

US EPA ARCHIVE DOCUMENT



Reducing Wasted Food & Packaging: A Guide for Food Services and Restaurants

United States Environmental Protection Agency

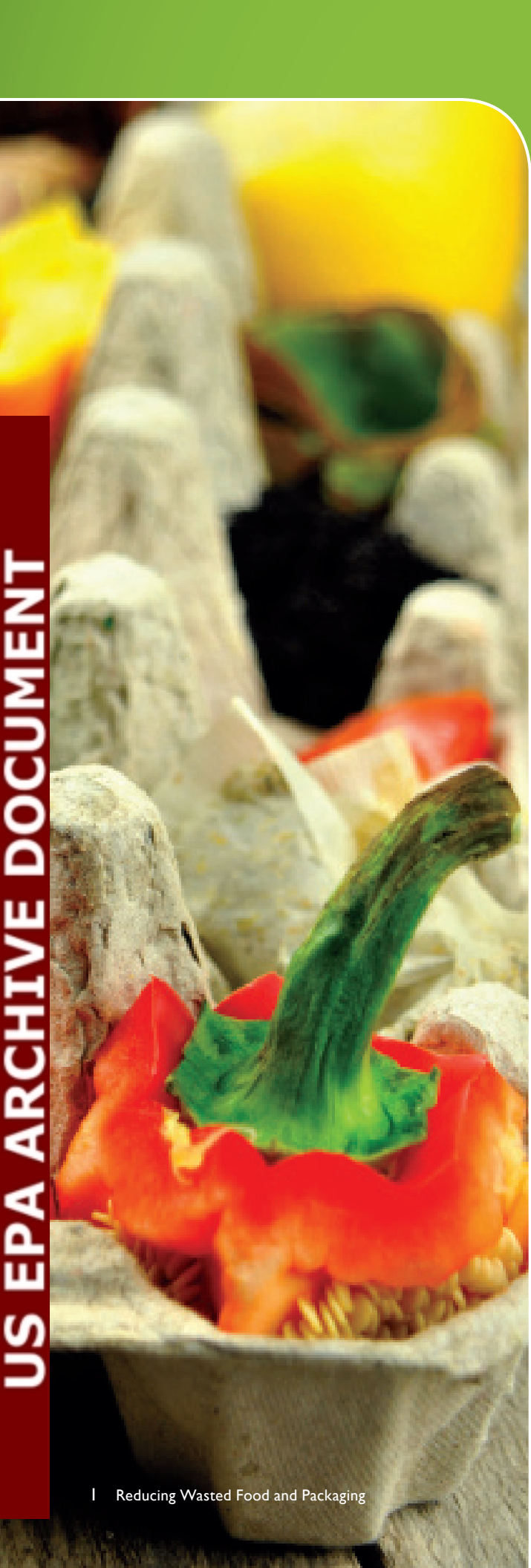


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This toolkit is designed to:

Help food service establishments and commercial kitchens save money by reducing wasted food and packaging with suggested strategies, templates and case studies.

Introduction

Why Reduce Wasted Food and Packaging?

Together, food and packaging/containers account for almost 45% of the materials landfilled in the United States, and some of these discarded materials are food-related packaging and containers. To reduce food reaching landfills, save money, and help communities, the U.S. Environmental Protection Agency started the Food Recovery Challenge. The Challenge is part of EPA's Sustainable Materials Management Program, which seeks to reduce the environmental impact of materials through their entire life cycle.

Food service establishments generate a significant amount of wasted food and packaging. Between 4 and 10 percent of food purchased by food service operations in the U.S. is thrown out before reaching the plate.¹ By reducing the amount of food and packaging discarded, they can significantly reduce their waste stream and save money.

Benefits of Reducing Wasted Food and Packaging

- Save money by reducing over-purchasing and disposal costs
- Reduce environmental impacts
- Support efforts to eliminate hunger
- Reduce health and odor concerns with food disposal
- Support community waste reduction efforts
- Increase tax benefits by donating food

Did you know that...

In 2010, over 33 million tons of food reached landfills in the U.S. – equivalent to half a pound per person per day – or enough food to fill the Rose Bowl Stadium every day.

(Bloom, 2010. American Wasteland. www.americanwastelandbook.com). [This link is for informational purposes only and does not imply endorsement by EPA.]

¹ LeanPath, www.leanpath.com/resources/food-waste-stats/. [This link is for informational purposes only and does not imply endorsement by EPA.]

Saving Food Saves Money



Reduce Over-Purchasing Costs through Waste Prevention



Reduce Labor Costs & Increase Staff Efficiency



Reduce Disposal Costs

Reasons to Reduce Wasted Food

Reason 1: Wasting food costs money

Wasted food costs the commercial food service industry roughly \$100 billion annually.² Reducing wasted food and packaging can save money by reducing not only disposal costs but also over-purchasing, labor, and energy costs. Additionally, food service establishments can receive tax benefits from donating wholesome, edible food to food banks or food rescue organizations.

Reason 2: Wasting food is unnecessary

Not all food that reaches landfills is inedible. Wasted food can be divided into three categories:

Avoidable: Food that can be easily prevented from going to waste. Reasons for waste include overpreparation, improper storage, or spoilage. Understanding the cause of this waste is key to preventing it. *Example: An entire tray of lasagna is left over every day at a buffet.*

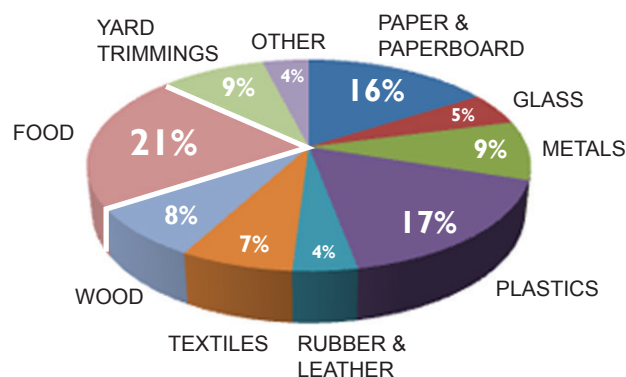
Possibly avoidable: Food that may seem inedible but can be used or repurposed. *Example: Beet tops can be cooked similarly to collard greens or spinach instead of discarded. Also, slightly stale bread can be used for croutons or bread crumbs.*

Unavoidable: Food that cannot be consumed by people and should be used for animal feed, compost, or anaerobic digestion. *Example: Banana peels and peach pits.*

Reason 3: Wasting food has environmental impacts

Unprecedented amounts of food are wasted in the United States. In fact, more food reaches landfills and incinerators than any other single component of municipal solid waste (MSW). In 2010 alone, more than 34 million tons of wasted food were generated, with a meager three percent of this diverted from landfills and incinerators to composting (see Figure 1). The damaging environmental effects of wasted food start with food rotting in landfills, which releases methane, a greenhouse gas (GHG) 21 times more potent than carbon dioxide. Thirteen percent of GHG emissions in the United States result from the growth, manufacturing, sale, transportation, and disposal of food. Additionally, large amounts of water and other resources are needed to grow and process food. More than a quarter of the total freshwater consumption per year in the United States is used to grow wasted food.³ Reducing discarded food avoids wasting the water, oil, and other natural resources that go into growing and delivering food.⁴

Figure 1. Percent of Total Waste Generation and Disposal of Municipal Solid Waste in the U.S. in 2010



² Bloom. 2010. American Wasteland. www.americanwastelandbook.com. [This link is for informational purposes only and does not imply endorsement by EPA.]

³ Hall et al. 2009. "The Progressive Increase of food waste in America and its environmental impacts."

⁴ U.S. EPA – www.epa.gov/oswer/docs/ghg_land_and_materials_management.pdf

Reasons to Reduce Wasted Packaging

Containers and packaging alone contribute over 23% of the material reaching landfills in the U.S., and some of these discarded materials are food-related containers and packaging. Additionally, packaging makes up a majority of the litter that ends up on our beaches and other waterways. This is a problem because fish, birds, and other aquatic wildlife are often harmed by ingesting plastic bags and other debris from packaging. Waste in the ocean also causes navigation hazards for boats and results in losses to the shipping, fishing, and tourism industries.

Did you know that...

Eliminating packaging can conserve energy and reduce greenhouse gas emissions. You can calculate the greenhouse gas impacts of reducing, recycling, and composting your organization's packaging using EPA's Waste Reduction Model (WARM) at www.epa.gov/WARM

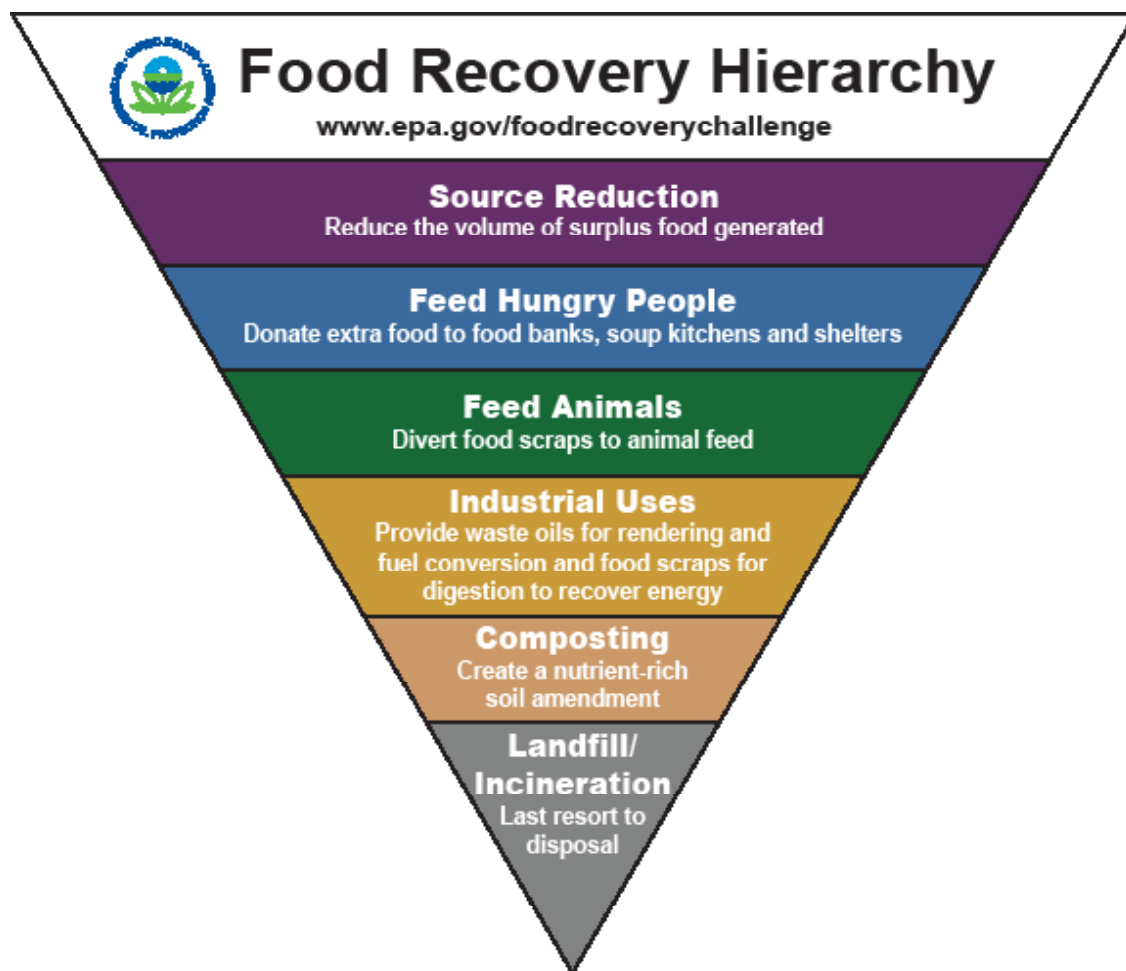
Ways to Reduce Wasted Food and Packaging

The Food Recovery Hierarchy (see Figure 2) identifies the preferred options for handling excess food. Listed in order from the most preferred (source reduction) to the least preferred (landfilling/incineration), these activities help reduce the environmental impact of wasting food.

Similar to the Food Recovery Hierarchy, the three main packaging reduction strategies are:

1. Source reduction or preventing waste before it is created;
2. Reuse; and
3. Recycling/Composting.

Figure 2. Food Recovery Hierarchy





Reducing Wasted Food and Packaging: Strategy Checklist

This checklist identifies common strategies that can be used by food service establishments to reduce their wasted food and packaging. Some strategies are applicable for all types of food service establishments and others are specific to certain venue types. Choose strategies based on the opportunities that exist at your facility. Tracking food waste is always the first step.

All Food Service Venues

- ☐ Conduct a wasted food and packaging assessment using the EPA's Food and Packaging Waste Prevention Tool or another waste tracking tool
- ☐ Adjust food purchasing policies to reduce excess food purchasing
- ☐ Use just-in-time purchasing software to reduce unnecessary purchasing
- ☐ Adjust menus to reduce frequently uneaten or wasted items
- ☐ Train staff to reduce prep waste and improper cooking (for example, refine knife skills to have more efficient food preparation)
- ☐ Modify food preparation methods to minimize waste (for example, heat soups or prepare food in smaller portions)
- ☐ Store food properly to reduce spoilage
- ☐ Use reusable service ware instead of disposable service ware
- ☐ Purchase items in bulk to reduce packaging
- ☐ Donate excess food

Buffet

- ☐ Identify which buffet items are regularly wasted and reduce the quantity of those items prepared
- ☐ Implement tray-less system
- ☐ Reduce serving utensil size

Made-to-Order

- ☐ Repurpose leftover kitchen food following food safety guidelines (for example, reuse day-old bread for croutons or leftover vegetables as a pizza topping)

Grab-and-Go

- ☐ Identify which grab-and-go items are not regularly being purchased and reduce the quantity of those items prepared
- ☐ Reduce to-go item packaging
- ☐ Use packaging that is compostable or recyclable
 - Find out what can be recycled and composted in your area. Note that some compostable packaging on the market today is not suitable for backyard composting.
 - Work with your local government to expand recycling and composting services.

Menu-Driven

- ☐ Identify which menu items are being wasted on a regular basis and reduce the quantity or portions of those items prepared
- ☐ Repurpose leftover kitchen food following food safety guidelines (for example, reuse day-old bread for croutons or leftover vegetables as a pizza topping)

Quick Service

- ☐ Use recyclable or compostable packaging
 - Find out what can be recycled and composted in your area. Note that some compostable packaging on the market today is not suitable for backyard composting.
 - Work with your local government to expand recycling and composting services.



Step One To Reducing Your Waste: Tracking and Assessing

The first step in reducing waste is to measure and track the amount, type of, and reason for the food and packaging being discarded. A thorough food and packaging assessment serves as the foundation for reduction efforts. It is important to understand more than simply the quantity of total waste generated to create targeted and successful interventions that reduce wasted food and packaging. Information on the waste type (for example, bell peppers or chicken breast) and reason for loss (for example, overpreparation or improper cooking) is important to make meaningful changes. Additionally, tracking when the material is generated can also provide useful information to target specific causes for wasted food and packaging.

A variety of auditing methods and tools can be used to determine how much, when, and why wasted food and packaging is being generated. Food waste tracking options include:

EPA's Food and Packaging Waste Prevention Tool

- Free
- Tracks both wasted food and packaging
- Mixture of daily paper tracking and a spreadsheet that automatically generates graphs and data summary based on inputs

Paper Logs

- Free
- Tracks both wasted food and packaging
- Requires effort to identify patterns of how much and why waste is being generated

Automated Tracking Systems

- Tracks only wasted food
- Uses software and hardware to easily track wasted food and identify patterns of waste generation

How Does EPA's Food and Packaging Waste Prevention Tool Work?

This tool is available to help measure and categorize both wasted food and packaging.

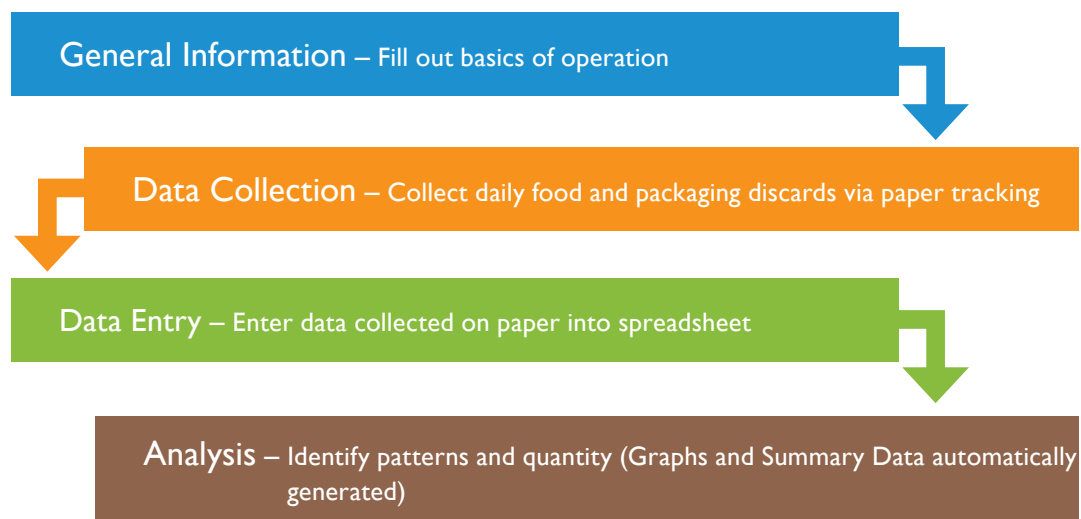
Types of waste tracked:

- Kitchen (Back-of-the-House)
- Packaging
- Plate (Front-of-the-House)

It can help measure:

- Amounts and types of wasted food and related packaging;
- Primary causes of waste generation; and
- Patterns of waste generation (through automatically generated graphs and summary data).

Steps to Using the Tool



The Food and Packaging Waste Prevention Tool allows flexibility for the user to track waste generated at varying levels of detail (e.g., protein vs. steak, chicken, pork chop) depending on available resources and goals of the assessment. More information on how to use the Food and Packaging Waste Prevention Tool and how to adapt the tool can be found on the EPA website.

Table 1: Tracking Example: Results from the Food and Packaging Waste Prevention Tool
(weekly pounds of wasted food)

Kitchen Food Waste	Prep Waste	Improperly Cooked	Stored Food Expired	Arrived Spoiled	Food Sent Back by Customer
Protein	0	5	33	0	0
Grain	6	1	0	0	0
Fruit and Vegetables	8	0	5	16	0
Dairy	3	0	0	0	0
Other	0	0	0	0	0
TOTAL	17	6	38	16	0

Background: This example shows wasted food type with respect to why the food was discarded. This information would be automatically generated in the Summary Data portion of the tool after data entry.

Tracking Analysis: The results in Table 1 show that there is more expired stored protein generated than any other category and that there is a significant amount of fruit and vegetables arriving spoiled.

Solutions: If these are consistent trends, the ordering manager should purchase less protein so that it doesn't spoil and work with the produce supplier to ensure that produce arrives fresh or, if needed, change suppliers.

After tracking and assessing your waste, appropriate strategies can be implemented to save money and reduce waste and its environmental impacts. The following pages outline these strategies in hierarchical order to help achieve the best results.



What is Source Reduction?

Source reduction, or waste prevention, is the most effective way of reducing the environmental impact of wasted food and packaging because it prevents unneeded materials from ever being created. Waste prevention saves the most money by reducing purchasing costs, handling costs, and disposal fees!

Benefits include:

- Cost savings by avoiding the purchase and disposal of unneeded food and packaging products; and
- Reduced environmental impacts over the lifecycle of a product associated with:
 - Food and packaging production (including fertilizer and pesticide use, water pollution, air pollution, energy use, and greenhouse gas emissions);
 - Transport of food and waste products (including energy use, air pollution, and greenhouse gas emissions from vehicle travel); and
 - Disposal (including landfill methane emissions⁵, water pollution).

Restaurants Can Become 'Green Certified' While Reducing Waste Generation

Green Seal, a non-profit organization that certifies environmentally sustainable products and services, offers a "green" certification for restaurants and food services. The certification process offers a structured way to accomplish broad sustainability goals.

The "Restaurant and Food Service Operation" standards specific to waste reduction and management include:

- Developing a waste management plan;
- Conducting waste audits;
- Operating a recycling program;
- Diverting a certain percentage of waste from landfill;
- Reducing a certain percentage of waste generation;
- Composting wasted food; and
- Avoiding or eliminating disposable products or service items.

(www.greenseal.org/) [This link is for informational purposes only and does not imply endorsement by EPA.]

⁵ The anaerobic decomposition of food and biodegradable food packaging in landfills releases methane, a greenhouse gas (GHG) 25 times more potent than carbon dioxide.



Wasted Food Source Reduction Strategies

Food Purchasing Policies

Create guidelines and goals to reduce spoilage and waste. Specific policies can include:

- Use a system to identify over-purchased food items and avoid excess wasted food;
- Purchase pre-cut food to reduce prep waste; and
- Implement a “just-in-time” purchasing system to only order what is needed when it is needed.

Use the Food and Packaging Waste Prevention Tool to help determine areas of over-purchasing and waste.

Storage Techniques

- Ensure that food products are stored under the proper conditions (for example, temperature); and
- Organize food products so that employees can easily:
 - Use older products first,
 - Find products when needed, and
 - Monitor inventory levels.

Food Reuse/Repurposing

As long as proper food safety and handling practices are followed, reusing leftover food can save money and reduce waste. Creatively repurpose leftovers and trimmings to efficiently use excess food for other meals. Flexibility in menu planning to accommodate the use of excess food from previous meals is key to success.



Vegetable Trimmings
Base for soups, sauces
and stocks

Training Staff

While individual managers can influence the amount of food wasted, the food service staff is ultimately responsible for day-to-day food storage, organization, preparation, and disposal. Continuous training and acknowledgement of staff is crucial to ensure proper training of all employees, especially if there is high turnover.

Employing multiple training strategies will increase the effectiveness (for example, in-person training as well as posted signs). Consider offering recognition or incentives to staff who help to significantly reduce waste or come up with new strategies to reduce waste.

Food service managers should educate their staff on basic steps to minimize food waste, including:

- Proper storage and organization practices to ensure food does not spoil before use;
- Cooking and preparation of food to reduce prep waste and food sent back to kitchen;
 - Refining knife skills to reduce improper preparation
 - Reducing batch sizes when reheating foods like soups or sauces to avoid leftovers
- Plating practices to reduce unnecessary food waste (see next page); and
- Waste tracking efforts.



Leftover Fruit
Smoothies or dessert topping



Day-old Bread
Croutons or breadcrumbs

Tray-less Systems

Case studies have shown that trays encourage customers to take more food than they can eat. Discourage customers from wasting food by going tray-less or by switching to smaller trays.

Menu Planning

Wasted food tracking systems can help identify which dishes customers frequently send back to the kitchen or leave uneaten. This information enables managers to modify the menu to both satisfy customers and generate less waste.

Table 2 contains a simplified example of one week of kitchen food waste tracking using the Food and Packaging Waste Prevention Tool.

Table 2: Menu Planning Example in Food and Packaging Waste Prevention Tool (pounds of wasted food)

Kitchen Food Waste	Prep Waste	Improperly Cooked	Stored Food Expired	Arrived Spoiled	Food Sent Back by Customer
Chicken	6	6	0	0	25
Pasta	4	5	0	0	2
Fruit and Vegetables	5	2	0	0	0
Dairy	4	0	0	0	0
Other	0	0	0	0	0
TOTAL	19	13	0	0	27

Background: This example shows wasted food type with respect to why the food was discarded. This information would be automatically generated in the Summary Data portion of the tool after data entry.

Tracking Analysis: Dishes containing predominantly chicken products are frequently sent back to the kitchen by the customers.

Solution: This could indicate that menu items need to be modified or is not being properly prepared on a regular basis. Also, if staff tracks plate waste, managers can adjust portion sizes so that less food is left unfinished.

Plating: Serving Sizes and Garnishes

Even small garnishes and improper serving sizes quickly add up to a significant amount of food reaching landfills. Food service managers can reduce food waste by:

- Avoiding use of inedible or rarely eaten garnishes unless requested.
- For serviced food counters, using the “ask first” policy for sides and garnishes (for example, ask if a pickle or side salad is wanted with a sandwich).
- Reducing scoop or serving size to reduce wasted food while still satisfying a customer’s appetite.

Removing Trays Reduces Waste

A 2008 study of 25 college campuses found that removing trays at dining halls results in as much as 25 to 30 percent less wasted food.



(Source: Washington Post – February 17, 2011)

Guest Education

Simply encouraging guests to take only the food they can consume goes a long way in reducing wasted food. Food service managers can post informational signs at buffet-style food service venues that encourage customers to take only enough food to match their appetite.

Case Studies

University of California (UC), Berkeley

Source Reduction Technique: Guest Education

Like many other colleges and universities, University of California (UC), Berkeley has buffet-style dining halls where much of the wasted food was a result of students' eyes being larger than their stomachs. To address this problem, CalDining worked with the Residential Sustainability Education Coordinator (RSEC) Program to host "Eat the World, Save the Earth" events to encourage students to take only what they could eat. Students who cleared their plates were rewarded with a small prize (for example, candy) while students who wasted food had to scrape their plates into a vessel and the amount of food discarded was measured and reported throughout the evening. Students noted that they had never before thought about how much food they wasted.

University of Maine at Farmington

Source Reduction Technique: Tray-less Dining

In February 2007, the University of Maine started a tray-less dining program. Food service managers spent several weeks creating communication materials to convey the benefits of the new tray-less dining program to students and other dining hall patrons. The university's food service managers credit their communication efforts as a key component of the program's success. In its first year, the program reduced the university's overall waste generation by 65,000 pounds, or roughly 46 pounds per person. As an added bonus, the university also used 288,000 fewer gallons of water and reduced the energy and dish detergent consumption associated with cleaning trays.

(Source: Time Magazine, August 25, 2008)

University of Texas at Austin

Source Reduction Technique: Guest Education and Serving Size

In Spring 2008, the University of Texas at Austin audited plate waste during lunch and dinner for five days. They found that students left an average of 5.7 ounces of edible food on their plates, equivalent to a medium-sized apple. Food service staff engaged the students with signage and visualizations of their daily waste using symbolic trash bins. Students were allowed to sample menu items before taking a full serving of the dish. Staff were also trained on portion control and tracking of pre- and post-consumer waste. In

fall 2008, another plate audit was conducted, showing a 48% reduction in wasted food.

Intel Corporation Cafes in Hillsboro, Oregon

Source Reduction Technique: Food Reuse

Two Intel business dining facilities, serving approximately 12,000 meals per week, tracked all pre-consumer wasted food on a daily basis for one year using computerized food waste tracking systems and software from LeanPath. Starting in April 2009, employees tracked all waste at a scale positioned along the regular route of disposal in the kitchen. They tracked not only the quantity of an item discarded, but the reason for disposal. Weighing time took less than four minutes per employee per week. With the data, the chefs looked for reuse opportunities such as using vegetable scraps for soup stock and sauce base, pureeing certain starches for thickeners in other entrees, using dairy items prepped for the coffee station to make chowder, and turning leftover fruit into chutney. Over the course of the year, wasted food in the kitchen was reduced by 47% and food costs per meal decreased by 13.2%.

(Source: www.ci.hillsboro.or.us/Sustainability/SustainabilityWeb_Upload/download/FoodWasteCaseStudy.pdf)

Turn Source Reduction Strategies into Action!

From the strategies detailed above, pick one or more to pursue based on your waste assessment:

- ☐ Create food purchasing policy
- ☐ Revise storage techniques
- ☐ Reuse food
- ☐ Train staff
- ☐ Remove trays
- ☐ Revise menu
- ☐ Alter plating and serving sizes
- ☐ Educate guests on taking only what they can eat



Feed Hungry People / Feed Animals

How can a business help the community, the environment, and its bottom line at the same time?

Every day, food service providers such as supermarkets and restaurants make decisions about what to do with surplus prepared food, produce, meat, bakery and dairy items that are still safe and wholesome to eat.

Feed People, Not Landfills: Food Donation

According to the U.S. Department of Agriculture (USDA), 50 million Americans, or 14% of American households, were food insecure in 2009. Donating fresh food not only reduces food reaching landfills, but also feeds those in need.

Do I have to worry about liability from donating food?

Many food providers worry about legal liability related to their donated food. However, the Bill Emerson Good Samaritan Food Donation Act (Public Law 104-210) protects food donors from legal liability if they donate in good faith and without gross negligence.

What kind of food can be donated?

Non-perishable and unspoiled perishable can be donated. Check with the local food bank or food rescue organization to find out what items they will accept. Additionally, follow food safety guidelines* at www.foodtodonate.com/Fdcmain/FoodSafety.aspx to ensure that food remains edible and safe to eat.

Will it take extra time to set aside donations?

Food that cannot be sold before its expiration date can be set aside for a food recovery group instead of put into the dumpster. Many food rescuers will take the time to sort through the food, meaning the only change in procedure is which bin to place the food in, with no extra work necessary. Most food rescuers also provide monthly totals of donations for making calculating tax deductions easy. Most food recovery programs offer free pickups and

* [This link is for informational purposes only and does not imply endorsement by EPA.]

Looking for a Venue to Make a Food Donation?

- Check out “Rock and Wrap It Up” (www.rockandwrapitup.org/resources/hungerpedia)*
- A new tool called Hungerpedia is a resource to match agencies in need with donors of food and other assets
- Feeding America: Offers a database of regional food banks with contacts for smaller outlets

* [This link is for informational purposes only and does not imply endorsement by EPA.]

containers for wholesome, edible food.

What tax benefits do I get from donating food?

Not only will donating food reduce your waste disposal costs, but donations can also generate significant tax benefits for businesses. Donors are advised to consult with their tax advisor in applying the appropriate deduction. Learn more at: www.epa.gov/waste/conserve/foodwaste/fd-donate.htm.

Feed Animals

After feeding people, the next preferred food diversion strategy is to send food waste to local farmers and others who use food scraps (generally vegetative only) to feed animals. To get started, contact the county agricultural extension office, state veterinarian, or county health department to find out about specific state regulations and to find contact information for farmers.

Training Staff

Regularly administered staff training is a key factor in the success of programs to feed people or animals.

Tips for Training Staff

- Create clear and consistent signs with images and using multiple languages, if necessary;
- Organize infrastructure to work with the flow of the kitchen and ensure easy sorting;
- Motivate staff with recognition, incentives, or awards;
- Regularly monitor and check for contamination;
- Re-train as necessary, especially when there is a high staff turnover rate; and
- Consider making food waste management a competency indicator for employee evaluations to incorporate reducing wasted food as a standard expectation.

Staff Tips for Easy Sorting

- Place bins near sources of waste such as prep stations
- Put the organics and recycling bins to the left of the trash bin (people read left to right)

Case Studies

Barthold Recycling & Roll-off Services, St. Francis, Minnesota

Food Recovery Technique: Feed Animals

Barthold Recycling & Roll-off Services collects food from restaurants, hotels, schools, nursing homes, grocery stores and even large food processors to feed 3,800 pigs and 250 head of cattle on its 290-acre facility. Today, Barthold collects food scraps from about 400 commercial customers in the St. Francis, Minnesota area each month. Customers pay 30% less to divert their wasted food because it reduces hauling costs and fees at landfills. Customers report other benefits such as increased cleanliness and reduced labor costs.

(Source: www.epa.gov/waste/conserve/foodwaste/success/barthold.pdf)

Rock and Wrap It Up, Nationwide

Food Recovery Technique: Feed People

Rock and Wrap It Up! (RWU) arranges the collection and local donation of leftover food and other basic necessities from rock concerts, sporting events, hotels, corporate meetings, political rallies, and school cafeterias. Since its inception in 1994, the group has collaborated with 150 bands, 200 schools and universities, and 30 sports franchises to feed millions of people.

RWU provides template language for bands, political figures, and sports teams to include in their contracts or permits with caterers. The language requires that all leftover food to be donated to local soup kitchens: "All edible leftover food to go to local soup kitchens or shelters and Rock and Wrap It Up! will arrange for the recovery." At the end of an event, RWU volunteers organize the safe recovery and delivery of edible leftover food. Feeding America's affiliated food banks also participate in the recovery opportunities. There is no cost to partnering with RWU. Food donations help reduce or avoid disposal costs, and RWU volunteers help to save labor costs.

(Source: www.epa.gov/waste/conserve/foodwaste/success/rockin.pdf)

Albertsons, Nationwide

Food Recovery Technique: Feed People

Starting in 2007, the Albertsons supermarket chain has worked to reduce its waste. After conducting a waste audit, they realized how much edible food was being thrown out. As a result, they developed a Fresh Rescue Program which redirects fresh items such as meat, dairy, and produce that have reached their "sell by" date but are still edible and safe. Instead of being sent to the landfill, this food is donated to a local nonprofit organization. The biggest challenge is the timing and logistics to get the food distributed within the narrow window of freshness. However, food rescue organizations such as Feeding America help relieve some of this strain with a network of partners. The thirty Nevada-area stores reduced their average daily waste from 1,588 pounds of daily waste per store to 100 pounds per day.



Industrial Uses/Composting

How can wasted food be converted into fuel, soil, or energy?

Industrial Uses

Fats, oil, and grease (FOG), such as fryer oil, can be used to make biodiesel and other consumer goods.

Option 1: Contact a local biodiesel club or manufacturer – search online for town, county, or local university biodiesel clubs to find out if they accept used fryer oil as feedstock.

Option 2: Locate a nearby rendering facility – most companies provide storage barrels and free pick-up service.

Composting

Composting food and compostable packaging (such as soiled paper and compostable plastics such as PLA) can produce a valuable soil amendment that can be used on-site or sold for agriculture, landscaping, or horticultural purposes. Food scraps can either be hauled off-site or composted on-site, if resources (including money, space, and staff) are available. Many haulers offer compostable material collection at a discounted rate compared to regular trash collection.

To get started:

1. Call your current waste hauler to see if they offer organic material collection (or look online at Find-A-Composter at www.findacomposter.com to find a composter near you).
2. Contact the local or state environmental agency to find a hauler or learn more details about composting on-site.
3. Train staff to properly sort compostable materials. Signage can help both staff and patrons sort the material properly.

More information on composting and a list of considerations for starting a composting program can be found at: www.epa.gov/waste/conserve/composting/.

Lessons Learned From Food Diversion Programs

- Training is key! It takes more than a letter or posted sign.
- If guests or staff speak multiple languages, produce training and signage in multiple languages and use images.
- Reduce odors through more frequent pickup, use of can liners, and rinsing containers.
- Develop innovative partnerships. Check with state government and EPA to see what resources are available.
- Calculate cost savings.

Anaerobic Digestion

Diverting wasted food to anaerobic digestion can generate renewable energy (biogas) and create a valuable soil amendment. Food service venues can partner with wastewater treatment plants, waste haulers, dairies, or municipalities to process their wasted food off-site at an anaerobic digestion facility. Similar to a composting program, staff need to be properly trained to sort digestible materials. Proper signage can help staff during this transition. For more information, visit www.epa.gov/waste/conserve/foodwaste/fd-anaerobic.htm.

* [This link is for information purposes only and does not imply endorsement by EPA.]

Training Staff

Staff need to know which materials are compostable and how to properly store food scraps and FOG.

Tips for Training Staff

- Create clear and consistent signs with images and in multiple languages, if necessary (Sample signage and training materials);
- Organize infrastructure to improve the flow of the kitchen and ensure easy sorting;
- Motivate staff with recognition, awards, or incentives;
- Regularly monitor and check for contamination; and
- Re-train as necessary, especially during times of high staff turnover.

Guest Education

Guests or customers also need clear and consistent signage to ensure proper sorting of plate waste and packaging. Use images and translate into multiple languages, if necessary. Signs should be placed near the bins for easy separation. Proper guidance will prevent contamination of your composting or anaerobic digestion program.

Case Studies

California Grey Bears, Santa Cruz, California

Waste Diversion Technique: Composting

The California Grey Bears is a non-profit that distributes food to seniors on a weekly basis, for a total of 100,000 brown bags delivered per year. In order to be a good partner to local produce distributors, Grey Bears must take both food they can use along with food which can't be distributed. As a result, they discard about one ton of food scraps per week. To divert its food from landfill, the Grey Bears purchased "Earth Tubs" for on-site composting. Not only do they save about \$2000 per year in garbage hauling and disposal costs, but they also make about \$2100 in revenue from compost sales.

(Source: CalRecycle – www.calrecycle.ca.gov/organics/Food/CaseStudies/Contracts/2000/GreyBears2.pdf)

Roche Bros Supermarkets, Massachusetts

Waste Diversion Technique: Composting

To help Massachusetts achieve its goal of 70% waste diversion, three Roche Brothers supermarkets began composting about 455 tons of organic waste per year. The program reduces the three stores' waste cost by 40 percent, saving \$10,000-\$20,000 annually. Previously, three compactors were used per supermarket to process waste going to landfills. Each supermarket switched one compactor to recyclables and one to compost. Keys to the success of the program were: 1) Training and communication with staff; 2) Use of biodegradable can liners; and 3) More frequent hauling of wasted food during the summer months to combat odor issues.

(Source: Massachusetts DEP – www.mass.gov/eea/docs/dep/recycle/reduce/m-thru-x/smsorn.pdf)

East Bay Municipal Utilities District (EBMUD), Oakland, California

Waste Diversion Technique: Anaerobic Digestion

Oakland, California's wastewater treatment plant was the first sewage treatment facility in the nation to convert post-consumer food scraps to energy via anaerobic digestion. Waste haulers collect post-consumer food from local restaurants and markets and take it to the plant. In an anaerobic digester, bacteria break down the food waste and release biogas as a byproduct. EBMUD then captures the biogas and uses it as a renewable source of energy to power the treatment plant. After the digestion process, the leftover material can be composted and used as a natural fertilizer.

(Source: U.S. EPA – www.epa.gov/region9/waste/features/foodtoenergy/)

Turn Waste Diversion Strategies into Action!

From the strategies detailed above, pick one or more to pursue based on your waste assessment:

- ☐ Donate extra food to a local food bank
- ☐ Give food scraps to a local farmer for feeding animals
- ☐ Sell or give fats, oils, and grease to a local biodiesel refiner or club to recycle
- ☐ Start a composting program
- ☐ Train staff on how to separate organics
- ☐ Educate guests to properly sort materials

Calculate Cost Savings From Wasted Food Diversion Strategies

- Estimate reduced hauling or tipping fees. Businesses that generate a lot of wasted food might be able to reduce dumpster size or pickup frequency
- Estimate sewer treatment, plumbing, and electricity costs for garbage disposals and other kitchen plumbing needs on a yearly basis. If discarded food is not going down the drain, how much can this save?
- Find out about eligibility for food donation tax breaks.
- How much is brand enhancement and marketing potential around supporting the community and reducing environmental impacts worth?
- Could revenue be generated by selling compost or using it for landscaping or growing food?

The Food Waste Management Cost Calculator is a free tool that helps venues estimate the cost competitiveness of alternatives to food disposal including source reduction, donation, and composting.



Packaging Reduction Strategies

Definition and Benefits of Packaging Reduction Strategies

Packaging and containers account for a significant portion (23 percent) of the municipal solid waste stream in the United States, equal to about 39 million tons per year.⁶ As with wasted food, there are many benefits to reducing the amount of wasted packaging, including:

- Cost savings from:
 - Purchasing less packaging materials, and
 - Avoided disposal of packaging materials.
- Environmental benefits by avoiding:
 - Transportation energy and emissions from packaging production and waste transport,
 - Use of natural resources, and
 - Landfill emissions and land use associated with disposal.

Tracking and Calculating Solid Waste Disposal

The State of Massachusetts developed methods to track costs associated with solid waste disposal including annual hauling, operating and disposal costs: www.epa.gov/foodrecovery/pubs/waste-audit-form.xls.

Using Reusable Packaging

A good resource for using reusable packaging is located at: www.usereusables.org/.

[This link is for informational purposes only and does not imply endorsement by EPA.]

Strategies for Reducing Packaging

Bulk Purchasing

Buying food in larger quantities can reduce the related packaging. This strategy is particularly useful for condiments and non-perishable food items such as sugar, grains, oils, spices, etc.

Front-of-the-house examples:

- Use condiment dispensers instead of individual packets to both encourage taking only what is needed and reduce excess packaging.
- Use a thermos of creamer and jar of sugar at coffee stations instead of single-use packets.

Use Reusable Packaging/Service Ware

Replacing one-time-use packaging and service ware with reusable products reduces waste and environmental impacts while saving money.

Standard Packaging	Waste Conscious Packaging
Corrugated (Cardboard) Boxes	Reusable totes, pallets or bins
Disposable cutlery	Reusable cutlery (or keep disposables behind the counter to discourage taking more than needed)
Paper or plastic plates	Reusable plates

⁶ U.S. EPA (2010). "Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2010". Available at: www.epa.gov/osw/nonhaz/municipal/pubs/msw_2010_data_tables.pdf.

Use Environmentally-Friendly Packaging

When selecting service ware or products (with packaging), choose materials that can be recycled or composted in your area. Before ordering packaging, check with your local waste hauler to see which types of material they accept for recycling and composting.

Buying Tip: Purchase wooden coffee stirrers that can be composted instead of plastic ones that are not recyclable. Remember: the most environmentally friendly packaging is no packaging.

For example, for carry-out bags, ask the customer if one is needed before automatically using one. Another strategy popular with customers is to offer discounts for “bring your own” containers- especially for beverages.

Example: “Bring Your Own” Cost Analysis

ASSUMPTIONS

\$0.15	Cost of disposable packaging (cup, lid, and sleeve)
\$0.10	Discount for “bring your own” cup
12 hours	Daily operating hours

RESULTS

No. of “bring your own” per hour	Daily cost savings	Annual cost savings
3	\$1.80	\$657
10	\$6.00	\$2,190

No. of “bring your own” per hour	Annual greenhouse gas reduction (lb. CO ₂ equivalent)*	Annual solid waste reduction (lb.)*
3	339	378
10	1130	1260

*Based on 16 oz. cup with insulating sleeve

Keeping Food Fresh and Safe

Packaging optimization helps to keep food fresh and safe for consumption. AMERIPEN reports that modern poultry packaging practices have decreased pre-consumer chicken food waste from 12% to 4%, resulting in an annual net savings of \$4 billion.

(Source: AMERIPEN – www.ameripen.org/wp-content/uploads/AMERIPEN_Chicken_and_Packaging_Brochure_Aug2013.pdf)

[This link is for informational purposes only and does not imply endorsement by EPA.]

Recycling or Composting Program

In many locations, recycling and composting are cheaper than landfilling.

Recyclable Materials*	Compostable Materials*
Cardboard	Food
Glass	Soiled paper (napkins, paper towels)
Plastic	Cardboard
Steel	Paper or wood packaging (sugar packets, wooden coffee stirrers)
Aluminum	Other organics (yard trimmings)

*These are the most common recyclable and compostable materials, check with your local waste hauler to confirm specific materials.

Zero-Packaging Groceries

Ingredients is a “package-free, zero waste” grocery store in Austin, Texas. Customers buying items in their store are encouraged to bring their own reusable packaging for items such as grains, dairy, and wine. This leads to a reduction of packaging.

(Source: GOOD – www.good.is/post/zero-packaging-grocery-store-to-open-in-austin-texas/)

[This link is for informational purposes only and does not imply endorsement by EPA.]

Purchasing Policies

Including packaging reduction in a purchasing policy helps reach reduction goals. A policy should include specific guidelines and goals for reducing and diverting waste, such as:

- Purchasing products in containers that can be taken back by supplier;
- Purchasing products in containers that can be recycled or composted;
- Selecting reusable instead of disposable service ware; and
- Selecting service ware or condiments that can be recycled or composted.

Case Studies

Ghirardelli Chocolate Company

Packaging Reduction Technique: Reusable Packaging

As a way to reduce waste in their production of premium chocolate products, Ghirardelli replaced cardboard packaging with plastic reusable totes. The company has realized almost \$2 million in packaging cost savings and prevented almost 400 tons of cardboard generation and disposal each year.

(Source: StopWaste.org – www.usereusables.org/downloads/Ghirardelli%20Chocolate_final_8-31-07.pdf). [This link is for informational purposes only and does not imply endorsement by EPA.]

Acme Bread Company

Packaging Reduction Technique: Environmentally-Friendly Packaging

This California-based artisan bread company converted its bread bags to use 40% post-consumer waste paper for its in-store packaging of bread. The switch has resulted in annual savings of over 70,000 gallons of water and 40,000 kilowatt-hours (kVWh) of electricity associated with avoided paper production.

Straus Creamery

Packaging Reduction Technique: Reusable Bottles

Since 1994, the organic creamery has used 50% recycled glass for its deposit-based reusable glass milk bottles. The bottles are returned to the creamery, washed, sanitized and reused an average of 6-8 times before being finally recycled. In addition, Straus uses plastic crates as reusable packaging for its shipments.

Turn Packaging Reduction Strategies into Action!

From the strategies detailed above, pick one or more to pursue based on your waste assessment:

- ☐ Identify supplies that can be purchased in bulk
- ☐ Replace one-time-use packaging and service ware with reusable products
- ☐ Switch to environmentally-friendly disposables
- ☐ Start a “bring your own” container program
- ☐ Recycle or compost packaging



Disposal

The least-desirable option on EPA's Food Waste Recovery Hierarchy is disposal.

Disposal Strategy

Pulping Waste

Pulpers remove excess water from wasted food which can significantly reduce its weight and volume. This usually reduces cost of disposal by leading to lowered tipping fees and less frequent pick-up.

Case Study

Rutgers University

Disposal Technique: Pulping Waste

Rutgers has implemented a sophisticated wasted food diversion plan to deal with a large amount of food discarded from their cafeterias and dining halls on campus. In addition to diverting food for animal feed, Rutgers also uses a food waste pulper. The pulper pulverizes food scraps and removes excess water which reduces the volume by up to 80 percent. Although the pulping machine is expensive (each unit costs roughly \$45,000), Rutgers saved almost \$100,000 in just one year in avoided landfill hauling costs.

Ensure Proper Recycling

Earth911

Earth911.com can help to find local recyclers for all kinds materials from plastic to batteries.

[This link is for informational purposes only and does not imply endorsement by EPA.]

Waste Reduction Model (WaRM)

WaRM is used to compare lifecycle greenhouse gas emissions from standard and alternative waste management practices, such as source reduction, recycling, and composting. This tool is used by local government and organizations to quantify the connection between waste and climate change.

(Source: U.S. EPA – www.epa.gov/climatechange/waste/calculators/Warm_home.html)



U.S. Environmental Protection Agency
Pacific Southwest – epa.gov/region9
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