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Food Waste Prevention Case Study: Intel Corporation's Cafés



City of Hillsboro

Oregon Department of
Environmental Quality



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SUMMARY

Food service staff at two Intel business dining facilities in Hillsboro, Oregon (operated by Bon Appetit Management Company) tracked all pre-consumer food waste on a daily basis for one year using computerized food waste tracking systems and software¹. The goal was to prevent and minimize food waste by raising staff awareness, focusing behavior, and providing information to diagnose the causes of waste. The initiative was launched in April 2009 and this report summarizes data collected through April 2010.

During this period of daily waste tracking, the sites collectively reduced pre-consumer food waste by 47% by weight and reduced food costs per meal by 13.2%. This reduction in food waste, over the course of a full year, reduces greenhouse gas emissions by approximately 100 metric tons of greenhouse gases (MTC02e). The sites required no additional labor to support the tracking effort.

These results have implications for other food service operations in Oregon and beyond, illustrating that daily food waste tracking is a best practice for minimizing food waste, thereby reducing operating costs while mitigating adverse upstream and downstream environmental impacts associated with food waste.

¹ Pre-consumer waste (i.e. kitchen waste) is food that goes to waste while under the control of the food service operator. This waste comes in the forms of overproduction, spoilage, expiration, trimmings and handling issues (burned, dropped, etc.)

WHY FOOD WASTE PREVENTION MATTERS

Food waste costs commercial and retail food service operations \$30-40 billion per year, according to the U.S. Environmental Protection Agency. In fact, data from LeanPath, a national provider of automated food waste tracking systems, shows that 4-10% of the food purchased in high-volume food service operations is discarded as waste before ever reaching a customer's plate (due to overproduction, trim waste, spoilage, and expiration). Beyond these significant economic implications, there are compelling environmental reasons to prevent food waste.

Food Waste – Upstream Environmental Impact

Upstream, the production of food uses tremendous energy, water, and land resources, and is a major source of pollution. Reducing the waste of food is an easy way to reduce these environmental impacts. The upstream chain begins at the farm where extensive fresh water and fossil fuels (for example, artificial fertilizers and pesticides) are used in the production of food and continues through environmental impacts associated with transportation, processing, packaging, storage, and preparation.

Food Waste – Downstream Environmental Impact

Downstream, the transportation of food waste generates diesel emissions from hauling vehicles. Most food waste in the U.S. is landfilled, and when food decomposes in a landfill, it produces methane, a greenhouse gas approximately 20+ times more potent than carbon dioxide in warming potential.

THE CHALLENGE: REDUCE PRE-CONSUMER FOOD WASTE AT INTEL'S CAFÉS

Intel's employee cafés Jones Farm 5 and Ronler Acres 3 serve approximately 12,000 meals per week and offer a diverse, high-quality menu to meet the expectations of employees and visitor. Despite focusing on food waste control over many years, these two cafés were producing over 2,900 lbs of pre-consumer food waste per week (primarily from overproduction, spoilage, expiration and trim waste) at the start of the tracking initiative (April 2009).

This was an important issue for Intel, Bon Appetit Management Company, Oregon's Department of Environmental Quality (DEQ), and the City of Hillsboro due to the costs and environmental impacts food waste generates both upstream and downstream from a food service or restaurant operation.

The challenge: How could Intel and Bon Appetit reduce pre-consumer food waste significantly while continuing to maintain the great food and service quality provided by the Intel cafes?

Starting Point: Why Is There Pre-Consumer Food Waste To Begin With?

Pre-consumer food waste is a challenge throughout the food service industry and no operation is immune.

At Intel, Bon Appetit chefs work diligently to estimate customer demand and produce accordingly. Additionally, managers work to ensure dozens of culinary workers follow the menu plan and use food as efficiently as possible, avoiding excessive trim waste when cutting fresh meat, fruit and vegetables.

However, it is challenging to develop 100% accurate forecasts due to changes in the

number of customers and menu choices. As a result, there is a significant volume of [pre-consumer food waste generated in the kitchen](#) as a result of overproduction or over purchasing which results in expiration and spoilage of food products.

Bon Appetit faces the additional challenge of aligning production realities with the forecast. For example, if a forecast calls for a limited number of turkey portions it's still necessary to produce an entire turkey breast at a minimum, whether or not the entire breast is needed to meet portion forecasts.

The Solution: Implement Daily Food Waste Tracking and Staff Training in Best Management Practices to Reduce Waste

We manage the things we measure

With support from an Oregon DEQ Solid Waste Program grant and matching funds from LeanPath & Bon Appetit, the City of Hillsboro sponsored a project to reduce pre-consumer food waste at Intel's Jones Farm Café 5 and Ronler Acres Café 3.

The goal was to reduce pre-consumer food waste by 50% through daily food waste monitoring, staff training, and staff involvement in brainstorming and implementation of creative solutions. Monitoring relied on a computerized food

waste tracking system from LeanPath. The expectation was that tracking waste data would raise staff awareness, focus behavior, and provide information to diagnose the causes of waste. By watching trends over time, this data could be used to target intervention and improvement practices.

Additionally, the City of Hillsboro wanted to develop best management practices that could be shared with other restaurants and food service operations to help them reduce pre-consumer food waste.

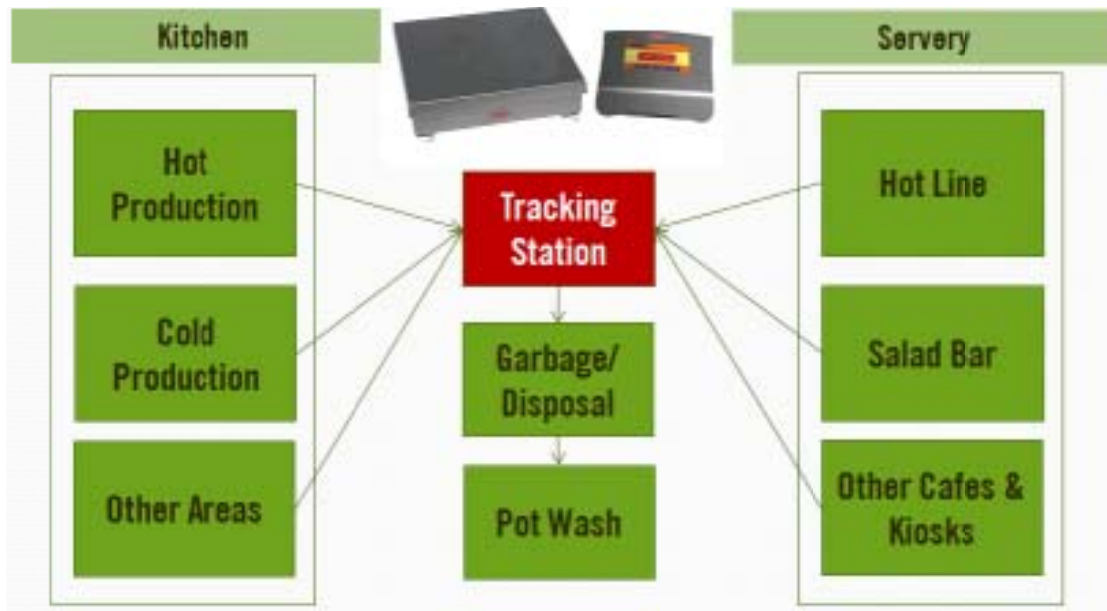
THE TRACKING SYSTEM

Employee training was done via brief in-service sessions demonstrating how to use the equipment and the rationale for tracking. Trainers and managers explained that this was a positive, employee-driven initiative and that no employee would be disciplined due to the amount of waste recorded even if it was deemed to be excessive. By recording this data, staff members were part of the solution and their efforts would be recognized and rewarded.

The scale was placed in the production area near the path that kitchen waste naturally followed en route to review and composting.



Each café tracked pre-consumer waste using one ValuWaste Tracker touch-screen terminal and scale from LeanPath.



The Tracking Process

Food waste items were weighed prior to disposal, donation, or composting.

Employees used the touch-screen interface to record the food item, the reason for loss, the container type (container weight is subtracted by the software), the sending station and employee name. The software automatically recorded the date, time and weight of the item and computed its estimated value.



The weighing process typically required less than 4 minutes per employee [per week](#). Bon Appetit did not have to add any labor to accomplish this and according to Ken Dale, District Manager, the effort may have even reduced labor by preventing waste and thereby avoiding excess production. In a hypothetical operation (with average hourly wages of \$10 and a staff of 40 FTEs), total labor cost for tracking would be less than \$30 per week and would be accomplished without adding additional hours or dollars.

This tracking system is currently used in hospitals, colleges, corporate dining facilities, and casino/hotels. The reporting software can also be paired with paper tracking to provide a software-only solution for lower-volume restaurants, coffee shops, convenience stores and food service operations.

Creating Reports

Bon Appétit also installed reporting software (ValuWaste Advantage from LeanPath) to generate waste reports and see progress over time. Data was moved from the Tracker to the Advantage software once weekly using a USB drive.

Using Data to Drive Change

Each site appointed its Executive Chef to lead the waste prevention program who then assembled Stop Waste Action Teams (SWAT) to work with them. The SWAT teams met on a regular basis to review data and set goals for improvement. Goals were defined very specifically (e.g. "Reduce soup waste by 50%"). Chefs solicited ideas from all staff members and discussed waste in regular employee pre-shift meetings. LeanPath also provided a coach who worked with the Chefs and teams at each site to understand their data and deploy best practices learned in other operations.

Summary of Weekly Waste Tracking Items

1. Track all pre-consumer food waste using touch-screens/scales.
2. Print and post waste reports weekly.
3. Hold a weekly SWAT team meeting and set specific goals for improvement.
4. Work methodically through each goal before setting a new goal.

Figure 1. RA3 – Top 5 Food Detail – Jan. 4 to Current

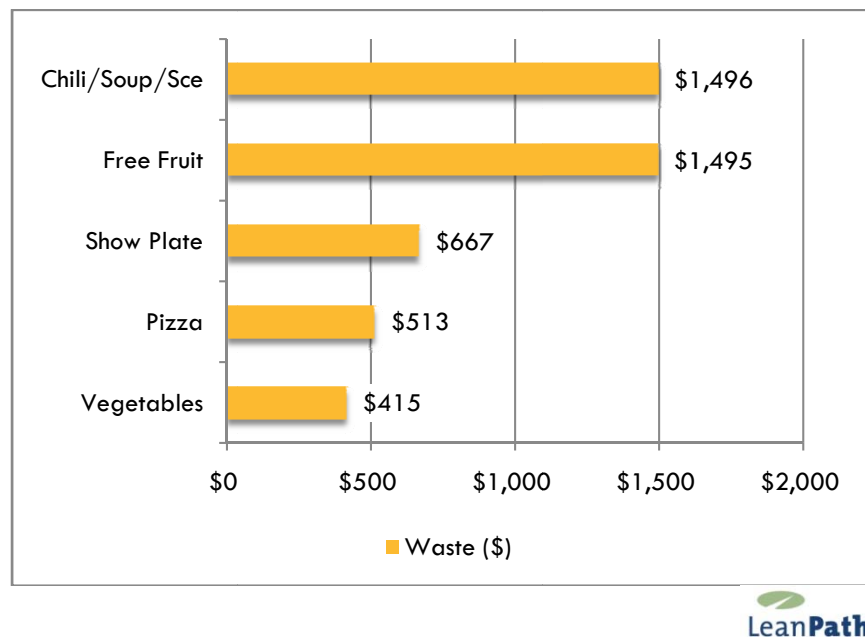
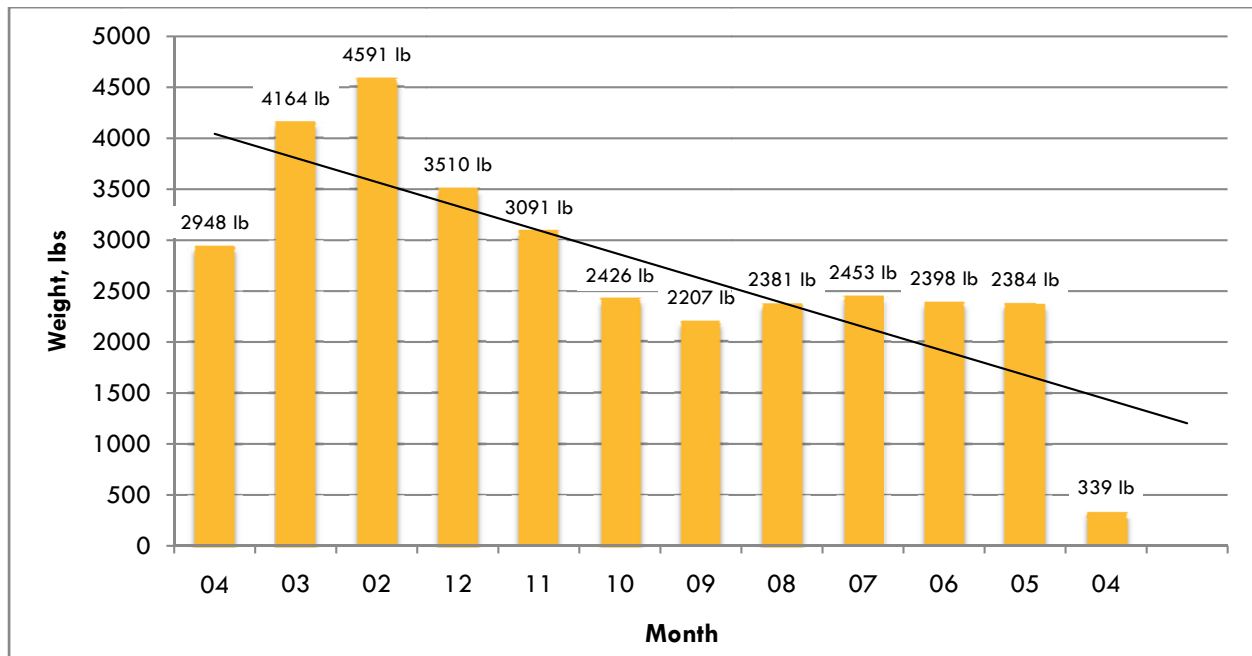


Figure 2. Waste Trend Report for Month



RESULTS

Waste Reduction

The combined pre-consumer food waste at the two cafes was reduced by 47% when comparing the baseline week of April 20, 2009² versus the week of April 5, 2010. This approach compares two moments in time the same seasonal period, year-over-year.

² LeanPath personnel monitored the baseline data collection to ensure high capture rates and an accurate initial baseline, although some undercapture of data was possible. All subsequent tracking was self-monitored and may include some amount of undercapture. Undercaptured data has not been estimated in this case study.

Metric	Total
Total Pre-Consumer Food Waste collected	92,920 lbs.
Waste Baseline Week (4/20/2009)	2933 lbs.
Report Period Ending Week (4/05/2010)	1562 lbs.
Percentage Change in lbs.	-47%

There are other assessment models available which also show strong waste reduction. For example:

In comparing the final six weeks of the study (the weeks beginning March 1-April 5, 2010) versus the baseline (April 20, 2009), the cafés experienced **total waste reduction of 49% versus baseline:**

Last Six Weeks	1,496
Baseline	2,933
Change	1,437
Percentage Change	49%

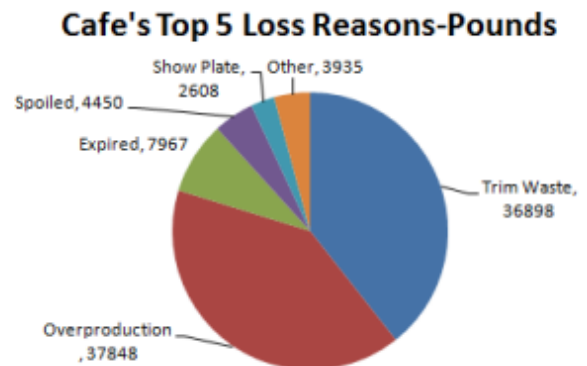
Using the same baseline (2933 lbs per week) and projecting monthly anticipated waste totals for the period, waste should be 152,935 lbs. Actual recorded waste was 91,358 lbs, indicating reduction of 61,577 lbs or 40%.

Food Cost Reduction Results

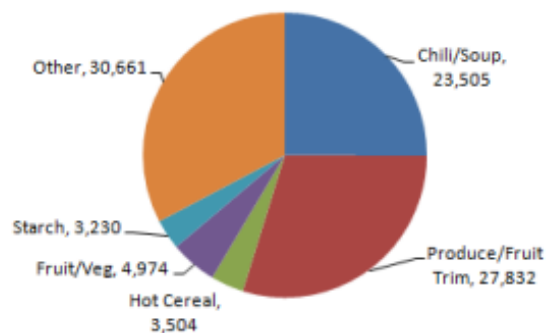
The two cafés reduced their food cost per meal served (FCPM) by a blended rate of **13.2%** in the year of the tracking effort versus the prior year.

To place this in perspective, for every \$1,000,000 spent on food purchases, the operator would yield a \$132,000 savings. In an industry with modest margins wherein food cost averages 30-40% of total revenue, this savings reflects a significant economic gain.

Profile of Pre-Consumer Food Waste Tracked



Cafe's Top 5 Discarded Foods-Pounds



BEST MANAGEMENT PRACTICES

(Note: All BMP's require and assume full compliance with all applicable food safety protocols. They also assume strict adherence to quality standards; leftovers refer to overproduced items held correctly at time and temperature)

- **Vegetable Trim Waste**
Chef reviews trimming practices, and reuse opportunities for trim in creating stock as a base for soup and sauce production.
- **Fruit**
Unused fruit can be re-worked into chutney and sauce that is used in daily offerings at café stations.
- **Pizza Station**
Move to a batch-oriented production model throughout meal periods allowing for lower upfront production of each variety. Utilize unused calzones in products such as soups.
- **Soup**
Use tracking data to establish leftover amounts. Review customer flow, seasonal preferences and weather to reduce initial soup production levels per day. Change procedures at the soup station to create opportunities to reuse leftover soup (planned re-use).
- **Chili**
Utilize leftover chili the following day as a topping for certain entrees.
- **Secondary Use Station**
Review all leftovers daily and discuss re-use opportunities among culinary team. Create a special station where leftovers can be safely redressed into new menu offerings.
- **Starches**
Redress leftover potato products and use at the utilization station. Puree certain starches and use as thickeners and texture enhancers for soups and entrees.
- **Coffee**
Coffee is offered for free at these sites and brewed throughout the day. Coffee production was curtailed in the afternoon as demand diminishes in order to lessen the amount discarded. Any leftover coffee is saved, chilled and mixed with ice and transferred to the flavored water station as an iced coffee beverage.
- **Coffee Mixers**
Dairy items prepped for the coffee station may be used as ingredients when making chowder.
- **Deli Station**
Historically was self-serve, but subsequently converted to a staffed station. This staffing led to a reduction in daily usage and post-consumer leftovers since each sandwich is made by a staff member – leading to better portion control. Also, since deli items are now in a controlled environment (behind the counter) there is more opportunity for safe re-use since there is no exposure to the public.
- **Salad Bar**
Reviewed vessel sizes and waste by item. Changed layout of salad bar and moved to smaller display bowls; maintained variety without having excessive leftovers.

CONCLUSION

*"I was surprised at the steady lowering of waste as it was projected over the duration of the program. It is still going down, which makes me wonder where the bottom will be ... **zero waste?**"*

- Executive Chef Micah Cavolo from Jones Farm 5

Pre-consumer food waste was a significant challenge for Intel at the two participating cafés, with more than 1 ton produced per week. After implementing continuous daily food waste tracking and staff training and involvement, the sites:

- Reduced pre-consumer waste by **47%**.
- Combined with other initiatives, reduced food costs per meal by **13.2%**.
- Achieved environmental benefits including **approximately 100** or more metric tons of avoided CO₂ equivalent greenhouse gases (MTCO₂e), annualized, split between upstream and downstream benefits (see Appendix).
- Created these results without adding any labor for tracking or expending any incremental labor dollars.

Along the way, the team identified numerous best practices which will be continued and can serve as a resource for other Chefs and food service managers.³



³ While this effort focused on waste prevention, the tracking process and training also validated existing practices and catalyzed new progress across other tiers of the food waste diversion hierarchy. For example, by the conclusion of the project, both cafés were sending pre-consumer fruit and vegetable trim waste to a local farmer for composting whereas only one site had done so previously. The sites purchased food from this farmer, thereby closing the farm-to-table loop. Both cafes had also implemented Bokashi composting of post-consumer food waste, whereas only one had implemented this prior to the project.

APPENDICES

APPENDIX A – GREENHOUSE GAS REDUCTION IMPACT

In addition to considering food waste reduction and cost reduction results, the study also evaluated avoided greenhouse gas emissions related to food waste prevention.

Methodology

Seven food types were selected among all the waste items tracked at Intel for further investigation of greenhouse gas avoidance:

- Bread/bakery (311810)
- Coffee (311920)
- Dairy (31151A)
- Fish (311700)
- Fruit/vegetables (1113A0)
- Poultry (311615)
- Beef (31161A)

Each of these was selected because upstream lifecycle data could be obtained for that item through the Carnegie Mellon Economic Input-Output Life Cycle Assessment EIO-LCA database. The number in parenthesis represents the EIO-LCA series code for that item. It should be noted that the EIO-LCA database does not account for indirect land use changes associated with increased or decreased agricultural production.

Each food waste item was assigned a value based on its net weight (the gross weight on the scale less the weight of the vessel containing the food) multiplied by an estimated cost per pound per item which was reviewed by Bon Appetit.

The cumulative totals for each item were calculated for consecutive periods ranging from 182 to 294 days per item. The amount of waste during the first week for each item was compared to the end week in the data set.

The weekly averted waste totals for each item were annualized to represent a 52 week year. This waste value was then adjusted by removing an allowance for wholesale and distribution costs (assumed to be 19% of the food service operator's purchase price) in order to arrive at the waste value expressed in producer prices.

The value was further adjusted to convert to 2002 dollars, the input required by the EIO-LCA 2002 dataset.

The data was then processed through the EIO-LCA tool to develop estimates of upstream metric ton carbon dioxide equivalent (MTC02e) avoided for each item.

Additionally, downstream landfill impacts were also estimated. These assumed that all food waste would be disposed of as mixed solid waste (not composting), using average disposal conditions for the Portland metropolitan area. Although the sites actually send their food waste to be composted, the emissions profile of composting is not well understood, and this case study modeled disposal as being more representative of a "typical" food waste generator. Coffee was not included as it would normally be disposed of as wastewater. The "dairy" category was included

because it is composed primarily of solid foods (cheese, yogurt) as opposed to fluid milk.

Avoided "downstream" emissions include reductions in fugitive methane emissions at landfills, incinerator nitrous oxide emissions, energy recovery offsets, and landfill carbon storage, consistent with the US EPA's Waste Reduction Model (WARM) tool.

The analysis focused only on greenhouse gas avoidance associated with the seven items identified above. Since the food waste stream included many other items, it is highly likely there are incremental avoided GHG savings beyond those described here.

Avoided Greenhouse Gas Emissions, Annualized

For Selected Items	Bread/ Bakery	Coffee	Dairy	Fish	Fruit/ Veg	Poultry	Beef	Total
Upstream								
Annual savings (to Operator), 2009 \$	\$5,512	\$5,928	\$4,680	\$1,456	\$16,692	\$10,504	\$14,976	\$59,748
Upstream GHG reductions, MTCO ₂ e	3.35	3.68	9.21	1.25	15.6	10.7	41.7	85.49
Downstream								
Annual pounds of waste prevented	2,704	12,636	1,560	312	30,888	8,892	4,940	61,932
Annual tons of "counting" waste prevented	1.35	0	0.78	0.16	15.44	4.45	2.47	24.65
Downstream GHG reductions, MTCO ₂ e*	0.62	-	0.36	0.07	7.12	2.05	1.14	11.36
Total Annual GHG Reductions, MTCO₂e/year	3.97	3.68	9.57	1.32	22.72	12.75	42.84	96.85

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