CHAMPIONS 12.3

# THE BUSINESS CASE FOR REDUCING FOOD LOSS AND WASTE: HOTELS

A Report on Behalf of Champions 12.3

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

## SUMMARY FINDINGS

We analyzed data of preconsumer waste from 42 hotel sites, located across 15 countries, and calculated the following results:

- The average benefit-cost ratio for food waste reduction was nearly 7:1 over a three-year time frame.
- Within the first year of implementing a food waste-reduction program, over 70 percent of the sites recouped their investment. Within two years of implementing a program, 95 percent of sites recouped their investment.
- By reducing food waste, the average site saved over 4 cents on every dollar of cost of goods sold (COGS).
- There appears to be no clear correlation between benefit-cost ratios and a site's market segment or geography.
- Key strategies for achieving food waste reduction were to measure the food waste, engage staff, rethink the buffet, reduce food overproduction, and repurpose excess food.

### ABOUT THIS PUBLICATION

This publication focuses on the financial business case for reducing food loss and waste in hotels. It is a supplement to *The Business Case for Reducing Food Loss and Waste* and provides additional sector-specific data and analyses. *The Business Case for Reducing Food Loss and Waste* was published in March 2017 and is available at www.champions123.org/the-business-case-for-reducing-food-loss-and-waste/.

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## DIVING INTO A SECTOR

### Context

According to available estimates, approximately one-third of all food produced in the world intended for human consumption is lost or wasted (FAO 2011). This level of inefficiency in the global food system has significant economic, social, and environmental impacts. It amounts to economic losses of $940 billion per year (FAO 2015). It means that more than a billion tons of food never get consumed each year, while one in nine people remain undernourished (WFP 2018). In addition, food loss and waste is responsible for an estimated 8 percent of annual greenhouse gas emissions; if it were a country, food loss and waste would be the third largest emitter after China and the United States (CAIT 2018; FAO 2015).

Reducing food loss and waste can generate a triple win: for the economy, for food security, and for the environment. But why is food loss and waste reduction not already being implemented at sufficient scale? Interviews with private-sector decision-makers indicate that one reason is many managers may not be aware—or may not believe—that there is a solid business case for reducing food loss and waste. For instance, the associated costs of food loss and waste may be buried in operational budgets, accepted as the cost of doing business, or considered not worth the investment needed to achieve reductions.

According to *The Business Case for Reducing Food Loss and Waste* (Hanson and Mitchell 2017), there is a robust business case for companies to reduce food loss and waste. That publication analyzed historical data from nearly 1,200 business sites across 17 countries and more than 700 companies. These companies represented a range of sectors including food manufacturing, food retail (e.g., grocery stores), hospitality (e.g., hotels), and food service (e.g., canteens, restaurants). The analysis found that the median benefit-cost ratio was 14:1. Thus, for every $1 (or other relevant currency) invested in food loss and waste reduction, half of the surveyed company sites realized a $14 or greater return.

There is also a nonfinancial business case for reducing food loss and waste. Interviews with business leaders indicated that there are a number of strategic yet nonfinancial motivators. These relate to waste regulations, environmental sustainability, food security, stakeholder relationships, brand recognition, and a sense of ethical responsibility. Although these benefits may be hard to quantify in monetary terms, interviewees indicated that these nonfinancial reasons are an important part of the business case for action.

Since the launch of *The Business Case for Reducing Food Loss and Waste*, some private-sector managers have asked the authors what the financial business case looks like for specific sectors. "The 2017 publication gave a good overview across industry sectors, but we want to know what our sector looks like alone," is a request periodically heard. This publication starts to address this request, focusing on hotels. Additional publications will focus on other sectors.

### Methodology

In this publication, we isolated data for the hotel sector from the original datasets used for *The Business Case for Reducing Food Loss and Waste*. We then complemented these data with new data from hotel operations that were not available to the authors a year ago. In total, we have data about food waste-reduction efforts from 42 hotel sites across 15 countries. Based on these data, we calculated the benefit-cost ratios, cost reductions, payback periods, and investments made. We then conducted interviews with managers, including managers of the data providers from these hotel sites, to identify what actions the sites took to reduce their food waste.

This publication is intended to supplement *The Business Case for Reducing Food Loss and Waste*. We encourage audiences to read that publication as well in order to have a holistic picture of business reasons for tackling this important issue.

## BENEFIT-COST RATIOS

Based on the suite of real-world, historical examples for which we could obtain both financial benefit and cost data, we estimate the "benefit-cost ratios" of taking action to reduce food loss and waste for hotels. A benefit-cost ratio is the ratio of financial benefits to financial costs attributable to the food loss and waste actions or program. Box 1 summarizes the methodology and dataset for the benefit-cost ratio analysis in this publication. While our analysis includes all hotel sites for which we could access data, we cannot guarantee that these results are applicable to the entire hospitality sector or to any particular hotel. What we could access is a small dataset relative to all hotels in the world. Therefore, be cautious when applying our results to other instances.

From the pool of data we could access, 95 percent of the sites analyzed had a net positive financial return; that is, a benefit-cost ratio greater than one-to-one (1:1). The average benefit-cost ratio was nearly 7:1. Expressed in terms of return on investment (ROI), this is a nearly 600 percent return on investment.[1] The median benefit-cost ratio—where half of the sites achieved a higher ratio while half achieved a lower ratio—was nearly 5:1 (Figure 1). Thus, for every $1 (or other relevant currency) invested in food waste reduction, half of the sites realized a nearly $5 return or greater.

Across the company sites analyzed, the ratios vary widely, from 0.4:1 to nearly 29:1. As shown in Table 1, there appears to be no clear correlation between benefit-cost ratios and a site's market segment. We also found no clear correlation between benefit-cost ratios and geography.

While the median benefit-cost ratio experienced by the hotel industry in our study is lower than that found in the broader sector analysis summarized in *The Business Case for Reducing Food Loss and Waste* (Hanson and Mitchell 2017), the median benefit-cost ratio of hotels still is a high return on investment and thus can be a financial opportunity for the hotel industry.

## BOX 1. Methodology for Quantifying Benefit-Cost Ratios

The analyses of benefit-cost ratios have the following parameters:

- **Benefits and costs.** Our analyses factor in both the benefits and the costs of reducing food loss and waste. Costs include how much an entity pays to quantify where and how much food is being lost and wasted, identify which actions it will take, and implement those actions. This includes expenditures on consultants, equipment, staff training, and more. The benefits are the financial gains (i.e., lower costs, additional revenue) from reducing food loss and waste. This includes optimizing food or raw material purchases (since more of what is purchased is consumed or used in a salable product), lowering waste collection and management costs, adding revenue by selling food that otherwise would have been unsold, and more.

To illustrate how we calculate a benefit-cost ratio, assume the following scenario: A hotel has baseline annual food sales of $3 million and food costs of $900,000. After one year of implementing a food waste-reduction program, annual food sales are still $3 million, but food costs are reduced by $27,000. When calculating the benefit-cost ratio for this time frame, the numerator (i.e., benefit) would be $27,000. Suppose the hotel spent $5,400 on the food waste-reduction program. This amount is the denominator (i.e., cost). The resulting benefit-cost ratio for this hotel would be 5:1.

- **Individual entities.** The benefit-cost ratios we developed are for individual business sites. We were able to access historical financial cost and benefit data for food waste-reduction efforts of 42 hotel sites located across 15 countries: Australia, China, Germany, Hungary, Myanmar, Norway, Philippines, Poland, Singapore, Sweden, Thailand, United Arab Emirates, United Kingdom, United States, and Vietnam. These data come from the dining areas of these hotels and feature sites in the economy, mid-range, gaming, full-service, and luxury segments of the industry. Benefit and cost data in local currencies have been converted to current year U.S. dollars. Except where noted, the sources of the data points are treated anonymously to preserve commercial confidentiality.

- **Historical data.** Our analyses are based on actual field data, not pro forma calculations.

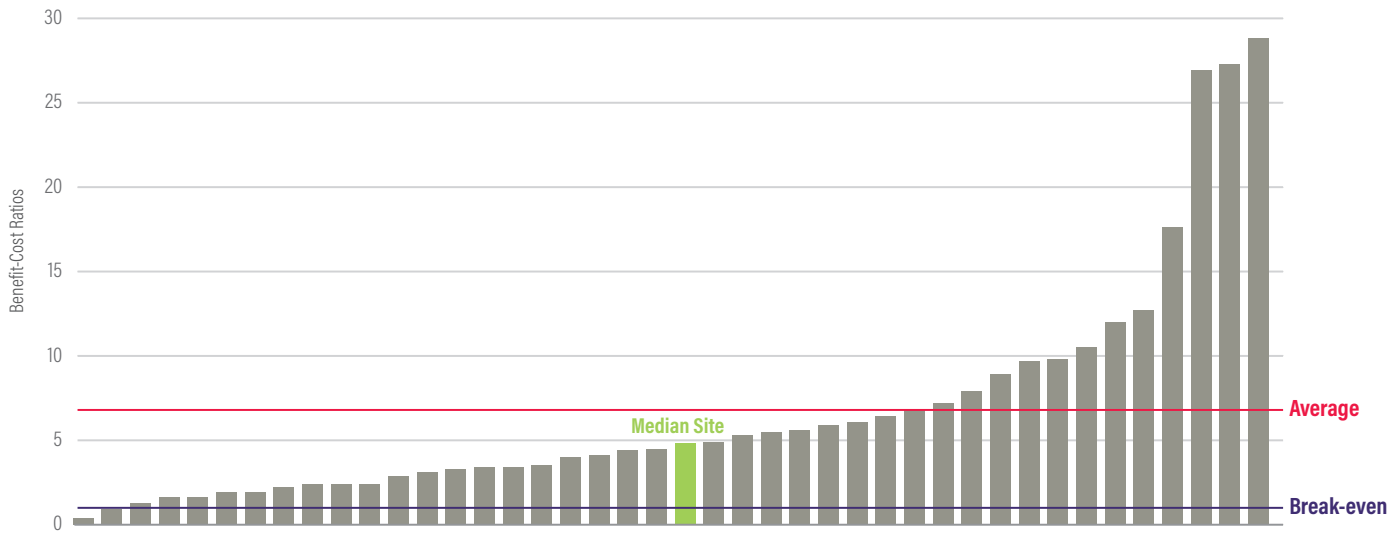
- **Time period.** For each site for which a benefit-cost ratio is calculated, we standardized the data provided to us by calculating the financial costs and the financial benefits cumulated over a three-year period. The three-year period for each site begins at implementation of a food waste-reduction program. Using a three-year time period enables us to capture the fact that for many sites, the majority of the costs occur in the first year and decline thereafter, while the financial savings start in the first year and continue each year thereafter. Usually there is a fixed investment cost occurring in the first year, followed by a smaller amount of annual recurring costs to maintain the program and monitor program implementation. Nonetheless, a three-year time horizon is conservative to the degree that cost savings continue after year three with continued investment. For sites with less than three years of data, we assumed that the pattern of actual results from the most recent weeks for which data are available would continue. This assumption is based on historical data of benefit and cost cash flow patterns from sites with three or more years of data collection.

- **Discount rate.** The benefit-cost ratio is the ratio of the three-year cumulated discounted flow of financial benefits to the three-year cumulated discounted flow of financial costs. We apply a conservative 10 percent per annum discount rate.[a]

- **Food waste measured.** In this analysis, we assessed food waste generated in a site's kitchen. This includes food and the associated inedible parts remaining from preparation, storage, and any leftovers thrown away by kitchen staff (including food left over from buffets). The analysis includes neither food rescued (given to charity) nor plate waste from customers (any food that a customer does not finish from his or her plate). In other words, if food was diverted to another organization to feed people in need or was on a customer's plate, it is outside the scope of this analysis. Leftover food from buffet trays is within the scope of this analysis. A study of more than 450 hospitality kitchens across 25 countries found that more than 70 percent of food waste occurs before it gets to the consumer's plate, indicating that this scope captures the majority of a site's waste (Winnow Solutions 2018).

*Notes:* a. Ten percent is a conservative discount rate when compared with the average cost of capital for market sectors covered by the business sites in our dataset (see Appendix).

FIGURE 1. **Financial Benefit-Cost Ratios for Hotel Sites**




*Source:* WRI and WRAP Analysis.

Drawing on interviews with nongovernmental organizations, food waste measurement experts, and managers involved with some of these surveyed sites, it appears that those locations with higher ratios tended to have one or more of the following features:

- They relied on common hotspots that consistently produce high levels of waste (e.g., buffet-style service), and prioritized efforts on these hotspots.
- They only needed low capital investments since they already had equipment in place to monitor or reduce food loss and waste (e.g., scales, containers, refrigeration units).
- They had high levels of staff engagement with the food waste-reduction program, especially among kitchen staff.

One trait interviewees observed that was associated with some sites with lower ratios was a lack of staff encouragement from management. In one site, food waste-reduction efforts yielded no results until management created an action plan, at which point kitchen staff became active and waste was dramatically reduced. This experience points to the fact that, although kitchen and service staff are a great source of innovation to reduce food waste, they need to be properly equipped and supported by management to be as effective as possible. Moreover, interviewees indicated that management not only must demonstrate buy-in and commitment but also be very open to learning from front-line kitchen staffers. It is important that there is no fear relating to tracking waste and that staff believe that their ideas and suggestions are heard.

Interviews with industry experts revealed that food waste is not typically measured as part of a hotel's standard operating procedures. Even in cases where food waste information is gathered (e.g., from composting, onsite equipment, or haulers), that information is not always communicated back to food service teams. To be successful, a program needs to address this. Information feedback loops should be created so that hotels can inform kitchen staff and accurately track food waste-reduction efforts. But measurement alone does not reduce waste. Sites should also establish clear targets, test actions, and subsequently assess results against the targets.

## COST REDUCTION

Overall, food waste-reduction efforts in the surveyed sites were successful in lowering the amount of food waste. On average, hotels achieved a 21 percent reduction of food waste by weight over a 12-month time frame. That said, many site managers prioritized reduction efforts based on the likely economic gain from the reduction. Put simply, the economic loss is greater when throwing away products that cost more per kilogram (e.g., ground beef versus potatoes), and many managers prioritized reduction efforts accordingly.

According to interviewees, one way that site managers evaluate the financial effectiveness of their food waste-reduction efforts is to calculate how much food waste changed as a share of cost of goods sold (COGS), also referred to as "food spend." To illustrate, suppose a hotel spends $100 procuring the food (e.g., whole food,

TABLE 1. **Distribution of Benefit-Cost Ratios by Market Segment**

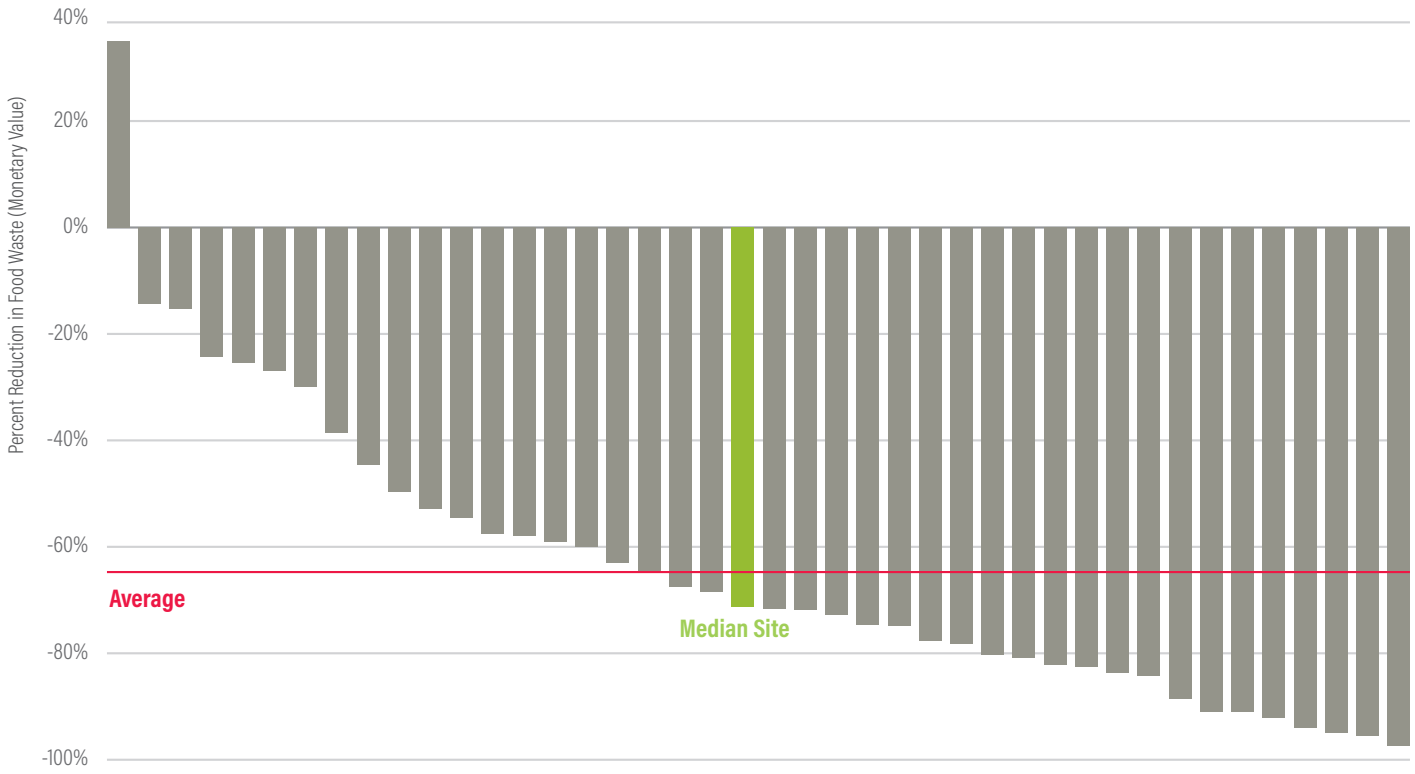
| Market Segment | BENEFIT-COST RATIOS | | | | |
|---|---|---|---|---|---|
| | Number of Sites | Low | Median | Average | High |
| Luxury | 21 | 1.3 | 4.5 | 6.1 | 17.6 |
| Mid-range | 14 | 0.9 | 4.2 | 6.1 | 26.9 |
| Economy | 2 | 0.4 | 2.9 | 2.9 | 5.3 |
| Full-service | 4 | 2.4 | 4.9 | 9.9 | 27.3 |
| Gaming | 1 | 28.8 | 28.8 | 28.8 | 28.8 |
| All Sites | 42 | 0.4 | 4.7 | 6.8 | 28.8 |

*Source:* WRI and WRAP Analysis.

ingredients) it sells to customers, and the cost of what was thrown away in the kitchen is $5. Food waste therefore represents 5 percent of COGS. If the hotel implements a food waste-reduction program that lowers the cost to $3, then the hotel achieves a 40 percent reduction in food waste in terms of monetary value, assuming its food spend is still $100. This equates to a 2 percentage point drop in food waste as a share of COGS (i.e., from 5 to 3 percent of COGS).

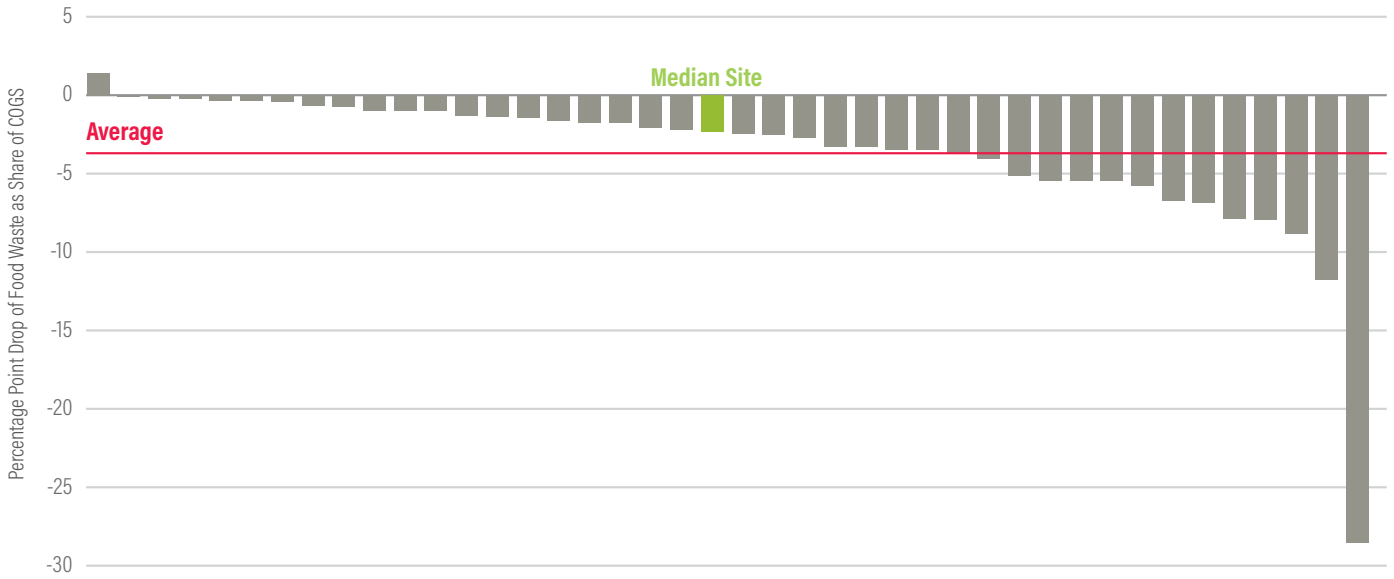
Figure 2 and Figure 3 summarize the results from the surveyed sites over the three-year implementation period. The average site saw a 64 percent reduction in the cost of food waste (Figure 2). The average across all sites was a nearly 4 percentage point drop in food waste as a share of COGS (Figure 3). The median site saw more than a 2 percentage point drop. In other words, half of the sites saved more than 2 cents on every dollar of COGS.

FIGURE 2. **Percentage Reduction in Food Waste (Monetary Value) over the Three-Year Implementation Period**




*Source:* WRI and WRAP Analysis.

FIGURE 3. **Percentage Point Drop in Food Waste as a Share of Cost of Goods Sold (COGS) over the Three-Year Implementation Period**



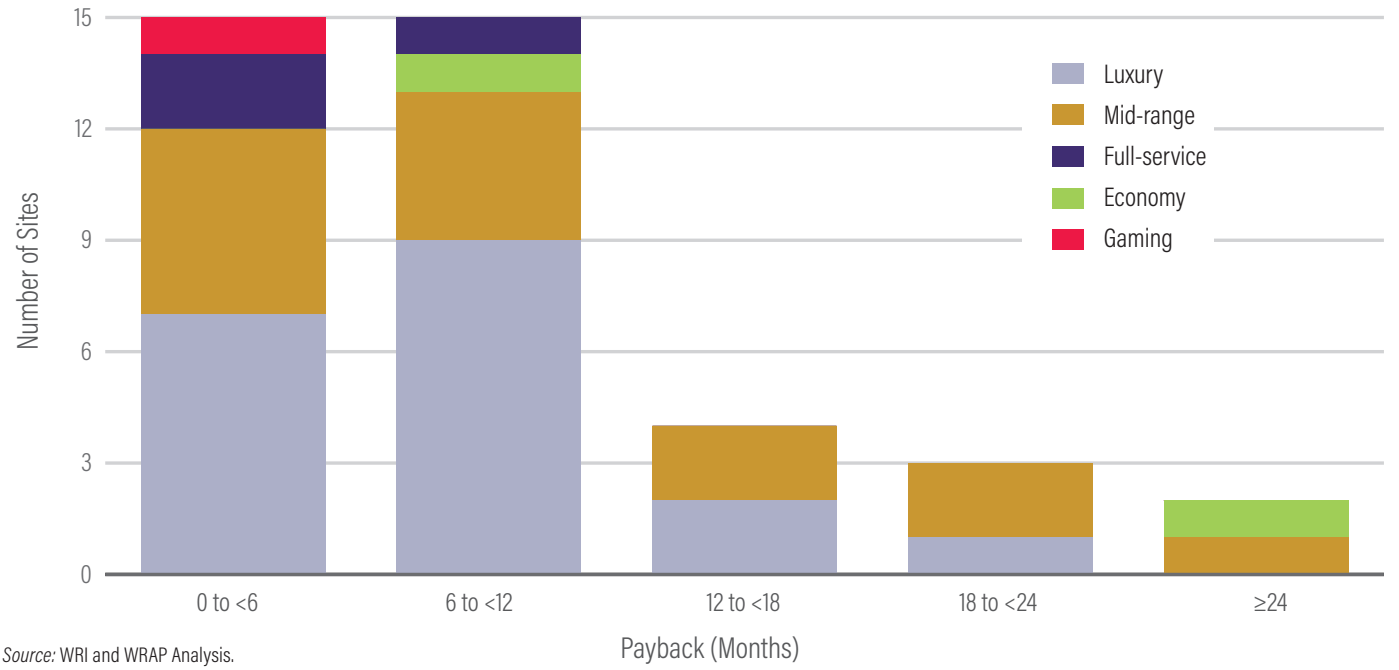

*Source:* WRI and WRAP Analysis.

## PAYBACK PERIODS

When implementing food waste-reduction programs, most surveyed sites experienced the bulk of financial costs up front, followed by a steady stream of financial benefits over time. Costs included conducting food waste inventories, training staff on new food handling and storage procedures, and redesigning menus. Benefits included reduced food costs (e.g., buying less food due to reduced waste levels), increased revenue from new menu items (e.g., turning leftovers or product previously considered scraps into new salable dishes), and lower waste management costs (e.g., sending less food to a landfill via a waste management company).

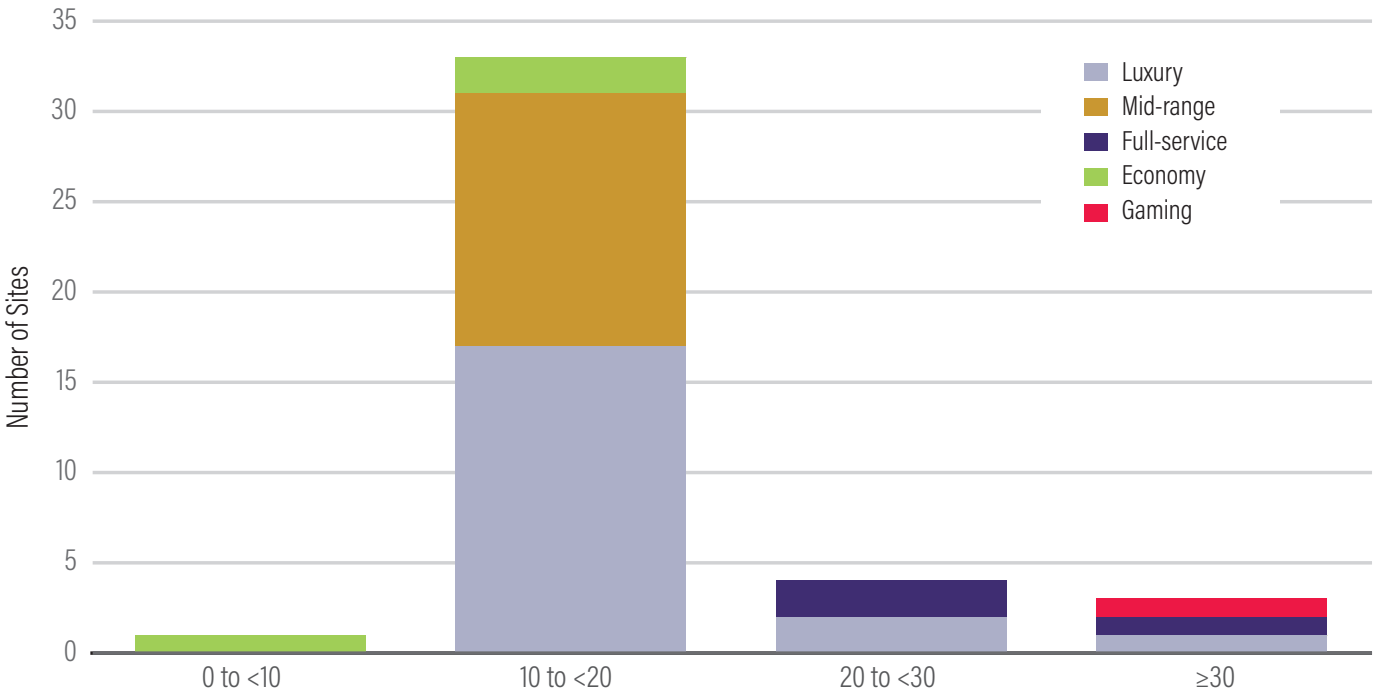
With this timing of financial flows in mind, we calculated the payback period for each site, assuming a linear flow of financial benefits over three years (Figure 4). The payback period indicates how long a food waste-reduction program must operate before

FIGURE 4. **Distribution of Payback Periods per Market Segment**




*Source:* WRI and WRAP Analysis.

FIGURE 5. **Investment in Food Waste Reduction per Site**




*Source:* WRI and WRAP Analysis.

surpassing a 1:1 benefit-cost ratio. Within the first year of implementing a food waste-reduction program, over 70 percent of the sites recouped their investment. Within two years, 95 percent of the sites surpassed a 1:1 benefit-cost ratio.

## INVESTMENTS MADE

The food waste-reduction programs implemented by the surveyed sites were relatively inexpensive in terms of absolute dollars spent. Nearly 90 percent of sites were able to keep their total cumulative investment in food waste reduction below $20,000 over the three-year period (Figure 5). These costs consisted of purchasing smart scales or similar measurement technology and training staff in measurement and techniques to reduce waste. Smart scales are tools installed in the kitchen that record the amount, composition, and value of food waste with an easy-to-use, customizable user interface. Examples of smart scales are tools sold by the firms LeanPath and Winnow.

The food waste-reduction programs were inexpensive relative to annual food sales, as well. Across all sites, the average cost to invest in food waste reduction was only 0.9 percent of annual food sales. For context, sites ranged from $426,000 to $27,600,000 in annual food sales. The average site had $4,500,000 in annual food sales (Table 2).

TABLE 2. **Annual Food Sales per Site**

| Market Segment | ANNUAL FOOD SALES | | | | |
|---|---|---|---|---|---|
| | Number of Sites | Low | Median | Average | High |
| Luxury | 21 | $996,000 | $2,721,000 | $4,194,000 | $27,650,000 |
| Mid-range | 14 | $663,000 | $1,862,000 | $2,291,000 | $4,745,000 |
| Economy | 2 | $426,000 | $473,000 | $473,000 | $519,000 |
| Full-service | 4 | $4,478,000 | $13,166,000 | $13,547,000 | $23,377,000 |
| Gaming | 1 | $12,777,000 | $12,777,000 | $12,777,000 | $12,777,000 |
| All Sites | 42 | $426,000 | $2,636,000 | $4,478,000 | $27,650,000 |

*Source:* WRI and WRAP Analysis.

## STRATEGIES EMPLOYED

Although specifics varied between sites, interviewees pointed consistently to five types of actions they pursued to achieve successful food waste reduction:

- **Measure.** Quantifying food waste generates a food waste inventory that enabled sites to identify *how much* and *where* food was being wasted. Such an inventory then helped managers prioritize hot spots to tackle and to monitor progress over time. All of the surveyed sites used smart scales to measure their waste. Box 2 and Box 3 provide case examples of hot spot prioritization based on measurement using smart scales.

- **Engage staff.** Research conducted by World Wildlife Fund and the American Hotel and Lodging Association indicates that more than 90 percent of staff want to take action to reduce food waste (WWF 2017). Even after implementing a pilot project, 96 percent of staff wanted to do more to reduce waste. Effective food waste-reduction efforts should harvest this interest. According to interviewees, staff engagement was, in fact, a key variable that determined the success of a food waste-reduction program among the surveyed sites. Kitchen and service staff often want to help prevent food waste at work but need more definition and guidance from leadership. This guidance, for example, could come in the form of daily staff meetings, casual conversations, formal training, or even establishing peer learning opportunities. Management should also work to remove any staff perception of blame for causing waste. If staff are blamed for food waste, rather than rewarded for measuring, staff engagement will quickly decline. Factors that make the efficacy or efficiency of staff engagement more difficult are menus that change frequently and high rates of staff turnover. Such factors can lead to cyclical patterns of waste wherein the reduction program works as intended for a period of time, but thereafter waste levels drift upward. To combat this, interviewees recommend that managers embed the importance of waste reduction and tactics to achieve it into their standard training and operating procedures.

- **Rethink the buffet.** For hotels, buffets tended to be a large source of food waste, especially of high-value foods like meats. Successful strategies for reducing buffet waste included reorganizing the placement of certain food items (e.g., providing individual servings rather than pans of food), displaying messaging about food waste near the buffet (e.g., a placard explaining the site's own food philosophy and internal commitment to reduce food waste), and offering high-value items à la carte (WWF 2017). Many hotels were able to significantly reduce their food waste by implementing very simple changes, such as providing smaller plates for customers or selling leftovers from the buffet later in the day. See Box 3 for specific examples of reducing buffet waste from one site.

- **Reduce overproduction.** Many sites had at least one menu item that was consistently under-consumed. By simply producing smaller quantities of such items, sites were able to prevent waste without negatively affecting customer experience. One site, for example, consistently produced too much potato salad. After noticing this pattern in the food waste inventory, managers made less potato salad and reduced waste without any change in consumer behavior. Many sites also became more diligent about a meal's potential head count, which allowed kitchen staff and management to better forecast needs and reduce unnecessary overproduction. While head count accuracy may already be a goal for many sites, placing food waste reduction higher on the agenda of staff resulted in added emphasis on more accurate head counts.

- **Repurpose excess food.** Because forecasting customer demand is not a perfect science, hotel kitchens will find themselves with leftovers and potential waste. In these cases, having a Plan B for how to safely repurpose leftovers can allow the kitchen to generate revenue from this potential waste. For example, unsold or leftover meat from breakfast may be a potential ingredient for a lunch or dinner dish. Sites that incorporated food scraps (e.g., peels, seeds, skins, bones) into dishes were able to produce value from items that typically go straight to the waste bin. For example, making soup stock from such scraps can cut down on costs if soup stocks were previously purchased, and can create added value through new soups and other dishes. While this analysis does not include any potential financial benefit from food donation, the authors urge hotels to donate any edible, unsalable food to charity, rather than throwing it away.

For more practical guidance, refer to *Fighting Food Waste in Hotels*, produced by World Wildlife Fund in collaboration with the American Hotels and Lodging Association (AHLA). It is available at https://furtherwithfood.org/wp-content/uploads/2017/11/HotelKitchen_Final_Final_11102017.pdf.

## BOX 2. Sofitel Bangkok Sukhumvit

Sofitel Bangkok Sukhumvit is a medium-sized, 5-star hotel in Bangkok's shopping district. The hotel was able to achieve a 50 percent reduction in food waste by value in just 15 weeks, saving an estimated $60,000 per year.

Achieving these results included the following key actions:

1. **Measure.** Management of food waste started with measurement. The hotel chose to use a smart scale that allowed staff to track and categorize kitchen waste. Managers identified as food waste hot spots the buffet and highly perishable foods such as bread and seasonal fruits.
2. **Reduce overproduction.** To address the buffet hot spot, management did not need to forgo signature buffet options. Rather, it focused on better controlling the amount of each option on offer.
3. **Engage suppliers.** To address highly perishable foods, management engaged suppliers—even renegotiating supplier contracts in some instances—to achieve more flexible ordering.
4. **Engage staff.** The hotel established a daily chef's meeting to discuss waste. Such regular check-ins encouraged staff to focus on high-value items prepared in batches and to identify creative opportunities to reduce the volume of waste.

## BOX 3. MGM Gold Strike Resort and Casino

The MGM Gold Strike Resort and Casino in Robinsonville, Mississippi (USA), serves more than 650,000 guests each year through a variety of dining options. Managers prioritized its food waste-reduction efforts on its all-you-can-eat buffet and in 12 months achieved a greater than 80 percent reduction in the amount of food waste and more than a 5 percent decrease in food costs.

Achieving these results included the following key actions:

1. **Measure.** Although the site was using typical tools like prep sheets and production guides, managers only understood that they had a food waste problem after specifically quantifying and tracking it. To do this, the site chose to use a smart scale that allowed managers to track and categorize kitchen waste.
2. **Rethink the buffet and reduce overproduction.** The site quickly focused on the end of the breakfast buffet, when pans of breakfast foods (e.g., bacon, eggs, ham, croissants) were thrown away due to overproduction. Staff noticed the same trend at the end of the night for the dinner buffet, when all leftovers from the day were discarded. To solve this problem, certain items were shifted to à la carte cooking near the end of each meal period. This not only made a fresher product for customers, it significantly reduced waste at the end of the meal period. Staff also found reuse opportunities for certain ingredients that would otherwise go to waste.
3. **Engage staff.** The food waste-reduction program was led by management. Because of this, kitchen staff were initially skeptical, thinking that the program was covertly designed to micromanage or even punish poor performers. However, through a weekly reward system for use of the smart scale and a series of dedicated meetings on food waste, the site saw a complete culture change in kitchen staff, even among long-term employees. The increase in regular engagement led not only to more accurate data collection, but also to kitchen staff proposing creative solutions to efficiency problems.

## A CALL TO ACTION

Our analyses find that there can be a strong financial business case for hotels to reduce food waste within their operations. These findings should encourage managers in this sector to start seriously exploring what they can do to reduce food waste and reap the benefits. What then are next steps? We recommend that the company follow the following three-step approach:

- **TARGET.** Targets set ambition, and ambition motivates action. Hotels should adopt a voluntary reduction target of 50 percent by 2030, which is aligned with Target 12.3 of the Sustainable Development Goals.
- **MEASURE.** What gets measured gets managed. Hotels should start to measure their food loss and waste and monitor progress toward achieving the target over time. The Food Loss and Waste Accounting and Reporting Standard (FLW Protocol 2016) can help entities proceed with measurement. Leading companies are publicly reporting their food waste data, and we recommend that hotels begin to do so as well.
- **ACT.** Action is what ultimately matters. Hotels, working alone and together, should take measures like those described in this publication to reduce food waste. A key success factor for action, as we discussed, is management engagement.

Target, measure, and act. If enough companies do this, the world will take a big step toward a future that improves financial performance, food security, environmental protection, and prosperity for all.

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## ENDNOTES

1. A benefit-cost ratio of 2:1 is equivalent to a 100 percent return on investment (not a 200 percent return on investment as may be mistakenly believed). With a ratio of 2:1, the entity expends $1 of costs and receives $2 worth of benefits. The ratio is the same with a 100 percent return on investment. The investor invests $1 and receives $2 in return. The pure profit is $1 while the investment itself is another $1, thus the profit is 100 percent more than the investment.

# APPENDIX

| GLOBAL | | | | |
|---|---|---|---|---|
| **Sector** | **Number of businesses** | **Average cost of equity** | **Average cost of debt** | **Average cost of capital** |
| Beverage (Alcoholic) | 212 | 8.6% | 4.6% | 7.8% |
| Beverage (Soft) | 104 | 10.2% | 4.6% | 9.1% |
| Food Processing | 1228 | 8.4% | 4.6% | 7.6% |
| Food Wholesalers | 119 | 7.5% | 4.6% | 6.9% |
| Retail (Grocery and Food) | 172 | 8.2% | 4.6% | 7.5% |
| Hotel/Gaming | 651 | 9.2% | 4.6% | 8.3% |

| USA | | | | |
|---|---|---|---|---|
| **Sector** | **Number of businesses** | **Average cost of equity** | **Average cost of debt** | **Average cost of capital** |
| Beverage (Alcoholic) | 22 | 7.9% | 4.0% | 7.1% |
| Beverage (Soft) | 43 | 9.2% | 4.0% | 8.2% |
| Food Processing | 89 | 7.6% | 3.5% | 6.8% |
| Food Wholesalers | 14 | 6.6% | 4.0% | 6.1% |
| Retail (Grocery and Food) | 17 | 8.5% | 4.0% | 7.6% |
| Hotel/Gaming | 73 | 8.1% | 3.5% | 7.2% |

| EUROPE | | | | |
|---|---|---|---|---|
| **Sector** | **Number of businesses** | **Average cost of equity** | **Average cost of debt** | **Average cost of capital** |
| Beverage (Alcoholic) | 51 | 7.2% | 4.4% | 6.6% |
| Beverage (Soft) | 18 | 7.3% | 4.4% | 6.7% |
| Food Processing | 156 | 8.2% | 4.4% | 7.4% |
| Food Wholesalers | 13 | 6.4% | 4.4% | 6.0% |
| Retail (Grocery and Food) | 31 | 10.8% | 4.4% | 9.6% |
| Hotel/Gaming | 122 | 9.3% | 4.9% | 8.4% |

| EMERGING | | | | |
|---|---|---|---|---|
| **Sector** | **Number of businesses** | **Average cost of equity** | **Average cost of debt** | **Average cost of capital** |
| Beverage (Alcoholic) | 117 | 10.3% | 5.3% | 9.3% |
| Beverage (Soft) | 33 | 12.7% | 5.3% | 11.2% |
| Food Processing | 815 | 96.0% | 5.3% | 8.7% |
| Food Wholesalers | 53 | 8.7% | 5.3% | 8.0% |
| Retail (Grocery and Food) | 61 | 9.6% | 5.3% | 8.8% |
| Hotel/Gaming | 399 | 10.0% | 5.3% | 9.1% |

*Source:* Authors' calculations for listed private-sector companies based on five-year financial performance data from NYU Stern Business School's international data, accessible at: http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html.

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Note: All tons are metric tons and all dollars are U.S. dollars, unless otherwise noted.

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