The City of Bakersfield developed an exciting new food waste recycling system with a simple breakthrough in how compost contaminants, like plastic janitorial bags and packaging, are handled. The system diverts roughly 50% of landfill waste generated from school cafeterias and other food waste sources. It achieves high levels of waste diversion by targeting not only food and compostable packaging, but also food scraps trapped within non-compostable packaging. Our pilot program went so well that all local school districts enthusiastically requested cafeteria composting service. Currently 53 schools are composting cafeteria waste.

The program is successful in Bakersfield because it makes food recycling feasible within school budget and staffing constraints as it eliminates the historical need for school personnel to remove most plastic bags and food wrappers before composting begins. Contaminants, like plastic bags and food wrappers, are first ground up with desirable material, like food. When composting is done, ground up plastic bags and other contaminants are weeded out of the product through a carefully developed screening and vacuum system. This new screening process produces a finer product that’s in demand among consumers. Truly this is a system worthy of recognition.
As discussed in the Executive Summary, the City of Bakersfield's Food and Wrapper Composting System is effectively designed to take an existing waste stream, that would otherwise have gone to the landfill, and create quality compost. It is designed to do this in order to realistically target and achieve landfill diversion goals set by the California Department of Resources Recycling and Recovery (CalRecycle). This is an enhancement of an already successful and award-winning regional green waste composting program. This system added new composting of food waste and food wrapping materials to an existing curbside green waste compost system. The Food and Wrapper Composting System has many unique features in its design and implementation - namely, through the integration with the City’s current refuse collection operation, a broad range of compost feedstocks are generated while retaining control over contaminants. Considering that most food waste composting systems have small volume due to avoidance of wrapper contamination, this system is a unique way of approaching contaminant control that allows the achievement of much greater landfill diversion than other systems. Furthermore, by utilizing the well-designed composting and back-end screening process for removing non-compostable material from the finished product, the Food and Wrapper Composting System is designed to go a step beyond. To best explain the advantages of this system, it is important to start with an understanding of the complex problem it was designed to solve.

Statement of the Problem

The City of Bakersfield identified a practical problem with achieving the new state waste diversion goals. Considering the amount of new composting activity needed to reach the goals, and the condition of the waste stream, it became evident that a conventional approach to food waste composting would not be enough. This was true for the obtainment of feedstock as well as for the compost production process. The complex problem was broken down in to the following parts:
Statewide Goals Translated to the Local Level

CalRecycle’s Strategic Directive Number 6.1 is to divert 50% of the organics currently being disposed in landfills. Given 35 million tons of annual disposal statewide, and a statewide waste characterization study that found 32% of the disposed material is organic, the 50% organic diversion goal will require 5.6 million tons per year of new composting. On a per-capita basis for 37 million California residents, that is “only” 13 ounces per day per Californian. But based on this average, Bakersfield (population 330,000) will need to divert 49,000 tons per year in addition to its existing 126,000 tons per year composting program.

Potential for New Organic Diversion Tonnage

Since Bakersfield already has a highly successful green waste diversion program handling 126,000 tons per year, it is appropriate to consider whether Bakersfield’s additional 49,000 tons per year “share” of the state “organics” goal may be disproportionately high. This could be possible, because other areas of the state may not already be diverting as much of their organic material. However, the targeted 49,000 tons per year organic waste diversion increase seems reasonable in light of the studies discussed earlier.

The targeted tonnage of organic waste also appears realistic considering how Bakersfield will advance from its current 61% diversion rate to achieve the new 75% state goal. For Bakersfield, each percentage point requires 4,800 tons per year of waste diversion. To increase from the current 61% to 75% will require 67,200 tons per year of new waste diversion. A new universal single stream curbside recycling program will divert 16,200 tons per year. New mandatory statewide commercial recycling (per Assembly Bill 341) will divert 17,000 tons per year. Together, these two new recycling programs will divert 33,200 tons per year out of the 67,200 tons needed to reach 75%. As these efforts “exhaust” the waste stream’s potential to yield more traditional recyclables, the goal still requires 34,000 tons per year to be hopefully diverted by organics. Comparing this to the 49,000 ton target discussed above, it is evident that significant amounts of organic diversion will be needed either way. This brings about the next part of the problem.

Is There Enough Food Waste?

Within the range of organic waste materials being disposed, there are various food and non-food materials. The state of the art in organic waste stream composting has been shifting toward including compostable non-food items. For example, soiled paper products and wet or waxy cardboard boxes are commonly being added to food composting programs. However, according to field observations, this approach falls short of really capturing leftover food that is discarded in non-compostable packaging. This part of the problem tends to increase as food packaging industries tend to stray away from heavier paper and cardboard toward lighter plastic. An example is the trend toward individual food servings which do not lend themselves to separation of food waste. As a result, significant tonnage of packaged food waste will be missed by convent-
ional “food and soiled paper” diversion programs. Thus, while there may be plenty of food waste in the waste stream, there may not be enough in a “targetable” state to reach goals without handling the non-compostable packaging issue. The system is designed to handle non-compostable packaging.

What About Extra Baggage?

The next part of the problem is with bagging up the feedstocks at the point of generation. Much work has been done in the compost industry to develop compostable bags for lining food waste collection containers.

Using compostable bags instead of regular plastic liners would be a good way to reduce “extra baggage” in the compost process. However, the relative high cost of compostable bags is an economic barrier. Consider the case of school cafeterias using 32 gallon barrels. Compostable liners cost about $0.70 each compared to $0.10 each for regular plastic liners. Field data indicates that school cafeteria waste uses about 100 bags per ton. Thus, the cost differential for compostable bags would be about $60 per ton over the normal plastic bags. Since compost systems operate in the $20 to $40 per ton range, adding a $60 per ton cost of compostable bags to that would be prohibitive. Therefore, the system is designed to accept and handle regular plastic bags from food waste generators.

Producing a Clean Product

Addressing the “extra baggage” issue discussed above, the system would achieve greater diversion than conventional “food and soiled paper” systems on the front end. However, the strategy needs to be completed with a composting operation that will separate out the non-compostable materials and yield a clean saleable product on the back end. This system does that, using a combination of certain features and techniques. These include:

1. **Containment and conservation of liquids in feedstock**: Each load of incoming food waste is dumped in a prepared bed of absorbent green waste and wood chips, to capture moisture for the compost process, as pictured:
2. Integrated de-packaging, mixing, and size reduction:
Food waste feedstock trapped in packaging or in external bagging is released and mixed with sufficient green waste, while size reduction of larger pieces takes place in one step, by feeding the required ratio of materials into a horizontal bed grinder. This method avoids the need for additional debagging equipment and labor:

3. Compost windrow management techniques:
Good compost windrow management, common to the industry, is practiced. However, the system goes beyond those, in order to avoid further reducing the size of non-compostable materials for better screening. One of these techniques is to use a compost turner with a less destructive drum (as opposed to ones designed to break down material). Another technique is to minimize the number of days that plastic materials are in contact with hot compost or sunlight, so that the plastic is not made brittle by the heat:

4. Two-stage screening combined with vacuum removal of plastics:
Much work has been done in the compost industry to screen out plastic from compost. However, most efforts have attempted to screen in one step, using fairly small screen openings. This conventional approach usually has limited success, as the wide range of material sizes in most compost streams tends to limit screen performance. The Bakersfield system has achieved better results by using a combination of larger primary screen openings and smaller secondary screen openings. The system is effective because it removes grossly oversized pieces of material from the compost in one screen, sending a more uniform range of material sizes to the second screen. In this way, the desirable fine compost particles are easily separated from the rest. As oversized materials are discharged from the screen units, plastics are removed from the remaining material by Air Lift Separators which vacuum up the plastic passing by on conveyor belts, as pictured to the right:
Merits of the system

From the description of the problem above, the need to design a high-capacity compost system with certain unconventional features was identified. Due to the need to target more than conventional “food and soiled paper” tonnage, the system needs to accept non-compostable materials in order to realistically get at the leftovers tucked away in so many wrappings. However, so many extra wrappings and bags may be considered by some people to be trash instead of compost feedstock. This requires careful discernment between what is trash and what is extra material “inert” to the compost process.

This design perspective is unusual for compost systems, but may be easier to see with an analogy single stream curbside recycling programs. Single stream curbside programs evolved in order to capture greater volumes of recyclables compared to small volume, source-separated curbside programs. However, a side effect experienced by single stream programs is the handling of reject materials. Typical reject rates are around 20%. Although an ideal program would not have to handle reject material, it is necessary to accept in exchange for the greater waste diversion from single stream recycling. In a sense, the same is true for organic waste diversion on a large scale over a wide collection area. Without gearing the system to accept some balance of non-compostables, the system would be limited to smaller volumes. Fortunately, although the City of Bakersfield’s Food and Wrapper Composting System has feedstock that somewhat resembles regular trash, the actual reject material tonnage after composting is only around 1% - a true merit of the system.

Environmental protection, demonstrating that It is “state of the art” composting system

As one of the largest compost facilities in California, the facility has a track record of expansion and improvements, having grown to a 97 acre regional facility from its original five acre site in 1992. This growth occurred in order to meet the demands of a 50% increase in the City’s population and the addition of green waste streams from neighboring jurisdictions. While absorbing such dramatic growth, the facility also implemented a number of improvements to have less impact on the environment. It has received multiple awards and recognition for “state of the art” systems (by SWANA and other groups), and has gone beyond that with other environmentally sound features. These include:
A. Implementation of electric equipment for grinding and screening to reduce harmful air emissions from diesel engines.
B. Coordination of electrical power usage to avoid peak times, helping the power utility delay additional power plant development.
C. Automation of bulk material handling for compost products leaving the final screen station, by “conveyorizing” to eliminate diesel heavy equipment.
D. Water conservation in windrow management by developing a special plow attachment for the compost turner. This allows water to enter the windrow without runoff. The plow attachment was later adopted as a feature by the turner manufacturer.
E. Groundwater protection by avoiding overwater-
ing and runoff common to most facilities, through use of the plow attachment described above.
F. Fuel conservation by setting up a below grade loading tunnel for trucks to be loaded by heavy equipment. The loaders stay at ground level, avoiding thousands of trips up and down ramps that are typically used in other facilities.

G. Creation of a perimeter view barrier and windbreak by using soil recycled from street sweepings otherwise destined for landfilling.
H. Reduction of liquids disposed of in landfills, by utilizing beverage de-casement fluids and liquids from school cafeterias in compost windrows.

Overall impact of the program on human health, environmental quality and resource conservation

As the Food and Wrapper Composting System acquires a large portion of its feedstock from area schools, the system has been extremely successful in raising awareness in the community – especially among school students. It is not enough to just have the system in place; participants must also be thoroughly educated on the benefits and necessity of food waste composting. Subsequently, a significant amount of time is given by City of Bakersfield staff to educating on where “waste” goes. Considering the Food and Wrapper Composting System is designed to recapture material that would have gone to the landfill, environmental quality improvement is already a direct result. The visualization of the amount of food waste generated is also ample encouragement to look for alternative reuse methods such as area food banks that can reuse the food in its original intended purpose.

Compatibility with the environment

Bakersfield is well-known for having some of the poorest air quality in California, making environmental impact a necessary focus for every decision that the City of Bakersfield makes. When developing the Food and Wrapper Composting System, a considerable amount of time was given to the benefits and potential consequences of the system on the area environment. What was discovered was that there was an overwhelmingly positive result from the implementation of the system.

Landfills do not want the liquids generated by food waste feedstock because of the methane generation over the long-run. By diverting the food waste liquids into a composting system, a significant amount of methane creation is reduced, which improves the overall air quality of the community. In addition, the liquids brought in with the food waste feedstock actually benefit the environment when composting because less water introduction is required. The resulting compost also promotes water conservation because it is used by farmers and landscapers to enrich the soil for better water retention. This ultimately results in less water being required to grow healthier crops and landscapes. Considering that water is also a very precious resource in California, this is a real step toward creating compatibility with the local environment.
The use of the finished compost has also been proven to reduce the need for chemical fertilizers and pesticides as a result of healthier soil from compost application in the residential and agricultural area – a further benefit to air quality. If these efforts to maintain compatibility with the environment weren’t enough, just the diesel fuel savings from the shorter trips to the compost facility compared to area landfills would put the system above and beyond. By taking food waste loads to the convenient and centrally-located green waste facility, fuel is conserved and less air pollution is created. By diverting food waste that would have ended up in the landfills and turning it into useable material, much-needed space is conserved thus creating a win-win situation for everyone.

**Are there innovative or unique aspects of the composting system**

Though this subject has been discussed in detail in the previous sections, a unique feature of the system is composting not only the food waste, but the wrappers as well. Similar programs often avoid the disposal containers and the wrappers associated with food waste, but the system employed by the City of Bakersfield has so effectively processed this material that only 1% of the food waste collected ends up as “trash”. The system is very unique because it does not attempt to change the waste stream to meet its requirements – the system has been designed to meet the community’s needs.

**Is this composting system different from the rest**

With the unique feature of composting not only food waste, but the wrappers and collection containers as well, the Food and Wrapper Composting System is already set apart from other food waste programs. Coupling this with the fact that the system uses an extremely innovative electrically-powered and conveyorized composting facility to process the food waste material collected takes the system to new heights. An award-winning facility for innovative design and environmental impact, the existing green waste facility used to process the food waste is able to adapt to the unique demands of processing food waste with the wrappers to make a clean and marketable product; a feat not often accomplished by other facilities. As mentioned earlier, the system also focuses on educating the community in order to stress the importance of resource conservation and alternatives to landfills – another distinguishing feature of the system. The City of Bakersfield is not content with just “figuring out” how to handle the current need for food waste disposal. Significant attention is given to educating the public to help alleviate the need for landfills in the long-term.
During major events throughout Bakersfield, the City of Bakersfield sets up educational booths and labeled disposal receptacles for food waste and other recyclable items. Staff members at the events hand out biodegradable collection bags for the collection of food waste and provide information on how the individual can make a positive impact through backyard composting, food waste disposal, and resource conservation. Though biodegradable bags are not proven to be cost effective for large institutions, they serve as an excellent tool in educating the public.

In addition to educating the community on food waste collection at the front-end, the City of Bakersfield uses the system to teach the public about alternatives to food waste disposal through donations to community garden programs. In conjunction with Keep America Beautiful through Keep Bakersfield Beautiful, the City of Bakersfield is connected with area volunteer groups and non-profit organizations that take aim on developing community garden and revitalization projects. Through the donations of compost made from materials like food waste, the community is able to see the end results of diversion efforts with each budding flower or edible plant. This is a perfect example of closing the loop – material starting out as food that is recycled and turned right back into food.

One of the more innovative educational tools is the use of the Bakersfield Homeless Shelter at the green waste facility to process the material received by the City’s green waste composting facility. Not only do participants from the homeless shelter gain valuable job training and experience from working onsite, they learn the impact of the food waste diversion program from a first-hand perspective.
Regulatory Compliance

Is the site in environmental compliance
For operating a composting system

The facility is in environmental compliance for operating a composting system, under several pertinent sets of regulations. The management staff of the facility has established solid working relationships with the regulatory agencies. This goes beyond basic compliance, into the realm of assisting regulatory agencies create practical regulations as they carry out their mission. The compost facility is often used as a guiding example for regulatory agencies, and is occasionally used for a training site for Local Enforcement Agency (LEA) training by the State of California.

The facility also assisted two Air Pollution Control Districts (Central California and Southern California) with development of new regulations to control volatile organic compound (VOC) air emissions from the compost process. The facility conducted special field operations to evaluate the practicality of proposed VOC control techniques. The green waste facility is so well regarded as an environmentally compliant site, that the California Water Quality Control Board used the facility management to provide technical research and input on cost effective methods for preventing degradation to ground water as the water board developed new compost industry requirements.

Have they submitted any awards, letters or facility inspection data

Over the last few years, the green waste facility has won such distinguished awards as the Silver Composting Excellence Award in 2008 from SWANA and the Outstanding Organics Program Award in 2008 from the California Resource Recovery Association. Management has also been invited to participate and present papers regarding the ground-breaking facility at multiple conventions throughout the United States, including at Wastecon 2009 and at BioCycle in 2012. In addition to recognition for these, the facility has banked bona fide air emission credits with the air pollution control district for its efforts.
Recently, the facility management created an industry-wide team of composters, consultants, scientists, and regulators to obtain a major grant for advancing the “new generation” compost facility to eliminate heavy diesel equipment while at the same time reducing biogenic VOC air emissions from compost. This proves that the green waste facility is viewed by leaders in the industry as worthy of not only award recognition, but of funding to take a step beyond for air pollution control.

**Is the system integrated and complimentary to other local solid waste management systems**

The Food and Wrapper Composting System is integrated with the rest of the City’s green waste composting program and municipal waste management system, as well as the unincorporated Kern County system. Both jurisdictions support the system with solid waste enterprise funding. User fees for food waste collection routes are structured to create an economic incentive for schools and institutions to compost and reduce disposal. The system is expandable to other jurisdictions, which is helpful for school districts that geographically span across city boundaries. The nearby City of Arvin has also begun using the green waste facility by bringing its combined green waste and food waste curbside residential collection for processing. As the only facility in the area equipped to process and recycle Arvin’s material economically, it is a clear example of how compatible the Food and Wrapper Composting System is with other local solid waste management systems.

**Have they received a citation and/or corrected a problem**

Due to a proactive approach to regulatory compliance and solid working relationships with regulatory agencies, the facility has not experienced problems with citations or complaints.

**If there were problems how were they corrected**

As there have been no problems or complaints, no corrections have been needed. In fact, relationships with regulatory agencies as so critical even suggestions or possible ideas are thoroughly discussed and explored to judge any possible merit.

**How good is the waste screening procedure**

The waste screening procedures have proven to be extremely efficient. The procedures are effective at monitoring for and removing reject materials from the various streams of incoming feedstock. These include:

- Visual monitoring of self-haul green waste loads arriving at the facility.
- Spot checks of automated curbside green waste carts when contaminated.
- Use of a pre-screen and sorting station for visual monitoring and removal of reject materials from curbside green waste.
- Visual inspection of the contents of food waste bins by the route driver, backed by “red tagging” for reject materials.
- Visual inspection of the food waste packer loads before they are ground.
Description of the design & effectiveness of the facility’s planning process

The system was designed to achieve greater waste diversion than other food waste composting systems. This was made possible by careful planning and piloting which began years ahead of the main program and ultimately led to the process summarized below:

1. Facility permit modifications were made to add food waste to the existing green waste system, following the State of California’s identification of “organics” as a major part of the post-2000 waste stream.
2. Study of “state of the art” composting revealed (in early 2000s) that most compost systems were trying to keep plastic out at the front-end.
3. Field observations indicated that packaging materials mixed with food waste were so prevalent that source separation would be costly and would limit participation.
4. Economic and performance evaluation of compostable plastic bags, cups, plates, and utensils were done.
5. Field trials were done to test composting and screening of food waste packaging.
6. Field trials were done to test grinding of food waste with packaging mixed with green waste.
7. Composting of certain industrial food waste in packaging began in the mid-2000s, followed by years of sampling and market development for the finished product.
8. Collection fees for food waste were formed to create an incentive compared to refuse collection fees.
9. Dumpster diving exercises were done to determine how many Styrofoam trays were in a typical school refuse bin and what the actual cost per tray was for disposal. This information was provided with assistance to school district managers, who then saw the benefit of switching away from Styrofoam trays.
10. Meetings were held at each school to assure the custodial and cafeteria staff that the program would not create extra work for them.
11. Two outgoing and kid-friendly refuse truck drivers were chosen for special duty to present the composting program to the students, with great success.
12. The system was phased in at 53 schools over a 6-month period.

Discuss system downtime if any

System downtime (for both collection and composting) is prevented by contingency planning and availability of backups. School cafeteria food waste is collected daily by a specially assigned refuse truck. Backup is available if needed from the rest of the City’s fleet of refuse trucks. Food waste is normally fed into a green waste grinder at the facility, but another grinder assigned to other woody materials can serve as backup. In the event that the facility’s single windrow turning machine has downtime, windrow turning can be done by a fleet of eight front-end loaders normally assigned to other parts of the facility. In the first year, no food waste route collection delays have occurred, and composting has been accomplished within the time frames prescribed by regulations.
Performance, Economics & Cost-Effectiveness

Describe the efficiency of the operation

To reiterate what was discussed in section one, the operation is efficient as it uses existing equipment and facility infrastructure with minimal extra steps. Collection is accomplished by simple rerouting of existing operations, using collection equipment freed up by reduced disposal. Composting is accomplished by blending in food waste feedstock to an existing green waste composting operation. These operational efficiencies and the program’s fundamental purpose of composting wrapper material with food waste allows it to achieve a much greater percentage of food waste diversion compared to conventional programs.

How does the facility measure their success

The facility measures success in several ways: Safety, operating economy, product quality, and participation levels. Many examples were discussed in the earlier sections, including the overwhelmingly positive reception the program has received by area schools on the front-end, as well as by the compost users on the back-end. The system has also proven to be more cost-effective for area schools than the previous disposal routine.

Does its operational performance equal or exceed the goals and expectations set forth for this facility, and found with other similar systems elsewhere

The goals and expectations for this facility were exceeded, in terms of both economics and product quality. According to published and anecdotal information about other facilities’ issues with plastic in the feedstock, this system has achieved a new higher level of performance. The cost of composting food waste and packaging on a large scale has remained about the same as regular green waste processing. The quality of the final product screening process actually increased revenues, instead of decreasing them as many plastic handling composters have experienced. Two examples are given below of the finished product that clearly demonstrates the superior quality of the finished compost:

City of Bakersfield Food & Wrapper Composting System
SWANA Composting Systems Excellence Award
2012 Nomination Packet
How does the organization foster customer service

The organization fosters customer service with a culture that only has two rules: Safety first, and take care of the customer. As a public solid waste enterprise, all employees are aware that every cent comes from its customers, and that private waste companies could replace the operation. Along with this, respect for the public eye is maintained.

Are the economics typical of those found in the industry

Economics for the City’s green waste composting system are typical of those found in the industry. Urban green waste in California is composted at facilities that cover most of their cost with upfront tipping fees, and less by product sales. This phenomenon exists because the cost of trucking finished compost to farms limits the farmers’ purchasing power.

Was the system constructed and operated as budgeted and expected

The system operates well within its budget, at a cost that is lower than local landfill fees. The system was created to blend into an existing operation, requiring very little capital expense. Construction was limited to placing an earthen berm and a litter fence to surround a small portion of the windrow composting facility. The cost of composting food waste and packaging on a large scale has remained about the same as regular green waste processing. The product quality from the screening process actually increased revenues, instead of decreasing them as many plastic handling composters have experienced.
Utilization of Equipment/Systems and Technologies

The Food and Wrapper Composting System primarily utilizes equipment in place for the existing green waste composting system. The green waste system was already designed to operate efficiently and to be expandable to other organic feedstocks, using carefully selected types of equipment. Only minor additions and modifications were necessary. For a complete list of the equipment being utilized, please see the following section.

- Alternate Fuel Refuse Collection Truck – The food waste feedstock is collected from schools and other sources by the use of a frontloading refuse truck servicing three-cubic-yard bins that are labeled “ORGANICS ONLY”. The truck is powered by liquid natural gas to reduce harmful diesel exhaust, consistent with air pollution control district goals. The truck is fitted with a special tailgate seal to contain the many liquids collected in school food waste.

- High-Reach Loader – At the facility, material is handled by normal five-cubic-yard loaders equipped with high reach arms, instead of roll-out buckets commonly used at other compost facilities. The high reach arm feature increases loading height like roll-out buckets do, but with less wear and tear compared to roll-out buckets. The facility’s loaders also have special low profile high-capacity buckets to move more material per scoop, while keeping safe clearance from trucks and hoppers.

- Flatbed Grinder – Feedstocks are ground up at the facility in flatbed grinders instead of tub grinders, for improved safety. Tub grinders tend to throw material skyward. The facility’s grinders are electrically-powered to reduce harmful diesel exhaust, consistent with air pollution control district goals. They are also equipped with special load sensors which conserve electricity by automatically adjusting the feed rate. This feature saves about one-third of the energy that would otherwise be used.

- Paddle-Type Compost Turner Drum – Windrows are turned with a 20’ wide Scarab compost turner, which has paddles instead of teeth on the drum. This feature is an important part of the system, because it prevents plastic packaging and bag material from being broken into smaller pieces in the windrow. This improves the successful screening of plastic from the finished compost.
• Windrow Water Furrow Attachment – The compost turner is also equipped with a plow to make furrows on top of windrows as it passes over them. This attachment was developed in-house as a means to conserve water, letting it soak in the top furrows instead of running down the face of the windrow. The turner manufacturer adopted the idea as an accessory for their product.

• Water Truck – Water trucks are quite commonly used to water windrows at compost facilities. However, standard nozzle arrangements are not the most efficient for this task. Therefore, the facility has modified the spray nozzles in two ways to save water. The nozzles are mounted on risers and the spray patterns are adjusted to apply water only on top of the windrows in the furrows mentioned above. This reduces water consumption by about 30%.

• Product Screening System – Much work has been done in the compost industry to screen out plastic from compost. However, most efforts have attempted to screen in one step, using fairly small screen openings. This conventional approach usually has limited success, as the wide range of material sizes in most compost streams tends to limit screen performance. The Bakersfield system has achieved better results by using a combination of larger primary screen openings and smaller secondary screen openings. The system is effective because it removes grossly oversized pieces of material from the compost in one screen, sending a more uniform range of material sizes over the second screen. In this way, the desirable fine compost particles are easily separated from the rest. As oversized materials are discharged from the screen units, plastics are removed from the remaining material by Air Lift Separators which vacuum up the plastic as it passes by on conveyor belts.

• Transfer Conveyors – Bulk handling of finished compost is partially automated by electric powered transfer conveyors which carry the product from the screens to the storage area without double handling, eliminating the need for a diesel loader.
Describe employee training frequency and safety procedures

Safety is first and foremost. There have been no reportable injuries for collection or processing of food waste due to an ambitious training and safety program. Detailed written instructions are included in every training binder discussing proper safety procedures. All staff members are tested on the information and must clearly demonstrate a thorough knowledge of the implementation of the procedures. Random observations take place constantly to ensure that the procedures are being clearly followed. Further safety for both the staff and the public at the facility is achieved by a combination of physical controls, inspection program, and a thorough training and performance evaluation program. The cost of the City’s self-insured coverage is less than one-third of worker compensation insurance costs paid by typical facilities. The industry benchmark in California for worker compensation is 19.4% for payroll dollars paid as premiums. The equivalent cost for the facility is only 5.2% of payroll dollars. This effectively illustrates the commitment to safety.

Inspection Program
1. Daily clearing of wood chips and other debris from equipment.
2. Daily pre-trip and post-trip inspection of heavy equipment and trucks. Although the facility equipment is used off-road, inspections are done to on-road standards.
3. Maintenance of fire lanes around material piles.
4. Monthly inspection and tightening of high voltage power terminals on equipment.

Safety Training Program Components (fully documented)
1. Formal Injury and Illness Prevention Plan with 12 month calendar of weekly topics.
2. Safety meetings are held weekly, above the OSHA standard. Absent employees are individually caught-up when they return, to ensure complete coverage.
3. Basic 40-hour orientation and safety training for new employees.
4. Special task safety training and certification for employees assigned to those duties.
5. Annual performance evaluations, required for pay step increases, include actual performance of the electrical power lock-out/tag-out process and pre-trip inspection of a heavy truck.

Physical Safety Controls
1. One-way traffic loop to avoid collisions.
3. Paved surface at public tipping area for wood waste.
4. Public tipping area divided in two parts – heavy equipment alternates working on opposite side of barrier, keeping the public and assigned staff on the ground well out of the way of the equipment.
5. Loading dock configured as “bridge” to prevent equipment falling over edge.
6. Positive lock-out/tag-out safety for grinders, screens, and conveyors.
7. Scaffolds for equipment maintenance at heights.
Public Acceptance, Appearance and Aesthetics

Discuss overall appearance of the vehicles, maintenance facility and yard

As part of the City’s focus on safety, equipment maintenance and facility upkeep are a priority. For all equipment used, documented inspections must take place before and after operation to catch any potential issues with the equipment. Repairs and maintenance are performed by the City’s fleet department, and costs are charged back to the solid waste enterprise. Equipment replacement is made according to recommended life cycles, funds for replacement, and the cost accrued during the life of the equipment. This way, money is available to replace worn-out equipment when the time comes, without delay. When a new technology comes onto the market that could benefit the City in the long-run, it is investigated. This results in new, safer equipment being cycled into operation. Some examples are the electric powered grinders and screens, and the alternate fuel refuse collection trucks used in the food waste route. The City is proud to use a fleet that is not only aesthetically pleasing, but environmentally-friendly as well.

Does the system work well

The Food and Wrapper Composting System works well, without negatively affecting the long established green waste compost system. In fact, the overall system is enhanced with new revenues and greater demand for its products because of the new system addition.

Are facility and vehicles properly maintained for cleanliness

The facility and equipment units are maintained for cleanliness by daily removal of loose debris and frequent pressure washing at an onsite wash rack. Tipping areas for feedstocks are kept clear by loader buckets scraping the areas clean. Dust is controlled on roads and tipping areas by regular passes of the facility’s water truck. The public roadway leaving the facility is swept as needed by a loader with a street sweeper brush. Incidental litter and occasional after-hours dumping near the facility are routinely cleared by facility crews.
Does the facility provide public relations measures and public education information

An integral part of the design of the Food and Wrapper Composting System is educating the participants in the program and the community at large. Great measures are taken to educate the public on their part in recycling. For example, the City uses to teach students about the food waste program. Friendly refuse drivers on special duty present the composting program to the students using visuals to reinforce the message.

![Image](image1.png)

After the food waste is composted, drivers take samples of it for students to examine and use in school gardens. Awareness is also achieved by guided tours of the green waste facility that show the composting process. Steps are taken to raise awareness at community events with booths to give out informational flyers and compost samples. The City also donates compost and mulch to gardens.

The facility has few neighbors, but is a good neighbor to them. Noise was reduced by the conversion to electric powered equipment, eliminating louder diesel engines. Facility traffic flows through a properly zoned corridor, and the City widened the road shoulders for improved safety. Litter and occasional after-hours dumping near the facility are routinely cleared by facility crews. The nearest homes are in a newly developed tract about one mile away, and for them the facility voluntarily created a berm topped by shrubs for an aesthetic view from the tract. Most importantly, the facility has prevented odor problems common to many compost facilities. No odor complaints have been received in its 20-plus years of operation.
Supplemental Material
Program Presentation

School Recycling Program
Reduce Monthly Refuse Fees at Schools by Recycling

**Trash Bin**
$9.40 Per Cubic Yard Average Cost for Trash
(most schools generate 20 to 30 cubic yards per week)

**Green & Blue Recycle Bin**
$4.10 Per Cubic Yard Average Cost for Recycling Bin
(recycle cardboard and paper)

**Recycle Cart**
$1.23 Per Cubic Yard Cost for Blue Recycling Cart
(recycle paper, bottles, and cans)

Being Green Is Better for the Bottom Line

<table>
<thead>
<tr>
<th>Trash Service Only</th>
<th>The Greenest Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>$14,145 12 months (estimate)</td>
<td>$6,194 12 months (estimate)</td>
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Recycle Students’ Food Scraps in Cafeteria

Cooperation is Key
- Custodians
- Kitchen Staff
- Teachers
- Students

Recycle Students’ Paper in Classrooms

City of Bakersfield Food & Wrapper Composting System
SWANA Composting Systems Excellence Award
2012 Nomination Packet
School compost effort saves money, teaches green living

BY ANTONIE BOESSENKOUL Californian staff writer aboessenkool@bakersfield.com

It’s lunchtime at Actis Junior High School. As the seventh-grade students chat with their friends and gobble down their food, they also pick through the remnants of their meals, separating the apple cores and paper milk cartons from the plastic wrap and styrofoam cups. On their way out, they empty their trays into either a gray barrel for trash or a blue barrel for food and other biodegradable waste.

Head Custodian Don Gutierrez stands guard, making sure the students use the correct bins, intervening when necessary. Gutierrez said the school has been able to dramatically cut the amount of trash it sends to landfills each week because of the composting process. It's also saved hundreds of dollars on its trash bills.

In Sal Moretti’s office several miles away sit stacks of round plastic containers holding the end product of what goes in those blue barrels — the separated, mashed, dried and degraded compost, which looks like dark, rich potting soil and smells, some say, like sour milk.

It’s the result of a new program from the city's solid waste division to "recycle," or compost, the lunchtime leftovers. After an initial tryout in 20 schools last spring, the solid waste division has installed the food waste program in 51 area elementary, middle and junior high schools.

So far, the program brings in about 15,000 pounds of food waste every weekday, said Moretti, city solid waste superintendent. The food scraps, paper milk cartons and other biodegradable waste is trucked from the schools to the city's green waste facility on Mount Vernon Avenue.
There, staff spread out the waste to look for anything that could damage the grinding machine, like tin cans. Everything goes into the grinder, then is laid out in rows on the ground and mixed with woodchips. It decomposes over 10 to 12 weeks then is put through a screen to take out any plastics that may not have been separated out.

The city sells the rich, pungent compost to farms, Moretti said.

"The beauty of our program was its simplicity," he said. "At most of the school districts, they had two trash dumpsters. ... So we just try to focus on if we can just change one of the trash dumpsters to food.

The catalyst was schools’ desire to save money, Moretti said. Schools get lower rates on trash service because they’re contributing less to the landfills. Actis Junior High Principal Patrick Spears, estimated the school has cut its trash hauling bill by about half to $200 a month.

The composting program can also help students develop lifelong habits, said Jaime Nunez of the solid waste division. Nunez and Moretti set up the program and train students and adults to implement it.

"We’re teaching the kids to recycle," Nunez said. "Hopefully when they grow up they’ll (know) how to manage waste."

Younger students, like those in elementary, have been especially excited about the idea, he said.

"(We tell them) ‘Guess what everybody! We get to save the Earth!’ And they get all excited -- ‘Yeah! We get to do this!’"

Actis Principal Spears said it took a couple weeks for the seventh- and eighth-graders to get the hang of separating the food scraps. But the school made adjustments and came up with a system where students work in pairs -- one carries the biodegradable scraps while the other carries the trash. That speeds up the process.

Spears said Actis was a "guinea-pig" for the program.

"We wanted to try it. Why not?" he said. "To start off, we really had to monitor kids and show them how to do it," but now students seem to be getting the hang of it.

Spears admits it can get a little messy.

"Turkey gravy day is messy. Salad day is messy, but you just deal with it," he said.

"This is the first school I’ve seen it in," said seventh-grade student Dillon Reynolds. "It’s important. It helps the environment."

"At least for the two years they’re here, they’ll get a heavy dose of recycling," Spears said of Actis students. The school uses some of the compost in its flowerbeds and recycles paper in its classrooms.

Almost all 23 Panama-Buena Vista Union School District schools compost their lunches, while two-thirds of Bakersfield City School District schools use the program. So do one school each in the Lakeside Union and Rosedale Union school districts.
The city would like to expand the program to all area schools, but there are obstacles for high schools, schools outside city limits and those that use a trash compactor.

Solid waste staff are discussing with Kern Refuse trash haulers how to cover schools outside the city limits, Moretti said. High schools are a challenge because students have lunches at places other than the cafeteria, so monitoring how trash is separated is more difficult.

Already, the solid waste staff has met with Kern High School District representatives to discuss a pilot program for Independence High School, Moretti said.

Brenda Johnson, director of food services for the Bakersfield City School District, said the plan is to extend the program to all BCSD schools, but it will take time.

"We're trying to make sure that everyone has an opportunity to be trained correctly," she said. "Plus, we want (students) to understand why we're doing it so as they grow up, they can see how to be greener in their environment."

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Flow Chart of Food & Wrapper Composting System

Food waste is collected at the schools for compost recycling. The material is picked up daily by a refuse truck and taken to the local green waste facility. There it is ground up and hauled to the windrows for composting. After successfully completing the designated pathogen reduction period and testing, the material is processed and screened. Buckets of finished compost are brought back to the schools to add to gardens. Compost is also used by local farmers to grow crops, which is used at local schools for nutrition – thereby starting the cycle again.
2012 COMPOSTING SYSTEMS EXCELLENCE AWARD
CHECKLIST AND RELEASE

2012 Applications must be submitted to SWANA no later than Friday, April 13, 2012

*** PLEASE NOTE THAT ENTRY REQUIREMENTS HAVE CHANGED ***

Application Checklist (Please make sure the following items are included in your submittal packet):

- Completed release statement (this page), to be scanned and included in digital submission
- Check (made payable to SWANA) or credit card payment for nomination fee (in U.S. dollars) via Excellence Award Nominations
- At least 2 pictures of your operation (may be included in nomination text)
- One copy of your award submittal uploaded using your purchased 2012 SWANA Excellence Awards Application Uploading Instructions
- If you would like to mail your submission, please contact Jesse Maxwell, Program Coordinator, at jmaxwell@swana.org or (240) 494-2237.

Release Statement: I certify that the information provided in this application is accurate and correct to the best of my knowledge. SWANA reserves the right to publish the enclosed information. Nominations become the property of SWANA. My signature gives SWANA the right to reproduce or make available for purchase any portion of this submittal.

Signature: ______________________ Date: 4/9/2012