



**Waste Reduction
and Recycling Guide**
for
Florida
Correctional Facilities

Prepared for
the Florida Department of Environmental Protection
and
the Solid Waste Authority of Palm Beach County

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Preface

This guide was prepared as part of the *Model Waste Reduction and Recycling Program for Florida Detention and Correctional Facilities Project* (IG1-12), funded by the Florida Department of Environmental Protection (FDEP) through a grant to the Solid Waste Authority of Palm Beach County (SWA). The project is a partnership between SWA, the Palm Beach County Sheriff's Office (PBSO), Sumter County, and the Sumter State Correctional Institution (SCI). SWA retained Kessler Consulting, Inc. (KCI) to provide technical assistance and project coordination.

As part of the project, KCI prepared Waste Reduction Action Plans for the Palm Beach County detention centers and SCI. The recommendations contained in each plan are based on comprehensive analysis of existing waste management systems and detailed waste composition studies. KCI also assessed the potential costs and benefits of a statewide Florida Department of Corrections (FDOC) waste reduction program and determined that FDOC could achieve significant cost savings by implementing such a program. These completed tasks and documents contributed to development of this guidebook.

In addition to staff members from the project partner organizations, KCI also wishes to acknowledge and thank James Marion with the New York State Department of Correctional Services for providing his time and expertise in development of this guide.

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Introduction

The opportunity to reduce waste and decrease waste management costs at federal, state, and local correctional facilities located in Florida is tremendous. The Florida Department of Corrections (FDOC) alone employs over 25,000 persons and operates 123 facilities with an inmate population of approximately 77,300.¹ The Federal Bureau of Prisons operates seven correctional facilities in Florida with an estimated inmate population of 19,900 plus 2,400 employees.² Waste generation measured at two correctional facilities in Florida averaged about 4 pounds per inmate per day, or 1,450 pounds per year.³ Based on this estimate, State and Federal correctional facilities in Florida generate over 70,000 tons of solid waste annually. This does not even include county or privately operated facilities.

Correctional facilities dispose of significant amounts of materials that could be reused, recycled or composted. Based on waste composition studies conducted at the Palm Beach County detention centers and the Sumter State Correctional Institution, recyclable paper, food waste, and metals alone account for about 68% of the average prison waste stream (28%,

30%, and 10%, respectively).⁴ As discussed later in this guide, many correctional facilities in the United States have implemented comprehensive waste reduction programs that have achieved waste reduction rates of 50% and higher.

The purpose of this guide is to provide a blueprint for developing comprehensive waste reduction programs at correctional facilities across the state. The manual begins by defining waste reduction and highlighting its benefits. It then walks through the steps to plan, design and implement a program and provides helpful resources to utilize along the way.



Implementing a waste reduction and recycling plan can reduce your overall waste management costs.

¹ Florida Department of Corrections, 2002-2003 Annual Report.

² U.S. Department of Justice, Federal Bureau of Prisons, State of the Bureau 2002.

³ Kessler Consulting, Inc., Analysis of a Statewide Florida Department of Corrections Waste Reduction Program, November 2003.

⁴ Ibid.

Section 2

Waste Reduction – What Is It & Why Should I Do It?

2.1 Definition of Key Terms and Concepts

As with any field of expertise, the recycling industry has its own unique terms and concepts. A number of them are used throughout this guide and, therefore, warrant definition upfront.

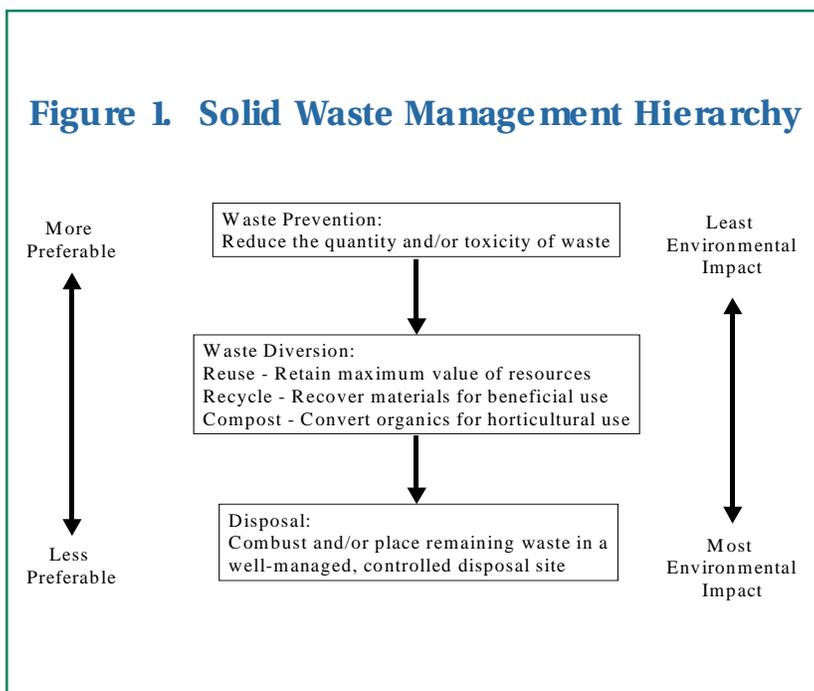
Waste Management Hierarchy – Strategies for managing solid waste are prioritized into a hierarchy adopted by the U.S. Environmental Protection Agency (EPA), Florida Department of Environmental Protection (FDEP), and many local jurisdictions (see Figure 1). Solid waste management strategies, in descending order or preference, are waste prevention, waste diversion, and disposal.

Waste Prevention – Actions to reduce the toxicity and/or quantity of waste generated. Examples of reducing toxicity include switching to non-toxic cleaners, disinfectants and solvents. Examples of reducing the amount of waste generated include using products and equipment that are repairable or have long life expectancy, decreasing the amount of packaging used for shipping, using reusable transport packaging, relying on computer networks for electronic document distribution, and double-sided printing and copying. Waste prevention is also known as “source reduction” or “pollution prevention.”

Waste Diversion – Actions to divert discarded materials from disposal, including reuse, recycling and composting.

Reuse – To use a product, material, or packaging in its original form more than once. For example, reuse includes using the blank-side of paper for printing draft documents or as scratch paper, reusing cardboard boxes from incoming shipments, and repairing and reusing broken furniture and office equipment.

Recycling – Separation, processing, and marketing of waste stream components for beneficial use as raw materials in the manufacture of new products. Recycling includes not just typical materials like scrap metal, aluminum cans, office paper, cardboard boxes, etc. Many other items in prison waste can be recycled such as electronic equipment, construction and demolition waste, and textiles.



Composting – Aerobic decomposition of organic wastes under controlled, high-temperature conditions. The product – compost – is a valuable humus-like soil amendment. Compostable organic materials include food waste, yard trimmings, farm waste, wood chips and even cotton textiles.

Waste Reduction – Actions that include waste prevention or waste diversion.

Environmentally Preferable Purchasing – Or “EPP,” incorporates environmental principles and criteria into the specification, selection, and procurement of goods and services. EPP considers various product or service attributes, such as lower toxicity, lower water or energy usage, and the percentage of a product made from recycled material.

2.2 Benefits of Waste Reduction

By implementing a waste reduction program, correctional facilities will realize numerous economic and environmental benefits, as summarized in Table 1.

A successful waste reduction program will also create a positive or “green” public image of environmental stewardship, while still allowing correctional facilities to accomplish their operational responsibilities.

2.3 Federal, State and Local Requirements

In addition to the environmental and economic reasons for initiating a waste reduction program, government mandates and directives also exist. Information on how to find the documents mentioned below can be found in Appendix A.

Federal

Federal Executive Order 13101, signed in 1998, is entitled “Greening the Government through Waste Prevention, Recycling and Federal Acquisition.” All executive agencies, including federal prisons, are required to incorporate waste prevention and recycling into the agency’s daily operations and work to increase and expand markets for recovered materials by identifying

Table 1. Summary of Waste Reduction Benefits

Environmental Benefits	Economic Benefits
<ul style="list-style-type: none"> • Conserves natural resources for future generations • Reduces the impact from raw materials extraction • Reduces the energy needed to manufacture new products • Reduces greenhouse gas emissions and other releases to air and water from manufacturing processes • Reduces the burden on landfills and waste-to-energy facilities • Reduces the use of water, fertilizers and insecticides when compost is utilized onsite 	<ul style="list-style-type: none"> • Reduces waste collection and disposal costs • Provides savings in material and supply costs • Promotes efficient work practices and improves worker safety • Generates revenues from certain recovered materials • Reduces potential future liability associated with waste disposal • Provides savings from reduced water usage and fertilizer and insecticide expenses when compost is utilized • Provides inmate labor and training

and purchasing environmentally preferable products and services. In 1999, EPA developed the “Final Guidance on Environmentally Preferable Purchasing” to assist executive agencies implement EPP programs.

Federal Executive Order 13148, signed in 2000, is entitled “Greening the Government through Leadership in Environmental Management.” It requires federal agencies to incorporate environmental management systems into agency day-to-day decision-making and long-term planning processes. Pollution Prevention is highlighted as a key aspect of the environmental management system process. This E.O. requires agencies to reduce the use of toxic chemicals, hazardous substances, and pollutants, and the generation of hazardous or radioactive wastes.

State

Florida Statute 403.714 requires that all state agencies “...establish a program ... for the collection of all recyclable materials generated in state offices and institutions throughout the state, including, at a minimum, aluminum, high-grade office paper, and corrugated cardboard.” The statute also requires agencies to procure compost products when they can be substituted for, and cost no more than, regular soil amendment products, provided the compost products meet all applicable state standards, specifications and regulations. This provision is important given the amount of organic waste generated at correctional facilities and the opportunity to compost such waste to create a valuable soil amendment.

FS 287.045 requires each state agency to “...review and revise its procurement procedures and specifications for the purchase of products and materials to ensure to the maximum extent feasible that each agency uses



state contracts to purchase products or materials that may be recycled or reused when these products or materials are discarded.” The law further requires that agencies eliminate any purchasing procedures and specifications that discriminate against recycled-content products unless necessary to protect public health, safety and welfare.

FS 287.045 is further supported by FS 403.7065, which requires state agencies to procure products or materials with recycled-content when the Florida Department of Management Services (FDMS) determines that such products or materials are available and meet performance specifications.

FDEP established the “Greening Florida Government” program to disseminate information and assist state agencies with implementing waste prevention and diversion programs in compliance with Florida law.

Local

In addition to federal and state requirements, some local Florida jurisdictions, including Alachua, Sarasota and Seminole Counties to name a few, have adopted ordinances that mandate recycling at all commercial and institutional facilities. Correctional facilities should contact their local recycling coordinator (see Appendix A) for information on any local waste reduction and recycling requirements that may exist. Local recycling coordinators can also provide valuable assistance as you develop and implement your waste reduction program, such as providing information about local recycling markets.



All kinds of materials can be included in your waste reduction and recycling program.

Section 3

Getting Started

The first step in establishing a waste reduction program is to lay the groundwork by developing program policies and goals, obtaining top management support, establishing a management team, and developing a work plan.

3.1 Waste Reduction Policies and Goals

Adopting waste reduction policies and goals helps to establish the framework for your facility's program. Policies and goals can be set for individual facilities, for all facilities within a region, or for all agency facilities within the state. A waste reduction policy should address the following elements:

- Commitment to comply with all environmental laws and regulations.
- Commitment to the solid waste management hierarchy.
- Establishment of program implementation and management responsibilities.
- Incorporation of EPP principles into purchasing policy and practices.

Program goals set a target to strive for and to measure success. While policies remain relatively consistent, goals should be reexamined and adjusted over time as the program becomes established and expands. Incremental goals may be developed as milestones toward reaching the waste reduction potential of the facility.

Comprehensive waste reduction programs implemented at various correctional facilities in the United States have demonstrated that 50% waste reduction is an achievable goal.

- Sumter State Correctional Institution diverts over 75% of its waste due in large part to a food waste recycling arrangement with a nearby pig farm.
- New York prisons have an overall diversion rate of over 50%, and are expected to achieve 60% in the near future.
- South Carolina Department of Corrections claims an average diversion rate of over 50% for its facilities.
- In Tennessee, 14 prisons have reached 50% diversion while 9 have reached 75% diversion.
- All prison facilities in Indiana have met or exceeded the goal of 50% diversion.

3.2 Top Management Support

For a program to be successful, top management (e.g., agency director, regional directors, and facility wardens) must not only adopt the waste reduction policy, but also support its implementation and operation. Their support will provide the authority and guidelines needed for those directly responsible for implementing the program to effectively do their job.

Initially, top-level management should issue a directive to develop a comprehensive, cost-effective program. Once waste reduction opportunities are identified and program planning is completed, management support is needed again to approve program initiatives, budgets, and any changes in standard operating procedures, as well as to initiate staff training. Once a program is implemented, ongoing management support (and especially active participation in waste reduction activities) will encourage widespread adoption and participation.

3.3 Waste Reduction Coordinator and Team

Top management should appoint a Waste Reduction Coordinator to oversee and manage development and implementation of the waste reduction program. Smaller correctional facilities may be able to assign all waste reduction work efforts to a single person. Larger facilities may need to designate a Waste Reduction Team to assist the Coordinator. The Coordinator's regular job duties must be adjusted to ensure that they have adequate time to carry out their waste reduction program duties.

The Coordinator will need diverse skills including leadership, communication and motivational skills. The Coordinator should also be familiar with all aspects of the facilities operations – administration, food service, inmate housing, inmate work programs, maintenance, PRIDE activities, etc.

The Coordinator and Team members should clearly understand their responsibilities and be held accountable. An incentive program can provide impetus for successful performance. Duties and responsibilities of the Waste Reduction Coordinator and Team include the following:

- Work with management to develop program policies and goals.
- Evaluate existing solid waste management operations.
- Identify viable waste prevention, diversion and disposal strategies.
- Design the waste reduction and recycling program.
- Determine program costs and benefits.
- Implement the waste reduction and recycling program.
- Promote the program and educate others on how to participate.
- Monitor and report on program progress.
- Review and improve the waste reduction program over time.

3.4 Work Plan

The first activity of the Waste Reduction Coordinator and Team should be to develop a work plan. They should compile a list of tasks necessary to develop the program, assign responsibility for each task, and develop a time schedule. Subsequent sections of this guidebook describe the tasks that the Coordinator and Team will need to undertake in order to complete their mission.

Section 4

Purchasing and Waste Assessments

Purchasing and waste assessments establish important baseline information about current procurement and waste management practices. These assessments provide valuable information with which to identify and select waste reduction strategies, design your program and evaluate costs. The assessments also establish a benchmark for measuring current waste generation and reduction rates, and future progress towards your waste reduction goal.

4.1 Purchasing Assessment

When conducting a purchasing assessment, it's important to enlist the help of purchasing personnel. With their help, compile a list of products commonly purchased for use at your facility, and estimate the quantity and cost of these items. In addition, identify the types of waste that result from use of these products – whether packaging waste or waste from the product itself. Ultimately, this purchasing

assessment will help reveal source reduction and pollution prevention opportunities, opportunities for purchasing recycled-content and other environmentally preferable products, reusable or returnable product options, and types of waste materials that might be collected for recycling.

4.2 Waste Assessment

Prior to developing a waste reduction program, you should have a thorough understanding of your facility's current waste management practices. Solid waste is generated in nearly all activities and departments at correctional facilities – administrative offices, food services, groundskeeping, farming, common areas, workshops, maintenance and physical plant, and inmate quarters. To assist with conducting a waste assessment of your facility, a form is provided in Appendix B.

First, complete Part I of the form, which consists of basic facility information.



You should understand your facility's waste stream before developing your waste reduction plan.

Second, obtain and review copies of all existing waste hauling and disposal contracts, recycling contracts and records, and any information regarding the quantity of waste collected, hauling costs (i.e., the costs of collecting and transporting waste), and tip fees (i.e., the costs of disposing of waste at the local landfill or waste-to-energy facility). Be sure to include contracts for leasing and servicing waste containers (e.g., roll-off containers, compactors, dumpsters, etc.). It's important to have a complete picture of how waste is collected and disposed of at your facility and what impacts the costs of these services.

This information, which should be used to complete Parts II and III of the waste assessment form, will help you assess the collection and disposal costs that might be reduced or "avoided" once you've implemented an effective waste reduction program. These avoided costs are often the greatest economic benefit of a waste reduction and recycling program.

Third, perform a facility walk-through to examine your facility's waste generating practices. A walk-through assessment allows you to observe operations in various departments or activity centers, interview employees and management, and identify ideal and convenient locations for recycling containers. During the walk-through, Parts IV and V of the form should be completed.

In Part IV, record any existing waste prevention activities that you observe. Examples of several common waste prevention activities are listed on the form to help get you started.

In Part V, record the main types of waste generated within your facility. To assist you, recyclable materials commonly found in a correctional facility waste stream are listed, with additional space for adding waste materials.

Describe the waste-producing activities or locations for each waste type; if possible, estimate the amount of that waste material produced; and note any existing activities that are in place to reduce the waste. By observing how people handle waste, inspecting bins and talking with staff, you can identify the major constituents of the waste stream.

You may want to complete a separate copy of Part V for each department or activity center within your facility, since they may generate different types of waste. For example, food service areas likely generate food waste, tin/steel and aluminum cans, plastic containers and cardboard. Administrative areas commonly generate white ledger, file stock, envelopes and other paper. In break rooms, you will normally find newspapers, aluminum cans and plastic bottles.

In Part VI of the waste assessment form, you will begin to identify waste reduction activities that can potentially be implemented to reduce the major constituents of your facility's waste stream, or those waste materials that are most easily reduced or recycled. Section 5 of this guide will help give you some ideas on waste reduction opportunities. This list will be the starting point for designing your waste reduction program.

4.3 Waste Generation and Composition

If your facility's waste or recycling collection companies are unable to provide you with information regarding the quantity of solid waste or recyclables collected, you can estimate these amounts by looking at the size of the collection containers utilized and the frequency of collection. Since collection containers are not always full, they will need to be monitored for

a period of time to determine how full they generally are prior to being serviced. You can then use industry-accepted conversion factors (see Appendix C) to calculate solid waste or recyclables collection. For example, a facility that utilizes three 8-cubic yard dumpsters that are serviced twice per week and are approximately 90% full when serviced can estimate its waste generation rate as follows:

$$\frac{8 \text{ cubic yards}}{\text{dumpster}} \times 90\% \times \frac{3 \text{ dumpsters}}{\text{pickup}} \times \frac{2 \text{ pickups}}{\text{week}} \times \frac{52 \text{ weeks}}{\text{year}} \times \frac{250 \text{ lbs.}}{\text{cubic yard}} \times \frac{1 \text{ ton}}{2000 \text{ lbs.}} = \frac{280.8 \text{ tons}}{\text{year}}$$

The walk-through facility assessment may provide sufficient information with which to develop your program. Alternatively, a detailed waste characterization study can be conducted to more accurately estimate the composition of your waste stream; however, such a study can be time consuming and labor intensive.

Waste composition and generation data from studies conducted at the Palm Beach County detention centers and the Sumter State Correctional Institution can also be utilized to estimate the waste stream of a typical correctional facility. As indicated in Table 2, the combined results of these studies compared well with waste composition data developed by the New York State Department of Correctional Services. An average waste generation rate (prior to any diversion) of 1,450 pounds per inmate per year (nearly 4 pounds per inmate per day) was also calculated based on these two studies. About 1.2 pounds of this 4 pounds was food waste. Because waste composition and generation varies from facility to facility, data from the Palm Beach and Sumter County studies should be compared with the information gathered during your walk-through assessment before using it for planning purposes.

Table 2. Estimated Solid Waste Composition for Correctional Facilities

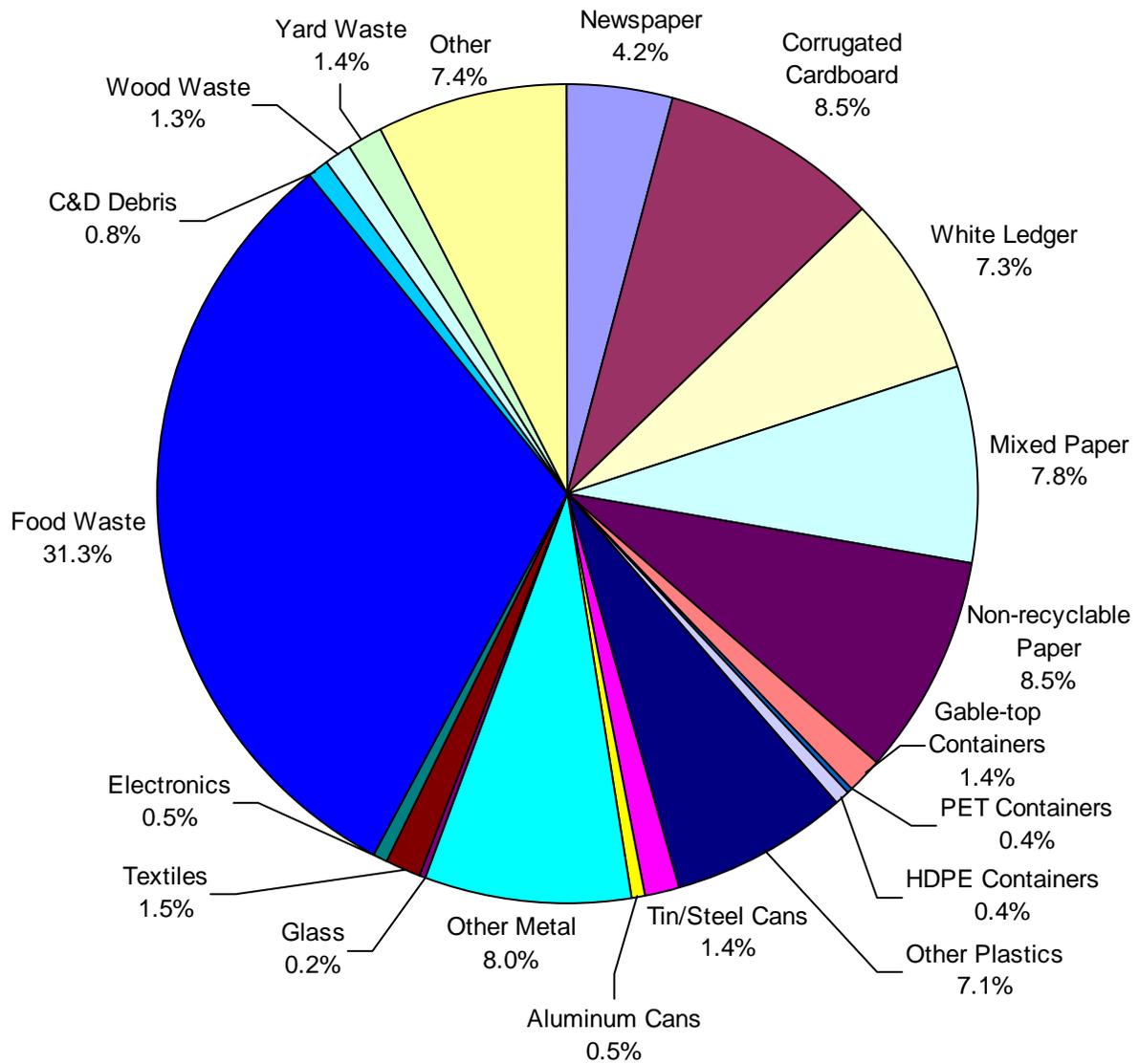
Material Categories	Florida Correctional Facilities*		New York Department of Correctional Services**
Newspaper	4.2%		
Corrugated Cardboard	8.5%		
White Ledger	7.3%		
Other Mixed Paper	7.8%		
Non-recyclable Paper	8.5%		
Gable-top Containers	1.4%		
All Paper		38%	40%
PET Containers (#1)	0.4%		
Natural HDPE Containers (#2)	0.2%		
Pigmented HDPE Containers (#2)	0.2%		
Polystyrene Plastic	1.0%		
Other Plastic Bottles/Containers	0.4%		
Other Plastics	5.7%		
All Plastics		8%	15%
Tin/Steel Cans	1.4%		
Aluminum Cans	0.5%		
Other Ferrous/Nonferrous Metal	8.0%		
All Metal		10%	5%
Glass	0.2%	0%	0%
Textiles	1.5%	2%	3%
Electronics	0.5%	0%	0%
Compostable Food Waste	30.4%		
Non-compostable Food Waste	0.9%		
All Food Waste ***		31%	30%
C&D Debris	0.8%		
Wood Waste	1.3%		
Yard Waste	1.4%		
All Wood Waste		4%	7%
Other Miscellaneous	7.4%	7%	0%
Total	100%	100%	100%

* Based on waste composition studies conducted by Kessler Consulting at the Palm Beach County detention centers and Sumter State Correctional Institution.

** Source: James Marion, New York Department of Correctional Services.

*** In the Florida study, food waste represented about 1.2 pounds of the nearly 4 pounds of waste generated per inmate per day.

Figure 2. Estimated Solid Waste Composition for Florida Correctional Facilities*



* Based on waste composition studies conducted by Kessler Consulting at the Palm Beach County detention centers and Sumter State Correctional Institution.

4.4 Benchmarking Your Program

By reviewing the waste reduction opportunities identified during the facility assessment and evaluating the waste composition and generation estimates for your facility, the Waste Reduction Coordinator and Team can begin to formulate a strategy of reducing solid waste disposal and developing a waste reduction program plan.

Major waste stream components that can be recycled (e.g., food, paper, cardboard, plastic and metal) should be identified and the quantities that are currently being disposed estimated. This information can be used to benchmark your existing program and to track future progress. Table 3 provides calculations for several program performance parameters that are commonly benchmarked and tracked.

Table 3. Program Performance Parameters

Performance Parameter	Calculation
Waste Generated	= Waste Recycled + Waste Disposed
Generation Rate	= $\frac{\text{Waste Generated}}{\text{Average Inmate Population}}$
Waste Reduction Rate (%)	= $\frac{(\text{Current Waste Disposed} - \text{Waste Disposed at Startup})}{\text{Waste Disposed at Startup}} \times 100$
Recycling Rate (%)	= $\frac{\text{Waste Recycled}}{\text{Waste Generated}} \times 100$

Section 5

Program Elements

Once assessments of your waste stream and purchasing practices have been completed, the Waste Reduction Coordinator and Team can evaluate options and plan the waste reduction program. The following elements should be considered for inclusion in the program plan:

- Waste prevention and material reuse
- Material exchange
- Composting
- Recycling
- Environmentally preferable purchasing

5.1 Criteria for Evaluating Program Options

The following criteria should be used to evaluate the technical, economic and institutional feasibility of various waste reduction options:

Conformance with the waste management hierarchy – In conformance with the solid waste management policy, waste prevention should be the first option considered for each material. If prevention is too costly, impractical, or not possible, then waste diversion options should be considered. If waste diversion cannot be justified, only then should a material be designated for disposal.

Cost – Many waste prevention and diversion measures can reduce overall waste management costs. On the positive side of your cost equation, you have avoided collection and disposal costs, revenue from recovered materials, and any EPP savings. On the expense side, you will have capital and equipment costs, labor, and operating costs.

Potential waste reduction – Waste prevention and diversion strategies should target those materials that constitute the highest percentage of the waste stream. They provide the greatest potential for waste reduction.

Ease of implementation – At the same time, consideration should be given to those materials that can be easily eliminated or recycled regardless of how much of the waste stream they constitute.

Security – Many correctional facilities choose not to recycle materials such as glass, which can present a threat to security.

Plastic food trays are an example of reuse that reduces waste in kitchen operations.



Availability of markets for recycled materials – Markets must exist that are willing and able to accept the recyclable materials you wish to collect. Without a market, there is little reason to separate a material for recycling. The location, revenues paid or fees charged, and services offered by material buyers need to be considered when determining what recyclables will be collected and how they will be handled.

Impact on operations – Will a waste reduction strategy improve or reduce worker efficiency? Will it increase or reduce labor requirements? Will it be necessary to change or allocate new equipment and facility space?

5.2 Waste Prevention and Material Reuse Opportunities

Based on work conducted for the Palm Beach County detention centers and Sumter State Correctional Institution, a list of waste prevention and reuse opportunities most applicable to correctional facilities was developed and is provided in Appendix D. Each facility is unique; therefore, this list should be used as a starting point. Additional waste prevention opportunities may be feasible depending upon the activities conducted at your facility. For example, facilities with onsite occupational training or PRIDE programs may produce wastes that are uncommon to most correctional facilities, but that can nonetheless be reduced in quantity or toxicity.

5.3 Material Exchange Opportunities

Material exchanges, like the non-profit Southern Waste Information eXchange (SWIX) in Florida, work to find markets for industrial by-products, surplus materials and wastes. Simply stated, material exchanges match

waste generators with waste users. The goal is to conserve energy, resources and landfill space by helping waste generators find alternatives to the disposal of valuable materials or wastes. Contact information for SWIX is provided in Appendix A.

5.4 Composting Opportunities

Based on waste composition studies conducted at correctional facilities in Florida, compostable food waste constitutes the largest single waste category of a facility (about 30% the waste stream). Of the nearly 4 pounds of waste generated per inmate per day, nearly 1.2 pound is food waste. Food waste collected at Sumter State Correctional Institution and several other FDOC facilities is given to local farmers as a feedstock for swine; however, this market for recovered food waste is becoming increasingly erratic in Florida. Numerous commercial and publicly operated mulching facilities exist throughout Florida, but only a few composting facilities operate that accept commercially generated food waste.

A feasible alternative is onsite composting, which has been shown to be a viable option at correctional facilities throughout the country. In addition to food waste, vegetative or yard wastes and wood wastes are also composted in the onsite systems that exist. Appendix E provides a general overview of the fundamental principles of composting.

Various composting technologies are available, including open windrows, covered windrows, aerated piles and in-vessel systems. The New York Department of Correctional Services (NYDOCS) has experience operating each type of facility, and Table 3 provides estimated costs for each. The windrow systems are on concrete pads and have leachate collection systems.

The aerated bay system includes the additional costs of fans, utilities and stationary mixer. In-vessel costs include one full-time civilian operator per system and equipment is amortized over a 15-20 year period.

Finished compost can be used onsite, which would reduce or replace the need to purchase peat moss or other soil amendments. It would also provide other indirect economic benefits, such as decreasing the need for horticultural watering or fertilizer and insecticide use. A permit to compost food waste would need to be obtained from FDEP prior to implementing onsite food waste composting.

5.5 Recycling Opportunities

Based on the Florida facilities' waste characterization studies, Table 5 provides a list of the types of recyclable materials typically found in a correctional facility's waste stream. In addition to the materials listed in Table 5, other types of recyclables may be generated that were not quantified in the Florida studies either because they were already being recovered or because they were found in very small quantities. These include cooking oil

and grease, motor oil and other automotive wastes, appliances and rechargeable batteries. Appendix F provides a summary of the general guidelines for preparing each of these recyclable materials for marketing.

Various options exist for collecting, processing and marketing the recyclable materials included in your waste reduction program. Provided below is a discussion of some of these options based on interviews with program managers at correctional facilities with effective waste reduction programs, as well as industry representatives with companies that collect and process recyclable materials in Florida, including All Around Recycling, Recycle America Alliance, SP Recycling, Smurfit-Stone, and Visy Recycling.

Corrugated Cardboard (OCC):

Numerous companies provide favorable collection arrangements for OCC, with many offering baler lease or lease/purchase agreements to businesses and institutions that generate sufficient quantities of OCC. The current cost for leasing a baler could range from \$150 to \$200 per month, with a revenue share ranging from 50% to 70% of the current market price. Unless market conditions are very poor or the quantity of OCC is minimal, a correctional facility should receive a net benefit or revenue for its OCC. Alternatively, a facility could invest in the acquisition of balers and accumulate trailer loads of OCC. For example, although collection costs and market conditions differ somewhat in the Northeast, NYDOCS currently receives revenue of \$45 to \$50 per ton of baled OCC. NYDOCS realized a 3-year payback period for their downstroke balers, which have about a 15-year useful life.

Sorted Office Paper (SOP): Many companies also offer favorable collection arrangements to facilities that generate significant quantities of SOP.

Table 4. Composting Costs at NYDOCS Facilities

Composting Technology	Cost (\$/ton)
Open Windrow	\$25
Covered Windrow	\$32 - \$35
Covered Aerated Bay	\$35 - \$37
In-vessel	\$47

Source: James Marion, New York Department of Correctional Services, Interview, 2003.

The terms of the collection agreements would depend upon the quantity of SOP generated and the proximity to a processing facility. Depending upon the quantity of SOP generated, dumpsters, roll-offs or compactors could be utilized for collection and storage, with various agreements available for servicing the containers and sharing revenue. Sorted white ledger would bring a higher market price; therefore, if significant quantities of white ledger are generated and can easily be sorted from other office paper, a facility may opt to do this. As with OCC, a facility may also invest in a baler and market larger quantities of SOP. This greater commitment and investment on the part of a facility would result in higher revenue. For example, NYDOCS currently receives \$120 per ton for bales of shredded office paper.

Security issues may arise when developing an office paper recycling program. NYDOCS overcame this by placing high-capacity shredders in key office areas throughout facilities. Each worker is responsible for shredding all of his or her paper waste daily. Since NYDOCS bales its own paper, marketing the shredded paper has not been a problem.

Newspaper (ONP): Several companies offer favorable agreements to collect ONP from facilities that generate sufficient quantities. Collection containers are often provided and serviced at no cost, with revenue sharing depending upon the current market.

Scrap Metal: Correctional facilities usually generate substantial amounts of scrap metal that can easily be segregated from the waste stream. A simple and cost-effective system to recover this material would be for a facility to make arrangements with a local scrap

metal dealer who may provide and service a collection container at no cost, and may perhaps offer a revenue share. Alternatively, a facility may choose to segregate higher-value metals in order to receive greater revenue for these materials. Tin/steel and aluminum cans may also be collected with the scrap metal unless an alternate market is available.

Aluminum Cans: Although the quantity of aluminum cans generated at correctional facilities may not be significant, this material has a high and relatively consistent market value. If sufficient quantities are generated, a recycler may be willing to provide onsite collection or local recycling centers usually accept donations of aluminum cans.

Textiles: Textiles that can no longer be used can be collected and marketed for fiberfill insulation, rags or animal bedding. For example, NYDOCS

Table 5. Recyclable Materials in Typical Correctional Facility Waste Stream

Material Category	Estimated % of Waste Stream
Corrugated cardboard	8.5%
White ledger	7.3%
Other recyclable office paper	7.8%
Newspaper	4.2%
Scrap metal	8.0%
Tin/steel cans	1.4%
Aluminum cans	0.5%
Textiles	1.5%
Yard waste	1.4%
Wood waste	1.3%
Plastic bottles/containers	0.8%
Construction & demolition debris	0.8%
Electronics	0.5%

Source: Kessler Consulting, Inc., Analysis of Statewide Florida Department of Corrections Waste Reduction Program, November 2003.

operates a rag-cutting facility at one of its facilities and also markets baled linens for fiberfill insulation. The Main Detention Center in Palm Beach County collects clean linens for use as animal bedding. In addition, a Tampa-based company, All Around Recycling, was identified that provides textile collection service statewide. Depending upon the type of textiles and quantity generated, this company may provide a collection container and service it at no charge.

Wood Pallets and Wood Waste:

Numerous companies exist throughout Florida that collect and refurbish standard-sized wood pallets. Depending upon the quantity of pallets and location of the facility, revenue may be provided for these pallets. Wood pallets and other untreated wood waste can also be ground and used as a bulking agent for composting.

5.6 Environmentally Preferable Purchasing Opportunities

EPP is not a new type of purchasing system, but rather a way of incorporating environmental considerations into purchasing decisions. Environmentally preferable products have a lesser or reduced effect on human health or the environment when compared with competing products or services that serve the same purpose. To help incorporate EPP into your purchasing practices, Table 6 provides EPP evaluation criteria for comparing products or services.

Based on the types of products and services typically purchased by correctional facilities, provided below are several EPP examples and suggestions. For several product types, it is recommended that facilities strive to meet the minimum recycled-content levels

recommended by EPA, which are provided in Appendix G. EPA also provides lists of available EPP products (see Appendix A).

Office paper

Select printing and writing papers (e.g., copier paper, letterhead, tablets, envelopes and file folders); newsprint, sanitary tissue products (e.g., towels, napkins and bathroom tissue); and paperboard and packaging products with the highest recycled-content available, using the EPA-recommended levels as a guideline.

Choose paper types that can easily be recycled as part of your recycling program.

Be sure to include these same recycled-content levels in the specifications of all printing orders and contracts.

Non-paper office supplies

Purchase non-paper office supplies (plastic desk organizers, sorters, trays and pencil holders; binders and report covers; plastic envelopes, clipboards and file folders; wastebaskets; and recycling receptacles) that meet EPA's minimum recycled-content guidelines.

Purchase office supplies that can be reused or refilled, such as pens and tape dispensers.

Toner cartridges

Purchase remanufactured or reconditioned toner cartridges, inkjet cartridges and printer ribbons. Most suppliers will guarantee that the quality and quantity of copies will match or exceed that of an Original Equipment Manufacturer (OEM).

To mesh your EPP program with your recycling program, buy from a cartridge remanufacturer or an equipment supplier that will take back your spent cartridges.

Office equipment and furniture

Purchase computers, photocopiers and other electronic equipment that have an EnergyStar® label. EnergyStar® is a voluntary labeling program started by EPA and the U.S. Department of Energy that identifies equipment that automatically powers down after a period of inactivity. Such devices can reduce energy use by 50%.

Select copiers and printers that feature automatic duplexing and multi-

page printing in order to reduce paper use and purchases.

Select computers that can easily be upgraded, e.g., with modular components or expandable memory.

Look for quality office furniture that will last a long period of time or can be repaired easily. When available, purchase furniture with recycled-content.

Consider leasing or take-back agreements that stipulate acceptable recycling or disposal practices.

Table 6. EPP Evaluation Criteria

Criteria	How to Evaluate
Cost	What is the purchase cost of a product?
Life Expectancy	What is the expected useful life of the product?
Manufacturer Warranty	For how long does the manufacturer warrant the product? What is the cost for extended warranty and service guarantees?
Reuse and Reparability	Can the product be easily repaired onsite? Are spare parts readily available or can they be fabricated onsite? Are component parts interchangeable with other products used onsite?
Toxicity	Is the product's toxicity lower or higher than comparable products?
Recyclability	Can the product be recycled? Is the packaging recyclable?
Recycled Content	What is the post-consumer recycled content of the product and/or its packaging?
Product Quantity	Based on the expected life and warranty, how many units of the product will be needed per year?
Product Cost	What is the annual cost to purchase the product?
Labor Cost	Compared to other products, does the product have a lower or higher labor cost associated with its use?
Other Costs	Compared to other products, does the product incur lower or higher cost for such items as electricity, water or fuel?
Waste Quantity	What is the volume or weight of waste generated by the product each year, including discarded product and packaging?
Waste Handling Cost	What is the annual cost for collecting and disposing the product and/or its packaging? If recycled, what is the annual cost (or revenue) for collecting and recycling the product and/or its packaging?

Cleaning Supplies

Select cleaning products that are biodegradable, have low toxicity and contain the least harmful components. Existing vendors may be able to assist with identifying such products, or PRIDE offers several environmentally preferable cleaning products, including window and glass cleaner, floor and drain cleaner, deodorizer and degreaser products. EPA also offers a matrix of EPP attributes for cleaning products and a Purchasing Decision Wizard (see Appendix A).

Automotive and Fleet Maintenance Products

Purchase re-refined oil, which is subject to the same stringent refining, compounding and performance standards as virgin oil.

Antifreeze can be recycled using your own equipment or a recycling service, and can provide a high quality reformulated product. Extended-life antifreeze is also available and is designed to last five years/150,000 miles or longer.

Purchase retread tires or tire-retreading services. The typical concerns expressed about retreads are related to safety and failure rate. Statistics compiled by the U.S. Department of Transportation indicate that nearly all tires involved in tire-related accidents were under-inflated or bald. Proper maintenance of tires, whether new or retread, is the best way to reduce tire failure and tire-related accidents.

Reclaim engine coolants for reuse through onsite processing of waste coolant.

Utilize environmentally sound parts cleaning products and equipment. Water-based cleaners that do not contain volatile organic compounds (VOCs) are available and reduce exposure risks to workers.

When acquiring new vehicles, consider purchasing Alternative Fueled Vehicles or Hybrid Electric Vehicles (HEV). Use of 85% ethanol blended fuels (E85) or HEVs reduces carbon monoxide and ozone-producing emissions.

Landscaping Products

Strive to meet EPA's minimum recycled-content levels for various landscaping products, such as mulch, garden and soaker hoses and landscaping timber and posts.

Minimize the use of traditional pesticides by incorporating integrated pest management or using less toxic products.

Maintenance and Construction Supplies

Purchase products, such as fiber-board, insulation, floor tiles, carpet and paint, which meet the EPA-recommended recycled-content levels.

Select carpets that use fusion-bonded technology to adhere the carpet fibers to the backing, or peel-and-stick carpeting that requires no glues for installation, to reduce or eliminate VOCs.

Select energy and resource efficient products, such as low-flow bathroom fixtures and energy-efficient lighting.

If acquiring lumber for outdoor use, use recycled-content plastic lumber or wood treated with alternative, lower-toxicity wood treatments.

The EPP recommendations above cover many of the products typically purchased by correctional facilities. However, purchasing staff should include EPP considerations in their product and service specifications when making an acquisition of any kind.

Program Design

Once the desired program elements have been identified, the next step is to design how the program will be implemented and maintained. This section describes the basic components in designing a waste reduction program – collection, processing and marketing – in conjunction with disposal of the remaining waste stream. These components are interrelated. For example, available markets will impact how your recyclables need to be collected and processed. Once your program design has been developed, document it for future reference.

6.1 Onsite Collection

Each type of recyclable material included in your program can be collected separately (known as source-separation), or you can mix certain recyclables together (known as commingling). Commingling may involve mixing all paper grades together or combining all container types, or it may mean combining all recyclables. The decision of whether to source-separate or commingle will mainly be determined by the specifications of the recycler or market that will receive the material. Typically, some amount of source-separation is required and, generally, higher revenue can be obtained by source-separating all materials.

Once you decide how your recyclables are to be collected, you will need to select recycling containers and determine where to place them. The following guidelines will assist in making these decisions:

- Place containers near the point where recyclables are generated to make it convenient to partici-
- Provide labels that clearly show what is acceptable versus unacceptable. Labels should be placed where clearly visible, either on the

pate in the recycling program. For example, use desk-side containers adjacent to each employee workstation, larger paper containers next to printers and copiers, and aluminum can collection containers next to vending machines and in cafeterias and breakrooms.

- Cluster containers for recyclables and solid waste together in places where mixed waste is generated. Without a convenient place to put waste, it can end up in the recycling container. Conversely, without a convenient place to put recyclables, they can end up in the waste container.
- Size containers to match the anticipated quantity and collection frequency. For example, if serviced only weekly, a container should be large enough to hold at least one week's worth of material. If space is limited, then the frequency of service may need to be increased.
- Select containers for functionality – durable, washable, maneuverable, readily emptied and able to contain liquids and wet waste where necessary.
- Use clearly distinguishable, color-coded containers (e.g., green for recyclables, brown for organics and gray for waste) so there is no question which container is for recyclables and which is for waste.

container or directly above it. Sample labels are provided in Appendix H, which can be modified to reflect the recyclables collected in your program.

- Use container designs that limit contamination. For example, specialized lids can be used that only allow the desired material to be placed in the container (e.g., a long, narrow opening will accept paper but not aluminum cans).

Specific procedures and schedules need to be developed for collecting recyclables from individual collection containers and transporting materials to central storage and/or processing areas. In some correctional facilities, this task is conducted by inmates. In others, custodial staff is responsible for consolidating recyclables.

Putrescible organic wastes (i.e., food waste and grass clippings) need to be collected more frequently than other recyclables in order to avoid odor and pest problems. If not collected daily, food waste should be placed in wheeled carts that can be moved into a cold storage area when filled or not in use.

6.2 Onsite Processing

Processing is the action of preparing collected recyclables to transport offsite and to meet buyer's specifications. Processing is not always required; a facility may choose to market recyclables in the form in which they are collected. The decision whether to process recyclables onsite is very site-specific. Onsite processing is generally considered only when one or more of the following conditions apply:

- Processing is required to meet the market's specifications for recyclables (e.g., the buyer requires that OCC be baled).

- The facility or the facilities within a region generate sufficient quantities of recyclables to warrant the acquisition of processing equipment.
- Processing is required to facilitate storage (e.g., aluminum cans need to be crushed because of limited storage space).
- Processing decreases the transportation cost and/or increases revenue from the sale of the material.

Onsite processing is appropriate if potential transportation efficiency, increased marketability and revenue, and greater storage efficiency outweigh the costs for space, equipment and labor. Many correctional facilities utilize inmate labor to conduct the processing. Using inmates to collect and process recyclables for market not only provides an inexpensive labor force, but also results in valuable work experience and training. NYDOCS uses approximately 1,100 inmates daily in its program, and has found this useful in addressing inmate idleness and providing employment options.

6.3 Marketing Recyclable Materials

Correctional facilities may choose to contract with a full-service vendor to pick up, process and market their recyclables. If recyclables are processed onsite, they may be sold directly to a broker or end-use market. In areas where markets are scarce, recyclables may need to be self-hauled to a local recycling center. Regionalizing collection and processing efforts between several facilities will increase the quantity of materials collected and, therefore, their marketability. To assist in contracting for service, the following guidelines are provided:

Identify and survey potential markets/contractors – A number of resources are available to help you identify viable markets. FDEP maintains a list of

recycling service providers that is published in Table 14B of the Solid Waste Management in Florida annual report. The Southern Waste Information eXchange (SWIX) publishes the Directory of Dealers/Processors and Industrial Users of Recyclable Materials. County and city recycling coordinators may also be helpful in identifying local recycling markets. Appendix A provides reference and contact information for all of these options.

Select markets/contractors – Cost and revenue are not the only criteria for selecting a recycling service provider or market. You should also consider the quality of equipment, reliability of service, references from other customers and ability to offer the services you need. Potential contractors should be contacted and interviewed to determine the following:

- Materials accepted and pre-processing requirements
- Fees charged and revenues paid
- Availability and terms of storage and collection containers
- Frequency of collection service and ability to provide on-call service
- Terms and length of service contract

Negotiate and sign contracts – A written contract is recommended to ensure that services, costs and revenues conform to agreements and expectations. Contract specifications should include at a minimum:

- Description of services and equipment to be provided by the contractor
- Description of your facility's responsibilities
- Contractor recordkeeping and reporting requirements

- Materials accepted and quality standards
- Procedures for handling complaints and disputes
- Price agreement

Monitor contractor performance

– The Waste Reduction Coordinator should regularly monitor records and performance of the contractors to ensure that they are conforming to contractual requirements.

6.4 Right-sizing Disposal Containers and Service

The quickest way to realize an economic benefit from your waste reduction program is to reduce your waste hauling costs as the amount of waste you dispose of decreases. Once an effective waste reduction program has been implemented, a facility should be able to reduce the level of waste collection service provided and, therefore, the cost of this service. Collection and disposal cost savings will help offset the costs of recycling, and may result in a net savings for your facility. To “right-size” your collection service, conduct the following steps:

- Monitor any changes in the quantity of waste set out for disposal, e.g., how full the collection containers are when serviced.
- Estimate whether a smaller collection container or less frequent service would meet your waste disposal needs.
- Renegotiate your contract or service plan with your waste hauling company.

Right-sizing waste collection containers and service is an often overlooked, but essential part of making your program cost-effective.

Education and Promotion

Employee and inmate education and program promotion are critical to the success of your waste reduction program. The program will require changes in people's behavior; therefore, both initial training and ongoing encouragement are necessary.

The following general guidelines can be used to develop and implement an education and promotion program.

Demonstrate support from top management – An all-staff letter from the warden, regional manager or agency director should be used to formally announce the program and demonstrate top management's support and participation in the waste reduction program.

Establish a consistent program identity and theme – A program logo and slogan can be used to make all waste reduction program elements instantly recognizable. All printed materials should have a uniform style and consistent color-scheme.

Promote the reasons for the waste reduction program – A well-managed waste reduction program has numerous direct and indirect benefits. Employees need to know that they will be making a positive contribution in meeting facility or agency goals, protecting the environment, and helping their facility to run more efficiently.

Provide clear and simple written instructions – Written instructions must be simple and unambiguous. Pictures can often help minimize the number of words needed. When describing recycling procedures, make sure to not only identify targeted items but also list contaminants that are prohibited. Appendix H provides sample labels and flyers that may be used or modified by your facility.

Publicize the program prior to start-up – Special flyers, posters, announcements on employee bulletin boards, articles in newsletters and announcements in staff meetings are all strategies for making employees aware of the new waste reduction program before it starts.

Organize special kick-off events – To help increase pride and broad-based support for the waste reduction program, host an all-staff kick-off event. It will also give employees an opportunity to ask questions about the program and their role.

Conduct orientation training – Employee and inmate training should occur within three weeks before program start-up, so that new procedures are still fresh in people's minds.

Appoint a waste reduction monitor in each department – For large correctional facilities, a person in each department should be identified as a waste reduction monitor (this person may already be a member of the Waste Reduction Team). Employees can then be instructed to contact this person with the questions, problems or comments that will inevitably arise during start-up and operations.

Provide visual reminders and instructions at recycling and waste containers – Simple instructions and clearly marked graphics should be prominently displayed wherever recycling and waste collection containers are located.

Regular updates and reminders – Once a waste reduction program is established, ongoing promotion is too often forgotten. It is vital to continue to remind personnel and inmates about the progress and benefits of the program by distributing reminders via e-mails and newsletters. Periodic updates should publicize program success (quantities recycled, revenue received, etc.) and highlight individual initiatives. Placement of posters and signs in common areas or adjacent to copiers or printers also provides a constant reminder.

Presentations – Frequent presentations during department or all-staff meetings not only serve as reminders about the program, but also provide an opportunity for staff to ask questions about the program. Any problems with the way staff is sorting or collecting recyclables can be addressed directly, with feedback provided on how to make the program more user-friendly.

Direct communication – The Waste Reduction Coordinator will play a critical role in communicating with management and staff in a one-on-one basis. If certain areas or departments are experiencing problems, the Coordinator will need to provide direct and targeted assistance in resolving them.

Train inmates or personnel responsible for handling recyclables – The role of inmates in the waste reduction program should be clearly defined, and appropriate educational and promotional materials developed. If inmate labor is to be utilized for collect-

ing, sorting or processing materials, it may be feasible to establish a certification program for the recycling experience obtained by inmates. If facility personnel or custodial staff will be handling recyclable materials, they will also need proper training to ensure all understand the program and their responsibilities. Written job responsibilities should be updated to properly reflect modified work activities.

Incentive program – Incentive programs often provide an effective way to encourage program participation. Such a program could include individual incentives such as time-off awards or group incentives such as distribution of complimentary reusable mugs or other useful items. To be effective, incentives should be an item or benefit that is considered of value to employees or inmates.

A new waste reduction program cannot be simply turned on like a machine and expected to run smoothly. Human systems take time to adapt to new procedures and conditions. Select a start-up date far enough in the future to allow for equipment procurement, facility modifications, employee training, and preparation and distribution of education and promotion material.

Have all contracts and other external services in place at least four weeks prior to start-up. Begin education and training three to four weeks prior to the planned start-up date, including both general employees and work crews responsible for handling materials. Have all equipment in place and containers ready for distribution at least one week before the official start-up date to minimize unexpected problems and delays. Distribute containers, labels and signs immediately before the official start of the program.

Section 8

Monitoring and Reporting

Maintaining accurate records and monitoring your waste reduction program progress is important in order to evaluate the success of the program, identify any necessary program changes or improvements, and justify continued operation of the program. This information is valuable to good internal management and control because it identifies ways to increase waste reduction, improve efficiency and reduce costs.

Appendix I provides a form that can be used by correctional facilities to track the performance and costs of their waste reduction programs. It includes sections for tracking waste prevention, recycling and composting, waste disposal, and overall programs costs and benefits. The form is relatively detailed and can be modified to include those program elements that are of greatest interest or importance to your facility.

In addition to maintaining quantitative records, a facility should also monitor program operations to ensure procedures are being properly followed and to identify opportunities to increase waste reduction and/or improve efficiency. The Waste Reduction Team should consider periodic facility walk-through assessments as part of its monitoring program. Provided below are some of the key questions that should be considered when evaluating program operations:

- Are key waste prevention activities regularly followed?
- Are employees and inmates correctly using the recycling system?
- Are recycling and waste collection containers properly sized and located?

- Is the recycling collection schedule appropriate?
- What additional wastes could potentially be reduced or recovered?
- Is processing equipment being properly operated and maintained?
- Is the staff following appropriate safety procedures?
- Is more or less storage space needed to handle the quantities of recyclables diverted from disposal?
- How might processing procedures be made more efficient?
- How might the quality of recyclable materials be improved to achieve a higher price?
- Are environmentally preferable purchasing considerations regularly included in acquisition of goods and services?

At least once each year, the Waste Reduction Coordinator should report to top management on the performance of the waste reduction program. The Coordinator's report should summarize program operations, avoided costs, revenues, and capital and operational costs. The annual review should also look at your program over time using annual reports from previous years to measure your program's growth. It should describe successes, identify problems, and present recommendations for future change and improvement. This annual review will help keep your program on track, allow you to make any necessary adjustments, and maintain management support – in other words, it will help make sure your program is effective and successful.

Information Resources

Florida Department of Environmental Protection Publications and Resources

Greening Florida Government:

www.dep.state.fl.us/waste/categories/recycling/pages/GreenGovernment.htm

Solid Waste Management in Florida 2001-2002:

www.dep.state.fl.us/waste/categories/recycling/pages/01.htm

(future annual reports should also be available on FDEP's Website)

Table 14B – List of Florida's Certified Recyclers

Table 1F – County Recycling Coordinators

Table 2F – City Recycling Coordinators

Other Florida Resources

Florida Pollution Prevention Roundtable:

www.flppr.org

Florida Statutes:

www.flsenate.gov/Statutes

Recycle Florida Today, Inc.:

www.recyclefloridatoday.org/

Solid Waste Association of North America, Florida Sunshine Chapter:

www.swanaflorida.org/

Southern Waste Information eXchange (SWIX):

www.wastexchange.org

SWIX Directory of Recycled Materials Dealers and Processors:

www.wastexchange.org/publications/2003_08_SWIX_Directory.pdf

U.S. Environmental Protection Agency Publications and Resources

Cleaning Products Pilot Program & Purchasing Decision Wizards:

www.epa.gov/opptintr/epp/cleaners//select/

Comprehensive Procurement Guidelines:

www.epa.gov/cpg

Comprehensive Procurement Guidelines – Product Fact Sheets:
www.epa.gov/cpg/factshts.htm

2000 Buy-Recycled Series: Construction Products
2000 Buy-Recycled Series: Landscaping Products
2000 Buy-Recycled Series: Nonpaper Office Products
2000 Buy-Recycled Series: Paper Products
2000 Buy-Recycled Series: Park and Recreation Products
2000 Buy-Recycled Series: Transportation Products
2000 Buy-Recycled Series: Vehicular Products
2000 Buy-Recycled Series: Miscellaneous Products

Comprehensive Procurement Guidelines – Supplier Database:
www.ergweb2.com/cpg/user/cpg_search.cfm

Database of Environmental Information for Products and Services:
yosemite1.epa.gov/oppt/eppstand2.nsf

Energy Star – Products:
www.energystar.gov/index.cfm?c=products.pr_index&layout=print

Environmentally Preferable Products:
www.epa.gov/opptintr/epp/products.htm

Environmentally Preferable Purchasing:
www.epa.gov/oppt/epp

Final Guidance on Environmentally Preferable Purchasing: www.epa.gov/oppt/epp/guidance/finalguidancetoc.htm

Private Sector Pioneers: How Companies are Incorporating Environmentally Preferable Purchasing (EPA-742-R-99-001), June 1999.
www.epa.gov/oppt/epp/pubs/privsect.pdf

The documents listed below - or information on how to obtain these documents – can be found at: www.epa.gov/epaoswer/osw/publicat.htm

Business Guide for Reducing Solid Waste (EPA/530-K-92-004), November 1993.

Electronics: A New Opportunity for Waste Prevention, Reuse, and Recycling (EPA 530-F-01-006), June 2001.

It's Easy Being Green! A Guide to Planning and Conducting Environmentally Aware Meetings and Events (EPA530-K-96-002), September 1996.

WasteWise - Climate Benefits From Reducing Waste (EPA530-F-03-009), March 2003.

WasteWise Tip Sheets:

Buying or Manufacturing Recycled Products (EPA530-F-94-005), January 1994.
Recycling Collection (EPA530-F-94-004), January 1994.
Waste Prevention (EPA530-F-94-003), January 1994.

WasteWise Updates:

A Fresh Look at Packaging (EPA530-N-95-004), May 1995.
Building for the Future.
Closing the Loop (EPA530-N-97-008), December 1997.
Donation Programs: Turning Trash Into Treasure (EPA530-N-97-005), August 1997.
Electronics Reuse and Recycling (EPA530-N-00-007), October 1997.
Employee Education (EPA530-N-96-001), January 1996.
Environmental Management Systems.
Environmentally Preferable Purchasing (EPA530-N-01-002), July 2001.
Extended Product Responsibility (EPA530-N-98-007), October 1998.
Global Warming...Is A Waste.
Going Paperless with Technology (EPA530-N-96-007), June 1996.
Measuring Waste Reduction (EPA530-N-95-006), September 1995.
Moving Toward Sustainability (EPA530-N-00-002), March 2000.
Recovering Organic Wastes - Giving Back to Mother Nature (EPA530-N-99-007), September 1999.
Remanufactured Products: Good as New (EPA530-N-97-002), May 1997.
Resource Management: Strategic Partnerships for Resource Efficiency.
The Measure of Success - Calculating Waste Reduction (EPA530-N-99-003), July 1999.

Other Resources

Federal Executive Orders:

E.O 13101 - www.ofee.gov/eo/13101.htm
E.O. 13148 - www.epa.gov/ems/federal/eo13148.htm

National Recycling Coalition:

www.nrc-recycle.org

Solid Waste Association of North America (SWANA):

www.swana.org

Appendix B

Waste Assessment Form

The form provided in this Appendix can be used and adapted by your correctional facility to conduct a waste assessment. Follow the instructions in Section 4.0, and make additional copies of Parts V and VI of the form for each department or activity center in your facility, if desired.

WASTE ASSESSMENT FORM

Conducted by: _____ Phone: _____ Date: _____

I. GENERAL INFORMATION

Facility Name: _____

Address: _____

Contact Person: _____ Phone: _____

Email: _____ Fax: _____

Number of Employees: _____ Number of Inmates: _____

Facility Size (e.g., sq. feet, number of floors/depts., etc.): _____

Types of Activities (e.g., inmate housing, administration, farming, training, etc.): _____

II. CURRENT WASTE COLLECTION INFORMATION

How is waste collected within facility (e.g., custodial staff, inmates)? _____

Name of Waste Collection Company: _____

Quantity of Waste Collected/Month (if known or estimated): _____

Number & Size of Collection Containers, Collection Frequency, and Cost of Collection:
 (Indicate number of each size container/dumpster used, and complete appropriate information for each.)

# of Containers	Container Size	Frequency of Collection (times/week)	How full is Container when emptied? (on average)	Collection Costs (complete all that apply)					Quantity of Waste Collected (lbs./month)
				Monthly Container Rental Fee	Monthly Collection Fee	Fee per Pull	Disposal Fee (\$/ton)	Total Monthly Cost	
	Cans/bags								
	Carts								
	2 cy dumpster								
	4 cy dumpster								
	6 cy dumpster								
	8 cy dumpster								
	20 cy roll-off								
	30 cy roll-off								
	40 cy roll-off								
	20-40 cy compactor								
Monthly Totals									

WASTE ASSESSMENT FORM

III. CURRENT RECYCLING ACTIVITIES

How are recyclables collected in facility (e.g., custodial staff, inmates)? _____

Name of Recycling Company (or Drop-Off Location): _____

Types & Quantity of Recyclables, Collection Frequency, and Cost of Collection:

(For each type of recyclable material collected, complete the appropriate information.)

Type of Recyclable Material	Type of Collection Container	Frequency of Collection (times/week)	Collection Costs (complete all that apply)				Average Quantity Collected (lbs./month)
			Monthly Collection Fee	Processing Fee (\$/lb.)	Revenue (\$/lb.)	Total Monthly (Cost) or Revenue	
Monthly Totals							

IV. CURRENT WASTE PREVENTION ACTIVITIES

Indicate whether your facility has implemented any of the waste prevention (i.e., source reduction) activities listed below; add any additional waste prevention activities your facility currently conducts.

Waste Prevention Activity			Comments
Two-sided copying	Yes	No	
Reusing single-sided paper	Yes	No	
Reusing office supplies	Yes	No	
Reusing packaging	Yes	No	
Toner cartridge return	Yes	No	
E-mail for all employee memos/messages	Yes	No	

Volume to Weight Conversions

The table provided in this Appendix can be used as a general guide for converting volumes of solid waste or recyclable materials to weights and vice versa. The figures calculated using these conversion factors should be used only as estimates. Moisture present in the materials, differences in the way the materials are handled, how full collection containers are when serviced, and other factors can cause actual weights to differ from these calculated figures.

VOLUME TO WEIGHT CONVERSION FACTORS

Category	Material	Volume	Estimated Weight
Municipal Solid Waste	Uncompacted - loose	1 cubic yard	250 pounds
	Compacted	1 cubic yard	500 pounds
Corrugated Cardboard	Uncompacted	1 cubic yard	150-300 pounds
	Compacted	1 cubic yard	500 pounds
	Baled	1 cubic yard	1000-1200 pounds
Office Paper	Flat, uncompacted	1 cubic yard	380 pounds
	Flat, compacted/baled	1 cubic yard	755 pounds
	Crumpled, uncompacted	1 cubic yard	110-205 pounds
	Crumpled, compacted/baled	1 cubic yard	610 pounds
Newspaper	Uncompacted	1 cubic yard	360-505 pounds
	Compacted/baled	1 cubic yard	720-1000 pounds
Ferrous Cans	Whole	1 cubic yard	150 pounds
	Flattened	1 cubic yard	850 pounds
Aluminum Cans	Whole	1 cubic yard	74 pounds
	Flattened (manually)	1 cubic yard	250 pounds
PET (#1) Plastic Bottles	Whole, uncompacted	1 cubic yard	30-40 pounds
	Whole, compacted	1 cubic yard	515 pounds
HDPE (#2) Plastic Bottles	Whole, uncompacted	1 cubic yard	24 pounds
	Whole, compacted	1 cubic yard	270 pounds
Mixed PET & HDPE	Whole, uncompacted	1 cubic yard	32 pounds
Other Plastic Bottles	Whole, uncompacted	1 cubic yard	50 pounds
	Compacted/baled	1 cubic yard	400-700 pounds
Glass	Loose, whole bottles	1 cubic yard	600 pounds
		55 gallon drum	175 pounds
	Crushed (manually broken)	1 cubic yard	1000 pounds
		55 gallon drum	300 pounds
	Crushed (mechanically broken)	1 cubic yard	1800 pounds
		55 gallon drum	550 pounds
Food Waste	Solid/liquid	55 gallon drum	400-410 pounds
Yard Waste	Leaves, uncompacted	1 cubic yard	200-250 pounds
	Leaves, compacted	1 cubic yard	300-450 pounds
	Grass clippings, uncompacted	1 cubic yard	350-450 pounds
	Grass clippings, compacted	1 cubic yard	550-1500 pounds
Wood Waste	Pallets	1 pallet	30-100 pounds
	Wood chips	1 cubic yard	500 pounds
Textiles	Mixed textiles	1 cubic yard	175 pounds
Automotive Waste	Truck tire	1 tire	60-100 pounds
	Car tire	1 tire	12-20 pounds
	Used motor oil	1 gallon	7.4 pounds
	Oil filters, uncrushed	55 gallon drum	175 pounds
	Oil filters, crushed	55 gallon drum	700 pounds
	Antifreeze	1 gallon	8.42 pounds
	Lead-acid batteries, truck	1 battery	53.3 pounds
	Lead-acid batteries, car	1 battery	39.4 pounds
Miscellaneous	Fluorescent tubes	4 foot tube	0.72 pounds
	Paint	1 gallon	10 pounds
	Solvent	1 gallon	8.42 pounds

Compiled by **Kessler Consulting, Inc.** Based on information from the Solid Waste Association of North America (SWANA), National Recycling Coalition (NRC), and U.S. Environmental Protection Agency (EPA).

Waste Prevention and Reuse Options

Offices

- Recover single-sided sheets of paper for reuse in printing draft copies or as scrap paper.
- Circulate or share documents, publications and telephone books, and create a shared, centralized filing system.
- Make the minimum number of copies required, and route all-personnel memos or post them in a central location.
- Make all documents and copies double-sided whenever possible, and purchase copier machines that have this capability.
- Use interoffice e-mails in place of hard-copy memos or messages.
- Route all-staff memos and announcements or post them in a central location, such as a bulletin board.
- Store documents electronically rather than in hard copy.
- Edit and proofread documents on the computer before printing.
- Eliminate fax cover sheets by using a stamp or sticker designed for fax use.
- Fax directly from a computer to eliminate unnecessary printouts.
- Eliminate the use of thermal fax machines and switch to plain-paper fax machines.
- Collect toner cartridges for reconditioning, and purchase only reconditioned toner cartridges.
- Eliminate disposable cups by switching to reusable mugs.
- Purchase reusable items such as refillable pens and tape dispensers.
- Reuse office supplies, such as interoffice envelopes, binders, file folders, paper clips, etc. Establish a system or central location for reusable office supplies.
- Purchase durable or repairable office equipment and furniture. Consider leasing office equipment that is used infrequently.
- Purchase equipment that does not require batteries or that uses rechargeable batteries.
- Perform routine preventative maintenance on office equipment to ensure longer life.
- Repair, reupholster or refurbish furniture.
- Donate obsolete electronic equipment to local charities.

Food Preparation and Serving

- Purchase products in bulk and/or concentrated form and dispense in reusable/refillable containers (e.g., juice concentrates, beverages, frozen foods and condiments such as sugar and ketchup).
- Switch from disposable plates, cups, and eating utensils to reusable plastic products.
- Require suppliers to provide produce, meats, baked goods and dairy products in reusable crates.
- Work with suppliers to reduce or eliminate packaging where feasible.
- Practice good inventory management (first-in, first-out, limited inventory levels) to prevent spoiled and out-of-date products.
- Inspect perishable items when delivered and return spoiled and off-spec goods to the supplier.
- Track daily food production and resulting waste generation, and adjust production amounts accordingly to reduce waste.

Janitorial Services

- Purchase or request contractors to use concentrated cleaning supplies, such as detergents, to reduce packaging.
- Purchase or request contractors to use cleaning products with nontoxic constituents.

Groundskeeping Services

- Maximize use of xeriscaping.
- Use mulching mowers.
- Practice good inventory management to prevent out-of-date horticultural products.

General Recommendations

- Request suppliers to use minimal packaging or reusable shipping containers that they take back.
- Reuse cardboard boxes and packaging materials, when feasible.
- Send out all bid requests electronically or on double-sided hard copy and request that responses be submitted in the same manner without extraneous materials.
- Consider replacing paper towels with hand dryers.

Composting Fundamentals

Composting is the process of aerobically decomposing organic wastes under controlled, high-temperature conditions to produce a valuable, humus-like soil amendment, known as compost. Microorganisms decompose the organic waste and generate the heat that causes the high temperatures. Temperatures as high as 50 degrees Celsius (122 degrees Fahrenheit) are common.

The central principle of composting is to maintain optimum conditions for the microorganisms. Like human beings, they require water, oxygen and food. Eight fundamental best practices of good composting are presented below.

- *Remove inorganic contaminants.* Food waste and landscaping waste can easily become contaminated with inorganic materials. Inorganic materials do not decompose and can ruin the visual appearance of compost. Plastic bags are a common contaminant.

- *Balance carbon:nitrogen ratio.* Composting occurs best when the ratio of carbon to nitrogen (C:N ratio) is in the range of 20:1 to 40:1. In general, kitchen waste is high in nitrogen, while shredded or chipped dry landscaping waste is high in carbon. A general rule of thumb for achieving a good C:N ratio is to mix approximately one volume of kitchen waste with three volumes of dry landscape waste. If a property generates excess landscape waste, it can be stockpiled for future use or shared with other properties that generate an excess of kitchen waste.

- *Control particle size and maintain porosity.* The size of materials in the compost pile will have a direct effect on the rate of decomposition. All organic waste should be reduced to pieces no greater than five centimeters in size. This increases the amount of surface area where microorganisms can thrive. Be careful not to make composting material too small or it will tend to become compacted and prevent oxygen from getting into the pile. In addition to keeping the C:N ratio balanced, kitchen waste must be mixed with dry landscape waste to provide the physical structure that maintains porosity.

- *Mix thoroughly.* All materials must be thoroughly mixed so that the compost pile is homogeneous. First, the microorganisms need a well-mixed substrate so that they can find proper nourishment. Second, if wet kitchen waste is not well mixed with dry carbonaceous material, it can become anaerobic and generate bad odors.

- *Maintain moisture content.* The microorganisms responsible for composting require water. The ideal moisture content is between 40% and 60%. The moisture content of a compost pile can be assessed by hand. If a handful of compost material releases several drops of water when squeezed by hand, the moisture content is okay. If no water is released, it is too dry – add more water. If more water is released, it is too wet – add more dry carbon material. Kitchen waste is typically high in moisture, while landscape waste tends to have low moisture content. The appropriate moisture content must be maintained throughout the composting process.

- *Aerate.* Composting microorganisms require oxygen. If there is no oxygen present in the compost pile, it will become very smelly. Care must be taken to avoid compacting the pile. Piles or windrows may need to be turned or rebuilt periodically to reintroduce oxygen and pore space.

- *Monitor temperature.* Temperature is an effective way to monitor the health of the microorganisms. Temperature should be monitored at several points in the pile with a specialized long-stemmed thermometer. When conditions are proper, the pile temperature should remain above 40 degrees Celsius (104 degrees Fahrenheit) for at least 10 to 14 days. This will kill weed seeds and pathogens. If the compost pile does not achieve these temperatures or if temperatures decline before the pile is well decomposed, then one of the other objectives is not being met.

- *Kill weed seeds and pathogens.* To become a safe and useful product, the compost must have achieved a high enough temperature to kill weed seeds (e.g., tomato seeds from kitchen waste) and destroy human pathogens. The general guideline for killing weed seeds is to achieve temperatures of at least 60 degrees Celsius (140 degrees Fahrenheit) for a day throughout the compost pile.

Recyclable Materials

This Appendix provides descriptions of the types of materials most commonly collected for recycling. It includes a description of the material, how it is typically prepared for market, what are generally considered contaminants, and the most common end uses for the recovered material. Check with your recycling contractor or market to determine the specifications required for the materials collected in your particular program.

Cardboard

Includes cardboard boxes, brown paper bags and brown envelopes.

Preparation: Remove food, plastic film, packing materials and other contaminants. Flatten boxes and store in a dry location until collection. Cardboard may be baled onsite prior to shipping to market.

Contaminants: Food, wet cardboard, wax-coated cardboard, paperboard (e.g., cereal boxes, tissue boxes), plastic of any type, packing material (e.g., foam “peanuts”), excessive amounts of tape and any non-cardboard material.

End Use: Cardboard is used by paper mills to manufacture new cardboard, boxboard, brown paper envelopes, brown tissue paper and other products.

NOTE: Wet cardboard and wax-coated cardboard may be composted along with food waste depending on the type of composting operation.

Office Paper

Includes computer paper, copy paper, printing and writing paper, non-carbon multi-forms, envelopes, discarded mail and flip charts. This grade of paper is manufactured from chemical pulps and is typically recycled separately from newspaper.

Preparation: Depending on available markets, paper may be recycled all together as mixed paper or it may be separated into two categories: white ledger and mixed office paper. Remove paper clips, bindings, rubber bands, unacceptable types of paper and other contaminants. Place in a dedicated paper recycling container and store in a dry location until collection. Office paper may be baled onsite prior to shipping to market.

Contaminants: Carbon paper, thermal fax paper, waxed paper, paper towels, toilet paper, tissue paper, paper plates and cups, rubber bands, paper clips, bound books and any non-paper material.

End Use: Office paper is used by paper mills to manufacture new paper, paperboard, white tissue and toilet paper, and other paper products. If paper markets are non-existent or cost-prohibitive, recycled paper may be shredded and composted with food waste.

Newspaper & Magazines

Includes daily newspapers and glossy magazines. Both are produced from groundwood or thermo-mechanical pulp, and are typically recycled separately from office paper. If paper markets are non-existent or cost-prohibitive, newspaper may be shredded and composted with food waste.

Preparation: Depending on available markets, newspaper and magazines may be recycled together or separately. Some markets allow them to be mixed with office paper. Remove any plastic bags, rubber bands, unacceptable types of paper and other contaminants. Place in a dedicated recycling container and store in a dry location until collection. Newspaper and magazines can be baled onsite prior to shipping to market.

Contaminants: Carbon paper, thermal fax paper, waxed paper, paper towels, toilet paper, tissue paper, paper plates and cups, rubber bands, paper clips, bound books and any non-paper material.

End Use: Newspaper and magazines are used by paper mills to manufacture new newspaper, paperboard, molded pulp products and other paper products.

Mixed Paper

Includes a variety of paper such as discarded mail, office paper, paperboard and boxboard.

Preparation: Remove paper clips, bindings, rubber bands, unacceptable types of paper and other contaminants. Place in a dedicated paper recycling container and store in a dry location until collection. Mixed paper may be baled onsite prior to shipping to market.

Contaminants: Carbon paper, thermal fax paper, waxed paper, paper towels, toilet paper, tissue paper, paper plates and cups, rubber bands, paper clips, bound books and any non-paper material.

End Use: Mixed paper is used by paper mills to manufacture paperboard, tissue and towel paper, and other paper products. If paper markets are non-existent or cost-prohibitive, recycled paper may be shredded and composted with food waste.

Scrap Metal

Includes various types of metal such as metal furniture, used appliances, reinforcement bars, metal pipe and aluminum window frames.

Preparation: Given the wide range of sizes, shapes and grades, scrap metal commonly is consolidated into a single dedicated recycling container and stored outside until collection. Metals may be sorted by type in order to obtain greater revenue for more valuable metals.

Contaminants: Pesticide and other hazardous waste cans and any non-metallic material.

End Use: Scrap metal may be sorted into many specific grades by a professional metal recycler, and then re-melted by smelters and foundries into raw materials for casting and molding as well as a wide range of finished metal products.

Metal Cans

Includes metal containers used for food, juice, soft drinks, and paint or other finishes. There are three types of metal cans: steel, aluminum and bi-metal. Steel cans typically are coated with tin. Aluminum cans are most commonly used for single-serve beverages. Bi-metal cans typically have a steel body and an aluminum lid.

Preparation: Depending on available markets, metal cans be separated into two categories: aluminum beverage cans and all other metal cans. Rinse to remove contents. Allow paint cans to dry out completely. Depending on the market, place aluminum cans and other metal cans into two separate dedicated recycling containers or mix all cans together in a dedicated recycling container. Store in a dry location until collection.

Contaminants: Pesticide and other hazardous waste cans, cutlery, Sterno fuel cans, metal tools, power tools, appliances, batteries, metal furniture and any non-metallic material.

End Use: Metal cans may be re-melted by smelters and foundries to manufacture a wide range of metal products.

Rigid Plastic Containers

Includes a wide range of container types and plastic resins. The most common resin types used for plastic containers are:

PET (polyethylene terephthalate), Code 1 – water bottles, soft drink bottles, liquor bottles, cooking oil bottles and other food bottles; and

HDPE (high-density polyethylene), Code 2 – personal health care bottles, milk jugs, plastic oil drums, buckets, flower pots, cleaning supply bottles and outdoor furniture.

However, other resins also are used, including:

PVC (polyvinyl chloride), Code 3 – some water and liquid beverage bottles and “blister” packaging;

LDPE (low-density polyethylene), Code 4 – some types of personal health care and food products bottles;

PP (polypropylene), Code 5 – personal health care bottles, dairy tubs and containers, and plastic cutlery;

PS (polystyrene), Code 6 – expanded foam cups and tableware, and rigid packages for take-away service; and

Other, Code 7 – includes multi-resin packaging that may be used for condiments, juices, personal health care products and other items.

Preparation: Depending on available markets, plastic containers can be separated by resin type or commingled together. Remove caps and lids, and rinse to remove all contents. Store in a dry location until collection and/or processing.

Contaminants: Plastic film, tires, tubing, plastic pipe, plastic electronic equipment housing and any non-plastic material.

End Use: Plastic containers can be used to manufacture a wide range of consumer products. If they are separated by resin type and color, plastic can be recycled into higher-value products. They can be molded into new containers, planters, clothes hangers, plastic bags and a wide variety of other products. Mixed resins are generally recycled into lower-value products, such as plastic lumber, shipping pallets, car stops and speed bumps.

Textiles

Includes discarded uniforms, sheets, towels and blankets.

Preparation: Textiles may be baled or packed loose in Gaylord boxes. They must be kept dry to prevent mold and mildew, which render them non-recyclable.

Contaminants: Moisture, metal, glass, packing materials, etc.

End Use: Textiles may be reconditioned for sale or recycled into rags, light-weight stuffing, sound insulation or animal bedding.

Wood Waste

Includes wood pallets, discarded lumber, and other scrap wood from construction and demolition projects. It also includes wood materials from land-clearing projects such as trees and stumps.

Preparation: Wood pallets should be sorted into reusable and non-reusable ones. Reusable pallets may be sold to a recycler. Other pallets and clean wood waste must be separated from painted and treated wood (e.g., pressure-treated wood) for recycling. Wood waste is typically ground into chips using a tub grinder, shredder or crusher. A magnet is often used to remove metals.

Contaminants: Painted and treated wood, metal, glass, dirt, etc.

End Use: Reusable wood pallets can be reused onsite for outgoing shipments or sold to a pallet recycler. Other pallets and wood waste may be chipped for boiler fuel, wood mulch or compost bulking agent.

Electronic Equipment

Includes computers, printers, calculators, fax machines, televisions and video cassette players.

Preparation: Discarded electronic equipment should be placed in wooden crates or cardboard boxes. They may also be stacked on wooden pallets and shrink-wrapped. They are then stored in a secure, indoor area until collection.

Contaminants: Moisture, scrap metals, broken glass and non-electronic materials.

End Use: Electronic equipment is either repaired or dismantled by specialized recycling companies. Materials from dismantled equipment are recycled through a variety of markets.

Appliances

Includes cooking stoves, microwave ovens, air conditioners, refrigerators, freezers, washers and dryers.

Preparation: Discarded appliances should be stored in a secure, dry area until collection. They should be sheltered from the elements to prevent rusting.

Contaminants: Moisture, tires, piping, ductwork and any materials other than appliances.

End Use: Old appliances can be repaired or recycled by specialized scrap metal recycling companies.

Fluorescent Tubes

Includes straight 2, 4, 5 and 8-foot tubes, U-shaped tubes, compact fluorescent tubes, and T-8 tubes, which are smaller in diameter and more energy efficient than traditional fluorescent light tubes of similar length.

Preparation: Spent fluorescent light tubes are removed from light fixtures and packaged in cardboard boxes specifically designed for the individual tube types to prevent breakage. Boxes are stored in a designated area and properly labeled. When full, the collection box is shipped to the designated recycler.

Contaminants: Broken bulbs, other glass, incandescent lights, etc.

End Use: Tubes are crushed under negative pressure and the mercury-containing calcium phosphate powder is separated into a storage container. The glass and aluminum end caps are segregated and marketed. The powder is distilled to recover the mercury.

Rechargeable Batteries

Includes the following rechargeable battery chemistries: nickel cadmium (Ni-Cd), nickel metal hydride (Ni-MH), lithium ion (Li-ion), and small sealed lead (Pb). Look for the Battery Recycling Seal on the battery. These batteries are commonly found in cordless power tools, cellular and cordless phones, laptop computers, digital cameras, two-way radios, camcorders, bar code readers, PDAs and remote-control toys.

Preparation: The Rechargeable Battery Recycling Corporation (RBRC) will provide collection boxes that include pre-paid, self-addressed shipping labels, safety instructions, and plastic bags for each used battery. Once full, the collection box is shipped to the RBRC. (RBRC may pay for shipping for public agencies.)

Contaminants: Alkaline batteries, automotive/motorcycle batteries, etc.

End Use: Metals are recovered for use in new products. Cadmium is used to make new batteries; nickel and iron are used to make stainless steel products.

Motor Oil

Includes lubricating oil from diesel- and gasoline-powered motors and engines, such as automobiles, electrical generators, pumps, desalinization units, air compressors and blowers. Motor oil poses a serious environmental threat to surface and ground water if it is not contained and properly handled.

Preparation: Motor oil should be drained into dedicated leak-proof containers. Containers can be stockpiled until collection. Small amounts of inert material such as metal fining need not be removed.

Contaminants: Water, large particulates and any non-oil substance.

End Use: Used motor oil is refined and used to manufacture a wide variety of lubricants including re-refined motor oil.

Automotive Waste

Other wastes generated from automotive maintenance and repair include transmission fluid, oil filters, transmission and fuel filters, lead-acid batteries, coolant, tires, rags, and paint waste.

Preparation: Liquids should be stored in dedicated leak-proof drums. Used oil filters should also be stored in a leak-proof drum. Lead-acid batteries should be stacked on a pallet or otherwise stored according to recycler instructions.
Contaminants: Each of the various materials needs to be source-separated and not mixed with any others.

End Use: These are dependent on the specific materials being recovered. Oil filters are recycled as scrap metal. Lead-acid batteries are de-constructed, the acid re-conditioned, the lead cells recycled, and the plastic casing recycled.

EPA's Recommended Recycled-Content Levels

Recycling is a three-part process, as represented by the three chasing arrows of the Recycling Logo:

- 1) Collecting recyclable materials
- 2) Processing and manufacturing these recovered materials into new products
- 3) Buying products made with recycled-content

Each section of the recycling loop depends upon the others, so when you buy recycled content products, you are “closing the loop.” Purchasing recycled content products helps maintain or increase the demand for the materials you collect in your facility’s recycling program.

The U.S. Environmental Protection Agency (EPA) has set recommended recycled-content levels for numerous products, which are provided in the following table. These guidelines are based on market research identifying recycled-content products that are commercially available, are priced competitively with virgin products, and meet buyers’ quality standards.

Recycled-content products may contain either pre-consumer or post-consumer recovered materials, or both.

Pre-consumer recovered materials are materials that result from manufacturing, such as leftover scraps, damaged items or overruns. For example, newspaper overruns have traditionally been collected and incorporated into the manufacture of new newsprint. Pre-consumer materials are usually clean, abundant and easily collected for recycling.

Post-consumer recovered materials are those that are collected from a business or consumer after a product has served its intended use. These materials are generally not as clean or as easily collected as pre-consumer materials. Whenever possible, preference should be given to the use of products with post-consumer content, because these have the greatest impact on diverting materials from the waste stream.

EPA'S RECOMMENDED RECYCLED CONTENT LEVELS

Item	Description	Recycled Content (%)	Consumer Content (%)
<i>Printing and Writing Papers</i>			
Reprographic	Business papers such as bond, electrostatic, copy, mimeo, duplicator, and reproduction	30	30
Offset	Used for book publishing, commercial printing, direct mail, technical documents, and manuals	30	30
Tablet	Office paper such as note pads and notebooks	30	30
Forms bond	Bond type papers used for business forms such as continuous, cash register, sales book, unit sets, and computer printout, excluding carbonless	30	30
Envelope	Wove	30	30
	Kraft, white and colored (including manila)	10-20	10-20
	Kraft, unbleached	10	10
Cotton fiber	High-quality papers used for stationery, invitations, currency, ledgers, maps, and other specialty items	30	30
Text and cover	Premium papers used for cover stock, books, and stationery and matching envelopes	30	30
Supercalendered	Groundwood paper used for advertising and mail order inserts, catalogs, and some magazines	10	10
Machine finished groundwood	Groundwood paper used in magazines and catalogs	10	10
Papeteries	Used for invitations and greeting cards	30	30
Check safety	Used in the manufacture of commercial and government checks	10	10
Coated	Used for annual reports, posters, brochures, and magazines. Have gloss, dull, or matte finishes	10	10
Carbonless	Used for multiple-impact copy forms	30	30
File folders	Manila or colored	30	30
Dyed filing products	Used for multicolored hanging folders and wallet files	20-50	20
Index and card stock	Used for index cards and postcards	50	20
Pressboard	High-strength paperboard used in binders and report covers	50	20
Tags and tickets	Used for toll and lottery tickets, licenses, and identification and tabulating cards	20-50	20
<i>Newsprint</i>			
Newsprint	Groundwood paper used in newspapers	20-100	20-85
<i>Commercial Sanitary Tissue Products</i>			
Bathroom tissue	Used in rolls or sheets	20-100	20-60
Paper towels	Used in rolls or sheets	40-100	40-60
Paper napkins	Used in food service applications	30-100	30-60
Facial tissue	Used for personal care	10-100	10-15
General purpose industrial wipes	Used in cleaning and wiping applications	40-100	40

EPA'S RECOMMENDED RECYCLED CONTENT LEVELS

Item	Description	Recycled Content (%)	Consumer Content (%)
<i>Paperboard and Packaging Products</i>			
Corrugated containers	Used for packaging and shipping a variety of goods		
	<300 psi	25-50	25-50
	300 psi	25-30	25-30
Solid fiber boxes	Used for specialized packaging needs such as dynamite packaging and army ration boxes	40	40
Folding cartons	Used to package a wide variety of foods, household products, cosmetics, pharmaceuticals, detergent, and hardware	100	40-80
Industrial paperboard	Used to create tubes, cores, cans, and drums	100	45-100
Miscellaneous	Includes "chipboard" pad backings, book covers, covered binders, mailing tubes, game boards, and puzzles	90-100	75-100
Padded mailers	Made from kraft paper that is usually brown but can be bleached white	5-15	5-15
Carrierboard	A type of folding carton designed for multipack beverage cartons	10-100	10-15
Brown papers	Used for bags and wrapping paper	5-40	5-20
<i>Miscellaneous Paper Products</i>			
Tray liners	Used to line food service trays.	100	50-75
<i>Non-Paper Office Products</i>			
Recycling containers & waste receptacles	Plastic	-	20-100
	Steel	25-30	16
	Corrugated	25-50	25-50
	Solid fiber boxes	-	40
	Industrial paperboard	100	40-80
Plastic desktop accessories	Includes polystyrene desk organizers, sorters, trays, and memo, note, and pencil holders	-	25-80
Binders	Plastic-covered	25-50	-
	Paper-covered	90-100	75-100
	Pressboard	50	20
	Solid HDPE plastic	90	90
	Solid PE plastic	30-50	30-50
	Solid PET plastic	100	100
	Miscellaneous plastic	80	80
Trash bags	Plastic	-	10-100
Envelopes	Plastic	25-35	25
Plastic clipboards	HDPE	90	90
	PS	50	50
	Miscellaneous plastic	15-80	15
Plastic file folders	HDPE	90	90
Plastic clip portfolios	HDPE	90	90
Plastic presentation folders	HDPE	90	90

EPA'S RECOMMENDED RECYCLED CONTENT LEVELS

Item	Description	Recycled Content (%)	Consumer Content (%)
Landscaping Products			
Hydraulic mulch	Paper	-	100
	Wood/paper	100	-
Hoses	Garden hose of rubber and/or plastic	-	60-65
	Soaker hose of rubber and/or plastic	-	60-70
Lawn & garden edging	Rubber and/or plastic	30-100	30-100
Landscaping timber & posts	HDPE	75-100	25-100
	Mixed plastic/sawdust	100	50
	HDPE/fiberglass	95	75
	Other mixed resins	95-100	50-100
Construction Products			
Structural fiberboard		80-100	-
Laminated paperboard	Post-consumer paper	100	100
Insulation	Rock wool insulation made from slag	75	-
	Fiberglass insulation made from glass cullet	20-25	-
	Cellulose insulation (loose-fill or spray-on) made from post-consumer paper	75	75
	Perlite composite board insulation made from post-consumer paper	23	23
	Rigid foam insulation	9	-
	Foam-in-place insulation	5	-
	Glass fiber reinforced insulation	6	-
Floor tiles (heavy-duty commercial use)	Rubber	-	90-100
	Plastic	90-100	-
Patio blocks	Rubber or rubber blends	-	90-100
	Plastic or plastic blends	90-100	-
Carpet fiber face	PET resin	25-100	25-100
Latex paint	Consolidated paint where color and consistency of performance are not primary concerns	100	100
	Reprocessed - white, off-white, pastel colors	20	20
	Reprocessed - grey, brown, earthtones, other dark colors	50-99	50-99
Shower & restroom partitions	Plastic	20-100	20-100
	Steel	25-100	16-67
Carpet cushion	Bonded polyurethane made from old carpet cushion	15-50	15-50
	Jute made from burlap	40	40
	Synthetic fibers made from carpet fabrication scrap	100	-
	Rubber made from tire rubber	60-90	60-90
Railroad grade crossing surfaces	Concrete made from coal fly ash	15-20	-
	Rubber made from tire rubber	85-95	-
	Steel	25-100	16-67

Notes:

(1) When buying recycled-content products, specify that you want a product "containing X percent recovered material including Y percent post-consumer material."

(2) Recovered and post-consumer fiber content should be measured as a percentage for the weight of all fiber in the paper, not as a percentage of the total weight. (The total weight also includes the weight of dyes, fillers, and water used in the manufacturing process.)

Sample Labels and Flyers

The labels and flyers provided in this Appendix are intended to serve as samples. For example, you may wish to modify them based on the types of recyclables collected at your facility and how they are collected, to include your program's logo or slogan, or to describe your specific collection procedures and waste prevention activities.















White Paper

Papel Blanco

- *White paper*
- *Plain white envelopes (no windows)*
- *White file cards*
- *White scratch-pad paper*
- *White loose-leaf paper*

No napkins, paper towels, or other contaminated paper.



Mixed Paper

Papel Mezclado

- *Colored & glossy paper*
- *Computer paper*
- *Envelopes (windows OK)*
- *File folders*
- *Fiberboard, including backing from paper pads*
- *Empty paper towel cones*

*Staples are OK!
But remove paper clips and binder clips.*





Mixed Paper

Papel Mezclado

- *Colored & glossy paper*
- *Computer paper*
- *Envelopes (windows OK)*
- *File folders*
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No napkins, paper towels, or other contaminated paper.



***Staples are OK!
But remove paper clips
and binder clips.***

WASTE PREVENTION CHECKLIST

Your Participation = Program Success

- Make double-sided copies (duplexing) whenever possible.
- Recover single-sided sheets of paper for reuse in printing draft copies or as scrap paper.
- Make the minimum number of copies required.
- Reuse office supplies, such as interoffice envelopes, binders, file folders, paper clips, etc. Establish a system or central location for reusable supplies.
- Use interoffice email in place of hard copy memos or messages.
- Route all-personnel memos and announcements or post them in a central location, such as a bulletin board.
- Circulate or share documents, publications, and telephone books and create a centralized filing system.
- Edit and proofread documents on the computer, before printing.
- Ask that your name or your office be removed from unwanted junk mail lists.
- Eliminate fax cover sheets, place important information on the first page.
- Store documents electronically rather than in hard copy form.
- Reuse old cardboard boxes for storing necessary files.
- Collect toner cartridges for reconditioning.
- Properly maintain office equipment to maximize its dependable, useful life.
- Donate surplus magazines, old office equipment, or furniture.
- Use reusable mugs, plates, utensils, and containers, as opposed to disposable ones.
- When recommending products to be purchased, look for the following:
 - Recycled Content
 - Energy Efficiency
 - Durability/Warranty
 - Leasing Options
 - Reusable/Refillable Products
 - Nontoxic Products
 - Opportunities to Buy in Bulk
 - Take Back Options
- Think Reduce, Reuse, and Recycle in all of your office activities!**

INSERT
YOUR
LOGO

RECYCLING INSTRUCTION SHEET

Your Participation = Program Success



White Office Paper / Papel Blanco

White Paper includes: White copier, loose-leaf, & notepad paper, white file cards & envelopes. Place White Paper in your desk-side bin, or in the designated bins next to all printers and copiers and in Central Recycling Areas. Remove all paper clips or binders, but staples are OK.



Mixed Paper / Papel Mezclado

Mixed Paper includes: Colored paper, magazines, junk mail, paper bags, file folders, envelopes, fiberboard, & construction paper. Place Mixed Paper in your desk-side bin, or in the designated bins next to all copiers and printers and in Central Recycling Areas. Remove all paper clips or binders, but staples are OK.



Commingled Containers / Envases

Place all empty Aluminum and Steel Cans, Plastic Containers, and Milk or Juice Cartons in the designated bins located in break rooms and Central Recycling Areas.



Corrugated Cardboard / Caja del Cartón

Take all flattened Corrugated Cardboard Boxes to the designated collection locations in your Central Recycling Area. To identify Corrugated Cardboard, look for the waffle-like ridges, but no wax coating allowed.



Newspaper / Periódicos

Place all Newspapers in the designated bin located in your Central Recycling Area.



Textiles / Textiles

Linens and Blankets that can no longer be used should still be sent to the laundry. From there, they will be recycled into animal bedding.



Scrap Metals / Metales de los Pedacitos

Scrap Metals, including Steel, Copper, and Tin, should be placed in the designated container in the loading dock area.

For More Information Contact: _____ **at** _____

Waste Reduction Program Tracking and Reporting Form

The form provided in this Appendix can be used to track and report on the performance and costs of your waste reduction program. It includes sections for tracking waste prevention, recycling and composting, waste disposal, and overall programs costs and benefits. The form is relatively detailed and can be modified to include those program elements that are of greatest interest or importance to your facility.

WASTE REDUCTION PROGRAM TRACKING & REPORTING FORM

I. Waste Prevention

Facility Name:	
Facility ID Number:	
Contact Name:	
Phone Number:	
Reporting Period:	

Waste Prevention Savings:

Instructions : list waste prevention activities, and enter the following information in the appropriate column: the units for measuring waste prevention, the weight per unit in pounds, the cost per unit in dollars, and the number of unit purchases that were prevented during the year.

Waste Prevention Activity/Material	Unit	Pounds /Unit	\$/Unit	Units Prevented	Pounds Prevented	Savings
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
					0	\$ -
Total					0	\$ -

Examples of Waste Prevention:

Waste Prevention Activity/Material	Unit	Pounds /Unit	\$/Unit	Units Prevented	Pounds Prevented	Savings
Double-sided Copying	Reams of Paper	1.3	\$ 0.89	32	41.6	\$ 28.48
Switch to Ceramic Coffee Mugs	1000 Plastic Cups	3.5	\$ 7.50	3	10.5	\$ 22.50
Total					52.1	\$ 50.98

WASTE REDUCTION PROGRAM TRACKING & REPORTING FORM

II. Recycling & Composting

Facility Name:		Contact Name:	
Facility ID Number:		Phone Number:	
Reporting Period:			

Quantity Recycled or Composted:

Instructions: list materials that are recycled/composted and enter pounds for each month.

Materials	Pounds												Year to Date	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
														0
														0
														0
														0
														0
														0
														0
														0
														0
														0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Recycling/Composting Revenue:

Instructions: list materials that are sold and enter revenue received for each month.

Materials	Dollars												Year to Date	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

WASTE REDUCTION PROGRAM TRACKING & REPORTING FORM

III. Waste Disposal

Facility Name:		Contact Name:	
Facility ID Number:		Phone Number:	
Reporting Period:			

Quantity Disposed:

Instructions : list disposal methods and enter pounds disposed for each month.

Disposal Method ¹	Pounds ²												Year to Date	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
														0
														0
														0
														0
														0
														0
														0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Disposal Cost:

Instructions : list disposal methods and enter disposal cost for each month.

Disposal Method ¹	Dollars												Year to Date	
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
														\$ -
Total	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

¹ Examples of possible disposal methods: trash compactor, dumpsters, roll-off container, & trash truck.

² To convert cubic yards of solid waste into pounds, use the conversion factors in Appendix C, the frequency of service, and estimate the fullness of the container.
 For example, an 8-cubic yard dumpster serviced weekly that is 3/4 full = 8 cy/pickup x 250 lbs./cy x 75% x 4.3 pickups/month = 6,450 pounds of solid waste

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WASTE REDUCTION PROGRAM TRACKING & REPORTING FORM

IV. Annual Costs & Cost Savings

Facility Name:	
Facility ID Number:	
Contact Name:	
Phone Number:	
Reporting Period:	

Annualized Capital Costs (straight line depreciation):

Instructions : list capital items purchased for the waste reduction program and enter the following information in the appropriate column: how many were purchased, the cost per unit in dollars, the life expectancy in years, and percent that the item is dedicated to the waste reduction program.

Item	Quantity	\$/Unit	Useful Life	% to Program	Annual Cost
Total Cost					

Operating Costs:

Instructions : list operating cost items for the waste reduction program and enter the following information in the appropriate column: how much was used, the unit for measuring the item, the cost per unit in dollars, and the percent that the item is dedicated to the waste reduction program.

Item	Quantity	Unit	\$/Unit	% to Program	Annual Cost
Labor: _____					
Labor: _____					
Electricity					
Fuel					
Supplies					
Other: _____					
Total Cost					

Disposal Cost Savings:

Instructions : list tons of waste reduced due to waste prevention, recycling, and composting activities.

	Tons
Waste Prevention	
Recycling & Composting	

Average Disposal Cost/Ton	\$ -
Disposal Cost Savings	\$ -

Other Cost Savings:

Instructions : list other cost savings due to waste prevention, recycling, and composting activities, and estimate the annual savings in waste management costs.

Item	Annual Savings
Other Cost Savings	\$ -

Examples of Other Savings:

Item	Annual Savings
Switch to smaller compactor	\$ 1,200.00
Reduced waste collection labor	\$ 3,000.00
Other Cost Savings	\$ 4,200.00

WASTE REDUCTION PROGRAM TRACKING & REPORTING FORM

V. Annual Cost-Benefit Analysis

Facility Name:	
Facility ID Number:	
Contact Name:	
Phone Number:	
Reporting Period:	

Waste Reduction Program Costs & Benefits:

Instructions: enter annual costs and savings from previous worksheets.

Item	Cost	
Annualized Capital Cost		
Operating Cost		
		Benefit
Recycling/Composting Revenue		
Waste Prevention Savings		
Disposal Cost Savings		
Other Cost Savings		
Subtotal	\$ -	\$ -

Annual Cost (Benefit)	\$ -
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Instructions: enter quantities of waste for each item.

Total Waste Generated	Tons
Waste Prevention	
Recycling/Composting	
Waste Disposal	

Waste Reduction Rate	-
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Per Ton Annual Cost (Benefit)	\$ -
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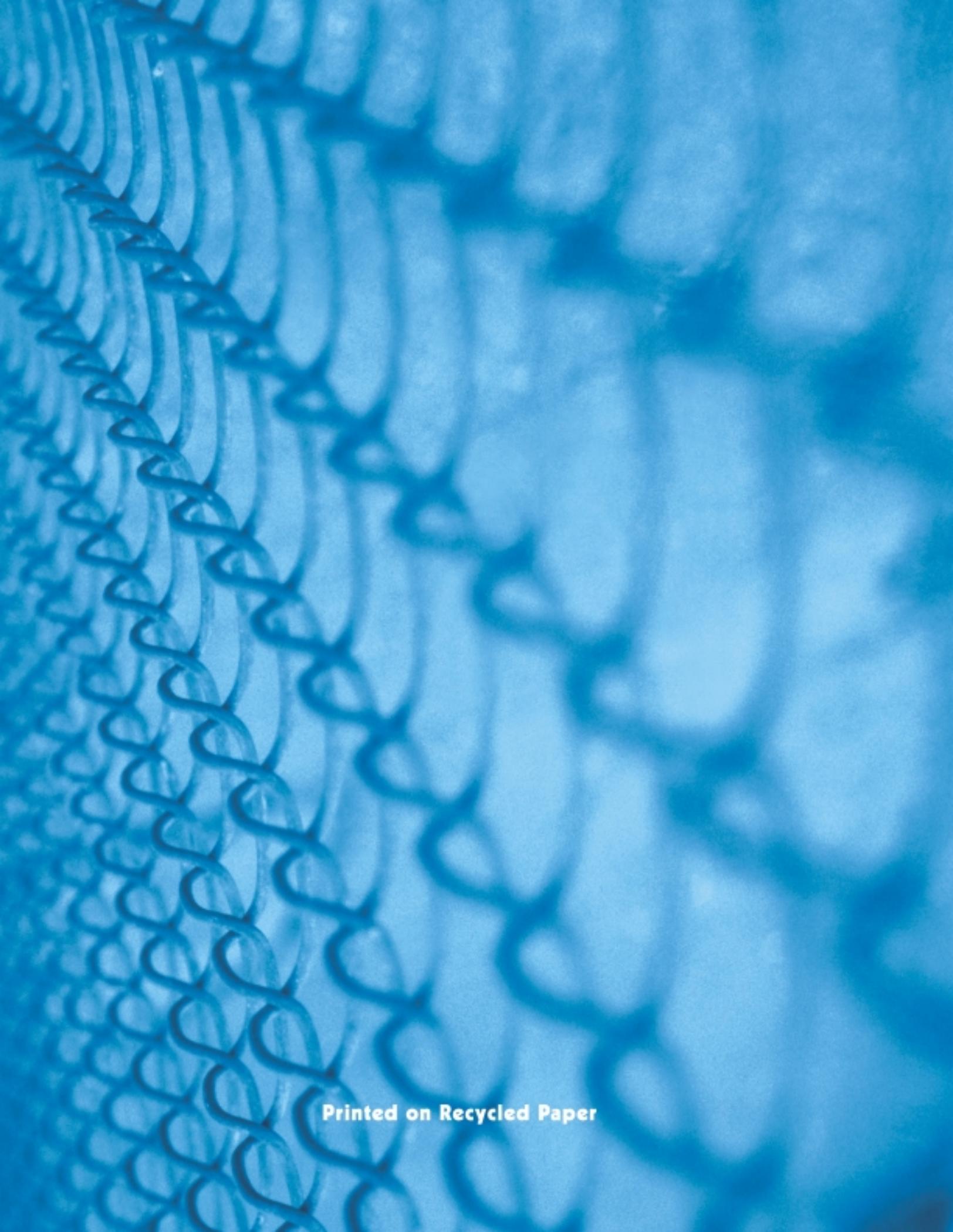
Non-Cost Factors:

Instructions: List other costs and benefits of the waste reduction program, and assess each one's relative impact.

Item	Program Impact ¹

¹ Rank impact qualitatively:
 "- ." = major cost; " - " = minor cost
 " 0 " = no impact
 "+ +" = major benefit; " + " = minor benefit

Notes



Printed on Recycled Paper