



A Strategic Guide for Using Data to Drive Food Loss and Waste Reductions

Fall 2017

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Introduction

Over the last five years, there has been a grand awakening to the quantity of food - estimated at **30-40 percent of what is produced** - that goes to waste in America. In our last eBook, *A Beginner's Guide to Food Waste*, we highlight some of the massive financial, environmental, and social consequences of food loss and waste (FLW) in the United States. Some key points to note:

- ✓ Food manufacturers and consumer-facing businesses (e.g., grocery retailers, food service, etc.) collectively spend almost **\$60 billion annually** on food that never reaches a plate.
- ✓ Taking action to avoid food loss and waste significantly reduces **greenhouse gas emissions from agriculture**.
- ✓ America's **top food service providers, major food company executives, and leading food distributors** are committing to food waste reduction strategies.



Food waste is a nexus issue for us, so addressing the issue impacts many other corporate responsibility metrics we use to measure our performance.

- Nell Fry,
Senior Manager of Sustainability Field Support,
Sodexo USA



An effective FLW reduction strategy is built upon comprehensive data. Data provides insight into: why losses occur in operations; which areas provide the biggest opportunity for improvement; and how to continuously make progress towards goals.

This guide is intended for food manufacturers, wholesale distributors, and grocery retailers interested in using data to better manage unsold inventory and reduce the volume of food sent to landfill.

Identifying the Food Waste Opportunity

To understand FLW within a company, it is essential to measure the quantity of food that is lost in production or along the supply chain, as well as how much food is wasted before it reaches a consumer. Measurement provides the data to guide an effective FLW reduction strategy.

Why Measure?

Food businesses have both internal and external motivations for quantifying food loss and waste.

INTERNAL MOTIVATIONS

Corporate Commitments

- **U.S. Food Loss and Waste 2030 Champions:** Twenty major U.S. food businesses have committed to halve FLW within operations by 2030.
- **The Consumer Goods Forum:** In 2015, the Consumer Goods Forum's Board of Directors passed a food waste resolution that aims to halve food wasted within operations of retailer and manufacturer members by 2025.

Employee Engagement

- Studies have found that **employee retention, productivity, and engagement** all go up when companies have strong corporate sustainability practices.
- **88% of millennials** say a job is more fulfilling when they are provided opportunities to make a positive impact on a social or environmental issue.

Operational Efficiencies

- **Tesco PLC, UK Grocer/Food Waste Pioneer:** "Transparency and measurement are essential for identifying hotspots, and in tackling the causes of food waste. It helps everyone understand how much, where, and why food is being wasted."
- **The Business Case for Reducing Food Loss and Waste:** A review of 1,200 business sites across 700 companies in 17 countries found that nearly every site achieved a positive financial return from investing in measures to reduce food loss and waste.

EXTERNAL MOTIVATIONS

Shareholder Requests

- **Trillium Asset Management**, a progressive investment management firm based in Boston, MA, directly engages companies like **Whole Foods** and **Target** to report on FLW generation and actions to mitigate the issue.
-

Customer Engagement

- "Time and time again, more than two dozen leaders from across the world said reducing FLW strengthened relationships with consumers, and improved retention and loyalty." - **Can Reducing Food Waste Solve the Customer Loyalty Problem?**, Liz Goodwin, Senior Fellow and Director, Food Waste at World Resources Institute
-

Sustainability Communications

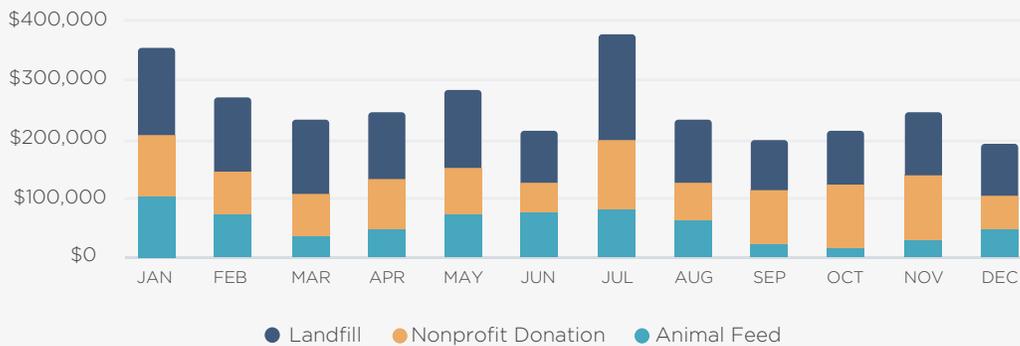
- Food business leaders, like **Sysco Corporation**, **Gordon Food Service**, **Nestlé**, and **Kroger**, include food recovery data in sustainability reports or sales and marketing collateral.



Baseline, Benchmarking, and the *Food Loss and Waste Standard*

The first step in any improvement process is to establish a baseline to measure progress against. A baseline should include how much FLW a company generates and how it is managed (sometimes referred to as a FLW inventory). Thought leaders like [Champions 12.3](#) and the [U.S. Food Loss and Waste 2030 Champions](#) track annual progress against a baseline to facilitate continuous improvement.

Diversion Summary



An example of a food loss and waste baseline developed using the Spoiler Alert platform.

Definitions for FLW often differ between and even among entities. For this reason, it can be challenging to compare FLW baselines and benchmark performance to industry standards or competitors. With the development and launch of the [Food Loss and Waste Accounting and Reporting Standard \(FLW Standard\)](#), entities now have access to a globally recognized set of accounting and reporting rules for developing a FLW inventory that enables transparency and benchmarking among peer companies. The *FLW Standard* caters to different motivations for measuring FLW and allows for a number of [quantification methods](#). Major companies, including [Delhaize America](#), [Nestlé](#), and [Kellogg Company](#), have all utilized the *FLW Standard* to quantify and report out FLW.

Diversion Breakdown



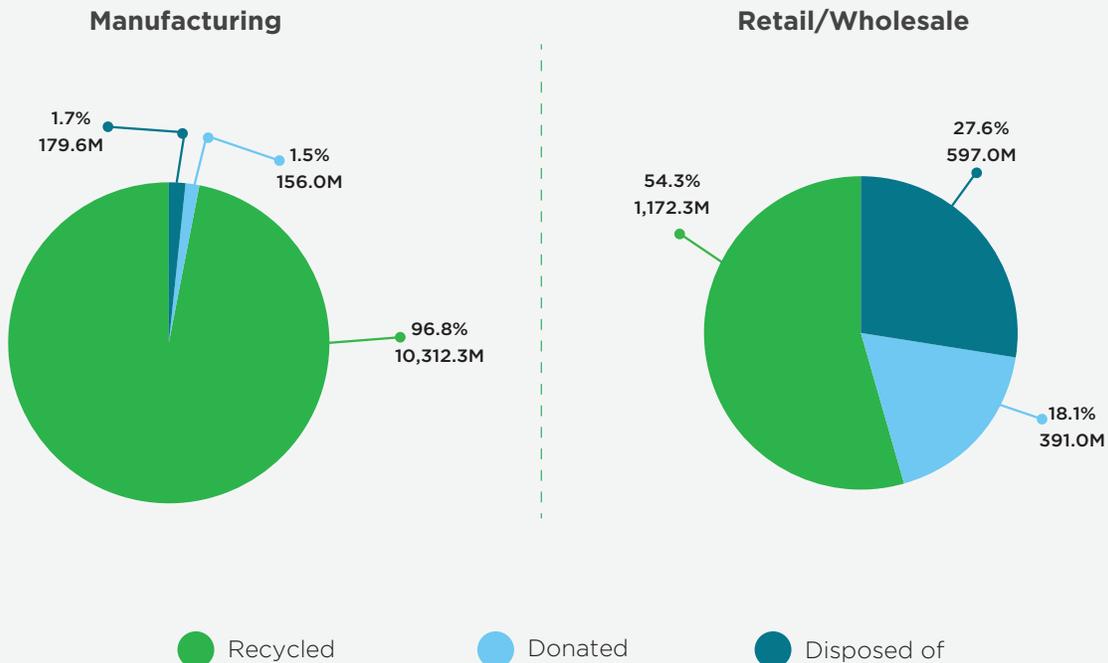
• Landfill	\$1,825,030
• Nonprofit Donation	\$881,600
• Animal Feed	\$1,149,913

Spoiler Alert offers the **industry's first** cloud-based reporting and analytics platform aligned to the *FLW Standard*, enabling the real-time tracking of unsold inventory and organic waste across a portfolio of locations and destinations. Learn more at www.spoileralert.com/flwstandard.

Industry Averages for FLW Diversion:

Since 2012, **The Food Waste Reduction Alliance**, a collaboration of the **Grocery Manufacturers Association**, **Food Marketing Institute**, and **National Restaurant Association**, has published annual reports detailing FLW generation among food manufacturers, retailers, and restaurants. In Fall 2016, the FWRA released **its fourth analysis**, which found that on average, manufacturers divert 300 lbs of food waste per \$1,000 of revenue, while food wholesalers and retailers divert only 6.6 lbs of food waste per \$1,000 of revenue.

Destinations of Food Waste (in Pounds), 2016



Source: *Analysis of U.S. Food Waste Among Food Manufacturers, Retailers, and Restaurants. Food Waste Reduction Alliance*

Solutions for Obtaining Data

An organization has a suite of options to obtain data on FLW, which differ in terms of accuracy, completeness, and continuity, as well as the level of investment required. For companies that decide to put forth a concerted effort to reduce waste, identifying a consistent and credible data collection strategy is important. Equally important is staff buy-in and the introduction of Standard Operating Procedures (SOPs) to ensure the same data collection strategies are implemented across locations. We highlight three of the many options available below:

Solution	Primary User	Purpose	Benefit	Tools
Waste Audit	SMEs; Academic Institutions	Systematic review of facility and its operations to quantify waste generation and identify management practices (EPA)	Provide a snapshot in time of the types and amounts of waste an organization generates that can be extrapolated to figure out total volumes (EPA)	EPA; RecyclingWorks Massachusetts
Waste Tracking & Analytics	Restaurants; Food Service Providers	Provides entities that prepare food with data on wasteful practices to inform behavior and operational changes (ReFED)	Enables source reduction via hard data on volumes and types of food thrown out during preparation, informing operational improvements and building business case for investments in other solutions (ReFED)	National Restaurant Association's Conserve Program; LeanPath; Winnow
Enterprise Software	Manufacturers; Distributors; Retailers	Organizational software that provides enhanced analysis and data to optimize the flow of unsold inventory to new and existing outlets	Real-time, continuous tracking and insights into what a company is and is not recovering to improve unsold inventory management	Spoiler Alert; Oracle; SAP

Using Data to Improve

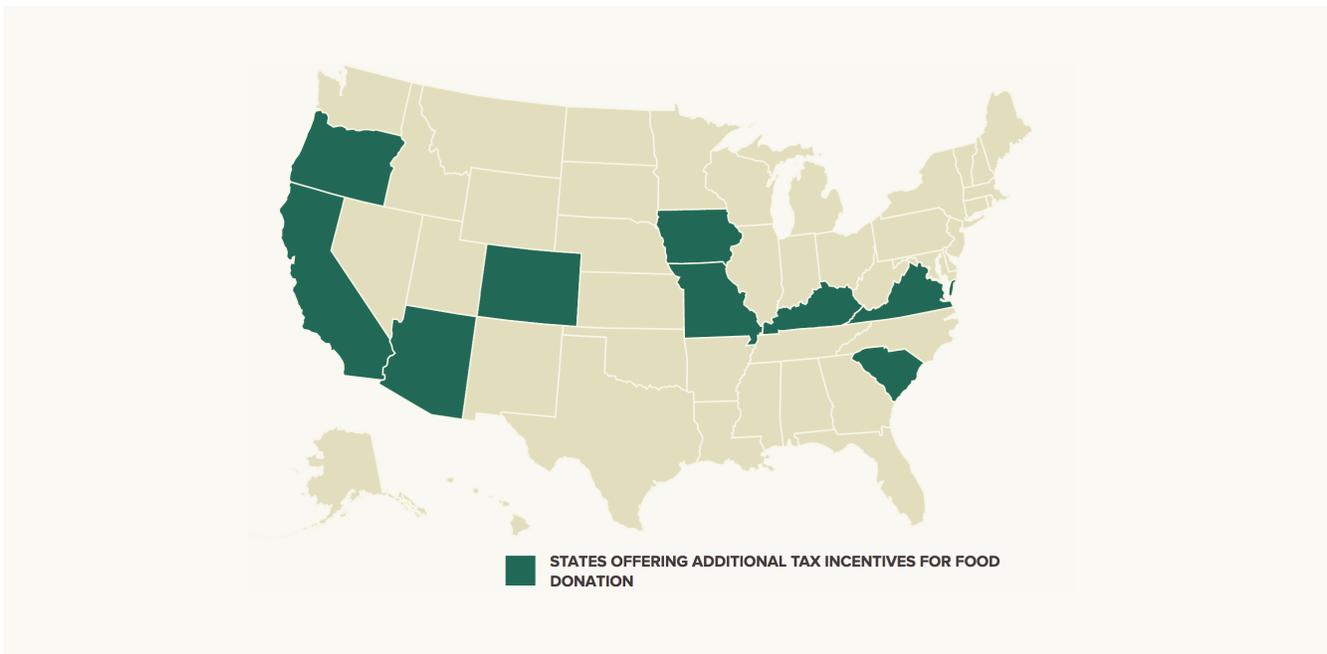
It is critical that data drive the direction of any FLW reduction effort. By leveraging data to track Key Performance Indicators (KPIs), companies are empowered to measure and monitor progress of FLW reduction initiatives.

The Math Behind Diversion Optimization

As businesses seek to reduce financial losses associated with unsold inventory, two common options are liquidation and donation. Enhanced tax deductions resulting from donation and waste hauling fees associated with disposal (combined with the social and environmental costs of sending food to landfill) provide strong incentives for businesses to divert as much surplus as possible.

Federal and State Tax Deductions

According to the Internal Revenue Code (IRC) Section 170, an [enhanced federal tax deduction](#) is available to businesses when donating food inventory to a qualified 501(c)(3) non-profit organization serving food insecure populations. In addition to this enhanced deduction at the federal level, [nine states](#) offer additional tax incentives for food donations. The Harvard Food Law and Policy Clinic's [Keeping Food Out of the Landfill: Policy Ideas for States and Localities](#) provides detailed information on state tax incentives.



Source: ReFED

Because of the enhanced federal tax deduction, the financial benefits associated with the donation of surplus can be greater than the potential revenue resulting from a sale at discount. This benefit was augmented and extended indefinitely in 2015 by way of the **PATH Act**, enabling businesses to claim deductions of up to 15 percent of taxable income. According to the law, a donor is eligible to deduct the lesser of:

1. Unit cost x 2
2. Unit cost + ½ Expected Gross Margin

Regardless of whether unsold inventory is liquidated, donated, or hauled as waste, many food companies will write off the unit cost of unsold product as a loss. As such, we will assume the available enhanced deduction for qualified donations is the lesser of the following values:

1. Unit cost
2. ½ Expected Gross Margin

In almost all cases within the manufacturing, distribution, and retail industries (where gross margins are far less than 66 percent), the latter scenario applies.

Liquidation, Donation, Disposal

To demonstrate a comparison of financial outcomes associated with liquidation, donation, and disposal, we will be using data from Boylston Foods, a hypothetical produce distributor.

Example: Boylston Foods	
Cases of Fruit Purchased	2,500,000
Cases of Surplus	50,000
Fair Market Value per Case	\$40
Pounds per Case	20
Cost per Case	\$30
Waste Hauling Fee per Ton	\$90
Liquidation Offer per Case	\$12
Operating Expenses	\$20,000,000

As a typical produce distributor, Boylston Foods purchases inventory based on projected customer demand with the goal of selling as close to 100% of purchased product to its customers. The price point at which it sells these goods is herein referred to as Fair Market Value (FMV). In addition to the cost of inventory, Boylston Foods also has operating expenses, which are day-to-day costs associated with rent, employee salaries and benefits, vehicles, utilities, and other overhead.

To determine the optimal financial outcome for its 50,000 cases of surplus fruit, the management team will compare dollar values associated with liquidation, donation, and disposal at \$12 per case (a 60 percent discount off of its unit cost).

First, Boylston Foods calculates the cost associated with disposal of the surplus cases. As seen in the table above, the company pays a waste hauling fee of approximately \$90 per ton.

$$\begin{aligned}
 \text{Cost of Disposal} &= \text{Tons of Waste} \times \text{Waste Disposal Fee per Ton} \\
 &= \frac{\text{\# of Units Wasted} \times \text{Pounds per Unit}}{\text{Pounds per Ton}} \times \text{Waste Disposal Fee per Ton} \\
 &= \frac{50,000 \text{ units} \times 20 \text{ lbs per unit}}{2,000 \text{ lbs per ton}} \times \$90 \text{ per Ton} \\
 &= \$45,000
 \end{aligned}$$

Next, Boylston Foods determines the value of the deduction associated with donation:

$$\begin{aligned}
 \text{Unit Cost} &= \text{Unit Cost} \times \text{\# of Units Donated} \\
 &= \$30 \text{ per unit} \times 50,000 \text{ units} \\
 &= \$1,500,000
 \end{aligned}$$

OR

$$\begin{aligned}
 \frac{1}{2} \text{ Expected Gross Margin} &= \frac{1}{2} \times (\text{FMV per Unit} - \text{Cost per Unit}) \times \text{\# of Units Donated} \\
 &= \frac{1}{2} \times (\$40 - \$30) \times 50,000 \text{ units} \\
 &= \$250,000
 \end{aligned}$$

In this scenario, Boylston Foods is eligible to deduct the lesser of the two values, which is $\frac{1}{2}$ expected gross margin. As a result of this deduction, Boylston Foods can reduce its taxable income from \$3,000,000 to \$2,750,000.

Finally, Boylston Foods determines the revenue associated with selling its surplus cases to a closeout buyer. The buyer has made an offer to pay \$12 per case for the inventory.

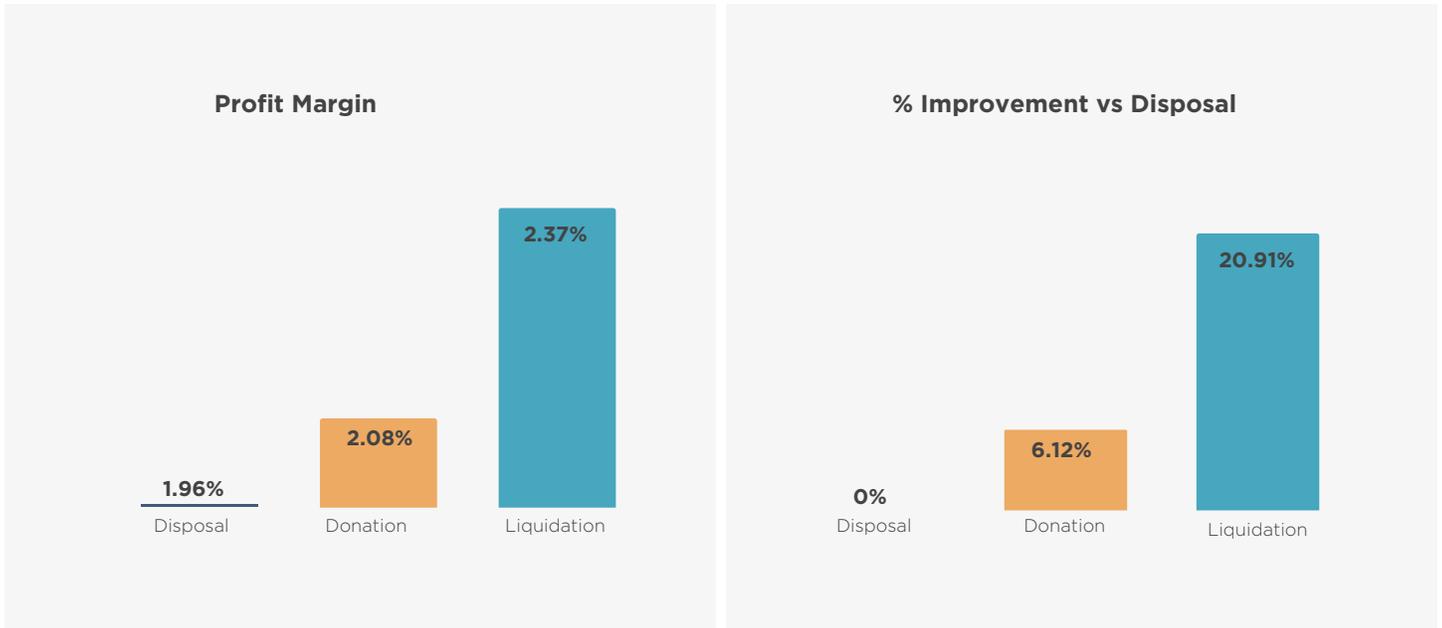
$$\begin{aligned}
 \text{Liquidation Sale Value} &= \text{Liquidation Price per Unit} \times \text{\# of Units Liquidated} \\
 &= \$12 \text{ per unit} \times 50,000 \text{ unit} \\
 &= \$600,000
 \end{aligned}$$

What Should Boylston Foods Do?

Now that the management team at Boylston Foods has calculated the financial values associated with three different outcomes for its 50,000 cases of surplus fruit, they are ready to compare each option and make a decision. To assess the bottom line impact of each option, they model each scenario using an Income or Profit & Loss Statement:

	Disposal	Donation	Liquidation
Revenue	\$98,000,000	\$98,000,000	\$98,600,000
Cost of Goods Sold	\$75,000,000	\$75,000,000	\$75,000,000
Gross Income	\$23,000,000	\$23,000,000	\$23,600,000
Operating Expenses	\$20,000,000	\$20,000,000	\$20,000,000
Waste Fees	\$45,000	\$0	\$0
Operating Income	\$2,955,000	\$3,000,000	\$3,600,000
Tax Deductions	\$0	\$250,000	\$0
Taxable Income	\$2,955,000	\$2,750,000	\$3,600,000
Taxes	\$1,034,250	\$962,500	\$1,260,000
Net Income	\$1,920,750	\$2,037,500	\$2,340,000
Profit Margin	1.96%	2.08%	2.37%
% Improvement vs Disposal	NA	6.12%	20.91%

In comparing these income statements, Boylston Foods finds that the disposal of its 50,000 surplus cases would result in a bottom line profit margin that is 6% lower than a scenario in which these cases are donated to a qualified charity. Better yet, the sale of these 50,000 cases at \$12/case would yield a 14% increase in profit margin versus donation, and a 21% increase in profit margin versus disposal. The financial outcomes associated with these three scenarios demonstrate the significant impact that surplus food management can have on a food business' bottom line.



Liquidation vs Donation: Additional Considerations

While it proved most financially advantageous for Boylston Foods to liquidate its surplus in the hypothetical scenario described above, a lower offer from a closeout buyer could have made donation a better outcome than liquidation given certain tax benefits. To identify the price at which financial value from liquidation is equal to that associated with donation, the following formula can be applied:

$$\begin{aligned}
 \text{Liquidation Price per Unit} &= \frac{\text{Enhanced Tax Deductions} \times \text{Corporate Tax Rate}}{\text{Units Liquidated} \times (1 - \text{Corporate Tax Rate})} \\
 &= \frac{\$250,000 \times 35\%}{50,000 \times (1 - 35\%)} \\
 &= \$2.69
 \end{aligned}$$

\$2.69 is the price point at which Boylston Foods will be indifferent between liquidation or donation. A higher price point provides an incentive to liquidate, whereas a lower price point provides an incentive to donate.

Beyond Direct Financial Outcomes

While financial outcomes will likely drive the majority of Boylston Foods' decision to liquidate, donate, or dispose of surplus, the company should also consider indirect costs and non-financial factors when comparing food surplus outlets.

'Slice of Reality': Factors to Consider

Disposal

- The [EPA Food Recovery Hierarchy](#) prioritizes alternative disposal methods by the benefits they can create for the environment, society, and economy
- Food decomposing in a landfill generates methane, a [potent greenhouse gas](#) (GHG) that contributes to climate change
- Average costs associated with municipal solid waste disposal [are increasing in certain geographic areas](#) due to limited landfill capacity
- Disposal of edible food by large companies can attract negative publicity and result in brand damage
- [Certain states](#) have enacted bans on commercial food waste, making disposal a more limited option for some food businesses

Donation

- Donating food combats hunger and supports the [42 million Americans](#) struggling with food insecurity
- A well-managed donation program can improve employee engagement and increase retention
- Surplus food donation programs can help companies differentiate from competitors
- Donation metrics can be incorporated in sales literature to acquire and retain customers who value a commitment to sustainability and community service
- Food rescue outlets may have more capacity to accept bulk donations of product (e.g., 6,000 cases of fruit) than smaller liquidation buyers, meaning you can manage unsold product with less effort and external communication

Liquidation

- There are a range of liquidation outlets, from large closeout buyers, to national chain dollar stores, to mom and pop discount grocers and non-profits
- Liquidation sales are highly relationship-focused, so it is important to develop a base of trusted and consistent liquidation buyers
- It is necessary to plan ahead when liquidating perishable product so that the food does not spoil during the sales cycle

Key Performance Indicators (KPIs)

Key performance indicators (KPIs) allow a business to interpret the effectiveness of its FLW reduction efforts and allocate resources appropriately based on performance of initiatives. The most valuable KPIs are analyzed in the context of a business as a whole, factoring in the relative growth or decline of a company's revenue or facility's throughput. For example, Ahold Delhaize utilizes a **sustainability KPI** to measure the ratio of food waste generated per million Euros of food sales. This allows the company to gauge the actual effectiveness of its food recovery and recycling efforts in the context of annual revenue.

Similar KPIs are required to monitor the effectiveness of FLW reduction programs. Raw numbers on how much food is recovered (i.e., not sent to a landfill) are uninformative without accompanying figures on the total volume of surplus. The following section highlights two 'must-know' KPIs that help address this issue.

KPIs for Assessing Food Recovery Programs

We will return to the example of Boylston Foods to demonstrate how ongoing data collection and KPI analysis are fundamental to evaluating the effectiveness of FLW reduction programs.

Example: Boylston Foods FY 2015

Cases of Fruit Purchased	2,500,000
Surplus Cases	50,000
FMV per Case	\$40
Cost per Case	\$30
Pounds per Case	20
Operating Expenses	\$20,000,000
Tax Rate	35%
Liquidation Price per Unit	\$12

1. Calculating Shrink Ratio

A simple but foundational KPI to establish is Shrink Ratio, which highlights loss as a percentage of inventory. The [definition of Shrink](#) varies by industry: in the food manufacturing and distribution sector, the term is often used to refer to finished goods that manufacturers or distributors cannot or will not sell. This can occur for a number of reasons, including but not limited to product spoilage (or surpassing a product's expiration date), product damages (such as in warehouses with forklift misoperation or breached packaging), quality considerations (such as produce aesthetics), or poor demand forecasting. While standards vary between industries regarding what level of shrink is "acceptable", a sustained high ratio indicates a potential problem in the area of sales, merchandising, or operations.

We can calculate Boylston Foods' Shrink Ratio for 2015 using information from the table above:

$$\begin{aligned} \text{Shrink Ratio} &= \frac{\text{Units Unsold}}{\text{Units Purchased}} \times 100\% \\ &= \frac{50,000}{2,500,000} \times 100\% \\ &= 2.0\% \end{aligned}$$

By calculating Shrink Ratio, Boylston Foods can establish a baseline picture of its FLW reduction performance. Monitoring performance against this baseline enables the business to identify opportunities for improvements in sales, merchandising, and operations that may decrease this ratio.

To continue with our example, let's assume that, in 2015, Boylston Foods established a goal of reducing FLW. To achieve this goal, the company began tracking Shrink Ratio as a KPI and experimented with initiatives in the merchandising department to reduce unsold inventory while growing sales. Below are the initial results of these efforts:

Boylston Foods: FLW Reduction Initiative

Fiscal Year	2015	2016
Cases Purchased	2,500,000	2,490,000
Cases Unsold	50,000	40,000
Cases Sold	2,450,000	2,450,000
Shrink Ratio	2.00%	1.61%

As shown above, Boylston Foods documented a decrease in Shrink Ratio from 2.0% to 1.61% following the implementation of a procurement efficiency initiative. In other words, through better merchandising processes, Boylston Foods was able to maintain its sales at 2,450,000 cases per year in both FY 2015 and FY 2016 but purchased 10,000 fewer cases in 2016, leaving the company with less surplus fruit.

While Boylston Foods achieved a laudable reduction in Shrink Ratio between 2015 and 2016, the business still continued to experience unsold inventory at a rate of 1.61% following this reduction. In the absence of donation initiatives, Boylston Foods did not capture any financial value from this unsold inventory, and it incurred costs associated with waste hauling.

2. Calculating Recovery Ratio

It is implausible that even the most aggressive operational improvement efforts will reduce a food business' Shrink Ratio to 0. Rather than dispose of unsold inventory, companies committed to FLW reduction will seek to divert edible product from the waste stream through recovery initiatives.

While Shrink Ratio is a useful KPI in evaluating the success of FLW reduction initiatives, a second KPI, Recovery Ratio, is critical in evaluating the success of initiatives that seek to recover a greater share of a food company's surplus inventory. A sustained low Recovery Ratio indicates that recovery efforts are ripe for improvement. Furthermore, a Recovery Ratio that fluctuates significantly from week to week or month to month highlights the need to invest in training and the establishment of Standard Operating Procedures (SOPs).

To further advance its FLW reduction program, Boylston Foods established a partnership with a local food bank at the beginning of FY 2017 to facilitate the donation of its edible surplus inventory. The potential value of this recovery initiative is significant, as Boylston Foods stands to benefit financially from the associated savings due to enhanced tax deductions while simultaneously reducing spend on waste hauling fees. In addition to these financial gains, Boylston Foods wants to contribute positively to its community, and donating surplus food to local families and individuals in need helps the business achieve this goal.

Just as tracking its Shrink Ratio helped Boylston Foods measure the success of its procurement efficiency initiative, establishing and tracking the Recovery Ratio as a KPI will help to measure the success of the business' donation program.

As noted above, the team at Boylston Foods reduced its Shrink Ratio from 2.00% to 1.61% pre-donation. In 2017, the business began its partnership with the local food bank. Below are the results of this donation program:

Boylston Foods: FLW Reduction Initiative			
	Base Case	Shrink Initiative	Donation Initiative
Fiscal Year	2015	2016	2017
Cases Purchased	2,500,000	2,490,000	2,490,000
Cases Unsold	50,000	40,000	40,000
Cases Sold	2,450,000	2,450,000	2,450,000
Shrink Ratio	2.00%	1.61%	1.61%
Units Donated	0	0	10,000
Recovery Ratio	0.00%	0.00%	25%

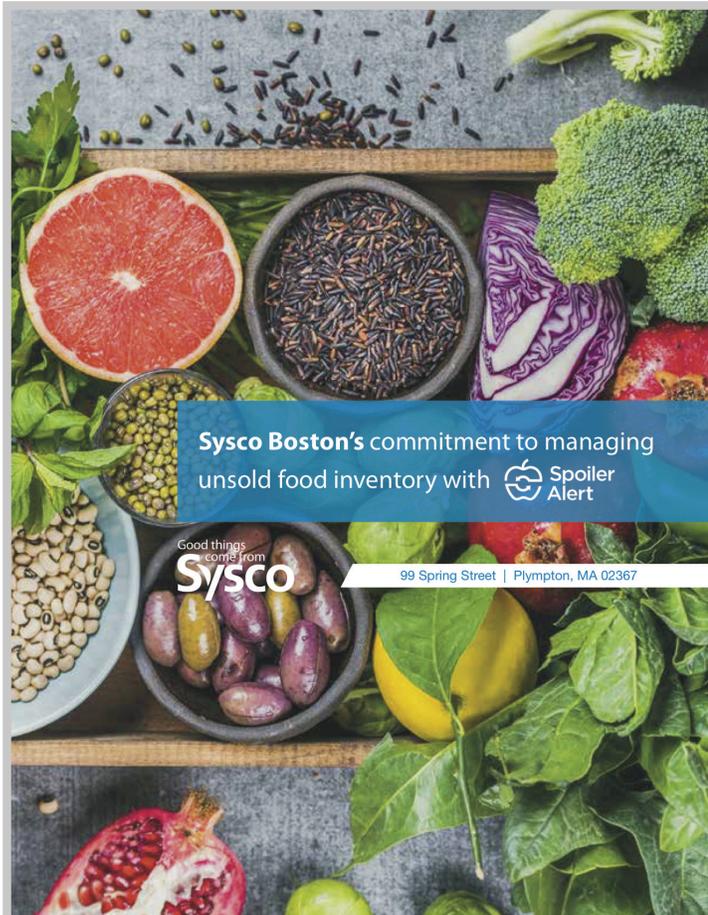
We can calculate Boylston Foods' Recovery Ratio for 2017 using information from the table above:

$$\begin{aligned}
 \text{Recovery Ratio} &= \frac{\text{Units Recovered}}{\text{Units Unsold}} \times 100\% \\
 &= \frac{10,000}{40,000} \times 100\% \\
 &= 25\%
 \end{aligned}$$

As demonstrated by its results, Boylston Foods improved its Shrink Ratio between FY 2015 and FY 2016 and maintained this improvement in FY 2017. Following the launch of its donation initiative in FY 2017, the business donated 10,000 cases of fruit, increasing its Recovery Ratio from 0% to 25%. Should the team at Boylston Foods continue to build out its recovery program while maintaining a consistent Shrink Ratio beyond FY 2017, its Recovery Ratio will reflect this improvement by increasing.

Case Study on Sysco Boston

As mentioned previously, an effective food donation program can help increase employee engagement and retention, differentiate a brand from competitors, and fight hunger in local communities. To highlight the community impact of its donation efforts, Sysco Boston developed a **community engagement report** that includes impact metrics from the Spoiler Alert platform.



Next Steps

Food loss and waste (FLW) is a massive challenge that negatively impacts the bottom line of food distributors, manufacturers, and retailers. But it is solvable, and improvements can be made rapidly once a data-driven strategy is in place and leveraged throughout operations. Some next steps to consider...

1. Make data your friend.

Collect data to understand how much FLW is currently being generated. It may be that some of this data exists in a usable format through a company's existing enterprise resource planning (ERP) software or warehouse management system (WMS). Use that data to develop an informed strategy for improvement by identifying the largest opportunity areas.

2. Commit at an executive level.

Obtain key strategy approval from decision makers to ensure everyone is on the same page, and that the program is resourced sufficiently. Use data to show how the financial, social, and environmental impacts of the FLW reduction program benefit many functional areas of your business.

3. Establish Standard Operating Procedures.

As success is realized, reinforce initiatives by investing in the development of Standard Operating Procedures (SOPs) that can be implemented across facilities. This will help with employee training and ensure benefits are maximized.

4. Develop and track KPIs.

Continuous data analysis ensures continuous improvement. Use holistic Key Performance Indicators (KPIs) to identify the most lucrative outlets for unsold product.

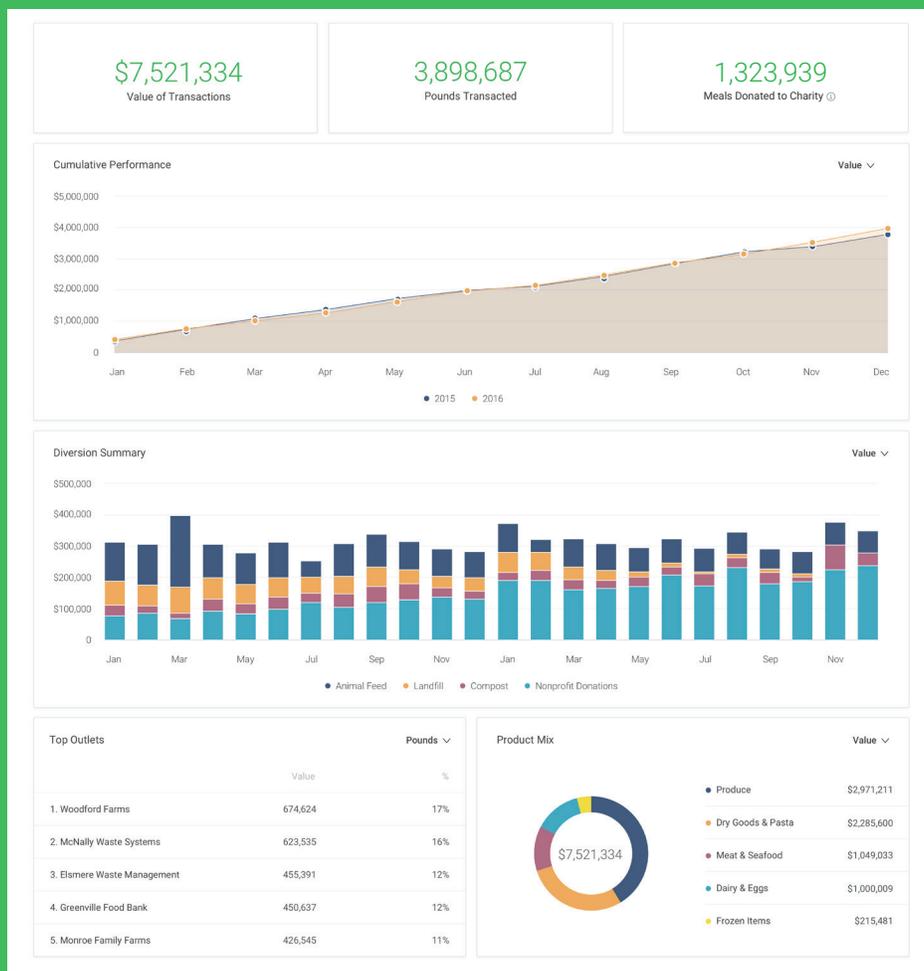
5. Communicate efforts.

Enhance transparency and strengthen relationships with employees and customers by promoting metrics that show positive social and environmental impacts of FLW reduction.



Spoiler Alert is a software company that helps food businesses manage unsold inventory. Our platform enables:

- Measurement and tracking of food recovery initiatives;
- Optimization of outlets for unsold product across donation, liquidation, and organic recycling opportunities;
- Development and tracking of holistic KPIs;
- Efficient tax accounting and reporting;
- Engagement and buy-in from key stakeholders.



Schedule a discovery call to learn how Spoiler Alert can drive improvements and help your business reduce food waste today.

Contact Us

Email us at info@spoileralert.com, give us a call at 617-917-4123, or visit us online at www.spoileralert.com.



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