

BUSINESS FOOD WASTE

BRIEFING PAPER:

OPTIONS FOR GROCERS, RESTAURANTS AND FOOD PROCESSORS



The Price of Wasted Food

Did you know that over one fourth of all food produced for human consumption goes to waste? The annual value of this excess food is estimated at around \$31 billion.¹ There is great potential for restaurants, grocery stores, food processors and other businesses to utilize their food waste and save money.

Food waste is the third largest portion of the U.S. waste stream, yet at a recovery rate just under 3%, it is currently the least recovered portion.²

Do you want to decrease the amount of food waste you are sending to the landfill and save your company money? This publication highlights the efforts of some companies that are successfully saving money, reducing food waste, and conserving resources. It will provide you with resources and solutions to reduce, reuse and compost your food waste.

Significant Quantities Mean Significant Opportunities

In 1997, nearly 22 million tons of food waste were generated nationally, accounting for 10% of the total waste stream by weight. In Wisconsin, 406,190 tons of residential and commercial food waste were generated in 1995, making up 11% of Wisconsin's municipal waste stream.³ Organic residues can represent 75 to 90 percent of a supermarket's total waste stream and in schools, restaurants, and personal care facilities, organic materials make up an average of 74 percent of the total waste stream.^{4,5} (Organic residues include food scraps, soiled, non-recyclable paper and cardboard.)

With such large portions of their waste streams available for food rescue or composting, grocery stores, restaurants and food processing facilities have an opportunity to divert substantial amounts of food waste from Wisconsin landfills.

Benefits of Diversion

Diverting food waste from your business' waste stream can have several benefits. The strategies presented in this publication will allow your business to:

✗ Reduce disposal and hauling costs.

Depending on the type of waste and method of composting selected, average national savings over conventional disposal vary from \$9 to \$38 per ton.⁶

✗ Support local economy by creating and sustaining new jobs.

Composting facilities employ four times more people on a per-ton basis than landfills.⁷ Hauling and collection service is also needed. Creating a composting infrastructure could create new jobs in your community.

✗ Decrease the amount of material being sent to local landfills.

Nationally and in Wisconsin, almost all food waste is sent to landfills. The anaerobic breaking down of food waste is a significant source of methane gas production and leachate in landfills.

✗ Help feed the hungry in your community.

According to a 1991 study by Second Harvest, an estimated 21 million Americans depend upon charitable food donations to help feed their families.

✗ Improve soil properties with compost.

Compost can improve the physical, chemical and biological properties of soil, as well as provide indirect environmental benefits such as soil and water conservation and reduction of pesticide use.



FOOD WASTE PREVENTION AND FOOD RESCUE

Food Waste Prevention (Reduction)

After implementing a food waste reuse or recycling program, a business often reexamines the contents of its waste stream. This analysis usually leads to the discovery of new ways to reduce the amount of food waste generated and save money. This waste may be able to be prevented by:

- ✗ Improving food preparation procedures
- ✗ Removing certain garnishes or food items
- ✗ Offering a wider selection of portion sizes
- ✗ Keeping an eye on inventory and using produce and other items before they expire

Because waste prevention can reduce purchasing and disposal costs, some businesses have even developed simple spreadsheets to track waste stream and inventory data to identify additional reduction opportunities.

Food Rescue (Reuse)

When surveying the types of food waste generated by your business, determine if any of the food can be donated to a local food pantry or shelter. Donating this excess food can be as easy as a phone call. Many local programs are able to collect food donations directly from your business. A pick up schedule can be arranged or you can donate on an on-call basis.

If donating prepared food directly to a local food pantry or shelter, make sure the facility is equipped to handle such donations: Is a cooler or freezer available? Are all proper preparation and handling procedures known and practiced to ensure food safety? Check with larger food banks and food rescue programs in your area and see Resources for more information on food safety

Benefits of Donating

There are a variety of benefits to donating excess food. Your business can:

- ✗ Reduce disposal costs.
- ✗ Experience tax benefits for your food donation. (Consult your tax adviser.)
- ✗ Identify and make changes to prevent waste and associated costs. Generate greater awareness and responsibility for managing surplus food.
- ✗ Join the fight against hunger.

The Good Samaritan law

The 1995 Market Potential Report found that 83% of more than 240 companies polled cited "liability concerns" as the single greatest factor in determining if their company would donate excess food. In 1996, the Bill Emerson Good Samaritan Food Donation Act was signed to encourage

donation of food and grocery products to non-profit organizations for distribution to needy individuals. The law protects food donors from civil and criminal liability should the product donated in good faith later cause harm to the needy recipient. The law standardizes donor liability, providing the same protection in all fifty states. The Act promotes food recovery by limiting the liability of donors only to instances of gross negligence or intentional misconduct,

The complete text of the Bill Emerson Good Samaritan Food Donation Act can be viewed in the USDA publication "A Citizen's Guide to Food Recovery" or at www.usda.gov/news/gleaning/appc.htm (See Resources)

Second Harvest Food Bank of Wisconsin Case Study

Second Harvest Food Bank of Wisconsin works to feed the hungry in Wisconsin by obtaining food and related products and distributing them to qualified non-profit programs. Second Harvest of Wisconsin currently distributes almost 11 million pounds of donated food and grocery products annually. Their two main warehouses in Milwaukee and Omro (Fox Valley) serve 48 Wisconsin counties.

With high capacity coolers, freezers and storage space, Second Harvest is able to accept larger donations and distribute them to smaller agencies who may not have the transportation or storage capabilities to handle such donations. Nearly 400 manufacturers, wholesalers, brokers, retailers and growers donate to them annually.

One program Second Harvest has developed to assist businesses with food donations is the Value Added Processing Program. If a company finds itself with a surplus of raw product (fruits and vegetables) beyond what its orders require, Second Harvest will work with businesses to produce value added product. They will coordinate the supply of cans and labels and, if necessary, arrange for distribution of the final product. The company need only provide the manpower for the finishing process.

Second Harvest also accepts other surplus items including mislabeled or dented cans, products not meeting retailers specifications and other distressed inventory. In addition to working with food manufacturers and wholesalers, they also work with grocery stores and restaurants to handle prepared and perishable product.

contact **Second Harvest, 414-931-7400**

FOOD WASTE AS ANIMAL FEED

Separating food waste for animal feed can help divert reusable food scraps from landfills and provide a nutritious feed, usually at a lower cost than traditional feed. Before making arrangements, businesses should be aware of applicable state laws

In 1982, federal regulations were established for garbage feeding, indicating that all food waste containing meat or having come in contact with meat be boiled for 30 minutes before being fed to hogs. This is the minimum requirement for food waste preparation. Individual states may adopt stricter versions of this act.

Wisconsin legislation states it is "unlawful for any person to feed public or commercial garbage to swine." Chapter 95, Section 10 (3) of the Wisconsin State Statutes defines garbage as:

"...putrescible animal or vegetable wastes containing animal parts, resulting from the handling, preparation, processing, cooking or consumption of food and which is collected from any source, and includes dead animals..(but) does not apply to private household wastes not removed from the premises where produced."

Using this definition of garbage, meat or vegetable wastes that have come in contact with any animal parts, even if boiled, cannot be fed to animals under any circumstances. Other foods-fruits, vegetables and breads, not containing any animal parts can be fed directly to animals.

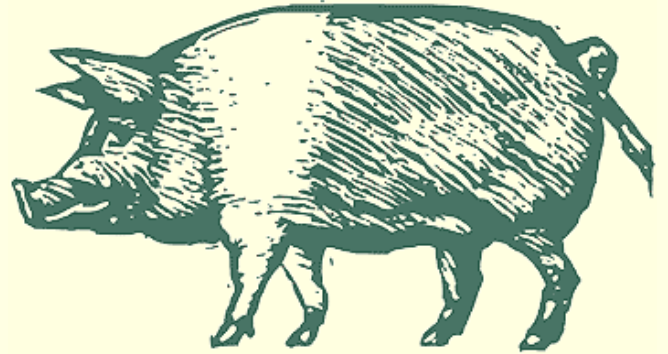
Employee education should focus on proper preparation of food scraps used as animal feed. Keep the scraps free from contact with any meat or other animal products during preparation, such as always using clean utensils and cutting boards. Plate scrapings should not be included. Meat, poultry, fish, gravy, grease from cooking or dairy products will contaminate any fruit, vegetables or bread on plates. Bins for animal feed should be clearly labeled to avoid contamination.

When organizing your collection system, find out:

- ✗ **Who will accept your food scraps? Call the Wisconsin Pork Producers Association at 1-800-822-7675 or your local County Agricultural Extension Agent to find any pork producers in your area. If you already have a relationship with a farmer, they may be your best resource.**
- ✗ **What is the amount and type of food waste generated? How much is the farmer willing to accept, both minimum and maximum? If your business generates a smaller amount of food waste, perhaps it can be used as a supplement to traditional feedstocks.**
- ✗ **How often is waste generated? Can your business provide a steady supply of food for the animals?**

- ✗ **Does your business have a cool area where the food can be stored until it is picked up? Also, work with the farmer or a local hauler to arrange a collection schedule.**

Contact the state veterinarian before you begin:
Dr. Clarence Siroky, WI State Veterinarian, 608-224-4872.



REC Systems Inc. Case Study

Utilizing food scraps has helped Eric Tarman-Ramcheck feed his pigs, save valuable landfill space and earn money for college. In May 2000, Eric designed a project that would reuse the food waste from local businesses for a WasteCap food diversion pilot project. Eric also won a college scholarship for his waste reduction achievements through this project

The project included feeding three test pigs all non-meat food scraps with a vitamin supplement while three control pigs were given traditional feed.

Eric's father, Bill Tarman-Ramcheck collected fruit and vegetable preparation scraps from the Four Points Hotel Sheraton and leftover bakery from Wildflour Bakery on his daily commute home Bill and Eric would then sort through the food to remove any contaminants (rubber bands, plastic wrap, etc). The nutrient content and amounts of food scraps were carefully monitored During the four month project a total of 3,933 pounds were collected from the restaurant and bakery and fed to the test pigs A final veterinarian check noted that the test pigs achieved the same high-quality rating as the control group. The meat processor also noted that he could not tell the difference between the pigs fed food waste and those fed traditional feed. The control pigs were auctioned at the Walworth County Fair. The meat from the three test pigs was sold to WasteCap Wisconsin for an awards lunch; Eagle Springs Golf Course for a special event; a community-supported agriculture farmer; and one of the food waste donors, Four Points Hotel Sheraton.

contact: Bill Taman-Ramcheck, REC systems Inc.,
262-642-3363

COMPOSTING WITH WORMS

Vermicomposting

Vermicomposting (composting with worms) can be done on or off-site. Vermicomposting uses the natural digestive system of worms to break down organic matter and food waste into nutrient-rich castings - the end product of the digested food. The castings are an excellent slow-release fertilizer, valued by many for house plants and gardens

Who should consider vermicomposting?

A business that does not generate enough food waste to make off-site composting economically-beneficial may consider an on-site vermicomposting system. Smaller restaurants or grocery stores could be well-suited for this option. When considering a vermicomposting system, determine:

✗ The type of food waste generated.

Fruit and vegetable scraps are the easiest for worms to digest and break down. Cantaloupe rinds, lettuce leaves, banana peels, orange rinds, and carrot peelings all will be quickly converted to nutrient-rich worm castings. Plate scrapings that contain grease, meat or dairy products are not broken down as easily and may cause odor problems.

✗ A place to put the bin(s).

Consider where to put the bin(s). A cool area such as a basement or storage area is a good place for the bin(s). If these areas are not available, bins can be set up outside behind your business during the summer months.



Growing Power and Sendik's Food Market Case Study

Will Allen a Milwaukee farmer is vermicomposting right in the heart of urban Milwaukee. Allen is co-director of Growing power, a non-profit organization and land trust dedicated to supporting local food systems. In addition to successfully vermicomposting vegetative waste from his greenhouse, Allen recently expanded his operation to include produce trimmings from Sendik's Food Market, a local grocery store known for its fresh, high-quality produce.

Since March 2000, Allen has regularly collected food prep scraps from Sendik's. To separate the scraps, staff replaced the store's 55-gallon trash bins with 22-gallon food storage bins, keeping one garbage bin nearby for non-compostable items. The bins are stacked on a pallet and stored near the loading dock to be picked up by Allen the following morning.

Allen has designated one of his four greenhouses strictly for vermicomposting with a total of twenty five 4'x2'x2' wooden bins. Inner-city youth help maintain and care for

the worms, harvesting the castings and selling them at local farmers markets.

Allen and his crew must be careful not to overload the vermicomposting system, potentially harming the worms with the heat generated by the composting process. Excess food scraps are either added to two long compost piles (windrows) behind the greenhouses or transported to Allen's farm located about thirty minutes south of his Milwaukee market

Currently Allen collects scraps from Sendik's three days a week - an average of 6,000 pounds per month.

Challenges include in-store storage space for the bins and incorporating hauling time into Allen's schedule. However, if these hurdles can be overcome, both parties would like to see the program continue and expand, possibly including seven days of collection

Contact: Will Allen, Growing Power, 414-527-1908
Tommy Balistreri, Sendik's Food Market,
414-962-9525

STEPS TO SETTING UP A BASIC VERMICOMPOSTING SYSTEM

1. Choose a bin type and size.

Determine the amount of food waste you will be putting into your system. It might be a good idea to start out small to allow yourself time to become familiar with all the details of maintaining a worm bin and expand from there.

The general rule is to allow about one square foot of space in your bin per pound of food waste generated per week. Many people use 20 to 22 gallon plastic bins. They are easy to move and are a nice size system to begin with.

You can also make a wooden bin with dimensions to fit the amount of food waste you plan to include. (Use untreated wood for the bins.)

2. Prepare your bin.

You will need to provide both air and drainage holes in the bin. Plastic bins won't "breathe" as easily as wooden bins and will need a few extra air holes. Drill or cut about twelve (sixteen for a plastic bin) drainage holes, 1/4" in size, in the bottom of the bin. Prop the bin up, perhaps on two bricks, over a tray to collect any liquid that will drain out of the bin. This liquid is an excellent fertilizer.

Place about two inches of bedding along the bottom. The bedding is important because it provides a moist medium for the worms to move through freely while eating the food scraps. It is also able to soak up excess moisture. Shredded newspaper or office paper, peat moss, used brown paper towels, dry leaves or wood shavings are some of the most common types of bedding. The bedding should be slightly damp when first placed in the bin.

3. Add the worms.

The earthworms used in vermicomposting are red wigglers, surface feeders suited for a vermicomposting situation. These earthworms are different than the nightcrawlers you might find in your garden or backyard. Nightcrawlers are burrowers and are not suited for vermicomposting.

Red wigglers, sometimes called manure worms, can be found in manure piles or compost piles. These worms can also be ordered by mail (See Resources.) You may also know someone with a vermicomposting bin who could give you a few worms to get started

A general rule is to have two pounds of worms per one pound of daily scraps, or a 2:1 ratio. You can start out with half this amount, as the worms will reproduce. Laboratory and field tests have shown that earthworms' capacity to consume organic material is limited only by the amount available. Given available food, your population will soon increase



Photo by Robert Queen, WI DNR.

4. Add the food scraps.

Start out small with the amount of food you give the worms. Give them a chance to adjust and start to reproduce, usually about three weeks. As the population increases, so will the amount of food they consume. Initially adding too much food can overload the system, resulting in odor problems or excess heat, which could harm the worms. Worms crawling up the side of the bin is a good indicator that something is not right inside the bin, i.e. too warm, too wet, not enough air. When all is well in the bin, the worms happily stay inside, eating the food scraps.

5. Add a top covering of dry bedding.

A couple of inches of finished compost, coffee grounds or damp peat moss work well to help filter out odors and prevent fruit flies. When adding more food to the bin it is a good idea to put it in different sections of the bin. This will attract worms to where the new food is, giving you a chance to harvest the older castings. Always bury the food under some of the finished castings and a few inches of dry bedding to prevent odors and fruit flies.

OFF-SITE COMPOSTING

Collection and Transportation

Off-site composting of food scraps eliminates the need for your business to manage the material and provides a valuable soil amendment for farmers. The first step in off-site management is determining who is going to accept the food waste for composting. A good place to start is by asking the farmers who currently supply you with produce or other products. Commercial composting facilities may also be near.

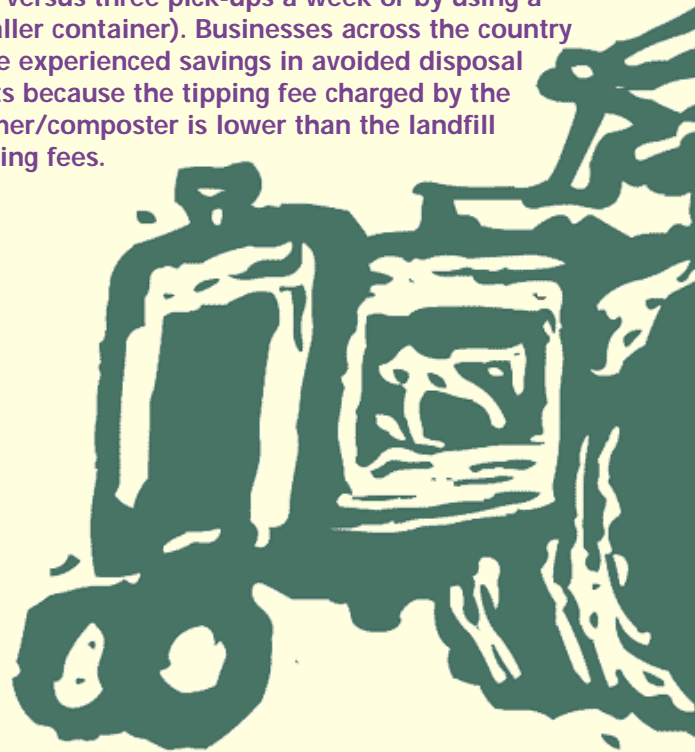
Second, determine who will haul the waste. Ask your current hauler or other local haulers if they would provide this service. If you cannot find an outside hauler, the farmer accepting the scraps may be able to provide collection service. If the farmer is someone from whom you currently buy produce, a back-hauling system may be able to be arranged. Otherwise, other local farmers, especially organic or community supported agriculture (CSA) farmers, may be interested in collecting these materials for their soils. Check with your local extension office or WasteCap for a listing of the CSA farmers in your area.

Examining the Economics

- ✗ Determine the amount of food waste to be diverted.
- ✗ Review your current hauling contract. Calculate current hauling costs. If you pay by weight, diverting your heavy, wet food scraps could make a considerable

difference. If you pay per container or pick-up you may be able to see a cost savings by requiring a smaller bin or fewer pick-ups since most of the materials that cause odor problems have been removed.

- ✗ Calculate what your avoided disposal costs could be (i.e. how much would you save by having only one versus three pick-ups a week or by using a smaller container). Businesses across the country have experienced savings in avoided disposal costs because the tipping fee charged by the farmer/composter is lower than the landfill tipping fees.



Pinehold Gardens Case Study

Pinehold Gardens has been in commercial operation as a CSA (Community Supported Agriculture) farm since 1995. In order to produce compost for their organic farm, owners Sandra Raduenz and David Kozlowski started using chopped hay silage from a neighboring dairy farm and their own kitchen and harvest scraps.

When seeking an additional organic source of nitrogen for the compost, Sandra and David turned to Outpost Natural Foods. They now pick up organic trimmings from Outpost's produce department every Monday, Wednesday and Friday. Between 12-15 eighteen and twenty-two gallon bins, weighing an average of 45-pounds each, are picked up weekly. A 400 pound average weekly pickup from February to April POW produced approximately 7 cubic yards of compost, enough to feed Pinehold Gardens' 1,500 spring transplants.

In the winter and early spring months, the composting operation took place in an unheated greenhouse at Pinehold Gardens. With shelter from the elements, the temperature was high enough to kill many of the weed pathogens and quickly produce a quality compost. Close control of moisture and regular turning proved to be very beneficial for heating the material. The addition of purchased micro-organisms was not necessary to produce a rich compost.

At Pinehold Gardens' second location in Vernon on the Wastersmeet farm, the food scraps are combined with wood-chip-based horse manure bedding from three local stables and leaves collected from the village of Vernon. Sandra notes that the vegetables with the compost are growing much stronger than those without.

Future plans include using the composting operation to heat the greenhouse during the winter months.

Contact: Sandra Raduenz or David Kozlowski,
Pinehold Gardens, 414-762-1301

OFF-SITE COMPOSTING

On-farm Composting Regulations

When working with a farmer for off-site composting, make sure the farmer understands and is following the regulations regarding food waste composting. The amount of food waste being composted by the farmer will determine what actions must be taken. For your reference, the following information summarizes the regulations set by the Wisconsin Department of Natural Resources (WDNR), Bureau of Waste Management, regarding composting and landspreading solid waste

Composting must be conducted in a nuisance free and environmentally sound manner. Composting facilities must comply with the following requirements:

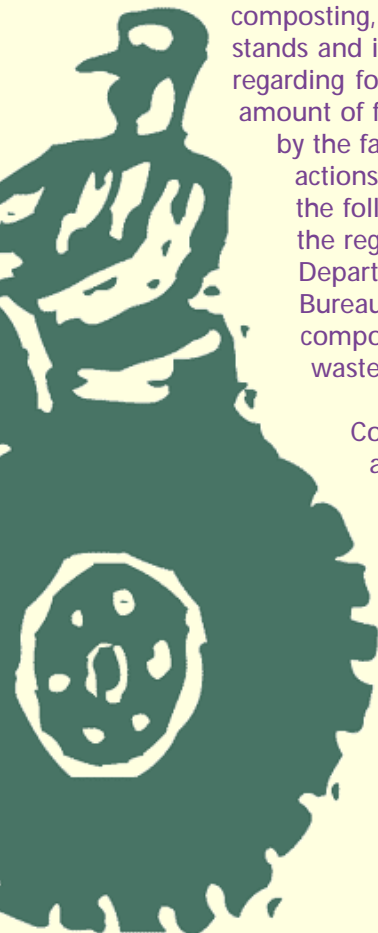
- ✗ **Offensive odors must not be generated.**
- ✗ **Birds, rodents and other vectors must be prevented from reaching food waste in the piles.**

- ✗ **Piles must be turned frequently enough to ensure oxygen is always available throughout the pile.**
- ✗ **Detrimental effects on surface water are prohibited.**

The following composting requires no contact with, license or approval from the WDNR. Local ordinances may apply.

- ✗ **Household composting**
- ✗ **Source separated organics composting with less than 50 cubic yards of materials on site at any one time. Source separated organics composting can include only grass clippings, leaves, clean chipped wood, vegetable food waste and manure. Vegetable food waste is defined as raw or cooked vegetable matter and used vegetable food containers comprised entirely of readily-biodegradable materials.**

Larger scale composting must meet additional requirements, including locational standards, initial site inspection, and licensing. Some larger sites will require a plan submittal and WDNR approval. For a rule summary or technical assistance, contact Gretchen Wheat, WDNR, 608-267-0557. To order a copy of NR502, the composting regulations, contact WI Department of Administration at 608-266-3358.



More 4 Grocery Store, University of Wisconsin - River Falls Case Study

In 1996, three More 4 grocery stores located in River Falls, Hudson and New Richmond started an investigative food waste diversion program. Approached by the stores' Environmental Director, Robert Butler and Gerald Nolte, professors at the College of Agriculture Food and Environmental Sciences - UW-River Falls, helped organize a food waste collection system that would separate past prime produce and preparation scraps, flower shop trimmings and non-recyclable cardboard (waxed or soiled) for off-site composting on the W-River Falls farm.

For in-store collection, employees collected trimmings and spoiled produce in designated 32-gallon bins. The bins have wheels making them easy to move around the kitchen store under a preparation counter and push onto the loading dock for collection. Non-recyclable cardboard was flattened and placed in a mesh bag next to the bins.

initially, the stores worked with their regular waste hauler to organize a separate food waste collection. However, the hauling of the relatively small volume of food waste proved

too expensive. UW-River Falls students soon took over the collection and hauling of the bins and cardboard, using a pick-up truck to transport them twice a week to the university research farm.

Once at the farm, the content of the bins and cardboard were emptied off the back of the pick-up truck onto long composting piles (windrows). To help speed up the composting process, a chopper was driven over the material several times to break the cardboard boxes into smaller pieces. Finished compost was used on the UW-River Falls research farm.

During the first "trial" year of the program, 160 tons of grocery store organic waste were separated and composted. After evaluating the project's progress, the store's management decided to extend the program, which still continues today. Over a four year period, the three grocery stores have diverted about 650 tons of food scraps from Wisconsin landfills.

Contact: Gerald Nolte, UW-River Falls, 715-425-3298
Robert Butler, UW-River Falls, 715-425-3985

CONTAINER COMPOSTING

Benefits of Container (In-vessel) Composting

- ✗ Reduction of hauling fees, either through fewer pickups or use of a smaller dumpster.
- ✗ Immediate addition of food scraps into composting vessel without having to arrange collection for off-site composting.
- ✗ Less contamination because the generator is also responsible for composting
- ✗ Possible revenue from selling the finished product.
- ✗ Positive publicity from use of system on-site.

When deciding if an in-vessel compost system is suitable for your business, several factors must be considered:

- ✗ Space to place an in-vessel composter You will need a minimum of 100 square feet of space for current commercially-available composters.
- ✗ Capital for the initial investment. When calculating the cost of an on-site composter, use the money you will save through reduced waste hauling costs to determine your payback for buying the system. (See Case Study)
- ✗ A source of wood chips, dried leaves, sawdust, or shredded paper to serve as a carbon source to balance the nitrogen-rich food discards and absorb excess moisture.

In-vessel Composters

There are several different types of in-vessel composter available. The system you choose will depend on the amount of food waste you generate and the amount of time you have to maintain the system. All composters must get air inside to eliminate odors and allow the materials to break down

For a company generating small amounts of food scraps, a simple **static, passively aerated** system should be sufficient. If the pile is small enough, the air will be able to enter the pile without the need for fans. Occasional turning of the pile may be necessary.

Static, aerated systems are able to handle a bit more food waste and rely on fans to aerate the bins.

Agitated, aerated bins include a fan for aeration and some type of physical means to turn the pile, promoting even distribution of oxygen and heat throughout the pile. Because of this additional mixing feature, this type of system will produce finished compost the fastest.

In-vessel composters can compost materials using either a batch or a continuous-flow system. The batch system may require some down time of the system once the container is full, allowing time for the completion of the composting

process before more material is added. Continuous-flow systems allow for continuous addition of food scraps.

Another feature to consider is whether or not the container includes a biofilter. A biofilter, commonly made of compost, peat moss and lime, is able to filter odors prior to releasing them to the environment.

Finally, for rural businesses that have available land and access to equipment to turn compost piles, windrow composting may be an attractive option. Windrows are long, large composting piles commonly used for on-farm composting.

Examples of commercially-available containers and information on how to set up an on-site windrow composting program are listed in the Resources.

PC's Market of Choice Case Study

PC's Market of Choice in Eugene, Ore., uses two Earth Tubs, 3.5 cubic yard agitated, aerated in-vessel composters. Each of the Earth Tubs, manufactured by Green Mountain Technologies, are capable of diverting an estimated 150 pounds of food waste per day, producing stabilized compost in about eight weeks.

Workers separate all fruit and vegetable trimmings and past prime produce and put them into the Earth Tub daily. PC's Market of Choice has been using the system since March, 1999 and has seen substantial avoided disposal costs.

In an area where the typical tipping fee is \$46/ton, plus a \$3.80/cubic yard fee, PC's Market of Choice believes it has saved between \$2,500 and \$3,000 in avoided disposal costs in one year. The store is diverting between 50 and 60 tons of food waste annually.

For the program to continue on a long term basis, PC's Market of Choice has discovered that it needs effective educational and incentive programs to accommodate for staff turnover and to ensure the system is correctly and consistently maintained.

As an extra benefit, the program has generated positive publicity for the store. Customers are very pleased that the store is committed to composting its waste and the store has even gained a few new customers because of its commitment. The finished product is given away to customers and local community gardens.

contact: Alex Cuyler, City of Eugene, 541-682-6830
Rick Wright, PC'S Market of Choice,
541-345-0566 x120

UTILIZING FOOD PROCESSING WASTE

When raw food materials are processed, there is a large amount of material that becomes waste because it is inedible or does not meet quality standards. Food processing waste has proteins, fats, nutrients and other useful raw material that can be utilized in various ways. These by-products can be managed for the highest and best use in the following order.

1. Use as Raw Material for Edible Products

The best possible use of a by-product is as a raw material for another food product. Wisconsin cheese producers have been very successful in utilizing whey for making a variety of food products. For every pound of cheese produced, nine pounds of by-product whey is generated. Cheese producers have developed innovative membrane technology to divide whey into usable parts, including an edible dried protein supplement that is added to some snack foods to increase their food value. The lactose sugar fraction is used in baking, infant formula and pharmaceuticals. Sometimes there is an oversupply of the lactose sugar fraction that can be fermented into ethanol (either fuel or drinks like vodka), converted to burnable methane gas by bacteria, or used as a food source for yeast cells that convert sugar to protein.

2. Use as Animal Feed

Large volumes of solid waste from the meat and vegetable processing sectors are utilized as animal feed. A long-standing practice of meat processors and renderers is to use the inedible parts of butchered animals for pet food and mink food. The remaining cobs and husks from sweet corn production can be fed directly to cattle or stored in a dense pile and fermented to produce silage for winter feed. This fermentation process releases a strong organic liquid, often called leachate, which is regulated by the Department of Natural Resources (DNR), but it can be landspread. Potato peelings can also be fermented into a cattle feed, but the peelings' slurry consistency requires a storage container for the fermenting process. Other by-products such as beet and carrot peels, cabbage leaves and cores, beans, peas, cherries, and cranberries that don't quite meet quality standards can also be fed to cattle or pigs. An efficient and timely transportation system should be available to allow same-day feeding of these by-products.

3. Direct Landspreading for Nutrient Utilization

Most food processing wastes are rich in nitrogen, phosphorus, potassium and other plant nutrients. With the exception of inedible animal parts, these wastes can be directly landspread as fertilizer without any additional processing.

They must be incorporated into the soil to avoid odor, runoff to surface water, and seepage to groundwater. A proper storage system must be available to hold the material until it can be landspread.

A Wisconsin Pollutant Discharge Elimination System (WPDES) permit is required by the DNR. The permit requires site approval and a management plan that limits the application rate to crop nutrient needs. For more information, contact: Jerry Rodenberg, DNR Food Processing Sector Specialist, 608-266-7715

4. Composting to Produce a Soil Conditioner

In general, all of the solid by-products that can be landspread can also be composted. Composting will produce a more valuable soil conditioner that can be transported to distant markets if there are insufficient crop fields available near the generator. Proper composting will eliminate the nuisance conditions, such as odor, that sometimes occur when wastes are stored waiting for proper field spreading conditions or when exposed on the land surface prior to incorporation into the soil. Composting also provides an opportunity to utilize other waste streams, such as non-salable grocery store produce, cafeteria food scraps or leaves to produce a compost for a specific market. To find out more about composting see Resources.

Waste Management, Inc. Case Study

Four organizations: Pheasant Run Recycling and Disposal Facility a division of Waste Management; Kenosha In Neighborhood Works Inc. (KIN), a non-profit grass-roots community organization; Ocean Spray, Inc.; and Maple Leaf Farms, a local duck farm have pooled their efforts and resources to produce a high quality compost product from a fruit by-product, cranberry mash, and a poultry waste material duck manure. The combined efforts are helping to: produce a high quality soil conditioner, tradenamed as Father Dom's Duck Doo Compost; divert more than half of Ocean Spray's waste from landfill disposal; and enhance environmental awareness, stewardship, and opportunities among the youth and community of Kenosha county,

In 1989, Ocean spray expressed an interest in establishing a means to reuse its fruit by-product. As a result, Pheasant Run offered to provide the technical foundation and land for composting the material, and the KIN group, founded by Father Dominic Roscioli, agreed to provide manpower for marketing the finished compost product. The KIN organization raises funds by selling the compost to landscapers and gardeners. To encourage smaller purchases of the compost, KIN has also opened the New Earth store in Kenosha.

contact: Mike Infusino, Waste Management, Inc.,
262-857-7956

Father Dominic Roscioli, KIN, 414-657-4463

STEPS TO SET UP A RECOVERY PROGRAM OF FOOD

1. Ensure Support and Coordination

Upper management must support food waste diversion efforts in order to maintain a long-lasting program. Designate a staff member to set up and monitor the program. The coordinator will also educate staff and other participants about the program and keep records of costs incurred.

2. Determine Amount of Food Scraps Available for Diversion

There are many methods for this step. The questions You are trying to answer are:

A. How much food waste do we generate per day and per week?

Measure by weighing and tracking volume of food waste generated over a week. Or, monitor what is being thrown in the dumpster. Determine: How large is the dumpster? How often is it collected? Approximately what percentage of the waste in the dumpster is food scraps? Answering these

questions over a representative amount of time will provide a good estimate of the amount of food scraps available for diversion.

B. What types of compostable materials do we generate and where in our business?

C. Are there areas where these materials can be easily separated?

For example, fruit and vegetable trimmings may be able to be easily separated from the preparation area of a grocery store.

The answers to these questions may vary considerably depending on the season and the day of the week. Design a system that can include those variables (for example, you may need daily collection in the summer months but only weekly collection in the winter).

3. Determine Market(s)

This paper outlines several options for diverting your food scraps. For all of these options, make sure to check applicable regulations - many are summarized in this paper. See Resources for further details. Also, make sure whoever you provide your food scraps to understands and is following applicable regulations.

When determining the best option(s) for your business, consider reducing, reusing and then recycling:

✗ **Reduce:** Can you reduce your food scraps and thus purchasing and disposal costs?

✗ **Then Reuse:** Can you donate leftovers to a food pantry?

✗ **Then Recycle/Compost:** Can you compost on site using worms, an in-vessel composter or, with enough space, windrows? Do you know a farmer who can feed the food scraps to their animals, worms, or compost the material?

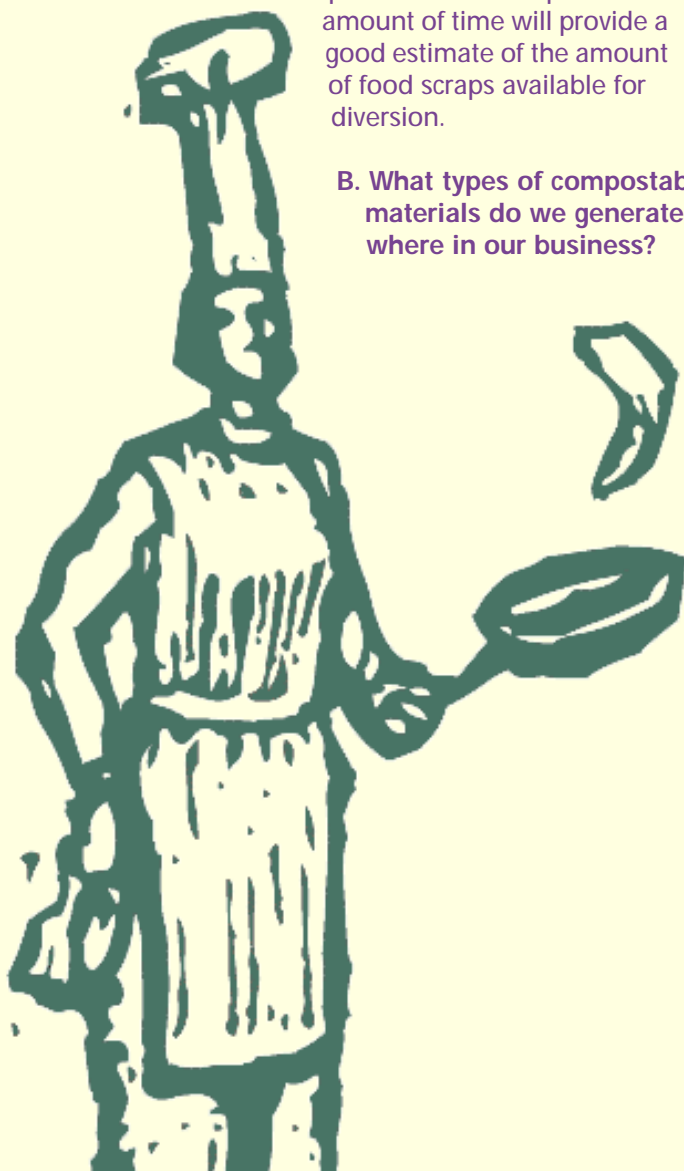
✗ **Then landfill:** Even with the best efforts to utilize waste there will likely be some situations where there are no practical alternatives to hauling the waste to a licensed sanitary landfill. Although landfilling is the option of last resort, a sanitary landfill is designed to capture leachate and avoid groundwater pollution that can occur when wastes are illegally buried in pits.

4. Develop the Collection Method(s)

A. Set aside time to manage the program

B. Select market(s) and make arrangements for collection. The market you choose will determine the material you separate.

Measure the economics of collection methods at this point. You may avoid disposal costs by eliminating the food waste from the trash and reducing the frequency of trash collection or size of your dumpster, You may be able to use some of those avoided disposal costs to pay someone to collect the food waste or to pay your staff to deliver the material.



WASTE FROM A KITCHEN OR GROCERY STORE

You may want to start slow (only separate fruits, vegetables and bread three days a week at the beginning, for example) and build from there. Build on Your success.

C. Will you process Your food differently?

One restaurant is reducing the volume of food waste by grinding all of its food waste before it is composted. This saves the restaurant considerable costs. Another restaurant uses a garbage disposal to send its food waste to the local sewerage treatment plant-where the material is composted. You may choose to process your fruits and vegetables in a different location in your business than the meats to more easily facilitate composting. Consider your options and come up with a plan.

D. Determine where to place containers, how many, and what type are needed.

The food waste collection containers should be a different color and/or shape than trash containers. Make sure to put a trash container near all recycling containers, or the recycling container may become a trash container.

5. Train employees

Train staff on proper separation and collection procedures. If you are using an on-site in-vessel composter set aside time for an initial training session with the equipment. After the initial training, a few hours a week should be enough time to follow up with employees on questions or suggestions they might have.

6. Monitor System, Make Changes and Celebrate Successes

- ✗ Periodically check the containers to ensure that the proper materials are going into them. If problems exist, find the person or people responsible and instruct them or their supervisor on how to properly participate.
- ✗ Promote success in the program to managers, employees, clients and the public.

Pandl's in Bayside Case Study

In the late 1980's, with the assistance of a demonstration grant from the Wisconsin Department of Natural Resources, Pandl's Restaurant installed the first proto-type mulching machine designed by Hobart Food Equipment Company. All food waste, meat, bones, fish, vegetable and fruit scraps from the restaurant as well as small paper and food products were put through the machine and ground to a pulp. The mulch was stored in garbage cans and taken to be composted off-site.

The addition of the mulcher completely changed the way staff handled the restaurant's food waste, resulting in some hidden benefits and cost reducers for the restaurant.

While putting food waste through the mulcher, staff started to notice exactly what was being thrown away. It was noted that usable portions, such as good cantaloupe left on the rind, were being discarded. Changes in preparation procedures were able to reduce these 'cutting' losses.

Because garbage cans were no longer available in the kitchen, all food waste was put through the mulcher. This eliminated the possibility for silverware to be accidentally dropped or discarded in the garbage can when emptying plate scrapings. Pandl estimates that silverware loss was cut in half by this new procedure.

The collected mulch was hauled by Pandl to two farmers and a topsoil company. While one farmer directly land-spread the mulch onto his fields, the second farmer and topsoil company added the mulch to their compost piles.

Tests were done to ensure that the direct field application did not cause any environmental or health problems. No adverse effects were discovered.

Challenges to the project included hauling costs, odors during storage and the weight of the bins while transporting. In the final evaluation, Pandl decided this off-site system was not economically feasible for his restaurant.

Instead, Pandl set up a small vermicomposting system in the basement to compost a portion of the restaurant's scraps and the rest of the food is put through the mulcher. Although the mulch is no longer composted it does result in a smaller volume of waste being disposed.

Pandl later designed a second restaurant focusing on waste reduction during the process. After receiving approval from the Milwaukee Metropolitan Sewerage District, Pandl installed new, larger garbage disposals in the kitchen, capable of handling a large portion of the food waste to be generated at the restaurant. Without the need for numerous garbage cans in the kitchen, Pandl was able to expand his dining area by approximately 70 square feet, enough to add three more tables. Pandl has estimated that the additional revenue from these three tables alone, seating four people 2-3 times a day with an average meal of \$15 per person, has resulted in an additional \$45,000 a year in revenue.

Contact: Jim Pandl, Pandl's in Bayside, 414-352-7300

Free Waste Reduction and Recycling Assistance for Businesses

WasteCap Wisconsin is a private, nonprofit 501 (c)(3) organization whose mission is to provide waste reduction and recycling assistance through business-to-business peer exchange. WasteCap offers a variety of services that target solid waste issues head on and helps companies find workable, cost-effective solutions. These services network business professionals, providing opportunities for participants to work together to create solutions. services include:

- ✗ **Talk & Tours** - WasteCap hosts educational open houses at businesses which practice successful waste reduction and recycling strategies.
- ✗ **Site Visits** - WasteCap conducts confidential waste assessments and provides written recommendations.
- ✗ **Telephone Assistance** - WasteCap staff find answers to your waste reduction resource needs.
- ✗ **Internet Resources** - WasteCap maintains an active web page: www.wastecapwi.org.
- ✗ **Publications and Articles** - WasteCap provides businesses and business associations with targeted resources and case studies.
- ✗ **Pilots** - WasteCap provides direct services to businesses to connect waste generators to reuse, recycling and compost markets.
- ✗ **Wisconsin's Buy Recycled Business Alliance** - A project of WasteCap Wisconsin, the WBRBA is committed to increasing the procurement of recycled content products through education and leadership by example.

What Does WasteCap Offer My Business?

Membership benefits include:

- ✗ Membership in Wisconsin's Buy Recycled Business Alliance (a project of WasteCap Wisconsin) and use of the WBRBA logo
- ✗ Free admission to Talk & Tours
- ✗ Regular members-only email bulletins to give you a chance to network with other members
- ✗ Invitation to annual networking meeting to link you to potential customers and resources
- ✗ Priority for first-come, first-served site visits
- ✗ Priority for public relations efforts
- ✗ Opportunity to join the network of WasteCap site visit volunteers
- ✗ Telephone assistance, internet resources, technical assistance, and publications
- ✗ A chance to support this organization which is helping reduce waste and conserving natural resources

You can be Part of the Solution

- Yes, I would like to support WasteCap Wisconsin with a tax-deductible membership contribution:
- Payment enclosed (check payable to WasteCap Wisconsin Inc.)
- Please invoice me
- I would like to sign up as a member using my:
 - Visa
 - MasterCard

Account number

Exp. date

Signature on Card

Membership levels:

- \$100 Individual** (One person can attend Talk & Tours for free)
- \$250 Organization**
- \$500 Coporation**
- \$1,000 Benefactor**
- Other: \$** _____

Name

Organization

Address

City

State

ZIP

Telephone

Fax

Email/Web site

Please complete and mail or fax to:

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www.wastecapwi.org

RESOURCES

Food Rescue

"A Citizen's Guide to Food Recovery." USDA National Hunger Clearinghouse World Hunger Year. 505 Eighth Avenue Suite 2100. New York, NY 10018. 800-453-2648 www.worldhungeryears.org/nhc/glean/ind

"A Quick Consumer Guide to Food Handling." USDA Food Safety and Inspection Service FSIS Publication. Room 1180. So. Bldg. Washington, DC 20250. 800-535-4555.

USDA Gleaning and Food Recovery Hotline. 800-GLEAN-IT.

"Understanding Prepared Foods." Workbook and companion video. American culinary Federation. 10 San Bartola Dr. St. Augustine, FL 32086. 904-824-4468 x108.

- ✘ Hunger Task Force Milwaukee. 414-777-0483
- ✘ Second Harvest of Wisconsin Milwaukee. 414-931-7400
- ✘ Three Rivers Harvest. LaCrosse. 608-785-9837
- ✘ Wisconsin Harvest, Madison. 608-246-4730

Food Waste as Animal Feed

"Feeding Food Byproducts to livestock." Fact sheet. Minnesota Technical Assistance Program. University of Minnesota Gateway. PO Oak St., Suite 350. Minneapolis, MI 55455. 612-624-1300. www.mntap.umn.edu,

"Managing Food Scraps as Animal Feed." EPA 530-F-96-037 Environmental Protection Agency. Waste WiSe. 800-424-9346

Vermicomposting

Happy D Ranch Vermicomposting Bins. 1512 W Whitendale, PO Box 3001, Visala, CA 93278. 559-738-9301, www.happydranch.com

"Laverme's Handbook of Indoor Worm Composting" Laverme De la Terra and Ellen Sandbeck. 218-721-4422

"A New Wiggle on Waste." WI Dept. of Natural Resources. CE-243-98. 608~267-7524. www.dnr.state.wi.us

"Vermicomposting Supplies Source List." 2000. I25.HJ.OO04A. UW-Extension. Solid & Haz. Waste Ed. Center. 2420 Nicolet Dr. Green Bay, WI 54311. 920-465-2707.

"Worm Composting or Vermicomposting." I25.HJ.9607B. *ibid.*

"Worm Digest" Monthly newsletter on worm composting issues. Edible City Resource Center. 541-485-0456. www.wormdigest.org

Worms Eat My Garbage 1998. Mary Appelhoff. Flower Press. 10322 Shaver Rd. Kalamazoo, MI 49024. 616-327-0108. www.wormwoman.com

Worm Wigwam. EPM, Inc. PO Box 1295. Cottage Grove, OR 97424. 800-779-1709. www.wormwigwam.com

Off-Site Composting/General Composting

"Don't Throw Away That Food - Strategies for Record-Setting Waste Reduction." 1998. Environmental Protection Agency. EPA-530-F-98-023. 800-424-9346. www.epa.gov/osw

"A Farmer's Guide for Evaluating the Collecting and On-Farm Composting of Grocery Store Organic Waste." Robert Butler or Gerald Nolte. College of Agriculture, Food and Environmental Sciences. UW-River Falls. 410 S. 3rd St. River Falls, WI 54022. 715-425-3985.

"A Grocery Store Manager's Guide to Initiating a Composting Program for Grocery Store Organic Waste." *ibid.*

Let It Rot. 1998. Stu Campbell. Storey Communications, Inc. Schoolhouse Road. RD#1 Box 105. Pownal, VT 05261. 800-441-5700. www.storey.com

On-Farm Composting Handbook. 1992. Natural Resource, Agriculture, and Engineering Service. 152 Riley-Robb Hall. Ithaca, NY 14853. 607-255-7654. nraes@cornell.edu. www.nraes.org

The Michael Fields Agricultural Institute. W2493 County Road ES, East Troy WI 53120. 262-642-3303.

In-Vessel Composting Systems

CM Pro. NaturTech Composting Systems, Inc. 44 28th Avenue North. Suite J. St. Cloud, MN 56303. 320-253-6255. naturtech@composter.com.

Earth Tub. Green Mountain Technologies. East Coast Office: 86 Brook St. Box 560. Whitingham, VT 05361. 800-610-7291.

Greendrum. RKB Enterprises Inc. 625 Maury Ave. Norfolk, VA 23517. 888-475-2368.

Super C-3. Nature's Soil. 611 Amherst St. Nashua, NH 03063. 877-674-9003. www.naturessoil.com

Wright Environmental Composting System. Wright Environmental Management, Inc. 9050 Yonge St. Suite 300 Richmond Hill, Ontario, Canada. L4C 9S6. 905-881-3950. www.compost.wem.ca

Food Processing

"Composting and Landspreading Food Processing By-Products." Minnesota Technical Assistance Program. Univ. of Minnesota-Gateway, 200 Oak St. Suite 350. Minneapolis, MN 55455. 612-624-1300. www.mntap.umn.edu.

"Source Reduction and Management Alternatives for the Food Processing Industry." *ibid.*

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Wisconsin Dept. of Natural Resources

Wisconsin Restaurant Association

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5. ["Strategies for Commercial Organics Diversion."](#) BioCycle. Black, G. November 1995.
6. ["Organic Materials Management Strategies."](#) EPA. May 1998.
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