity to share their success in a way that helps other universities.

Hopkins also enjoys working with students and willingly supports their research in solid waste management. We recruited her to help us to analyze the WasteWise Program from the perspective of a new member with a successfully established waste management program in place. We formulated this case study to explore the process of becoming a new member and also to review the materials provided by WasteWise with an experienced critical eye to understand what WasteWise is doing well and what they could do better. The process and our findings are documented in the following sections.

Process / Findings

Registering

Joining the WasteWise program can be done electronically through the website and literally takes only a few minutes. After joining electronically, a message flashes thanking the user for becoming a member and notifying the user that program materials will be coming in the mail. The electronic form is divided into three sections: Section A: How the perspective member heard about the WasteWise program, Section B: Information about the organization, and Section C: Information to be completed if joining as a WasteWise Partner.

In general, the form is simple and easily understood. However, it appears to be set up primarily for a business and could be improved in some very simple ways to accommodate the new members in the education sector as well as other sectors. WasteWise administrators should consider making the following changes to the registration process:

- Automate the form using drop-down lists. For example, in Section B, a drop down list of sectors with general SIC (standard industrial classification) codes and a description of the general sector that goes with the SIC code would help potential members that do not know what a SIC code or a sector is.

- Link drop-down lists in one section to other sections. For example, “facilities to be included in initial waste

reduction efforts" should be linked to the general SIC code or industry sector chosen in Section B of the form.

- Clarify that Section C of the registration form is required for official membership in the program. As it stands now, it indicates only to complete this section if you are joining as a partner. It is unclear why you would otherwise fill out any part of the form.

- Use broad categories for choices in the drop down lists in Section C. It would be helpful if a drop down list of choices was provided that was broad enough to be applicable to universities and other sectors. Examples to include might be, single department within a facility, multiple departments within a facility, individual or multiple buildings at a facility.

- Use the website to direct a new member at the time of registering to information available on the website for determining their baseline waste generation and how to set their waste management goals.

- Explain that the number of employees is important in the context of the number of waste generators and can be used to calculate per capita waste generation at a member facility. It is not just an indicator of size of a facility.

Baseline and Goal Setting

Establishing a baseline means that a member must evaluate the current status of their waste stream. The best method for achieving this is to conduct a waste assessment. A waste assessment is an audit or accounting of the types of materials being disposed of in the trash. WasteWise provides new members with information on how to conduct a waste assessment in the ToolKit and in the EPA's publication Business Guide for Reducing Solid Waste (EPA/530-K-92-004). UCSB was fortunate to have conducted two waste stream audits in the recent past and the most recent audit was used to determine their baseline. After the baseline has been determined, the results can be used to begin setting the WasteWise program goals. Goal setting is the process by which a member uses their baseline to set waste prevention, recycling collection and the purchase of recycled content goals.

New members of WasteWise are assigned a password within forty-eight hours of joining but they are unable to use this password to electronically file their goals or access the Partner Network until the website is updated (occurs once a month according to the WasteWise HelpLine). In addition, all forms including goal identification forms are included in the reporting area of the website and in the Toolkit (unavailable on the website or as an electronic document). Due to the importance of the baseline determination and goal setting steps in becoming a member, WasteWise might consider making the following changes:

- Make the ToolKit available electronically.

- Create separate links outside of the reporting link on the website for baseline determination and goal setting and expand the information contained there to include the information found in the ToolKit as well as examples of completed forms.

- Add a separate tab for baseline determination and another tab for goal setting into the ToolKit. This would show the importance of these activities and the link between these two areas.

- Update the website more frequently and activate passwords more quickly. Currently, the website is updated once per month. It is possible for a member to have to wait a month before they can access the full potential of the website.

These changes should expedite the process of becoming an active partner in the program by requiring less manual input (forms can be down-loaded to a hardcopy and be completed by hand) of information and demonstrate waste prevention by eliminating the use of paper in the process.

UCSB used the 1999 CEC waste audit as their baseline, along with data that had been collected from 1993 to 1999 to determine their goals for the WasteWise program. These data showed UCSB that they needed to reduce the amount of waste generated while continuing to modify their recycling strategies to collect more paper

from the waste stream. UCSB's goals can be viewed in detail in Appendix G9.

UCSB would have preferred to file their goals electronically but was unable to do so because they did not have an active password or full access to the website. WasteWise could expedite this process for new members by:

- Facilitate new members electronic filing of goals by placing the forms on the Website where they can be down-loaded electronically, completed and returned electronically to a WasteWise representative.

- Add information to the "goals identification form" that encourages new members to file electronically. It is a good waste prevention strategy and it captures the enthusiasm of new members. Currently, there is no mention on the form of electronic filing on the website or by e-mail to a WasteWise representative.

- Create a separate goal setting category called Education/Outreach. Education and outreach are very important components of a waste prevention program and should be highlighted.

Reporting Progress

The reporting form is divided into five sections one of which collects the standard partner information and three of which correspond to the three general goal areas: waste prevention, recycling collection and the purchase or manufacture of recycled content products. The last section is a comment section where partners can make general or specific comments and describe advances the organization would like WasteWise to know about.

Although UCSB is a brand new member, they have been collecting data since 1993 and have been reporting their waste management progress to the CIWMB. We asked UCSB to review the WasteWise annual reporting form in addition to our review of the sections of the form. Recommendations follow:

- Guide the partner during goal setting to make the connection between goal setting and reporting. Section

II: Waste Prevention on the form asks the partner to choose a "primary material" and a "product" from two different "lists". These lists were not used during goal setting and translating the goals to the reporting form is not clear.

- Expand the list of materials included in Section III: Recycling Collection beyond the broad categories of materials currently listed or make more room for writing in "other" materials. Members have expressed a desire to list other materials and are eager to record all of their recycling efforts even if the non-hazardous materials they are collecting have not been identified as top materials from a greenhouse gas perspective. For example, there is no category for office furniture or used tire recycling commonly found at partner facilities.

- Draw a better connection between goal setting and reporting for Section IV: Buying or Manufacturing Recycled Products on the reporting form. This section also uses "material" and "product" lists that were not used in goal setting.

- Create a separate section on the reporting form for Education/Outreach. Educational activities are extremely important to the success of a waste management program and they should be highlighted.

- Modify the form to collect information about total amount of waste generated and number of generators. Per capita waste generation is important data. It can be an indication as to whether educational programs are effective at changing attitudes about waste.

WasteWise HelpLine

Our research about becoming a member of WasteWise spanned a short amount of time and did not include extensive use of the HelpLine. One functional comment we can make about the WasteWise HelpLine is that the hours may not serve West Coast partners well. Partners on the West Coast need to call before 1:30pm Pacific Standard Time (PST) to receive assistance due to the time difference. WasteWise administrators should consider covering

longer hours by using a sliding shift where some employees come in later and work later into the evening.

Conclusions and Recommendations from UCSB Case Study

The WasteWise program's focus on waste prevention is timely and necessary. We saw in our research with UCSB that recycling can make a significant impact on waste diversion but that waste generation continues to rise at a much faster rate. Collecting and evaluating data on a waste stream are the first steps to developing waste management strategies to reduce waste. This data provides information about materials that are successfully being captured and those that are not. Periodic waste audits are not only a good tool for identifying recyclable materials in the waste stream they can be used to evaluate a waste management programs progress toward a goal. UCSB's waste management statistics and waste audits indicated that waste prevention should be a focus of their future waste management efforts in addition to fine tuning their recycling program to in order to capture more recyclable material.

Education and outreach are important components of a waste management prevention approach. Internal recognition programs, such as, UCSB's Green Awards program, is an example of an outreach effort that is designed to modify social behavior at the department level. It is also important to educate individuals about waste prevention in order to reduce per capita waste generation. The WasteWise program should emphasize education and outreach. WasteWise should consider modifying the program goals that members submit to include a category for education and outreach thus highlighting it. WasteWise should develop materials that could assist members in designing and implementing internal recognition programs at member facilities.

5.4 COST STUDY

Many programs sponsored by the EPA focus on energy reductions. Green Lights and Energy Star are examples of some of the more popular programs the EPA has set forth. However, a key concern raised about voluntary agreements is the difficulty in determining their effectiveness. It has not been definitively determined whether the reductions from these programs took place as a result of the program or because of external pressures or other factors, such as legislation or competition.

A cost analysis is a feasible approach to evaluate the effectiveness of the WasteWise program. A cost analysis is the review and evaluation of:

(1) the separate cost elements and proposed profit of an offeror's or contractor's cost or pricing data, and

(2) the judgmental factors applied in projecting from the data to the estimated costs.

The objective of the cost analysis is to form an opinion on the degree to which the proposed costs represent what the cost of the contract should be, assuming reasonable economy and efficiency (www.kcilink.com). The basis for the cost analysis, the cost or pricing data, is factual and verifiable.

It usually takes economic arguments to motivate companies to change practice or policy. It is also important to keep in mind that with an individualized program like WasteWise, measuring success is company dependent. Benefits such as employee moral and community relationship are side-benefits of the WasteWise program that are not easily measured in a cost-benefit relationship. Nonetheless, these benefits can have real impacts on profitability, employee retention, and land-use plans of a company.

In this study, we conducted a small-scale cost analysis of two similar companies. The cost analysis entailed looking at the different costs incurred by each company in disposing and recycling products. Since the sample size studied was small, the conclusions may not be widely applicable. The results may not indicate accurate judgment about estimated future costs or projections, but may provide a starting point for future studies.

The study encompassed the solid waste disposal costs of a WasteWise member and a non-member. Administrative costs were not considered. The study examined only recycling activities because data for purchasing and reduction are largely unavailable.

Methods

Specific criteria for selecting two companies were developed to provide a comparison in this cost study. The following criteria were established in selecting the companies:

Criteria for the WasteWise member:

1. Consistent reporting history
2. Most active partner in its industry sector (reported the most reduced, recycled)
3. Willingness to share information

Criteria for the non-member:

1. Within the same sector as the WasteWise member
2. Produce the same or similar product/service
3. Located within the local vicinity
4. Willingness to share information

Selection

The WasteWise member was chosen based on information provided by the EPA on the most active partners (drivers) from each sector (Appendix B8). Finding companies that met the first two criteria was not as difficult as the third criteria. Due to time constraints, it was not possible to gather sufficient data for a complete analysis.

For most companies, disposal costs were either not tracked or considered sensitive information. When considering the sector to be analyzed, these two issues played a critical role. For this study the Hotel sector was chosen due to data availability and willingness to share information.

Once the WasteWise member was selected, the non-member was matched from a list of companies obtained through the local chamber of commerce. An exact match in relation to size was not found, however this was not necessary since the comparison should

scale well for hotels of different sizes. It should also be noted that the larger an organization is, the greater amount of costs and savings will be seen.

Measuring the Costs

Costs can be measured through analysis of the amounts of goods purchased and/or the amount of waste disposed. Estimates of the amount of products demanded by customers can be made by tracking the amount of products purchased. It is difficult to monitor the amount of recyclable products entering hotels, because they are packaging materials (e.g. cardboard boxes, styrofoam peanuts, steel food containers, etc), and are not purchased or tracked directly. The costs associated with monitoring the inputs may be higher and require more effort than monitoring the material outputs.

In contrast, estimates on the actual amount of a recycled material used can be determined, by tracking the volume of material disposed. Volumes of waste disposed were available for the WasteWise member, but was not tracked by the non-member, however disposal fees were available from the non-WasteWise member. External factors play a role in determining the disposal fees imposed on the individual companies. These include local legislation, disposal company, and business market. It was assumed that these external pressures were proportionally equal when comparing the disposal fees for the two hotels.

Annual disposal costs from 1990-99 and the non-WasteWise member (Appendix H) provided monthly disposal costs for 1999. Annual disposal costs from the WasteWise member were not obtained, however the volume of waste disposed was given from 1995-1999. The volume of wastes recycled and the cost savings for 1996-1999 were also provided (Appendix H). A comparison of the disposal costs was done with 1999 data to signify any sort of change with recycling.

$$\text{Cost of Disposal} = \left(\frac{\textit{Cost Savings}}{\textit{Amount of Waste Recycled}}\right) * (\text{Annual Volume of waste produced})$$

The Companies

As mentioned earlier, this analysis concentrated on the disposal costs for the total waste disposed of two companies in the hotel business.

All information collected from the companies was done through direct communication via e-mail, phone and/or personal interviews with representatives from each hotel.

Ideally a company that joined in 1994, the same time the WasteWise program began may be able to provide the most detailed information. However, the members were not able to provide the necessary data. The WasteWise member (WWM) chosen joined the program in 1997. This limited the amount of data, but the company was able to provide recycling data from the previous year prior to joining WasteWise. Disposal cost for the member hotel was evaluated from 1996 to present.

Disposal data from the non-WasteWise member (NWWM) was obtained from 1990 to the present. Though data from NWWM prior to 1996 cannot be compared to the WWM, it is important to have historical data to illustrate trends in waste reduction since the early 1990's and determine if the trend is continued. This trend can be used as a baseline to show waste reduction pre-WasteWise. Since the WWM did not have this information, this baseline can only be useful for comparison from 1997 on. One can get a rough estimate of the effectiveness of WasteWise by comparing the slopes of disposal costs over time to the member and compare it to the non-member. It must be kept in mind that this study is only conducted with two companies so this baseline is not representative, but it provides an example.

5.4.1 WASTEWISE MEMBER (WWM)

The WWM is a hotel located in the state of Washington and is one of the largest hotels in the region. It has 840 guestrooms, 25 meeting rooms covering approximately 42,000 sq. ft. It employs approximately 475 employees. The occupancy rate is approximately 238,561 rooms annually (78% average occupancy). This hotel offers many different services: a business center which handles faxing, photocopying, word processing, secretarial services, internet access, notary, courier and shipping services and cellular and computer equipment rental, an audio visual center, which has full-service, on-site equipment and technicians. The hotel also has other services such as: postal service, dry cleaning, limousine, barber shop, news agent, foreign currency exchange, translation and airport transportation. Thus, a hotel with this many types of services could produce a large amount of waste.

The hotel joined the WasteWise program in 1997. However, it began its own recycling program in 1996. In 1995 the hotel generated a total waste of 924 tons and from 1996-1999 the average waste was 771 tons. These reductions were calculated by taking the average weight per compactor load each month. Using this as a comparison, the hotel has managed to reduce its waste output by over 100 tons per year.

It is important to note that these figures focused only on the hotel's recycling program. The costs savings or costs only represent a fraction of the WasteWise program. Larger benefits may be seen through waste reduction, however this type of data is difficult to quantify since the hotel does not track these activities and therefore cannot be quantified in this analysis.

Figure 5.7 illustrates the total amount of waste generated versus the amount of waste recycled. The trend seems fairly steady since 1996. The amount of materials recycled is approximately equal to half the amount of waste generated. The hotel was able to reduce its output by 141 tons within the first year of implementing a recycling program. After the hotel joined WasteWise in 1997, the amount of recycling continued to decrease slightly. The waste output has remained relatively constant, while the amount of waste recycled has fluctuated slightly.

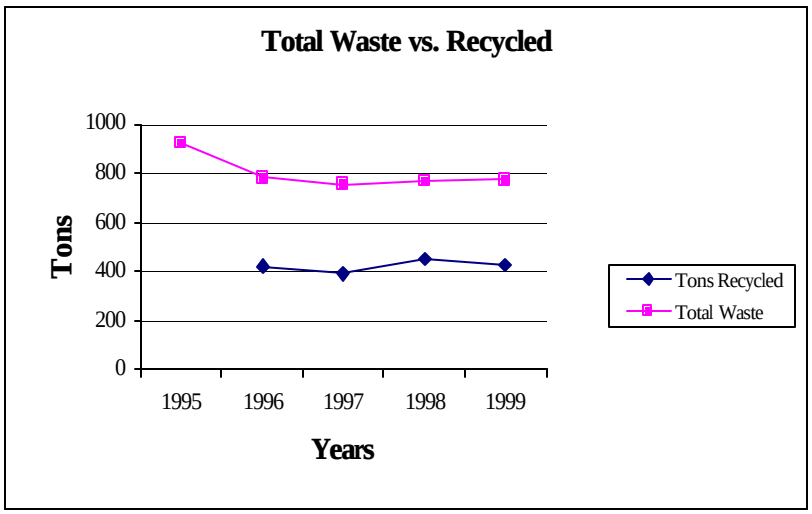

Figure 5.7 Total Waste Produced and Waste Recycled

The hotel's recycling program encompasses five different materials: paper, cardboard, glass, compost and GLOB (glass, aluminum, plastic etc.). There have been variable effects between each of the categories since the hotel joined the WasteWise program. In some instances the amounts recycled has decreased while in others it has increased or remained steady. The fluctuations between the different categories have been such that the increases in one area were balanced with decreases in others. This may explain why the amount of recycling remained steady. Some reasons for the variability in the recycling could be a result of different activities taken by the hotel.

Materials

According to the data provided, one interesting anomaly is associated with the reporting of glass recycling. The amount reported significantly decreased between 1998 and 1999 (100 tons to 4.2 tons). The reason for this drastic drop was that in 1999, the amount of glass recycled was only recorded during the month of January and after January, glass recycling was combined with the GLOB category. GLOB was on the decline for the first two years until 1998 and increased about 50 tons between 1998-1999 (Figure 5.8)

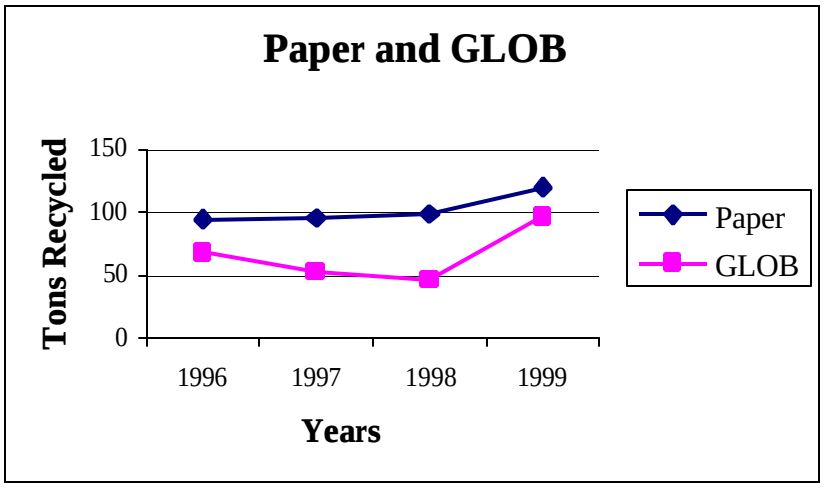

Figure 5.8 Paper and GLOB Recycling Trend

The increase was because recycling of glass was grouped into the GLOB category. According to the figure, two products (paper and GLOB) have shown increasing recycling trend. Another reason for the patterns for paper and GLOB could be due to ease of collection. Paper is easily collected and does not have to be separated into different categories making it easier to track and report than GLOB. GLOB is composed of different materials, making it difficult to quantify. Initially, the recycling company required the GLOB to be separated before collection. By having this policy, it may have caused a disincentive for the collection of GLOB. In 1999, the recycling company changed its policy, allowing the company to co-mingle the GLOB materials. The new policy created an incentive for the hotel to collect more of the GLOB materials. An indication of the change in policy could have resulted in the decision to incorporate glass recycling into GLOB.

Not all of the materials being recycled have increased over time. The amount of cardboard and compost remained fairly steady but cardboard appears to be on the decline (Figure 5.9)

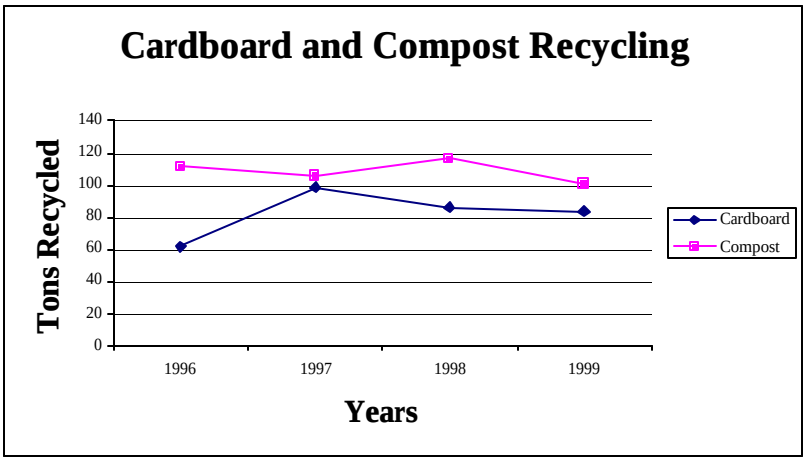

Figure 5.9 Cardboard and Compost Recycling

The volume of cardboard increased between 1996 and 1997, but has been on the decline since. The amount recycled in 1999 is still higher than the amount recycled in 1996. The amount of cardboard recycled has increased by approximately 20 tons from the beginning, and only decreased by about ten tons from 1997. Cardboard is one of the easier materials to recycle, since it can be easily compacted. With this hotel's data, in the last two years there was a decrease in the amount of cardboard recycled. This may indicate that other factors can be involved with the problem of reporting outside of ease of recycling.

Analysis

There may be some correlation between the amount of compost recycled to the number of occupied rooms. The number of occupied rooms in 1997 and 1999 were 235,000 and 236,000 respectively. The total occupied rooms in 1999 were approximately 244,000 and 240,000 in 1996. The highest volume of compost recycled occurred during the years of 1995 and 1998, with the greater amount in 1998. The more occupied rooms, the more compost materials used and recycled. There is no such correlation with the other recycled materials in the study. One possibility for this correlation is that compost may consist of materials that are directly utilized by the guests (e.g. food), whereas the rest of the materials recycled are more independent. This is a plausible explanation because the amount of compost recycled fluctuates proportionally to the number of guests.

Cost Savings

Cost savings were estimated by the hotel based on the number of compactor loads that were not sent to the landfill. They were calculated from the average weight per compactor load each month, including all taxes as well as the cost of recycling. The cost of recycling was deducted from the calculated savings and revenue generated via the sales of any recyclable products was added.

Costs savings were calculated for 1998 and 1999. In 1998, the total amount saved was $50,936 and in 1999 the total amount saved was $47,615. In 1999, the costs of disposal were $93,169. The cost savings for 1999 were equal to approximately half the disposal fee. It takes large amounts of materials recycled to produce the above savings. The amount of savings incurred ($47,615) is very small compared to the amount of revenue generated ($64 million).

Benefits

This analysis may indicate that participation in waste recycling has some effect on the financial status of an organization. According to a representative from the WasteWise member hotel, WasteWise has assisted them in keeping better recycling records, finding innovative methods to recycle and encouraging employees to recycle. The hotel has also made efforts to purchase recycled products. However, managers often do not purchase these products. The hotel representative also mentioned that "literature provided by WasteWise on recycling/reduction techniques have been useful. In addition, WasteWise has assisted them in achieving goals and keeping the company on track. It has allowed them to keep better track of its records and make the employees aware of recycling."

5.4.2 NON WASTEWISE MEMBER (NWWM)

The NWWM hotel is located in California and is the largest hotel of its type between San Francisco and San Diego. It covers approximately 40,000 square feet, employs approximately 460 personnel, and has 337 rooms. The resort offers a variety of services such as meeting and banquet facilities, fitness center, heated outdoor pool, spa, laundry, valet services, bar/lounge. The hotel also offers free newspapers.

This hotel is not a member of the WasteWise program, but it has the beginnings of a recycling program. The hotel's recycling program was initiated by a hotel employee and began in the fall of 1999. There was some support from upper management, but it was not overwhelming. The program has not reached its full potential because the hotel committee (general manager and several directors) decided to implement the recycling program on a trial basis, focusing on a few materials. In addition, even though the program has the approval of upper management, it was implemented and managed at the employee level. For this analysis, it is assumed that the amount of recycling that takes place at this facility may be negligible, compared to its full potential.

Recycling

Currently, the recycling program is under the supervision of the local recycling company and covers the recycling of glass, paper and cardboard. The two largest wastes produced by the hotel are paper and cardboard. Most of the recycled material is produced by the sales, marketing and catering divisions of the hotel. Other divisions such as the human resources, kitchen, and banquets departments also contribute to recycle their paper wastes. An interesting note is the method of recycling glass at the hotel. A single employee at the hotel is responsible for the glass-recycling program. Glass from throughout the hotel is stored in a designated area and the employee collects it about twice a week. The employee recycles the glass for personal income and does not report the volume recycled. As a result, the hotel does not have records of the amount of glass recycled, which make it difficult to assess the status of the recycling program.

Problems

One problem with the recycling program is that is does not encompass newspaper that the hotel delivers to its guests every morning. Every month approximately 7 tons of newspaper is thrown away. The hotel is also limited in staff, especially with the housekeeping department. Housekeeping staff works the greatest amount of overtime, which causes a problem with the implementation of the recycling program by increasing the cost of maintenance. The hotel measures the cost of the program by labor hours put in by staff. The hotel representative mentioned that they may have to pay over time to staff members to run the recycling program, thus the costs of maintenance may outweigh the benefits. The hotel is also concerned with some of the logistics of a recycling program. One example is the aesthetic problem of transporting different wastes within the hotel. The management is concerned with the fact that guests may take a strong distaste to the view and odor of recyclable materials, and as a result may have a negative impact on their business.

Analysis

This analysis accounts for the disposal costs incurred by the number of loads collected by the waste hauling company during the month or year and does not take into account overlapping waste between months in the hotel. The hotel was charged based on the number of loads the waste hauler made. The waste removed cannot exceed a specific weight set by the city, therefore the hotel is limited by the amount of waste it can dispose in a single load. It is important to note that cost is associated with the number of loads. The more waste generated by the hotel, the more loads needed to be picked up, the greater the cost. Figure 5.10 illustrates that disposal costs of the hotel increased from 1990 to 1994, declined, then remained steady for the past five years.

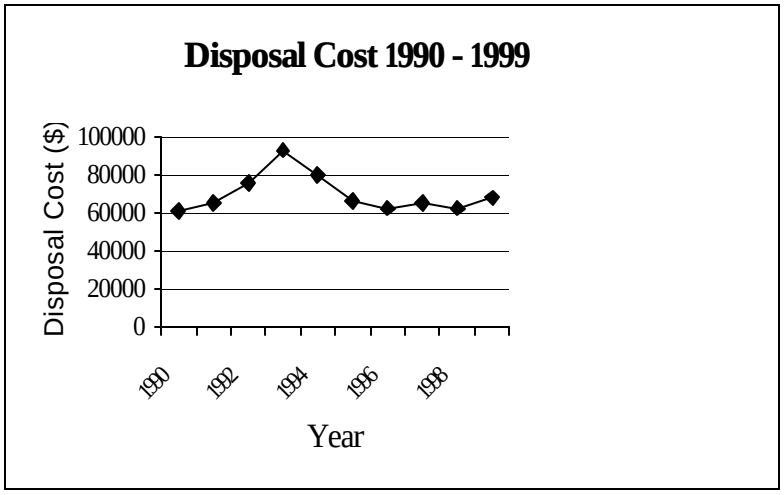

Figure 5.10 Disposal Cost for NWWM Hotel 1990 –1999

This trend may be a result of many internal and external variables, such as a change in hotel management and/or legislation may also influence the disposal cost. Some internal factors that may explain the increase in disposal cost include the result of renovations, increase in the number of guests, or poor management in hotels. External reasons may include price fluctuations in waste hauling and materials or change in city's disposal policies. The decrease in disposal cost after 1994 may also be a result of glass recycling by the employee, but the date of starting this process is unknown.

Data for monthly disposal costs for 1999 in the hotel is seen in Figure 5.11. August and October generated the largest amount of disposal costs, and may be the result of the fact that these months reflect the greatest number of hotel occupancy.

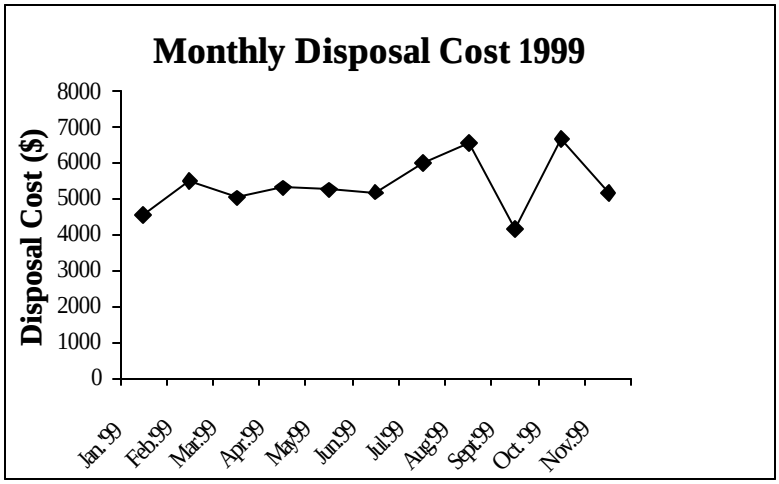

Figure 5.11 Monthly Disposal Cost 1999

Disposal costs for this hotel on a monthly scale seem to follow a trend where more waste is disposed of in some months. For their overall disposal, it seems recently there has been a decreasing trend in the fees. This decrease was observed before the recycling program. This suggests other factors be in motion to reduce waste outside of WasteWise.

Comparison of Disposal Costs between WWM and NWWM

Data from two hotels were gathered. One is a member of WasteWise with a recycling program that started in 1996, one year prior to becoming a member. The other hotel is not a member of WasteWise and started a recycling program in the fall of 1999. Since the recycling program at the NWWM is still in its infancy, no data was available concerning the volume of waste recycled or discarded. The hotel was able to provide information on its disposal fees for 1990-99 and a monthly breakdown of the costs for 1999. On the other hand, monthly disposal volumes for 1999 were not obtained from the WasteWise hotel, therefore there could be no comparison on a monthly time scale.

In 1995, disposal costs for the WWM were over $100,000 and once the recycling program was implemented, costs have decreased and have remained below this mark. In the last five years, disposal costs

for both hotels followed a similar pattern (Figure 5.12). In the mid-'90's, both hotels experienced similar decreases in disposal costs. It is difficult to determine the disposal costs prior to 1995 with the WasteWise member, due to data availability.

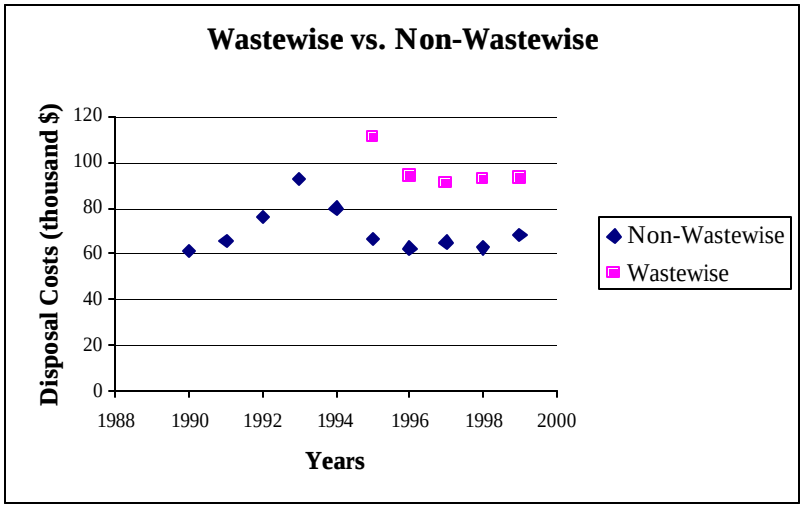

Figure 5.12 WasteWise vs. NonWasteWise Disposal Annual Costs

Shortcomings of Analysis

This analysis did not encompass all of the aspects of either company's waste reduction activities. This study only covered waste reduction as it related to the recycling programs. Definite savings can be seen through recycling, but may not be completely reflected in the total costs of disposal.

This study may have shortcomings because of differences between this WasteWise member and the other members in the program in regards to type of location, products demanded and management practices. This difference may produce a different trend in cost versus benefit depending on the member or non-member chosen. The trend may or may not be representative of members in the entire sector since the sample size of this analysis was limited. The main contribution of this study is to act as an indicator to justify further studies.

Conclusions of Cost Study between WWM and NWWM

Economic factors may have influenced the reduction in disposal cost observed between the NWWM and the WWM. No concrete conclusions can be made from this data due to external variables and limited sample size. Nonetheless, these data may provide some indication that there are minimal effects associated with recycling with respect to disposal fees. However, a larger sample size is needed to give a definitive answer.

5.5 Conclusion of Case Studies

These case studies illustrate partners' perspective and assessment of the WasteWise program. Amgen and the hotel industry case studies illustrated that WasteWise may be used as a tool for guidance in waste reduction activities. Economic benefits may also be seen in recycling by cost savings. Recycling may also have an influence on community relations.

On-site visits illustrated that partners have difficulty in establishing baseline, quantifying material, cross-training and educating employees on waste prevention. Partners also expressed their need for development of a specific protocol for particular industry sectors.

UCSB expressed the importance for waste educational and outreach programs. In addition, UCSB's waste audits were useful in identifying recyclable materials and evaluating their waste management program.

Recommendations

- The WasteWise program should emphasize education and outreach. WasteWise should consider modifying the program goals that members submit to include a category for education and outreach thus highlighting it. WasteWise should develop materials that could assist members in designing and implementing internal recognition programs at member facilities.

- Establish an ordinance on Education, to deliver information to all the people in the city, to find ways to reinforce the program through awards or use of an event (Earth day) to spark interests and to remind people of environmental awareness.

- The WasteWise program should emphasize education and outreach. WasteWise should consider modifying the program goals that members submit to include a category for education and outreach thus highlighting it. WasteWise should develop materials that could assist members in designing and implementing internal recognition programs at member facilities.

- For an effective recycling program to succeed there must be teamwork and more support from upper management. This may lead to a more effective approach or commitment to the hotel's recycling program.

- Joining environmental organizations, such as Green Hotels Association and WasteWise may provide networking opportunities, improve recycling activities, and yield greater potential cost savings.

6. RECYCLING PROTOCOL FOR A UNIVERSITY

How to Assist Partners in the WasteWise Program

One of the primary objectives of our research is to develop innovative methods that partners can use to achieve the most from the WasteWise program. Since the program is open to a variety of industrial and service sectors, partners have a wide diversity of waste materials. With that in mind, our research has primarily been focused on our desire to provide recommendations to the EPA and assist as many partners as possible within the program so that both EPA and its partners can achieve the best performance of waste prevention. To achieve this objective, we have developed a useful tool or protocol aimed at starting a recycling program in a University for WasteWise Partners in the Education Sector to benefit.

Definition

For purposes of this study, a protocol is defined as a step-by-step procedural manual or set of guidelines that an organization can use when first joining the WasteWise program. When a partner joins the WasteWise program they are provided with a WasteWise ToolKit that outlines a broad set of procedures and steps when first starting the program. This includes setting a baseline, establishing goals, measuring and tracking material, and reporting. It is our intent that our protocol be similar in structure to the WasteWise ToolKit, but with more specific details for a particular sector with similar types of materials. The goal of this protocol is to ease the various tasks of the reporting process and the overall process of waste reduction within the facility.

Goals of the Protocol

- Ease the reporting process for certain partners in industrial sectors.
- Identify methodologies for handling common waste materials.
- Provide a step-by-step procedure that outlines procedures for establishing and actively pursuing the goals of WasteWise effectively; establishing a baseline, tracking and measuring materials, and reporting.

- Outline potential difficulties and barriers that may occur in the initial process of joining the program.
- Provide partner success stories and strategies for conducting waste minimization techniques.

First Stage: Gathering and Analyzing Data

Data collection from partners and their assessment of the WasteWise program is important for creating a more useful waste reduction resource for partners. In order to achieve the goals of the protocol, it is necessary to study and research the experiences from partners. Their assessment of the program, including potential barriers or successes that they experience when first joining the program and throughout the program is essential. This information enables us to identify the most logical approach for developing a protocol by researching partner assessment via surveys and interviewing with partners.

Data: 1996 EPA Study

A brief study by the US EPA on partner assessment of the WasteWise program was performed in 1996. The assessment involved a selected number of telephone interviews with partners and a posted a message on the WasteWise list server focusing on measurement issues *(Addressing the Measurement Needs of WasteWise Partners).* According to the responses by a few partners, EPA identified the following issues as reporting barriers:

- Gathering and tracking information regularly
- Finding time to collect and summarize information
- Learning the situation was not as simple as what the forms stated

Second Stage: Identify Elements of the Protocol

The next step was to determine an industry sector that can benefit most from the Protocol and that has a common material and/or goal. These elements can be widely applied to other partners in the same industry to create a protocol that addresses the barriers noted above.

Identify Sector to Target

Based on the partner responses to the EPA Study, reporting history of 51 industry sectors (Appendix B2) and on-site visits with partners, the Education Sector would benefit from the development of a protocol.

The Education sector comprises approximately 10% (88 partners) of the total partners in WasteWise. It is also the second largest sector, following the Local Government Sector. The reporting history for the Education Sector is low (Figure 6.1). Although the overall trend is increasing, only 14% of partners reported for 1997.

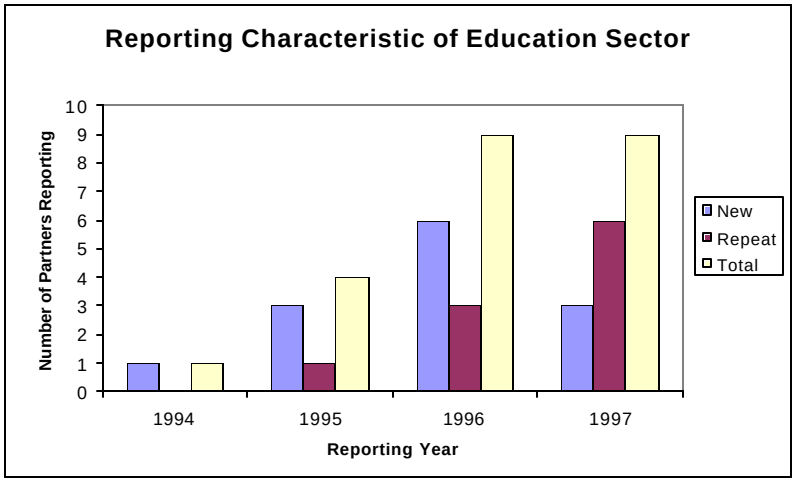

Figure 6.1 Reporting Characteristics of Education Sector

Identify Materials to Incorporate in the Protocol

Table 6.1 indicates the most common materials reported for 1998 by the Education Sector. These materials are also representative of most other sectors.

Type of Material	Tons Reduced	Number of Partners Reported
Food	1,568.98	3
Other Yard Waste	422.27	1
Mixed Organic	176.7	1
Wood	137.61	2
Various/General	69.93	7
Coated Paper	22.51	3
Plastic (resin unknown)	13.91	2
High grade Paper	3.17	5
Textiles	0.5	1
Polystyrene	0.2	2
Corrugated	0.1	1

Table 6.1 1998 Reporting History of Education Sector

Some of these are also materials that contribute significantly to greenhouse gas emissions. The top 5 materials that contribute to greenhouse gas emissions include the following (*Net GHG Emissions from Source Reduction and MSW Management Option*s, EPA)

- Aluminum
- Office Paper
- Newspaper
- Plastics (HDPE, LDPE, PET)
- Steel cans

One of the goals of the WasteWise program is to reduce greenhouse gas emissions through waste reduction activities. This is a factor that will be taken into consideration during the design process of the protocol. We hope to target materials that contribute to greenhouse gas emissions.

In addition, WasteWise has the benefit of the WAste Reduction Model (WARM) that converts materials diverted from the landfill to the numerical value of greenhouse gas emissions.

Interview with Education Establishment: UC Santa Barbara

The 1999 UCSB waste audit (Section 5.3, Appendix G5) identified recyclable materials that could still be captured from the wastestream.

Summary Analysis of UCSB Waste Audit:

- Paper (office paper) is the largest component of UCSB's wastestream.
- Cardboard is a good commodity. UCSB is fortunate that CEC supplied cardboard recycling containers on campus, however, CEC's audit noted that cardboard still showed up in trash dumpsters as whole boxes, despite the fact that cardboard recycling containers were placed next to the dumpsters. In this case, requiring that people disposing the cardboard boxes flatten them before they are placing them in the recycling containers may be an obstacle.

The following are also significant materials but was not a targeted commodity within the selected buildings at UCSB:

- Newspaper is the second largest paper contributor. However, UCSB does not currently collect and recycle within the selected buildings in this study, but they do have recycling containers outside of the buildings.
- Magazines

Design of the Protocol

The protocol consists of the following targeted elements that may provide much benefit to many partners in the same industry with the same waste material, achieving similar goals:

- Target Sector: Education
- Target Material: Paper
- Target Goal: Recycling

6.1 A Protocol for Starting a Recycling Program in a University

According to Hopkins, the following are important factors for any university or education organization interested in starting a recycling program as one of the goals of the WasteWise program:

Step 1. Be aware of the occupant density on campus to be able to determine where the largest amount of waste material is generated.

At UCSB, Science buildings do not contribute as much as an administrative building.

Step 2. Identify your waste by conducting a waste audit.

Conducting a waste audit is very important. It provides a baseline for tracking and measuring the amount of material being generated or recycled on campus. It also helps determine how many or what type of recycling containers and the location to place around campus buildings.

- Select an organization or group of individuals (ex., waste disposal company, community organization, Manpower, unemployment office) willing to participate in a waste audit.

At UCSB, they had the benefit of working with CEC who performed their waste stream audit in 1999 (Appendix G5) and J & S Salvage contractors, a who performed their waste audit in 1994 (Appendix G4).

- Select university buildings based on the amount and type of materials generated.

At UCSB, a mix of administrative offices, departmental offices, classrooms, science laboratories, and food services were targeted. These buildings were chosen for their diversity and provide a wide cross-section of trash material.

- Go “dumpster diving” through your trash. This entails going in your dumpsters and sorting out the waste materials into different waste types. Document the materials with a pen and paper by listing the items as you gather and collect them.

At UCSB, CEC sorted samples into 19 different waste types (Appendix G5). This waste audit list of materials is summarized as follows:

Paper: Office paper, Newspaper, Corrugated Cardboard, Magazines, Other
Plastics: PETE (#1), HDPE (#2), PVC (#3)
Glass: Clear, Green, Amber, Other
Metal: Aluminum cans, Scrap aluminum, Steel, Other
Organics: Yard Trimmings, Food Scraps, Scrap Wood, Other
Other: Textiles, Rubber, Leather, Copier Toner Cartridges, Inorganics (ceramics)

- Lastly, weigh your materials using a scale and record your weights.

Step 3. Know your commodities and be aware of what is happening in the recycling market.

If you are aware of materials and their market value, then you will find that certain materials have a higher market value and are worth more to waste haulers and recyclers.

For UCSB, Hopkins contacted local waste haulers and examined UCSB's recycling records for the past 16 years. This process determined cardboard and high-grade paper to be valuable recyclable commodities. The CEC waste audit identified paper as the largest component of its wastestream.

Step 4. Identify who hauls your commodities.

- **Contact your local waste haulers** to identify who contributes the most to the total outgoing materials. This may entail communicating and working with internal departments (eg., Environmental and Facilities) for data on waste hauling and recycling records.

- **Negotiation with haulers**: Set out a bid and make it as detailed as possible. Include how many containers, how often pick-up service is needed, and what commodities is needed. Knowing your valuable commodities is important.

UCSB sent out a recycling and trash hauling bid and established a contract agreement not only with CEC but also their waste hauler, Marborg; both haul UCSB's recyclable waste.

Step 5. Audit the amount of manpower needed.

- **Audit how much money is needed, and where your labor is best served.**

- **Audit the level of trash in your trash dumpsters.**
  This will provide information to eliminate unnecessary dumpsters and any cost associated with such (monies not spent).

- **Audit the "fullness" of recycling containers.**

  - How full are the containers right before pick up service?
  - Do you need more or less containers in that area?

- **Involve Students and Custodians.**

  Educate and use the power of students and custodians to help promote environmental awareness but do not depend on the students completely as they will eventually leave. Do not rely on custodians too, because they have other tasks. Therefore, you need to have one person in charge that your recycling aspects report to.

  At UCSB, what has been valuable is the role of Associated Students Recycling Program (ASRP), who collect recyclable materials outside the buildings. The custodians collect materials inside the buildings. UCSB's relationship with Community Environmental Council (CEC) and Marborg Disposal has also contributed to their success. (Section 5.3, UCSB Case Study).

Step 6. Apply time and motion studies to your commodities.

Keep the flow of a commodity on a straight line as it is moved from a building. It may go from a building to a dumpster, and then finally hauled by a truck. Or it may go from a building to a recycling container, and then finally being hauled by a truck. Limit the number of people handling your commodity; the more hands on it, the more expensive.

Step 7. Gather data and enter into database for goal assessment and evaluation of your program.

- Identify feasible options to increase recycling of material in the organization.
- Determine and rank the cost-effectiveness and energy efficiency of the options.
- Choose which of these options to include that would be the aggressive step of capturing the next commodity.
- Set goals based on your analysis.
- Research evaluations of other similar organizations and share knowledge.

Step 8. Provide educational outreach to campus community (students, faculty, staff, custodians, etc.).

Provide education and pamphlets, brochures, or environmental newsletters (hard copy or e-mail) that gives suggestions and tips for increasing recycling or waste minimization efforts on campus. Students have power and can influence members on the campus. They are active and see what, where, who the environmental people are and are aware of the recycling community. Keep it always on the forefront through many creative ways.

Step 9. Establish internal awards to motivate employees or students.

For example**,** UCSB has a Green Awards Program where awards are give to department buildings that recycle the most. This has stimulated friendly competition among students and staff in different departments to recycle more.

Benefits of our Protocol for Partners in the Education Sector

This protocol will provide an initial starting point in your growth towards waste minimization where other partners in the Education Sector may learn from the successes and failures that have brought UCSB to a successful recycling program. This protocol will also provide essential guidance and successful tips for universities and other similar entities to succeed in waste reduction from these guidelines chosen. We also hope that our protocol delivers a unique and applicable "success story" that other universities can learn from and adopt to accomplish similar goals in the WasteWise program.

7. CONCLUSIONS & RECOMMENDATIONS

7.1 Effectiveness of US EPA WasteWise Program

The US EPA WasteWise program was created in response to the growing concerns of increasing solid waste generation in the United States. WasteWise focuses on promoting waste reduction through waste prevention, increasing recycling, and purchasing and manufacturing of recycled content products by establishing a voluntary, flexible, cooperative partnership between US EPA and organizations nationwide.

We found that voluntary programs are tailored to the environmental issues they are addressing (e.g., solid waste, energy) and are also applied by organizations in an individualized manner suited to their needs.

We believe the strengths and weaknesses of the voluntary and the traditional regulatory approach can be complementary and both are instrumental tools for improving environmental quality.

The effectiveness of voluntary programs depends on:

- Setting clear goals as part of the agreement
- Specifying the baseline against which improvements will be measured
- Specifying reliable and clear monitoring and reporting mechanisms

The WasteWise program allows partners to set their own goals based on their own needs. Consequently, goals can vary widely within the same sector. This illustrates that a flexible voluntary approach can be beneficial. The results reported by the US EPA for the WasteWise program indicate that the program can be more effective if there were an increase in partner reporting. However, the major difficulty faced by WasteWise is that the reporting requirement is not enforced.

7.2 Strengths and Weaknesses of the WasteWise

Recognition

The most significant benefit is the potential for national recognition, which was found to be important to partners, as noted in the questionnaire and case studies. However, local recognition is equally important to members. According to our questionnaire, community relations is the most important reason for joining WasteWise (83.5% of respondents indicated that it was a "very important" or "important" reason for joining the program). In order to capitalize on partner's interest in improving community relations via WasteWise, the program should provide resources that will assist partners in promoting their participation in the program and their waste reduction efforts to the public. The WasteWise logo is insufficient for this and is limited in its use.

We found that it is important for partners to obtain internal recognition within their organization. This includes management and department-wide support for waste reduction programs as well as developing a structure that includes management, staff, community organizations and individuals. A teamwork approach that fosters the attitude that waste reduction is a community effort is helpful. Also, internal recognition programs within the partner facility may help build the necessary internal support for waste management programs.

Data Collection

We believe that an additional benefit of the WasteWise program is that it can make partners feel more "responsible" for collecting waste reduction data. If left to their own devices, many organizations may not consider tracking internal solid waste streams as a priority. As noted in the Amgen case study, the waste reduction coordinator was responsible for obtaining recycling quantities from various departments. By mentioning that the data was for the US EPA she was able to motivate individuals to supply the data.

WasteWise also delivers a valuable tool for tracking and collecting waste reduction data which is useful for evaluating an organization's progress. This was demonstrated in the UCSB case study. Tracking data allows organizations to determine wasteful practices and to target specific materials for improvement. In addition, quantified waste reduction values can be easily converted to cost savings. These cost savings can be used to justify the financial benefits of a waste

reduction program to upper management or administration. Various partners have commented that the program gives them an additional reason to track quantities.

WasteWise Resources

Based on the questionnaire and case studies we found that organizations can benefit from the WasteWise resources when developing a waste reduction program. The WasteWise Toolkit, website, and links to other waste reduction websites are useful resources for partners in the early stages of developing a waste reduction program. However, determining a baseline and setting goals continue to be a problem for new partners. Although the Toolkit and other WasteWise resources provide assistance for these tasks, they may not be sufficient or too broad. They also do not provide any local resource contacts.

According to our questionnaire and case studies, the WasteWise Helpline was the least useful resource available to partners for establishing their goals and setting their baseline. A number of partners responding to the WasteWise customer survey complained that they did not receive return phone calls from the customer service representatives and felt that there was too much turnover of the Helpline staff. The hours of the Helpline may not serve partners well in different time zones. Other partners felt that the program's communication with them was impersonal and did not offer enough local knowledge.

On-Site Visits

On-site visits evaluated in our research showed that EPA WasteWise has made site visits to a number of partner facilities with relative success. This provided a valuable opportunity for both EPA WasteWise and their partners to discuss any potential issues with the program as well as offer specific technical assistance. We learned the perspective of the partners and their assessment of the program, as noted in the interviews. A common difficulty that partners face is determining their baseline, setting their goals, and reporting their progress.

In addition, a number of comments from partners and the results of the survey suggest that many partners feel they would benefit from onsite visits. However, the limited number of WasteWise staff

members and the location of the headquarters in Washington D.C. create limitations on the scope of onsite visits.

Administrative

We found through the UCSB case study that it is easy to register and become a partner of the WasteWise program. Although new partners can register electronically, they cannot file their goals and access other important WasteWise materials such as the ToolKit electronically. The UCSB case study highlighted the importance of using available community resources to complete these tasks. It also showed that a critical component of waste management programs is educational awareness. Although the WasteWise program is well constructed towards waste prevention it does not emphasize an education component on the goal setting and reporting forms.

Purchase of buying recycled content products

According to the results of our questionnaire buying recycled content products is the most difficult WasteWise goal to achieve. The WasteWise website does provide links to companies that sell recycled content products and to other websites that provide advice on "how to buy recycled." However, there are no direct links to a comprehensive list of companies selling recycled content products.

7.3 Recommendations

Partner Recruitment

We recommend that WasteWise should consider increasing their efforts assisting their current non-reporting partners to report rather than to recruit potential new partners. However, if they do recruit, they should continue to focus on recruiting partners in areas where they already have developed expertise.

The Education sector should be targeted more heavily by WasteWise to complete their reporting forms. Universities and colleges have a large population of people responsible for generating significant amounts of waste, yet the number of schools reporting to the program is low. WasteWise could target the Education Sector by creating an awards program specifically for universities and colleges. In addition, our protocol or other resources specifically targeting the

education sector could be utilized to assist non-reporting partners in improving their waste reduction programs.

WasteWise Resources

WasteWise needs to continue its efforts to assist partners with determining their baseline and provide resources in promoting their participation in the program and their waste reduction efforts to the public locally. Although the ToolKit and other WasteWise resources provide assistance for these tasks, the program should develop additional resources specifically targeting the various sectors.

- Develop materials specific to industry sector, such as the Education Protocol.

- Develop electronic lists of state waste management contacts, regional contacts and local (county & city) contacts for each state. If possible include waste haulers and recyclers so that there is more local knowledge in the technical assistance for members.

- Put partners in touch with community organizations.

- Train student interns from universities or partner employees in the WasteWise program to assist in conducting waste audits.

- Improve the quality of the WasteWise Helpline:

    - Improve customer service
    - Decrease turnover of employees
    - Extend the hours
    - Improve local knowledge

- Identify needs of small businesses and tailor WasteWise program to help the small businesses.

- Develop a tool to automate reporting that gives immediate feedback about cost savings, incremental improvements made in waste management and greenhouse gas emissions avoided.

- Modify the WasteWise goal setting and reporting form to emphasize education.

Recognition

WasteWise could create a brochure or include a section in the various WasteWise publications about "advertising" an organization's waste reduction efforts. The brochure could provide information about what other companies are doing to promote their program and provide mock press releases for members

WasteWise should consider expanding awards recognition to include the top waste prevention partner in each state or county. This would bring the program to a more local level and raise the overall awareness of the program (issue certificates). They should also make much more extensive use of media (TV, newspapers) to publicize the award winners, at local, state and national levels. Recognition can be a very powerful tool.

- WasteWise should expand the use and visibility of the WasteWise logo

- Set up more structured recognition program with Platinum Gold winners for companies and others that better recognize individual efforts within a company.

- Construct tiered incentives that encourage members to strive to increase waste prevention. For example, members could be classified as platinum, gold and silver according to their reporting consistency and level of waste reduction.

- Assist partners in developing an internal campaign for the partner facility to raise the awareness of the WasteWise program.

On-site visits

WasteWise should increase on-site visits to partners. WasteWise should also train local officials to conduct on-site visits. Since WasteWise officials face limitations, city and local government partners could also be challenged to reach out to local WasteWise partners that are not reporting. Local governments are in position to assist local organizations with their waste reduction programs.

Partner networking

WasteWise should contact successful partners to determine if they would be willing to help guide non-reporting partners. This entails establishing better communication and sharing information between parties involved. Since partners expressed that goal setting is one difficulty they experience, WasteWise should provide more concrete examples for goals that are specific within the industry sector.

- Promote networking in various sectors. Not-for-profits expressed more interest in networking with partners from same sector.

Education and Outreach

WasteWise should consider modifying the program goals that partners submit to include a category for education and outreach thus highlighting it. WasteWise should develop materials that could assist partners in designing and implementing internal recognition programs at partner facilities.

WasteWise should also develop a template for an ordinance on Education, to deliver information to all the people in a community, to find ways to reinforce the program through awards or use of an event (Earth day) to spark interests and to remind people of environmental awareness.

For an effective recycling program to succeed, there must be teamwork and more support from upper management. This may lead to a more effective approach or commitment to the hotel's recycling program.

Purchase of buying recycled content products

WasteWise should improve partners' ability to meet the purchase of recycled content products goal.

- Recruit producers of recycled content products that could be encouraged to participate in information exchange programs facilitated by the WasteWise program.

- Participating companies could send in price lists to the program and this information could be distributed electronically to members in the delivery radius of these companies. Partners

could also be sent emails asking if they would like to receive information or a price list of local companies selling recycled content products.

- Provide electronic access to a catalogue of companies that sell recycled content products on the partner website. Design the catalogue so that it can be easily searched by zipcode, product of interest, etc.

- Create a database of companies that produce or distribute these types of products.

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APPENDIX

Appendix A: EPA Partnership Programs

Appendix B: EPA Data
- B.1 Top Industrial Sector Drivers
- B.2 Overall Reporting Results: Industry Sectors
- B.3 Materials Ranking based on the Total Tons Reduced
- B.4 Materials Ranking based on the Total Number of Partners Reporting
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- B.7 Top Waste Preventers Since 1994
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Appendix C: 1999 WasteWise Award Winner
- C.1 Partners of the Year
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Appendix D: Questionnaire
- D.1 Cover Letter
- D.2 Questionnaire
- D.3 Goal Identification Form
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- D.5 Registration Form

Appendix E: UCSB Survey Analysis

Appendix F: Cost Study Analysis for Amgen

Appendix G: University of California, Santa Barbara Case Study Data

Appendix A

EPA Partnership Programs

EPA Partnership Programs List

Program	Region #	Sector(s)
Center for Environmental Industry & Technology (CEIT)	1	Environmental Technology Industry
Clean Pollution Prevention Pilot Project (CLEAN)	1	Not limited
New England Environmental Assistance Team (NEEAT)	1	Not limited
Star Track		Not limited
Small Business Assistance Center	3	
Businesses for the Chesapeake Bay	3	Not limited
Green Communities	3	Community Groups & Local Business
Urban Initiatives for Sustainable Communities	4	Public, private, non-profit community orgs/all levels of govt.
Sustainable Challenge Grants		
Natural Landscaping	5	Not limited
Great Printers	5	Printing Sector only
Greater Chicago Pollution Prevention Alliance	5	Not limited
Indoor Air Quality Program		School districts, states & indian tribes, indoor air groups
US Auto Pollution Prevention Project	5	Auto Sector/US auto manufacturers
Waste Minimization Opportunity Assessments	5	Not limited
Chlor-Alkall Industry Mercury Reduction Project		Chlorine factories nationwide
Clean Star Texas City Program	6	Not limited
Partnership to Help Foundries Achieve Environmental Compliance	6	Foundries in Region 6
Pollution Prevention Awards for Environmental Excellence	7	Not limited
Pollution Prevention Roundtable	7	Not limited
Air Quality Initiative	8	EPA and states
Headwaters Mining Waste Initiative	8	Mining Sector
Urban Livability		
Utah 2002 Olympics	8	Not Limited
American Heritage Rivers	8	Not Limited
Problem Oil Pit Initiative	8	Oil pit owners/operators in Region 8
Community Based Environmental Protection (CBEP)	8	Not Limited
Agricultural Initiative	9	Farmers/Growers
Bay Area Green Business Program	9	Not Limited
Merit Partnership	9	Not Limited
Metal Finishing Partners	9	Metal finishing companies
Evergreen Award	10	Not Limited
Pesticide Environmental Stewardship Program (PESP)		Agriculture Sector
Water Alliance for Voluntary Efficiency (WAVE)		Lodging Business/may expand to hospitals, schools
33/50 Program		Not Limited

Project XL	Not Limited
Environmental Leadership Program	Not Limited
Design for the Environment (DfE)	Not Limited
State and Local Outreach Program	State and Local Governments
Waste Minimization National Plan	Not Limited
Climate Wise Recognition Program	Not Limited
Indoor Environments Program	Building Sector
AgStar	Livestock Operations:Swine and dairy
Coalbed Methane Outreach Program	Coal mine owners and operators
Energy Star Buildings and Green Lights Partnership	Owners and Operators of Commercial and Industrial Buildings
Energy Star Label	Consumers or purchasers of residential or commercial equipment
Environmental Accounting Project	Not Limited
Green Chemistry Program/Challenge	Chemical industry and trade associations
Landfill Methane Outreach Program	Landfill operators, utilities, pipeline companies or buyers of methane
Natural Gas STAR Program	Natural gas production companies
The Ruminant Livestock Efficiency Program	Beef and Dairy Producers
Transportation Partners	Not Limited
Voluntary Aluminum Industrial Partnership	Aluminum Manufacturers
WasteWise Program	Not Limited
Adopt Your Watershed!	Not Limited
Common Sense Initiative (CSI)	Auto manufacturing, computers & electronics, iron & steel metal finishing, etc.
Environmental Technology Verification Program	Not Limited
Consumer Labeling Initiative	Not Limited

EPA Partnership Programs List

Program	Shared Characteristic
Center for Environmental Industry & Technology (CEIT)	
Clean Pollution Prevention Pilot Project (CLEAN)	Small Businesses
New England Environmental Assistance Team (NEEAT)	Regulated entities in various sectors
Star Track	
Small Business Assistance Center	Small & Medium Size Businesses
Businesses for the Chesapeake Bay	Small & Medium Size Businesses
Green Communities	
Urban Initiatives for Sustainable Communities	
Sustainable Challenge Grants	
Natural Landscaping	Any entity with landscaping needs
Great Printers	
Greater Chicago Pollution Prevention Alliance	
Indoor Air Quality Program	
US Auto Pollution Prevention Project	
Waste Minimization Opportunity Assessments	Small manufacturers
Chlor-Alkall Industry Mercury Reduction Project	
Clean Star Texas City Program	Small Businesses
Partnership to Help Foundries Achieve Environmental Compliance	
Pollution Prevention Awards for Environmental Excellence	Private and Public Sectors
Pollution Prevention Roundtable	State & local agencies & small and medium business
Air Quality Initiative	
Headwaters Mining Waste Initiative	
Urban Livability	
Utah 2002 Olympics	All that can help reduce environmental impacts of event
American Heritage Rivers	All those interested in improving local river water quality
Problem Oil Pit Initiative	
Community Based Environmental Protection (CBEP)	All those interested in improving environmental quality of places
Agricultural Initiative	
Bay Area Green Business Program	Businesses in the San Francisco Bay area with retail exposure
Merit Partnership	Regulated entities in Region 9
Metal Finishing Partners	
Evergreen Award	
Pesticide Environmental Stewardship Program (PESP)	

Water Alliance for Voluntary Efficiency (WAVE)	
33/50 Program	Industrial companies, chemical manufacturers
Project XL	Entities regulated by EPA
Environmental Leadership Program	Companies with exemplary environmental records
Design for the Environment (DfE)	Industry and business decision makers at all levels
State and Local Outreach Program	
Waste Minimization National Plan	Any entity that consistently generates hazardous waste
Climate Wise Recognition Program	Industrial companies
Indoor Environments Program	
AgStar	
Coalbed Methane Outreach Program	
Energy Star Buildings and Green Lights Partnership	
Energy Star Label	
Environmental Accounting Project	Business owners and managers
Green Chemistry Program/Challenge	
Landfill Methane Outreach Program	
Natural Gas STAR Program	
The Ruminant Livestock Efficiency Program	
Transportation Partners	Transportation Sector, Climate Wise corporate partners, governments
Voluntary Aluminum Industrial Partnership	
WasteWise Program	All sizes of businesses, education, governments, non-profits
Adopt Your Watershed!	All those interested in protecting, restoring rivers, streams etc.
Common Sense Initiative (CSI)	
Environmental Technology Verification Program	Verifies performance characteristics for environmental tech.
Consumer Labeling Initiative	Manufacturers of products that could be labeled better

Appendix B

EPA DATA

B.1

PARTNERS REPORTING Industry Sector	# Partners					# Partners Reporting				
	1994	1995	1996	1997	1998	1994	1995	1996	1997	1998
Advertising/Marketing	0	0	0	0	1	0	0	0	0	0
Aerospace	5	6	7	8	8	2	4	0	1	2
Airlines	1	3	3	2	3	1	0	0	0	0
Apparel	1	1	1	1	4	1	0	0	0	0
Banking, Financial & Savings	19	22	22	23	25	7	8	5	3	3
Beverages	8	9	8	12	13	7	6	5	2	3
Building Materials	3	6	7	6	8	1	1	1	1	1
Chemicals	23	29	32	30	28	14	17	15	4	12
Communication	6	8	9	10	10	3	2	4	4	4
Computer & Data Services	0	0	2	2	2	0	0	0	0	0
Computers & Office Equipment	8	9	12	14	22	4	6	2	3	7
Construction & Engineering	0	19	0	1	3	0	8	0	0	1
Consulting & Employment Services	19	0	20	21	24	6	0	4	4	3
Dry Cleaning & Laundering	3	3	3	2	2	1	1	1	0	0
Education	5	5	25	56	82	1	4	9	9	11
Electronics & Electrical Equipment	23	27	28	32	35	14	12	11	10	8
Entertainment	6	6	7	6	6	1	2	2	3	2
Federal Government	0	0	1	11	16	0	0	0	1	5
Food Manufacturing	10	13	12	16	18	5	7	2	2	2
Food, Drug & Convenience Stores	2	2	5	6	3	2	2	0	0	0
Forest & Paper Products	16	16	19	21	16	6	6	5	5	2
Furniture Manufacturing	4	5	8	8	11	3	4	5	5	6
Hotels, Resorts & Lodging	1	1	4	10	20	0	1	0	0	2
Industrial & Farm Equipment	7	7	8	8	8	4	4	4	3	3
Insurance	12	10	9	9	9	1	3	3	2	2
Local Government	0	0	0	72	119	0	0	0	1	18
Medical Services	12	14	16	37	50	2	1	3	1	3
Metal Manufacturing	7	9	9	10	11	5	5	3	2	1
Metal Products	13	12	12	12	13	5	5	5	4	3
Mining & Crude Oil Production	4	5	5	5	5	4	3	3	3	2
Motor Vehicles & Parts	6	5	7	9	10	4	4	4	5	5
Non-Profit Organization	5	9	9	9	14	0	3	2	0	1
Petroleum Refining	9	9	8	9	9	6	2	2	2	1
Pharmaceuticals	6	6	7	6	9	3	4	4	3	3
Printing & Publishing	4	7	6	8	8	0	3	2	4	3
Property Management & Real Estate	0	2	2	2	4	0	1	0	0	0
Research Services	2	2	3	2	4	1	1	1	1	2
Restaurants & Food Service	18	14	16	15	15	6	4	1	2	1
Retail & Mail Order	13	14	17	17	19	1	4	3	3	2
Rubber & Plastic Products	9	11	14	17	20	3	4	6	9	9

Scientific, Photographic & Control Equipment	13	14	16	14	15	7	8	9	6	5
Soaps, Cosmetics & Hygiene	8	10	10	10	11	3	7	8	8	4
State Government	0	0	0	5	14	0	0	0	0	6
Textile Manufacturing	18	19	24	25	24	11	11	11	9	11
Toys & Sporting Goods	5	6	6	7	7	3	2	2	4	0
Transportation Equipment	2	4	4	6	6	1	1	1	0	1
Transportation Equipment	3	3	2	3	3	1	0	0	0	0
Tribal Government	0	0	0	17	24	0	0	0	0	2
Utilities	20	22	34	32	32	15	14	15	16	13
Waste Management Services	6	10	12	17	19	4	5	0	2	1
Wholesale & Distribution	1	1	1	2	4	1	1	1	1	0
TOTAL	366	415	492	683	846	170	191	164	158	176

B.2

Overall Reporting Results: Industry Sec. Waste Prevention (Tons reduced)

	1994	1995	1996	1997	1998
Advertising/Marketing	0	0	0	0	0
Aerospace	2	3,310	0	4	555
Airlines	1	0	0	0	0
Apparel	0	0	0	0	0
Banking, Financial & Savings	433	4,371	2,080	462	5
Beverages	52,442	149,964	147,076	377,775	324,854
Building Materials	340	313	0	0	180
Chemicals	20,837	13,478	52,015	11,114	1,541
Communication	3,769	4,149	14,437	2,094	7,061
Computer & Data Services	0	0	0	0	0
Computers & Office Equipment	443	1,619			19,648
Construction & Engineering	0	5	0	0	34
Consulting & Employment Services	24	0	0	1	2
Dry Cleaning & Laundering	0	0	0	0	0
Education	0	21	224	105	2,428
Electronics & Electrical Equipment	2,539	6,434	3,895	3,884	3,410
Entertainment	36	278	15,703	1,524	2,612
Federal Government	0	0	0	0	1,324
Food Manufacturing	3,876	46,642	404	206	621
Food, Drug & Convenience Stores	112	132	0	0	0
Forest & Paper Products	23,484	16,345	3,495	147,016	19,824
Furniture Manufacturing	345	524	822	7,431	6,974
Hotels, Resorts & Lodging	0	1	0	0	7
Industrial & Farm Equipment	1,349		1,096	3,571	608
Insurance	41	442	168	50	70
Local Government	0	0	0	0	376
Medical Services	0	0	10	6	0
Metal Manufacturing	130	1,210	131	49	27
Metal Products	28,097			32,049	30,992
Mining & Crude Oil Production	0	23	1	44	33
Motor Vehicles & Parts	54,880	11,455	79,547	90,631	68,005
Non-Profit Organization	0	0	0	0	0
Petroleum Refining	60	449	63	18	14
Pharmaceuticals	9	277	363	423	666
Printing & Publishing	0	494	157	5	133
Property Management & Real Estate	0	0	0	0	0
Research Services	0	0	17	16	72
Restaurants & Food Service	1,306	2,163	8,040	1,950	2,600
Retail & Mail Order	7,560	1,512	23,856	16,300	36,689
Rubber & Plastic Products	29	49	975	1,248	3,323
Scientific, Photographic & Control Equipment	38,870	45,905	48,829	55,781	36,249
Soaps, Cosmetics & Hygiene	0	21,107	33,021	44,182	18,694
State Government	0	0	0	0	1,010
Textile Manufacturing	951	7,825	14,346	10,045	13,444

Toys & Sporting Goods	27	497	1	127	0
Transportation Equipment	4	299	1	0	36
Transportation Equipment	0	0	0	0	0
Tribal Government	0	0	0	0	0
Utilities	849	1,745	1,426	8,122	6,517
Waste Management Services	0	68	0	0	0
Wholesale & Distribution	0	0	20	0	0
GRAND TOTAL	242,853	343,834	452,637	816,305	610,639

B.3

Materials Ranking based on the Total Tons Reduced

Rank	Materials	Total Tons Reduced
1	Mixed Organics	291,190
2	Wood	116,957
3	Corrugated	49,356
4	Various/general materials	26,804
5	Glass	14,649
6	Construction/Demolition	12,612
7	Polystyrene	12,522
8	Plastic (resin unknown)	10,179
9	Aluminum	7,527
10	Sand/Soil/Dirt	7,500
11	Steel	7,222
12	Textiles	6,503
13	Metal (type unknown)	5,401
14	Mixed Plastics	5,309
15	Mixed Metals	4,755
16	Organics (type unknown)	4,581
17	Coated Paper	4,547
18	Food	4,327
19	Concrete/Cement	3,500
20	Mixed Paper	3,171
21	PVC/Vinyl	2,890
22	Other Yard Waste	2,735
23	Paper (type unknown)	2,612
24	High Grade Paper	1,510
25	HDPE	784

B.4

Materials Ranking based on the Total # Partners Reporting

Rank	Materials	Total # Partners Reporting
1	High Grade Paper	95
2	Various/general materials	81
3	Mixed Paper	45
4	Wood	44
5	Corrugated	39
6	Mixed Plastics	36
7	Textiles	21
8	Polystyrene	18
9	Plastic (resin unknown)	18
10	Food	16
11	Coated Paper	15
12	Steel	12
13	Mixed Metals	12
14	Glass	8
15	Metal (type unknown)	7
16	PVC/Vinyl	6
17	Construction/Demolition	4
18	Aluminum	4
19	HDPE	4
20	Mixed Organics	3
21	Organics (type unknown)	3
22	Other Yard Waste	3
23	Paper (type unknown)	3
24	Sand/Soil/Dirt	2
25	Concrete/Cement	1

B.5

Activities Ranking based on the Total Tons Reduced

Rank	Specific Activities	Total Tons Reduced
1	On-Site Composting	310,732
2	Use reusable/returnable packaging	68,962
3	Find a method to reuse (internal/external)/use old products	36,998
4	Reduce amount of solid waste disposal	22,816
5	Sell for reuse	17,313
6	Repair/refurbish/recondition	16,611
7	Use durable/refillable/reusable/repairable products	12,313
8	Switch from one packaging option to another	9,588
9	Reuse incoming packaging for outgoing shipments	8,255
10	Switch from disposable to reusable product	6,795
11	Packaging changes	3,060
12	Work with suppliers	1,535
13	Donation Program	805
14	Office paper reduction efforts	393
15	Establish employee education program/newsletter	370
16	On-line phone directory/manuals, etc.	327
17	Set up internal employee exchange/donating system	276
18	Electronic mail	255
19	Reduce consumption./use less	207
20	Clean for reuse	114
21	Supply swap meet/return supplies to central area for reuse	90
22	On-line forms	70
23	Electronic routing of documents	29
24	Duplex Copying	23
25	Electronic billing/purchasing/recordkeeping/distribution system	22

B.6

Activities Raking based on Total # Partners Reporting

Rank	Specific Activities	Total # Partners Reporting
1	Establish employee education program/newsletter	31
2	Donation Program	30
3	Switch from disposable to reusable product	29
4	Electronic mail	28
5	Find a method to reuse (internal/external)/use old products	27
6	Repair/refurbish/recondition	24
7	Office paper reduction efforts	24
8	Use durable/refillable/reusable/repairable products	21
9	Reduce consumption./use less	19
10	Set up internal employee exchange/donating system	18
11	Duplex Copying	16
12	Sell for reuse	15
13	Reuse incoming packaging for outgoing shipments	15
14	Clean for reuse	13
15	Electronic billing/purchasing/recordkeeping/distribution system	13
16	On-Site Composting	12
17	Work with suppliers	11
18	On-line phone directory/manuals, etc.	11
19	Supply swap meet/return supplies to central area for reuse	11
20	Use reusable/returnable packaging	10
21	Reduce amount of solid waste disposal	10
22	Switch from one packaging option to another	10
23	On-line forms	10
24	Packaging changes	9
25	Electronic routing of documents	9

B.7

Top Waste Preventers Since 1994 (in million lb)

Date Joined	Partners	Industrial Sector	1994	1995	1996	1997	1998
5/15/95	Allied Signal	Aerospace		7			
3/14/94	American Electric	Utilities					7
3/14/94	Anheuser-Busch	Beverages			89	635	630
1/28/94	Bank of America	Banking, Financial & Savings		9	4	<1	<1
3/31/94	Baltimore Gas & Elec.	Utilities				8	2
5/18/94	Baxter	Scientific, Photographic & Control Equip.				5	~1
1/24/94	Bell Atlantic	Communication		6		3	14
5/15/94	BellSouth Telecomm	Communication			27		
2/23/94	Chrysler	Motor Vehicles & Parts	96	11		10	<1
5/5/94	Clorox	Soaps, Cosmetics & Hygiene				37	33
4/25/94	Coca-Cola	Beverages		13	2	121	20
2/28/94	Coors	Beverages		80			
10/24/96	Creative Office	Furniture Manufacturing				12	12
3/7/94	Crown Cork & Seal	Metal Products (Heavy Manufacturing.)	56			64	62
7/1/97	Dell	Computer & Office Equipment					39
4/5/94	Dow Corning	Chemicals	7	9	4	<1	<1
2/1/94	E.I duPont (alumni)	Chemicals	8	17	96	21	
2/24/94	Eastman Kodak	Scientific, Photographic & Control Equip.	13	11	7	9	46
1/13/94	Ford	Motor Vehicles & Parts			96	55	
3/9/96	Formosa Plastic	Rubber & Plastic Products					5
5/20/94	General Mills	Food Manufacturing		39			
3/11/94	General Motors	Motor Vehicles & Parts		10	62	103	0
6/6/96	GPU	Utilities				4	
3/11/94	Ingersoll-Rand	Industrial & Farm Equip.				5	<1
3/11/94	Johnson & Johnson	Soaps, Cosmetics & Hygiene		30			
3/18/94	Johnston Industries	Textile Manufacturing (Heavy Manufacturing.)		12	13	<1	10
5/6/94	Ketchikan Pulp	Forest & Paper Products				273	40
10/3/94	Lousiana Pacific	Forest & Paper Products (Heavy Manufacturing.)		20	<1	<1	<1
5/20/94	Maytag	Electronic & Electrical Equip.		9	5	4	5
1/3/94	McDonald's	Restaurant & Food Services		4	16	4	5
2/17/94	Navistar	Motor Vehicles & Parts (Heavy Manufacturing)	6		1	13	<1
5/20/94	Pepsi	Beverages	104	207	214		
5/18/94	Procter & Gamble	Soaps, Cosmetics & Hygiene		8	14	50	4
5/19/94	Russell Corp.	Textile Manufacturing (Heavy Manufacturing.)				8	<1
10/24/97	Rutgers University	Education					4
3/29/94	SC Johnson	Chemicals	25				

5/9/94	Stone Container	Forest & Paper Products	45	12	5	20	merge
4/24/96	Synthetic Industries	Textile Manufacturing (Heavy Manufacturing.)			11	11	14
2/18/94	Target Stores	Retail & Mail Order	15		48	33	73
7/12/94	Walt Disney Company	Entertainment				3	5
-	Walt Disney World	Entertainment			31		<1
2/28/94	Xerox	Scientific, Photographic & Control Equip.	62	77	88	97	23
	Total		446	643	833	1611	1060

B.8

Waste Prevention (lb reduced) in 1997

Industry Sector	Drivers	(lb reduced)	Date Joined
*Beverages	Anheuser-Busch (84%)	634,662,000	3/14/94
	Coca-Cola (16%)	120,888,000	4/25/94
*Consulting & Employment Services	Wilmot & Assoc.(55%)	851	4/29/94
	Resource Strategies (42%)	650	5/20/94
*Electronics & Electrical Equipment	Maytag (56%)	4,349,479	5/20/94
	Motorola (41%)	3,184,440	5/17/94
*Industrial and Farm Equipment	Ingersoll-Rand Co. (63%)	4,499,783	3/11/94
	UTC Carrier (36%)	2,571,306	8/12/94
*Metal Manufacturing	Inland Steel Co. (68%)	65,913	5/16/94
	Bethlehem Steel (32%)	31,018	5/3/94
*Motor Vehicles & Parts	General Motors (56%)	101,506,471	3/11/94
	Ford Motor (30%)	54,378,467	1/13/94
*Soaps, Cosmetics & Hygiene	Procter & Gamble (56%)	49,484,060	5/18/94
	The Clorox Company (42%)	37,113,045	5/5/94
*Textile Manufacturing	Synthetics Industries (55%)	11,049,671	4/24/96
	Russell Corp. 39%)	7,835,222	5/19/94
*Utilities	Baltimore Gas & Elec. (52%)	8,446,682	3/31/94
	GPU Energy (21%)	3,411,160	6/6/96
*Waste Management Services	Michigan Recycling (51%)	209	5/60/96
	FBN Enterprises (49%)	201	11/7/96
Aerospace	Gen. Dynamics Defense System. (100%)	8,008	2/13/97
Banking, Financial & Savings	BankAmerica (98%)	906,337	1/28/94
Building Materials	American Standards (100%)	0	5/18/94
Chemicals	E.I. duPont de Nemours & Co. (95%)	21,116,991	2/1/94
Communication	Bell Atlantic (705)	2,932,222	1/24/94
Computers & Office Equipment	Silicon Graphics (75%)	108,300	1/27/95
Education	University of Notre Dame (87%)	181,925	6/9/95
Entertainment	Walt Disney Co. (99%)	3,017,932	7/12/94
Federal Government	U.S.Postal Service (100%)	0	12/21/98
Food Manufacturing	Stonyfield Farm Yogurt (100%)	411,226	2/28/94
Forest & Paper Products	Ketchikan Pulp. Co. (93%)	273,450,420	5/6/94
Furniture Manufacturing	Creative Office Systems (77%)	11,442,939	10/24/96
Insurance	State Farm Mutual Auto (84%)	83,671	3/30/94
Local Government	RRRASOC,MI (100%)	21	6/12/97
Medical Services	Thomas Jefferson Uni. Hospital (100%)	12,260	2/27/95
Metal Products	Crown Cork & Seal Co. (99%)	63,457,385	3/7/94
Mining & Crude Oil Production	Oryx Energy Co. (99%)	87,249	3/7/94
Petroleum Refining	CITGO Petroleum (95%)	33,679	3/9/94
Pharmaceuticals	Abbott Laboratories (93%)	787,531	3/11/96
Printing & Publishing	Grolier, Inc. (100%)	10,450	3/12/97

Research Services	Battelle Memorial Institute (100%)	32,150	5/17/94
Restaurants & Food Service	McDonald's Corp. (100%)	3,899,369	1/3/94
Retail & Mail Order	Target Stores (99%)	32,273,573	5/18/94
Rubber and Plastic Products	O'Sullivan Corp. (69%)	1,722,824	5/18/94
Science., Photographic & Control Equip.	Xerox Corp. (87%)	97,059,196	2/28/94
Toys & Sporting Goods	Radio Flyer, Inc. (89%)	225,259	2/11/94
Wholesale & Distribution	Creative Agri. Packaging, Inc. (100%)	0	10/13/94

* Industrial Sector with 2 Drivers

Note: 74.4% Drivers joined in 1994, 25.5% Drivers joined after 1994

B.9

Partners in each state listed according to decreasing number of partners

State	Total num. Of Partners	State	Partner # Gov.	State	Partner # Business	State	Partner # Institute	State	Partner # Endorser
CA	91	CA	16	CA	60	CA	10	DC	17
NY	52	VA	13	NY	38	MO	7	VA	12
VA	50	NJ	12	MO	29	NY	7	NY	6
NJ	45	MI	8	NJ	29	VA	7	CA	5
MO	42	NC	7	TX	29	FL	6	IL	4
TX	40	PA	7	IL	26	NC	5	MD	3
IL	37	TX	7	MA	25	AZ	4	MI	3
MI	34	FL	6	PA	24	IL	4	NJ	3
FL	33	OH	6	MN	22	MD	4	OH	3
OH	33	PR	6	OH	22	MA	3	AZ	2
PA	32	AK	4	FL	21	MN	3	CT	2
MN	30	AZ	4	MI	21	TX	3	MN	2
MA	29	GA	4	VA	18	DC	2	MO	2
DC	26	KY	4	CO	16	GA	2	CO	1
AZ	24	MD	4	GA	16	IN	2	IA	1
NC	24	MO	4	IN	16	LA	2	IN	1
GA	22	WA	4	AZ	14	MI	2	KY	1
CO	21	WI	4	CT	14	OH	2	LA	1
WA	21	AR	3	WA	14	WA	2	MS	1
IN	20	CO	3	LA	13	WI	2	NH	1
LA	19	IA	3	NC	12	WY	2	PA	1
CT	18	IL	3	TN	9	WY	2	PR	1
MD	17	LA	3	WI	9	AK	1	TX	1
WI	16	MN	3	AK	7	CO	1	WA	1
PR	14	NV	3	KY	7	IA	1	WI	1
KY	13	OK	3	OR	7	ID	1	AK	0
AK	12	OR	3	PR	7	KY	1	AL	0
TN	12	SC	3	DC	6	NE	1	AR	0
OR	11	TN	3	DE	6	NH	1	DE	0
IA	9	CT	2	MD	6	NJ	1	FL	0
SC	9	MS	2	SC	6	NV	1	GA	0
OK	8	NM	2	KS	5	OR	1	HI	0
DE	7	SD	2	OK	5	RI	1	ID	0
NV	7	AL	1	IA	4	UT	1	KS	0
AR	6	DC	1	AL	3	VT	1	MA	0
NH	6	DE	1	AR	3	AL	0	AK	0
KS	5	HI	1	AK	3	AR	0	NC	0
NE	5	IN	1	NE	3	CT	0	NE	0
NM	5	MA	1	NH	3	DE	0	NM	0
WY	5	NE	1	NM	3	HI	0	NV	0
WY	5	NH	1	NV	3	KS	0	OK	0
AL	4	NY	1	WY	3	AK	0	OR	0
MS	4	VT	1	RI	2	MS	0	RI	0

VT	4	WY	1	UT	2	NM	0	SC	0
AK	3	ID	0	VT	2	OK	0	SD	0
RI	3	KS	0	WY	2	PA	0	TN	0
SD	3	AK	0	ID	1	PR	0	UT	0
UT	3	RI	0	MS	1	SC	0	VT	0
ID	2	UT	0	SD	1	SD	0	WY	0
HI	1	WY	0	HI	0	TN	0	WY	0
Total	942	Total	172	Total	598	Total	96	Total	76

B.10

Industry Sector	# Partners	# Partners Reporting	Percent Reporting
Soaps, Cosmetics & Hygiene	11	7	64%
Mining & Crude Oil Production	5	3	60%
Toys & Sporting Goods	7	4	57%
Motor Vehicles & Parts	9	5	56%
Rubber and Plastic Products	18	9	50%
Chemicals	30	14	47%
Utilities	34	16	47%
Furniture Manufacturing	11	5	45%
Printing & Publishing	9	4	44%
Scientific, Photographic & Control Equipment	16	6	38%
Industrial and Farm Equipment	8	3	38%
Textile Manufacturing	25	9	36%
Communication	11	4	36%
Entertainment	6	2	33%
Research Services	3	1	33%
Wholesale & Distribution	3	1	33%
Metal Products	13	4	31%
Electronics & Electrical Equipment	36	11	31%
Pharmaceuticals	10	3	30%
Forest & Paper Products	17	5	29%
Insurance	9	2	22%
Petroleum Refining	9	2	22%
Beverages	11	2	18%
Metal Manufacturing	11	2	18%
Consulting & Employment Services	24	4	17%
Retail & Mail Order	19	3	16%
Computer & Office Equipment	22	3	14%
Building Materials	7	1	14%
Restaurants & Food Service	16	2	13%
Banking, Financial & Savings	25	3	12%
Education	79	9	11%
Aerospace	9	1	11%
Waste Management Services	21	2	10%
Food Manufacturing	22	2	9%
Federal Government	12	1	8%
Medical Services	49	1	2%
Local Government	111	1	1%
Tribal Government	21	0	0%
Hotels, Resorts & Lodging	18	0	0%
Non-Profit Organizations	13	0	0%
State Government	13	0	0%
Transportation	6	0	0%
Airlines	4	0	0%
Apparel	4	0	0%
Dry Cleaning & Laundering	3	0	0%

Food, Drug & Convenience Stores	3	0	0%
Transportation Equipment	3	0	0%
Computer & Data Services	2	0	0%
Construction & Engineering	2	0	0%
Property Management & Real Estate	2	0	0%
Advertising/Marketing	1	0	0%

B.11

Industry Sector	1994	1995			1996			1997			1998		
	Tot	New	R	Tot	New	R	Tot	New	R	Tot	New	R	Tot
Advertising/Marketing													
Aerospace	2	3	1	4				1		1		1	2
Airlines	1												
Apparel	1												
Banking, Financial & Savings	7	4	4	8		5	5	1	2	3		2	3
Beverages	7	1	5	6		4	5		2	2	1	2	3
Building Materials	1		1	1		1	1		1	1		1	1
Chemicals	14	7	10	17	3	11	15	1	12	14	2	10	12
Communication	3		2	2	1	2	4	2	2	4		4	4
Computer & Data Service													
Computers & Office Equip.	4	4	2	6		2	2	1	2	3	3	3	7
Construction & Engineering											1		1
Consulting & Employment Service	6	4	4	8	1	3	4	1	2	4		1	3
Dry Cleaning & Laundering	1	1		1		1	1						
Education	1	3	1	4	6	3	9	3	6	9	7	4	11
Electronics & Electrical Equip.	14	2	10	12	2	9	11	2	7	10	3	5	8
Entertainment	1	1	1	2	1	1	2		2	3		2	2
Federal Government								1		1	4	1	5
Food Manufacturing	5	3	4	7	1	1	2		2	2		1	2
Food, Drug & Convenience	2		2	2									
Forest & Paper Products	6	3	3	6	1	4	5	2	3	5		2	2
Furniture Manufacturing	3	1	3	4	1	4	5	1	4	5		5	6
Hotels, Resorts & Lodging		1		1							2		2
Industrial and Farm Equipment	4	1	3	4	2	2	4		3	3		3	3
Insurance	1	2	1	3		3	3		2	2		2	2
Local Government								1		1	17	1	18
Medical Services	2	1		1	3		3		1	1	2		3
Metal Manufacturing	5	1	4	5		3	3		2	2		1	1
Metal Products	5	3	2	5	1	4	5		3	4		3	3
Mining & Crude Oil Prod.	4		3	3	1	2	3		2	3		2	2
Motor Vehicles & Parts	4		4	4		4	4	1	4	5		5	5
Non-Profit Organizations		3		3	1	1	2				1		1
Petroleum Refining	6	1	1	2		2	2		2	2		1	1
Pharmaceuticals	3	1	3	4	1	3	4		3	3	1	2	3
Printing & Publishing		3		3		2	2	2	1	4	1	2	3
Property Mgmt. & Real Estate		1		1									
Research Services	1		1	1		1	1		1	1	1	1	2

Restaurants & Food Service	6	2	2	4		1	1	1	1	2		1	1
Retail & Mail Order	1	4		4	1	1	3		3	3		2	2
Rubber & Plastic Products	3	2	2	4	4	2	6	3	6	9	1	8	9
Scien., Photo & Control Equip.	7	2	6	8	1	8	9		6	6		4	5
Soaps, Cosmetics & Hygiene	3	4	8	7	1	7	8	1	7	8		4	4
State Government											6		6
Textile Manufacturing	11	6	8	11	1	10	11		9	9	2	8	11
Toys & Sporting Goods	3	1	1	2	1	1	2		2	4			
Transportation	1		1	1	1		1				1		1
Transportation Equipment	1												
Tribal Government											2		2
Utilities	15	2	12	14	3	12	15	3	12	16	1	12	13
Waste Management Services	4	2	3	5				1		2		1	1
Wholesale & Distribution	1		1	1		1	1		1	1			
Grand Total	170	77	114	191	39	121	164	29	118	158	59	107	176

* New reporters are partners that have never reported previously
R=Repeat reporters (Partners who reported two or more years in a row)

	1994	1995			1996			1997			1998		
Size	Tot	New	R	Tot	New	R	Tot	New	R	Tot	New	R	Tot
Large	105	34	74	108	16	80	99	13	75	93	23	70	100
Medium	19	10	14	24	4	15	20	1	15	17	10	12	22
Small	46	33	26	59	19	26	45	15	28	48	26	25	54
Grand Total	170	77	114	191	39	121	164	29	118	158	59	107	176

Appendix C

1999 WasteWise Award Winners

C.1 Partners of the Year
C.2 Program Champions

C.1

Partners of the Year

Very Large Corporation
Eastman Kodak Company

Large Corporation
Herman Miller, Inc.

Midsize Corporation
Southern Mills, Inc., Schlegel Systems, Inc.

Small Business
Guardian Industries – Ligonier Plant, The Seydel Companies

School/School District
Alden Central School

Local Government
Washoe County Government

University/College
Eastern Illinois University, Tennessee Department of Corrections

Tribal Government
Blue Lake Rancheria

Federal Government
U.S. Postal Service – Northeast Area

State Government
State of Ohio

C.2
Program Champions

Very Large Corporation
Bell Atlantic, Target Stores, Walt Disney World Co.

Large Corporation
Allergan, Inc., Amgen, Inc., Baltimore Gas & Electric Co., Battelle Memorial Institute
Crown Cork & Seal Co., Inc., Dow Corning Corp., Florida Power & Light
Millpore Corp., Pitney Bowes, Inc., Russell Corp., Public Service Electric & Gas
UTC Carrier Corp., Virco Manufacturing

Midsize Corporation
AIRPAX, Grolier, Inc.

Small Business
First National Bank & Trust Company of the Treasure Coast

University / College
Seattle University

Appendix D

Questionnaire

D1. Cover letter
D2. Questionnaire
D3. Goal Identification Form
D4. Annual Reporting Form
D5. Registration Form

D.1

April 26, 2000

Please forward to the person most familiar with the WasteWise Program.

Dear WasteWise Partner,

We are inviting you to participate in a questionnaire evaluating the U.S. Environmental Protection's WasteWise program. We are independent researchers from the Bren School of Environmental Science and Management at the University of California, Santa Barbara. Our research focus is to analyze the effectiveness of voluntary agreements between firms and regulatory agencies. As part of this evaluation process, we have developed the attached questionnaire about your organization's participation in the WasteWise program.

We are aware the EPA recently sent out a survey about the program that focused on EPA's customer service. The purpose of our questionnaire is different; its aim is to evaluate the performance of the program from the perspective of its partners. Your assistance in completing this brief questionnaire will help us evaluate the program and will provide an independent feedback loop to program coordinators.

The information you share with us will remain confidential. It will be analyzed and presented in aggregate form. The final report will be distributed to managers of the WasteWise program with recommendations for improvement. We will be presenting our conclusions in a public forum in Santa Barbara in April 2000. You are invited to attend. In addition, you will have access to the results on the web page www.bren.ucsb.edu/wastewise.edu by the end of June 2000.

If you are unable to answer some of the questions presented, please skip them and complete as much as you can. Questions regarding the questionnaire may be directed to wwsurvey@bren.ucsb.edu. We respectfully request that you return the questionnaire by January 25, 2000.

If you would like to request a copy of the report, please check the box at the end of the survey and be sure to include your address. The WasteWise program has cooperated with our research and has

expressed interest in using its results to continually improve their program.

Thank you for your valuable contribution to this research.

Alfred Andrade Jr.

This survey was developed by UCSB researchers as part of an academic research project. EPA WasteWise staff have cooperated with this project, and indicated they will consider the results for ideas to improve the program. This survey is a UCSB project and should not be construed as either being developed or endorsed by EPA.

D2.

WasteWise Program Questionnaire

Independent Research Survey

UCSB Graduate School of Environmental Science & Management

Please use insert key.

Name of business/organization _____ Location _____

___ Corporate Membership ___Single Facility Membership ___Other

Your Name _____ Your Title _____

E-mail address (Optional) _____

Date your business/organization joined the WasteWise Program (month/year): _____

Type of Business/Sector: (e.g. Chemical Mfg., Pharmaceutical, Clothing, Aerospace, Service, etc.)

_____ SIC Code # _____

PARTNER INFORMATION *Please check appropriate box*

	1 to 100	100 to 1000	1000 to 5000	Over 5000
Number of Employees (all locations)				

1.) Has your organization participated in any other EPA voluntary programs?

	33/50	Green Lights	Energy Star	Design for Environment	Climate Wise
EPA voluntary programs					

Other(s) _____

2.) Does your organization have an Environmental Management System in place (e.g. ISO 14000, Natural Step, in-house EMS)?

	Yes	No
EMS in place		

3.) Did your organization participate in a waste reduction program before joining Waste Wise?

		Yes	No
Waste reduction program	Internal		
	Local		
	State		
	Regional		

Other(s) _____

4.) Indicate how important the following issues were in deciding to join Waste Wise.

		Very important	Important	Somewhat important	Not Important
Incentives to join Waste Wise	Cost savings				
	Community relations				
	Employee environmental interests				
	Learn waste reduction techniques				
	Promote relations with EPA				
	Promote company waste reduction goals				
	Participation is free				

5.) How important are the following methods for reducing waste in your organization?

		Very important	Important	Somewhat important	Not important
Methods to reduce waste	Waste recycling				
	Buying recycled products				
	Reuse				
	Process modifications				
	Product redesign				
	Packaging modifications				
	Manufacturing recycled products				
	Others:				

6.) Please estimate your organizations approximate *cost savings* from waste reduction in 1998 (e.g. reduced disposal fees, less purchasing). *If you reported to WasteWise for 1998, please use amount from reporting form.*

	Less than $10,000	$10,000 - $100,000	$100,000 - $1,000,000	$1,000,000 – $10,000,000	Greater than $10,000,000
Approximate costs savings					

7.) Please estimate your organizations approximate *costs* for the WasteWise waste reduction program in 1998 (e.g. additional staff, increased work hours, purchasing equipment).

	Less than $10,000	$10,000 - $100,000	$100,000- $1,000,000	$1,000,000 – $10,000,000	Greater than $10,000,000
Approximate operation and maintenance costs					
Approximate capital costs					

8.) Please indicate the level of support the Waste Wise program receives in your organization.

		Supportive	**Aware**	**Aware but unsupportive**	**Unaware**
Waste Wise support in organization	CEO/President				
	Upper management				
	Department managers				
	Individual employees				

9.) How many staff in your organization spend a significant amount of time (20 hrs/month or more) implementing and maintaining your organization's WasteWise program? _____

10.) Please estimate how much time your staff spends on the following WasteWise activities.

		Time spent (hours per month)
Time spent for Waste Wise activities	Researching and setting goals	
	Determining baseline	
	Tracking & measuring data	
	Gathering info. from other departments	
	Reporting progress	
	External negotiations/communications	

ESTABLISHING BASELINE & GOAL SETTING

11.) Which resources did you find useful for establishing your baseline of current solid waste generation and management data?

		Very Useful	Useful	Somewhat useful	Not useful
Useful Resources	Waste Wise Tool Kit				
	Waste Wise Update				
	Waste Wise Bulletin				
	Waste Wise Helpline (800) EPA-WISE				
	Website (www.epa.gov/wastewise)				
	EPA Guide for Reducing Solid Waste				
	State or local waste reduction programs				

12.) Is six months adequate time to establish a baseline and set your goals in the three areas (waste prevention, recycling, and buying/manufacturing recycled products) specified by WasteWise?

	Yes	No
Adequate time for baseline and goal setting		

13.) How easy is defining goal setting in the following areas?

		Very easy	Easy	Somewhat easy	Not easy
Defining goals	Waste Prevention				
	Recycling				
	Buying/Manufacturing Recycled Content Products				

14.) How much progress has your organization achieved toward your Waste Wise goals?

		Significant progress (90% - 100% of goals)	Some progress (50% - 90% of goals)	Little progress (10% -50% of goals)	No progress (less than 10%)
Progress towards goals	Waste prevention				
	Recycling collection				
	Buying/manufacturing recycled				

REPORTING

15.) Do you currently complete the Annual Reporting Form for WasteWise?

Yes	No

If no, indicate which of the following reasons are significant deterrents to your reporting?

		Very significant	Significant	Somewhat significant	Not significant
Deterrents to reporting	Insufficient time				
	Insufficient resources				
	From/process to complicated				
	Others:				

16.) How would you describe the reporting process?

	Easy	Somewhat easy	Somewhat Difficult	Difficult
Completing reporting form				
Tracking & measuring progress				
Gathering the data				

Comments_____

17.) Would the following be useful for increasing your waste reduction efforts?

	Very useful	Useful	Somewhat Useful	Not Useful
On-site assistance by Waste Wise representatives				
Networking with partners from same sector				
Better communication with waste management companies				

Comments_____

PROGRAM INCENTIVES

18.) In what ways do you display the WasteWise logo?

	Extensive use	Some use	Little use	No use
Display internally (e.g. at recycling stations, newsletters)				
External communication (e.g. website, annual reports)				
Others:				

19.) How helpful are the following incentives for promoting the WasteWise program within your organization?

	Very Helpful	Helpful	Somewhat Helpful	Not Helpful
National company recognition (National Awards Ceremony)				
Local company recognition				
Recognition of individual employees				
Correlating your waste reduction efforts to greenhouse gas emission reduction estimates				
Others:				

Thank you very much for taking the time to complete this questionnaire.

____ Check if you would like a copy of our final report. Please provide your email address above.

Please return in enclosed envelope to Waste Wise Group, 4670 Physical Sciences North, UCSB, Santa Barbara, CA 93106.
Or fax to (203) 730-9767.
Or return Email version to `wwsurvey@bren.ucsb.edu`

D3. Goal Identification Form

http://www.epa.gov/wastewise/images/goalform.pdf

D4. Annual Reporting Form

http://www.epa.gov/wastewise/images/repform.pdf

D5. Registration Form

http://www.epa.gov/wastewise/images/parform.pdf

Appendix E

UCSB Survey Analysis

E.1
UCSB Survey Analysis

PARTNER INFORMATION

Number of Employees	Number	%
1-100	21	20.2
100-1000	33	31.7
1000-5000	17	16.3
Over 5000	33	31.7

Other EPA Voluntary Programs	Yes	%	No	%
33/50	18	17.3	86	82.7
Green Lights	27	26	77	74
Energy Star	19	18.3	85	81.7
Design for Environment	3	2.9	101	97.1
Climate Wise	14	13.5	90	86.5

	Yes	%	No	%
Environmental Management System in place	48	46.2	52	50

Waste Reduction program	Yes	%	No	%
Internal	86	82.7	17	16.3
Local	38	36.5	64	61.5
State	34	32.7	68	65.4
Regional	20	19.2	81	77.9

Importance in deciding to join WasteWise	Very Important	%	Important	%	Somewhat Important	%	Not Important	%
Cost savings	28	26.9	37	35.6	21	20.2	13	12.5
Community relations	36	34.6	48	46.2	9	8.7	8	7.7
Employees environmental interests	27	26	43	41.3	23	22.1	7	6.7
Learn waste reduction techniques	36	34.6	45	43.3	12	11.5	7	6.7
Promote relation with EPA	26	25	28	26.9	27	26	20	19.2
Promote company waste reduction goals	56	53.8	27	26	12	11.5	4	3.8
Participation is free	32	30.8	27	26	21	20.2	19	18.3

Importance of method for reducing waste	Very Important	%	Important	%	Somewhat Important	%	Not Important	%
Waste recycling	79	76	19	18.3	5	4.8	-	-
Buying recycled products	37	35.6	40	38.5	17	16.3	8	7.7
Reuse	51	49	31	29.8	20	19.2	1	1
Process modifications	35	33.7	33	31.7	19	18.3	12	11.5
Product redesign	20	19.2	21	20.2	18	17.3	34	32.7
Packaging modifications	22	21.2	21	20.2	21	20.2	30	28.8
Manufacturing recycled products	16	15.4	20	19.2	13	12.5	41	39.4

Estimated costs savings	Number	%
Less than $10,000	42	40.4
$10,000-$100,000	23	22.1
$100,000-$1,000,000	13	12.5
$1,000,000-$10,000,000	11	10.6
Greater than $10,000,000	1	1

Approximate costs for WW waste reduction program		
O&M	Number	%
Less than $10,000	58	55.8
$10,000-$100,000	19	18.3
$100,000-$1,000,000	4	3.8
$1,000,000-$10,000,000	-	-
Greater than $10,000,000	-	-
Capital costs		
Less than $10,000	59	56.7
$10,000-$100,000	9	8.7
$100,000-$1,000,000	2	1.9
$1,000,000-$10,000,000	1	1
Greater than $10,000,000	-	-

Level of support for WasteWise within organization	Supportive	%	Aware	%	Un-supportive	%	Unaware	%
CEO/President	48	46.2	22	21.2	3	2.9	16	15.4
Upper management	48	46.2	27	26	4	3.8	11	10.6
Department managers	42	40.4	35	33.7	5	4.8	9	8.7
Individual employees	45	43.3	34	32.7	5	4.8	11	10.6

Time spent WasteWise activities	Hours
Amount of time used for WasteWise	0-100
Research and setting goals	0-27
Determining baseline	0-100
Tracking & Measuring data	0-300
Gathering info from other dept.	0-300
Reporting progress	0-300
External negotiations/comm.	0-120

PROGRAM INCENTIVES

WasteWise Logo	Extensive Use	%	Some Use	%	Little Use	%	No Use	%
Display internally	7	6.7	36	34.6	15	14.4	36	34.6
External communication	4	3.8	28	26.9	19	18.3	42	40.4

Incentives for promoting the WW program within organization	Very Helpful	%	Helpful	%	Somewhat Helpful	%	Not Helpful	%
National company recognition	40	38.5	19	18.3	13	12.5	20	19.2
Local company recognition	25	24	34	32.7	12	11.5	20	19.2
Recognition of individual employees	22	21.2	31	29.8	21	20.2	18	17.3
Correlating waste efforts to GHG reduction	16	15.4	25	24	20	19.2	27	26

ESTABLISHING BASELINE AND GOAL SETTING

Useful Resources	Very Useful	%	Useful	%	Somewhat Useful	%	Not Useful	%
WasteWise Toolkit	23	22.1	38	36.5	17	16.3	12	11.5
WasteWise update	15	14.4	37	35.6	24	23.1	13	12.5
WasteWise Bulletin	16	15.4	38	36.5	29	27.9	9	8.7
WasteWise Helpline	7	6.7	21	20.2	25	24	23	22.1
Website	13	12.5	24	23.1	28	26.9	16	15.4
EPA Guide fro Reducing Solid Waste	14	13.5	32	30.8	23	22.1	14	13.5
State or Local waste reduction programs	13	12.5	27	26	27	26	17	16.3

	Yes	%	No	%
6 months adequate for baseline & set goals	75	72.1	23	22.1

Defining Goals	Very Easy	%	Easy	%	Somewhat Easy	%	Not Easy	%
Waste prevention	19	18.3	27	26	33	31.7	22	21.2
Recycling	29	27.9	41	39.4	24	23.1	7	6.7
Buying / Manufacturing Recycled contents product	14	13.5	20	19.2	32	30.8	33	31.7

Progress	Significant (90%-100%)	%	Somewhat (50%-90%)	%	Little (10%-50%)	%	No progress (<10%)	%
Waste prevention	27	26	40	38.5	26	25	7	6.7
Recycling colllection	38	36.5	44	42.3	10	9.6	8	7.7
Buying / Manufacturing recycled	14	13.5	34	32.7	39	37.5	12	11.5

REPORTING

	Yes	%	No	%
Complete the Annual Reporting Form	61	58.7	39	37.5

Deterrents to reporting	Very Significant	%	Significant	%	Somewhat Significant	%	Not Significant	%
Insufficient time	20	19.2	6	5.8	7	6.7	2	1.9
Insufficient resources	14	13.5	11	10.6	6	5.8	4	3.8
Form/process too complicated	3	2.9	7	6.7	8	7.7	10	9.6

Reporting Process	Easy	%	Somewhat Easy	%	Somewhat Difficult	%	Difficult	%
Completing reporting form	10	9.6	45	43.3	25	24	7	6.7
Tracking & Measuring progress	4	3.8	27	26	37	35.6	17	16.3
Gathering the data	4	3.8	24	23.1	38	36.5	20	19.2

Useful in increasing waste reduction efforts	Very Useful	%	Useful	%	Somewhat Useful	%	Not Useful	%
On-site assistance by WW representatives	24	23.1	18	17.3	17	16.3	28	26.9
Networking with partners from the same sector	31	29.8	41	39.4	14	13.5	8	7.7
Better communication with waste management companies	27	26	22	21.2	21	20.2	14	13.5

Appendix F

Cost Study Analysis for Amgen

		Amt. (lbs.)	Price (US $)	Cost / Savings
1994				
Paper	Corrugated		0.0225	0
	Confidential (wh. ledger)	93,172	0.08	7,456.80
	Mixed	225,200	(-)0.00375	(-)844.5
	Magazines(wh. Ledger)	0	0.08	0
	Newspaper	0	0.015	0
Plastics	PET		0.01	0
	HDPE		0.1	0
	LDPE		0.1	0
	Polypropylene		0.18	0
	Polystyrene		0.16	0
Glass	Scrap	1,600	0.0005	0.8
Metals	Steel			0
	Other Metals			0
Wood	Wood Pallets		3.5	0
	Wood Scrap		0.0125	0
Concrete				0
Other Construction Waste				0
Trash fees				80,000
Lab Stations		35,000	0.015	525
Supplies and Equipment		500	1	500
Lab Coats		6,907 unit	20	138,140
Overalls		474 unit	15	7,110
X-ray		2	0.01	0.02
Total '94				232,040

1995				
Equipment Reuse				100,000
Furniture Reuse				180,000
Paper	Corrugated	196,207	0.0225	4,414.70
	Confidential (wh. ledger)	292,603	0.08	23,408
	Mixed	157,439	(-)0.00375	(-)590.39
	Magazines(wh. Ledger)	31,595	0.08	2,527.60

	Newspaper	9,067	0.015	136.005
Plastics	PET	877	0.01	8.77
	HDPE	877	0.1	87.7
	LDPE		0.1	0
	Polypropylene		0.18	0
	Polystyrene		0.16	0
Glass	Scrap	877	1	877
Metals	Steel	35,287		0
	Other Metals	1,925		0
Wood	Wood Pallets	11,844 pallet	3.5	41,454
	Wood Scrap		0.0125	0
Concrete		324,000		0
Other Construciton Waste				0
Coats		11,668 unit	$20	$233,360
Overalls		15,795 unit	$15	$236,925
Total '95				1,174,342

1996				
Paper	Corrugated	390,920	0.0225	8,795.70
	Confidential (wh. ledger)	586,804	0.08	46,944.32
	Mixed	226,934	(-)0.00375	(-)851
	Magazines(wh. Ledger)	6,800	0.08	544
	Newspaper	5,780	0.015	86.7
Plastics	PET	unknown	0.01	?
	HDPE	unknown	0.1	?
	LDPE	unknown	0.1	?
	Polypropylene	832	0.18	149.76
	Polystyrene	624	0.16	99.84
Glass		unknown	0.0005	?
Metals	Steel			0
	Other Metals	37,397		0
Wood	Wood Pallets		3.5	0
	Wood Scrap	217,588	(-)0.0125	(-)2,720
Ad-		n/a	n/a	

submissions				
Disposal Fees				0
Lab Coats		33,342 unit	$20	666,840
Overalls		4,547 unit	15	68,205
Total '96				784,524
Grand Total Saving from 1994-1996				2,190,906
Cost Savings	**Costs**	**Net Benefit**		
2,110,906	182,400	1,928,506	642,825	

Appendix G

University of California, Santa Barbara Case Study Data

G.1

Description of the Components of UCSB's Recycling Network:ASRP

Associated Students Recycling Program (ASRP)

The ASRP is a student funded and student run program that focuses on recyclable collection and waste awareness education and outreach at UCSB. ASRP established the outdoor beverage container and newspaper collection and recycling program in 1994. They are responsible for servicing the outdoor recycling clusters, which capture glass, newspaper, aluminum and trash. A trash compartment is included in the recycling cluster to improve the quality of the recyclable collected by providing an opportunity for a person to choose trash when applicable.

There are 65 of these recycling clusters peppered generously all over the UCSB campus. The students accomplish this task using bicycles with attached carts for collection. They believe that the visibility of the student's efforts when collecting the recyclable from the clusters acts as an incentive to others to do their share and to recycle. The students deposit the recyclable in a designated CEC recycling dumpster**.** The trash in the recycling clusters and in all outside trash cans is captured by the grounds crew and deposited in 40 dumpsters located at the recyclable refuse area on campus. These are then collected by the Marborg Company which sorts the trash in order to recover other recyclables improperly disposed of in the trash cans and the trash compartments of the recycling clusters. ASRP also works with the Associated Students Legislative Council and the University's Administration to promote and encourage waste reduction, recycling collection, and the purchase of recycled materials.

Physical Facilities

The Custodial Department is trained to collect "office pack", all paper except magazine and newsprint, from the green office pack recycling containers in main office areas or copy rooms to a designated CEC recycling dumpsters. As was previously mentioned, they are also responsible for collecting all of the refuse campus wide and depositing it in the dumpsters in the recyclable refuse area on campus.

University Center (UCen) Operations

"UCen Operations provides and services the recycling bins for glass, aluminum/plastic, newspaper, and office pack inside the UCen and Associated Students buildings. Cardboard, metal, and furniture are also recycled within the UCen when remodeling occurs. A UCen employee recycling committee was formed to promote recycling within the UCen." (source: Recycling Handbook UCSB)

UCen Dining Services

The UCen Dining Services promotes waste prevention by offering customers a $0.20 discount on coffee and fountain drinks when they use a UCen dining mug and a $0.05 discount for a non-UCen mug (e.g. reuse of a cup purchased or a customers own mug). UCen Dining Services in conjunction with Residential Dining Services collect fresh produce trimmings from food preparation and compost it on a daily basis.

Residence Halls

UCSB has six residence halls located on campus and off-campus graduate and married student housing. Due to the large number of buildings and the diverse nature of the waste stream generated by housing, residential housing has its own recycling manager. In addition, each hall has a recycling coordinator that retrieves recyclables from within the residence hall's designated recycling areas and promotes recycling awareness and education. The recyclables collected by the residence halls are also picked up by CEC.

Central Stores

By stocking recycled products whenever feasible and offering a competitive price, the UCSB Storehouse promotes the purchase of recycled products thereby completing the loop on recycling. The Furniture Services Division of Central Stores handles the disposal of surplus property for UCSB and attempts to divert as much as possible away from the landfill by reusing furniture and donating it whenever possible. Central Stores also manages a metal recycling bin for items with metal content and recycles wooden pallets and cardboard boxes from incoming shipments of goods.

Green Awards Program

UCSB began the Green Awards program to promote their waste management goals and to recognize departments and campus organizations that strive to improve their waste prevention methods, increase their use of recycled content materials, such as paper, and participate in recycling collection. This program acts as a form of internal recognition and stimulates competition among departments and other organizations such as the copy centers that produce quarterly readers for students and results in increased awareness that waste management is everyone's job. Green Awards are publicized through e-mail and in campus publications such as the newspaper the Daily.

Recycling Committee

The Recycling Committee was created in 1990 to develop a coordinated strategy to increase the capture of recyclable products from UCSB's waste stream. The committee is composed of staff, faculty and students. There are representatives from the offices of Budget and Planning, Facilities Management, UCen Dining Services, UCen Operations, Central Stores, Housing and Environmental Office and from the Associated Students Recycling Program (ASRP). The Community Environmental Council (CEC) and representatives from the County of Santa Barbara are also members of the Recycling Committee. The Recycling Committee's efforts have expanded the amount and types of materials collected drastically reducing the amount of solid waste destined for the landfill.

Community Environmental Council (CEC)

"The Community Environmental Council (CEC) was born in 1970 amid a heightened environmental awareness instilled by the catastrophic Santa Barbara, California, oil spill. At that time there were few organizations dedicated to addressing the practical challenges of putting appropriate conservation measures into practice; CEC's founders made it their goal to fill that void. Now an internationally recognized non-profit research, policy development and education organization headquartered in Santa Barbara, CEC works from its Gildea Resource Center to pioneer new ways of solving environmental problems through design and implementation of innovative environmental management systems. CEC's unique role is to connect government agencies, business and industry,

universities, regulatory bodies, environmental organizations and the community as they address environmental issues. CEC's work actively demonstrates how resource management and policy innovations can improve our quality of life and our economy**."** (Source: http://www.grc.org/cec)

CEC and UCSB began working together in 1986. Their combined vision was to begin a recycling program at UCSB and initially the program focused on collecting high-grade office paper that was present in large quantities in the general waste stream destined for the landfill. CEC is responsible for funding the purchase of and the placement of the recycling dumpsters on the UCSB campus. There are three types of dumpsters that CEC sponsor at UCSB: 1) cardboard recycling dumpsters (36 of them dispersed on campus), 2) office pack dumpsters (72 of them on campus where the janitors bring high quality paper which they collect on their rounds from the various departments), and 3) recycling dumpsters (23 of them on campus where the ASRP student collectors deposit the recyclable that they collect from the recycling clusters). CEC collects the materials in the dumpsters finds markets for them and then sells them. CEC provides this service to UCSB at no cost and if the proceeds made on the materials exceeds the cost of service the surplus is returned to UCSB and the funds are recycled into the Refuse Disposal budgets. UCSB's relationship with CEC is an integral component of the success of their waste management program.

In addition to providing this service, CEC has performed several waste audits in conjunction with UCSB. The two most recent ones were completed in 1992 and 1999. The one in 1992 was a large-scale waste stream audit conducted and included all of the dumpsters on campus. The small-scale waste audit conducted in 1999 included samples of waste taken from three multi-use buildings containing academic faculty offices, classrooms and laboratories, an administration building and a residence hall. The 1999 audit will be discussed in further detail later in this paper.

Marborg (UCSB's Contracted Waste Hauler)

Marborg is on contract with UCSB and provides 72 trash dumpsters that collect trash destined for the landfill. They are also responsible for the removal of the bulk of the waste stream from UCSB. In addition, they provide the green waste recycling and sort through the

trash transported from UCSB to their facility to further capture recyclables from the refuse.

County of Santa Barbara Department of Public Works

Provides information to UCSB regarding the status of the local landfills, upcoming State solid waste legislation and the most current research regarding solid waste management. Attends UCSB's quarterly Recycling Committee meetings and reports the hard data on the amounts of refuse generated in the county and other needed reports.

G.2

Description of the Components of UCSB's Recycling Network:CEC

Community Environmental Council (CEC)

"The Community Environmental Council (CEC) was born in 1970 amid a heightened environmental awareness instilled by the catastrophic Santa Barbara, California, oil spill. At that time there were few organizations dedicated to addressing the practical challenges of putting appropriate conservation measures into practice; CEC's founders made it their goal to fill that void. Now an internationally recognized non-profit research, policy development and education organization headquartered in Santa Barbara, CEC works from its Gildea Resource Center to pioneer new ways of solving environmental problems through design and implementation of innovative environmental management systems. CEC's unique role is to connect government agencies, business and industry, universities, regulatory bodies, environmental organizations and the community as they address environmental issues. CEC's work actively demonstrates how resource management and policy innovations can improve our quality of life and our economy**."** (http://www.grc.org/cec)

CEC and UCSB began working together in 1986. Their combined vision was to begin a recycling program at UCSB and initially the program focused on collecting high-grade office paper that was present in large quantities in the general waste stream destined for the landfill. CEC is responsible for funding the purchase of and the placement of the recycling dumpsters on the UCSB campus. There are three types of dumpsters that CEC sponsor at UCSB: 1) cardboard recycling dumpsters (36 of them dispersed on campus), 2) office pack dumpsters (72 of them on campus where the janitors bring high quality paper which they collect on their rounds from the various departments), and 3) recycling dumpsters (23 of them on campus where the ASRP student collectors deposit the recyclable that they collect from the recycling clusters). CEC collects the materials in the dumpsters finds markets for them and then sells them. CEC provides this service to UCSB at no cost and if the proceeds made on the materials exceeds the cost of service the surplus is returned to UCSB and the funds are recycled into the Refuse Disposal budgets. UCSB's relationship with CEC is an

integral component of the success of their waste management program.

In addition to providing this service, CEC has performed waste audits in conjunction with UCSB. The two most recent ones were completed in 1992 and 1999. The one in 1992 was a large-scale waste stream audit conducted and included all of the dumpsters on campus. The small-scale waste audit conducted in 1999 included samples of waste taken from three multi-use buildings containing academic faculty offices, classrooms and laboratories, an administration building and a residence hall. The 1999 audit will be discussed in further detail later in this paper.

Associated Students Recycling Program (ASRP)

The ASRP is a student funded and student run program that focuses on recyclable collection and waste awareness education and outreach at UCSB. ASRP established the outdoor beverage container and newspaper collection and recycling program in 1994. They are responsible for servicing the outdoor recycling clusters, which capture glass, newspaper, aluminum and trash. A trash compartment is included in the recycling cluster to improve the quality of the recyclable collected by providing an opportunity for a person to choose trash when applicable.

There are 65 of these recycling clusters peppered generously all over the UCSB campus. The students accomplish this task using bicycles with attached carts for collection. They believe that the visibility of the student's efforts when collecting the recyclable from the clusters acts as an incentive to others to do their share and to recycle. The students deposit the recyclable in a designated CEC recycling dumpster**.** The trash in the recycling clusters and in all outside trash cans is captured by the grounds crew and deposited in 40 dumpsters located at the recyclable refuse area on campus. These are then collected by the Marborg Company which sorts the trash in order to recover other recyclables improperly disposed of in the trash cans and the trash compartments of the recycling clusters. ASRP also works with the Associated Students Legislative Council and the University's Administration to promote and encourage waste reduction, recycling collection, and the purchase of recycled materials.

Physical Facilities

The Custodial Department is trained to collect "office pack", all paper except magazine and newsprint, from the green office pack recycling containers in main office areas or copy rooms to a designated CEC recycling dumpsters. As was previously mentioned, they are also responsible for collecting all of the refuse campus wide and depositing it in the dumpsters in the recyclable refuse area on campus.

University Center (UCen) Operations

"UCen Operations provides and services the recycling bins for glass, aluminum/plastic, newspaper, and office pack inside the UCen and Associated Students buildings. Cardboard, metal, and furniture are also recycled within the UCen when remodeling occurs. A UCen employee recycling committee was formed to promote recycling within the UCen." (source: Recycling Handbook UCSB)

UCen Dining Services

The UCen Dining Services promotes waste prevention by offering customers a $0.20 discount on coffee and fountain drinks when they use a UCen dining mug and a $0.05 discount for a non-UCen mug (e.g. reuse of a cup purchased or a customers own mug). UCen Dining Services in conjunction with Residential Dining Services collect fresh produce trimmings from food preparation and compost it on a daily basis.

Residence Halls

UCSB has six residence halls located on campus and off-campus graduate and married student housing. Due to the large number of buildings and the diverse nature of the waste stream generated by housing, residential housing has its own recycling manager. In addition, each hall has a recycling coordinator that retrieves recyclables from within the residence hall's designated recycling areas and promotes recycling awareness and education. The recyclables collected by the residence halls are also picked up by CEC.

Central Stores

By stocking recycled products whenever feasible and offering a competitive price, the UCSB Storehouse promotes the purchase of

recycled products thereby completing the loop on recycling. The Furniture Services Division of Central Stores handles the disposal of surplus property for UCSB and attempts to divert as much as possible away from the landfill by reusing furniture and donating it whenever possible. Central Stores also manages a metal recycling bin for items with metal content and recycles wooden pallets and cardboard boxes from incoming shipments of goods.

Green Awards Program

UCSB began the Green Awards program to promote their waste management goals and to recognize departments and campus organizations that strive to improve their waste prevention methods, increase their use of recycled content materials, such as paper, and participate in recycling collection. This program acts as a form of internal recognition and stimulates competition among departments and other organizations such as the copy centers that produce quarterly readers for students and results in increased awareness that waste management is everyone's job. Green Awards are publicized through e-mail and in campus publications such as the newspaper the Daily.

Recycling Committee

The Recycling Committee was created in 1990 to develop a coordinated strategy to increase the capture of recyclable products from UCSB's waste stream. The committee is composed of staff, faculty and students. There are representatives from the offices of Budget and Planning, Facilities Management, UCen Dining Services, UCen Operations, Central Stores, Housing and Environmental Office and from the Associated Students Recycling Program (ASRP). The Community Environmental Council (CEC) and representatives from the County of Santa Barbara are also members of the Recycling Committee. The Recycling Committee's efforts have expanded the amount and types of materials collected drastically reducing the amount of solid waste destined for the landfill.

Marborg (UCSB's Contracted Waste Hauler)

Marborg is on contract with UCSB and provides 72 trash dumpsters that collect trash destined for the landfill. They are also responsible for the removal of the bulk of the waste stream from UCSB. In addition, they provide the green waste recycling and sort through the

trash transported from UCSB to their facility to further capture recyclables from the refuse.

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G.3

EPA Strategic Goals Linked to Partnership Programs

EPA Goal	Programs Headquarters	Regional
Clean Air	Indoor Environments Transportation Partners	Natural Landscaping Indoor Air Quality Air Quality Initiative
Clean, Safe Water		Natural Landscaping American Heritage Rivers
Safe Food	Pesticide Environmental Stewardship Program	
Pollution Prevention	WasteWise Water Alliance for Voluntary Efficiency 33/50 Project XL Environmental Leadership Program Design for the Environment Waste Minimization National Plan Environmental Accounting Green Chemistry Transportation Partners	CLEAN Business for the Bay Urban Initiatives Sustainable Challenge Grants Natural Landscaping Great Printers Greater Chicago P2 Alliance US Auto P2 Project Waste Minimization Assessment Chlor-alkalai Mercury Reduction P2 Awards for Excellence P2 Roundtable Urban Livability Utah 2002 Olympics Community Based Environmental Protection Agricultural Initiative Bay Area Green Business Merit Partnership Metal Finishing Partnership Evergreen Award
Waste Management	WasteWise Waste Minimization National Plan 33/50	Headwaters Waste Mining Initiative Waste Minimization Assessment
Global/Cross-	State & Local Outreach	

Border Risks	ClimateWise AgStar Coalbed Methane Outreach Energy Star Buildings/Green Lights Energy Star Label Landfill and Methane Outreach Natural Gas Star Ruminant Livestock Efficiency Transportation Partners Voluntary Aluminum Industrial Partnership	
Sound Science	Project XL Green Chemistry	CEIT
Credible Deterrent/ Greater Compliance		New England Environmental Assistance Team Startrack Small Business Assistance Center Clean Star Texas City Partnership to Help Foundries Problem Oil Pit Initiative Bay Area Green Business Merit Partnership Metal Finishing Partnership

G.4

UCSB 1994 Waste Audit Data

Composition of Waste Stream

Material	% by Wt.
Paper	67.5
Plastic	8
Organics	7.5
Special Waste	5.6
Household HW	3.7
Other	3.6
Glass	2.8
Metals	1.3

Paper Composition

Paper Type	% by Wt.
Non-recyclable	20.9
Office Mix	15
Cardboard	11.6
White Paper	10.9
Newspaper	8.3
Computer	0.9

G.5

UCSB 1999 Waste Stream Audit CEC

UCSB 1999 Waste Audit

Building	Engineering 1	Phelps	Cheadle Hall	Girvetz	San Nicolas	Total Wt. (lbs.)	%by wt.
Sample Size	233	330	338	25	145	1071	
Office Paper	41	145	87	5	8	286	27
Newspaper	10	29	23	3	7	72	7
Cardboard	6	15	12	1	1	35	3
Magazines	3	5	31	0	2	41	4
PETE#1	4	5	3		10	22	2
HDPE#2	3	3	1		26	33	3
Other Plastic	15	16	33		8	72	7
Glass	3	13	5		13	34	3
Alum. Cans	4	5	2		2	13	1
Food scraps	9	18	8	2	13	50	5
Wood	22	0	0		0	22	2
Trash	113	76	133	6	54	382	36
Metal					1	1	0
Plastic / Glass / Al				8		8	0
						1071	100

G.6

UCSB's Garbage and Recycling Statistics

Weight Collected

Materials Collected	1993	1994	1995	1996	1997	1998
Cardboard	55.38 tons	104.59 tons	133.23 tons	169.39 tons	206.79 tons	398.81 tons
Office Pack	18.9 tons	23.63 tons	61.08 tons	74.69 tons	78.61 tons	86.72 tons
Newspaper	23.23 tons	40.40 tons	51.99 tons	89.40 tons	98.74 tons	108.94 tons
Aluminum	1,089 lbs.	2.26 tons	1.44 tons	1,044 lbs.	80 lbs.	60 lbs.
Plastic	403 lbs.	421 lbs.	0.71 tons	6.19 tons	13.11 tons	14.40 tons
All Glass	9.7 tons	9.84 tons	11.12 tons	35.07 tons	18.87 tons	26.67 tons
Magazines					1,715 lbs.	1.57 tons
Steel Cans				44.86 tons	4.74 tons	4.99 tons
Telephone Directories				1,890 lbs.	5.94 tons	2.8 tons
Metal	287 lbs.	3.80 tons	36.24 tons	15.03 tons	32.26 tons	55.23 tons
Auto Bodies						36.8 tons
Green Waste			37.59 tons	970.69 tons	599.54 tons	71.30 tons
Recycled Refuse	287 lbs.					1,325.03 tons
Wooden Pallets		4.20 tons	4.32 tons	2.11 tons	10.79 tons	8.02 tons
Electric Motors						0.5 tons
AC & concrete						122.27 tons
Computers						4.00 tons
Fluorescent Tubes			8,125 lbs.	1,400 lbs.	810 lbs.	27.6 tons
Vehicle Batteries		150 lbs.	1,275 lbs.	3,150 lbs.	1,380 lbs.	1.05 tons
Car Radiators						360 lbs.
Vehicle Tires	420 lbs.	2.33 tons	960 lbs.	1,950 lbs.	5,650 lbs.	3.8 tons
Used Oil	4 lbs.	39 lbs.	258 lbs.	210 gal.	385 gal.	0.57 tons
Used Oil Filters						0.66 tons
Antifreeze		6.88 lbs.	16 lbs.	300 lbs.	160 lbs.	

Total SW Weights	3,181 tons	3,299 tons	3,717 tons	4793.62 tons	4,812.96 tons	5,657.59 tons
Total Recycling Wt (tons)	108.31 tons	191.35 tons	343.04 tons	1,412.30 tons	1,074.70 tons	2,326.55 tons
% Diverted from Landfill	**3.4**	**5.8**	**9.2**	**29.5**	**22.3**	**41.1**

G.7

UCSB Waste Generation and Recycling Data 1993-1999

Year	Waste Generated	Recycled	% Waste Diverted	Amount Landfilled	Total # Generators	Per Capita Waste Generation (Tons / Generator / year)
1993	3181	108	3.4	3073	26634	0.12
1994	3299	191	5.8	3108	26096	0.13
1995	3717	343	9.2	3374	26635	0.14
1996	4794	1412	29.5	3382	27191	0.18
1997	4813	1075	22.3	3738	27755	0.17
1998	5658	2327	41.1	3331	28275	0.20

G.9

UCSB WasteWise Goals

UCSB (805) 893-2661 x2302 FAX: (805) 893-4493
maryann.hopkins@pf.ucsb.edu
Mary Ann Hopkins Manager of IPM, Recycling & Refuse
UCSB Physical Facilities Bldg 437
Santa Barbara, CA 93106-1030

Facilities included in planned waste reduction efforts: All UCSB buildings

Waste Prevention

1) Reduce the amount of paper waste from diffuse sources

Encourage the use of e-mail, printer defaults for two-sided copies reuse of one-sided paper for note pads, etc. in departments and computing facilities. Use e-mail as a promotional tool for being waste wise.

Initiate and participate in the redesign of UCSB publications, including directories, newspapers, etc. to increase the use of recycled content material and increase the "recyclability" of the final product (covers, inserts, inks, etc.). Begin a collection drive for outdated university publications where they may not already exist.

2) Collect and reuse recyclable refuse

Develop a compartmentalized collection area for recyclable refuse (e.g. desks, chairs, concrete, green waste, etc.) on campus that preserves the quality of the products it contains, that can be easily accessed and utilized by "interested parties" and that will also facilitate the reuse of the high quality products it contains.

3) Increase Waste Prevention Awareness Through Education

Use the "Green Rewards Program" to expand the campuses waste prevention capabilities. Encourage and assist in waste audits/waste sorts for individual departments through outreach and education by training department representatives or the use of student interns.

Use e-mail as a waste prevention educational tool by using it to send tips for preventing waste to all departments and to promote the Green Awards Program.

Recycling Collection

1) Install "WIT" containers in all classrooms and in areas in the library that students frequently study (e.g. dorm group study areas, reserve book room, 24-hour room, library copy center, etc.).

Coordinate collection of paper and measure the impact of the new strategy by estimating amount collected.

2) Increase the amount of newspaper collected and recycled on campus by installing newspaper collection bins in strategic locations on the campus.

3) Increase On Campus Composting

Green waste-expand beyond the current collection to composting and reuse on campus. Decrease the amount of green waste transported off-campus by reusing it on campus.

Food waste-initiate a pilot program for food-composting by designing a collection method for preparation/pre-consumer food-waste in conjunction with food services management. Determine the requirements necessary for a food composting area and the desired scale for this program.

Purchasing of Recycled Content Products

Increase the purchase and installation of items such as plastic lumber for benches and picnic tables. Use recycled concrete in new construction whenever possible and reuse asphalt and concrete for other applications whenever practicable.

Work with purchasing to increase the availability of economically priced recycled content paper, and increase the department wide use of this resource through an educational/promotional campaign marketed to all departments.

G.10

1999 WasteWise Award Winners

Partners of the Year

Very Large Corporation
Eastman Kodak Company

Large Corporation
Herman Miller, Inc.

Midsize Corporation
Southern Mills, Inc.
Schlegel Systems, Inc.

Small Business
Guardian Industries – Ligonier Plant
The Seydel Companies

School/School District
Alden Central School

Local Government
Washoe County Government

University/College
Eastern Illinois University
Tennessee Department of Corrections

Tribal Government
Blue Lake Rancheria

Federal Government
U.S. Postal Service – Northeast Area

State Government
State of Ohio

Program Champions

Very Large Corporation
Bell Atlantic
Target Stores

Walt Disney World Co.

Large Corporation
Allergan, Inc.
Amgen, Inc.
Baltimore Gas & Electric Co.
Battelle Memorial Institute
Crown Cork & Seal Co., Inc.
Dow Corning Corp.
Florida Power & Light
Millpore Corp.
Pitney Bowes, Inc.
Russell Corp.
Public Service Electric & Gas
UTC Carrier Corp.
Virco Manufacturing

Midsize Corporation
AIRPAX
Grolier, Inc.

Small Business
First National Bank & Trust Company of the Treasure Coast

University / College
Seattle University

Appendix H

Cost Study Data

H.1 WasteWise Recycling Data
H.2 WasteWise Total Recycling Volume
H.3 WasteWise and Non-WasteWise Disposal Costs

Sources of the data provided are kept confidential

H.1

WasteWise Recycling Data 1999

MONTH	PAPER TONS	CARDBOARD TONS	GLASS TONS	GLOB TONS	COMPOST TONS	OTHER TONS	TOTAL TONS
JANUARY	5.96	5.61	4.2	8.24	8.05	0	32.06
FEBRUARY	7.13	6.78	0	10.88	7.7	0	32.49
MARCH	10.15	8.08	0	7.2	9.98	0	35.41
APRIL	13.23	6.95	0	6.24	10.5	17.13	54.05
MAY	12.02	7	0	7.52	9.45	0.89	36.88
JUNE	15.06	10.46	0	11.36	9.45	2.095	48.425
JULY	11.06	7.8	0	8.48	9.63	1.015	37.985
AUGUST	12.04	9.04	0	10.08	8.4	1.14	40.7
SEPTEMBER	8.37	6.85	0	8.16	7.7	1.24	32.32
OCTOBER	11.34	9.1	0	8.08	10.68	1.06	40.26
NOVEMBER	13.76	5.97	0	10.56	9.1	1.39	40.78
DECEMBER							0
GRAND TOTAL	120.12	83.64	4.2	96.8	100.64	25.96	431.36

1999 RECYCLING

MONTH	CALCULATED SAVINGS	RECYCLING COST	ACTUAL SAVINGS	TOTAL REVENUE	TOTAL $$$$
JANUARY	$3,994.77	$664.67	$3,330.10	$0.00	**$3,330.10**
FEBRUARY	$4,029.47	$396.24	$3,633.23	$125.50	**$3,758.73**
MARCH	$4,279.79	$664.43	$3,615.36	$9.00	**$3,624.36**
APRIL	$6,499.14	$566.17	$5,932.97	$24.00	**$5,956.97**
MAY	$4,463.05	$611.60	$3,851.45	$30.00	**$3,881.45**
JUNE	$5,660.20	$562.02	$5,098.18	$83.00	**$5,181.18**
JULY	$4,565.16	$470.02	$4,095.14	$267.46	**$4,362.60**
AUGUST	$4,874.14	$430.10	$4,444.04	$345.00	**$4,789.04**
SEPTEMBER	$3,822.30	$552.69	$3,269.61	$197.60	**$3,467.21**
OCTOBER	$4,812.46	$349.24	$4,463.22	$326.13	**$4,789.35**
NOVEMBER	$4,923.62	$600.28	$4,323.34	$150.46	**$4,473.80**
DECEMBER	$0.00				
GRAND TOTAL	$51,924.11	$5,867.46	$46,056.65	$1,558.15	**$47,614.80**

H.2

WasteWise Total Recycling Volume 1999

	PPR				TNS	CBRD			TNS				GLS		TNS	
	1996	1997	1998	1999	1996	1997	1998	1999	1996	1997	1998	1999
JAN	5.3	5.0	6.3	6.0	2.5	5.3	6.3	5.6	16.4	6.3	8.1	4.2
FEB	8.0	7.6	7.5	7.1	2.3	6.7	6.9	6.8	4.1	1.8	14.1	0.0
MAR	6.6	6.1	9.6	10.2	4.2	6.6	9.2	8.1	7.5	1.3	14.6	0.0
APR	5.5	6.4	7.0	13.2	4.3	9.5	7.8	7.0	4.8	0.0	10.8	0.0
MAY	11.6	13.2	8.6	12.0	6.0	8.7	7.5	7.0	8.1	0.6	1.1	0.0
JUN	8.5	9.2	8.5	15.1	5.0	7.9	7.0	10.5	6.2	0.6	11.0	0.0
JUL	9.4	9.2	7.5	11.1	2.8	8.8	6.1	7.8	6.9	5.1	6.0	0.0
AUG	9.9	8.4	7.7	12.0	0.7	8.4	6.7	9.0	6.5	3.6	3.8	0.0
SEP	7.7	6.7	9.8	8.4	8.8	8.8	7.6	6.9	6.2	4.7	4.4	0.0
OCT	6.1	9.7	9.1	11.3	8.3	11.1	5.2	9.1	6.7	5.4	5.9	0.0
NOV	10.3	7.7	10.1	13.8	9.1	8.1	8.0	6.0	6.1	3.9	8.1	0.0
DEC	5.6	6.6	7.4		8.1	8.8	8.1		6.0	5.3	12.6	
SUB TOT	95	96	99	120	62	99	86	84	85	39	100	4

	1996	**1997**	**1998**	**1999 YTD**
TOT	422	391	449	431

TNS – Tons
YTD – Year to Date
PPR – Paper
CRDB – Cardboard
GLS – Glass
OTHR – Other
CPST - Compost

		GLOB	TNS			CPST	TNS		OTHR		
	1996	1997	1998	1999	1996	1997	1998	1999	1999	1998 MTH TOT	1999 MTH TOT
JAN	3.0	5.1	1.0	8.2	6.1	8.9	8.6	8.1	0	**30.3**	**32.1**
FEB	4.4	5.1	0.3	10.9	8.1	6.0	9.3	7.7	0	**38.1**	**32.5**
MAR	7.5	5.4	1.5	7.2	9.8	10.0	10.9	10.0	0	**45.8**	**35.4**
APR	4.5	6.0	3.7	6.2	7.2	7.8	11.4	10.5	17.13	**40.7**	**54.1**
MAY	3.5	5.3	6.7	7.5	10.3	8.2	11.0	9.5	0.89	**34.9**	**36.9**
JUN	4.2	6.3	4.2	11.4	8.8	11.0	8.4	9.5	2.095	**39.1**	**48.4**
JUL	7.4	3.3	2.5	8.5	10.7	6.0	8.8	9.6	1.015	**30.9**	**38.0**
AUG	7.4	2.2	4.2	10.1	9.8	9.3	10.2	8.4	1.14	**32.6**	**40.7**
SEP	6.8	4.4	5.8	8.2	12.3	10.0	8.4	7.7	1.24	**35.9**	**32.3**
OCT	7.6	3.2	5.1	8.1	12.1	9.8	9.8	10.7	1.06	**35.0**	**40.3**
NOV	5.4	3.8	4.0	10.6	10.0	9.5	10.3	9.1	1.39	**40.4**	**40.8**
DEC	6.4	2.5	7.2		6.5	9.5	9.8			**45.1**	**0.0**
										1998	**1999**
SUB										**YTD**	**YTD**
TOT	68	53	46	97	112	106	117	101	26	**189.7**	**431.4**

H.3

WasteWise and Non-WasteWise Disposal Costs

1999				
Total Tons Prevented		**Calculated Savings**	**Cost/Ton**	**Waste/Cost Ratio**
431.36		51924	120	0.00830751

	Year	**Total tons**	**Cost of Disposal**
	1995	923.65	111182
	1996	782.1	94143
	1997	757.24	91151
	1998	769.33	92606
	1999	774	93168

Non-Wastewise

Year	**Disposal Cost**	**CPI RATIO**	**Present Value(1999)**
1990	48198	1.27	61211
1991	53645	1.22	65447
1992	63879	1.19	76016
1993	80786	1.15	92904
1994	71269	1.12	79821
1995	60947	1.09	66432
1996	58985	1.06	62524
1997	62630	1.04	65135.2
1998	61418	1.02	62646.36
1999	68028	1	68028
total	629785		

	Monthly Costs '99
Jan. '99	4569
Feb.'99	5496
Mar.'99	5034
Apr.'99	5313
May'99	5257
Jun.'99	5200
Jul.'99	6006
Aug.'99	6566
Sept.'99	4163

Oct. '99	6688
Nov.'99	5160

For the month of May not all of the disposal fees were available so an average was taken between April and June.

Appendix I

Summary of EPA Survey

EPA conducted its first official WasteWise Customer Service Survey through the Partnership Programs Coordinating Committee (PPCC), in the summer of 1999 to all the partner. Surveys were completed and returned anonymously by 163 partners. For purposes of developing a protocol, the following is a summary of the most common written responses to survey questions concerning partner assessment of the program (EPA Survey, September 8, 1999):

Question: Do you have any suggestion for improving how well this program communicates with you?

Summary of Written Responses from Partners:

1. Focus more information on particular sectors, in particular what other companies are doing in terms of reaching their goals.
2. Increase e-mail information.
3. Make the reporting form user-friendlier
4. Establish and maintain relationship with partners; contact through increased on-site visits, phone calls, or communication. If possible, decrease the turnover rate of WasteWise account representatives.

Question: How can we improve your satisfaction?

Summary of Written Responses from Partners:

1. Focus information on universities, small companies, and government.
2. Focus information on success stories of waste reduction, and what other companies are doing in the same industry.
3. Smaller companies need more recognition (other than a certificate).
4. Need more help with reporting, but have less paperwork.
5. Need more solutions and recommendations.
6. Motivate employees, more contact and on-site visits.

Summary of Written Negative Responses from Partners:

1. Not much contact/Lack assistance
2. Smaller business, lack capital
3. No recognition
4. Too much paperwork

Question: Why would you recommend (or not) the WasteWise program to others?

Yes, recommend:
1. Non-recycling offices can benefit more.
2. Recognition.
3. Networking with others, sharing ideas.
4. Good place to start for people starting a program.

No, not recommend:
1. Not locally, but maybe for manufacturers in urban areas.
2. Limited budget to support program and attend network meetings.
3. Smaller businesses have a harder time to spark interests in people to participate.
4. Lack communication.
5. See no actual economic benefits.

Additional Written Comments from Partners:
1. Need specific recommendations and specific vendors in our area.
2. No time.
3. Need more recognition.

Summary Analysis of 1999 EPA Survey of Partner's Written Responses

Our interpretation of the EPA survey leads us to the following concerns:

- Establishing a baseline, reporting, and finding time to conduct all these activities.
- Increasing support and recognition to universities, smaller organizations and government.
- Sharing knowledge from other partners in their sector, in terms of setting their goals and baselines, success stories of waste reduction and overall performance.
- Smaller companies need more recognition (other than a certificate).
- Finding and determining more solutions and recommendations.

Motivating employees, and increasing contact and on-site visits.

Appendix J

Definitions

Definitions

Combustion of MSW is the burning of wastes with or without energy recovery. Combustion with energy recovery is commonly called "waste-energy" and is preferred over strict combustion.

Discards are the materials in the MSW that remain after recovery or recycling. They are unable to be recycled and are either combusted or land filled.

Diversion means that the wastes did not end up at the landfill. Wastes are commonly diverted through waste prevention methods, materials recovery and combustion.

Durable goods are long lasting materials that become obsolete or non-functional and are discarded. Some examples of these goods would be appliances and computers.

Non-durable goods are materials that are produced frequently and have a short life span such as newspapers, magazines and office paper.

Free riders are those who might not wish to participate in a voluntary, consent-based system but reap the benefits of others efforts.

Generation refers to the amount by weight or volume of materials and products that enter the waste stream before recycling including composting, landfilling, or combustion occurs.

Municipal Solid Waste (MSW) is a term used to represent the wastes created by households, commercial sources such as restaurants and retail stores, institutions like hospitals, schools and museums. Both durable goods and non-durable goods are included as well as packaging, containers, food scraps, landscape waste and other inorganic wastes.

Recovery of materials refers to the removal of MSW from the waste stream for the purpose of recycling, which includes composting. Recovery for recycling includes purchases of post-consumer recovered material plus net exports of the materials. Recovery of yard trimmings includes diverting yard trimmings from disposal to a composting facility. Recovery for uses such as construction is

\considered recovery along with materials used in re-manufacturing processes.

Recycling occurs when materials that otherwise would have become waste are collected, broken down, and remade into new or similar products (Andress, 1989). Along with adequate markets, technology dictates which materials are recyclable and currently, glass, newspaper, office paper, cardboard, aluminum, tin-coated steel cans, tires, batteries, motor oil, and some plastics are readily recycled. Recycling also includes materials that are re-used in their original or altered forms such as re-using wooden pallets and the composting of food and yard trimmings.

Waste Prevention or Source Reduction activities are activities that reduce the amount or toxicity of wastes *before* they enter the MSW system. Reuse is a source reduction activity involving the recovery or reapplication of a package, used product, or material in a manner that retains its original form or identity. Reuse of products such as refillable glass bottles, reusable plastic containers, or refurbished wood pallets are examples of source reduction.