Zero Waste Schools:
How to Plan for Success and Become a Sustainable School

Tracie Onstad Bills

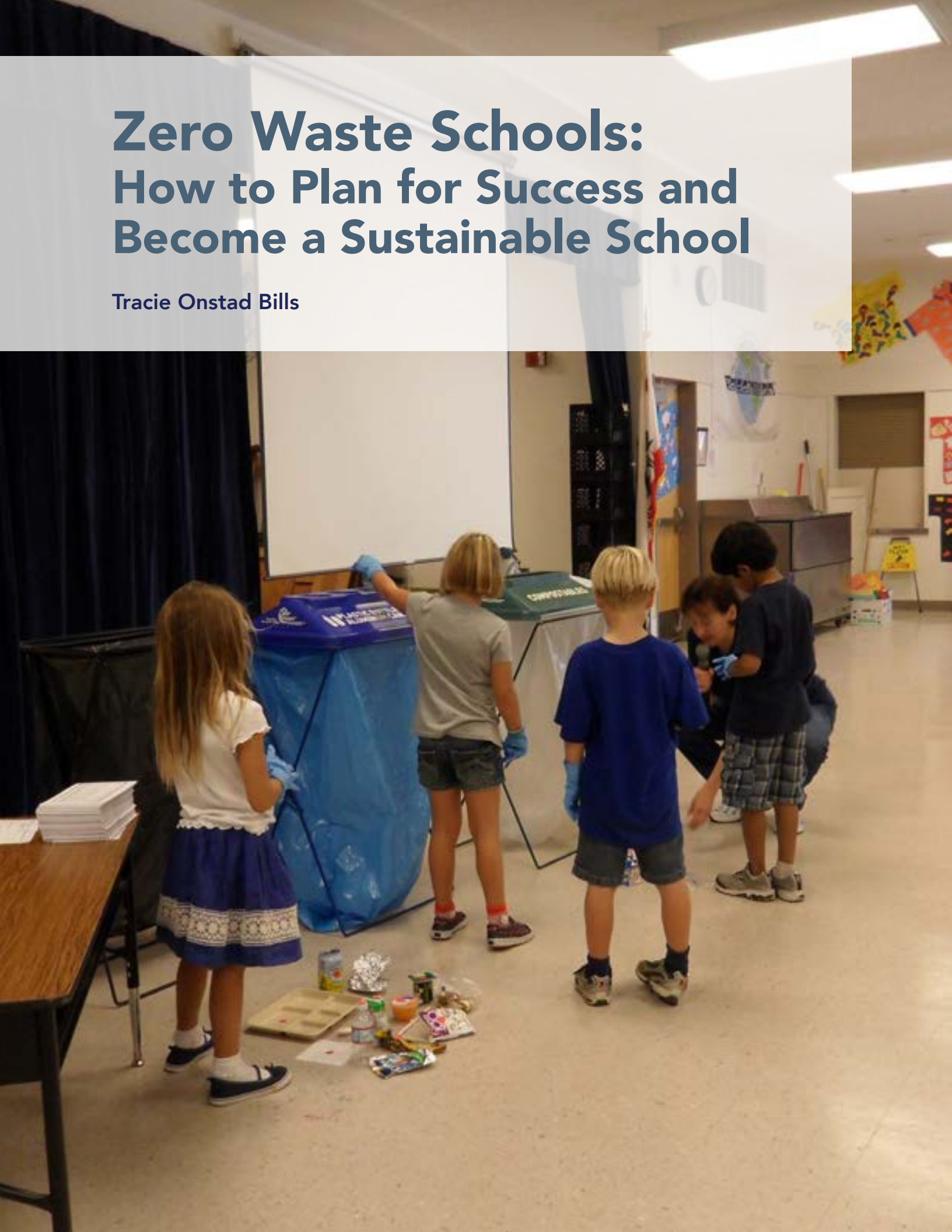

Photo: City of San Jose

Many schools are prioritizing a shift toward sustainability. However, learning to manage their material resources on-site in a more sustainable manner is a challenge. The United States is a 'land of waste,' generating around 728,000 tons of garbage per day (SaveOnEnergy, n.d.). With approximately one of every six Americans attending or working in schools, a large amount of that waste is generated there. According to CalRecycle's latest school waste characterization data for California schools, this includes 51% organic material (e.g. food scraps, compostable paper), 46% recyclables (31% paper, 13% plastic, 1.4% metal, and 0.5% glass), and 4% garbage (CalRecycle, 2014). A study by the Minnesota Pollution Control Agency (Cioci & Farnan, 2010) reported similar results. According to Waste Free Lunch, each student who consumes a disposable lunch generates roughly 67 pounds of waste per year, equating to 18,760 pounds of lunch waste for an average size elementary school (Waste Free Lunches, n.d.). Cafeterias create the majority of a school's waste, which is largely comprised of food scraps and (depending on the school) packaging materials and service ware that can or cannot be recycled or composted. To reduce the material going to landfills and reap cost savings, a sustainable materials management program should be developed, which will become part of a comprehensive school sustainability program. Developing a strong material management program may also lead to the adoption of a zero waste program.

According to the U.S. Environmental Protection Agency (EPA), sustainable materials management is a systemic approach to using and reusing materials more productively over their entire life cycles. It represents a change in how our society thinks about the use of natural resources and environmental protection. (U.S. EPA, n.d.)

So, what is zero waste? It is a systems approach to eliminating the impact of products and packaging, resource use, and reutilization through the implementation of modern materials management and greenhouse gas reduction programs. Zero waste does not mean "zero garbage," but rather "zero waste"

of resources. The term describes the desired end-state and a call-to-action to rethink what we regard as garbage as potentially valuable resources (Leonard, 2016). The old adage of one person's trash is another's treasure certainly holds true in a zero waste program. The following article provides examples and describes how a consulting firm, such as SCS Engineers, has assisted schools without materials management programs to launch zero waste programs.

Benefits of a Zero Waste School

The benefits of achieving zero waste depend on the driving factor(s) behind the goal to get there. Some schools believe sustainability is a critical component to education and a healthy environment. Others are trying to reduce expenditures. Reports have shown a direct correlation between a healthy environment, happier kids, and better test scores (NCCDPHP, 2014). There are a variety of benefits to improving materials management practices while striving to become a zero waste school. These benefits include:

- Conserving natural resources
- Providing a healthy environment
- Creating a sustainable community practice
- Minimizing pollution
- Reducing climate impact
- Providing educational opportunities on environmental topics
- Generating cost savings

Zero waste practices conserve resources and schools can contribute by recycling and composting. According to Keep America Beautiful, the 2016 Recycle Bowl Competition had nearly 1,300 K-12 schools and over 700,000 students and teachers participate in recycling 2.2 million pounds of recyclables. That is 1,100 tons of paper, bottles, and cans that were removed from landfills and recycled into new products. Recycling this material reduced greenhouse gas emissions by 3.15 metric tons of CO2 equivalents, thus reducing the impact on climate change (Recycling Today, 2017). (This program represents only about 1% of the schools in the country; consider the impact if every school participated.)

Additionally, most recycling programs are serviced at no additional charge to the school. By recycling, a school/school district can remove 46% of the material (amount of recycling found in a typical school's garbage container) from the garbage, which will reduce monthly disposal costs by almost half.

All of these are important benefits, but how they are prioritized depends on the school or school district's goals. For example, cost is important to all schools and school districts. If a program will cost more money than what is currently spent, it becomes harder for decision-makers to approve it. These costs come about in various ways. A school can save money if it can reduce the amount of garbage serviced each week. Yet, if a school needs to reconsider the type of cafeteria service ware it purchases, sometimes it will save money, but in many instances it will cost more. Identifying priorities and evaluating the benefits of those priorities will help assess if adding a zero

waste program makes sense. To evaluate how a school with no zero waste program can begin one, several actions should be taken.

1. Evaluate if there is an outlet for the material. Talk with the garbage hauler or perform research on other collection companies that can provide recycling and organics services. If there are no collection opportunities, look to local drop-off centers to accept material. This is the most critical step. If there is no way to recycle or compost the material, then starting a program is problematic. Work with your city or collection company for guidance in identifying a viable solution.

2. Establish priorities. Once a method to recycle or compost material has been validated, then establish priorities to direct how the program is designed. Be sure to consider why attaining zero waste is of value to the school/district/community. What goals will a zero waste program have and will the economics of the program help or hinder achieving these goals? Also, be clear as to what benefits are most important to the school. Is it saving resources from the landfill? Reducing greenhouse gas emissions? Saving money? Or something else? These answers will help prioritize how to formulate a program.

Once a decision to move forward with a zero waste program is made, the following steps will provide guidance on best practices for starting and maintaining a strong materials management program that leads to zero waste.

Steps to a Zero Waste Program

Leadership Commitment

The first step to becoming a zero waste school is to obtain buy-in and commitment from school leadership. SCS Engineers typically meets with the leadership at the school and/or school district to discuss and review the goals of the program, outline potential expenditures and cost savings, identify what can be accomplished, determine what garbage and recycling collection services are being provided, and collect any other information that should be known prior to starting the process.

Waste Audit

A waste audit is then conducted to evaluate all the waste streams produced by a school/school district. Auditors walk through the school/school district to identify where waste is generated and evaluate what comprises the waste (i.e. sort the garbage). SCS Engineers likes to involve students during the waste audit to engage them early in the program and provide peer-to-peer support. Steps to a waste audit include removing the material from garbage containers, sorting into six to ten categories (i.e. food, food soiled paper, mixed paper, cardboard, bottles, aluminum, garbage) that are defined by what can be recycled or composted, and weighing the material to determine the percentage of each category that is placed in the garbage. The waste audit should incorporate any existing efforts toward waste minimization, for example aluminum can recycling. It is important to evaluate the effectiveness of these programs; for example, if a paper recycling program exists, but a large amount of paper is still found in the garbage, efforts to find out why this is happening need to be included in the materials management program.

Waste Program Assessment

It is not just what a school throws away that is important to know in developing a zero waste program. Identifying and assessing policies and procedures that affect waste generation is done through a waste program assessment. This step evaluates each component of the school districts' current procurement and waste management systems looking for opportunities to incorporate waste prevention. (Waste prevention can include environmentally preferable procurement practices, composting,

and use of "green building" design, in addition to recycling.) Knowledge regarding what is entering the school district in every area, such as food preparation, cafeterias, food and supply warehouses, maintenance and custodial service areas, transportation facilities, print shops, and administrative areas is important when analyzing what is found in the waste audit. The assessment phase may also be used to builds participation for the program from other district personnel, for example, business officials and managers from each school department like transportation, facilities, purchasing, and nutrition. An effective waste assessment identifies and evaluates wasteful practices and creates opportunities to increase efficiency, reduce waste, and lower costs.

Cost Analysis

Performing a cost analysis on the recommended services (disposition of recyclables, organics for composting, and landfilling remaining material) follows the results of the waste audit and assessment. Factors involved include additional collection equipment and hauling services, potential changes to supply purchasing (e.g. changing the food service ware), potential recovery value of recyclables, and reduction in hauling/landfill tipping fees. The following questions should guide an examination of a school's materials management resources: Is the material needed? Can the school get by with less? Can we use this material more effectively and efficiently? What will be the material's final disposition (recycle, reuse, compost, landfill)? Breaking down the costs will help identify any major concerns and may determine the extent to which a program will be implemented.

Formulating a Plan

Once the waste profile is understood, policies and procedures are assessed, and costs outlined, a preliminary plan can be formulated. At this juncture, it is usually time to circle back to the school/school district leadership to discuss what is realistic and what their next steps should be. This discussion should include the type of collaboration that may be necessary. For example:

- If there are changes to the program that involve the entire school district, such as purchasing different food service ware (needing to switch from Styrofoam plates to compostable or reusable containers), adding organic or recycling collection service to the garbage

service contract, and/or wanting to implement the program districtwide, the appropriate person from the school district should be included in the discussion. These changes are never simple and a comprehensive analysis with costs and plans should be included.

- Communicate with potential vendors, suppliers, and local government leaders to determine how they can support the program, for example by providing posters and signage, staff to run assemblies or assist in setting up the program, grants to help offset any costs, etc.

- Work with school leadership to confirm direction of recommendations and assign a staff person as the zero waste coordinator. The success of any program depends not just on having champions/sponsors at the highest level, but on having someone at the working level be in charge. (Note, it is our experience at SCS Engineers that use of parent volunteers for this position has not been successful.) The zero waste coordinator must be empowered to help establish the program. A key role for this person would be to communicate with faculty, janitors, parent volunteers, and students regarding their individual roles.

- Establish a bin monitoring system to be managed by the zero waste coordinator and recruit students to implement. For example, the most challenging, yet critical area of the school to monitor is the cafeteria. Directing and informing students where to place various meal time waste streams is critical to the success of a zero waste program. A number of elementary schools that SCS Engineers has worked with use fourth or fifth grade students as bin monitors. Establishing weekly assignments by class, like some schools do for crosswalk duty, will provide consistent bin monitors. This helps students take ownership of the program and provides an established method for monitoring.

Implementation

Designing a materials management program that will lead toward zero waste is only possible if care is taken with preparation for recycling and organics services. The following best practices are recommended for a successful program.

- Develop flyers, posters, and signs that are clear and contain lots of pictures. SCS Engineers recommends taking pictures of what students use and place those on posters for easy identification.

- Place bins for every material type (garbage, recycling, and organics) in strategic locations and pair them together. This will allow students to properly sort. If you only have a garbage bin in one location and a recycling bin in another, students are likely to dispose of material in the closest bin regardless of whether it is the correct one.

- Use appropriate style containers in different locations throughout the school. For example, small bins in classrooms work well, while larger 32-gallon containers in the cafeteria and slender 18-gallon containers in the teacher breakroom allow for space constraints, ease of use of containers, and prevent overflow of material.

- Bags are essential for proper placement of material. A best practice when setting up a program is to use black bags for garbage, clear bags for recycling, and compostable bags for organics. This will help janitors keep material straight when placing it in collection bins so it does not accidently end up in the trash.

Setting up a zero waste program can be performed in phases and, in fact, this is recommended. Success can then be measured in small steps. As an example, phase one could include establishing a mixed paper and cardboard recycling program. Once that is well established, consider adding bottle and can recycling during lunch as phase two. This could consist of emptying juice, water, or milk from their containers into a bucket (this will provide a method for clean container recycling) and then recycling the containers.

Phase three might be to incorporate new purchasing initiatives, such as ensuring a high recycled content in all paper stocks (for offices, bathrooms, etc.) obtained; switching to greener cleaning supplies or elimination of hazardous or toxic material purchases; or converting to biodiesel fuel for school buses.

Phase four could involve tackling cafeteria waste and recycling of organic material (e.g. food scraps, compostable paper). Adding organics to your service has a variety of complexities, such as establishing organics service through a waste hauler, purchasing and placing containers next to the garbage and recycling bins, and purchasing compostable or reusable service ware. This phase may add extra money to the budget and options to make this economically viable would need to be considered. There is a wealth of information on the Internet (e.g. from U.S. Department of Agriculture and the U.S. Environmental Protection Agency) that can be mined to help in this area.

Phase five could include educational efforts targeting parents or the wider community, which will enhance and support your zero waste program. Take part in a challenge like Trash on Your Back. Participate in competitions like the Keep America Beautiful Recycle Bowl or the PepsiCo Recycle Rally to provide healthy competition and help provide additional incentives. Or contribute to an improved understanding of waste management by becoming involved in programs like SCRAP (the School Cafeteria Discards Assessment Project), which is being undertaken by the Environmental Research & Education Foundation. Additional support resources are shown in the sidebar.

Zero Waste Program Resources

Trash on Your Back Challenge
U.S. Environmental Protection Agency Advancing Sustainable Materials Management
Green Schools Initiative
Green Kids Now Inc.
Keep America Beautiful Recycle Bowl K-12 competition
Keep America Beautiful / Coca Cola Bin Grants
Project Learning Tree Grants
Environmental Research & Education Foundation K-12 School Cafeteria Discards Assessment Project
Zero Waste Schools Facebook Page
Waste Free Lunches
Zero Waste Lunch Boxes
TerraCycle Recycling Program
Green Star Awards Program
PepsiCo Recycling Rally

Educate

Educating everyone in the school community should be a priority for a successful program. This should include discussing the new program and providing zero waste facts during morning announcements, scheduling an assembly to walk students through what will be expected of them, meeting with lunch monitors to educate them on their responsibilities and the importance of their assistance, and talking with janitors and parent volunteers to make sure they are clear about the program.

Monitor

Monitor progress by conducting periodic waste audits. Look into the garbage, organics, and recycling bins to see how students/staff are performing. Provide feedback to students, or better yet, involve them in data collection by having them measure and chart the amount of materials collected in waste and recycling bins. A better understanding of what is ending up where can help them adjust what they do with their materials and continually reinforces what should be recycled or disposed of. If there are problems with contamination in the recycling or organics bin, or if a lot of recyclable material is ending up in the garbage bin, review the program to understand why and make adjustments.

In addition, follow up with your waste haulers to be sure that material destined for recycling or composting does not end up in a landfill. Make a field trip out of it and visit a local material recovery facility or landfill to help students follow the pathway of material once it has left their hands.

Reward

Lastly, reward and recognize students, faculty, staff, and janitors for doing a good job. The only way your program will be successful is if everyone cooperates. Update school/school district leadership on a regular basis and have them participate in distributing awards to celebrate successes.

Conclusion

Setting up a school zero waste program takes time, patience, excellent collaboration and communication, and a team that wants to achieve the same goal of zero waste. Remember, be realistic about the approach, do your best to succeed, have patience, and allow for flexibility while maneuvering the unique challenges that occur. Building a successful program does not happen overnight, but you can do it!

The San Jose Story

Over a decade ago, the City of San Jose embarked on an endeavor to establish a zero waste schools program and divert a minimum of 90% of their material from landfill. In 2007, the city adopted a Green Vision which is a 15-year plan for economic growth, environmental sustainability, and an enhanced quality of life for its community (City of San Jose, 2007). As part of this plan, the city established a zero waste goal in its Integrated Waste Management Zero Waste Strategic Plan (City of San Jose ESD, 2008) that mandates schools to move toward zero waste. The city's assistance and funding for schools to develop a zero waste program was an important step in achieving their Green Vision.

The City of San Jose has 315 schools (237 public schools and 78 private schools) within 19 school districts, and over 262,000 students who speak 54 different languages. Over the past decade, the city established zero waste programs at 69 schools with a goal of 60% participation, and recycling programs at 100% of the schools. On average, each zero waste school diverts 80% of their garbage from landfill, by recycling, composting, and encouraging zero waste lunches. When the city started the program, it was successful because of the hands-on support they provided to the schools in setting up the program, facilitating the assemblies, and working with the districts and garbage collection companies. Over the past few years, the city budget and staffing changed and they are unable to provide the same hands-on assistance; however, they still provide outreach materials (posters, stickers, and signs) and free containers, and continue to offer mini-grants to assist with the purchase of additional containers or to help offset the costs for switching to compostable service ware. This assistance, along with an excellent infrastructure with local organics and recycling facilities, and a reasonable rate structure for the cost of these collection services, provides an ideal situation for schools to begin and maintain a materials management program that leads to zero waste. These successes took time, collaboration, and the recognition that each school will have different priorities, goals, and methods to achieve zero waste.

Works Cited

CalRecycle. (2014). *Schools waste composition*. CA.Gov. Retrieved from http://www.calrecycle.ca.gov/ReduceWaste/Schools/Composition.htm

Cioci, M. & Farnan, T. (2010). *Digging deep through school trash.* Minnesota Pollution Control Agency. Retrieved from https://www.pca.state.mn.us/sites/default/files/p-p2s6-14.pdf

City of San Jose Environmental Services Department (ESD). (2008). *Integrated waste management: Zero waste strategic plan.* City of San Jose, CA. Retrieved from https://www.sanjoseca.gov/DocumentCenter/View/1020

City of San Jose. (2007). *Green Vision Goals.* SanJoseCA.gov. Retrieved from http://www.sanjoseca.gov/index.aspx?NID=2737

Leonard, M. P. (2016). *How does a community get to zero waste in the 21st century?* SCS Engineers. Retrieved from http://www.scsengineers.com/how-does-a-community-get-to-zero-waste-in-the-21st-century/

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). (2014). *Health and Academic Achievement.* Atlanta, GA: Center for Disease Control and Prevention. Retrieved from https://www.cdc.gov/healthyyouth/health_and_academics/pdf/health-academic-achievement.pdf

Recycling Today. (2017). *Keep America Beautiful names 2016 Recycle-Bowl champion.* GIE Media, Inc. Retrieved from http://www.recyclingtoday.com/article/keep-america-beautiful-2017-recycle-bowl/

SaveOnEnergy. (n.d.) *Land of waste: American landfills and waste production.* SaveOnEnergy. Retrieved from https://www.saveonenergy.com/land-of-waste/

Waste Free Lunches. (n.d.). *What's the problem?* WasteFreeLunches.org. Retrieved from http://www.wastefreelunches.org/

U.S. Environmental Protection Agency. (n.d.) *Sustainable Materials Management.* EPA.gov. Retrieved from https://www.epa.gov/smm

Tracie Onstad Bills (tbills@scsengineers.com) works for SCS Engineers as their Northern California Director of Sustainable Materials Management. She has over 20 years of materials management experience, including working for a hauler, a county government, and a nonprofit, and over 12 years of experience with materials management consulting firms. She has provided commercial sector materials flow assessments; organics processing research and analysis; waste characterization studies; and recycling, organics, and waste management technical assistance to government agencies, schools, multi-family dwellings, and businesses. Ms. Bills has an environmental science degree from San Jose State and is an instructor for the SWANA Zero Waste certification program.