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Sustainability "How-to Guide" Series

Sustainability in the Food Service Environment

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2nd Edition

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FOREWORD

It is no secret that a focused, well-defined sustainability strategy is beneficial to an organization's bottom line, whether it is a federal, private-sector, military or nonprofit entity. Sustainable practices are not only the right thing to do for the environment; they also benefit the communities in which they are implemented. Sustainability is the business implementation of environmental responsibility.

Sustainability is all around us. Federal, state and local governments are increasingly applying regulatory constraints on design, construction and facility operations standards. Employees expect their employers to act responsibly, and vice versa. Going green is no longer a fad or a trend, but a course of action for individuals and businesses alike – benefiting the triple bottom line of people, planet and profit.

Today's facility manager needs to be able to clearly communicate the benefits and positive economic impact of sustainability and energy-efficient practices, not only to the public, but also to the C-suite. While there is a dramatic need for each of us – and our organizations – to care for the environment, it is just as important that we convey to executives and stakeholders how these initiatives can benefit our company's financial success.

The document in your hands is the result of a partnership between the IFMA Foundation and IFMA, through its Sustainability Committee, each working to fulfill the shared goal of furthering sustainability knowledge. Conducting research like this provides both IFMA and the foundation with great insight into what each can do as an organization to assist the facility management community at large.

It is my hope that you, as a facility professional, will join us in our mission of furthering sustainable practices. This resource is a good place to start.

Tony Keane, CAE
President and CEO
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FOREWORD

IFMA Sustainability Committee (ISC)

The IFMA Sustainablitiy Committee (ISC) is charged with developing and implementing strategic and tactical sustainability initiatives. A current initiative involves working with the IFMA Foundation on the development of a series of "How-to Guides" that will help educate facility management professionals and others with similar interests in a wide variety of topics associated with sustainability and the built environment.

The general objectives of these "How-to Guides" are as follows:

1. To provide data associated with a wide range of subjects related to sustainability, energy savings and the built environment

2. To provide practical information associated with how to implement the steps being recommended

3. To present a business case and return-on-investment (ROI) analysis, wherever possible, justifying each green initiative being discussed

4. To provide information on how to sell management on the implementation of the sustainability technology under discussion

5. To provide case studies of successful examples of implementing each green initiative

6. To provide references and additional resources (e.g., Web sites, articles, glossary) where readers can go for additional information

7. To work with other associations for the purpose of sharing and promoting sustainability content

The guides are reviewed by an editorial board, an advisory board and, in most cases, by invited external reviewers. Once the guides are completed, they are distributed via the IFMA Foundation's Web site (www.ifmafoundation.org) free of charge.

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The mission of the IFMA Foundation is to promote and support scholarships, educational and research opportunities for the advancement of facility management worldwide.

Established in 1990 as a nonprofit, 501(c)(3) corporation, the IFMA Foundation is supported by the generosity of a community of individuals – IFMA members, chapters, councils, corporate sponsors and private contributors – and is proud to be an instrument of information and opportunities for the profession and its representatives.

A separate entity from IFMA, the IFMA Foundation receives no funding from annual membership dues to carry out its mission. Supported by the generosity of the FM community, the IFMA Foundation provides education, research and scholarships for the benefit of FM professionals and students. Foundation contributors share the belief that education and research improve the FM profession.

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1 EXECUTIVE SUMMARY

'Expand knowledge of the built environment, in a changing world, through scholarships, education and research'

The Vision Statement of the IFMA Foundation

Food service management is one of many activities in commercial and institutional buildings. Often a very complex work environment, the decisions and practices in food service can have a significant influence on the social well-being, environmental health and economic security of both surrounding communities and those around the world.

This balance of social, economic and environmental factors is commonly referred to as sustainability, or the triple bottom line (Figure 1). When looking through the lens of sustainability within the food service environment, there are myriad interrelated issues, ranging from local purchasing, to waste management, to energy conservation, to green building design. In order to sufficiently address any of these issues, food service managers and facility managers must take into account potential changes to operational processes, education and marketing needs, and processes for measuring costs and benefits.

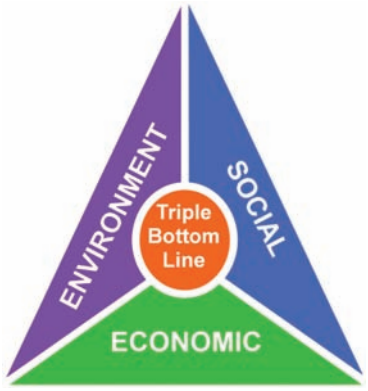

Figure 1: Triple bottom line (Hodges 2009)

This guide provides practical, real-world guidance on how to introduce and advance sustainable practices within the food service environment. The guide provides direction for individuals in leadership and management positions within the food service environment, as well as general information for professionals within the operation and management of buildings, including real estate management, property developers, architects, engineers and government entities. Students in facility management degree programs will also find the guide relevant.

The purpose of this guide is to provide an overview of several key sustainability areas in the food service environment. As a single guide could be written on each of these areas, this document concludes with a list of resources for additional information. The guide is neither all-inclusive nor meant to be set in stone. As with all areas of sustainability, the solutions and actions are multilayered and continuously evolving and vary by location.

This guide is organized by broad categories, focusing primarily on inputs, operations and outputs. Areas addressed include responsible procurement, green buildings, energy conservation and waste stream management. In addition, the guide discusses:

- Venue-specific considerations
- Ideas for first-time implementers
- Consumer education
- Measuring the environmental impacts
- Making the business case
- Developing an action plan
- Sustainability checklists from affordable implementations through costlier solutions
- Case studies of trayless dining in cafeterias and reusable to-go containers

While reading, think about what practices you may be able to implement at your facility. If you do not manage a facility or are not directly involved in food service, use this information to understand and advance sustainable practices in the facilities where you work or visit.

2 INTRODUCTION

A food service environment is any public or private location that provides food to a group of individuals, including cafeterias, vending machines, catered meals, concession stands and restaurants. There are 10 million commercial kitchens within the United States. A sustainable food service environment is one that seeks to balance social, economic and environmental factors: the triple bottom line. The depth and breadth of sustainability initiatives varies based on location, client, venue and other factors discussed within this guide.

Food services are dependent upon a complex supply chain, involving a multitude of food producers and/or providers. Examples can include, but are not limited to, farmers, manufacturers, distributors, food service companies, equipment installers, maintenance services, waste management companies and consumers.

At each stage of the supply chain, decisions impact social, economic and environmental factors. A sustainable supply chain works to incorporate products and services that reduce environmental impact and provide improved health benefits and/or positive social impacts as a result of the preparation and/or delivery of the meal. From advances in packaging that minimize volume and weight to efficient routing and on-time delivery of food, there are numerous activities that yield beneficial results. In this case, by reducing the volume of packing materials, food can be transported more efficiently on trucks and by forklifts within warehouses. Additionally, less solid waste is produced. With such changes, both environmental and economic benefits are realized.

A food service provider may be limited by the preferences and priorities of the customer or client, thereby restricting the implementation of even the best ideas. At the same time, many customers and clients take leadership positions on certain sustainable initiatives because they believe it is the right thing to do, they recognize the public relations benefits or see the direct financial benefits. In both circumstances, the food service manager is positioned to provide recommendations to improve sustainable practices.

Ultimately, the food service provider is responsible for understanding sustainable food service attributes, assessing the viability of both best practices and innovative ideas, and aligning with customer and client sustainability goals to support the customers and community he or she serves.

3 DETAILED FINDINGS

3.1 Responsible Procurement

Procurement covers not only the food and beverages purchased to support the dining operations, but also all of the supporting products and equipment necessary. The following is a summary of categories to consider in the planning process.

3.1.1 Sustainable Foods

Sustainable food products include, but are not limited to, organic, local, seasonal, fair trade, cage free, hormone free, third-party certifications and food-miles traveled. Each is interrelated, thereby expanding the options while potentially complicating the decision-making process.

When considering the implementation and expansion of a sustainable procurement plan, first take into account the products already being purchased, lessons from previous failed expansions and shifts of current consumer demand. It is important to understand the big picture before getting caught in discrete and often unclear purchasing decisions, such as the pros and cons of purchasing produce that is locally sourced but grown using pesticides, or organically grown but shipped over many miles.

In developing a sustainable procurement plan, conduct a market assessment by considering consumer demand, product availability, food safety requirements, cost and logistics. When focusing specifically on sourcing a particular product, partner with local distributors and suppliers to determine product availability. If certain products are more expensive than others, determine if an additional cost is acceptable, and if so, how much. Local produce and fair-trade coffee are often the most economical options and can be a good starting point. Over time, build a responsible procurement plan, adjusting to meet changing factors. After successes have been achieved with a few items, add a few more. By taking steps, it may be possible to responsibly procure cage-free eggs, organic produce, sustainable seafood, environmentally preferable disposables and more. Take heart in the adage: Don't bite off more than you can chew.

3.1.2 Local Purchasing

Transportation within the food service supply chain includes the movement of food from the location it was grown or produced to the distributor, and then from the distributor to the customer. Decisions to purchase locally sourced food yield multiple benefits, including support of local economies, reduced delivery time, reduced delivery cost, reduced environmental impact due to vehicle emissions for food transport, and reduced potential of food spoilage or damage during transportation.

Local sourcing is specific to food that was produced and/or processed as close to the location of consumption as possible (Sustainable Food Laboratory 2008). Local sourcing could be from within the community, a specified state or province, or a region identified within a specified radius, such as 150 to 300 miles (241 to 483 kilometers). Without any agreed upon definition, local purchasing criteria may shift based upon the priorities and limitations of the respective client. However, as some foods are perishable by nature, local sourcing is already common practice for many dairy and baked goods.

Local sourcing varies seasonally, based on the geography of the customer and the type of food provided. Growing season also impacts the availability of the local supply. For example, tomatoes are seasonal in New Jersey in July and August. In winter, tomatoes served in New Jersey are typically grown in greenhouses or shipped from California and Florida. If local sourcing is a key part of a client's goals, encourage menus to be developed using seasonal produce by contacting local producers to see what is available for each season. The chef can then develop his/her menu around local availability.

3.1.3 Food Safety

Before incorporating any new vendors or suppliers into the supply chain, ensure that the company and products are fully compliant with all food safety requirements. Information must be gathered and documented across the entire supply chain, including the handling, packaging,

production, preparation and storage of food. For example, food safety cannot be compromised or placed at a lower priority than procuring locally sourced goods.

Awareness of food safety practices is especially important when handling meats, seafood, eggs and produce, as these have stricter food safety guidelines than other foods. When sourcing local and organic produce from smaller farms, be sure to ask about sanitation, pest control practices and potable water testing practices. All growers, regardless of size, should follow Good Agricultural Practices (GAP), and manufacturers should follow Good Manufacturing Practices (GMP). Check the United States Department of Agriculture (USDA) audit verification program for compliance with GAP and GMP for fruits and vegetables. To find out more go to: www.ams.usda.gov.

3.1.4 Consumer Disposable Products

The procurement of all support products, such as napkins and other disposable products, should be assessed for sustainable options. Polystyrene products and waxed cardboard are examples of products that should be avoided when better environmental choices are available. Examples of environmentally preferable products include, but are not limited to, products that contain recycled content (pre- and post-consumer content), contain renewable materials or are compostable.

When evaluating products using post-consumer content, it is important to recognize that the United States Food and Drug Administration (FDA) has strict regulations that limit the use of post-consumer content in containers that carry food products.

Disposable items that are used in the food service environment but are not in direct contact with food products, such as hot beverage cup sleeves, can be made from higher quantities of post-consumer recycled fiber. Companies and nonprofit advocacy organizations work with the FDA to drive advancements in the regulations while maintaining high standards for food safety and public health.

For example, by working in close partnership with the FDA, a major coffee retailer now uses 10 percent post-consumer recycled fiber in their disposable cups. The retailer estimates that by making this change across their entire chain, they have saved more than 100,000 trees from being harvested annually. Similarly, another coffee retailer's hot beverage sleeves are made of 70 percent post-consumer recycled fiber.

3.2 Green Buildings

The building shell and systems within the building also impact the overall sustainability of the food service environment. A few key factors to consider when designing or redesigning a food service facility include: sustainable design, construction, operations and maintenance practices. When evaluating alternatives, remember that energy efficiency and energy conservation strategies are the most practical and cost effective sustainable practices to implement, compared to renewable energy strategies (IFMA 2009). As an entire paper could be written on this topic, several resources for further reading are recommended: ASHRAE Green Guide, BetterBricks Web site, United States Green Building Web site and the Whole Building Design Guide Web site. See section 6.2 Appendix B: Additional Resources.

3.2.1 Site Planning

When building dining facilities, efforts should be made to minimize the impact on the natural environment. These efforts can include, but are not limited to:

- Using the existing building footprint when possible
- Restoring habitats disrupted during construction
- Implementing environmentally focused storm water design
- Reducing heat island effects
- Minimizing light pollution
- Providing access to mass transportation

3.2.2 Water Efficiency

Developing a water conservation plan and purchasing water-efficient products reduce both operating costs and environmental impact. To develop a water conservation plan, start by verifying that the following practices are currently performed at the facility:

- Undertaking a periodic leak inspection program
- Operating dishwashers only when full
- Hand scraping food scraps
- Using water-efficient sink aerators; see EPA WaterSense for more information
- Using water-efficient dishwashers

3.2.3 Building Materials

When purchasing building materials and products, research information on environmentally preferable products. A few things to look for include:

- Reuse of building elements from existing buildings: Using elements from an existing structure reduces the volume of materials needed to construct a new building.
- Products with recycled content: Reduces the volume of raw materials that must be extracted from the environment.
- Use of rapidly renewable materials.
- Low-emitting materials: Reduce off-gassing of chemicals during construction and operation by using low volatile organic compound (VOC) adhesives, sealants, paints and carpets.

When using wood products it is important to be aware of the efforts of the Forest Stewardship Council (FSC). The FSC coordinates the development of forest management standards, provides public information about FSC certification and works with other certification organizations to promote FSC certification (FSC 2009). The FSC certifies paper, furniture and building materials — including lumber, plywood, flooring, doors and windows, and kitchenware. Two searchable databases are available, one for FSC certified product retailers, and a second for certified product manufacturers, see www.fscus.org/faqs/fsc_products.php?link=1.

3.2.4 Heating, Ventilating and Air Conditioning (HVAC) Systems

HVAC systems provide heating, cooling and ventilation, providing a comfortable and safe environment for employees and patrons. Rightsizing of equipment and electrical service during design or renovations are important for equipment to run efficiently.

To reduce energy consumption and the volume of makeup air for kitchen ventilation, the following strategies are recommended:

- Use demand control ventilation for kitchen exhaust hoods and makeup air units.
- Use variable speed drives (VFDs) to control fan speed for ventilation hoods and kitchen makeup air units, instead of two speed on-off fan control.
- When installing kitchen exhaust hoods, select a custom-designed hood that meets the specific exhaust airflow requirements needed by the facility. Selecting a properly sized hood will reduce the fan speed, reducing both energy use and cost (ASHRAE 2003).
- Minimize the use of island hoods by locating exhaust hoods near walls for more efficient capture of exhaust.

Although heat recovery can be a great sustainability strategy for office buildings to reduce the heating or cooling load, it is generally not a good idea for restaurants or commercial kitchens. If not maintained and cleaned at a high frequency, the grease and smoke in the exhaust air can clog the heat exchangers (ASHRAE 2003).

3.2.5 Ongoing Operations

In addition to continually purchasing environmentally responsible building products and operating the building using energy-efficient practices, custodial elements are also part of green buildings. Examples include green cleaning products such as cleaning equipment, microfiber cloths and bathroom amenities. Refer to the United States Green Building Council LEED® for Existing Buildings: Operations & Maintenance for an expanded list.

3.3 Energy Management

Restaurants and buildings with commercial kitchens consume about 2.5 times more energy than other commercial buildings (ENERGY STAR 2009). Unfortunately, as much as 80 percent of the $10 billion (US dollars) spent annually for energy in the commercial food service sector is wasted. The energy waste results from excess heat and noise generated from inefficient appliances, heating ventilation and air conditioning systems, lighting and refrigeration (ENERGY STAR 2009).

Significant potential exists to improve the energy efficiency and sustainability of current practices in the food service environment. The US ENERGY STAR program estimates that restaurants that strategically invest in operational practices can reduce utility costs from 10 to 30 percent, without sacrificing service, quality, style or comfort (ENERGY STAR 2009). The percentage of energy consumption by end use is summarized in Figure 2.

3.3.1 Lighting

The largest opportunity to make lighting more sustainable is to replace current lamps with more

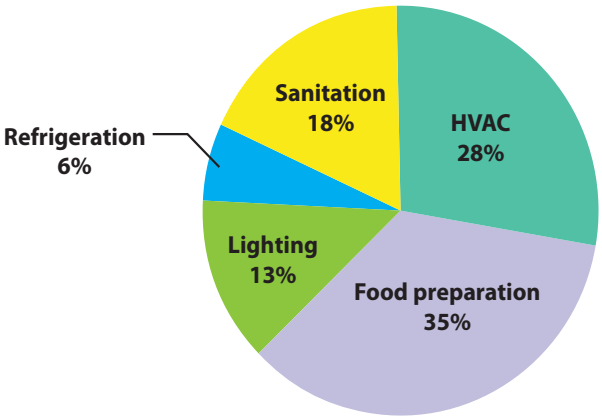

Figure 2: Energy consumption within the food service environment (IFMA 2009)

efficient lamps. For example, within walk-in refrigerators and freezers, replace incandescent lights with low-temperature compact fluorescent lamps (CFL). CFLs give off less heat, reducing the amount of heat the refrigerator needs to reject (ENERGY STAR 2007). CFLs can also be used in the dining environment. However, if the dining environment requires subdued lighting, carefully select dimmable CFLs (ENERGY STAR 2007). Additionally, fluorescent T12 lamps can be replaced with more efficient T8 or T5 lamps. To minimize energy consumption from lighting, all lamps can be connected to a lighting control system with shutdown schedules.

3.3.2 Windows

The heat loss or gain from windows can be reduced by applying window film on south- and west-facing windows in the dining environments that get a lot of sun. The window film will help reduce cooling costs, make dining environments more comfortable, and help prevent fading of carpet, chairs and furnishings (ENERGY STAR 2007).

3.3.3 Reducing Demand Charges

A large portion of restaurant energy consumption occurs during peak hours of electricity consumption. Without proactive planning, food service providers may be subject to large monthly demand charges. Two strategies in particular can be used to minimize monthly demand charges:

- Schedule the ice maker to operate during off-peak hours, such as at night. In addition, less heat is rejected into the kitchen, decreasing the kitchen cooling load (ENERGY STAR 2007).
- Use digital demand controllers (DDCs) to control the operation of equipment, such as water heaters, air conditioners, electric space heating units and refrigerating equipment. Using DDCs to interrupt equipment operation for periods of 10 to 30 minutes can help to level the energy consumption load of the building, reducing power demand spikes that can result in large monthly demand charges (ENERGY STAR 2007).

3.3.4 Refrigeration Systems

Many small efforts can be made to improve the energy efficiency of refrigeration systems without replacing current appliances. Here are several tips to ensure your systems operate efficiently:

- Make sure that reach-in refrigerators and freezers are not pushed up tightly against the wall. Since refrigerators and freezers reject heat through the coils in the back, space between the wall and the coils is needed to prevent heat buildup. If heat builds up near the coils, the refrigerator or freezer will need to work harder, consuming more energy (ENERGY STAR 2007).
- Periodically clean the coil fins as part of the preventive maintenance routine for refrigerators and freezers. Over time dust builds up on the coils, reducing the efficiency. Dust can contribute to equipment failure or more frequent maintenance service calls.
- Decrease energy consumption used for defrost cycles by setting refrigerator defrost cycles to meet the needs of the operation. In most cases, four 15-minute defrost cycles are sufficient. Adjusting the defrost cycle can result in a significant energy and cost savings. One restaurant owner was able to save $800 (US dollars) annually by shortening the defrost cycle from 70 minutes to 15 minutes (ENERGY STAR 2007).
- A low-cost upgrade for walk-in refrigerators is replacing strip curtains. Strip curtains alone can reduce outside air infiltration by 75 percent. Utility rebates are often available to cover a large portion of the capital cost. With the rebate, the payback can be less than one year (ENERGY STAR 2007).

3.3.5 Efficient Appliances

In most restaurants, the annual energy consumption required to produce food is greater than the energy required to heat and cool the building

(ENERGY STAR 2007). Energy is used for cooking, food preparation, cleaning and dishwashing. Energy is also used for refrigeration, ventilation and many other applications. The type, model, age and how the appliance is used greatly impact energy consumption. Efficient use of energy can reduce operation costs while having a positive environmental impact.

To improve operational efficiency without replacing current appliances, the following strategies can be used:

- Use the most efficient appliance available at your facility.
- Cook with the oven fully loaded when possible (ENERGY STAR 2007).
- Keep the lids closed on braising pans during periods of extended use. This practice will reduce energy consumption from braising by as much as 50 percent (ENERGY STAR 2007).
- Implement a startup/shutdown plan so that appliances are only operating when needed.
- Keep equipment maintained by repairing leaky gaskets, cleaning clogged burners, ensuring oven hinges are tight and recalibrating thermostats (ENERGY STAR 2007).

Making operational process changes can be significant. For example, cutting out only one hour each day of broiler on time can translate to a savings of around $450 (US dollars) annually. Although $450 (US dollars) might not seem like much at first, it could be huge when thought of in terms of profit margin. If a restaurant operates with a profit margin of about 5 percent, about $9,000 (US dollars) of sales is needed to earn $450 (US dollars). Therefore, every dollar saved through energy efficiency is a dollar of additional profit (ENERGY STAR 2007).

Links for several free calculators for making life cycle and energy decisions and performing pre-rinse spray valve water cost analysis, as well as an outdoor air load calculator, are found in section 6.2 Appendix B: Additional Resources.

3.3.6 ENERGY STAR Appliances

ENERGY STAR is a program of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). ENERGY STAR is an international standard for energy-efficient consumer products and a voluntary climate protection partnership. It has programs for commercial food service, small businesses, buildings, lighting, HVAC and others.

ENERGY STAR qualifies commercial food services products for fryers, hot food holding cabinets, commercial refrigerators and freezers, commercial steam cookers, commercial dishwashers, commercial ice makers, commercial griddles and commercial ovens. ENERGY STAR qualified appliances use up to 50 percent less energy than conventional appliances. This guide provides an overview of ENERGY STAR qualified products specific to the food service environment. For more information about ENERGY STAR see the IFMA Foundation ENERGY STAR Portfolio Manager “How-to Guide” and the Additional Resources section of this guide.

When evaluating ENERGY STAR and conventional appliances ask equipment manufacturers and dealers for energy use and maintenance information. In some cases, energy-efficient equipment may require less maintenance than conventional equipment (ENERGY STAR 2007). Before purchasing a new appliance, ask about manufacturer rebates, local utility company incentives and upcoming laws requiring energy-efficient products to be sold. Several states within the United States are currently in the process of passing laws requiring new reach-in refrigerators and freezers being sold to be ENERGY STAR qualified or equivalent (ENERGY STAR 2007).

In addition to the energy savings shown in Table 1, ENERGY STAR steam cookers are 90 percent more efficient than nonqualified steam cookers (ENERGY STAR 2007). New connectionless steamers that operate as a closed system, without a boiler and a drain, use much less water than older steamers that can use up to 40 gallons of water per year (ENERGY STAR 2007).

THE GREENEST ENERGY IS THE ENERGY YOU DON’T USE.

3.4 Waste Stream Management

Solid waste within the food service environment can be categorized as food, packaging and operating waste (IFMA 2009). The size and content of the waste stream in a food service environment is greatly impacted by the use of reusable or disposable dishes and flatware and the existence of recycling, composting programs and other waste management programs. The quantity of food not consumed by the customer constitutes a large portion of waste in the food service environment.

Table 1: Comparison of standard vs. energy-efficient appliances energy savings estimates

	Standard equipment and use	Energy-efficient equipment and use	Savings	Energy savings
Technology	***($/yr)***	***($/yr)***	***($/yr)***	***(%)***
Solid reach-in refrigerator	210	97	113	54
Lighting – incandescent	26	7	20	7
Walk-in freezer/cooler	118	39	80	67
Steamer	2,700	508	2,191	73
Prep table	406	182	223	55
Toaster	964	128	836	87

Excerpt from ENERGY STAR 2007

In fact, according to the U.S. Environmental Protection Agency (EPA), food waste is the number one least recycled material in the United States.

3.4.1 Reusable Ware

Using reusable dishes and flatware, combined with energy- and water-efficient dishwashers and environmentally preferable detergents is one option to reduce solid waste. When disposable flatware is required, compostable flatware is an alternate environmentally preferable option. However, compostable flatware must be directed to a commercial composting facility, as it will not degrade within a landfill environment. When making decisions about disposable flatware and dishware, be sure to consider products made from renewable materials, post-consumer content and products that are compostable.

3.4.2 Recycling Bottles, Containers and Paper Fibers

The EPA estimates that US residents, businesses and institutions produced more than 251 million tons of municipal solid waste in 2006, equivalent to approximately 4.6 pounds of waste per person per day. Plastic, glass and aluminum beverage containers, and materials made with fibers, such as paper and cardboard, are the most commonly recycled products in food service recycling programs. Check with the client, local agencies and waste haulers to determine which products can be recycled in a locale. Work with the custodial crew to review operational and training adjustments. Engage the client and customers in raising awareness and education.

3.4.3 Recycling Fryer Oil

Fryer oil from kitchens can be reprocessed and used for biodiesel, to generate on-site electricity, or in any diesel system including heating, automotive and trucking uses. In order for the fryer oil to be reprocessed, it must be collected and often stored on-site for a short period of time until it can be picked up. Fryer oil can be stored in 55-gallon (208 liter) drums, and up to 1,000-gallon (3,785 liter) containment units. The economics of disposing or reprocessing fryer oil is geographically dependent. Some locales currently have reprocessing facilities, and the food service company is paid to collect the fryer oil. In other locales, food service companies must pay to have the fryer oil removed.

3.4.4 Composting

Composting can also reduce the volume of the waste sent to the landfill. Similar to fryer oil reprocessing, opportunities for composting are dependent upon local jurisdictions, client preference and the amount of space available. For example, some states, such as Arizona, currently have rules in place that do not support composting, due to airborne illness and groundwater leaching concerns. Before starting a composting program, be sure to determine restrictions and requirements in the locale. By planning and implementing a composting program in partnership with the facility management team, food service provider and municipality, the pitfalls can be minimized and likelihood of a successful implementation increased.

Composting is a science, requiring the right proportions of air, water, organic waste and bulking agents for the decomposition to occur. When implementing a composting program, it is best to

work with a municipality or other third party who is familiar with composting. If a composting program is being considered, the following are a few tips:

- Food grinders can be used to increase the volume of compostable material.
- Composting can be put into practice in cold climates within greenhouses.
- Composting is not always an economical solution.

Efforts to minimize waste are also discussed in Part 5 Case Studies, with case studies on trayless dining and reusable to-go containers.

3.5 Venue-Specific Considerations

Within the food service environment, there are many types of facilities: cafeterias, vending areas, catering services, restaurants and concession stands. Some examples of sustainable practices unique to each of these facility types are described below.

3.5.1 Cafeterias

Within cafeteria environments, food service providers can offer opportunities for the consumer to make environmentally conscious decisions. If there is a minimal cost to make the environmentally conscious decision, the cost can be absorbed or passed onto the consumer, such as selling more responsibly manufactured water bottles and reusable bags and mugs (Figure 3). To encourage patrons to reuse their mugs, institute a frequency card program: buy 10 drinks using a reusable mug and get the 11th free. The cost of the 11th beverage is less than the cost of 10 cups, lids and straws. As a result, the frequency card program helps reduce waste, provides an opportunity for consumer education and is more economical.

3.5.2 Vending Areas

Vending areas include beverage and snack machines. Two strategies for sustainable vending areas are reducing the energy consumption of the vending machines and selecting vending machines that allow eco-friendly bottles to be loaded into the machine.

To reduce the energy consumption of vending machines, they can be powered down when the area surrounding them is vacant. Commercially available technologies exist that will monitor the room temperature and re-power the cooling system

Figure 3: Reusable bags and mugs

within the machine at one- to three-hour intervals to ensure the beverages stay cold. One vendor of this technology estimates that energy savings is increased by about 46 percent per machine.

Eco-shaped water bottles use 30 percent less plastic than comparable half-liter beverage containers. To use less plastic, the bottle walls are thinner. If eco-shaped water bottles are sold using a vending machine, the vending machine must be engineered to accommodate this type of bottle. If eco-shaped water bottles are dispensed by a vending machine that has not been engineered to accommodate these bottles, the bottles may explode during vending. The beverage vending machine shown in Figures 4 and 5 is designed to vend eco-shaped water bottles.

3.5.3 Catering

Within the catering environment, each event is unique. Each group has unique requests for food selection, signage and communication preferences during planning. The sustainable solutions that are implemented are dependent upon the

Figure 4: Eco-shaped water bottle compatible vending machine

client's budget, preferences and choices made. When catering a sustainable event, first work with the client and the event planners to identify their sustainability goals.

The goals may range from health and wellness menu planning, to providing locally sourced organic foods, to considerations of broader ecological impacts. In some cases, the client may have requested a green or sustainable event, but may not be certain what a green or sustainable event should include. The caterer can take this opportunity to work with the client to educate them about the available options.

One recommendation should be to determine ways to reduce waste. Clients are rarely opposed to waste-reduction methods, but often do not think to ask about this as a sustainable strategy. Waste reduction is a wise practice to implement because it is often one of the most sustainable practices in the catering environment, and it yields environmental and economic benefits. Some simple water conservation practices include:

- Not pre-filling water glasses. Instead, fill upon request.
- Use mugs instead of cups and saucers.
- Select tables that do not require linens, reducing the volume of washing required.

Potted plants can be used instead of cut flowers as another waste-reduction strategy. Potted plants can be placed on the dining tables and then moved to the stage for decoration, allowing the plants to be reused several times during a multi-space and/or multiday event. After the event, the plants can be used for future events or donated to nonprofit organizations, such as Habitat for Humanity or local senior centers for use in gardens. Replacing a vase of cut flowers with a 10- to 12-inch potted plant addresses the three aspects of sustainability:

- Environmentally: Waste is reduced because the life of a potted plant is longer than that of cut flowers and can be used over a longer period of time.
- Economically: Potted plants are a fraction of the cost of cut flowers.
- Socially: The plants can be donated, benefiting organizations that may not have the funds to purchase plants.

Figure 5: Eco-friendly water bottle in transport within the vending machine

3.5.4 Restaurants

Within the restaurant environment, sustainable practices are dependent upon the type of restaurant. Within a sit-down restaurant, table-top signs can be used to educate patrons. The table-top sign in Figure 6 is to educate patrons about the new recycling program implemented within a café. As a second example, a Los Angeles-area hotel restaurant used table-top signs to educate travelers that glasses of water are provided only upon request in an effort to reduce impacts of the drought. In fast-food restaurants, sandwiches can be wrapped in paper instead of using clam boxes to reduce the volume of solid waste. Additionally,

if composting facilities are available, unwaxed paper waste can also be composted.

Figure 6: Table-top sign to educate patrons

3.5.5 Concessions

Concession stands are most commonly found at sporting events. One universally relevant practice for concession environments is to implement a recycling program. Carbonated beverage companies will often provide containers to facilitate recycling of plastic bottles. To encourage recycling, place clearly marked waste and recycling bins next to each other in easily accessible locations. Although it may seem minor, the importance of placing the waste and recycling bins next to each other should not be overlooked.

3.6 Consumer Education

In the food service environment, consumer education includes communicating the benefits of sustainable and healthy eating practices and how to successfully participate in recycling and composting programs. Brochures, video display screens, table tents and posters placed within the eating and vending areas can be used for consumer education. For example, brochures about healthy eating habits, including how to determine a serving size and/or information on how to remove trans fats from one's diet, can be placed near serving lines (Figure 7). When starting a recycling program, table tents and signs near the recycling bins can help patrons understand what can and cannot be recycled. Be sure to simply and clearly define the requirements, such as completely emptying aluminum, plastic and glass containers, or that food-contaminated materials are not recyclable.

The Monterey Bay Aquarium's Seafood Watch program is one successful example of a consumer education program. The Monterey Bay Aquarium's Seafood Watch program works to raise consumer awareness about the importance of buying sustainable seafood, as nearly 75 percent of the world's fisheries are fully or over-fished. They recommend what seafood to buy and avoid, and help consumers make environmentally friendly seafood choices. Restaurants within any state within the United States can participate in the Seafood Watch Restaurant Program by implementing a sustainable seafood program at their restaurant, and by distributing educational materials and educating staff about sustainable seafood (Seafood Watch 2009). The Marine Stewardship Council also provides resources about consumer education and fishery certification (Marine Stewardship Council 2009).

Figure 7: Brochure to educate consumers about healthy eating habits

3.7 Measuring the Environmental Impact

Determining the environmental impact of a food service operation can reduce operational costs and improve environmental, financial and operational efficiencies. Like other sustainability initiatives, it is best to start by defining the goals of the effort and start with a small pilot project. Selecting too many metrics or too broad of a focus area can detract from the quantity and quality of the data generated.

The first step to measure the environmental impact of a food service operation is to determine what data should be collected, considering what environmental impacts are to be quantified. The data can include, but is not limited to, procurement

IDEAS FOR SUSTAINABILITY LEADERS

Here are a few sustainable strategies that are being practiced by sustainability leaders

- **Food Service Master Plan: When developing a campus or other food service venue master plan, be sure planning efforts include locating food service locations near public transportation and walking paths.**
- **Designing Facilities: When designing food service facilities, work with USGBC LEED® Accredited Professionals, chefs and financial planners to make conscious design decisions that will help reduce food waste and energy use.**
- **Local Purchasing Policy: Develop a food purchasing policy based upon local and regional capabilities. This will greatly assist in developing menus that focus on foods that align with mutually agreed upon goals.**
- **Meet Your Farmer Day: To educate patrons about local produce and farming, set up a "Meet Your Farmer Day" within the dining room. The patrons will have the opportunity to learn about where food comes from and the farmer will likely benefit from increased income.**
- **Janitorial "Policing": Provide small, friendly notifications cards for janitorial staff to help educate employees when they place recyclable materials into waste baskets instead of recycling bins.**

practices, water consumption, electricity consumption, chilled water consumption, steam usage, volume or weight of compostable materials, recyclable materials and trash. Collecting water and energy consumption data is often the easiest place to start since most of this information is contained within utility invoices. Waste stream and supply chain data are often the most difficult to gather since this information is often scattered.

When collecting energy consumption data, it is important to differentiate between direct and indirect energy sources, and renewable or nonrenewable sources, as each type of energy has a different emission factor. Differentiating between renewable or nonrenewable energy sources is relevant when a facility has solar panels, wind turbines or purchasing agreements with the utility to provide a certain percentage of electricity from renewable energy sources. A direct energy source is one that is used directly to generate energy that can be used at the food service facility. An indirect energy source requires an intermediate process in order for the energy source to be used. For example, steam is an indirect energy source, produced from burning coal.

Procurement data includes the amount of sustainable products purchased, such as sustainable seafood, fair-trade coffee, environmentally preferable serviceware and products containing recycled content. Volume or dollars (or other monetary units) are common units of measure for supply chain data because they are readily available from invoices and other tracking systems. Although in some cases, weight, such as pounds (kilograms) of fish, provides a more accurate reading on the quantity consumed.

In general, invoices are a good starting point for collecting data on procured products, water, energy and waste. When requesting invoices from others, it is important to explain why the data is being collected and how it will be used. This will help the people providing the invoices understand the value of the efforts and take ownership in the project. When invoices are not available, estimates and measurements can be used. If estimating data, document the methodology or conversion factors used. For example, electricity consumption data could be divided equally among all buildings or calculated based upon the occupied building area. Take caution, however, in that location-specific usage patterns and building types can have a large impact on electricity consumption. More simply put, 25 percent of the building area may not actually translate to 25 percent of the energy used. Similarly, waste generation data can be converted from volume to weight using standard conversion factors. In all cases, it is important to document the source of the data, as estimated figures may vary greatly from an actual reading — ultimately impacting the accuracy of the data.

Commercially available software systems can support effective data collection and analysis. Several software vendors offer solutions that are specifically designed to collect and manage resource consumption data, calculate greenhouse gas emissions and generate reports. For small calculation efforts, spreadsheets can also be used. Free resources to calculate greenhouse gas emissions are available; see links provided in section 6.2 Appendix B: Additional Resources.

Normalizing data enables an evaluation of efficiency measures, allowing comparisons from month-to-month and year-to-year at specific locations. Data can be normalized using several different units: number of guests, building area or revenue generated. After two to three years of data is collected, a benchmark for the facility can be established, which helps with decision-making. To start making decisions using the data, look for direct comparisons that allow conclusions to be drawn about practices within the organization. For example, compare the tipping fees for landfilled trash and recycling. If tipping fees for trash can be reduced, both environmental and economic benefits result.

4 MAKING THE BUSINESS CASE

In building the case for implementing sustainable food services, ensure that the recommended actions are aligned with the client's culture, business strategies and customer interest. All three factors will directly impact the type and extent of sustainability initiatives. By aligning goals, there is greater likelihood of securing buy-in. To make the business case and sell the ideas to senior management, start by developing goals, assessing the potential return on investment (ROI) and developing an action plan.

4.1 Developing Goals and an Action Plan

The first step to implementing sustainable food service practices within your organization is to clearly define the type of sustainable practices to implement. As shown earlier, categories of sustainability in the food service environment include responsible procurement, green buildings, energy management and waste stream management. If reducing operational costs is a key consideration, energy and water conservation can be a good starting point. If visible actions are the priority, local purchasing and waste reduction strategies can also often be good starting points. The sustainability checklists beginning on page 20 may also be helpful in determining where to start.

Second, define several attainable goals within the implementation area. Be sure the goals are manageable and include a realistic timeline and budget. To gain insight about the viability of the goals and lessons learned, talk with other professionals, companies and consultants who have successfully set and achieved sustainability goals.

During the goal determination process, develop a framework for prioritizing the goals. Consider factors such as client interest, consumer demand, cost and any operational adjustments. For example, classify the ideas as green, greener or greenest, and rank them in order of lowest to highest cost. After goals are classified, determine what goals to work toward first and if a top-down or bottom-up approach is needed. Depending on the size of the effort, implementing the goal(s) may require establishing a task force, providing consumer and/or employee education, developing marketing and/or educational materials or changing business practices. As the efforts at the facility mature, greener and greenest goals can be reset.

4.2 Calculating Return on Investment

Calculating the return on investment (ROI) is helpful when the required initial start-up funds are significant. Projecting the ROI provides a full assessment of all associated costs, enabling informed decision-making that considers the long-term implications. In the case of waste management, calculating the ROI is a four-step process. First, estimate the gross savings by determining how it is possible to reduce the volume of raw materials used, labor invested and/or waste disposal costs. Second, depreciate the estimated cost of the new equipment. Third, calculate the net savings, taking into account service and maintenance costs. Finally, project the net savings over multiple years (LeanPath 2009). Add up the total cumulative savings over multiple years and present this figure as well. This four-step process is summarized in Figure 8.

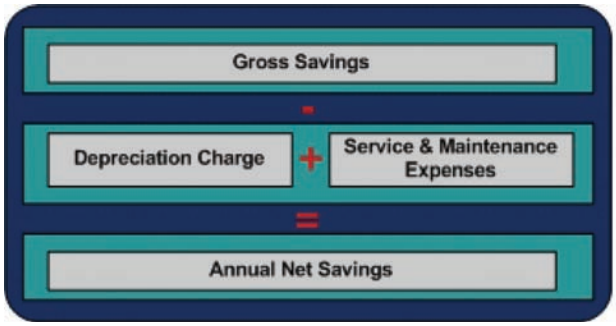

Figure 8: How to calculate ROI (LeanPath 2009)

4.3 Developing Sustainability Checklists

Implementing sustainable practices in the food service environment covers a very wide scope, including purchasing, buildings, operations and waste. Below are three checklists of sustainability action items. The action items have been classified as low cost of entry, medium cost of entry and higher cost of entry. Given factors such as variable costs, availability and practicality, the action items may be categorized slightly differently at

different facilities. The checklists are intended as starting points for identifying action items, but are not all-inclusive.

4.3.1 Low Cost of Entry

Responsible Procurement

- Purchase concentrated green cleaning products. Concentrated cleaning products are less expensive, require less packaging and take up less volume during transportation.
- Purchase fair-trade coffee or local produce, milk and dairy.
- Purchase ENERGY STAR appliances and/or equipment.
- Work with suppliers and producers to ensure fair wages and safe working conditions.

Energy Efficiency

- Air bake foods, instead of frying. Air baking is healthier and requires less energy to prepare than fried foods.
- Start and enforce a startup and shutdown schedule for cooking and holding equipment and the kitchen ventilation system (FSTC 2008).
- Clean evaporator and condenser coils on refrigeration units and air conditioning units to ensure proper airflow.
- Ensure refrigeration defrost timers are set properly, including defrost cycles.
- Install plastic strip curtains or swing-doors on walk-in refrigerators and freezers (FSTC 2008).
- Install a low-flow pre-rinse spray valve, less than 1.6 gallons per minute (0.10 liters per second), at the dish station (FSTC 2008).
- Clean and replace filters on air conditioning units (FSTC 2008).
- Insulate all accessible hot water pipes leading to and from the water heater (FSTC 2008).
- Replace incandescent lamps in the back of house and exterior fixtures with compact fluorescent lamps (FSTC 2008).
- Properly set outdoor lighting controls using an on/off schedule (FSTC 2008).
- Install “Turn Off Lights” reminders where appropriate (FSTC 2008).

Waste Reduction

- Place napkins and flatware as close as possible to where they will be used. When napkins are placed at the tables within a cafeteria or after the checkout counter, people will more frequently take only what they need (Figure 9).
- Provide to-go packing only upon request to reduce waste and cost.
- Promote local recycling programs to increase amount of recycled waste.

Figure 9: Locating napkins and utensils near point of use

Consumer Education

- Ask employees for suggestions and ideas, as their personal knowledge of the customers and facility often translates into excellent suggestions that are relevant and possible.
- Engage building occupants, students, custodial staff and maintenance staff in sustainability efforts at the facility.
- Use signs to remind and educate customers:
  - To “Take only what you need” for napkins
  - Of “What is local today” to encourage the selection of locally sourced foods
  - About portion control to reduce food waste

4.3.2 Medium Cost of Entry

Procurement

- Purchase organic food.
- Serve select sustainable seafood, such as line-caught Pacific salmon.

Green Buildings

- When designing a new food service space or planning a major renovation, determine the most space-efficient layout as possible. An efficient space layout can reduce the environmental footprint by decreasing the building area that needs to be cleaned and energy needed to light, heat and cool the space.
- Install large windows to utilize natural light.
- Consider the use of passive ventilation strategies.
- Consider maintenance requirements, life cycle operating costs and energy consumption when selecting new kitchen equipment, lighting, and heating and ventilating systems.
- Within food serving areas, consider the use of

space-efficient serving counters, such as the one shown in Figure 10.
- If a char broiler is used, consider where a griddle could be used to meet some of the food preparation needs. A char broiler located within an island is very inefficient. By installing a smaller char broiler, the volume of kitchen exhaust air is reduced, reducing energy consumption during the food preparation process.

Figure 10: Curved space-efficient countertop

Energy Efficiency
- Replace T12 fluorescent fixtures with energy-efficient T8 or T5 fixtures with electronic ballasts or other equivalent efficacy lighting (FSTC 2008).
- Install occupancy sensors in areas of infrequent use.
- Install a time clock to control the ice machine and restrict hours of operation to off-peak hours (FSTC 2008).
- Install a vending controller to turn the machine off when the area is unoccupied.
- Install low-flow pre-rinse spray valves, less than 1.2 gallons per minute (0.08 liters per second) or 1.6 gallons per minute (0.10 liters per second), at the dish machine pre-rinse station (FSTC 2008).
- Install side panels at the exhaust hoods.

Waste Reduction
- If disposable flatware and dishes are used, look for products made with post-consumer content or that are recyclable.
- Use 100 percent biodegradable and compostable takeout boxes made of bamboo, sugar cane and grass reed instead of Styrofoam (Figure 11). Although Styrofoam continues to be the least expensive material for takeout boxes, it has many negative environmental impacts.
- Implement a reusable lunch bag program using a top-down approach. Send clients reusable lunch bags with directions of how to sell the bags and how much to charge, and preprinted marketing and promotional materials to sell the bags.
- Waste can be compacted using trash compactors to reduce the volume that is to be transported to the landfill.
- Provide separate bins for waste separation. Bins can be provided for recyclable materials (plastic, glass and aluminum), compostable items (organics, paper and compostable napkins) and waste.

Figure 11: 100% biodegradable and compostable takeout box

Consumer Education
- Install electronic displays and provide brochures about how customers can be more sustainable at home and at the office.
- Provide training materials and sustainability tool kits to clients for a small fee. Charging a small fee helps the clients see that the materials being provided are of value and should be given serious consideration.
- Provide Web-based presentations to train client locations about sustainable practices and effective methods to promote behavior change.
- Eliminate the sale of single-use water bottles and provide filtered water systems that promote the use of reusable bottles and cups.

4.3.3 Higher Cost of Entry

Responsible Procurement
- Serve pasture-raised, organic beef
- Use cage-free eggs
- Provide eco-friendly disposables

Energy Efficiency

- Replace incandescent or neon lighting in channel signs with LEDs (FSTC 2008), as shown in Figure 12.
- Install induction-type fluorescent lamps or LED lamps in walk-in freezers and refrigerated display cases (FSTC 2008).
- Install a demand control ventilation system for the kitchen exhaust hood (FSTC 2008).

Waste Reduction

- Use food grinders to increase the volume of compostable content.

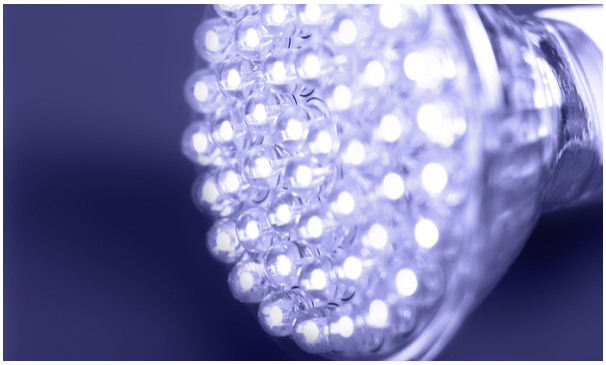

Figure 12: LED lights

5 CASE STUDIES

Two case studies are presented. The first features trayless dining. The second discusses pilot programs for using reusable to-go containers.

5.1 Trayless Dining

Trayless dining is an initiative that has gained attention over the last several years. This case study captures the findings of an analysis performed by ARAMARK at 25 colleges and universities in the United States. The results are impressive: over the course of serving 186,000 meals, there was a 25 to 30 percent per person reduction in food waste (ARAMARK 2008).

Trayless dining is the removal of trays from the dining environment to promote reduction in food waste, and water and energy consumption. Instead of picking up a tray to go through the cafeteria line, students pick up a plate (Figure 13). Food waste is reduced because students can only take what can fit on their plate or in their hands. When trays are used, some students have the habit of taking more food than they actually eat. In addition, consumption of water, energy, dishwashing detergents, drying agents and cleaning chemicals is reduced because these resources are no longer needed to wash trays. Before implementing this technique, be sure the dish conveyor is designed to allow plates to be transported on the conveyor. Older-style, roller conveyors may need to be modified to support this technique.

In the ARAMARK study, food waste was analyzed per person for the 2008 academic year. The amount of food waste generated when using trays and not using trays was compared. Over the test period, the 25 institutions collectively generated 11,505 pounds (5,219 kilograms) less waste on days trays were not used. On average, food waste was reduced between 1.2 and 1.8 ounces (34 to 51 grams) per person per meal using trayless dining – a 25 to 30 percent reduction in food waste. It was estimated that about one-third to one-half gallon (1.1 to 1.9 liters) of water was saved per each unused tray. Energy consumption and energy savings for the 25 institutions were not quantified because of variation in regional and local utility rates, institutional fuel mixes and operating practices. Table 2 further summarizes the benefits of trayless dining.

The cultural acceptance of trayless dining is one of the largest challenges to its implementation. To further study the cultural acceptance of trayless dining, a survey of more than 92,000 students, faculty and staff at 300 North American institutions was conducted. The overall finding was

Table 2: How trayless dining meets the triple bottom line

Environmental
• Conserves energy by eliminating the need to heat water for washing trays • Reduces water consumption in the cafeteria between one-third to one-half gallon (1.1 to 1.9 liters) of water per tray • Reduces the volume of chemicals, detergents and drying agents used to wash trays • Decreases landfill waste
Social
• Educates about environmental topics • Reinforces sustainability initiatives • Encourages student participation in green initiatives • Reinforces sustainable practices on a nearly daily basis
Economic
• Saves money from reduced water and energy consumption • Saves money from reduced consumption of detergents and rinsing/drying agents • Eliminates the cost of trays • Reduces food-waste disposal costs

Adapted from ARAMARK 2008

that 79 percent of respondents would support the removal of trays from the dining environment in an effort to reduce waste on the campus. To overcome a cultural acceptance gap or other potential challenges, include these strategies during the planning and implementation of the program:

- Start by conducting a pilot program. To gain additional support, conduct the pilot program during periods of heightened environmental awareness, such as Earth Day.
- Develop comprehensive communication initiatives to educate and inform all campus stakeholders, including students, faculty, staff, senior administrators, student government participants, campus environmental organizations and the faculty senate.
- Engage stakeholders by providing tours of the dish room to understand first hand the impact of removing trays from the dining environment.
- After the pilot program has demonstrated success, implement the program at the start of the next academic year.
- Apply trayless dining best practices (Table 5).

To obtain buy-in from senior management and senior administrators, demonstrate how trayless dining meets social, environmental and economic goals of the organization. Emphasize the potential savings from reduced resource consumption, social responsibility through education about portion control and the reduced environmental impact from reduced consumption of water and energy, as well as a reduction in food waste volume. If senior management is skeptical, share the quantitative benefits that the University of Maine at Farmingdale and Grand Valley State University

Figure 13: Trayless dining

experienced as a result of implementing trayless dining, as described below.

5.1.1 University of Maine at Farmingdale

Trayless dining was implemented in February 2007 at the University of Maine at Farmingdale, USA, as part of a campuswide environmental initiative. The food service executives and managers worked with the university's Sustainable Campus Coalition to successfully implement the program. The key to the successful launch of the program was educating students about the benefits of reducing food waste and its environmental impact. The president of Farmingdale supports the program, stating: "We've quickly seen the benefits of trayless dining because it saves water, energy, time and money. It's the right thing to do." Table 3 quantifies the benefits of the Farmingdale trayless dining program.

Table 3: Quantitative benefits of trayless dining at University of Maine at Farmingdale

Environmental
• Food waste reduced by 46 pounds (21 kilograms) per person per year • Overall food waste reduced by 65,000 pounds (29,400 kilograms) per year • Conserved 288,288 gallons (about 1 million liters) of water per year
Social
• Created awareness about food waste and the environment • Recognized by the community for reducing the volume of wastewater sent to the local wastewater treatment plant • Students reported better dining experience without trays
Economic
Total estimated annual savings of $57,000 (US dollars)

Table 4: Quantitative benefits of trayless dining at Grand Valley State University

Environmental
• Food waste reduced by 56 pounds (25 kilograms) per person per year • Overall annual waste reduction of 960 pounds (435 kilograms) of food per week, equivalent to 14 tons (12.7 tonnes) per year • Reduced water consumption by 31,000 gallons (117,000 liters) • Reduced dish detergent and sanitizer consumption by 540 pounds (245 kilograms) per year
Social
• Created greater awareness about food waste and the environment • Helped students learn about portion control
Economic
Total estimated annual savings of $79,000 (US dollars)

5.1.2 Grand Valley State University

Grand Valley State University in Allendale, Michigan, USA, piloted trayless dining in spring 2007 as part of Earth Week events. Trayless dining was then implemented permanently in fall 2007. The program was implemented by food service directors and managers. They proposed the idea to the student government to gain support and present the benefits of trayless dining. During the initial planning, the program was met with some hesitation. One participant voiced that the program was "crazy" and "students will never go for it." Despite this doubt, Grand Valley's trayless dining program has successfully impacted the triple bottom line (Table 4).

5.2 Reusable To-Go Containers

Reusable to-go food containers can be used to reduce waste at any type of dining facility, such as campus dining halls and corporate cafeterias. The reusable containers are dishwasher safe and are cleaned using the same cleaning process as the dinnerware used in campus dining halls. If reusable to-go food containers were used at 600 colleges and universities within North America, it is estimated that more than 2 million disposables could be diverted during an academic year (ARAMARK 2009).

Reusable to-go food containers programs were piloted at several campuses in the United States during the 2008 to 2009 academic year, including Baylor University in Texas, University of Florida, University of North Carolina-Chapel Hill, Peace

Table 5: Trayless dining best practices

Best Practices of Trayless Dining	
1	Keep trays stored, but readily available for people who demand one. Some individuals may not support the practice and expect to have a tray.
2	Provide trays for the disabled.
3	Educate staff and employees about the benefits. A main source of resistance can come from dining and kitchen staff, especially long-term employees.
4	Conduct a pre-implementation survey to determine potential challenges and concerns.
5	Conduct a pilot program, preferably during Earth Day/Week as a voluntary program. Migrate to a mandatory program at the start of the next academic year.
6	Collect waste reduction data and share the results with the campus community.

College in North Carolina and Salem College in North Carolina. Students that participated in the pilot programs were very supportive and understood how landfill waste was reduced through the use of reusable to-go containers when compared to the use of conventional disposable containers.

At Baylor University, in 2007-2008, about 500,000 Styrofoam to-go containers were used. After implementing the reusable to-go container program, Styrofoam usage has dropped 40 percent. It was also estimated that $20,000 (US dollars) would be saved annually by implementing the reusable to-go container program. The savings are attributed to the reduced volume of waste and reduced disposal fees (ARAMARK 2009). The two largest challenges of the reusable to-go container programs are that the containers do not dry as fast as plates and it is currently unknown how the product holds up over an extended period of time.

5.2.1 Implementing A Reusable To-Go Container Program

There are seven steps necessary to successfully implement a reusable to-go container program.

Step 1: Determine the scope of the program. Is the scope to completely eliminate disposable to-go containers or to reduce the number of disposable to-go containers? In general, larger schools or schools that are just starting to implement sustainable initiatives are encouraged to start by reducing the number of disposable to-go containers.

Step 2: Determine how many containers need to be ordered. If the scope is to eliminate disposable containers, the container order should be about 110 percent of the total number of meal plan memberships. If the goal is to reduce the number of disposable containers, order the number of containers that is equal to about 25 percent of the daily patron count.

Step 3: Determine a selling and replacement cost for the containers. For programs seeking to eliminate disposable containers, provide one reusable to-go container to each student as part of their meal plan. If a student loses their container, charge $5 (US dollars) for replacement. If the goal is to reduce the number of disposable containers, sell the to-go containers at cost.

Step 4: Work with marketing staff to advertise and promote the program. The following benefits can be used within the marketing campaign:

- Help reduce waste
- Conserve resources and materials
- Reduce the cost of waste management
- Encourage school pride by printing the school logo on the containers (ARAMARK 2009b)

Step 5: Train dining services employees about how the program works and the environmental benefits of the program, and how to provide customer service to staff and students to support the reusable to-go container program.

Step 6: Track the usage of the reusable to-go containers to quantify environmental and economic benefits.

Step 7: Determine if local recycling companies accept #5 plastics. If #5 plastics are not collected locally, to-go containers needing to be recycled can be mailed to Preserve Products (see www.preserveproducts.com/recycling/gimme5locations.html). The reusable to-go containers in Figure 14 are:

- Stackable
- Reusable
- Break resistant
- Dishwasher safe
- Microwave safe for reheating
- BPA free
- Recyclable #5 plastic

Figure 14: Reusable to-go containers made of #5 plastic (ARAMARK 2009b)

5.3 Conclusion

The principles of sustainability, including social, environmental and economic principles, can be widely applied in the food service environment. As discussed, sustainability within the food service environment can be classified as responsible procurement, green buildings, energy management practices and waste stream management. To implement sustainable principles at a specific facility, start by making an action plan. As the action plan is developed, be sure to review the checklists presented, consult colleagues who have successfully implemented sustainability initiatives, and review section 6.2 Appendix B: Additional Resources to gain additional sustainability knowledge.

Each successfully implemented and sustained effort will have a lasting impact on the environment, economy and society.

6 APPENDICES

6.1 Appendix A: References

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6.2 Appendix B: Additional Resources

Consumer Education
Developing consumer brochures about healthy eating and portion sizes: www.mypyramid.gov

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Convention Industry and Green Meeting Planning Convention Industry Council Green Meetings Web site: www.conventionindustry.org/StandardsPractices/GreenMeetings.aspx

Energy Efficiency
Food Service Technology Center: www.fishnick.com

The Energy Efficient Kitchen, Interactive Web site: www.fishnick.com/design/eek/kitchen.html

ENERGY STAR
ENERGY STAR Small Business Network: Free information, technical support and public recognition for restaurants that take action to save energy: www.energystar.gov/index.cfm?c=small_business.sb_index

Food Safety
"Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables." www.fda.gov/downloads/Food/guidancecomplianceregulatoryinformation/guidancedocuments/productsandproducts/UCM169112.pdf

Listing of USDA Good Agricultural and Good Handling Practices Inspection Offices: www.fsis.usda.gov/Contact_Us/Office_Locations_&_Phone_Numbers/index.asp

State of Florida Department of Agriculture: www.doacs.state.fl.us/divisions.html

State of Maryland Department of Agriculture: www.mda.state.md.us

State of South Carolina Department of Agriculture: www.agriculture.sc.gov

National Restaurant Association ServSafe: www.servsafe.com

United States Department of Agriculture (USDA): www.usda.gov

Food Service
Food Service Technology Center: www.fishnick.com

HOBART Center for Food Service Sustainability:
www.hobartcorp.com/sustainabledesign/hcfs/default.aspx

IFMA Restaurant and Food Service Community of Practice: www.ifma.org/communities/rfs

North American Association of Food Equipment Manufacturers: www.nafem.org

Food Waste
Food Waste Tracking Systems: www.leanpath.com/lpweb/index2.htm

FSC Certified Paper Products
Forest Stewardship Council: www.fscus.org/paper

Green Buildings
ASHRAE Green Guide (2006): The Design, Construction and Operation of Sustainable Buildings, 2nd Ed.

BetterBricks: www.betterbricks.com

Life-Cycle and Energy Cost Calculators: www.fishnick.com/saveenergy/tools/calculators

Outdoor Air Load Calculator: www.fishnick.com/ventilation/oalc

Pre-Rinse Spray Valve/Water Cost Calculator: www.fishnick.com/savewater/tools/watercalculator

U.S. Environmental Protection Agency Green Buildings: www.epa.gov/greenbuilding

U.S. Green Building Council: www.usgbc.org

Whole Building Design Guide: www.wbdg.org

Greenhouse Gas Calculators
Greenhouse Gas Protocol Initiative: www.ghgprotocol.org/calculation-tools/all-tools

EPA Waste Reduction Model (WARM):
www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html

EPA Greenhouse Gas Equivalencies Calculator:
www.epa.gov/cleanenergy/energy-resources/calculator.html

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

Restaurants
GS-46, Green Seal™ Standard for Restaurants and Food Services, First Edition, April 20, 2009: www.greenseal.org/Portals/0/Documents/Standards/GS-46/GS-46_Restaurants_and_Food_Services_Standard.pdf

Green Restaurant Association: www.dinegreen.com

National Restaurant Association: www.restaurant.org

National Restaurant Association, Conserve Solutions for Sustainability: conserve.restaurant.org

Water Efficiency
EPA WaterSense: www.epa.gov/watersense

6.3 Appendix C: Glossary

Biodegradable: Capable of decomposition into simpler, more stable organic compounds, by natural bio-logical processes by living microorganisms, such as bacteria or fungi.

Cage free: Birds not confined to cages. Generally, this means that the birds live on the floor of a large barn.

Composting: A process whereby organic wastes such as food waste, paper and yard waste decompose naturally, resulting in a product rich in minerals. Compost is ideal to use as a soil conditioner and can be used for gardening, farming, mulch or landfill cover.

Compostable: Solid biodegradable materials that decay to a nutrient-rich, natural material under con-trolled conditions in a commercial composting facility utilizing controlled microorganisms, humidity and temperature.

Demand charge: A utility charge billed on the basis of demand, under a rate set by a schedule or con-tract (Wirtz 1998).

Demand control ventilation: A control strategy that provides for a ventilation system that provides ventilation air in response to the number of occupants or the process load requirements (such as kitchen exhaust) for a location within a building.

Fair trade: A business practice that includes fair prices, fair labor conditions, direct trade, democratic and transparent organizations, community development and environmental sustainability to empower farmers and farm workers to compete in the global marketplace. Such practices help to decrease poverty by investing in farms and communities, protect the environment and develop business skills of farmers and farm workers.

Food service environment: Any public location that provides food to a group of individuals, including cafeterias, vending machines, catered meals, concession stands and restaurants.

Food safety: The handling, packaging and storage practices for food, much of which is part of the distributor's responsibility.

Heat exchanger: Any device used to transfer heat from one medium to another (Wirtz 1998).

Hormone free: Animals that have been raised without the use of growth hormones.

Makeup air: Air drawn into a conditioned space to replace air that has been removed by an exhaust system (Wirtz 1998).

Monterey Bay Aquarium Seafood Watch Program: A seafood program designed to raise consumer awareness about the importance of buying seafood from sustainable sources.

Supply chain: The strategy where buyers and sellers collaborate to bring greater value to the customer. Effective management of the supply chain enables businesses to make informed decisions, including acquiring raw materials, manufacturing products and distributing finished goods to the consumer.

Sustainable seafood: Seafood fished or farmed from sources that can maintain or increase long-term production without jeopardizing the affected ecosystems. When evaluating if seafood is sustainably sourced, the following are considered: inherent vulnerability of the species to fishing pressure, the population of the species, the effect of fishing practices on habitat and ecosystems and the effectiveness of fishery management.

Trayless dining: The removal of trays from the dining environment to promote food waste reduction and reduce water and energy consumption. Water and energy consumption is reduced because the volume of water, energy and cleaning chemicals needed to wash the trays is no longer needed.

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